Agenda, Volume 14, Number 1, 2007, pages 51-68

Regulating Railways in Logistics Chains

Nick Wills-Johnson

Railways contain natural monopoly components in their track infrastructure. Hence, like most infrastructure industries in Australia, they are subject to economic regulation to prevent abuses of monopoly power. Railways also form part of logistics chains and, as such, their ability to abuse market power depends upon the characteristics of those chains. Third party access regimes presently apply to the whole network of a given railway rather than targeting routes where market power might be an issue. Access regimes also make no distinction between the types of rents earned by railways. This is important for two reasons — not all rents have the same effect on firm behaviour, and any rents available to a railway infrastructure owner are closely tied to the rents available in the logistics chain in which it forms a link. This paper seeks to expand the debate on rail access through a more detailed examination of the types of rents attributable to the different freight tasks of Australian railways and the effects these rents might have on the railways.

The following section examines some of the theory surrounding rents and the likely consequences of regulation in the presence of various types of rent. The third section examines the markets of rail's major freight tasks to ascertain the extent of economically damaging rents in each of these logistics chains and the likely behaviour of railways in response to these rents. The paper concludes with some policy recommendations for the future of railway access in Australia, and some caveats to these policy recommendations.

Economic Rents, Regulation and Logistics Chains

Economic regulation of railways in Australia is undertaken by the Australian Competition and Consumer Commission (ACCC) and state-based regulators. Regulation is aimed at the below-rail infrastructure, not above-rail services, as the below-rail infrastructure represents a natural monopoly, while rail services are potentially contestable. Most of the regimes are similar in character, but regulatory intervention for vertically integrated railways (where track and train are owned by the same company) is more pervasive than for vertically separated railways. This reflects the diminished incentives to provide access to train operators which compete with the downstream operations of a vertically integrated track owner.

In Australia, Queensland Rail (QR) is vertically integrated in Queensland, Pacific National (PN) is vertically integrated in Victoria, Genesee and Wyoming is vertically integrated in SA and Freightlink is vertically integrated on the Tarcoola to Darwin railway. All four also operate above rail in other jurisdictions and each ring-fences its below rail operations from those above-rail, in accordance with the regulatory requirements in each jurisdiction. The iron ore railways of the Pilbara

Nick Wills-Johnson is a Senior Research Fellow at the Planning and Transport Research Centre (PATREC), Perth, Australia.

and the sugar railways of Queensland are vertically integrated into their respective production chains, do not interconnect into other rail systems and are not currently subject to economic regulation. The interstate track and most of the non-urban track in NSW are vertically separated and managed by the Australian Rail Track Corporation (ARTC). The Rail Infrastructure Corporation (RIC), the former manager of intra-state track in NSW, retains a small amount of track outside the coal chains of NSW. In WA, Babcock and Brown Infrastructure (BBI) has recently taken over the management of the non-urban, below-rail infrastructure, which it operates through its subsidiary, Westnet Rail.

The characteristics of logistics chains are an important part of considerations of market power and its abuse. This section presents some theory on the nature of economic rents and the effects different types of rents have on logistics chains, establishing a framework for considering, in the case of each major logistics chain served by Australian railways, whether economic regulation is appropriate. The examination of the major logistics chains is undertaken in the subsequent section.

Types of economic rents

In broad terms, there are three types of economic rents: market power rents; Schumpeterian rents; and Ricardian or resource rents. The key distinction between them is the type of behaviour they induce. Economic regulation is concerned with ensuring that economic behaviour promotes the efficient allocation of resources and hence, where a particular rent is unlikely to change economic behaviour, regulation is misplaced.

Market power rents occur when a monopolist is able to influence price. A monopolist sets output where marginal revenue equals marginal cost, and prices this output according to the demand curve. This results in higher prices and less output than the competitive outcome, where price is equal to marginal cost. It is the efficiency losses associated with this loss of output (the Harberger triangle) that concerns economic regulation, rather than the distribution of surplus between consumers and producers. In essence, economic regulators endeavour to mimic the forces of absent competition through restricting the price a monopolist can charge and thus creating an incentive to increase output.

Schumpeterian rents are rents to innovation. In form, they are the same as market power rents, but they differ in their genesis. Innovation produces temporary market power for the firm which possesses it until it is imitated by rivals and the rents are competed away. While Schumpeterian rents cause the same static efficiency issues as market-power rents, they actually improve dynamic efficiency by providing a reward for innovation and hence an incentive to undertake it. For this reason, Schumpeterian rents are encouraged through the patent system.

