Tasmanian Freight Equalisation Scheme: A 'Landbridge' Approach to the Estimation of Subsidy Rates

Report

In order to provide information to assist with the continuing administration of the Tasmanian Freight Equalisation Scheme TFES, the Minister for Transport directed the BTE to undertake studies of the costs incurred by Australian industries on Mainland interstate long distance freight transport, and the factors determining the freight rates charged between Tasmania and the Mainland and the potential for cost reductions.

Tasmanian Freight Equalisation Scheme: A 'Landbridge' Approach to the Estimation of Subsidy Rate

Bureau of Transport Economics

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FOREWORD

In order to provide information to assist with the continuing administration of the Tasmanian Freight Equalisation Scheme, the then Minister for Transport, the Honourable P.J. Nixon, MP, in May 1979 directed the BTE to undertake studies of:

- the costs incurred by Australian industries on Mainland interstate long distance freight transport; and

- the factors determining the freight rates charged between Tasmania and the Mainland and the potential for cost reductions.

This report relates to the first area of study; the second area is being addressed in a separate report to be issued at a later date.

The report was prepared by Mr P.J. McNamara of the Finance Branch, under the supervision of Mr P.W. Blackshaw. Mr C.P. Piccinin of Economic Assessment Branch provided advice on the regression analysis of freight rates. Much of the data relating to refrigerated transport are based on a consultancy report prepared for the BTE by Mr T. Hughes.

The assistance of various freight forwarders, shipping lines, consignors, government departments and other organisations, especially in the provision of the data on which this report is based, is gratefully acknowledged.

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Canberra
January 1981

CONTENTS

<u>TABLES</u>

FIGURES

SUMMARY

In July 1976 the Commonwealth Government initiated the Tasmanian Freight Equalisation Scheme (TFES) under which transport subsidies are paid on northbound shipments of goods consigned from Tasmania for sale or use on the mainland and on southbound shipments of materials and equipment with Australian content for use by Tasmanian manufacturers and primary industries. (The southbound component was not introduced until mid 1978.) The TFES was introduced on the recommendation of the Nimmo Commission of Inquiry into Transport to and from Tasmania with the objectives of offsetting the higher costs faced by Tasmanian firms due to their almost total dependence on sea transport, encouraging the development of Tasmania's industries and resources, and encouraging the development of an efficient transport system.

The policy of the TFES is that Tasmanian shippers should be paid a subsidy to offset their transport disadvantage; this being defined as the difference between Tasmania's interstate freight rates and the rates charged for shipping a similar consignment over a comparable interstate mainland route. When the Government announced the introduction of TFES it directed the Bureau of Transport Economics (BTE) to recalculate the rates of assistance within 18 months. Two major recalculations have been carried out to date, resulting in new northbound subsidy rates being introduced in 1978 and new southbound rates in 1980. The method used by the BTE in recalculating TFES subsidies was similar to the approach adopted by the Nimmo Commission in setting the initial northbound TFES rates of assistance. This method involves defining each Tasmanian interstate route as being comparable to one of four specific mainland interstate routes. (For example, the route from Northern Tasmania to Melbourne is defined as comparable to the Melbourne to Adelaide route.) The subsidies paid on any Tasmanian interstate route are then calculated so as to reduce the shipper's net cost to a level approximating the freight rates charged on the comparable mainland route.

In its 1978 report recommending new northbound rates the BTE expressed reservations about this method of setting TFES subsidies, although in the time available for that report it was not possible to develop a better method. The primary reservation is that the Nimmo method produces a structure of subsidy rates on different routes which tends to increase with distance,

whereas the disadvantage of being largely dependent on sea transport would be expected, all other things being equal, to be at a maximum over a short distance and to decrease over longer distances. Another related reservation concerns whether freight rates on the four mainland routes used to determine subsidy rates are representative of mainland interstate freight rates. Furthermore, freight rates on these four comparison routes appear to change at different rates over time, giving rise to anomalies in the structure of TFES subsidies on the various Tasmanian interstate routes.

The purpose of this report, which was prepared at the direction of the previous Minister for Transport, is to provide details of BTE research exploring whether it is possible to develop an alternative method of calculating TFES subsidies which overcomes some of the problems with the current method. The essence of this alternative method is to derive relationships (technically speaking, 'estimation equations') which 'reproduce' the structure of mainland freight rates. These equations can then be used to estimate land freight rates for routes of the same transport characteristics as Tasmania's interstate routes. This is tantamount to estimating the freight rates that might prevail if there was a 'landbridge' between Tasmania and the mainland. Tasmania's transport disadvantage can then be defined as the difference between its actual interstate freight rates using sea transport and the estimated 'landbridge' rates over the same routes. This method of calculating TFES subsidies requires judgments about how to measure the hypothetical 'landbridge' distances, and how to represent the size of origins and destinations (which are terms in the preferred form of regression equations). These judgments affect the actual subsidy rates implied by this alternative method, but do not materially alter the study's general conclusions concerning an appropriate structure of TFES subsidy rates.

It is concluded that as a general proposition the current method of calculating TFES subsidies probably results in shipments to Victoria being 'under-compensated' while those to more distant destinations are 'over-compensated'. Accordingly, it appears possible to devise a structure of subsidy rates which more accurately compensates Tasmania for its 'transport disadvantage', although administrative considerations may preclude absolute precision in such compensation.

CHAPTER 1 - INTRODUCTION

On 1 July 1976 the Commonwealth Government initiated the Tasmanian Freight Equalisation Scheme (TFES). Under this Scheme transport subsidies are paid on certain cargoes shipped by sea between Tasmania and the mainland. The Scheme comprises two components: northbound subsidies (introduced in July 1976) which are paid on goods consigned from Tasmania for use or sale on the mainland, and southbound subsidies (introduced in mid 1978)(1) which are paid only on consignments of materials and equipment with Australian content for use by Tasmanian manufacturing and primary industries.

As shown in Table 1.1, northbound cargoes account for most (over 90 per cent) of the TFES subsidy payments, which in 1979-80 totalled $27.6m. Details of TFES payments by commodity and route are provided in Appendix I.

TABLE 1.1 - TFES PAYMENTS, 1978-79 AND 1979-80

($'000)

	1978-79	1979-80
Northbound	23 138	25 681
Southbound	1 562	1 876
TOTAL	24 700	27 557

Source: Department of Transport, Australia.

The Government implemented the TFES on the recommendation of the Nimmo Commission of Inquiry into Transport to and from Tasmania. The Commission found that Tasmanian industry suffered a freight disadvantage relative to mainland producers and therefore recommended paying freight equalisation assistance with the intention of:

(1) Subsidy payments were back dated to July 1976 for firms registering as southbound claimants before 31 March 1977.

- offsetting the hardship suffered by Tasmanian industry due to its higher interstate freight costs;
- stimulating development of the Tasmanian economy; and
- promoting development of a more efficient transport service, (Nimmo, 1976, p153).

The Commission found Tasmania's transport disadvantage resulted from its almost total dependence on sea transport for the short Bass Strait crossing (Nimmo, p151).

The subsidy philosophy espoused by the Commission and adopted by the Government was that Tasmanian shippers be subsidised so that their net transport costs approximated the freight rates for the same type of cargo over a comparable mainland route (The Minister for Transport, the Honourable R.J. Hunt, MP, Hansard, 1980, p1854). This difference between Tasmanian and mainland freight rates is referred to as Tasmania's transport disadvantage.

As required by its terms of reference, the subsidy rates initially recommended by the Commission were calculated as Tasmania's freight disadvantage less an estimate of the locational cost advantages enjoyed by Tasmanian producers, (Nimmo, p1). However in view of the difficulty of accurately assessing locational advantage and the contention likely to surround such assessments, the Government decided to implement TFES using the higher subsidy rates reflecting only Tasmania's transport disadvantage.

In announcing the introduction of the TFES, the Government also directed the BTE to recalculate the rates of subsidy within 18 months. Two major recalculation studies have been carried out to date: new subsidy rates for northbound cargoes were introduced in 1978 (BTE, 1978a) and new southbound rates were introduced in 1980 (BTE, 1979a).(1) The latter report also gave new

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(1) As noted above, while northbound subsidies were introduced in 1976, southbound subsidies were not introduced until 1978, because in the time available for his Inquiry Commissioner Nimmo had been able to calculate only northbound subsidy rates. Consequently southbound rates were recalculated later than the northbound rates.

recommended rates for northbound shipments of timber and livestock which were required for reasons specific to those two commodities. Detailed information on the administration of the TFES and the way in which subsidy rates were recalculated is given in these BTE reports.

The reports recommended some changes in TFES administration procedures which were subsequently implemented. For example, some commodity classifications were split into sub-classifications, certain items were paid subsidies on a weight rather than volume basis, and consignors were required to meet a specified net minimum amount of the freight rate.(1) Separate rates were also introduced for commodities going to WA (although to date separate WA rates have only been introduced for cargoes being shipped in significant quantities). In the overall context of the TFES, however, such changes were minor and its basic form has not changed significantly since 1976.

The method used by the BTE in recalculating TFES subsidy rates was similar to the approach adopted by the Nimmo Commission for setting the initial northbound rates of assistance. This approach involved defining certain mainland routes to be comparable to specific routes between Tasmania and the mainland. For example, the route from Northern Tasmania to Melbourne was defined as comparable to the Melbourne to Adelaide route. The difference in freight rates on these two routes was then set as the subsidy on shipments from Northern Tasmania to Victoria. Further details on the comparison routes and the method used in calculating TFES subsidies are given in the next chapter. The BTE followed the Nimmo Commission method for setting TFES subsidies because given the then existing knowledge of transport practices and freight rates no superior method was apparent. In the report recommending new northbound TFES rates, however, the BTE noted that further research could lead to a better understanding of Tasmania's transport disadvantage and to the development of an improved method of setting TFES assistance rates.

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(1) To date, minimums have only been applied to all southbound cargoes and some northbound cargoes. Later in this Report, BTE recommends that minimums should be applied to all northbound cargoes.

The aim of this study, which has been carried out under terms of reference issued by the previous Minister for Transport, the Honourable P.J. Nixon, MP, (see Foreword) was therefore to develop an improved method of determining Tasmania's transport disadvantage and thus the rates of subsidy to be paid under the TFES.

Given the objective of the study it was necessary to develop a method for making valid comparisons between Tasmanian and mainland freight rates. Comparisons of freight rates charged on specific Tasmanian and mainland routes may give an approximate indication of Tasmania's transport disadvantage. However, the differences may also be due to differences in other factors, such as distance, quantities of freight consigned on each route, or directional imbalances. Other difficulties involved in defining Tasmania's transport disadvantage as the difference between specific sets of Tasmanian and mainland interstate routes are discussed in the next chapter.

The approach adopted in this report for calculating Tasmania's transport disadvantage can be summarised as follows. First, the report provides an analysis of mainland interstate freight rates for full truck load consignments. The analysis establishes equations which enable mainland intercapital freight rates to be expressed as a function of distance and other factors. Given such equations, it is possible to estimate land freight rates for intercapital routes of any specified transport characteristics. The transport disadvantage suffered by cargoes shipped over any route between Tasmania and the mainland can then be defined as the difference between the actual sea freight rates paid and the estimated land freight rates over a route of the same transport characteristics.

The core of this report comprises seven chapters. Chapter 2 outlines submissions received from firms seeking changes in the nature of the Scheme and discusses factors which need to be taken into account in calculating TFES subsidies. Chapter 3 gives a description of the operations of freight forwarders and outlines the factors affecting freight consignors' decisions in arranging transport services. Chapter 4 gives the results of a regression analysis of a sample of actual mainland intercapital freight rates for dry general cargo. On the basis of this analysis a method is outlined in Chapter 5 by which Tasmania's transport disadvantage could be calculated as the difference between its actual sea freight rates and the estimated freight rates that would be charged over land routes of the same distance and transport characteristics. A similar approach for livestock and refrigerated cargoes is discussed in Chapters 6 and 7, respectively. The last chapter summarises the results of the report with respect to the aims of the TFES and puts forward a number of suggested changes concerning calculation of TFES subsidies and the Scheme's administration.

CHAPTER 2 - THE TASMANIAN FREIGHT EQUALISATION SCHEME

This chapter describes the methods used to date in setting TFES subsidy rates and outlines some of the submissions put forward by industries seeking changes in the levels of specific subsidy rates or in the Scheme's administrative procedures. The last section of the chapter discusses some of the problems encountered by the BTE in calculating subsidy rates.

In describing these aspects of the TFES this chapter aims to illustrate two fundamental matters. First, the concept of Tasmania's transport disadvantage is not axiomatic but rather must be precisely defined. Studies of mainland and Tasmanian freight rates may give an indication of Tasmania's higher interstate freight costs, but to quantify this difference exactly it is necessary to adopt a precise operational definition of 'transport disadvantage'. Unfortunately, there is probably no single definition of transport disadvantage which is totally acceptable to all those affected by the Scheme. Second, the formula currently used to calculate TFES rates is not entirely satisfactory, since Tasmania's transport disadvantage is being assessed against four separate indicators of mainland transport costs, namely the four comparison routes shown in Table 2.1. As discussed below, this practice can result in an inconsistent set of TFES subsidy rates and can favour Tasmanian firms shipping cargoes on specific routes.

METHOD OF CALCULATING TFES SUBSIDIES.

The Nimmo Commission calculated the initial (northbound) TFES subsidies by defining certain mainland routes to be 'equivalent' to specific routes between Tasmania and the mainland (Table 2.1). The subsidy rates were then taken as the difference between freight rates paid on comparable Tasmanian and mainland routes. Thus, for example, a cargo costing $50 per tonne to ship from Tasmania to the mainland and $30 per tonne on the comparable mainland route would receive a subsidy of $20 per tonne.

A similar method was used by the Sea Transport Policy Division of the Department of Transport, Australia (DOTA) for setting the initial southbound TFES subsidies and then by the BTE in recalculating both the northbound and southbound subsidy rates.

TABLE 2.1 - NIMMO COMMISSION COMPARISON ROUTES

Mainland		Tasmania	
Route	Road Distance (km)	Route	Sea Distance[(a)] (km)
Sydney-Brisbane	998	S.Tasmania-Victoria	878
Sydney-Adelaide	1 398	S.Tasmania-SA	1 436
Sydney-Brisbane	998	S.Tasmania-NSW[(b)]	1 195
Melbourne-Perth	3 333	S.Tasmania-WA[(c)]	3 367
Melbourne-Adelaide	745	N.Tasmania-Victoria	443
Sydney-Brisbane	998	N.Tasmania-SA	1 088
Sydney-Brisbane	998	N.Tasmania-NSW[(b)]	968
Melbourne-Perth	3 333	N.Tasmania-WA[(c)]	3 232

(a) Berth to berth distances from Devonport and Hobart.
(b) Qld and NT shipments receive the same subsidy as NSW cargoes.
(c) WA cargoes were initially paid the same subsidy as SA cargoes. Separate rates were introduced when shipments to WA increased to significant levels. For calculating TFES subsidies to WA the Government adopted Melbourne-Perth as the mainland comparison route for shipments from both Northern and Southern Tasmania.

NOTE: For TFES purposes the dividing line between North and South Tasmania is taken as latitude 42° South.

Source: Nimmo, p128. For distances see Tables II.9 and II.10 in Appendix II.

It should be noted, however, that the BTE expressed some reservations about using the Nimmo Commission method for setting subsidy rates (BTE, 1978a, p53 and BTE, 1979a, p39). The Commission's report stated the basic philosophy of freight equalisation, ie that Tasmanian shippers be subsidised such that their net transport costs approximated mainland freight rates on comparable routes, and also defined the sets of Tasmanian and mainland routes to be used in setting subsidies. However, the report did not document how the sets of comparison routes were selected. The Commission's files on this matter are confidential and were not available to the BTE but it is understood the comparison routes were selected on the basis of criteria such as distance, volume of cargo, and general conditions in the market for transport services. The BTE also noted that even if the set of comparison routes was satisfactory for setting northbound rates, it did not automatically hold that they would also be appropriate for setting southbound rates. Despite these reservations, the BTE used the Nimmo method to recalculate the northbound and southbound subsidy rates because no superior method was immediately apparent, and because there was not the time or data available to check the formula or develop an alternative method.

The procedure adopted by the BTE for calculating subsidy rates involved asking freight forwarders for special freight rate quotes for moving full container loads to or from Tasmania and for consigning full truck loads on the mainland comparison routes. These quotes were compared with freight rate data obtained from TFES claimants to arrive at representative Tasmanian and mainland freight rates for various types of cargo units. For most general dry cargo, subsidies were set by comparing freight rates charged for using 5.08 metre containers for Tasmanian cargoes and 12 metre trailers for mainland consignments. The freight rates used were those charged by freight forwarders for regular consignments of full container loads and full truck loads on a door to door basis.

The calculations for each commodity were carried out as follows:

$$\text{Subsidy (\$/t)} = \text{Tasmanian freight rate (\$/t) less mainland freight rate (\$/t)}$$

Where:

$$\text{Tasmanian freight rate} = \frac{\text{Rate for full container load (\$)}}{\text{Weight of full container load (t)}} \text{ and}$$

$$\text{Mainland freight rate} = \frac{\text{Rate for full truck load (\$)}}{\text{Weight of full truck load (t)}}$$

This calculation was carried out for each commodity on each route between Tasmania and the mainland.

The calculations showed that transport disadvantage varied with cargo density, being minimum for dense cargoes and increasing for cargoes of lower density. This result was due to the different weight and volume capacities of Tasmanian and mainland cargo units. Semi-trailers operating on mainland routes can carry a full weight load of commodities stowing up to about 3.4 cubic metres per tonne, a figure which includes most domestic cargoes. With commodities stowing above 3.4 cubic metres per tonne, all available space is occupied before the trailer's legal weight limit is attained. Assuming a fixed rate per truck load on any route therefore, mainland freight rates per tonne are constant for cargoes stowing up to about 3.4 cubic metres per tonne and begin to rise as a function of stowage factor for lighter cargoes; the higher rate for lighter cargoes being necessary to generate the same revenue as for a full weight load. In practice, this effect may be offset by forwarders blending high and low density cargoes where such complementary commodities are available. Similarly, with the 5.08 metre containers used for carrying Tasmanian cargoes, freight rates increase as a function of stowage factor for commodities stowing over about 1.1 cubic metres per tonne, (although this effect may also be mitigated by blending cargoes of different densities). As a generalisation therefore, over the relevant range of cargo densities mainland freight rates per tonne on any route are constant while Tasmanian rates are an increasing function of stowage factor. Consequently, TFES subsidy rates are a direct function of stowage factor, with the rate per tonne being minimum for dense cargo such as aluminium and maximum for low density cargoes such as knitting yarn. Similar calculations to that outlined above were carried out for cargoes carried in other types of cargo units such as refrigerated cargoes and livestock.

DEFINITION OF TRANSPORT COSTS

The freight rates used in calculating the TFES subsidies for most commodities were freight forwarders' door to door rates for regular consignments of full container loads by the most efficient means. The rates charged by Tasmanian freight forwarders for such services cover the sea line haul, pick up and delivery, container hire and incidental expenses, plus some contribution to overhead expenses and profit on providing the service.

In some respects this definition differs from that used by the Nimmo Commission. First, the BTE approach did not include any allowance for higher inventory costs incurred by Tasmanian shippers. Inventory costs were taken into account in setting the initial TFES rates (Nimmo, p163), but the Commission's Report did not say whether this was done by a specific formula or by some 'rule of thumb'. Because of the greater risk of disruption to deliveries by sea transport (compared to say, road transport) it is indeed likely that Tasmanian shippers incur higher inventory costs (or find it harder to develop mainland markets) than their mainland counterparts. Objectively quantifying this expense, however, is a very difficult task. Since many mainland firms also keep inventories in other States, it would be necessary to measure the extra amount of inventory held by Tasmanian firms on the mainland because of their dependence on sea transport, not just the total amount. Further, for both Tasmanian and mainland producers, the decision on whether to hold stocks in other States or to make deliveries as required direct to customers may be influenced by factors other than transport reliability. For many claimant firms the inventory component of transport disadvantage would be small, while for others a detailed individual examination of accounting records and commercial practices would be necessary to assess such costs on a standard basis. This component of Tasmania's overall freight disadvantage has probably decreased due to improvements in sea transport services since the Nimmo Commission Inquiry, but nevertheless it is important to recognise that any calculation of Tasmania's 'transport disadvantage' based solely on comparative freight rates is likely to be an underestimate.

The BTE also departed from the Nimmo Commission method by standardising the form of calculation and cost figures used in setting subsidies, eg all calculations for commodities using the same type of container were based on the same representative freight rate per container, rather than the various rates actually paid for different shipments. This approach was adopted to ensure that, as far as possible, all claimants were treated on an equal basis. In practice, the rate charged for a specific type of container on any route can vary significantly between shippers because of differences in bargaining strength or skill, or availability of backloading capacity from certain forwarders, or because of differences in the services being provided. Using a standard rate per comparable container, differences in subsidy rates per tonne or per cubic metre between commodities shipped in the same type of container were thus mainly due to differences in transport characteristics, rather than differences in bargaining strengths etc. For example, a commodity loading a maximum 13 tonnes per high gate 5.08 metre unit(1) received a higher subsidy rate than a commodity loading a maximum 16 tonnes in the same type of unit. This standardised approach rewards shippers who attain below average freight rates, either by negotiation or efficiency. An exception was made in the case of some special commodity rates, as discussed in a later section.

Last, TFES subsidies per tonne or per cubic metre for individual commodities were calculated on the basis of the most efficient means currently available for shipping that commodity to or from Tasmania, ie the cost of shipping the maximum possible load in the most appropriate cargo unit for a specific commodity. Some shippers do not attain the lowest possible cost, either through inefficient packing or for other internal operational reasons. In such cases the calculations were nevertheless based on the lowest attainable cost.

SUBMISSIONS

Since the beginning of the TFES there have been a number of submissions from various interested parties seeking changes in its rules of administration or in the method used in calculating subsidies. Such submissions are primarily the responsibility of Sea Transport Policy Division of DOTA but are frequently referred to the BTE for technical advice and comment. This section summarises the arguments put forward in some of these submissions and offers some comments on them. It should be noted that submissions are not confined to requests for increased subsidy payments; many submissions come from groups whose economic interests have been adversely affected by TFES subsidies.

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(1) The properties of high gate and low gate 5.08 metre units are described on p 18.

Origin to Destination vs Port to Port

Some port and shipping authorities advocate paying TFES assistance only on a port to port rather than an origin to destination basis. For example, under current administrative procedures, cargoes shipped from Northern Tasmania to Adelaide or Sydney receive higher subsidy payments than Melbourne cargoes. This higher subsidy is paid irrespective of whether the cargoes are carried direct to the destination by sea or landed in Melbourne for onward shipment by land transport. The suggested change would involve paying the lower Northern Tasmania to Victoria subsidy on cargoes landed in Melbourne and the higher subsidy only on cargoes carried the full distance by sea. Admittedly this change is advocated with self interest in mind since it would give direct sea transport some advantage over land transport for shipments beyond Melbourne, and might increase the volume of cargo handled in certain ports. However, it is argued that a Tasmanian consignment travelling by land is on par with mainland cargoes and therefore should not receive assistance for such movements. The validity of this argument depends on the precise definitions adopted in calculating transport disadvantage and on the degree to which transport rates taper as a function of distance. It is correct if distances are measured via Melbourne and a flat rate per tonne kilometre is charged irrespective of distance. It is also argued that land transport is already heavily subsidised and that TFES cargoes moving by road or rail therefore receive a double subsidy. This argument is probably not valid for mainland rail. A large part of mainland rail system deficits is due to passenger and branch line services and available evidence suggests that on at least some intercapital services the freight rates charged are covering all direct operating costs (BTE, 1979b). On a short run marginal cost basis, it is understood that Tasmanian Rail's interstate container movements are also profitable. On the other hand, interstate road freight operations may be 'subsidised' where they do not pay the full attributable cost of road construction, repair and maintenance necessary due to trucking operations (BTE, 1977, p170-171).

