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Land Freight Subsidies in Australia

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Abstract:

Rail freight deficits in Australia have been showing a general downward trend during the 1990s This is at a time the rail freight task is showing modest growth and efficiently in increasing. However, despite the ongoing increases in fuel excise, the road freight industry is showing both strong growth and under-recovery from road system costs for the heavier long distance articulated trucks. Accordingly, the National Road Transport Commission's current first generation road user charges invite major review during the proposed second determination and before implementation over the recommendations of the mass limits review. Clearly road freight in Australia is currently being supported by the private motorist In contrast, freight train operations are generally required to cover all infrastructure cost with minimal contribution from passenger operations The paper also outlines the New Zealand "mass-distance" road user charges and observes that the rail operations in New Zealand that were privatised in 1993 now pay both dividends to shareholders and taxes to Government.

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Introduction

The Australian land freight transport tasks for 1970-71 and 1994-95 are shown in Table 1. From this, we note the strong growth in the road freight moved by articulated trucks - doubling each decade. Despite strong growth in export coal traffic over this time, the Government rail freight task has only shown a modest average annual growth rate.

Cost recovery from land freight transport is an old topic in Australia. Some 25 years ago, in 1972, the report of a Board of Inquiry of the Victorian Land Transport System was released (Bland, 1972). Speaking to this report at a meeting of the Institution of Engineers, Australia, on 17 May 1972, the Chairman, Sir Henry Bland observed that it did not require an Inquiry to find that the Railways did not pay their way, and, that the position on the road side was worse. Here, the road related charges paid by the road freight industry in Victoria for 1969-70 were estimated at $14 million for trucks with load capacity exceeding 4 tonnes, whilst road construction and maintenance costs attributed to these trucks was $56 million. As the Board saw it, neither road nor rail freight met its true costs so that Victoria was *"getting its transport on the cheap"*; also, a condition for a truly competitive environment was for both modes to bear their real costs.

Subsequent Government studies looking at both road and rail have also found subsidies to road and rail freight. At a State level, the NSW Commission of Enquiry into the NSW Road Freight Industry (McDonell, 1980) found, in addition to severe data limitations, for 1977-78, a qualified rail freight deficit of $144.5 million; and, on one data set (Economics of Road Vehicle Use) articulated trucks and rigid trucks exceeding 4.1 tonnes carrying capacity had an attributed road system cost of $220.5 million and road related revenues were estimated at $141.2 million; a shortfall of nearly $80 million.

At a national level the Bureau of Transport Economics (BTE - 1977) undertook a study of all transport modes using 1974-75 data. In the summary of results, as noted by the Commonwealth Department of Transport (1980) overall freight transport deficits were

Table 1 Australian Road and Rail Freight Tasks

	Billion tonne km 1970-71	1994-95	Average Annual Growth Rate
Total road freight task	27	119.3	6.4 %
Articulated truck freight task	15	89.4	7.7 %
Government Rail freight	25	61.6	3.8 %
Non Government Rail freight	14	38.1	4.3 %

References: For 1970-71 data, Inter-State Commission (ISC - 1990), and for 1994-95 data, Government rail - Steering Committee on National Performance Monitoring of Government Trading Enterprises, Private Rail - BTCE Transport Indicators, and road - Australian Bureau of Statistics (1996) including 4.8 billion tonne km due to light commercial vehicles.

reported of $353.2 million for urban road, $217.2 million for rural road, and $229.2 million for non-urban rail, with cost recovery levels of 79%, 80% and 67% respectively.

As part of its terms of reference, the National Road Freight Industry Inquiry (May et al, 1984) examined rail freight deficits and road cost recovery. In brief the Inquiry found a declared rail freight deficit of $334 million in 1981-82 for a freight task of 37.3 billion tonne km (with revenue $1432 million) giving an average deficit rate of 0.9 cents per net tonne km; (with additional capital expenditure for freight of $400 million), and for road (p266) that *"the implied average deficit rate on road cost recovery from articulated freight vehicles is nearly 0.6 cents per tonne-km"* (noting road costs were more than fully recovered from all vehicles).

The work of the Inter-State Commission (ISC, 1986, 1987, 1990) also included studies of cost recovery from interstate land freight. The work here showed that there were interstate rail freight losses, and, that the heavier articulated trucks hauling long distances were making less than adequate contributions to road system costs.