Ricardian or resource rents accrue to the owners of low-cost inputs that cannot be imitated, such as a mineral deposit which costs less to exploit than other deposits of the same mineral. The possessor of resource rents cannot supply the entirety of market demand from its outputs and thus customers must also source supply from higher-cost sources. These higher cost sources then become the price-makers in the market, and the possessor of the lower cost resource earns a rent. The rent is quite different from market-power rents,

because of the behaviour it induces. Since the possessor of a resource rent cannot influence price, it has no incentive to withhold supply. In fact, it has every incentive to produce as much as it can, as every additional unit produced and sold at a market price higher than the cost of production creates a windfall gain. The behaviour of the possessor of resource rents is thus indistinguishable from that of a perfectly competitive mine, and economic regulation can deliver no benefits.

Rent in a logistics chain

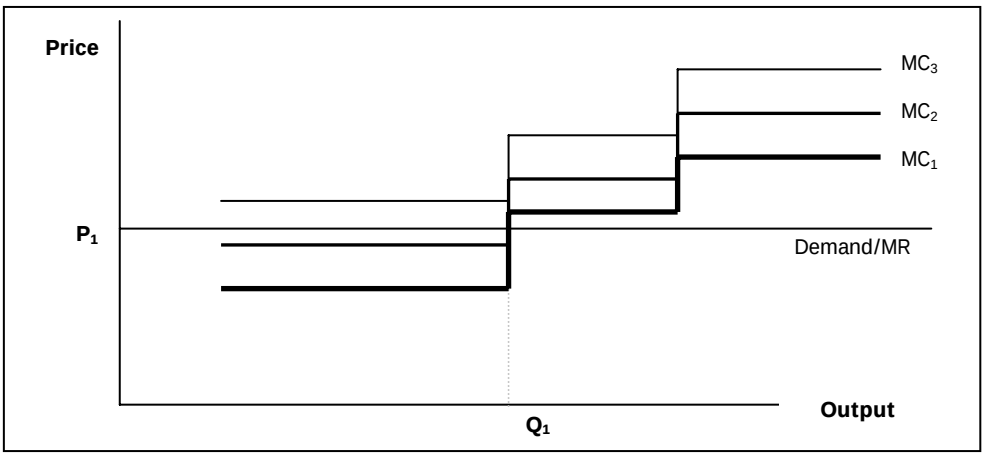
Freight railways seldom service final demand, but rather form a link in a logistics chain and thus face a derived demand from the next link downstream in the chain. As railway infrastructure is a natural monopoly, its owner can extract market power rents available in the consumer market(s) served by the logistics chain by virtue of the way in which it provides railway infrastructure services. The incentive to extract rents exists whether the railway is vertically integrated or not. The difference lies in the way in which rents are extracted. An unregulated vertically integrated railway will use access charges and haulage charges to extract rents (or just haulage charges if it is more profitable to avoid providing access) while a vertically separate railway can only use access charges. A vertically integrated railway might be better at extracting rents because it has operations one step closer to the final consumption market and thus is able to observe more information about demand characteristics in that market, but the rents being pursued are the same. The size of such rents is important; if available rents are small, so too are the consequences of an owner of railway infrastructure exercising its market power. In such cases, economic regulation may be unnecessarily burdensome. The type of rents is also important, and influences the behaviour of the owner of the railway infrastructure.

A railway serving a final market where there are market-power or Schumpeterian rents are present will obviously try to increase the prices under its control (either access price or haulage charges) in order to extract these rents. If it is the only monopolist in the chain, it will be able to extract all of the rents, while it will have to share the rents if other links also have market power. In some cases, even an ostensibly competitive consumer market might yield rents. If the only transport route into a market is the railway, then the owner of the railway infrastructure can act as a cartel manager, increasing the price of goods in the final market to their monopoly level and extracting all of the rents thus gained through either access or haulage charges. Where the final consumer market contains (sufficiently large) market-power rents or where a railway infrastructure owner is able to act as a cartel manager, then there is a strong rationale for economic regulation of the relevant railway infrastructure.