Industrial Disadvantage

Another variation on TFES advocated by some Tasmanian industries involves calculating subsidies on an 'industrial disadvantage' basis. This approach would entail setting subsidies at the level required for Tasmanian industries to meet the market price of their mainland competitors. Some of the initial Nimmo subsidy rates may have been determined by comparing mainland and Tasmanian transport costs for specific industries, but details of whether this method was used and, if so, the commodities concerned are not given in the Commission's report. In any case, in recalculating TFES subsidies a clear distinction was made between the concepts of 'freight disadvantage' and 'industrial disadvantage'. Transport disadvantage was held to be the difference between Tasmanian interstate freight costs and those for shipping a similar consignment over a comparable mainland route. Industrial disadvantage was defined as the amount of subsidy required to enable Tasmanian producers to meet the selling price of their mainland competitors. The Government decided that TFES subsidies would be set purely on the basis of transport disadvantage.

The principal objection to the industrial disadvantage concept is that it would encourage inefficient use of Tasmania's resources. Subsidies would presumably be greatest for firms or industries whose production costs are highest relative to mainland competitors, and lowest (or, by logical extension, even negative) for firms/industries with production costs comparable to or below those of mainland producers. Thus relatively efficient Tasmanian firms/industries would in effect be penalised compared with less efficient Tasmanian firms/industries.

Advocates of the industrial disadvantage concept often cite their mainland competitors' low freight rates in support of their case, but such rates are usually low intrastate backloading rates, often further lowered by State rail pricing policies. It should be recognised that for most commodities it would not be possible to set subsidy rates which give both 'correct' freight equalisation and also exactly offset industrial disadvantage: the two concepts are not equivalent or compatible.

Requests for Lower TFES Rates

Not all submissions have asked for increases in TFES subsidies. Requests for lower subsidies have come from mainland producers losing market shares to Tasmanian firms; from Tasmanian firms facing reduced supplies and higher prices for local products due to increased demand from the mainland; and from Tasmanian suppliers of materials and equipment facing increased competition from mainland products coming into the State with assistance from southbound subsidies.

Associated with the last point is the tendency for problems within industries to be sheeted home to 'too much' or 'too little' TFES assistance to the exclusion of other, perhaps more important, factors. Sections of industries believing themselves adversely affected by TFES subsidies have applied for changes in the levels of specific rates on economic grounds, ie to 'stimulate' the industry. Under current policy guidelines, such changes were not possible. Subsidy rates have only been changed to give correct freight equalisation assistance according to the Government's TFES principles. For example, the initial 1976 rates for apple shipments were calculated for refrigerated shipments and it was necessary to introduce lower rates for non-refrigerated shipments. Separate rates were also introduced for some WA shipments when consignments to that State increased to significant quantitities and it was determined that the previous subsidy rates, calculated for shipments to Adelaide, were too high.

PROBLEMS

This section looks at some of the problems encountered in recalculating TFES rates and in administering the Scheme. Not all the matters discussed here have been of major concern to TFES claimants, but they have been important in determining the absolute and relative levels of TFES subsidies.

Comparison Routes

As discussed above, the basic guiding principle of TFES is to subsidise eligible Tasmanian industries' interstate transport for northbound and southbound cargoes so that their net costs approximate freight rates charged on comparable mainland routes. In practice, subsidy rates are set as the difference between freight rates charged on defined sets of Tasmanian and mainland interstate routes. A potential problem with this method is that, whereas the Tasmanian freight rates currently used really are the actual transport costs paid by most Tasmanian interstate trade, the mainland rates used comprise only a four route sample of mainland industries' freight costs (see Table 2.1). These four rates are not averaged but are used individually in setting subsidy rates on specific Tasmanian interstate routes. Further, there is no guarantee that the four mainland rates will accurately reflect changes in the average level of mainland freight rates, or that they will change by the same proportion or (in real terms) even in the same direction. Freight rates on any route are determined by both cost (supply) factors, such as fuel and wages, and demand factors. Transport operations on all mainland routes are presumably subject to similar cost pressures and to factors affecting the overall demand for transport services, such as the state of the economy, but the changes in such factors do not necessarily result in uniform changes in all mainland freight rates. For example, the degree to which an increase in fuel prices can be passed on to shippers depends on demand and supply conditions on each route. On a route where roughly equal quantities of cargo are shipped in each direction, increased fuel costs could be passed on as increased freight rates on both the forward and back legs. On routes where relatively little cargo is shipped on the back leg, such as between Brisbane and Sydney, most of the increase would tend to be passed onto the forward leg. It is understood from discussions with freight forwarders that the percentage increase in forward leg freight rates over the last few years has been greater than on back leg routes. Further, because of variations in market conditions between routes, forward leg rates have not all increased by the same proportion. These phenomena are illustrated in Table 2.2 which shows increases in rail line haul rates for the period 1974 to 1980.

Tasmania's transport disadvantage is therefore currently being assessed against four different yardsticks, each of which reflects market conditions peculiar to that particular route, rather than general trends in mainland transport costs. Over time, such an approach is likely to generate inconsistencies within the overall set of TFES subsidy rates and could favour shippers on specific routes. All other things equal, a lower than average rate of increase in transport costs on one mainland comparison route would result in relatively higher subsidy rates on its 'equivalent' Tasmanian route.

TABLE 2.2 - RAIL LINE HAUL FREIGHT RATE INCREASES, AUGUST 1974 TO SEPTEMBER 1980

Route	Effective Date											Cumulative Total Increase
	1-8-74	1-7-75	1-2-76	1-8-76	29-8-77	1-3-78	1-9-78	1-3-79	1-9-79	1-3-80	1-9-80	
	%	%	%	%	%	%	%	%	%	%	%	
Syd-Bris	20	-	10	7	5	-	3	5	5	8	12.5	105
Bris-Syd	10	-	5	7	-	-	-	3	-	3	5	38
Syd-Melb	10	-	5	7	-	-	-	3	3	3	5	42
Melb-Syd	20	-	10	7	5	-	3	5	5	8	15	109
Syd-Adel(a)	20	-	10	7	5	-	3	5	5	8	8	96
Adel-Syd(a)	10	-	5	7	5	-	-	5	5	3.5	8	60
Syd-Perth	15	20	10	7	5	5	3	5	5	8	15	153
Perth-Syd	5	20	10	7	5	5	3	5	-	3.5	20	120
Melb-Adel	20	-	10	7	2.5	-	3	4	5	5	8	85
Adel-Melb	10	-	5	7	2.5	-	-	2	3	3.5	8	49
Melb-Bris	20	-	10	7	5	-	3	5	5	8	-	107(b)
Melb-Syd											15	
Syd-Bris											12.5	
Bris-Melb	10	-	5	7	-	-	-	3	1.5(c)	3	5	40(b)
Melb-Perth	15	20	10	7	5	5	3	-	5	5	5	114
Perth-Melb	5	20	10	7	5	5	3	-	-	3.5	5	83
Adel-Bris		-		7	5	-		5	5			
Adel-Syd(a)	10		5				-			3.5	8	81(b)
Syd-Bris	20		10				3			8	12.5	
Bris-Adel		-		7		-						
Bris-Syd	10		5		-		-	3	-	3	5	65(b)
Syd-Adel	20		10		5		3	5	5	8	8	
Adel-Perth	15	20	10	7	5	5	3	-	5	5	8	120
Perth-Adel	5	20	10	7	5	5	3	-	-	3.5	8	88

(a) Via Broken Hill.
(b) Where different freight rates were applied to component legs on a route the cumulative total increase was calculated using the average of the increases, eg Adelaide-Brisbane increase of 1-9-80 taken as 10.25%.
(c) An increase of 3 per cent on Sydney-Melbourne leg.

NOTE: Table shows increases in freight rates charged to freight forwarders and firms paying special rates.

Source: Private sector firms, confirmed by rail authority.

This problem has been encountered in both BTE recalculations of TFES rates carried out to date. As a generalisation, the initial Nimmo Commission subsidy rates for consignments out of Hobart were greater than for Northern Tasmanian shipments to the same destination, while subsidies to Adelaide or Sydney were greater than for Melbourne cargoes. (Although where a commodity was shipped only from Northern Tasmania, the same rates were set for Southern Tasmania.) Using the same Nimmo Commission method, however, the 1978 BTE recalculation of northbound refrigerated cargo subsidies gave Hobart-Adelaide rates which were less than for Hobart-Melbourne consignments (BTE, 1978a, p43). Similarly, the 1979 recalculation of southbound rates for shipments out of Melbourne gave Northern Tasmanian cargoes a greater subsidy than those going to Hobart. For cargoes going to Northern Tasmania there was also some evidence that the previous relative levels of Adelaide and Melbourne subsidies should be reversed, although no change was effected since the data were ambiguous (BTE, 1979a, p49). Since Nimmo Commission files are confidential the two sets of calculations could not be compared, but the change in the relative levels of subsidies was possibly due to changes in the relative levels of rates on different mainland routes.

The facts outlined above are not meant to imply that TFES subsidies should necessarily remain at the same relative levels as set in 1976, ie with rates for Sydney and Adelaide cargoes significantly higher than for Melbourne shipments. (Rather, it is suggested in Chapter 5 that a different structure of subsidy rates would be more appropriate.) However, experience over the last four years suggests that TFES subsidies should be calculated against one measure of mainland costs, with appropriate adjustments for distance and other factors where necessary, so that all Tasmanian shippers are treated on an equal basis.

Staked Pairs versus Single Units

A second problem arises from freight rating practices across Bass Strait, namely, should TFES subsidies be based on the cost of consigning cargoes in a staked pair or in a single unit. The background to this question is as follows. Most TFES calculations to date for dry general cargoes have been based on the rates for a 5.08 metre unit, the most commonly used container on Bass Strait and in most cases the lowest cost transport available. The

5.08 metre unit is an open top container available in two modes: the low gate unit (the gate being a removable side panel) with internal volume of about 16 cubic metres, and the high gate unit of about 26 cubic metres. Both have a weight capacity of about 16 tonnes. Because of these volume to weight ratios, the low gate unit is optimum for deadweight cargoes, (ie cargoes stowing at less than one cubic metre per tonne), while the high gate container is better suited to lower density cargoes. As initially introduced, 5.08 metre units were designed so that a high gate unit could be loaded on top of a low gate unit in the ship's hold to form a staked pair. Some units have subsequently been modified so that shippers can also consign staked pairs comprising two high gate units. Double high gate staked pairs are the lowest cost means of shipping many commodities from Tasmania but they are subject to some limitations. The cargo decks of Union Steam Ship Company of New Zealand (USS) and some Australian National Line (ANL) ships are too low to load a double high gate unit, while the crane decks of some ANL ships are not designed to take the maximum possible weight of such units. (Although the deck of one ANL vessel has been strengthened to take double stacked containers and similar work is being considered for other vessels.)

ANL and USS set freight rates designed to encourage shippers to present cargo in staked pairs because they economise use of space in ships' holds. The staked pair shipping rate is less than the sum of the rates for high and low gate units consigned separately or for two separate high gate units. Many shippers, however, prefer using only high or low gate units, whichever type better suits their specific commodity. On routes where only high-low staked pairs can be consigned this attitude may be partly due to pick up and delivery costs. A firm paying say $150 for a pick up and delivery of a high gate unit carrying 16 tonnes may be unwilling to outlay the same amount for a low gate unit carrying 10 tonnes. Alternatively, current practice may be controlled by the forwarding firms which own a large proportion of containers in use.

Given shippers' practice, freight forwarders aim to build up a clientele which generates flows of containers suitable for combination as staked pairs. Except where double high gate units can be consigned this requires matching flows of high and low gate units. As a generalisation, the more cargo handled by an individual forwarder the easier it is to attain matching numbers of high and low gate units. Forwarders attaining this objective can either pass some proportion of the savings in sea line haul on to shippers, or retain them as profits. The course of action taken seems to depend on the individual forwarder's marketing strategy and the bargaining power of shippers. Some seem to concentrate on providing a 'high quality' service to a restricted number of customers for an above average freight rate while others seek high volume with lower freight rates. Large producers usually have the bargaining strength and skill to obtain the best possible rates available for their type of cargo. Among smaller and middle size consignors, however, many freight rates are based on the cost of consigning a single unit although some reflect the cost savings of staked pairs. Differences in Tasmanian freight rates are therefore partly due to differences in the type of service being provided and the bargaining strength and volume of cargo being shipped by individual shippers. Some of the variation may be due to smaller shippers lacking knowledge about the prevailing market rates for door to door transport services.

The representative freight rates used by the BTE in recalculating TFES subsidies have been close to the lower rates quoted by freight forwarders for shipping single containers. This follows what is believed to have been the method used by the Nimmo Commission. Such rates probably reflect at least some of the savings possible from using staked pairs. If an explicit decision were taken to base TFES calculations on staked pair costs, where appropriate, then subsidy rates for some commodities could fall below their present relative levels.

Data Collection

Data collection is another area where problems are encountered in recalculating TFES rates. A general recalculation of rates involves collecting a considerable amount of information, comprising freight rates and transport practices on Tasmanian and mainland interstate routes. For TFES calculations carried out to date information has been required on six Tasmanian interstate routes but this will increase to eight for future recalculations since separate rates are to be set for shipments from Northern and Southern Tasmania to WA (see Table 2.1 for the Tasmanian and mainland routes). Data are required for general cargo and special commodities such as livestock and refrigerated cargoes.

Industry has sometimes been reluctant to provide this information since freight rates are regarded as commercially confidential information. Shippers are naturally wary of competitors obtaining their transport costs while freight forwarders may be concerned about competition from other forwarders and carriers. Forwarders possibly also restrict freight rate data to facilitate price discrimination (ie the practice of charging different rates to different shippers for a similar service). Most areas of industry, especially those benefiting from the Scheme, now co-operate by providing data required for TFES calculations.

It is not possible, however, to be sure that the information provided gives the correct overall picture. For example, the existence of special commodity rates was not disclosed by the normal information gathering activities of the BTE but was identified by other means. As a generalisation, most Tasmanian trade pays a similar rate per container for interstate movements. However, some commodities pay special rates which are effectively below the standard container rates. Such discounts may be given because of the large volume consigned, because a specific commodity can be matched in staked pairs with cargoes from other sources, or for lower value commodities which could not bear the normal freight rate. In some cases special rates may involve paying the standard freight rate but with the provision of other services such as pick up and delivery. Commodity rates were used in setting TFES subsidies where they were known to be lower than normal shipping rates. Using the normal rate would have given too high a subsidy rate.

Data collection problems would increase immensely if TFES subsidies were based on an industrial disadvantage basis. It would then be necessary to collect data on all mainland freight rates paid by mainland producers competing with Tasmanian firms as well as their respective production costs.

Freight Rate Variations

Variations in freight rates pose judgment problems in selecting the representative freight rates to be used in setting TFES rates. Even after eliminating very low and very high quotes on any route, it is not unusual to find variations in freight rates charged by different forwarders. As a proportion of the total freight rate charged the variations are not large but for calculating TFES rates they can be very significant. For example, for shipments between Northern Tasmania and Melbourne, a variation of less than three per cent in the Tasmania-mainland freight rate used in the calculation gave more than a 10 per cent change in the TFES rate. This problem might be overcome by calculating weighted averages of Tasmanian and mainland freight rates but the information necessary to do this is not available. In practice, representative freight rates have been chosen after study of data produced by freight forwarders and TFES claimants and by studying documents lodged in support of TFES claims.

Freight Forwarders' or Line Haul Freight Rates

Some mainland and Tasmanian shippers have the option of consigning cargoes through a freight forwarder or direct with a line haul carrier. Line haul operators usually prefer dealing direct only with shippers consigning reasonably large quantities of freight on a regular basis.

Shipping lines dealing direct with Tasmanian firms will arrange a door to door service, charging a rate which includes container hire and with pick up and delivery being sub-contracted to road operators. Direct negotiations between producers and shipping lines usually concern specific products and are referred to as commodity rates. The amount of cargo shipped under commodity rates may at present be limited by the amount of equipment available from shipping lines, since most of the containers used on Bass Strait are owned by freight forwarders.

Large mainland firms have the option of negotiating wagon or container rates direct with rail authorities or of forming an in-house freight forwarding firm to hire road sub-contractors. Smaller shippers can use the Railways of Australia Container Express (RACE) service for shipments of full container loads. RACE provides door to door service and the rate charged includes container hire.

Not all large shippers consign direct through line haul operators. Where cargoes suitable for blending are available, freight forwarders may quote rates lower than those which line haul operators are willing to offer. Some firms therefore deal direct with shipping lines in consigning cargoes from Tasmania to the mainland but ship through freight forwarders for mainland movements.

In calculating some TFES subsidies therefore, there is the question of whether calculations should be based on freight forwarders' rates or the cost of shipping door to door dealing through a line haul operator. On one hand there is the argument that like should be compared with like, and most TFES subsidies are calculated using mainland and Tasmanian freight forwarders' rates. For some products, however, calculations are based on their commodity rates when these were known to be lower than the standard shipping rate.

ADMINISTRATIVE COSTS

Overall, TFES administration appears to have been efficient; claims are paid quickly and the ratio of administrative costs to total subsidy payments compares favourably with that for other government subsidy schemes. However, administrative costs are considerably higher than originally expected. When the Scheme was introduced it was envisaged that approximately four officers would be adequate to process claims. In fact, at least thirteen officers are now employed full-time on the Scheme, in Hobart and Canberra, plus others on a part-time basis. The extra staff has been required mainly to investigate requests for higher or lower subsidies for specific commodities, or for changes in the Scheme's administrative procedures, or in resolving other submissions from claimants.

Extra staff were also required because agricultural claimants were exempted from the minimum claim requirement of $250 per quarter for southbound cargoes. In 1977-78 claims less than $250 comprised less than 1.5 per cent of southbound subsidy payments but account for over half the number of claimants. Almost 20 per cent of the claimants made claims averaging around $20, and the question arises of whether it is cost effective to process such claims. In summary, there is scope for administrative economies by simplifying the basis of determining many rates (especially those related to small shippers), and by implementing a minimum claim requirement for agricultural claimants.

CHAPTER 3 - FREIGHT FORWARDERS AND SHIPPERS

This chapter describes freight forwarders' mainland operations and shippers' requirements for long distance transport services. The general principles of mainland forwarding operations are similar to those governing Tasmanian operations, although many specific differences exist, such as the greater mode choice and the organisation of forwarding firms. Although this chapter is based on previous research (BTE, 1979b) and on interviews with forwarders and consignors, there can be considerable diversity in freight forwarders operations, so that the general description contained in this chapter may not be universally valid.

SHIPPERS' REQUIREMENTS

Freight consignors can be classified into two broad groups: those shipping full container loads (FCLs); and those consigning less than full container loads (LCLs). The maximum weight of a full container load varies with the type of cargo unit used; about 22 tonnes for a 12 metre trailer, 17 tonnes for a RACE or ISO container, or 40 tonnes for a rail wagon.

The important distinction between FCLs and LCLs is not just consignment size but rather the methods used in handling them and the options open to the shipper. FCLs can be shipped direct to the destination although a forwarder may choose to route such consignments via a depot for blending with other cargoes. An FCL shipper also has the option of organising his own transport requirements by dealing direct with rail or a road carrier rather than using a freight forwarder. An LCL on the other hand must generally be consigned through a freight forwarder's depot for blending with other cargoes. Except in unusual circumstances a shipper would not hire a truck or container just for shipping a consignment of say 2 or 3 tonnes from Sydney to Melbourne; the cost per tonne would be prohibitively high.

The only alternatives to freight forwarders for LCLs are air cargo and Railways of Australia (ROA) rates. Air cargo is generally more expensive than surface transport while ROA rates are not always competitive with forwarders' rates and railways generally provide only line haul service for LCL cargo. Cargo consigned under ROA rates accounts for only a small proportion of interstate cargo movements.

Consignors buy transport services on the basis of two factors: price and quality of service. As a generalisation, shippers choose the lowest rate quoted for the quality of service required. The concept of quality of service covers such factors as transit time, frequency, reliability, quality and security of cargo handling, or the provision of dedicated equipment for special cargoes. For many of these factors forwarders explicitly charge a higher rate, for example for special equipment or express delivery. Other less tangible factors may give certain forwarders a marketing advantage without necessarily enabling them to charge higher rates. For example, a consignor of fragile cargoes might prefer using a firm which uses regular drivers rather than hiring sub-contractors as required, since regular drivers gain experience in handling the cargo, thereby minimising breakages, while road transport firms running new and well maintained vehicles are preferred by shippers conscious of their corporate image, such as food manufacturers.

Shippers try to select the type of transport service which is optimum for their overall operation, including production, warehousing, distribution and marketing. To maximise profit, a shipper must try to negotiate the lowest possible freight rate, while at the same time obtaining a quality of service adequate to avoid causing losses in other areas of operations. Buying a low quality transport service could cause losses in other areas which far outweigh any savings in transport costs: for example, a production line closed for lack of materials; lost sales due to slow deliveries; goods damaged by careless handling; or cargoes stolen for want of good security.

In negotiating for transport services, firms must also take account of transport related costs such as warehousing, materials handling and distribution and inventory costs. For example, many firms face the choice of using a high cost on demand transport service direct to the buyer, or a lower cost but fixed frequency service which would therefore also involve maintaining inventories at the destination for delivery to customers as required. Using the slower service for direct shipment to customers without a warehousing operation could result in slow delivery times with sales being lost to competitors. Shippers facing this choice have to weigh the cost savings of using slower transport against the extra outlays required to establish a warehouse operation and hold extra inventory. With high value products the use of fast direct transport services minimises stock holding requirements and thereby reduces interest costs on working capital.

FREIGHT FORWARDERS

The freight forwarder is a broker interfacing between sellers of transport services and consignors wishing to ship cargoes to other locations. In addition, the forwarder also plans and manages door to door cargo movements. Forwarders remain in business because they can offer lower freight rates than many individual consignors could attain by acting on their own account.

Costs

Freight forwarders adopt a number of practices to reduce the unit cost of transport.

One of the most important methods of reducing costs is freight blending. This is the practice of matching the transport requirements of different types of cargoes to reduce the total line haul capacity required. Freight blending is possible because not all commodities have the same density. Consigning only one type of commodity in a cargo unit is therefore often not an economic practice, since high density cargoes such as steel use the full weight capacity but not all the volume available, while low density cargoes take up all the space without reaching the weight limit. By mixing cargoes of different densities, the forwarder can make maximum use of a cargo unit's weight and volume capacities, thereby reducing the total requirement for transport. For example, by combining a truck load of steel from one customer with just under two loads of foam rubber from another, the forwarder could reduce their combined need for transport from three to two trailers. Because of their bargaining power and skill, forwarders are able to negotiate lower rates for line haul transport and pick up and delivery services.