The ISC (1990) also considered the internalisation of environmental costs for road freight, and recommended that the BTCE should examine rail freight external costs. We are not able to examine environmental costs for land freight in this paper but note that the main reason for their exclusion in pricing is the perceived difficulty by the Australian authorities in allocating accurate values to these costs. There is, however, a real cost to this omission: *"Some would argue that we cannot quantify external costs in transport planning because we do not know exactly the amount they cost. By excluding them, we have quantified them; we have set them to zero. Thus, estimates of external costs, even if rough, are better than no estimates"* (Transport Concepts, 1996, p6).

Particular external costs associated with the land freight include:
A. Those costs involving other users of the road system:
* Congestion, each vehicle added to the system delays the progress of other vehicles during peak periods and at strategic locations.
* Accidents, the portion of the total cost unfunded by insurance premiums.
B. Environmental externalities:
* Noise, particularly in residential areas adjacent to main railways and roads.
* Emissions, particularly the aspects of air pollution and the Greenhouse Effect.

The National Transport Planning Taskforce (NTPT - 1994) considered that *"....A pricing mechanism for road use, which relates use to cost of provision and external costs, such as congestion and environmental factors, needs to be developed"*.

The inclusion of externalities in the economic evaluation of projects competing for funding would likely reduce the benefit cost ratio of any road project and enhance the relative position of rail. A more balanced approach to road and rail track funding was supported by the NTPT (1994). In this regard, the extensive investment in the National Highway System (some $15 billion in 1997 terms since its formation in 1974 to June 1997) with under-investment in the interstate mainlines in Eastern Australia (less than $1 billion over this time (Laird, 1996a)) is of note.

Rail freight deficits

We shall restrict our attention to rail freight deficits in the Government systems, which in 1995 comprised four State systems (Queensland Rail (QR), State Rail Authority of New South Wales (SRA), the Public Transport Corporation of Victoria (PTC) and Westrail (WR)), along with Australian National (AN) and National Rail (NR). As a rule, rail freight deficits are not highlighted in the Annual Reports of these systems, and when freight and passenger trains share track, there is a difficulty in attributing rail track costs. Consequently, rail freight deficits are only approximate and are qualified. By way of example, the Industry Commission (1991) in its report on rail transport did not calculate a rail freight deficit, but observed that rail freight deficit was about one quarter (i.e. some about $525 million) of an overall rail deficit of $2.1 billion for 1989-90.

As noted by the Bureau of Transport and Communications Economics (BTCE -1995a), there has been a reduction of rail freight deficits in Australia in recent years. Rail deficits have fallen to $1.4 billion for 1993-94, as compared with $2.1 billion for 1989-90. The Bureau of Industry Economics (1995, p7) noted that *"Up to 1991-92, freight operations typically contributed about 20 per cent of the overall rail operating deficit ..... However, there has been a substantial reduction in the extent of freight operating deficits in the past two years, possibly to less than $200 million in 1993-94 (BIE Estimate)".*

In broad terms, the 1995-96 Annual Report of National Rail notes that the interstate rail freight loss, including capital costs, was some $380 million in 1990-91, and since then, to 1995-96, *"....the underlying loss has been reduced by approximately three quarters"* with a declared profit of $1 million in 1995-96 (after two abnormal items had been included). The State Rail Authority Annual Report for 1995-96 notes a Government Social Program payment for Freight Rail Services (including some interstate and rural branch line services) of some $121.1 million and a freight profit of $10.8 million. Table 2 gives some estimates of rail freight surpluses and deficits for the rail systems. Lower deficits are due to increased efficiency in rail freight operations (Laird, 1996b), which also allows for lower rail freight rates.

Table 2 Rail System Freight Surplus / Deficit

YEAR	QR	SRA	PTC	Westrail	AN	NR	Total
1989-90	96	-232	n.p.	-49	-49	-	-234
1990-91	174	-151	-203	-52	-40	-	-272
1991-92	190	-148	-200	-28	-182	-2	-370
1992-93	123	-67	-179	-20	-79	-14	-236
1993-94	146	-44	-156	-11	-40	1	-104

Ref: Derived from BTCE (1995a), except for PTC data which was not provided and infered from freight revenue less freight costs. It is understood that PTC freight deficits have now fallen to appreciably below $100 million a year.