Cost management practices may include scheduling cargo-handling operations in normal business hours wherever possible in order to minimise overtime payments, efficient planning of pick up and delivery routes to minimise running distance, and co-ordination of road/rail transhipments to minimise cargo handling. Some forwarders operate using a proportion of hired equipment and casual labour so costs can be reduced quickly in response to a downturn in cargo volume.

Revenues

Many freight forwarders publish freight rates for their major routes for LCL consignments. These published rates generally only apply to one-off shippers of small consignments. Regular LCL shippers usually pay a lower rate than the published figure. Discounts are given because regular consignments enable the freight forwarder to plan the most efficient method of handling the cargo and to seek out complementary cargoes suitable for blending, and possibly because unit administration costs are lower for regular consignments. The lower rate is also probably due to regular consignors being in a stronger negotiating position, especially for cargoes suitable for blending.

The rates negotiated for regular LCL or FCL consignments are based on the cost of providing transport services. Hence, higher rates would normally be charged for commodities which were difficult to handle, or not suitable for blending, where express delivery was required, or where the pick up or delivery must be at a precise time or an out of the way location. Negotiated rates are reviewed regularly by forwarders who try to pass on cost increases from higher line haul rates or national wage cases although the level of such increases is subject to competition from other forwarders and the shippers bargaining strength.

Forwarders generally aim to charge a freight rate which covers direct and overhead operating expenses plus some profit. Forwarders are, however, aware of marginal costing principles and will offer lower rates where it is logical to do so, for example on backloading operations. A few instances of zero freight rates are thought to exist on routes where cargo is scarce and, for technical reasons, it is desirable to have some weight in the cargo unit, eg semi-trailers travelling over dirt roads.

Where excess capacity exists freight forwarders may offer off-peak rates. Excess capacity can occur when a freight forwarder operates its own road fleet or has contracted to regularly consign a specified minimum quantity by rail and cannot immediately reduce this capacity in response to short term downturns in consignments. For many forwarders, freight consignments vary daily through the week, from a minimum on Monday to a maximum on Friday. Some forwarders may therefore offer lower rates for non-urgent movements of cargoes from factory to store on Monday mornings. Other tactics would be adopted to meet a more serious surplus capacity problem. For example, a forwarder with surplus rail capacity would use rail wherever possible, even with cargoes more suited to road. Surplus capacity on one route could affect cargoes on other routes; a forwarder with unused capacity on the Sydney-Melbourne line would probably consider sending its consignments between NSW and Tasmania via Melbourne rather than direct by sea, since less outlay would be required for the shorter sea journey while the land leg capacity would have to be paid for whether or not it was used.

Mode Choice

Freight forwarders' choice of transport mode for line haul movements is determined by cost and customer requirements.

Rail line haul rates are generally lower than road sub-contractors' rates on all routes. However, when pick up and delivery costs are taken into account, previous research has shown that the cost advantage varies between routes and by type of consignment with rail being the lower cost mode for some tasks and road having the advantage on others (BTE, 1979b, p61). Subsequent increases in fuel costs would have increased the operating costs of road transport relative to rail. It is understood that increases in fuel costs have been passed on largely in forward leg rates, with back leg rates being subject to significantly smaller increases.

For LCL consignments, the forwarder's terminal operations are similar, whether he uses road or rail for the line haul. Consignments have to be picked up and consolidated at a depot with the reverse process at the other end. Forwarders claim the capital and operating costs of road and rail depots are similar, so that rail's cost advantage on the line haul tends to carry through to the total door-to-door costs.

However, for FCL consignments the situation is more complicated. Forwarders must weigh the cost of hiring a road sub-contractor for the complete door-to-door task against the sum of the rail line haul, pick up and delivery, and transhipment costs. Road has an advantage on short hauls, and with cargoes which are difficult to handle or labour intensive to trans-ship, but rail is becoming more competitive in this area with the use of containers and flexi-trays.

Structure of Industry

The Australian freight forwarding industry at present comprises four large national firms plus a large number of smaller operators. The large firms, Ansett, Brambles, Mayne Nickless, and TNT, operate a network of depots throughout the nation, while the smaller firms often specialise in one type of freight or on specific routes. The exact number of freight forwarding companies is not known but an Australian Bureau of Statistics (ABS) survey of interstate freight movements through freight forwarders covers about 100 firms, although some of these would be subsidiaries of the major national operators. Previous research has indicated a high degree of concentration in the forwarding industry with the four major firms carrying about 45 per cent of interstate movements between capitals and other major cities (Rimmer, 1977, p183).

The major economies of scale in freight forwarding come from establishing freight depots and securing sufficient freight business to benefit from blending and backloading practices (BTE, 1979b, p29). These economies are available to forwarding firms of relatively small size as compared to the major national forwarders. Economies of scale from continued growth are less obvious although some specific advantages accrue to the biggest firms. For example, having organisation networks operating to most towns in Australia gives major national forwarders an advantage in securing consignments from national producers consigning large numbers of LCLs to diverse locations. On some intercapital routes, the large volumes of freight handled by the major forwarders may enable them to attain lower line haul costs than other firms by contracting for regular rail capacity.

Beyond a certain size, however, the economies, if any, available from continued expansion are thought to be small (BTE, 1979b, p27). The growth of successful forwarding firms seems to involve duplicating or taking over units of optimum size, rather than continually expanding a single operating entity. Hence, the large national forwarding firms often comprise a central holding company controlling a number of subsidiaries. The subsidiary companies may each specialise in a particular type of freight movement using specialised equipment, eg fast overnight express services, low density commodities, FCL rail consignments, bulk cargoes, etc.

Competition and Bargaining

The market conditions under which freight forwarders operate place upper and lower limits on the rates which can be charged. The lower limit is set by the minimum attainable cost of moving cargo while an upper limit is determined by actual and potential competition from other forwarders and by the bargaining strength of customers.

In the short term, price competition between forwarders is restricted by the absence of major economies of large scale operations. In sectors of manufacturing industry benefiting from economies of scale it may be logical for firms to engage in strong price competition, since lower prices give increased volume, lower production costs, and hence increased profit. Strong price competition may also occur in the freight forwarding industry in areas where higher than normal profits are being made. At normal price levels, however, a firm reducing its freight rates will receive increased trade, but in the absence of any economies of scale its unit operating costs will remain about the same. In the short term, therefore, forwarders are often wary of competing by price cutting. Profits will probably not be increased and the tactic invites retaliation. On the contrary, to increase profits, forwarders often try to differentiate their services and increase freight rates, arguing that a premium should be paid for a 'high quality service'. This tactic is limited by competition from other forwarders and by customer resistance.

Freight forwarders do, however, engage in price competition when it might increase profits. Over the medium to long term, price competition has been strongly associated with technical and operational innovations to reduce costs, eg improved road vehicles, use of pallets, inter-modal containers etc. Any firm obtaining a cost advantage over the rest of the industry, albeit temporary, can compete with lower freight rates while at the same time increasing profits.

An upper limit is placed on forwarders' rates by actual and potential competition from other forwarding firms. If the major forwarders tried to significantly increase the level of freight rates, they would face strong competition from a large number of smaller forwarding firms. Freight rates and profits are further constrained because there is free entry to the industry; economic regulation of interstate freight forwarding by governments is prevented by Section 92 of the Constitution, capital requirements are small, and economies of scale are attained at a relatively low level of operations.

A further limit on the level of freight rates comes from customer bargaining power. Large FCL shippers are in a strong position, having the option of arranging their own transport services. Freight forwarders' rates are limited by the cost for which firms can arrange alternative transport services. It is unusual for a firm to operate its own fleet of trailers for long distance movements unless it can also provide return cargoes on the backloading leg. A more common practice is for firms to deal direct with rail or to establish an in-house forwarding firm to hire sub-contractors.

In fact, however, large shippers often find that freight forwarders offer lower rates than can be attained by organising their own transport services. Some FCL shippers carry out freight rate negotiations in an aggressive manner, collecting intelligence on rates paid by other shippers, obtaining several quotes, and costing out the transport operations to estimate the forwarders' profit mark up. To obtain the lowest possible rates, such firms may use different forwarding firms on different routes and deal direct with rail on others. On routes where the major forwarding firms do not have cost advantages, large shippers often prefer to deal with small forwarding firms to maximise their relative bargaining advantage.

SEA TRANSPORT

Although most mainland interstate consignments of general cargoes are carried by road or rail, sea transport does successfully compete with land transport on the longer routes. ANL operates services out of Melbourne and Sydney to

Brisbane, North Queensland, Darwin and Fremantle. Except for the Darwin Trader's voyages between Melbourne, Sydney and Darwin, all these services are provided by ships which also call at Tasmanian ports and which operate at a profit (ANL 1978 pp14-15, 1979 p11).

Other coastal services are provided by Western Australian Coastal Shipping Commission which operates from Fremantle to Tasmania, Melbourne, north west Western Australia and Darwin, and John Burke Pty Ltd which operates services from Brisbane to Northern Queensland.

CHAPTER 4 - ANALYSIS OF MAINLAND FREIGHT RATES

This chapter gives the results of a statistical analysis of mainland freight forwarders' contract rates for interstate consignments of FCLs. The object of this analysis was to determine whether a systematic relationship existed between freight rates, distance and other factors which could then be used in calculating hypothetical 'land' freight rates for routes between Tasmanian and mainland centres. If so, the transport cost disadvantage experienced by Tasmanian industry could be measured as the difference between those rates and its actual sea transport costs. Compared with the method currently used to calculate TFES subsidies, this approach would have the advantage of using only one general representative measure of mainland transport costs in assessing the transport disadvantage on all Tasmanian interstate routes, thereby providing a more consistent treatment for all shippers.

FACTORS INFLUENCING FREIGHT RATES

This section gives a brief outline of supply and demand factors which might be expected to determine long distance freight rates.

The costs of shipping freight comprise items which are fixed regardless of distance, such as for loading, unloading, and documentation; plus costs which are a function of distance, such as fuel, oil, maintenance, tyres and drivers' wages. As an approximation therefore transport costs can be represented as comprising a fixed 'flagfall' plus a rate per kilometre.

The relationship between transport costs and freight rates on any route is further influenced by the availability of backloading cargoes. Consider the case of trucks operating only on a specific route, say between Brisbane and Sydney. Cargo shipments from Sydney to Brisbane greatly exceed consignments in the reverse direction. Hence, not all trucks arriving in Brisbane will be able to pick up backloading cargoes for the trip to Sydney. However, having made the journey from Sydney to Brisbane, trucks must incur the cost of a return journey whether loaded or not. The cost of operating each round trip is 'allocated' by market forces between Sydney and Brisbane shippers on the basis of demand. Since the quantity of cargo shipped from Sydney to Brisbane exceeds southbound movements, the freight rate from Sydney to

Brisbane exceeds the rate on the backloading leg. Typically, on routes where cargo shipments on the forward leg greatly exceed backloading cargoes there will be a wide difference between the forward and backloading freight rates. On routes where cargo flows in each direction are about equal, then freight rates in each direction will also tend to be similar (although the mix of cargo types in each direction can influence equipment requirements and utilisation, and thus rates by direction).

In practice, trucks often operate on a triangular route, eg Sydney-Melbourne-Wollongong-Sydney, but the general principles remain the same: total revenue from freight rates must exceed the total operating costs, and operating costs are (implicitly) allocated between different legs of the service on the basis of the demand for transport on each leg.

Given the potential for operating triangular routes, it may be that freight rates are determined by the total demand and supply conditions for transport services at each centre rather than the relative quantities of forward and back leg cargoes. For example, the forward and back leg rates between Sydney and Brisbane may be determined by the relative levels of total freight shipments to all destinations out of each city, rather than just the quantity of cargo consigned on this route.

For competitive reasons, rail freight rates mirror road rates, with forward leg rates exceeding backloading rates. On most routes it is understood that rail line haul rates are lower than road subcontractors' rates.

Other factors which may possibly affect freight rates on a specific route include the number of transport modes competing for freight, and the range of cargo being carried which affects, for example, the opportunities for blending heavy and low density cargoes.

Ideally, the objective would be to develop a 'structural model' which attempts to explain the role of each of the foregoing factors in determining freight rates. However, development of a satisfactory explanatory model is a complex and data consuming exercise, which the BTE has not yet attempted. It has been possible, though, to develop a model which satisfactorily 'reproduces', as distinct from explains, mainland freight rates. The distinction between the two types of model needs to be emphasised. For example, as is demonstrated later in this chapter, it is possible to satisfactorily estimate mainland freight rates using a relatively simple model which establishes a systematic relationship between, on the one hand, freight rates and on the other, distance and the population of the origin and destination. Distance obviously is an explanatory factor but population is only a proxy for various market forces which determine freight rates, such as degree of competition, total volume of freight consigned and the opportunity for blending cargoes.

DATA

The data used in the analysis are given in Appendix II. The freight rates used warrant special mention. They were freight forwarders' contract rates for shipments of over 20 tonnes, as contained in contracts let by the Commonwealth Government with various freight forwarding firms for providing interstate general cargo services. Being a Government contract, the information is public knowledge. The contracts came into force in late 1978 for the period ending 31 August 1980 and contain rates for moving LCL and FCL consignments over 111 routes on the mainland and to Tasmania. The only rates used in the analysis and not included in the contracts were for a few routes to and from Canberra. These were obtained from a firm specialising in road services to the ACT and Queanbeyan. It should be noted though that most consignments to Canberra came from Sydney and Melbourne and very little cargo goes out to any destination. On many routes to and from the ACT therefore there is not a well established market rate for transport services and forwarders' quotes vary more than on other routes.

Details of the Government contract rates were checked against confidential data supplied to the BTE by freight forwarders. A number of major freight forwarders provided a representative sample of FCL freight rates on major mainland intercapital routes. Each consignor included in the sample data was identified only by a code number, but otherwise forwarders provided full details of the freight rates paid by individual shippers together with information on the stowage factor of cargoes, the average consignment size, and the total amount shipped annually. The data were provided in confidence and are not published or implied in this report, but used merely to verify the representativeness of the Government contract rates.

As a further check, the Government contract rates were also sent to a major forwarding firm; the firm indicated that in general the Government rates were similar to rates paid by commercial shippers at the time the contract was let.

Consideration was given to whether Canberra and Darwin rates should be included in the sample since both are different in many ways to other capitals. Both cities have relatively small populations with above average incomes and are mainly freight receivers, consigning very little cargo to other cities. Canberra is the only mainland capital not served by sea while Darwin is the only one without a rail service. Neither city acts as a service centre to a large hinterland as do other capitals. In addition, Canberra's freight rates are probably influenced by its proximity to Sydney and its location just off the Sydney-Melbourne corridor. Except for firms specialising in servicing Canberra, many road transport operators are reluctant to operate into the National Capital due to lack of backloading cargoes. For this reason it is understood that Melbourne-Canberra freight rates are about the same as Melbourne-Sydney rates since Sydney is the closest source of backloading for trucks delivering to Canberra.

Notwithstanding these factors, Canberra and Darwin were included in the analysis to give a larger number of observations and, for equations using population variables, to obtain observations for centres comparable in size to Tasmania. Without the Canberra and Darwin freight rates, Perth would have been the smallest centre included in the analysis, yet its urban locality population is eighty per cent higher than the State total for Tasmania. Using regression equations to estimate Tasmanian interstate 'equivalent' land freight rates would then have involved extrapolation, rather than the interpolation possible when Darwin and Canberra are included in the data set.

Other data used in the analysis included population and employment statistics from the 1976 Census of Population and Housing, and statistics on freight movements from the BTE's report on interregional freight movements in 1971-72 (BTE 1976). The 1971-72 freight movements data were used in preference to 1975-76 figures (BTE 1978b) because it is believed the relative levels of road movements given in the former report are the more correct. The 1971-72 estimates of road freight movements were made using a rigorous and consistent method for all areas in Australia while the 1975-76 road figures were prepared using a less sophisticated method.

THE ANALYSIS

The analysis was confined to freight rates between all mainland State capitals plus Canberra and Darwin, ie 42 freight rate observations out of the above-mentioned total set of 111. The other observations were not used because they relate, for the most part, to general cargo movements which are small-scale compared with Tasmania's interstate trade in general cargo. The rates used are specified in Table 4.1.

Regression analysis was carried out on this full set of data plus a number of subsets, using both linear and logarithm functional forms. The logarithm form equations gave slightly better results, so the following discussion relates only to them.

Table 4.2 presents equations with freight rates expressed solely as a function of distance, and as a function of distance plus population of origin and destination. The latter form of equation is preferred, as indicated by higher values for the coefficient of determination adjusted for degrees of freedom ($\bar{R}^2$), and by the plot in Figure 4.1. The $\bar{R}^2$ is satisfactory and the 't' values indicate the coefficients are significant at the 95 per cent confidence level.

A number of alternative variables for origin and destination size were examined, such as employment, total freight consigned between origin and destination, total freight consigned from origin to all destinations, and total freight received at the destination from all origins. The different variables all gave similar results. The similarity between the results of using population or freight consigned, for example, is illustrated in Figure 4.1. From the viewpoint of an explanatory model, an equation form using freight consigned seems preferable to one based on population. However, as population data are more readily available and more reliable than freight data, equations using population are at the present time the preferred form from a practical point of view, and henceforth reference is made only to equations using distance and population. Again, it is emphasised that these equations are only intended to be used as a means of estimating freight rates; they do not purport to explain (in a detailed structural sense) the level of freight rates. Distance obviously is an explanatory factor but population is only a proxy for the various market forces which determine the level of interstate freight rates.

TABLE 4.1 - COMMONWEALTH GOVERNMENT CONTRACT FREIGHT RATES FOR FULL TRUCK LOAD CONSIGNMENTS BETWEEN MAINLAND AND CAPITALS, DECEMBER 1978

(Dollars per tonne)

Origin	Destination						
	Sydney	Melbourne	Brisbane	Adelaide	Perth	Darwin	Canberra
Sydney	-	25.00	31.00	34.00	88.60	129.30	18.00
Melbourne	28.00	-	52.00	27.00	80.50	117.50	28.00
Brisbane	22.00	30.00	-	47.50	125.00	95.00	37.50
Adelaide	30.00	20.00	56.00	-	60.00	97.50	31.00
Perth	52.50	42.00	73.60	31.50	-	125.00	60.00
Darwin	70.00	70.00	55.00	55.00	80.00	-	95.00
Canberra	15.00	20.00	56.00	48.00	148.00	170.00	-

Source: Commonwealth Department of Administrative Services, and a Canberra freight forwarder.

Forward Leg Rates

The forward leg equations in Table 4.2 were derived from a subset of the data comprising the 21 forward leg freight rates for intercapital movements. The equations show freight rates to be directly proportional to distance and inversely proportional to population. All of the equations derived using forward leg rates have $\bar{R}^2$ values of 0.90 or higher. Equation 3 in Table 4.2 shows freight rate per kilometre expressed as a function of distance and population. The equation shows that the freight rate charged per kilometre is a decreasing function of distance.

TABLE 4.2 - REGRESSION EQUATIONS FOR FREIGHT FORWARDERS' INTERCAPTIAL CONTRACT FREIGHT RATES

Equation No	Equation	$\bar{R}^2$/DF
Forward Leg Rates		
(1)	ln FR = .82 ln DIST - 2.05	.90
	(13.3) (-4.4)	19
(2)	ln FR = .71 ln DIST - .13 ln POPO - .08 ln POPD + .18	.96
	(15.8) (-4.1) (-3.6)	17
(3)	ln FR-D = -.29 ln DIST - .13 ln POPO - .08 ln POPD + .18	.70
	(-6.5) (-4.1) (-3.6)	17
Back Leg Rates		
(4)	ln FR = .63 ln DIST - 1.11	.86
	(10.9) (-2.5)	19
(5)	ln FR = .54 ln DIST - .08 ln POPO - .09 ln POPD + .66	.91
	(10.5) (-2.9) (-2.5)	17
(6)	ln FR-D = -.46 ln DIST - .08 ln POPO - .09 ln POPD + .66	.79
	(-8.8) (-2.9) (-2.5)	17
Forward and Back Leg Rates		
(7)	ln FR = .73 ln DIST - 1.58	.75
	(11.26) (-3.2)	40
(8)	ln FR = .79 ln DIST + 0.06 ln POPO - .12 ln POPD + .46D_1 - .35D_2 - 1.7	.94
	(18.0) (2.4) (-6.1) (5.7) (-4.5)	36
(9)	ln FR-D = -.21 ln DIST + .06 ln POPO - .12 ln POPD + .46D_1 - .35D_2 - 1.65	.81
	(-4.7) (2.4) (-6.1) (5.7) (-4.5)	36
Average Freight Rate		
(10)	ln FR12 = .65 ln DIST - .09 ln POPX + .84	.96
	(23.3) (-7.5)	18
(11)	ln FR12-D = -.35 ln DIST - .09 ln POPX + .84	.79
	(-12.3) (-7.5)	18

Where : FR = Freight Rate (\$/t)

DIST = Road Distance (km)

POPO = Population of Origin

POPD = Population of Destination

POPX = Product of Origin and Destination Populations

FR-D = Freight Rate per kilometre (\$/t/km)

FR12 = Sum of forward and back rate on route (\$/t)

FR12-D = FR12 divided by distance (\$/t/km)

D_1 = Set as one for shipments out of Canberra and zero in all other cases

D_2 = Set as one for shipments out of Perth and zero in all other cases

't' statistics are given in brackets below coefficients

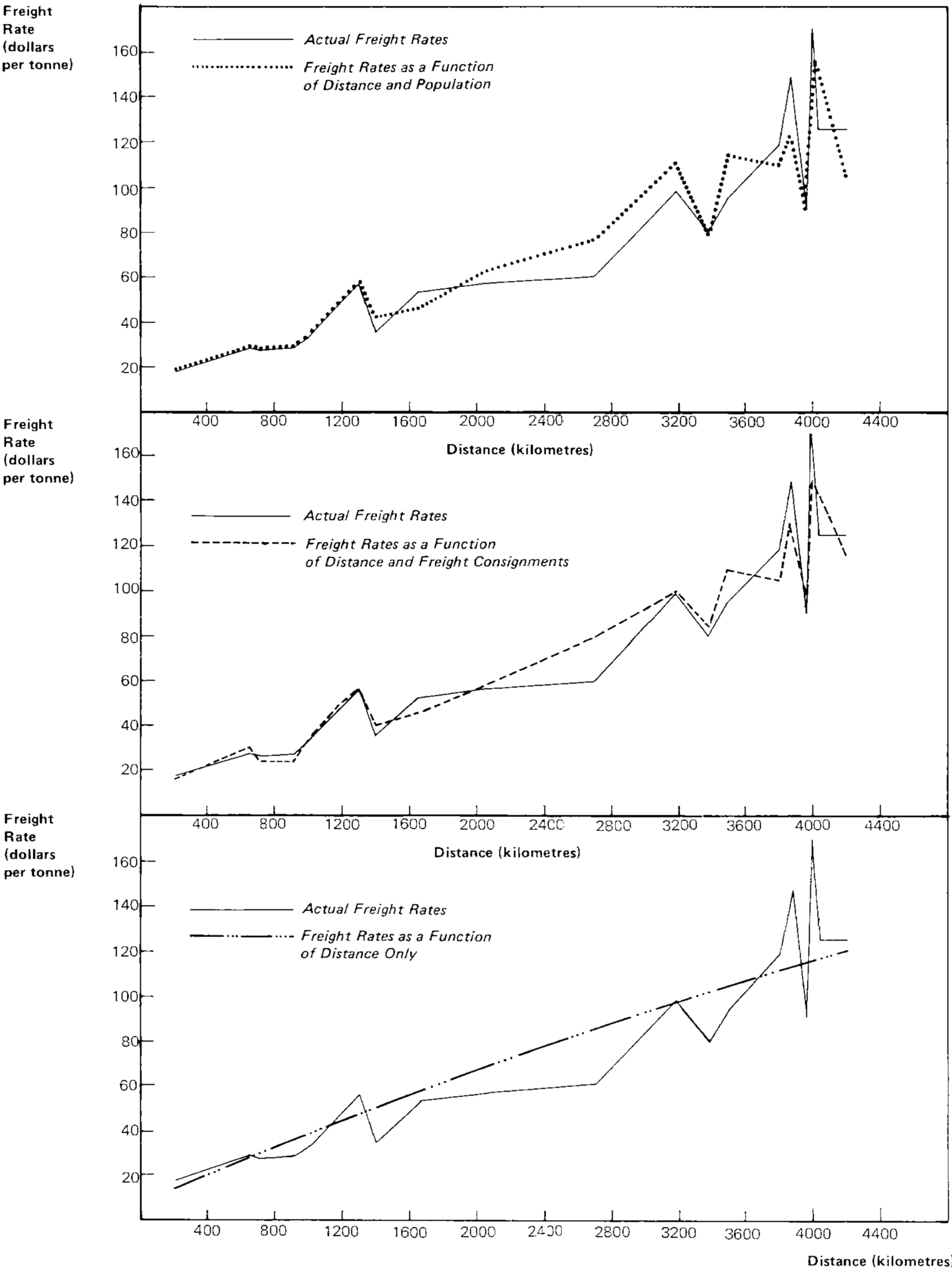

Figure 4.1
Actual and predicted freight rates (forward legs), 1978

Backloading Leg Rates

The backleg equations were derived from a 21 observation subset of the data comprising backloading leg freight rates. The form of the equations is similar to that of the forward leg equations although $\bar{R}^2$ and 't' statistic values are slightly lower and the elasticity of freight rates with respect to distance is higher in the forward leg equations. Equation 6 shows freight rate per kilometre on backloading legs expressed as a function of distance and population.