Road cost recovery from heavy trucks

It is appreciated that road cost recovery from heavy trucks is a contentious issue. Estimates of attributable road system costs to truck operators are subject to severe data limitations and are assumption sensitive. As well, truck operators have faced increased fuel excise in recent years which was 34.559 cents per litre as of 1 August 1996, compared with approximately 20 cents a litre in 1986. It is also noted that in 1992-93, the total taxes and charges (including concessions) paid by the road freight industry on trucks with a Gross Vehicle Mass (GVM) exceeding 4.5 tonnes were estimated at about $2536 million (Department of Transport (1995, Table VII.3). As always, it is debatable whether to designate a particular Government tax on a trucking operation as a general tax or as a road user charge. A reasonable scope of road user charges would comprise the notional NRTC 18 cents per litre on diesel, all vehicle registration charges, and State fuel franchises. In this case (using fuel excise at some 26.23 cents per litre in 1992-93), the road user charges amount to some $1254 million - about 49 per cent of the above cited $2536 million. As well, aggregate road user taxes and charges for articulated trucks were some $1202 million, which was less than the $1333 million for rigid trucks.

For a summary of studies of road cost recovery from heavy trucks up to 1990, the reader is referred to the BTE(1983), ISC (1986), BTCE (1988), Ogden (1988) and Laird (1990). The main changes during the 1980s were increasing reliance by the Federal and State Governments on fuel taxes, the introduction of a Federal Interstate Registration Scheme (FIRS) in 1987 that included the option of mass-distance charging, and the relaxation of mass and dimension limits. The latter followed a detailed study by the National Association of Australian State Road Authorities (NAASRA-1985) and included the option for a six axle articulated truck to raise its GVM legal limit from 38 tonnes to either 41 tonnes or 42.5 tonnes, with NSW and Victoria charging permit fees for extra mass. A modification of FIRS in 1988 allowed the option of a six axle articulated truck raising its GVM from 38 tonnes to 42.5 tonnes, with respective registration fees of $1250 and $3285.

Following recommendations from the ISC (1990) that a national scheme be established for the registration and charging of all vehicles operating in Australia, and an agreement made by the Commonwealth, all States and the ACT Government at the July 1991 Special Premiers Conference (SPC), with enabling legislation, a National Road Transport Commission (NRTC) was established. In June 1992, the NRTC (1992c) gave its determination on heavy vehicle road user charges. These charges were approved by a Ministerial Council in 1992 with implementation throughout Australia occurring in 1996. An account of the NRTC charges is given by Starrs (1996) who noted general industry acceptance, and that in regard to charges *" a long debate has been closed ...."*

However, the NRTC charges result in under-recovery of road system costs from the heavy long- distance road freight operations and lead to distortion of road - rail competition for line haul and some bulk freight. This distortion is becoming increasingly apparent from the discrepancies between access pricing for road track and rail track.

Problems with the now current NRTC charges were noted by the Industry Commission

(1991-92 Annual Report, p197-198): *"**The result is that some vehicles - the heaviest travelling long annual distances - will meet less than 20 per cent of their attributed costs.*** [emphasis added] ..... *Differences between the recommended charges and road-related costs are greatest for vehicles competing with rail. The charges, as recommended, will therefore potentially distort the long-haul freight market as rail reforms take effect......"*

This view is in contrast with the current 'convential wisdom' that the NRTC charges amount to full cost recovery. The Industry Commission (1995, p347) noted that *"None of the NRTC's publications relating to the proposed heavy vehicle charges (1992a, 1992b, 1992c, and 1993a) provide a detailed costing of all revenue and expenditure items to support their claim of full cost recovery. Different sections of these report indicate that they have taken most, if not all factors into account. In the absence of evidence to the contrary, the Commission has accepted the NRTC's claim that the proposed charges recover the full costs attributable to road transport."*

However, it is of note that NRTC (1993a, p9) stated that their charges would result in under-recovery from six axle and larger articulated trucks by $61. 2 million. As well, the NRTC estimated annual road system costs of $702 million for articulated trucks. Of this, $407 million was for six axle articulated trucks and $178 million was for B-Doubles and Road Trains. On the basis of former studies, including those of the former ISC (1990), as shown in Table 3, the NRTC estimates of road system costs attributable to the heavier articulated trucks are unduly conservative. This in part is shown by the fact that in September 1991, the Federal Land Transport Minister, the Hon Bob Brown, indicated by way of a letter that annual charges for the heavier articulated trucks would likely be in the $7000 to $8000 range. The NRTC put them at $4000.

As noted above, numerous reports on road cost recovery published during the 1980s found under-recovery of road system costs from the heavier articulated trucks. Over the last 10 years, fuel excise has increased, whilst the effect of the NRTC first generation of charges saw little change in aggregate revenue from annual registration fees.

Table 3 Estimates of road system costs attributable to articulated trucks

Study	Year	Road System	Road System Costs $ million	Costs attributable articulated trucks $ million	Percentage
NRFII	1981-82	Arterial	1276	389	30.5
NSW	1984-85	All roads	1595	369	23.1
BTCE	1985-86	Arterial	4200	1963	46.7
ISC	1989-90	Arterial	2630	563	21.4
NRTC	Early 90s	Arterial	4515	702	16.9

References: NRFII (National Road Freight Industry Inquiry) report (May et al, 1984), BTCE (1988), Laird (1990), ISC (1990), and NRTC (1993a).

The NRTC (1996, p51) also makes a claim that *"In general, the national heavy vehicle charges developed by NRTC fully recover costs of roads and bridges."* As above, this view is open to question. During 1992-93, road user charges from heavy trucks raised about 44 per cent of the main source of road funds (New Zealand Ministry of Transport, 1994, p12). New Zealand's raising about 44 per cent of road system charges from heavy trucks is much higher than the NRTC level of about 16 per cent now prevailing in Australia. This observation is made not to suggest that Australia should be raising 44 per cent of its road system costs from heavy vehicle road user charges, but that the present level in Australia of about 16 per cent is too low.

It is instructive to examine why the NRTC charges result in low cost recovery from the heavier trucks. The NRTC methodology involves using a cost allocation model which is based on the masses and distances travelled of the average vehicles for each class. This annual cost calculated for the average vehicle in each class is then allocated via two "charging instruments"; a road user charge (18 cents per litre on fuel use) and a fixed vehicle registration fee to make up the shortfall. Mass - distance charging, although an option open to the NRTC, was not used. The NRTC cost allocation model itself is not in question but there are very real deficiencies in the application of the model in the way costs are allocated between and within vehicle classes.

The cost allocation model assumes that all travel for each vehicle class is undertaken by vehicles at exactly the class average mass and travelling at exactly the class average distance. This leads to a mis-allocation of costs both within and between vehicle classes. There are three reasons for this:

* The major allocation parameter for pavement damage (but not pavement construction) is the Equivalent Standard Axle (ESA-km) which varies with the fourth power of the axle loading. By applying a fourth power law to average masses there will be an under-estimation of the pavement damage attributable to a vehicle when it is travelling at over the class average mass. This will not be compensated for by the over-estimation of the damage attributed to the vehicle when it is under the class average mass. The net result is an under-recovery of pavement costs attributable to heavy vehicles.
* B-doubles and road trains which are aggregated as "7+ axle articulated trucks" - a hypothetical vehicle on which all calculations are based.
* The allocated costs of vehicles which travel greater than average distances will understate their true road costs at the expense of short haul vehicles.

Three cases are considered in order to illustrate the inadequacy of this aspect of the NRTC charging system in regards to various loading patterns.

* NRTC Average Vehicle: Vehicles loaded in both directions to NRTC average mass of 32 tonnes. For a 6-axle articulated truck, this corresponds to a 16 tonne truck loaded with 16 tonnes in both directions of travel. This may happen for example when a truck is loaded with tissue in the forward direction and back loaded with breakfast cereal for the return trip but this is an exceptional loading pattern.
* Empty Return: The truck is fully loaded on the outward trip, but returns empty.
* Full Load Return: The truck is fully loaded in both the outward and the return trips.

Table 4 compares 6-axle articulated, 8-axle B-Double and Road Train configurations with the above loading patterns travelling at NRTC class average distances.

Table 4 Net recovery of road costs using NRTC cost allocation model

Vehicle/Loading pattern	Gross Vehicle Mass Outward (tonnes)	Return (tonnes)	ESA	Net Recovery of Allocated Road Costs (cents/km)
6 axle articulated truck				
NRTC avge. load at all times	32.0	32.0	1.83	+ 0.5
Full load out/empty return	42.5	16.0	2.63	- 1.8
Full load both ways	42.5	42.5	4.71	- 9.8
7+axle articulated truck				
NRTC avge. load at all times	61.4	61.4	3.96	- 13.8
8-axle B-double				
Full load out/empty return	62.5	22.5	4.69	- 8.6
Full load both ways	62.5	62.5	8.38	- 22.8
Double Road Train				
Full load out/empty return	79.0	26.0	4.59	- 8.7
Full load both ways	79.0	79.0	8.21	- 23.6

Reference Lander (1997) based on NRTC (1992b, 1993b) data with a road user charge of 18 cents/litre and NRTC annual registration fees.