Complete Data Set

Analysis of the complete data set comprising 42 freight rate observations from both forward and backloading legs gave similar results to those described above. There was, however, one significant difference. In the equations derived from forward or backloading leg routes, freight rates are shown as inversely proportional to population for both the origin and the destination. In the equations generated using the full data set of 42 observations freight rates are directly proportional to population for the origin and inversely proportional to the population for the destination.

The effect of this result is to generate a 'backloading factor' in the equation which is generally greater than one on forward legs (giving a higher freight rate) and less than one on back legs (giving a lower rate). For example, the backloading factor is greater than unity for shipments from Sydney to Brisbane and less than unity for shipments in the reverse direction. None of the various origin-destination variables used gave a 'correct' backloading factor on every route. For example, Adelaide to Brisbane is a forward leg route. A backloading factor derived from including a population term would, however, indicate it is a backloading leg, since Brisbane's population is greater than Adelaide's. Overall though, the results were good. The question of predicting in which direction forward and back leg rates will be charged is discussed further in the next chapter.

In analysing the complete set of data, it was necessary to include two dummy variables in the equations. Dummy variable D_1 was set equal to one for freight rates for consignments from Canberra and zero for other observations. This dummy variable was included because many freight rates out of Canberra are 'forward leg' rates even though the weighting factors used indicated it should be a back leg. Canberra's freight rates are almost certainly determined as much by its location in the Sydney-Melbourne corridor and its proximity to Sydney as by its consignments and receipts of freight.

The second dummy variable D_2 was set as equal to one for consignments from Perth and zero for other observations because the actual rates for consignments out of Perth were observed to be lower than estimated by the equations. Services are provided to Perth by road, rail, and sea, and there is strong competition for the small quantity of eastbound cargoes available.

Average Freight Rate

Last, a regression analysis was carried out on a set of data comprising the sum of forward and backloading rates on each route. The population figures presenting the size of each origin and destination were multiplied to form a single variable. The sum of the forward and back leg rates on each route was then regressed against distance and this variable represented the combined sizes of origin and destination. The results were similar to those given by equations based on forward or back leg data. The equations show average freight rates are positively related to distance and negatively related to the sizes of the origin and destination.

RESULTS

The results of the analysis outlined above indicate that it is possible to generate regression equations which satisfactorily estimate mainland intercapital freight rates. Such regression equations can be regarded as a form of averaging. The analysis shows that intercapital freight rates can be expressed as a function of three factors. On any route freight rates increase with distance and decrease with the sizes of the origin and destination. Further, the level of freight rates in each direction is influenced by the demand for transport in each direction, or by total demand at the origin and destination, with the result that there is a forward leg rate higher than the back leg rate. It is possible to generate separate regression equations for the sets of forward and back leg freight rates or, with slightly less accuracy, to generate an equation based on the set of all intercapital rates.

CHAPTER 5 - TASMANIA'S INTERSTATE TRANSPORT DISADVANTAGE

This chapter examines the problems of defining and quantifying Tasmania's interstate transport disadvantage.

At the outset, it must be stated that 'transport disadvantage' is a defined rather than an axiomatic concept, ie the level of transport disadvantage depends on which definition of the concept is used. A comparison of land and sea transport costs may give a general indication that Tasmania suffers a transport disadvantage but to quantify this exactly for TFES purposes it is necessary to adopt a precise definition of the concept.

Three basic definitions of transport disadvantage have commonly been used interchangeably in the past; namely that Tasmania's transport disadvantage is measured as the difference between its actual interstate transport costs and:

- the transport costs that Tasmanian industries would pay if Tasmania were joined to the mainland by a landbridge; or

- the costs of shipping cargoes over the same distance on the mainland; or

- the costs of shipping cargoes over a comparable route on the mainland.

The previous chapter has shown that freight rates on any mainland route are 'determined' by at least three factors, namely:

- distance - all other things being equal freight rates are an increasing function of distance;

- size of origin and destination - all other things being equal, freight rates are inversely related to the sizes of the origin and destination; 'size' can be represented by a number of measures such as population, workforce or freight consignments, which are not necessarily causal factors but rather are proxies for the 'other' size associated market factors influencing freight rates; and

- directional balance or imbalance in cargo flows - rates for shipping cargoes over the forward leg of any route are higher than rates charged on the backloading leg.

Given this picture of mainland freight rates the 'equal distance' concept of transport disadvantage can be eliminated as too imprecise since freight rates are also influenced by the sizes of the origin and destination and the relationship between forward leg and back leg volumes.

The comparable route concept is more precise. Although the criteria on which Commissioner Nimmo selected his mainland comparable routes are not known, it would appear that he took account of factors other than distance. For example, the Sydney-Melbourne route, though similar in length to some Tasmania-mainland routes, was not used as a comparable route, presumably because the volume of freight on that route was considered too large relative to that on Tasmanian interstate routes. However, as noted in Chapter 2, the Nimmo method involves some anomalies, and it is possible that these can be reduced by a refinement of the comparable route concept, using the regression equations developed in Chapter 4. This would entail applying average mainland freight rates (as defined by regression equations) to Tasmania-mainland distances, making allowances for the sizes of the origin and destination, and assuming all other factors remain constant. This form of comparable route approach would therefore be the same as a simple landbridge method of calculating transport disadvantage.

Any attempt to create a more detailed landbridge model for predicting Tasmania-mainland freight rates would be tenuous. If such a landbridge actually did exist at present, then the development pattern and transport network of south eastern Australia would almost certainly be different and State borders might be in different positions.

In addition to defining a distance concept, calculating TFES subsidies also entails adopting a precise definition of transport costs. For example, most calculations to date have been based on freight forwarders' rates for regular consignments of two to three FCLs per week with no additional costs such as warehousing or insurance.

ESTIMATED BASS STRAIT LANDBRIDGE RATES

The previous chapter showed mainland intercapital freight rates could be estimated using regression equations; the independent variables being distance, sizes of origin and destination, and forward/backward leg. Before using similar equations to predict Bass Strait 'land' transport freight rates, it is necessary to decide how each of these factors should be measured for Tasmanian consignments.

Distance

In general terms, there are two alternative ways of measuring hypothetical land distances between Tasmania and mainland centres. On the one hand, it could be assumed that if a landbridge existed all Tasmania's land transport connections with the rest of Australia would be via Melbourne. Alternatively, it could be assumed that all such connections would have been by the most direct route possible. Under this assumption, for example, Tasmania's hypothetical land route to Sydney and Brisbane might be via a connection with the Princes Highway east of Melbourne at say Orbost. Similarly, Tasmania's hypothetical land route to Adelaide and Perth might be via a connection with the Princes Highway west of Melbourne, at say Portland. The latter assumption of more direct connections with the mainland transport has been adopted in the calculations reported below. As a sensitivity test, alternative calculations were performed assuming distances via Melbourne. These alternative calculations, which are reported in Appendix III, yield higher hypothetical land freight rates for destinations beyond Melbourne, and thus imply lower TFES subsidies, than the calculations assuming more direct connections.

Sizes of Origins and Destinations

The regression equations of mainland freight rates given in the previous Chapter include terms for the size of origin and destination. A number of statistics gave similar results when used as estimating variables, including population, workforce, and freight consigned or received by road or rail. If regression equations are to be used in estimating Tasmanian interstate land rates for TFES purposes, it will be necessary to decide which set of independent variables should be used to represent origin/destination size. In the equations based on the full data set of all intercapital rates the origin/destination terms also estimate whether forward or back leg rates would be charged on specific routes, but the question of which Tasmanian routes should be treated as back legs is discussed in the next part of this section.

For calculating hypothetical Tasmanian interstate land rates it is suggested that the most practicable statistic would be population. The advantage of using this statistic is that accurate population figures are regularly available from the Australian Bureau of Statistics. The use of freight consigned statistics would involve a number of disadvantages. Statistics on interregional freight movements are not available on a regular basis and to date only two estimates of such figures have been prepared by the BTE. These estimates could be subject to a considerable margin of error due to difficulties in making an accurate assessment of mainland road movements.

Having selected a size variable, it is then necessary to decide how to apply it in Tasmania's case. The population weights used in deriving the regression equations of mainland freight rates given in Chapter 4 related to capital city urban localities. However, having regard to Tasmania's location (which would place it at the end of any mainland transport system if there was a landbridge) and its compact size, it seems reasonable to hypothesise that if there was a landbridge, freight rates to and from Tasmania would be influenced more by the State's total population (407 000 in 1976) than by Hobart's population alone (163 000 in 1976).(1) Accordingly, for the purposes of the calculations reported later in this chapter, the whole of Tasmania's population has been used as the weighting factor.

As a sensitivity test, two alternative sets of calculations were carried out, the results of which are detailed in Appendix III. One alternative uses Hobart's population to calculate hypothetical land rates to and from Southern Tasmania, and the sum of Launceston, Burnie and Devonport's population to

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(1) It might also be argued that if a landbridge did exist, the pattern of development within the State would have been more akin to that in the mainland States, and Hobart would have accounted for a higher proportion of the total Tasmanian population than it actually does.

calculate rates to and from Northern Tasmania. The second alternative uses, respectively, total Southern Region and Northern Region populations. Both alternatives produced higher hypothetical land rates and thus implied lower rates of TFES subsidies than the calculations reported later in this chapter.

Forward and Backward Legs

Some of the regression equations described in the previous chapter were generated from data sets comprising only forward or back leg freight rates. In order to predict freight rates using such equations it would be necessary to decide whether each of Tasmania's interstate trade routes should be treated as a forward or back leg.

Available statistics indicate that slightly more general cargo is shipped out of Tasmania than is received from the mainland and that, furthermore, Tasmania is a net exporter to each mainland State except South Australia (Table 5.1). (See also BTE 1979a, p17-18; BTE 1976, p246.) The evidence on container movements also tends to support the suggestion of northbound being the forward leg. The Nimmo Commission reported that in 1975 empty container movements comprised 11.6 per cent of southbound container movements but only 6.5 per cent of northbound container movements (Nimmo, p23). This is confirmed by other (incomplete) data on empty container movements in subsequent years.

TABLE 5.1 - TASMANIAN[(a)] INTERSTATE MOVEMENTS OF GENERAL CARGO[(b)], 1976-77

('000 Cargo Tonnes)[(c)]

	NSW	Vic	Qld	SA[(d)]	WA	NT	Total
Imports	246	1 354	4	125	1	-	1 730
Exports	334	1 360	48	67	16	-	1 825

(a) Excludes King and Flinders Island cargoes.
(b) Defined here as cargo carried on Ro Ro or conventional vessels.
(c) The sum of cargoes measured in tonnes and cargoes measured in cubic metres.
(d) On the advice of Hobart Marine Board, an additional 16 thousand tonnes has been included in both figures for SA.

Source: Department of Transport Australia, 1978 and Marine Board of Hobart.

However, contrary to this evidence, scheduled southbound sea freight rates from Sydney and Melbourne to Tasmania are higher than northbound rates to these cities. This appears to be a market aberration, possibly a traditional carryover from when Tasmania's interstate imports exceeded its exports. The strong competition which would correct such a situation on the mainland does not exist to the same degree on the Bass Strait trade. Most trade is carried by three shipping lines: ANL, USS, and Holymans with ANL acting as price leader. Competition from land transport does affect shipping rates on longer routes (eg cargoes can be shipped from Tasmania to Sydney direct by sea or landed in Melbourne and consigned onward by road or rail) but price competition between shipping lines is only known to have occurred between ANL and Western Australia Coastal Shipping Commission for shipments to WA. On the more important routes, the form of shipping rate schedules has remained the same for many years, with increases taking the form of a percentage increase applied to all rates on a given route, both northbound and southbound.

For the purposes of the following calculations, northbound is regarded as the forward leg, based on the figures on cargo and container movements.

TRANSPORT DISADVANTAGE AND DISTANCE

Total costs for any transport mode comprise fixed and variable components. Relative to land transport, sea is believed to have much higher fixed costs and lower variable (ie distance related) costs. Sea transport is therefore significantly more expensive than road over short hauls. On the mainland, FCL shipments over short routes equivalent to the Northern Tasmania to Melbourne route would usually be consigned by road. Tasmanian shippers on the other hand face pick up and delivery and transhipment costs in addition to the ship's line haul costs which are believed to be in the order of $200 to $300 per container or about $13 to $20 per tonne (although shippers dealing direct with carriers rather than through freight forwarders would pay a lower rate).

On long distance routes sea becomes a relatively lower cost transport mode as its lower line haul costs offset the higher fixed costs for wharf handling. Similarly, long distance rail transport becomes a lower cost mode than road, largely because of fuel costs. Comparing rail and sea, pick up and delivery costs for FCLs are about the same although sea's transhipment costs are higher. The rate charged for transferring a 6.1m container between rail and road on the mainland is $15, while it is understood that the cost of moving a similar unit between wharf and ship is $75 or more.

Despite this disadvantage, sea does compete with road and rail over the longer mainland routes, ie Sydney and Melbourne to Perth, Darwin, and North Queensland. This raises the question of whether Tasmanian shippers suffer any transport disadvantage on long distance routes, since some mainland shippers also use sea transport for such consignments.

Some indication of how transport disadvantage varies as a function of distance is given by a comparison of Tables 5.2 and 5.3. Table 5.2 shows freight forwarder's rates for door to door consignments while Table 5.3 gives sea line haul rates from Tasmania to various mainland ports. The figures in the two tables are not exactly comparable since the land rates are for door to door movements while the sea rates are for wharf to wharf movements and do not include pick up and delivery costs. Pick up and delivery costs for consignors dealing direct with carriers could be up to about $150 to $200 per container although many shippers pay less. In any case this is not a cost item which varies with route length. The rates shown for the long distance ANL services out of Tasmania to North Queensland, Darwin and Fremantle also include container hire, while the rates to Sydney, Melbourne and Adelaide are for sea line haul only. It should also be noted that the sea rates shown are the standard schedule rates. Some shippers have negotiated special commodity rates lower than those shown in Table 5.3; such commodity rates on the Adelaide, Melbourne and Sydney routes may also include container hire.

TABLE 5.2 - FREIGHT FORWARDERS' MAINLAND INTERCAPITAL FREIGHT RATES, DECEMBER 1978(a)

Route	Road Distance (km)	Forward Leg		Back Leg	
		($/t)	(c/t/km)	($/t)	(c/t/km)
Sydney-Canberra	300	18	6.00	12	4.00
Melbourne-Canberra	652	28	4.29	19	2.91
Melbourne-Adelaide	745	27	3.62	20	2.68
Melbourne-Sydney	889	28	3.15	25	2.81
Sydney-Brisbane	998	31	3.11	22	2.20
Canberra-Adelaide	1 178	48	4.07	31	2.63
Canberra-Brisbane	1 298	56	4.31	38	2.93
Sydney-Adelaide	1 398	34	2.43	30	2.15
Melbourne-Brisbane	1 656	52	3.14	30	1.81
Adelaide-Brisbane	2 066	56	2.71	48	2.32
Adelaide-Perth	2 692	60	2.23	32	1.19
Adelaide-Darwin	3 178	98	3.08	55	1.73
Melbourne-Perth	3 333	80	2.40	42	1.26
Brisbane-Darwin	3 449	95	2.75	55	1.59
Melbourne-Darwin	3 819	118	3.09	70	1.83
Canberra-Perth	3 715	148	3.98	60	1.62
Sydney-Perth	3 900	89	2.28	52	1.33
Canberra-Darwin	3 975	170	4.28	95	2.39
Perth-Darwin	4 008	125	3.12	80	2.00
Sydney-Darwin	4 015	129	3.21	70	1.74
Brisbane-Perth	4 218	125	2.96	74	1.75

(a) Door-to door rates for full truck load consignments.

Source: Freight Rates: Commonwealth Department of Administrative Services, 1978 Road Distances: NRMA, 1979.

TABLE 5.3 - SEA LINE HAUL RATES FOR SHIPPING 6.1m ISO BOX EX TASMANIA, DECEMBER 1978[a]

Route	Line	Distance[b] (km)	($)	($/t)[c]	(c/t/km)
N.Tasmania-Melbourne	ANL	443	570	38.00	8.58
Hobart-Melbourne	USS	878	656	43.73	4.98
N.Tasmania-Sydney	ANL	968	849	56.60	5.85
N.Tasmania-Adelaide	HOL	1 088	868	57.87	5.32
Hobart-Sydney	USS	1 195	936	62.40	5.22
Hobart-Adelaide	HOL	1 436	998	66.53	4.63
N.Tasmania-Brisbane	ANL	1 896	938	62.53	3.30
N.Tasmania-Mackay	ANL	2 606	1 258	83.87	3.22
N.Tasmania-Townsville	ANL	2 955	1 281	85.40	2.89
N.Tasmania-Cairns	ANL	3 211	1 304	86.93	2.71
N.Tasmania-Fremantle	ANL	3 232	1 199	79.93	2.47
N.Tasmania-Darwin	ANL	5 515	1 759	117.27	2.13

(a) Rates include wharfage and wharf handling but not pick up or delivery. Container hire also included for Qld, NT and WA. 6.1m box is only unit carried on all routes shown but lower rates may be attained where 5.08m units are available. Some shippers have negotiated special commodity rates lower than the standard schedule rates shown.
(b) Berth to berth sea distance; see Table II.10 in Appendix II.
(c) Calculated for 15t load.

Source: For services from Tasmania to Sydney, Melbourne and Adelaide, printed freight rate schedules for: ANL, 9 December 1978; USS, 11 December 1978; Holymans, October 1978. Other rates calculated using ANL rates as at 22 November 1979 less 13 per cent, the proportion by which ANL coastal rates increased between December 1978 and November 1979. The ANL service to WA was introduced in early 1979.

A comparison of the figures in the tables suggests that Tasmania's transport disadvantage decreases over distance. For example, the land rate for Sydney-Brisbane shipments (998 km) was $31 per tonne while the sea line haul between Northern Tasmania and Sydney (968 km) cost $57 per tonne, a difference of $26 per tonne. For shipments to Fremantle, however, the rates were the same; $80 per tonne ex-Northern Tasmania (3211 km) and ex-Melbourne (3333 km)(1).

SUBSIDY IMPLICATIONS

This section discusses the implications of using estimated Tasmanian interstate land freight rates in setting TFES subsidies rather than the rates charged on the Nimmo comparison routes.

Table 5.4 shows hypothetical Tasmanian interstate land freight rates estimated from the regression equations identified in Chapter 4 (henceforth, the 'landbridge' method), using the assumptions specified earlier in this chapter (ie with distance measured direct between Tasmania and mainland centres and with origin and destination sizes being represented by population). The Table also shows the freight rates on the Nimmo comparison routes currently used in setting TFES subsidies. The rates shown were taken from the set of rates used in calculating the regression equations, rather than those used to calculate the latest TFES subsidy rates.(2) Thus, a comparison of the hypothetical 'landbridge' freight rates for each route with the rate on its Nimmo comparison route as specified in this Table gives an indication of the general effect of using regression equations to calculate Tasmania's transport disadvantage, but does not indicate the precise changes which would occur in current subsidy payments if this alternative method of calculating the subsidy rates was adopted.

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(1) The distances quoted ex-Tasmania are by sea and would be longer if adjusted to a land equivalent basis. Some Tasmanian interstate routes are close to Great Circle distances, whereas most mainland routes are at least 20 per cent longer than Great Circle Distances.

(2) The current northbound TFES rates were calculated using freight rates current at 1 January, 1978, whereas the calculations performed here are based on late 1978 freight rates.

Nevertheless, the rates shown in Table 5.4 can be used to assess the general effect of using the regression equations to calculate TFES subsidies as compared with the rates on Nimmo comparison routes. For example, the estimated 1978 'landbridge' rate for shipments from Northern Tasmania to Melbourne was $22 per tonne while the contemporary rate on its comparable Nimmo route, Melbourne to Adelaide, was $27 per tonne. In this example therefore the 'landbridge' method of setting subsidy rates would have given a subsidy $5 per tonne higher than the Nimmo method.

More generally, Table 5.4 suggests that the 'landbridge' method would produce higher subsidy rates than the Nimmo method between Tasmania and Victoria (both directions),(1) and between Western Australia and Tasmania (southbound only). Southbound rates for other routes are comparable under both methods. For northbound routes other than Tasmania to Victoria, the 'landbridge' method implies lower subsidy rates than the Nimmo method.

The general implications of the two methods for total TFES payments on northbound cargoes are indicated in Table 5.5.(2) To provide an order of magnitude reference base, 1979-80 outlays by route are also shown, although for the reasons explained above these are not on a strictly comparable basis with the other financial figures shown in the Table. The Table suggests that compared with the Nimmo method the 'landbridge' method would result in an increase of $1.0m in payments for Northern Tasmania to Victoria (representing a 13 per cent increase on 1979-80 outlays of $7.5m). Outlays for Southern Tasmania to Victoria would be about the same, while outlays on other northbound routes could be expected to be lower. Payments for cargoes to South Australia and Western Australia would be about 40 per cent of their 1979-80 level.

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(1) Except for northbound shipments from Southern Tasmania, which would receive a similar subsidy under either method.

(2) As illustrated in Table 1.1 payments on northbound cargoes account for over 90 per cent of total TFES payments, so this analysis has concentrated on northbound payments.

TABLE 5.4 - ESTIMATED 'LANDBRIDGE' FREIGHT RATES AND NIMMO COMPARISON ROUTE RATES 1978

(Dollars per tonne)

Route	Estimated 'Landbridge' Rate [a]		Nimmo Route[b]
	Northbound	Southbound	Rate
Northern Tasmania to			
Victoria	22	18	27
South Australia	47	31	31
NSW	42	28	31
Queensland	71	43	-
Western Australia	108	60	80
Southern Tasmania to			
Victoria	31	23	31
South Australia	54	35	34
NSW	49	32	31
Queensland	77	46	-
Western Australia	114	62	80

(a) The regression equations used to estimate the 'landbridge' rates are given in Table 4.2. Northbound rates were estimated with forward leg equations and southbound rates with back leg equations. Population weights used are 1976 Census urban locality figures for mainland capitals and total Tasmanian population. Direct distances are used. For details of population and distances assumed, see Appendices II and III.

(b) Comparison routes currently used are: Melbourne-Adelaide for Northern Tasmania-Victoria; Sydney-Brisbane for Northern Tasmania-NSW, Northern Tasmania-South Australia, Southern Tasmania-Victoria, and Southern Tasmania-NSW; Sydney-Adelaide for Southern Tasmania-South Australia; Melbourne-Perth for Northern and Southern Tasmania to Western Australia. Queensland and NT shipments are paid NSW rates.

It should be noted that the difference in outlays of $5m shown in Table 5.5 relates to northbound dry cargoes only. This reduction would be partly offset by increased payments for livestock, refrigerated cargoes and southbound cargoes.(1) The increase in outlays on these three categories would be in the range of $0.5m to $1.2m, depending on the distance assumptions adopted in calculating subsidy rates. The calculation of TFES subsidy for livestock and refrigerated cargoes is discussed in Chapters 6 and 7 respectively.

The foregoing results have been inferred from differences in the respective reference bases (ie freight rates on Nimmo comparable routes and via a hypothetical Tasmania-mainland landbridge) rather than by any direct calculation of actual subsidy rates. Because of the significant changes implied in the structure and total level of TFES payments, it was decided to undertake a partial recalculation of a representative set of subsidy rates for northbound cargoes. The calculations were carried out using mainland freight forwarders' door-to-door rates for full truck loads, and with rates to/from Tasmania taken as sea freight rates plus a constant amount on all routes for pick up and delivery and for freight forwarders' profit. Since profit mark-ups may vary between forwarders and between routes the results, which are shown in Table 5.6, are only indicative. However, they do confirm the general results inferred indirectly in Table 5.5. That is, compared with the Nimmo method the 'landbridge' method produces a higher subsidy rate for Northern Tasmania to Victoria, about the same subsidy rate for Southern Tasmania to Victoria, and lower subsidy rates on the longer routes.

As a general proposition, there is essentially just one step in the structure of Nimmo subsidy rates, whereby consignments to all mainland States other than Victoria receive a higher rate than consignments to Victoria. (Details of the comparison routes currently used to set Nimmo subsidy rates are provided in Table 5.4.) By contrast, the 'landbridge' method implies subsidy rates which decline with increasing distance (as well as with decreasing size of destination).(2) This structure of subsidy rates is more consistent with

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(1) Southbound TFES subsidies would increase if routes from the mainland to Tasmania are defined as back leg routes.

(2) For example, although the distances to NSW and SA are similar, implied subsidy rates to the latter are generally lower because the regression equations suggest that 'landbridge' freight rates would be higher to a smaller destination than to a larger one.

TABLE 5.5 - FINANCIAL IMPLICATIONS OF BASING NORTHBOUND TFES RATES ON HYPOTHETICAL 'LANDBRIDGE RATES'

Route	Quantity Shipped ('000t)(a)	Nimmo Route Freight Rate ($/t)(b)	'Landbridge' Rate ($/t)(c)	Difference in Implied Subsidy Rate ($/t)(d)	Difference in Outlays ($'000)(e)	Actual 1979-80 Outlays ($'000)(f)
N.Tasmania to						
Vic	200	27	22	+ 5	+1 000	7 500
SA/WA	43	31	47	-16	- 688	1 353
NSW/Qld	200	31	42	-11	-2 200	8 030
S.Tasmania to						
Vic	183	31	31	0	0	3 871
SA/WA	37	34	54	-20	- 740	1 095
NSW/Qld	134	31	49	-18	-2 412	3 832
TOTAL	798	-	-	-	-5 040	25 681

(a) Estimated tonnes weight of Tasmanian northbound cargoes receiving TFES assistance in 1979-80 excluding refrigerated cargoes and livestock.
(b) Freight forwarders' rate charged on mainland comparison route, December 1978.
(c) Estimated 1978 Tasmanian-mainland land rates using direct distances (see Table 5.4).
(d) Difference between estimated Tasmanian interstate land rate and Nimmo route rate.
(e) Effect on total outlays of basing TFES calculations on estimated Tasmanian mainland freight rates rather than Nimmo route rates.
(f) These are not strictly comparable with the figures shown in the 'Difference in Outlays' column. The latter are based on late 1978 freight rates but current northbound subsidy rates (reflected in 1979-80 outlays) are based on early 1978 freight rates.

TABLE 5.6 - COMPARISON OF ILLUSTRATIVE NORTHBOUND SUBSIDY RATES, 1978[a]

(Dollars per tonne)

Route	Deadweight Cargo[b]		Non-Deadweight Cargo[c]	
	Nimmo Method	Landbridge Method	Nimmo Method	Landbridge Method
N.Tasmania to				
Vic	9	14	20	25
SA	18	2	31	15
NSW	18	7	30	19
Qld	18	0	30	3
WA	18[d]	0	31[d]	0
S.Tasmania to				
Vic	10	10	21	21
SA	21	1	36	16
NSW	20	2	34	16

(a) Tasmanian interstate rates were taken as sea freight rates on each route plus a fixed amount on all routes for pick up and delivery and forwarders' profit. As forwarders' profit mark-ups may differ between routes, the results cited here are only indicative.
(b) Deadweight cargo is defined as cargo stowing up to one cubic metre per tonne. Calculation based on 5.08 metre unit loaded to a height of 1.37 metres.
(c) Defined as cargo stowing more than one cubic metre per tonne. Calculation based on 5.08 metre unit loaded to a height of 2.50 metres.
(d) In 1978 WA cargoes received same subsidy rate as SA cargoes. Subsequently lower rates were introduced for WA, based on using Melbourne-Perth as comparable route.

the relationship that one would expect to exist between distance and the 'disadvantage' of sea transport compared with land transport, as discussed earlier in this chapter. That is, all other things being equal, the 'disadvantage' of being dependent on sea transport would appear to be greatest on short routes and to diminish with distance. It is difficult to see why this 'disadvantage' should increase with distance, as implied by the Nimmo method and the current structure of TFES rates.

It should be noted, however, that there may be administrative difficulties with instituting a structure of subsidy rates corresponding exactly to that implied by the 'landbridge' method, as shown in Table 5.6. The payment of a higher subsidy on shipments into Victoria than to more distant destinations might encourage shippers to consign cargo to Victoria (for onward shipment to another State) in order to obtain the maximum possible TFES payment. However, if the general structure of the illustrative rates shown in Table 5.6 is confirmed by more detailed calculations, it may be possible to simplify the subsidy rate structure. For example, perhaps the one rate could be set for shipments of non-deadweight cargoes to Victoria, SA and NSW. It would still be possible for shipments to WA and Queensland to obtain higher TFES payments than their entitlement by staging the shipments into these other States, but the magnitude of the problem would have been significantly reduced, because shipments to WA and Queensland are only a small proportion of Tasmania's interstate exports (see Table 4.1).

Another area where some averaging might be considered relates to the present difference that occurs between subsidy rates from Southern Tasmania compared with Northern Tasmania. Under the Nimmo method subsidies for consignments from Southern Tasmania are greater than for consignments from Northern Tasmania, whereas the 'landbridge' method implies that, if anything, this relativity should be reversed. Depending on the degree of averaging which is considered acceptable, it might be reasonable on policy grounds to set one rate for all Tasmania.

CHAPTER 6 - LIVESTOCK

The previous chapter described how the transport disadvantage on shipments of general cargo could be measured as the difference between actual sea rates and estimated Tasmanian interstate 'land' freight rates. Transport of livestock and refrigerated cargo differs significantly from general cargo. Accordingly, these transport operations are considered separately, in this, and the following chapter.

TASMANIAN SHIPMENTS

Livestock shipments from Tasmania are normally consigned in special trailers or 5.08 metre containers. The capacity of each cargo unit is determined by the type of animal being shipped as well as its age and value; in order to reduce the risk of injury the number of stud animals loaded in a container or trailer is usually less than its maximum capacity of store animals. With horses, however, it is understood that the best practice is to load one animal per stall whatever its value.

In order to minimise time at sea, most livestock consignments are shipped from Northern Tasmania to Melbourne. Shipments going beyond Melbourne are usually forwarded on by road transport, although WA cargoes may be sent by rail.

Most livestock shipments from Tasmania are consigned through specialist carriers and as far as is known no animals are shipped through ordinary freight forwarders. The rates charged for shipments between Northern Tasmania and Melbourne are based on the ANL sea line haul rate for livestock plus other expenses and a profit mark-up. It is understood that ANL charges a special commodity rate for livestock which is less than the rate charged on shipments of general cargo in similar containers and trailers. The going land transport rate for livestock movements is charged from Southern Tasmania to the northern ports and from Melbourne to other mainland destinations.

MAINLAND MOVEMENTS

Although there is no detailed information on mainland livestock movements, data available suggest that most interregional and interstate shipments are consigned by road. Rail shipments comprise mainly intra-state movements to coastal abattoirs.

The most efficient vehicle for long distance movements is the 12 metre 2/3 deck trailer which can be adapted to carry three decks of sheep or two decks of cattle. Some four deck sheep trailers are also in use but these vehicles are not so popular with carriers because they cannot be used for carrying cattle. As with Tasmanian shipments, the capacity of any trailer depends on the type, age, and value of the animals being carried. Stud animals are usually loaded on only one deck.

The rate charged by livestock carriers for mainland movements is usually expressed in terms of a rate per loaded truck kilometre. Rates quoted to the BTE in November 1980 for shipments over 400 kilometres ranged from $1.20 per loaded kilometre for a two deck 12 metre trailer, to $1.35 per kilometre for a 2/3 deck unit and up to $1.50 per kilometre for a four deck trailer. Higher rates per kilometre are charged for shorter movements.

PREVIOUS RECALCULATIONS

The method used by the BTE in the previous two recalculations of TFES livestock rates (BTE, 1978a & 1979a) was similar to that used in setting subsidies for other cargoes, ie the subsidies were calculated using the standard set of Nimmo comparison routes. For example, for shipments from Northern Tasmania to NSW the subsidy was calculated as the freight rate from Northern Tasmania to Melbourne, plus the road rate for livestock from Melbourne to Sydney (889 km), less the road rate for shipments from Sydney to Brisbane (998 km).

As with general cargo, a strict application of the Nimmo formula in calculating TFES subsidies for livestock may result in inconsistencies between the subsidies for shipments from Northern and Southern Tasmania.(1) In the last recalculation of TFES subsidies (BTE, 1979a), therefore, the same rates were set for shipments from Northern and Southern Tasmania.

A further problem encountered in setting TFES rates for livestock was the need to define equivalent loading figures for Tasmanian and mainland cargo units in order to calculate unit transport costs from the full truck load or full container load rates quoted by carriers, eg if it is assumed that a three deck trailer can carry say 340 lambs, then it is necessary to estimate how many lambs of the same size and condition could be loaded in a 5.08 metre container.

TASMANIA-MAINLAND LAND RATES

Given that land transport rates for livestock are normally quoted in terms of a rate per loaded trailer kilometre, it is possible to calculate the cost to a shipper of consigning a full trailer load of animals over routes comparable to the distance of Tasmania-mainland shipments. To carry out such a calculation, it is necessary to define a method of measuring distances between Tasmania and the mainland. As discussed in the previous Chapter, the options include direct distance between the origin and destination, or distance via Melbourne. The transport disadvantage on livestock can then be defined as the difference between the actual rates charged for shipping cargoes from Tasmania to the mainland and the estimated land transport rate for sending a similar consignment over the same distance.

This approach would result in higher rates for shipments into Melbourne than those currently applying, whether distance is measured direct or via Melbourne. If distance is measured via Melbourne, then the same subsidy rate would apply on all livestock shipments from Tasmania to the mainland whatever the destination. (Although, of course, different rates would apply to animals of different sizes.) If distance is measured direct between origin and destination, then the rate for shipments from Northern Tasmania to the Sydney or Adelaide areas will be the same or lower than current subsidy levels.

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(1) The primary cause of such inconsistencies is the use of different mainland comparison routes for shipments from Southern and Northern Tasmania.

TFES subsidy rates for livestock, calculated using the 'landbridge' concept, are given in Table 6.1 and discussed in the last section of this chapter.

HORSES

Firms providing a service for transporting horses operate on some mainland intercapital routes using special horse floats of various sizes. On any specific route the firms usually quote a rate per horse although some may be willing to negotiate a full-float rate.

The 1979 recalculation of TFES rates for horses (BTE, 1979a) was based on the method used by the Nimmo Commission. As for other livestock the Tasmanian costs were calculated for shipments through Melbourne. The Northern Tasmania to Melbourne route is preferred by shippers in order to minimise time at sea, and it is rare for horses to be carried on other sailings.

The transport disadvantage on shipments of horses can be calculated by a method similar to that outlined for other livestock in the previous section. The rates for shipments over a distance comparable to Tasmania-mainland consignments can be calculated using the average of a sample of mainland long distance freight rates for horses.

The number of horses being shipped across Bass Strait with TFES assistance is very small compared to sheep and cattle consignments. For example, in 1979-80 northbound TFES payments on horses totalled just over $3 000. Therefore, the subsidy rates for horses based on the 'landbridge' concept have not been calculated.

SUBSIDY IMPLICATIONS

Table 6.1 shows TFES rates for livestock calculated using the 'landbridge method' with distances measured direct between Tasmania and mainland centres. The calculations were based on the same cost figures used in setting the 1979 TFES livestock rates. In this calculation, Tasmanian rates were taken as the costs of shipping livestock into Melbourne then onward by road to Sydney or Adelaide. Road rates were calculated using the rate per kilometre charged by livestock transporters in January 1979. The 'landbridge' rates were calculated as the product of the mainland road rate per kilometre and the distances over the hypothetical Tasmanian landbridge.

TABLE 6.1 - ESTIMATED 'LANDBRIDGE' TFES RATES FOR LIVESTOCK AND 1979 TFES RATES(a)

($ per head)

	Tasmania(b) to		
	Melbourne	Adelaide	Sydney
Lambs & Ewes	3 (2)	3 (4)	3 (4)
Rams	4 (3)	4 (5)	5 (6)
Calves	15 (10)	15 (17)	17 (18)
Yearlings	20 (15)	20 (23)	23 (25)
Cows	27 (20)	27 (31)	31 (33)
Bulls	30 (23)	31 (35)	35 (38)

(a) The TFES rates introduced in 1979 are shown in brackets. The 1979 rates were calculated using the Nimmo Commission method.
(b) In this example it is assumed that the same TFES rates would be paid on consignments from Northern and Southern Tasmania.

NOTE: The rates in this Table were calculated with distances measured direct betwen Tasmania and mainland centres. If distances were measured via Melbourne, then subsidy rates to NSW or SA would be the same as for Melbourne.

Table 6.1 also shows the livestock rates introduced in 1979 which were calculated using the Nimmo Commission method. For sheep the 'landbridge' method gives subsidy rates $1 per head higher for shipments to Victoria and $1 per head lower for SA and NSW. For cattle the Victorian rates are $5 to $7 per head higher and the rates to other destinations up to $4 per head lower.

In the Table 6.1 example, the 'landbridge' subsidy rates are approximately the same for all destinations. This suggests the possibility of simplifying the Scheme by setting one rate to all destinations. The higher rates for NSW shipments shown in Table 6.1 reflect the method of calculation used rather than any inherently higher transport disadvantage. Under current arrangements subsidies on shipments of livestock to NSW and SA are calculated on the costs of shipments to Sydney and Adelaide via Melbourne. In this example, therefore, NSW TFES rates are higher because the Melbourne-Sydney road distance is greater than the Melbourne-Adelaide distance, while the direct 'landbridge' distances to both capitals are about the same. Subsidy rates to SA and NSW would be the same if calculated for centres which are at equal road distances from Melbourne and equal 'landbridge' distances from Northern Tasmania. Subsidy rates to all mainland destinations would be exactly the same if distances were measured via Melbourne rather than direct between Tasmanian and mainland centres.

Relative to the current subsidy levels the 'landbridge' subsidy rates given in Table 6.1 would result in higher total TFES outlays for both sheep and cattle. For sheep the increase would be about $100 000 per annum if the Victorian rates were paid on all shipments or about $130 000 if higher rates were paid on NSW shipments.

With cattle, nearly all shipments are sent to Victoria and the 'landbridge' rates would result in increased outlays of about $80 000 per annum whether or not a higher rate were paid on NSW shipments. These estimates are based on the number of livestock shipped from Tasmania to the mainland in 1979-80 and on the assumption that shipments of sheep comprise mainly lambs and ewes and shipments of cattle comprise mainly yearlings. Larger animals are shipped but comprise only a minority of consignments. TFES payments for 1979-80 totalled $435 000 for sheep and $272 000 for cattle. It should be noted, however, that these totals comprise claims based on the 1978 TFES rates as well as those based on the livestock rates introduced in 1979. Therefore, the 1979-80 figures do not give a precisely accurate base for calculating total livestock outlays resulting from TFES rates based on the 'landbridge' concept.

Outlays for southbound shipments of livestock would also increase if TFES subsidies were calculated using the 'landbridge' concept but the amount should be small since southbound livestock shipments in 1979-80 totalled less than 500 animals.

CHAPTER 7 - REFRIGERATED TRANSPORT

This chapter discusses the feasibility of calculating TFES subsidies for refrigerated cargoes using the 'landbridge' method outlined in Chapter 5 in relation to dry cargoes. Refrigerated transport is provided by a specialised sector of the transport industry, using specialised equipment and with the market setting separate freight rates for its services. Separate calculations must therefore be carried out in determining the TFES subsidies to be paid on refrigerated cargoes. This chapter deals mainly with the method for setting TFES subsidies. An outline of the principal characteristics of refrigerated transport operations is provided in Appendix IV. Much of the data in this chapter and Appendix IV were taken from a paper prepared for the BTE by a consultant.

ANALYSIS OF FREIGHT RATES

Table 7.1 shows freight rates for refrigerated movements over major intercapital mainland routes as at September 1980. Forward leg routes for refrigerated cargoes are the same as for dry cargoes. The Table does not show rates from Perth to Sydney or Melbourne since it is understood that few, if any, shippers regularly consign cargoes from WA to the eastern States although some miscellaneous commodities are carried at low backloading rates. The table shows three rates for each route: a lowest rate, a top rate, and an estimated average rate. The lowest rate would be slightly below the going spot market rate and would apply where shipper and transport operator were able to co-operate in minimising transport costs for regular consignments of a large amount of cargo. The top rate shown would be a contract rate for regular consignments of moderate quantities of cargo.

Some rates are also affected by route specific factors. Transport operators serving WA must cover all costs on the westbound leg because little cargo is shipped east, although this cost problem is at least partly offset by using overseas containers being re-positioned to Perth. Back loading rates are also charged from Brisbane to southern capitals for much of the year although there are some regular consignments of frozen vegetables on these routes. When fresh fruit and vegetables are in season, however, demand for refrigerated southbound transport from Brisbane increases substantially, together with freight rates. Last, certain refrigerated cargo rates are said to be depressed because of overloading practices by some carriers. Overloading is said to be attempted on routes where, for example, margarine (a dense product by refrigerated cargo standards) comprises a significant proportion of cargoes.

TABLE 7.1 - REFRIGERATED CARGO RATES, SEPTEMBER 1980

(Cents per kilogram)

Route	Lowest[a] Rate	Top[b] Rate	Average Rate
Melbourne-Sydney	3.40	4.50	3.85
Melbourne-Brisbane	6.50	9.00	7.40
Melbourne-Adelaide	2.70	4.50	3.25
Melbourne-Perth	13.90	18.00	15.65
Sydney-Melbourne	2.30	4.00	2.90
Sydney-Brisbane	4.10	5.20	4.40
Sydney-Adelaide	4.60	7.80	5.20
Sydney-Perth	16.50	18.00	17.50
Brisbane-Melbourne	5.00	6.00	5.75
Brisbane-Sydney	3.30	4.00	3.60
Adelaide-Melbourne	2.00	2.50	2.20
Adelaide-Sydney	4.00	4.60	4.40

(a) The lowest rate shown here is slightly lower than the going 'spot' market rate and would apply where consignor and transport firm co-operate to minimise transport costs.
(b) Contract rates for shipping moderate quantities of cargoes.

Source: Various refrigerated cargo carriers and consignors.

Table 7.2 gives the results of a regression analysis of the freight rates for refrigerated cargoes shown in Table 7.1 using the average freight rate paid figure. Both forward and back leg rates were included in the data set used in the analysis together with a dummy variable, D_1, set equal to one on forward legs and zero for back leg routes. The results were similar for both linear and logarithm functional forms. Although the number of observations is small (twelve), it does include those routes which account for the majority of mainland refrigerated freight movements. Equations incorporating population figures for the origin and destination, like those discussed in Chapter 4, did not give satisfactory results. Data available precluded experimentation with equations incorporating freight consignments from each centre.

Both linear and logarithm form equations resulted in $\bar{R}^2$ values over 0.9. The equations illustrate an interesting feature of refrigerated cargo rates, namely that the rates per tonne kilometre do not vary greatly with distance. As a generalisation, the average rate on forward legs is about 4.3 cents per tonne kilometre while on back legs the figure is about 3.3 cents per tonne kilometre (see Table 7.3). Rates out of Perth would be much lower. By contrast the analysis of dry cargo rates in Chapter 4 indicates that the rate per tonne kilometre decreases with distance.

TABLE 7.2 - REGRESSION EQUATIONS FOR REFRIGERATED CARGO FREIGHT RATES

Equation	$\bar{R}^2$/DF
$FR = .0046\ DIST + 1.14\ D_1 - 1.41$	.99
(29.2) (3.6)	9
$\ln FR = 1.05 \ln DIST + .26\ D_1 - 6.03$	.99
(23.9) (5.7)	9

Where : FR = Freight rate (c/kg)
DIST = Road distance (km)
D_1 = Set as one on forward leg routes and zero on back leg routes.
't' values are in parenthesis.

Source: Estimated from data shown in Table 7.1 and Appendices II and IV.

TABLE 7.3 - FREIGHT RATES PER TONNE KILOMETRE FOR REFRIGERATED CARGOES, SEPTEMBER 1980

Route	Distance (km)	Forward Leg		Back Leg	
		(c/kg)[a]	(c/t/km)	(c/kg)[a]	(c/t/km)
Melbourne-Adelaide	745	3.25	4.36	2.20	2.95
Melbourne-Sydney	889	3.85	4.33	2.90	3.26
Sydney-Brisbane	998	4.40	4.41	3.60	3.61
Sydney-Adelaide	1 398	5.20	3.72	4.40	3.15
Melbourne-Brisbane	1 656	7.40	4.47	5.75	3.47
Melbourne-Perth	3 333	15.65	4.70	(b)	-
Sydney-Perth	3 900	17.50	4.49	(b)	-

(a) Average freight rates shown from Table 7.1.
(b) Very little refrigerated cargo is regularly shipped from WA to eastern States.