Table 5 Net recovery of road costs using NRTC cost allocation model for six axle articulated trucks

	Annual Distance (km)	Gross Vehicle Mass Outward (tonnes)	Return (tonnes)	ESA	Net Recovery of Road Costs (cents/km)
Short Haul	30,000	44.0	20.0	3.0	+ 6.5
Long Haul	200,000	42.5	33.0	3.4	- 6.7

Reference Lander (1997) based on NRTC (1992b, 1993b) data with a road user charge of 18 cents/litre and NRTC annual registration fees.

It may be concluded from Table 4 that:

* The use of average vehicle types leads to the number of ESA's per vehicle being understated, particularly where the vehicle is loaded in both directions.

* For all vehicles other than the NRTC average 6-axle articulated truck, there is an under-recovery of road costs. This becomes substantial where the truck is fully loaded in both directions.

A further problem with the NRTC model is that in allocating charges, insufficient attention has been paid to the effect of varying the distance travelled as well as load. Table 5 gives a comparison of the road cost recovery of a 6-axle articulated truck engaged in pick-up and delivery work to an intermodal freight yard with that of a similar vehicle engaged in line haul work. Table 5 highlights the substantial cross subsidy from short-haul vehicles that are not in competition with rail to the heavy articulated line-haul vehicles which are in direct competition with rail.

The implications of the data presented in Tables 4 and 5 above are:

* Heavy articulated trucks are not recovering their allocated costs and herefore actual road costs will not be recovered in the long term via the current charging mechanism.
* The magnitude of the under-recovery is significant in the transport cost structure, effectively between 0.3 and 0.6 cents per net tonne km. This constitutes a substantial advantage for the heavy articulated vehicles which are the main competitors for rail.
* The cross subsidy effect is such that vehicles which are in competition with rail - long distance articulated trucks - will be those which benefit the most. Vehicles not in competition with rail will be required to bear more than their allocated costs.

An across-the-board increase in road charges would penalise road users which are already meeting their allocated share of road costs as illustrated by the short haul delivery vehicle. The main problem is that the present NRTC charging mechanism is based on only two charging instruments - the fuel charge and the fixed registration charge (irrespective of the GVM of a particular class of vehicle) - and is therefore not sufficiently flexible for a consistent recovery of full road costs.

Yet another problem in the current NRTC cost allocation model is with the allocation of non-separable costs. Separable costs are those which may be meaningfully allocated to a particular class of vehicles and which would be avoided if that class (or a large proportion of that class) were not users of the road system. For example, bridge design is very dependent on vehicle mass and is therefore largely separable to heavy vehicles. The separable cost is not the marginal cost of an individual vehicle but rather the marginal cost of a class of vehicles. Non-separable costs are those costs which may not be meaningfully attributed to any particular class of vehicles but are common to all users of the road system. Non-separable costs may be regarded as "fixed" costs in the short term.

The NRTC model and data (NRTC, 1992b, 1993b) leads to the conclusion that 74.8 per cent of all road costs are non-separable, and 25.2 per cent are separable, with the non-separable costs allocated on the basis of vehicle kilometres travelled (VKT). Thus a car carrying 1 person, a bus carrying 40 passengers and a double road train weighing 75 tonnes all contribute equally to the fixed costs of the road system (at 2 cents/km). We suggest that it would be preferable to use means other than VKT to allocate non - separable costs. One approach would be to follow McDonnel (1980) and use Passenger Car Unit (PCU) kilometres, with one for a car, two for a rigid truck and three for an articulated truck, with the modification of say 4.5 for a B- Double and 6 for a road train.

It is of note that Transit New Zealand allocates non-separable costs between road users by a more rigorous approach using a number of parameters in addition to vehicle kilometres travelled. The result is that the proportion of non-separable road costs allocated to articulated vehicles is much higher than in Australia and corresponds more to their proportion of separable costs.

Whilst individual heavy vehicles travel much further than lighter vehicles on average, this factor is outweighed by the sheer numbers of cars, station wagons and light commercial vehicles on the roads. The result is that these lighter vehicles are allocated 92 per cent of the non-separable road costs, whilst articulated trucks are allocated less than 3 per cent of these costs.

Thus, the NRTC model after having determined that most of the cost of supplying roads is a non-separable cost, then proceeds to use an allocation parameter (VKT) that minimizes the share of the road system cost that is to be borne by the heavy long distance road freight industry. Stated less subtly, this means that the private motorist is bearing the full cost of the road system, whilst the heavy vehicle operator is bearing its marginal costs only. There are significant economic implications of this approach.

The impact of full road cost recovery from heavy trucks on road - rail competition for freight was touched on by the NRTC (1992a) who considered the impact as not of concern, and by Laird (1993) who held that it was relevant, and gave some examples. A further example is provided by Lander (1997) for the transport of freight between Sydney and Melbourne (about 880 km each way). This corridor represents a high profile corridor in which rail has a small market share at present of some 20 per cent of land freight. By assuming the articulated vehicles travel at around 180,000 km/year which corresponds to two round trips each week, it may be demonstrated that the level of under-recovery corresponds from $2.00 to $ 5.00 per tonne - excluding other quantifiable externalities such as road crashes. The highest level of under-recovery is from B-doubles which are now the major competitor for rail on this corridor. Note that this does not include congestion. This corresponds to about 5-10% of the current freight rate and means that if articulated vehicles were to bear their full costs, road transport rates would have to rise accordingly. The effect of this would include reduced demand for freight transport on this corridor and a significant modal shift of freight from road to rail.

Mass limits review

As part of a Mass Limits Review, the NRTC (1996) recommended, inter alia, that an increase in mass limits for heavy trucks fittedwith road friendly air suspension units. The NRTC preference was for an Option F that would include the GVM of 6 axle articulated vehicles being increased from 42.5 to 45.5 tonnes, the GVM of B-doubles increased to a maximum of 65 tonnes, and, the gross mass of road trains and other long combinations vehicles being allowed to increase by the sum of the increases on road friendly tandem and triaxle groups in the combination.The mass limit increases for B-Doubles were limited because of concerns about the ability of bridges to bear increased GVMs.

The NRTC appears to favour the higher mass limits. An NRTC circular dated 27 August 1996 cites ..... *"transport savings of nearly $1.3 billion over the next 15 years. Much of these savings should be passed on to freight customers to enhance Australia's economic competitiveness and export performance. Communities will benefit as quieter, more efficient vehicles carrying a slightly higher payload would reduce the number of trucks needed to perform the nation's transport task, thereby reducing overall truck emissions* *and the risk of crashes."* The main mass limits report (NRTC, 1996, page 53) notes that Option F would lead to a reduction in transport costs of $162 million per annum and a reduction in road costs of $6 million a year. This (somewhat surprising) road wear saving is claimed to be derived *"using the well-established unit of Equivalent Standard Axles (ESAs)"* (NRTC, 1996, page 25).

The NRTC (1992a, 1996) has shown problems with its treatment of the effect of road pricing and relaxed mass limits on rail freight competitiveness. The effect of heavier trucks is acknowledged (NRTC, 1996, p 25 - but not quantified) with a note that *"Converted traffic describes freight which changes mode of travel, usually from rail, because of a relative decrease in road transport costs. Both generated and converted traffic were excluded from the analysis as a realistic estimation of the effects is difficult, the percentage change in the overall freight task is small and the ensuing differences between options minimise any slight impact of the exclusion."*

This cursory treatment of the NRTC (1996) on this issue stands in contrast with the NAASRA (1985) analysis that found that some freight could be lost from rail as a result of allowing heavy vehicles to increase their load limits, with the introduction of Option C limits possibly costing rail some three million tonnes a year. The widespread introduction of B-Doubles were noted by NAASRA (1985) as having the potential to cost rail another three million tonnes a year of freight.

The effect of higher mass limits on the environment is also open to question. Here, the NRTC (1996, p 30) claim that *"Increased mass limits will reduce vehicle travel and hence total fuel used. Total emissions would reduce in virtually direct proportion to reduced travel in rural areas, and the reduction was estimated in Module 2 to be about 1 per cent."* As line haul rail freight is generally more energy efficient than line haul road freight, it is quite possible that an increase in mass limits would lead to an **increase** in the road freight task at the expense of rail. As a result, there would be an increase in total land freight transport emissions as well as road crash risk. It is also of note that some truck use could be decreased with improved intercity mainline track where a NTPT (1995) study considered an outlay of $3 billion would be warranted, also such upgrading would reduce energy use (Laird and and Adorni -Braccesi, 1993).