Source: Table 7.1.

SUBSIDY IMPLICATIONS

The financial implications of using the 'landbridge' method to calculate TFES subsidies are shown in Tables 7.4 and 7.5.

Table 7.4 shows the rates charged on the various Nimmo Commission comparison routes together with the predicted Tasmanian 'landbridge' rates. The Nimmo route rates were taken from the set of 1980 freight rates given in Table 7.1 while the 'landbridge' rates were calculated with the logarithmic form equation in Table 7.2

TABLE 7.4 - ESTIMATED 'LANDBRIDGE' FREIGHT RATES FOR REFRIGERATED CARGOES AND NIMMO COMPARISON ROUTE RATES, 1980

(Dollars per tonne)

Route	Nimmo[a] Route Rate	Direct 'Landbridge'[b]		'Landbridge' Via Melbourne[b]	
		Rate	Difference[c]	Rate	Difference[c]
N.Tasmania to					
VIC	32	19	+13	19	+13
SA	44	50	- 6	52	- 8
NSW	44	50	- 6	58	-14
WA	156	172	-16	172[d]	-16
S.Tasmania to					
VIC	44	31	+13	31	+13
SA	52	63	-11	65	-13
NSW	44	63	-19	71	-27
WA	156	185	-29	185[d]	-29

(a) Nimmo Commission comparison routes are given in Table 2.1. These rates are taken from the set of 1980 rates given in Table 2.1.
(b) 'Landbridge' rates calculated using the logarithm form equation given in Table 7.2 and direct 'landbridge' distances in Table III.1.
(c) Difference between Nimmo route rate and estimated rate.
(d) For shipments to WA, the distance via Melbourne is the shortest route.

Source: Nimmo route rates, Table 7.1, 'Landbridge' rates calculated using logarithmic equation from Table 7.2.

The effect on TFES rates of using the 'landbridge' method can be seen by comparing the predicted 'landbridge' rate on each route with its equivalent Nimmo comparison route. For example, the predicted 'landbridge' rate from Northern Tasmania to Victoria is $31 per tonne while the rate on the equivalent mainland comparison route is $44 per tonne. On this route therefore the 'landbridge' method would give a subsidy rate $13 per tonne higher than the Nimmo Commission method when applied to 1980 freight rates.

Overall, the 'landbridge' method would give higher subsidies on shipments to Victoria but lower subsidies to other States. As explained in Chapter 5, this occurs because the transport disadvantage of being reliant solely on sea transport can be expected to decline with increasing distance, other things being equal.

The changes in subsidy levels would be the same for Victoria cargoes whether Tasmania-mainland distances are measured direct or via Melbourne. For SA and NSW cargoes, however, measuring distances via Melbourne would give the greater reduction in subsidies. The table shows the same reduction in subsidies for both distance options to WA because the route via Melbourne is the shortest 'landbridge' distance to WA.

The effect on total TFES outlays for refrigerated cargoes of calculating subsidy rates by the 'landbridge' method is shown in Table 7.5. The estimate is based on the quantities of refrigerated cargoes shipped to Tasmania in 1979-80. Unfortunately, separate figures are not available of the quantities of cargo shipped from Northern Tasmania to SA and WA, although it is known that significant quantities of refrigerated products are consigned to Perth. In preparing this table it was assumed that all cargoes are consigned to SA. The reduction in outlays on SA/WA cargoes is therefore understated by perhaps $10 000 to $20 000.

Table 7.5 shows that if TFES subsidies for refrigerated cargoes were calculated by the 'landbridge' method rather than by the Nimmo method, then total subsidy outlays would increase by $253 000 per annum if distances are measured direct from Tasmania to mainland centres or by $72 000 if distances are measured via Melbourne. Subsidies on shipments to Victoria would increase by $648 000 but this would be offset by lower payments to other areas.

TABLE 7.5 - FINANCIAL IMPLICATIONS OF CALCULATING TFES RATES ON REFRIGERATED CARGOES BY 'LANDBRIDGE' METHOD, 1980

Route	Quantity Shipped 1979-80 (t)	Change in Outlays Distance Measured: Direct ($'000)	Via Melbourne ($'000)
Northern Tasmania to			
VIC	48 198	+626.6	+626.6
SA/WA(a)	2 423	- 14.5	- 19.4
NSW	29 330	-176.0	-410.6
Southern Tasmania to			
VIC	1 630	+ 21.2	+ 21.2
SA/WA	705	- 7.8	- 9.2
NSW	5 068	- 96.3	-136.8
TOTAL	87 354	+353.2	+ 71.8

(a) Separate figures are not available for 1979-80 on the quantity shipped to WA and SA. In this calculation it is assumed that all shipments go to SA although it is understood that significant quantities are consigned from Northern Tasmania to Perth. Since the reduction in TFES outlays on WA cargoes would be greater than for SA consignments the reduction in TFES outlays from Northern Tasmania to SA/WA would be greater than the figures shown here, perhaps by $10 000 to $20 000.

Source: Quantity shipped taken from Department of Transport Australia records; changes in outlays derived from Table 7.4.

CHAPTER 8 - TFES OBJECTIVES AND ADMINISTRATION

This chapter comments briefly on the extent to which TFES objectives are being met, then discusses various matters which warrant consideration in calculating TFES subsidies and in administering the Scheme.

TFES OBJECTIVES

As noted in Chapter 1, the aims of TFES as listed by the Nimmo Commission are to offset hardship suffered by Tasmanian industry due to its higher interstate transport costs, to stimulate development of the Tasmanian economy, and to encourage the development of an efficient Tasmanian interstate transport system.

On the question of whether the TFES offsets the 'transport disadvantage' suffered by Tasmanian industry, as mentioned in Chapter, 2 any measure of 'transport disadvantage' based solely on comparative freight rates is likely to be an underestimate. This is because the unreliability of sea transport relative to land transport (especially road transport) imposes on shippers costs which are not reflected in the freight costs. It may, for example, require higher inventories, or restrict the opportunities for development of mainland markets. However, it is extremely difficult to quantify these indirect costs, or compensate for them. If 'transport disadvantage' is defined solely with reference to comparative freight rates, the discussion in Chapters 5 to 7 above suggests that as a general proposition the current method of calculating TFES subsidies may result in shipments to Victoria being 'under-compensated' while those to more distant destinations are 'over-compensated'. Accordingly, it is suggested that it would be possible to devise a structure of subsidy rates which more precisely compensates Tasmania for its 'transport disadvantage', although administrative considerations may preclude absolute precision in such compensation.

Turning to the second objective of TFES, an analysis of the effects of TFES assistance on the Tasmanian economy is beyond the terms of reference of this study and would be a major project in its own right. Some preliminary observations can be made on the basis of the output and employment statistics presented in Tables 8.1 to 8.4. From Tables 8.1 to 8.3 it appears that, taken

TABLE 8.1 - TASMANIA'S SHARE OF EMPLOYMENT IN AUSTRALIAN MANUFACTURING, 1971-72 TO 1977-78

(Per cent)

ASIC code (a)	Industry	1971-72	1972-73	1973-74	1974-75	1975-76	1976-77	1977-78
2131	Fruit products	6.5	6.2	5.8	6.4	2.2	1.9	3.3
2132	Vegetable products	10.0	9.7	9.9	9.2(b)	9.1(b)	10.0(b)	12.1
214 217	Margarine and other food products	4.1	3.7	4.3	4.0(b)	4.0(b)	4.2(b)	4.9
2531	Log sawmilling	10.1	9.5	9.3	7.8	7.5	11.2	9.9
2532	Resawn & dressed timber	13.9	12.9(b)	12.9	14.7	15.7	10.1	9.6
2533	Veneers & manufactured boards	5.2(b)	5.2(b)	5.2	5.7	6.2	4.8(b)	4.1(b)
2631	Pulp, paper, paperboard	37.0	36.3	34.5	34.3	33.5	34.2	36.8(b)
275	Basic chemicals	7.1	6.8	6.5	6.1	6.3	6.2	5.7
29	Basic metal products	4.1	4.0	3.8	3.6	3.4	3.8	3.7
	Above Industries(b)	7.4	7.1	7.0	6.7	6.5	6.8	6.9
	Remainder of Manufacturing(b)	1.5	1.5	1.5	1.4	1.5	1.5	1.5
21-34	ALL MANUFACTURING	2.4	2.4	2.4	2.3	2.3	2.4	2.4

(a) Industries listed are those which account for most (over 80 per cent) of TFES subsidies to manufacturing industries.
(b) Estimated.

Source: Derived from material prepared by Central Statistical Unit, DOTA, using data supplied by ABS.

TABLE 8.2 - TASMANIA'S SHARE OF VALUE ADDED IN AUSTRALIAN MANUFACTURING, 1971-72 TO 1977-78

(Per cent)

ASIC code	Industry[a]	1971-72	1972-73	1973-74	1974-75	1975-76	1976-77	1977-78
2131	Fruit products	3.4	3.9	4.0	3.0	1.5	1.6	2.6
2132	Vegetable products	7.8	7.1	6.8	8.2[b]	9.6[b]	8.4[b]	9.7
214 217	Margarine and other food products	3.2	4.0	4.2	3.5[b]	3.8[b]	3.9[b]	4.2
2531	Log sawmilling	7.7	8.4	8.8	7.5	6.5	13.5	9.7
2532	Resawn & dressed timber	13.4	14.0[b]	13.2	22.9	20.2	10.6	9.3
2533	Veneers & manufactured boards	4.9[b]	6.9[b]	7.3	7.2	7.0	8.1[b]	5.4[b]
2631	Pulp, paper, paperboard	30.5	29.5	27.9	32.4	29.8	35.0	39.0[b]
275	Basic chemicals	5.7	5.8	4.4	4.2	5.4	5.1	4.8
29	Basic metal products	5.5	5.1	5.2	5.2	5.3	4.8	3.1
	Above Industries[b]	7.0	6.9	6.8	6.9	7.1	7.1	6.1
	Remainder of Manufacturing[b]	1.4	1.6	1.5	1.4	1.5	1.6	1.5
21-34	ALL MANUFACTURING	2.5	2.6	2.6	2.6	2.7	2.8	2.5

(a) Industries listed are those which account for most (over 80 per cent) of TFES subsidies to manufacturing industries.
(b) Estimated.

Source: Derived from material prepared by Central Statistical Unit, DOTA, using data supplied by ABS.

TABLE 8.3 - TASMANIA'S SHARE OF TURNOVER IN AUSTRALIAN MANUFACTURING, 1971-72 TO 1977-78

(Per cent)

ASIC code	Industry[a]	1971-72	1972-73	1973-74	1974-75	1975-76	1976-77	1977-78
2131	Fruit products	3.7	3.8	3.8	3.0	1.7	1.5	1.9
2132	Vegetable products	9.3	8.7	8.0	9.2[b]	9.1[b]	9.4[b]	11.9
214 217	Margarine and other food products	2.9	2.7	2.9	2.4[b]	2.7[b]	2.7[b]	3.0
2531	Log sawmilling	9.4	9.5	9.2	8.2	7.3	11.5	10.4
2532	Resawn & dressed timber	13.9	12.6[b]	11.3	14.1	13.2	8.0	7.7
2533	Veneers & manufactured boards	5.2[b]	7.2[b]	6.7	7.1	7.0	7.3[b]	5.2[b]
2631	Pulp, paper, paperboard	29.3	29.3	28.1	31.0	28.1	31.2	34.0[b]
275	Basic chemicals	5.1	5.0	4.3	3.9	4.0	3.9	4.0
29	Basic metal products	5.1	5.0	4.7	4.7	4.8	4.9	4.3
	Above Industries[b]	6.3	6.3	6.0	5.8	5.9	5.9	5.8
	Remainder of Manufacturing[b]	1.4	1.5	1.6	1.5	1.6	1.6	1.6
21-34	ALL MANUFACTURING	2.5	2.5	2.6	2.6	2.6	2.7	2.6

(a) Industries listed are those which account for most (over 80 per cent) of TFES subsidies to manufacturing industries.
(b) Estimated.

Source: Derived from material prepared by Central Statistical Unit, DOTA, using data supplied by ABS.

TABLE 8.4 - TASMANIA'S SHARE OF AUSTRALIAN OUTPUT OF SELECTED AGRICULTURAL PRODUCTS,[(a)] 1971-72 TO 1978-79

(Per cent, by weight)

Product	1971-72	1972-73	1973-74	1974-75	1975-76	1976-77	1977-78	1978-79
Apples	31.0	31.3	34.1	26.3	26.4	23.8	24.6	24.7
Beans	15.7	18.6	23.7	23.1	26.2	31.4	25.4	29.9
Carrots	6.9	7.6	8.6	7.5	6.3	6.9	7.4	7.3
Hops	62.8	68.6	68.0	63.4	60.2	62.2	55.6	66.2
Peas	35.1	39.8	37.2	38.9	45.7	51.1	62.2	57.5
Potatoes	8.6	10.9	9.7	12.9	13.7	15.4	13.9	15.7
Turnips	38.5	39.3	40.8	36.1	34.3	38.7	28.8	32.8
Cheese	7.3	7.7	8.8	12.6	11.8	12.7	12.0	12.4
Honey	2.0	2.3	2.3	2.8	2.9	3.7	4.1	3.7
Meat	2.9	3.2	3.4	3.2	3.2	2.9	2.9	2.5
Wool	2.4	2.5	2.5	2.4	2.6	2.6	2.8	2.7
ABOVE PRODUCTS	6.8	7.9	8.0	7.7	7.2	7.5	7.0	7.7

(a) Products listed are those receiving TFES assistance.

Source: Derived from material prepared by Central Statistical Unit, DOTA, using data supplied by ABS.

as a group, Tasmanian manufacturing industries receiving TFES assistance have not increased in importance relative to the Australian total, as measured by employment, value added, or turnover. However, the ASIC industry groups which account for the bulk of TFES northbound payments have shown some growth, or at least a reversal of a previous trend of accounting for a declining percentage of Australian manufacturing activity. (Refer to the categories Vegetable products, Margarine and other food products, Log sawmilling, and Pulp, paper and paperboard.) Tasmania's share of total Australian output of some agricultural products has increased considerably since TFES was introduced (Table 8.4).(1) This applies particularly to peas, production of which has increased from 20 688 tons (46 per cent of total Australian production) in 1975-76 to 30 189 tons (57 per cent of total Australian production) in 1978-79.

However, it may be noted that merely studying the performance of Tasmanian industries since 1976 would not necessarily give an accurate indication of the effects of TFES. Rather, it would be necessary to distinguish the effects of TFES subsidies from the results of other factors influencing the Tasmanian economy. Industries which have increased output over the period might have done well without TFES subsidy while industries remaining static may have been in a worse situation without assistance. For example, livestock shipments to the mainland would be influenced by pastoral conditions in Tasmania and on the mainland and the requirements of abattoirs, as well as TFES payments. Shipments of livestock from Tasmania to the mainland decreased from 1972-73 to a low in 1975-76, then started to increase again from 1976-77, the year in which TFES was introduced. It is not possible to say, however, whether the increase was due to TFES payments or a return to normal export levels. Similarly, increased shipments of frozen fruit and vegetables to the mainland can be associated both with TFES assistance and national rationalisation of manufacturing capacity within this industry.

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(1) There is an element of double-counting between Table 8.4 and Tables 8.1 to 8.3 in the sense that some of the agricultural products in Table 8.4 also appear as fruit or vegetable products in Tables 8.1 to 8.3.

The third aim of TFES is to improve the efficiency of Tasmania's interstate transport system. While there is no reason to suppose that a transport subsidy scheme like TFES will induce more transport improvements than a regime of unsubsidised transport, the direct payment of TFES subsidies to shippers seems to be superior to the previous arrangement under which all subsidies were paid to ANL. All lines servicing Tasmania are now on an equal footing and the increased competition for cargoes has resulted in an improved quality of shipping service.

There are other respects in which TFES has tended to encourage improved efficiency in transport compared with the previous system of subsidising one shipping line. For example, most subsidies are now paid to shippers on a weight basis so that they have an incentive for loading the maximum possible amount of cargo into containers. However, where subsidies are paid on a volume basis, the extra cost to the shipper of inefficiently packed cargoes is at least partly offset by TFES subsidy payments. Hence, even though all subsidy rates have been calculated on the basis of the most efficient transport practices in use, shippers of commodities receiving payments on a tonnes weight basis have a stronger incentive to pack cargoes efficiently than those on volume rate.

ADMINISTRATION

This section discusses a number of questions concerning the calculation of TFES subsidy rates and the administration of the Scheme. Some of the points included have been discussed at greater length in previous chapters.

Freight Rates

Consideration should be given to defining which freight rates should be used in calculating TFES subsidies. Previous calculations have generally been based on the cost of full single container consignments shipped through freight forwarders. In some cases, however, it might be more appropriate to base calculations on the cost of using staked pairs or on the special commodity rates negotiated between shipping lines and consignors. Shippers using staked pairs obtain lower freight rates and are thus 'over-compensated' (all other things equal) by subsidy rates based on single container rates.

There is a trade-off between such 'fine-tuning' of TFES subsidy rates and administrative costs. The general approach to date has been to attempt to minimise administrative costs by using a 'standardised' approach (see Chapter 2) which probably 'over-compensates' some shippers and 'under-compensates' others. However, twelve of the seventy-four commodity categories account for over 80 per cent of total northbound subsidy payments (Table I.1 in Appendix I). Accordingly, it would appear possible to tailor subsidy rates for those commodities more precisely to their actual transport costs, at little additional administrative cost.

In fact, it may be possible to offset any such increases in administrative cost by simplifying the calculations and administration associated with the considerable number of minor categories. At the moment separate calculations are performed for each of these categories, using individual stowage factors. The number of subsidy rates could be reduced by classifying the various commodities into groups according to the quantity of each item which could be loaded into a container, and then calculating one subsidy rate for each group. For example, cargoes shipped in high gate 5.08 metre units could be classified into say three groups: commodities loading 14 to 16 tonnes per container, those loading 12 to 14 tonnes, and those loading less than 12 tonnes per unit.

With low gate unit cargoes similarly divided into two groups, most Tasmanian cargoes would be classified into only five subsidy rate groups. This approach could involve a greater degree of averaging than under present arrangements with some shippers receiving slightly more or less than the required amount of subsidy. Special calculations could still be required for shippers negotiating special commodity rates with shipping lines and where it was more convenient to pay on a different unit of measure, eg bales of wool, cartons of apples etc.

Whatever practice is adopted, it is suggested that the present system of paying each commodity under a separate code number should be retained, since it provides a detailed analysis of outlays which is valuable in evaluating and administering the scheme. It is also suggested that most subsidies be set on a weight basis wherever possible in the interests of encouraging efficiency in loading practices, the exception being where it is more convenient to use special units of measure, eg cartons, bales etc.

Minimum Payments

Shippers consigning cargoes of the same or similar characteristics on any route do not all pay exactly the same freight rates. Variations in freight rates may arise due to differences in bargaining strength or skills or other factors. This poses the question of which freight rate should be used in setting TFES subsidies since, for example, the rate paid by most shippers could give too much assistance to those paying the lowest rates. To the extent that it is not possible to rectify this problem by the above-mentioned suggestions regarding more precise calculations for major commodity catgories, it is suggested the present practice of setting a minimum net freight cost to be met by shippers after receipt of the TFES subsidy should be continued for southbound cargoes and implemented for northbound cargoes.

Line Haul Only

It has been suggested that the calculation of TFES subsidies should be simplified by defining transport disadvantage as the difference between Tasmanian and mainland line haul costs. However, this would be an incomplete measure of Tasmania's transport disadvantage since it fails to take account of the fact that shipments to or from Tasmania entail intermodal transfer (with its associated costs), whereas mainland shipments over distances comparable to at least the shorter Tasmanian interstate routes (Northern Tasmania to Victoria) would normally not involve intermodal transfer. In any event, it would be difficult to identify comparable freight rates. For example, sea freight rates typically relate to a wharf-to-wharf movement while for FCLs the road rate typically relates to a door-to-door service. Further, sea line haul rates cover the costs of moving containers between the wharf and ship while mainland shippers frequently make separate arrangements for transhipping cargoes between road and rail. On both conceptual and practical considerations, therefore, the current practice of basing subsidy calculations on freight forwarders' rates including pick up and delivery appears preferable to the alternative of using line haul freight rates.

Eligibility

TFES assistance is currently payable on any goods produced in Tasmania for use or sale on the mainland and which are transported in non-bulk ships. A firm wishing to receive TFES assistance on a product which meets the guidelines but is not included on the northbound TFES schedule is required to make an appropriate application to the Minister for Transport. The BTE is then directed to set a subsidy rate providing full freight equalisation. Under this arrangement it would be possible for cargoes to gain access to TFES assistance which would not normally be regarded as commercially viable for interstate sea transport, such as very low density products or outsize items incurring shipping surcharges. It is therefore suggested that applications for including such items in the Scheme should not be automatically accepted but rather should be considered individually by the Government. TFES regulations could be altered to make admission to the Scheme subject to Government approval for cargoes stowing over, say 3.5 cubic metres per tonne, or where shipping surcharges are involved. Alternatively, an upper limit might be placed on the amount of subsidy payable on low density or outsize cargo.

Commissioner Nimmo recommended that air freight should also be included in TFES, on the grounds that TFES should not distort consignors' choice of mode (Nimmo, p166). However, in implementing TFES the Government decided not to include air freight, because Tasmania did not appear to suffer any particular burden in terms of air freight charges relative to those imposed on the mainland. This has given rise to administrative problems and complaints from shippers, particularly regarding consignments through freight forwarders. Freight forwarders will from time to time consign, or wish to consign, freight by air even though the shipper may only have paid a surface freight rate. When such instances come to DOTA's notice, under present policy DOTA is obliged to refuse the TFES subsidy. Shippers consider this inequitable, and freight forwarders claim that TFES is interfering with their commercial freedom to use whichever mode is appropriate for a particular transport task at a particular time. These difficulties could be overcome if TFES was extended to include not all air freight but freight which has been subject to surface transport rates and in the event is actually transported by air. The Government may also wish to consider including air cargo where this will result in a significant reduction in TFES outlays, ie where the use of air transport results in a lower freight rate to the shipper for interstate movements of eligible cargo.

New Commodities

Consideration could also be given to simplifying procedures for including new commodities in the northbound component of the Freight Equalisation Scheme. Under current arrangements it is necessary to determine the transport characteristics of new commodities, to calculate a new rate, and then to prepare formal submissions for consideration by the Ministers for Transport and Finance. While this may be warranted for new commodities which could involve substantial increases in TFES payments, it is suggested that simpler procedures might be more appropriate for sole traders and small firms involving only moderate amounts of cargo. A number of provisional TFES rates could be calculated for cargoes of various densities. Authority could then be delegated to a Department of Transport Australia officer to approve appropriate provisional rates for new commodities with more detailed calculations being carried out, if required, at the next general recalculation of subsidy rates.