NRTC Second determination of charges

In January 1997, the NRTC indicated its intention to review charges for heavy vehicles in 1997, but no changes expected are until at least mid 1998. One reason for this review is a stated need to deal with some "anomolies" affecting rigid trucks of lighter mass. However, the heavier semitrailers and B-Doubles are conspicuous by their absence.

Ideally, the NRTC in its second determination and before there is any further relaxation of mass limits would :-

A. Ensure that in determining truck charges, regard is given to competitive neutrality between road and rail track access pricing.

B. Adopt core elements as recommended by the Over-Arching Group in 1991 - including

two zones - not one - for charging purposes and three differential levels of mass limits for each class of vehicle (light (former standard limits including 38 tonnes for a six axle articulated truck), medium (41 t) and heavy (42.5 t)).
C. Specify minimum consultative procedures to protect the public interest, including all submissions being placed on the public record.

Other recent Government comment on road pricing

The Industry Commission (1995, p345) noted *"In the context of Hilmer, the degree to which the proposed charges recover the costs associated with maintaining the road system attributable to heavy vehicles imposes implications for other transport modes, most notably rail, under the competitive neutrality requirements. For example, if the level of cost recovery, after making allowances for community service obligations and externalities, are not similar for road and rail transport then one transport mode will enjoy an artificial competitive advantage over the other."*

The National Commission of Audit (NCOA - 1996) did not appear to specifically cite under-recovery of road system costs from heavy trucks. This is in keeping with recent Government attitudes to the issue. However, whilst recognising (p209) that *"Competitive pricing of infrastructure services is essential for an internationally competitive Australian economy"*, it was recommended (8.8 Appropriate Pricing Signals) that *"The Government should require appropriate pricing of infrastructure services. In particular, where users of service can be identified, pricing of services to reflect full resource costs (including an appropriate return on infrastructure investment) should be adopted."*

The Federal Department of Finance (1997) draws on the NCOA report and makes some comment on the topic of road pricing. With reference to road pricing for heavy trucks, the current PAYGO system for heavy trucks is raised along with other road user charging systems with comment on Multimodal Issues (p 33-34): *"Consideration should be given to the impact of pricing signals in the context of a multimodal transport system ... This would necessitate consideration of the pricing and cost recovery approaches of each mode, and the degree of interaction. ..... "Efficient pricing structures are important to the efficient allocation of resources between transport modes."*

A BTCE (1995b) cost model explicitly excludes externalities but acknowledges that *"an [efficient] pricing system based on marginal costs would include any externalities associated with road use"*.

A BTCE (1996) report 'Transport and Greenhouse: Costs and options for reducing emissions' does not give specific attention to road cost recovery from heavy trucks (in contrast to their report 'Review of Road Cost Recovery' (BTCE, 1988) that found under-recovery of fully allocated road system costs for six axle articulated trucks in 1986-87 as $828 million). The 1996 report did, however, note (p212) a *"road damage cost of 0.85 cents per net tonne-kilometre"* from a 1993 Sydney-Melbourne corridor study, and *"a cost for accidents involving articulated trucks of 0.02 cents per net tonne-kilometre."* Both estimates are considered as conservative. It is probable that improved road cost recovery from heavy trucks could have well emerged as a 'no-regrets' Greenhouse Gas measure, had of the BTCE examined it.

In this regard, a recent study by Burgan (1997) considered the economic welfare gains associated with the introduction of higher charges based on full cost recovery for articulated vehicles. The argument is largely based on the fact that the road industry is characterised by low fixed costs but high marginal costs, whereas rail is the opposite. A shift of freight from road to rail will therefore lead to direct savings in the road sector, but only minimal increases in total costs of the rail sector with a surplus in the rail transport sector. This surplus will become evident either as increased investments in infrastructure, reduced transport rates for rail users, or a combination of both. It is not likely to lead to a long term increase in rail rates, but an improvement in the competitive margin available to rail. Using the same analysis as the Industry Commission review of the Automotive Industry (which considered that tariffs on cars produces a primary distortion which if corrected would lead to a 1% increase in GDP), Burgan (1997) showed that the net economic gain to Australia by correcting the present under-recovery of road costs attributable to articulated vehicles would be approximately $1 billion over 10 years.