It is also suggested that consideration be given to authorising the Department of Transport to set interim TFES rates to enable trial shipments of new cargoes to be sent to the mainland. Interim rates could be determined on the basis of discussions with shippers and shipping lines regarding the stowage factor and other transport characteristics likely to be associated with such cargoes. TFES subsidy rates cannot be set unless freight rates and transport characteristics are known yet, for some products, this information could only be accurately determined by trial shipments. This facility would probably only be required for small firms where the financial viability of an operation could depend on receiving TFES subsidy payments soon after cargoes were shipped.

Container Packing

Finally, it is suggested that consideration be given to adopting an explicit policy concerning the shipment of cargoes on pallets where this practice reduces the net load of cargoes shipped in containers out of Tasmania. Using pallets reduces labour and warehousing costs but increases the unit transport costs.

APPENDIX I - DETAILS OF TFES PAYMENTS

TABLE I.1 - NORTHBOUND TFES PAYMENTS BY COMMODITY, 1978-79 AND 1979-80

($'000)

Code	Category	1978-79	1979-80
01	Cattle and horses	435.4	275.0
02	Sheep and pigs	480.4	497.1
03A	Chilled meat	40.6	61.6
03B	Frozen meat	47.4	33.4
04	Processed meat and other meat preparations	2.1	4.0
05	Dried and condensed milk	1.0	13.6
06	Fresh and frozen fish	73.3	66.2
07	Other processed fish and fish preparations	7.6	0.7
08A	Dry malt preparations	65.4	70.9
08B	Liquid and dry malt preparations	15.4	23.4
09	Other cereals & cereal preparations	2.6	1.7
10A & C	Fresh fruit - refrigerated[a]	217.8	314.7
10B & D	Fresh fruit - unrefrigerated[a]	833.4	753.0
11	Fresh vegetables	385.6	260.6
12A	Frozen fruit & vegetables (under $2.22m^3/t$)	1 340.3	1 002.5
12B	Frozen fruit & vegetables (over $2.22m^3/t$)	2 012.3	2 585.7
13	Other processed fruit and vegetables	604.2	650.0
14	Hops, refrigerated	0	0
15	Hops, unrefrigerated	10.7	28.2
16	Honey	3.8	3.7
17	Confectionery & chocolate products	525.8	608.3
18	Animal feeding stuffs	8.8	55.2
19A	Beverages in drums	28.4	25.5
19B	Beverages in cartons	160.2	127.9
20	Hides and skins	11.9	16.0
21A & B	Timber	2 596.8	3 145.3
22A	Baled wood pulp	338.8	225.7
22B	Waste paper	469.5	513.9
23A & B	Sheep and lamb's wool	229.1	262.6
	Ores and concentrates		
24	Rutile and zircon	6.0	9.5
25	Tin	106.0	83.6

TABLE I.1 - NORTHBOUND TFES PAYMENTS BY COMMODITY, 1978-79 AND 1979-80 (Cont)

($'000)

Code	Category	1978-79	1979-80
26	Sausage casings	0.4	0.3
27	Seeds	146.8	75.0
28	Tallow	1.5	2.4
29	Calcium carbide	203.9	125.3
30	Titanium dioxide	244.1	322.0
31	Casein	1.0	0
32A	Hardboard & plywood	43.9	25.4
32B	Particle Board	744.1	1 120.8
33	Newsprint	3 896.3	4 121.0
34	Paper other than newsprint	4 286.5	5 068.0
35	Hand knitting yarns	0	-
36	Blankets	0	0
37	Floor coverings	6.6	1.1
38	Other textile yarns, fabrics & made-up articles and clothing	88.9	114.2
39	Footwear	0.3	-
40	Articles of asbestos cement	20.3	25.5
41	Aluminium metal, powder & paste	1 072.5	1 211.3
42	Zinc metal	621.0	769.3
43	Metal castings	58.2	57.8
44	Machine & hand tools	0	0
45A	Metal manufactures & machine parts-vol rate	9.6	25.7
45B	Metal manufactures & machine parts-mass rate	0.3	1.5
46	Machinery & transport equipment	0.7	16.1
47	Furniture	17.4	8.4
48	Other wood & cork manufacturers	13.9	90.1
49	Other ores and concentrates	138.9	128.9
50	Fertilisers, manufactured	29.1	36.8
51	Metal waste and scrap	46.6	52.0
52	Ferro alloy products	87.4	99.6
53	Grinding ball millstones	5.0	11.4
54	Colouring materials other than titanium dioxide	0	0

TABLE I.1 - NORTHBOUND TFES PAYMENTS BY COMMODITY, 1978-79 AND 1979-80 (Cont)

($'000)

Code	Category	1978-79	1979-80
55	Gravel aggregate	0.3	0
56	Fibreglass reinforced plastic products	20.6	72.0
57	Quarried stone	1.7	1.3
58	Waste rag	7.4	10.5
59A,B,C	Soil conditioners	5.6	21.3
60	Iced confectionery	2.1	9.6
61	Refrigerated meat products nei	1.2	0
62	Glassware	23.1	45.6
63	Plastic PVC products nei	0.8	0.1
	Cheese 'assisted'		
64	- refrigerated	0	0
66	- unrefrigerated	23.5	23.5
	Cheese 'unassisted'		
65	- refrigerated	16.4	67.8
67	- unrefrigerated	187.8	198.4
68	Turf	1.1	0.4
69	Frozen egg pulp	1.8	0
70	Coal (containerised)	0	0
71	Carbonate of lime	0	0
72	Concrete products	0	0
73	Tree ferns	0	0.7
74	Carbon black	0	0.8
TOTAL		23 138.5	25 681.5

(a) Mainly apples.

\- Less than $50.00.

NOTES: Some category names are abbreviated and some category sub-classifications have been combined to show a single total. Differences in total due to rounding.

Source: Department of Transport Australia.

TABLE I.2 - NORTHBOUND TFES PAYMENTS BY ROUTE 1978-79 AND 1979-80

($'000)

	Route	1978-79	1979-80
A	Southern Tasmania to Victoria	3 724	3 871
B	Southern Tasmania to SA/WA	945	1 095
C	Southern Tasmania to NSW/QLD	3 745	3 832
D	Northern Tasmania to Victoria	6 848	7 500
E	Northern Tasmania to SA/WA	1 154	1 353
F	Northern Tasmania to NSW/QLD	6 723	8 030
TOTAL		23 138	25 681

Source: Department of Transport Australia.

TABLE I.3 - SOUTHBOUND TFES PAYMENTS BY ROUTE 1978-79 AND 1979-80

($'000)

		1978-79	1979-80
M	Victoria to Southern Tasmania	421	665
N	SA/WA to Southern Tasmania	65	61
O	NSW/QLD to Southern Tasmania	142	187
P	Victoria to Northern Tasmania	557	587
Q	SA/WA to Northern Tasmania	186	193
R	NSW/QLD to Northern Tasmania	190	183
TOTAL		1 562	1 876

NOTE: Differences in totals due to rounding.

Source: Department of Transport Australia.

TABLE I.4 - ESTIMATED QUANTITY OF NORTHBOUND CARGO RECEIVING TFES ASSISTANCE 1979-80

('000 tonnes)[a]

Origin	Destination			Total
	VIC	SA/WA	NSW/QLD	
N. Tasmania	248	46	230	524
S. Tasmania	184	38	139	361
TOTAL	432	84	369	885

(a) tonnes weight.

NOTES: The figures shown above were derived from records of TFES payments. Total shipments comprised 798 000 tonnes of dry cargo and 87 000 tonnes of refrigerated cargoes. The above figure does not include livestock shipments which totalled 17 000 cattle, 162 000 sheep, and 51 horses. The above figures are rounded to the nearest thousand and differences in totals are due to rounding.

Source: Department of Transport Australia.

TABLE I.5 - SOUTHBOUND TFES PAYMENTS BY COMMODITY 1978-79 AND 1979-80

($'000)

	1978-79	1979-80
Manufacturing and mining industries		
refrigerated cargo	118	187
general cargo	1 270	1 442
Agriculture, forestry and fishing		
livestock	2	4
general cargo	145	243
mobile agricultural units	28	(a)
TOTAL	1 562	1 876

(a) Payments on mobile agricultural units are included in the general cargo category for 1979-80.

Source: Department of Transport Australia.

APPENDIX II - DATA USED IN ANALYSIS OF MAINLAND FREIGHT RATES

II.1	Population and Workforce Statistics, 1976.
II.2	Commonwealth Government Contract Rates for Interstate General Cargo Services: Full Truck Loads, December 1978.
II.3	Estimates of Intercapital Consignments of Non Bulk Freight by Road, 1971-72.
II.4	Estimates of Intercapital Consignments of Non Bulk Freight by Rail, 1971-72.
II.5	Great Circle Distances Between Selected Mainland Centres.
II.6	Great Circle Distances from Tasmania to Selected Mainland Centres.
II.7	Rail Distances Between Selected Mainland Centres.
II.8	Rail Distances Between Selected Tasmanian Centres.
II.9	Road Distances Between Selected Mainland Centres.
II.10	Berth to Berth Distances Between Tasmanian and Mainland Ports.

TABLE II.1 - POPULATION AND WORKFORCE STATISTICS, 1976

City	Population	Number Employed	Selected Industries[a] (per cent)
	('000)		
Sydney	2 765	1 243	48.80
Melbourne	2 481	1 106	52.70
Brisbane	893	376	47.10
Adelaide	857	375	52.20
Perth	731	312	46.10
Darwin	41	21	34.90
Canberra	195	90	26.20

(a) Proportion of workforce employed in manufacturing, construction, wholesale and retail sectors.

NOTE: Statistics relate to urban localities.

Source: ABS, 1976.

TABLE II.2 - COMMONWEALTH GOVERNMENT CONTRACT RATES FOR INTERSTATE GENERAL CARGO SERVICES: FULL TRUCK LOADS DECEMBER 1978

No	Origin	Destination	Company	Rate[a] (cents per kg)
1	Brisbane	Sydney	(b)	2.20
2	Brisbane	Canberra	Ansett	3.75
3	Brisbane	Melbourne	Sartori's	3.00
4	Brisbane	Adelaide	Ansett	4.75
5	Brisbane	Perth	Ansett	12.50
6	Brisbane	Darwin	TNT	9.50
7	Brisbane	Hobart	Ansett	15.50
8	Brisbane	Launceston	Ansett	15.00
9	Brisbane	A. Springs	TNT	13.00
10	Brisbane	Katherine	TNT	9.50
11	Brisbane	T. Creek	TNT	9.50
12	Sydney	Brisbane	Ansett	3.10
13	Sydney	Melbourne	Ansett	2.50
14	Sydney	Adelaide	Ansett	3.40
15	Sydney	Darwin	Kalamunda	12.93
16	Sydney	Perth	Kalamunda	8.86
17	Sydney	A. Springs	Kalamunda	10.00
18	Sydney	Katherine	Kalamunda	11.75
19	Sydney	T. Creek	Kalamunda	11.75
20	Canberra	Brisbane	Ansett	5.60
21	Canberra	Hobart	Ansett	15.00
22	Canberra	Adelaide	Jetspress NSW	4.80
23	Canberra	Perth	TNT	14.80
24	Canberra	Darwin	TNT	17.00
25	Canberra	A. Springs	Ansett	11.50
26	Canberra	Katherine	TNT	17.00
27	Canberra	T. Creek	Ansett	13.50
28	A. Wodonga	Melbourne	Ansett	1.50
29	A. Wodonga	Canberra	TNT	2.40
30	A. Wodonga	Sydney	TNT	2.80
31	A. Wodonga	Brisbane	TNT	5.90

TABLE II.2 - COMMONWEALTH GOVERNMENT CONTRACT RATES FOR INTERSTATE GENERAL CARGO SERVICES: FULL TRUCK LOADS DECEMBER 1978 (Cont)

No	Origin	Destination	Company	Rate[a] (cents per kg)
32	Wagga	Melbourne	TNT	2.50
33	Wagga	Canberra	TNT	2.00
34	Wagga	Sydney	TNT	2.40
35	Wagga	Oaklands	TNT	2.00
36	Oaklands	Canberra	TNT	2.80
37	Melbourne	Brisbane	(b)	5.20
38	Melbourne	Sydney	Ansett	2.80
39	Melbourne	Hobart	Ansett	12.50
40	Melbourne	Launceston	Ansett	11.50
41	Melbourne	Burnie	Ansett	11.50
42	Melbourne	Devonport	Ansett	11.50
43	Melbourne	Scottsdale	Ansett	12.00
44	Melbourne	Adelaide	(b)	2.70
45	Melbourne	Perth	Kalamunda	8.05
46	Melbourne	Darwin	Kalamunda	11.75
47	Melbourne	A. Springs	TNT	9.50
48	Melbourne	Katherine	Kalamunda	11.75
49	Melbourne	T. Creek	TNT	12.50
50	Melbourne	Wagga	Ansett	2.10
51	Melbourne	A. Wodonga	Ansett	1.60
52	Melbourne	Canberra	Ansett	2.80
53	Adelaide	Brisbane	(b)	5.60
54	Adelaide	Sydney	(b)	3.00
55	Adelaide	Canberra	Ansett	3.10
56	Adelaide	Melbourne	Ansett	2.00
57	Adelaide	Hobart	Ansett	14.50
58	Adelaide	Perth	Ansett	6.00
59	Adelaide	Darwin	Kalamunda	9.75
60	Adelaide	A. Springs	TNT	7.00
61	Adelaide	Katherine	TNT	9.50
62	Adelaide	T. Creek	TNT	8.50
63	Perth	Brisbane	United	7.36

TABLE II.2 - COMMONWEALTH GOVERNMENT CONTRACT RATES FOR INTERSTATE GENERAL CARGO SERVICES: FULL TRUCK LOADS DECEMBER 1978 (Cont)

No	Origin	Destination	Company	Rate[a] (cents per kg)
64	Perth	Sydney	United	5.25
65	Perth	Canberra	Ansett	6.00
66	Perth	Melbourne	United	4.20
67	Perth	Adelaide	United	3.15
68	Perth	Darwin	TNT	12.50
69	Perth	A. Springs	TNT	9.00
70	Perth	Katherine	TNT	12.50
71	Perth	T. Creek	TNT	9.50
72	Hobart	Brisbane	Ansett	15.00
73	Hobart	Sydney	Ansett	13.00
74	Hobart	Melbourne	Ansett	10.50
75	Hobart	Adelaide	Ansett	12.00
76	Hobart	Darwin	Ansett	25.50
77	Hobart	A. Springs	Ansett	19.50
78	Hobart	Katherine	TNT	27.70
79	Hobart	T. Creek	Ansett	21.50
80	Launceston	Brisbane	Ansett	14.00
81	Launceston	Sydney	Ansett	13.00
82	Launceston	Melbourne	Ansett	9.00
83	Launceston	Adelaide	Ansett	12.00
84	Burnie	Brisbane	Ansett	14.00
85	Burnie	Sydney	Ansett	13.00
86	Burnie	Melbourne	Ansett	9.00
87	Burnie	Adelaide	Ansett	12.00
88	Devonport	Brisbane	Ansett	14.00
89	Devonport	Sydney	Ansett	13.00
90	Devonport	Melbourne	Ansett	9.00
91	Devonport	Adelaide	Ansett	12.00
92	Scottsdale	Sydney	Ansett	13.00
93	Scottsdale	Melbourne	Ansett	10.00
94	Darwin	Brisbane	TNT	5.50
95	Darwin	Sydney	TNT	7.00

TABLE II.2 - COMMONWEALTH GOVERNMENT CONTRACT RATES FOR INTERSTATE GENERAL CARGO SERVICES: FULL TRUCK LOADS DECEMBER 1978 (Cont)

No	Origin	Destination	Company	Rate[a] (cents per kg)
96	Darwin	Canberra	TNT	9.50
97	Darwin	Melbourne	TNT	7.00
98	Darwin	Hobart	TNT	23.40
99	Darwin	Adelaide	TNT	5.50
100	Darwin	Perth	TNT	8.00
101	Darwin	A. Springs	TNT	4.50
102	Darwin	Katherine	TNT	3.00
103	Darwin	T. Creek	TNT	3.50
104	A. Springs	Brisbane	TNT	12.00
105	A. Springs	Sydney	Ansett	9.00
106	A. Springs	Canberra	Ansett	9.10
107	A. Springs	Melbourne	Ansett	8.00
108	A. Springs	Hobart	Ansett	20.50
109	A. Springs	Adelaide	TNT	4.50
110	A. Springs	Perth	TNT	8.00
111	A. Springs	Darwin	TNT	7.00

(a) Rate charged in cents per kilogram for consignments over 20 000 kg.
(b) The firm which originally won the tender for the route subsequently withdrew its services and the Table shows the next lowest tender with an acceptable delivery time.

NOTE: It is understood that contracts were awarded on the basis of the freight rate and delivery time quoted.

Source: Commonwealth Department of Administrative Services.

TABLE II.3 - ESTIMATES OF INTERCAPITAL CONSIGNMENTS OF NON-BULK FREIGHT BY ROAD, 1971-72

('000 tonnes)

Origin	Destination							Total Out
	Sydney	Melbourne	Brisbane	Adelaide	Perth	NT	ACT/QBN	
Sydney	-	948	270	203	10	6	241	1 678
Melbourne	836	-	174	236	27	4	48	1 325
Brisbane	135	46	-	48	3	18	-	250
Adelaide	172	207	77	-	16	66	-	538
Perth	8	7	-	18	-	-	-	33
NT	1	1	4	4	-	-	-	10
ACT/QBN	45	8	-	-	-	-	-	53
Total In	1 197	1 217	525	509	56	94	289	3 887

Source: BTE (1976) p44.

TABLE II.4 - ESTIMATES OF INTERCAPITAL CONSIGNMENTS OF NON-BULK FREIGHT BY RAIL, 1971-72

('000 tonnes)

Origin	Destination							Total Out
	Sydney	Melbourne	Brisbane	Adelaide	Perth	NT	ACT/QBN	
Sydney	-	624	319	38	88	-	98	1 167
Melbourne	530	-	119	353	140	-	4	1 146
Brisbane	227	33	-	15	6	-	-	281
Adelaide	35	348	37	-	109	-	-	529
Perth	9	8	1	49	-	-	-	67
NT	-	-	-	-	-	-	-	-
ACT/QBN	17	-	-	-	-	-	-	17
Total In	818	1 013	476	455	343	-	102	3 207

Source: BTE (1976) p45.

TABLE II.5 - GREAT CIRCLE DISTANCES BETWEEN SELECTED MAINLAND CENTRES

(kilometres)

	Sydney	Melbourne	Brisbane	Adelaide	Perth
Adelaide	1 162	653	1 598	-	2 128
Brisbane	733	1 372	-	1 598	3 600
Cairns	1 960	2 321	1 387	2 122	3 436
Darwin	3 147	3 145	2 843	2 615	2 649
Fremantle	3 294	2 724	3 611	2 136	16
Geelong	778	67	1 435	626	2 668
Melbourne	712	-	1 372	653	2 718
Newcastle	117	820	619	1 232	3 350
Perth	3 286	2 718	3 600	2 128	-
Rockhampton	1 169	1 689	519	1 725	3 524
Sydney	-	712	733	1 162	3 286
Townsville	1 680	2 067	1 107	1 917	3 388
Western Port	743	70	1 420	699	2 739
Wollongong	68	650	799	1 122	3 250

Source: BTE estimates using the equation

$$D = 60 \cos^{-1} \left[\sin A_1 \sin A_2 + \cos A_1 \cos A_2 \cos (B_2 - B_1)\right]$$

Where D = Great Circle Distance

A_1, B_1 = coordinates of origin

A_2, B_2 = coordinates of destination.

TABLE II.6 - GREAT CIRCLE DISTANCES FROM TASMANIA TO SELECTED MAINLAND CENTRES

(kilometres)

	Hobart	Devonport
Adelaide	1 151	969
Brisbane	1 783	1 639
Cairns	2 880	2 694
Darwin	3 723	3 528
Fremantle	3 002	2 892
Geelong	573	376
Melbourne	589	392
Newcastle	1 167	1 033
Perth	2 999	2 888
Rockhampton	2 182	2 016
Sydney	1 051	916
Townsville	2 616	2 433
Western Port	520	322
Wollongong	984	848
Portland	-	513
Orbost	-	425

Source: BTE estimates, as for Table II.5.

TABLE II.7 - RAIL DISTANCES BETWEEN SELECTED MAINLAND CENTRES

(kilometres)

	Sydney	Melbourne	Brisbane	Adelaide	Perth
Sydney	-	961	988	1 658	3 960
Newcastle	169	1 104	827	1 801	4 103
Wollongong	84	882	1 070	1 668	3 970
Melbourne	961	-	1 923	774	3 430
Brisbane	988	1 923	-	2 620	4 922
Rockhampton	1 634	2 569	646	3 266	5 568
Townsville	2 331	3 266	1 343	3 963	6 265
Cairns	2 671	3 606	1 683	4 303	6 605
Adelaide	1 658	774	2 620	-	2 656

Source: Railways of Australia, 1973, and New South Wales Public Transport Commission, 1973.

TABLE II.8 - RAIL DISTANCES BETWEEN SELECTED TASMANIAN CENTRES

(kilometres)

Centre	Distance From	
	Hobart	Launceston
Launceston	214.0	-
Bell Bay	266.5	52.5
Devonport	346.5	132.5
Burnie	395.0	181.0
Smithton	501.5	287.5

Source: Tasmanian Department of Transport, 1973.

TABLE II.9 - ROAD DISTANCES BETWEEN SELECTED MAINLAND CENTRES[a]

(kilometres)

	Sydney	Melbourne	Brisbane	Adelaide	Perth
Sydney	-	889	998	1 398	3 900
Newcastle	172	1 061	826	1 570	4 133
Wollongong	83	824	1 081	1 333	4 044
Melbourne	889	-	1 656	745	3 333
Brisbane	998	1 656	-	2 066	4 218
Rockhampton	1 658	1 995	662	2 280	4 397
Cairns	2 792	2 866	1 794	2 829	5 197
Townsville	2 437	2 513	1 441	2 578	5 023
Adelaide	1 398	745	2 066	-	2 692
Darwin	4 015	3 819	3 449	3 178	4 008
Canberra[b]	300	652	1 298	1 178	3 715
Portland	1 225	360	1 932	567	3 259
Orbost	655	376	1 685	1 126	3 818

(a) Distances shown are shortest practical route between centres.
(b) Canberra to Darwin distance is 3975 km.

Source: NRMA, 1979.

TABLE II.10 - BERTH TO BERTH DISTANCES BETWEEN TASMANIAN AND MAINLAND PORTS

(kilometres)

	Burnie (4)	Devonport (4)	Bell Bay (17)	Hobart (22)
Townsville (9)	2 970	2 955	2 941	3 179
Mackay (2)	2 621	2 606	2 591	2 829
Brisbane (106)	1 911	1 896	1 881	2 120
Newcastle (6)	1 088	1 074	1 059	1 301
Sydney (13)	982	968	953	1 195
Port Kembla (2)	899	884	870	1 112
Western Port (28)	319	345	362	773
Melbourne (89)	417	443	462	878
Geelong (98)	426	452	471	887
Adelaide (19)	1 053	1 088	1 120	1 436
Fremantle (6)	3 197	3 232	3 264	3 367
Darwin (11)	5 530	5 515	5 500	5 738

NOTE: Distances between the pilot pick-up points and berths are shown in brackets after each port.

Source: Department of Transport Australia, 1976.

APPENDIX III - SENSITIVITY ANALYSIS

As noted in Chapter 5, use of the regression equations based on mainland freight rates to calculate hypothetical land freight rates for Tasmania's interstate trade requires a choice between alternative measures of distance and population. This choice is not one that is dictated by technical considerations but rather by judgment as to the most appropriate interpretation of the basis of the TFES. The purpose of this Appendix is to illustrate the implications of choosing one measure rather than another.

DISTANCE

In general terms, hypothetical land distances between Tasmania and the mainland centres could be measured on two alternative bases: via Melbourne, or assuming more direct connections (eg, for Adelaide a connection with the Princes Highway at say Portland, and for Sydney a connection with the Princes Highway at Orbost). Distances under the two alternative sets of assumptions are given in Table III.1.

The effects of the two alternative assumptions on hypothetical land freight rates for Tasmania's interstate trade are illustrated in Table III.2. The assumption of more direct routes produces lower hypothetical freight rates (and thus implies higher TFES subsidy rates) than measuring distances via Melbourne. However, the differences are not significant. The largest difference occurs on the estimated northbound rate from Northern Tasmania to Sydney, where the direct distance method implies a hypothetical land freight rate 11 per cent lower than the via Melbourne distance.

TABLE III.1 - HYPOTHETICAL TASMANIA-MAINLAND LAND DISTANCES

Route	Via Melbourne[(a)]	Direct[(b)]
Northern Tasmania to		
Melbourne	470	470
Adelaide	1 215	1 183
Sydney	1 359	1 165
Brisbane	2 126	2 126
Perth	3 803	3 803
Southern Tasmania to		
Melbourne	748	748
Adelaide	1 493	1 461
Sydney	1 637	1 443
Brisbane	2 404	2 404
Perth	4 081	4 081

(a) Distances from Northern Tasmania are taken as Great Circle Distance between Melbourne and Devonport plus 20 per cent, plus actual road distances from Melbourne to other mainland capitals. The Great Circle Distance is increased by 20 per cent because most mainland intercapital land distances are at least 20 per cent greater than Great Circle Distances. For Southern Tasmania, the Hobart to Devonport road distance (278 km) is added.

(b) Direct distances calculated in a similar manner to distances via Melbourne except that measurements were made via Portland for Adelaide and via Orbost for Sydney. For Brisbane and Perth, distances via Melbourne are the most direct.

TABLE III.2 - HYPOTHETICAL LAND FREIGHT RATES UNDER ALTERNATIVE DISTANCE ASSUMPTIONS, 1978

(Dollars per tonne)

Route	Distance Measurement			
	Via Melbourne		Direct	
	Northbound	Southbound	Northbound	Southbound
Northern Tasmania to				
Melbourne	22	18	22	18
Adelaide	48	32	47	31
Sydney	47	31	42	28
Brisbane	71	43	71	43
Perth	108	60	108	60
Southern Tasmania to				
Melbourne	31	23	31	23
Adelaide	55	36	54	35
Sydney	53	34	49	32
Brisbane	77	46	77	46
Perth	114	62	114	62

NOTE: Both hypothetical freight rates 'Via Melbourne' and 'Direct' were calculated with the size of the Tasmanian origin/destination represented as the total State population.

Source: BTE estimates based on data in Appendix II and equations in Table 4.2.

POPULATION

The preferred form of regression equation for mainland intercity (general cargo) freight rates includes as independent variables the population of the origin and destination (see Table 4.2). Although the equations were estimated using capital city urban locality population figures, it could be argued that it would be inappropriate to estimate Tasmania's hypothetical interstate land freight rate by using only Hobart's population. It seems plausible to suggest that having regard to Tasmania's position and compact size, the interstate land freight rates which would exist if there was a landbridge would be influenced by some larger population measure. Three alternatives were tested:

- Hobart's urban locality population for rates to and from Southern Tasmania, and the sum of urban locality populations of Burnie, Devonport and Launceston for rates to and from Northern Tasmania;

- Southern and Northern Region populations for rates to and from the two Regions, respectively; and

- total State population.

The actual population numbers corresponding to these three alternative sets of assumptions are specified in Table III.3.

The hypothetical land freight rates resulting from these three alternative sets of population data are shown in Table III.4. Freight rates based on the largest population figures (total State population) are generally 10 to 15 per cent lower than those resulting from the smallest population numbers (urban localities). The maximum difference occurs on northbound rates from Devonport to Melbourne, which are 19 per cent lower on the State population assumption than on the urban locality population assumption.

TABLE III.3 - ALTERNATIVE POPULATION ASSUMPTIONS, 1976

('000)

Assumption	Northern Tasmania	Southern Tasmania
. Respective Urban Locality Populations[a]	102	132
. Respective Area Populations[b]	209	198
. Total State Population	407	407

(a) Taken as sum of urban locality figures for Devonport, Burnie and Launceston for Northern Tasmania and Hobart for Southern Tasmania.

(b) Population of Southern Tasmania taken as populations of Hobart and Southern Statistical Divisions plus LGAs of Gormanston, Strahan and Queenstown. Northern Tasmania taken as Mersey-Lyell (less those LGAs included in Southern Tasmania) and Northern Statistical Divisions.

Source: ABS (1976), ABS (1979) p80, and ABS Hobart office.

TABLE III.4 - HYPOTHETICAL LAND FREIGHT RATES UNDER ALTERNATIVE POPULATION ASSUMPTIONS, 1978

(Dollars per tonne)

Route	Population Assumption					
	Urban Locality		Region		Total State	
	N.Bound	S.Bound	N.Bound	S.Bound	N.Bound	S.Bound
Devonport -						
Melbourne	27	20	24	19	22	18
Adelaide	56	36	51	33	47	31
Sydney	50	32	46	30	42	28
Brisbane	84	49	77	46	71	43
Perth	129	68	118	64	108	60
Hobart -						
Melbourne	36	25	34	24	31	23
Adelaide	63	39	60	38	54	35
Sydney	56	35	54	34	49	32
Brisbane	89	51	85	49	77	46
Perth	132	69	125	66	114	62

NOTE: All rates calculated with distances measured direct, ie via Portland for Adelaide and Orbost for Sydney. See Table III.1 for distances.

Source: BTE estimates based on data in Table III.3, Appendix II, and regression equations in Table 4.2.

SUBSIDY IMPLICATIONS

Table 5.5 in the text of the report summarises the implications for TFES payments of basing subsidy calculations on the hypothetical 'landbridge' method compared with the Nimmo method presently used. The 'landbridge' rates presented in that table were based on direct distance and total State population. As a sensitivity test, the calculations were also performed for the set of distance and population assumptions which differed most from those assumptions ie distance via Melbourne and urban locality population. The results are compared with the 'recommended estimate' results (as detailed in Table 5.5) in Table III.5. To provide an order of magnitude reference base, 1979-80 northbound subsidy payments are also included, although the basis on which the 'difference in outlays' figures have been calculated is not strictly comparable with the basis on which subsidy rates applying in 1979-80 were derived.(1)

It should be noted that the difference in outlays shown in Table III.5 relate to dry cargoes only and would be partly offset by increased outlays for refrigerated cargoes and livestock of between $0.5 million and $1.2 million, depending on the distance assumption adopted.

The absolute numbers differ considerably, but the general structure of changes by route is the same. That is, the results imply larger reductions for the longer routes than for the shorter routes. Reasons for considering the assumptions underlying the 'central estimate' to be more reasonable than those underlying the 'extreme estimate' are given in Chapter 5.

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(1) The 'difference in outlays' figures, like other calculations throughout this report, are based on freight rates prevailing in late 1978, whereas the current northbound subsidy rates are based on early 1978 freight rates.

TABLE III.5 - EFFECT ON NORTHBOUND SUBSIDY PAYMENTS OF ALTERNATIVE DISTANCE AND POPULATION ASSUMPTIONS, 1978

($'000)

Route	1979-80 Northbound Payments	Difference in Outlays[a]	
		'Recommended' Estimate[b]	'Extreme' Estimate[c]
N.Tasmania to			
Vic	7 500	+1 000	0
SA/WA	1 353	- 688	- 1 118
NSW/Qld	8 030	-2 200	- 5 000
S.Tasmania to			
Vic	3 871	0	- 915
SA/WA	1 095	- 740	- 1 110
NSW/Qld	3 832	-2 412	- 4 020
TOTAL	25 681	-5 040	-12 163

(a) Figures represent difference in outlays on northbound route subsidies for dry cargoes compared with total outlays under Nimmo method. For reasons given in text these are not strictly comparable with 1979-80 outlays, but latter are provided for purposes of order of magnitude comparison. When increases for livestock and refrigerated cargoes are taken into account, reduction in outlays would be less than shown above.
(b) Using direct distance and total State population as estimating variables.
(c) Using as estimating variables distance via Melbourne and urban locality populations of Hobart (for Southern Tasmania) and Burnie, Devonport and Launceston (for Northern Tasmania).

Source: BTE estimates derived from Table III.4.

APPENDIX IV - REFRIGERATED TRANSPORT

This appendix gives a brief outline of refrigerated transport operations in mainland Australia. Most of the information here is taken from a paper on the refrigerated transport industry prepared for the BTE by a consultant.

Prior to 1950 when transport firms first began operating mechanically refrigerated road transport units in Australia, domestic refrigerated transport comprised mainly intrastate movements of meat in insulated rail wagons equipped with ice bunkers. Some mechanically refrigerated road units were built in Australia in the late 1930s but it is understood that they were operated as ancilliary vehicles and were not available for hire. Today, most domestic refrigerated cargoes are consigned by road transport although some services are provided by sea and rail.

The expansion and improvement in services offered by the refrigerated transport industry has enabled producers to supply a wider range of products to consumers, in better condition and over a greater period of the year. Waste of perishable foods has been reduced and manufacturers have been able to rationalise production and storage into fewer facilities.

REFRIGERATION PROCESS

The long distance refrigerated transport industry has a dual function. First, it provides the obvious service of moving cargoes between origin and destination. Second, it is an integral part of the overall processing function, this being the food preservation technique of reducing temperatures in order to halt or reduce the natural spoilage phenomena affecting fresh products. The overall processing operation may include preparation, temperature reduction, warehousing, transport and display for sale of the processed or fresh products.

The process requirements for refrigerated transport vary according to the type of products, transit time, and previous storage conditions. For any product the intransit process requirements can usually be specified in terms of temperature control, air circulation and atmosphere control.

The two general temperature control processes are freezing, in which temperatures are reduced below 0°C and chilling, where temperatures are reduced but not below freezing point. The temperature required for freezer cargoes varies with the type of product and may be as low as -20°C. Freezer cargoes include processed fruit and vegetables, juice concentrates, fish, cartons of meat, poultry and prepared foods such as pies etc. Chiller cargoes comprise dairy products, fresh fruits and vegetables, fresh meat, photographic materials, pharmaceuticals, fresh fish, and temperature sensitive bulbs and cuttings.

The industry also has the capability for providing heated temperature controlled transport because most trailers have been constructed with imported refrigeration units designed for conditions in the United States and northern Europe. In Australia's climate, however, this capability is rarely, if ever, used (although heated transport facilities may be used with some bulk cargoes such as honey and chocolate).

For moving fresh cargoes, trailer temperatures may have to be controlled within closely defined limits. Temperatures must be low enough to remove the heat of respiration generated by products which continue to mature after harvesting, yet not be so low as to damage the product by freezing. Air circulation within the cargo unit is necessary to ensure all parts of the cargo are kept at the required temperature and, where required, to provide atmosphere control. Some fresh products generate gases while maturing which, if present in too high a concentration, may adversely affect their quality. Excessive air circulation can, however, dessicate some fresh products such as fruit and vegetables and fresh meat.

Because of its involvement in the processing function, the refrigerated transport industry is subject to various State laws and regulations concerning health and food purity. For export cargoes, Commonwealth Government regulations are also involved.

EQUIPMENT

This section gives a brief outline of refrigerated equipment in use in Australia.

Road

Twelve metre trailers are the favoured unit for long distance movements of refrigerated cargoes although older vehicles may be slightly shorter. Trailers currently being purchased for intercapital operations are usually constructed with fibre glass reinforced plastic bodies and with only 38mm of sidewall insulation. The use of thin wall construction increases the interior width so that modern trailers can load 20 standard Australian pallets on the floor (comprising two rows of ten pallets). Older units were constructed with 78mm of insulation and are too narrow to take pallets side by side but rather must be loaded by hand.

A modern prime mover refrigerated trailer combination optimised for intercapital operations has the capacity to legally carry at least 20.5 tonnes of cargo. Vehicles fitted with extra equipment have lower payloads. For example, for operations to remote locations the prime mover might be fitted with a large fuel tank, a sleeping cabin, and bull bars, while trailers for carrying hanging meat lose about one tonne of payload with the fitting of overhead rails.

Table IV.1 gives an estimate of the number of refrigerated trailers currently operating in Australia. No statistics on refrigerated vehicles are published by the ABS or State authorities and the figures shown in Table IV.1 are estimates prepared by a consultant after discussions with various industry sources. The figures in the Table refer to fleets of trailers. As a generalisation, it is understood that owners of small fleets of up to say ten trailers also own and operate prime movers, while owners of larger fleets arrange line haul by hiring hauliers, ie owner drivers providing a prime mover only. In September 1980, the rate paid to hauliers on intercapital routes in eastern Australia was about 49 cents per kilometre with an additional amount of about $26 per journey for work performed in urban areas, eg for pick up and delivery of cargoes and assisting in cargo handling etc.

TABLE IV.1 - ESTIMATED MAINLAND AUSTRALIAN REFRIGERATED FLEETS, AUGUST 1980

Fleet Size	Fleet Type							
No of Trailers	Private[a]		Limited Distance[b]		Long Distance[c]		Total	
	Fleets	Trls	Fleets	Trls	Fleets	Trls	Fleets	Trls
1	6	6	9	9	5	5	20	20
2 to 5	22	74	47	150	31	106	100	330
6 to 10	9	63	13	91	33	266	55	420
11 to 25	3	57	1	18	11	195	15	270
26 & over	-	-	-	-	10	360	10	360
TOTAL	40	200	70	268	90	932	200	1 400

(a) Owned and operated by manufacturers, co-operatives, and retailers for ancilliary operations.
(b) Principally used in restricted areas with distances limited to a maximum 24 hour return trip.
(c) Available for interstate operations and return trips exceeding 24 hours.

NOTE: All figures shown relate to trailers and do not include rigid vehicles.

Source: Consultant estimate based on data collected from various industry sources.

Rail

Rail transport carries both domestic and export cargoes. Export cargoes are usually consigned in refrigerated ISO containers and are consigned by shipping companies under cargo centralisation practices. Various methods are used to refrigerate export cargoes in transit including carbon dioxide snow loaded in bunkers or sprayed into cargo, clip-on liquid nitrogen or diesel refrigerator units, or generator packs used in conjunction with containers equipped with integral electrical refrigeration equipment.

Overseas containers are also used for carrying some domestic cargoes, particularly from the east coast to WA. This is possible because Customs regulations permit overseas units to be used for one repositioning movement with domestic cargoes without becoming liable for duty payments.

Domestic refrigerated cargoes are also consigned on rail in various types of refrigerated equipment owned by railways and freight forwarders. Much of the railways equipment is used in carrying primary industry products such as meat and fruit and vegetables. The railway systems' inventory is believed to comprise just over 300 items of equipment. The State Rail Authority of NSW operates 80 twelve metre (40 ft) containers; Queensland Railways is taking delivery of 100 7.6 metre (25 ft) containers for interstate trade and also provides 63 refrigerated vans on intrastate services; ANR has 64 mechanically refrigerated containers used on services to Alice Springs plus 40 insulated 6.1 metre containers refrigerated with carbon dioxide snow; and Victorian Railways own six containers.

Sea

Coastal sea transport carries refrigerated cargoes to WA, North Queensland, and Darwin using 6.1m refrigerated ISO containers. Much of the equipment is owned by freight forwarders and the shipping lines but overseas units being repositioned are also used, particularly for services to WA.

Some firms are currently purchasing new equipment for moving refrigerated cargoes by coastal sea transport. The new units have standard ISO lifting fittings but otherwise are slightly larger than the standard ISO unit. The interior width of the new units is sufficient to accommodate two rows of Australian standard pallets. A further innovation with these units is the use of removable bolt-on refrigeration units which can be taken out in winter months enabling the containers to be used as insulated boxes with a higher payload. This is possible because, in south eastern Australia, some commodities only require refrigeration in the hottest months and insulated ordinary transport equipment is adequate for the rest of the year.

VARIATION IN DEMAND

Demand for refrigerated transport services may vary substantially over the year although not always on a predictable seasonal basis. Many fruits and vegetables with short harvesting periods and limited storage lives are principal causes of demand variations. The pattern of demand may vary from month to month as different crops become available in various localities throughout the year. Unexpected changes in transport patterns may result from crop failures while meat transport operations are affected by pastoral conditions and the need for economic utilisation of killing capacity in abattoirs.

Summer may bring increased demand for transporting dairy products, especially impulse purchase items, and particularly where factory rationalisation has increased transport requirements. Increased demand for refrigerated transport in summer also comes from cargoes which can be moved in conventional transport in winter, such as chocolate biscuits.

On some routes, demand for transport services may be affected by the availability of overseas reefer units being repositioned.

Fluctuations in demand for transport of specific commodities can be reduced by constructing cold stores near the source of production or processing. This practice avoids flooding the market and, by eliminating demand peaks, may reduce transport costs.

In periods of reduced demand, some refrigerated trailers are either left idle or are used for carrying dry cargo.

MATERIALS HANDLING AND DISTRIBUTION

Most refrigerated cargoes being shipped in Australia can load about 21 tonnes per trailer although there are a number of low density commodities for which cargo size is limited by volume rather than vehicle weight limits. In practice, however, load sizes are sometimes limited by customers requiring cargoes to be delivered on pallets. First, pallets weigh about 45 kg each so that for a 20 pallet consignment net payload can be reduced by nearly one tonne. Second, some buyers specify that pallets should be loaded to less than the maximum possible height, thereby increasing the number of pallets carried and further reducing net payloads. Lower pallet heights may be required for compatability with warehouse racks or so that full pallet loads can be delivered to an increased number of retail outlets, the assumption being that the smaller the pallet load the greater the number of retail outlets which will take pallet deliveries. These practices may reduce warehousing and handling costs but result in higher unit transport costs. Net payload figures may also be reduced for cargoes where carton sizes have not been designed to maximise the load per pallet.

As a generalisation, pallets are frequently used on the shorter routes but for longer movements shippers must weigh the costs of labour required for hand loading cargoes against increased transport costs in using pallets.

A further distribution problem encountered by the refrigerated transport industry involves the handling of LCL consignments, since cargoes must always be kept refrigerated. The technically best way of handling LCLs is to pick up and deliver cargoes with feeder vehicles, consolidate loads in warehouses, and use trailers or containers for the line haul. This is a relatively expensive operation, however, and is only known to be used regularly for some shipments to WA. A more common practice is to use line haul trailers to make pick ups and deliveries even though frequently opening the door may result in rising temperatures with consequent product deterioration. The frozen food industry seems to have at least partly avoided this problem by distributing to retail outlets via wholesale grocers. FCL consignments are shipped from producers to wholesalers warehouses where the various items comprising orders for individual retail outlets are made up into single loads and sent out by small delivery vehicles.

Market Operations

Most domestic refrigerated cargoes are consigned by road but transport arrangements are different to those existing for dry cargo. The dry cargo sector is characterised by the dominance of freight forwarders consolidating LCL cargoes and hiring sub-contractors or rail wagons. Most refrigerated shipments are, however, arranged direct between consignor and carrier. Where freight forwarders are involved in moving refrigerated cargoes it is usually in the role of carrier using company-owned equipment rather than as an agent responsible for hiring sub-contractors. The practice of direct arrangement between shipper and carrier may arise because, relative to dry cargoes, the quantity of refrigerated consignments on intercapital routes is small and most is shipped in FCLs. Further, many shippers prefer consigning through a specific carrier known to have a good record for maintaining cargo quality rather than a variety of carriers arranged by freight forwarders or booking agents.

As with other sectors of the road transport industry very strong competition exists between refrigerated transport operators. Even when consigning most cargoes through only one or a few carriers, many large consignors prefer to pay the going 'spot' market rate rather than enter into a formal contract arrangement. In general spot market rates are less than contract rates except for short period emergency movement situations as when an overseas ship does not berth at a scheduled port.

When contracts are signed, they frequently cover several services including warehousing, order selection, line haul transport, and local distribution. Contracts for line haul transport alone represent a small proportion of total trade. Shippers usually only sign contracts with carriers having a history of good service and where a consistent and reliable operation is required.

REFERENCES CITED

ABS (1976a)	Urban Centres and Localities, 1976 Census, Microfiche, 76.102.
ABS (1976b)	Population and Dwellings in Local Government Areas and Urban Centres, Tasmania (preliminary) Cat No 2406.0.
ABS (1979)	Yearbook of Australia No 63, AGPS, Canberra.
ANL (1978)	Annual Report, 1978.
ANL (1979)	Annual Report, 1979.
Bureau of Transport Economics (1976)	Estimates of Australian Interregional Freight Movements, 1971-72, AGPS, Canberra.
Bureau of Transport Economics (1977)	Cost Recovery in Australian Transport, AGPS, Canberra.
Bureau of Transport Economics (1978a)	Tasmanian Freight Equalisation Scheme: Recommended Northbound Assistance Rates at 1 January, 1978, AGPS, Canberra.
Bureau of Transport Economics (1978b)	Estimates of Australian Interregional Freight Movements, 1975-76, AGPS, Canberra.
Bureau of Transport Economics (1979a)	Tasmanian Freight Equalisation Scheme: Recommended Rates of Assistance for Southbound Cargoes, Livestock and Timber at 31 January, 1979, AGPS, Canberra.
Bureau of Transport Economics (1979b)	The Long Distance Road Haulage Industry, AGPS, Canberra.

Department of Transport, Australia, (1976) — Marine Information Manual, Australia (1975) Amendment 14.3.1, August 1976, AGPS, Canberra.

Department of Transport, Australia, (1978) — Port Authority Cargo Movements, 1976-77, AGPS, Canberra.

Hansard (1980) — Commonwealth of Australia, Parliamentary Debates, House of Representatives, 16 April, Weekly Hansard No 7.

NRMA (1979) — Motorists Map of South East Australia, May 1979.

NSW Public Transport Commission (1973) — Merchandise and Livestock Rates.

Nimmo, J.F. (Commissioner) (1976) — Report of the Commission of Inquiry into Transport to and from Tasmania, AGPS, Canberra.

Railways of Australia (1973) — Goods Rates Book.

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

Tasmanian Department of Transport, Railways Branch, (1973) — Working Timetable.

ABBREVIATIONS

ABS	Australian Bureau of Statistics
ANL	Australian National Line
ANR	Australian National Railways (now Australian National)
ASIC	Australian Standard Industrial Classification
DOTA	Department of Transport, Australia
FCL	Full Container Load
GCD	Great Circle Distance
ISO	International Standards Organisation, which *inter alia* prescribes standards for freight containers
LCL	Less than Container Load
LGA	Local Government Area
RACE	Railways of Australia Container Express
ROA	Railways of Australia
RoRo	Roll on roll off
TFES	Tasmanian Freight Equalisation Scheme
TNT	Thomas Nationwide Transport
USS	Union Steam Ship Company of New Zealand