New Zealand land freight pricing

In New Zealand, all vehicles over 3.5 tonnes Gross Combination Mass (GCM) have been required to purchase mass - distance licenses since 1978. The actual road user charges depend on the axle configurations and loadings for the vehicle and any trailers. The charges now include a 12.5 per cent Goods and Services Tax (GST). To aid compliance, each vehicle paying road user charges must be fitted with an approved distance measuring device such as a hubodometer. The income from road user charges is fully applied to road works.

Road pricing for heavy trucks affects the rates charged for rail freight services in New Zealand and is one of many reasons why New Zealand Rail (NZR) Ltd has returned a profit for some years and was successfully privatised in 1993. In 1997, NZR's parent company, Tranz Rail Holdings, was paying both dividends and taxes. NZR operates over upgraded intercity rail track and adds value with road pick up and delivery of freight. NZR also runs ferries and its freight revenue in 1995-96 was $NZ400.7 million for a small 3.26 billion tonne km freight task. With currency conversion, the NZR earning capability on freight is nearly four times that of National Rail (with 2.8 cents per net tonne km in 1995-96).

Table 8 shows that for six axle articulated trucks operating at current NRTC maximum mass limits (42.5 tonnes GVM) with no GST and currency conversion at $A1=$NZ1.1, NZ truck operators pay, with current NRTC charges, about three times the road user charges than paid by Australian truck operators. For B-Doubles, the ratio is about four. As well, the New Zealand Ministry of Transport (1997) is undertaking a basic review of the funding of its road system, and may further increase its road pricing for heavy trucks. Whilst the New Zealand scheme is not perfect and would be difficult to quickly implement in an Australian context, its underlying basis does have merit.

Table 6 Former, current and projected truck load limits

	Tonnes				
	Former Standard	NAASRA (Old limits)	Option A	Option C	Option F Projected
6 axle articulated truck:		38	41	42.5	45.5
8 axle B-Double		53.4	56	59	62.5

Reference RORVL (NAASRA, 1985) and Mass Limits Review (NRTC, 1996)
Note that the NAASRA Option C is now the current NRTC Standard

Table 7 New Zealand 1996 road user charges

	(NZ dollars per 1000 truck kilometres - with GST)			
	Old Limits	Option A	Option C	Option F
- 3 axle rigid truck	297.66	320.60	402.79	432.57
- triaxle	148.34	200.57	200.57	289.17
- tandem axle (with 8 axle B-Double)	202.43	202.43	278.85	307.37
- 6 axle articulated truck	446.00	521.17	603.36	721.74
- 8 axle B-Double	648.43	723.60	882.21	1029.11

Reference Road User Charges, New Zealand Land Transport Safety Authority, 1996
Note half tonnages found by averaging charges for adjacent whole tonnages.

Table 8 Australian and New Zealand 1996 road user charges

	(Australian cents per truck kilometres with GST removed for NZ charges)				
	NRTC	Old Limits	Option A	Option C	Option F
- 6 axle articulated truck:	15.4	36.0	42.1	48.8	58.3
- 8 axle B-Double	17.0	52.4	58.5	71.3	83.2

Reference Tables 6 and 7 with GST at 12.5 per cent and currency conversion at \$A1=\$NZ1.1.

For a six axle articulated truck in Australia, the annual NRTC charge of \$4000, plus the NRTC road user charge on diesel at 18 cents a litre and in most states a fuel franchise of about 7 cents a litre is used along with haulage at 160,000 km per year and ABS average fuel use in 1991 at 51.5 litres per 100 km.

For an 8 axle B - Double, the annual NRTC charge of \$5500, plus the NRTC road user charge on diesel at 18 cents a litre and in most states a fuel franchise of about 7 cents a litre is used along with haulage at 275,000 km per year and average fuel use of 60 litres per 100 km.

Note, in New Zealand, diesel is not subject to excise but certain other minor levies.

Conclusions

Rail freight deficits in Australia have been showing a general downward trend during the 1990s. This is at a time the rail freight task is showing modest growth and its efficiency is increasing. However, despite the ongoing increases in fuel excise, the road freight industry is showing both strong growth and under-recovery from road suystem costs for the heavier long distance articulated trucks. As such, and in view of the NRTC's charter including a provision to seek improvements in transport efficiency, the current first generation charges invite major review during the second determination before implementation of the recommendations of the recent mass limits review.

Clearly road freight in Australia is currently being supported by the private motorist. In contrast, freight train operations are generally required to cover all infrastructure costs with minimal contribution from passenger operations. Road-rail competition is also distorted by the extensive investment in the National Highway System with under-investment in the interstate mainlines in Eastern Australia.

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