A more interesting case occurs where the railway infrastructure serves a market where only Ricardian or resource rents are available, say a mine. Where the marginal cost curve of the customer is smooth and rising, an increase in access or haulage charges will shift the marginal cost curve upwards and decrease the amount produced by the railway customer. In this instance, economic regulation seems justified. However, mines generally do not have smooth marginal cost curves. Rather, due to their own fixed costs, their marginal cost curves increase in steps; flat over a range of output and then increasing sharply

when new fixed costs need to be incurred in order to expand output beyond the capacity of existing infrastructure. In this case, if the marginal cost curve is vertical at the point it intersects the (horizontal — as the market will accept all output from the mine at the given price) demand curve faced by the mine, there is scope to increase access or haulage charges without a drop in mine output. Consider Figure 1. A railway, serving this mine, can increase its (access or haulage) charges such that the marginal costs of the mine rise from MC_1 to MC_2 without any effect on output or price. All that occurs is that the railway infrastructure owner obtains some of the resource rents which formerly went to the owner of the mine. However, if the railway increases charges again, so that the marginal cost curve rises to MC_3, not only does the railway lose revenue from the marginal units of output but, because the costs of the mine are now above the global market price, the railway loses all revenue from hauling that mine's output. If there is one mine and one railway, and the railway knows the shape of the mine's marginal cost curve, it has an incentive to increase the price of haulage or access up to the point where the marginal cost curve of the mine just touches its demand curve and no further. In such a scenario, economic regulation will have no effect on price in the global commodity market and no effect on the output of the mine to which the railway is providing services. All it will do is redistribute the resource rents from the railway to the mine it serves. This is not regulation, but industry policy.

Figure 1: A Railway Price Hike with Ricardian Rents



There are, however, few cases where a given piece of railway infrastructure serves only a single mine. In most cases, a railway might serve a number of mines which, even if they are in the same industry, might have very different marginal cost curves as each is exploiting a different resource. There are also few cases where the railway infrastructure owner knows the marginal costs of the mines it serves. In particular, the railway faces an information asymmetry in respect to its customers, exactly the same as that described by Laffont and Tirole (1993) in respect of regulators and regulated mines. Moreover, the customers have the same incentives to overstate their costs and keep more of the resource

rents. This means that the railway infrastructure owner might find it difficult to efficiently price discriminate between its customers.

In response to different resource rents and information asymmetries, a railway infrastructure owner might decide to eschew price discrimination and set a price (for haulage or access) that recovers its fixed costs, plus as much of the total resource rents as it thinks it can obtain with a single price. Effectively, it trades off the resource rents it can capture from the larger, lower-cost customers against the losses in revenue from smaller, higher-cost customers being forced out of the market by being forced to a situation like MC_3 in Figure 1. The result will be less supplied to global commodity markets and hence a fall in Australia's export earnings.

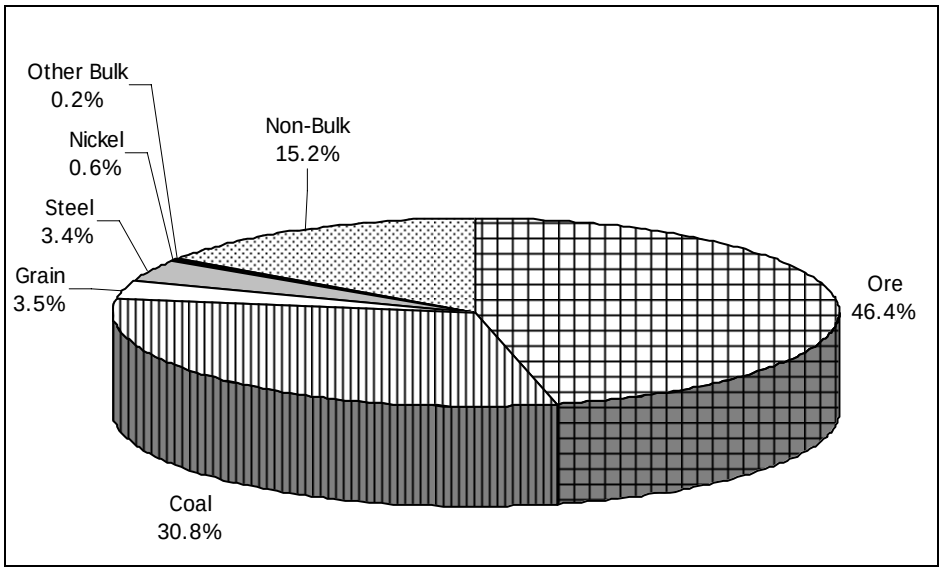
In this instance, regulation might be able to play a role. To the extent that regulation forces the relevant railway infrastructure owner to recover only its fixed costs, rather than its fixed costs and that portion of the resource rents it thinks it can achieve in the trade-off mentioned above, it increases the likelihood that smaller, higher-cost customers of the railway will be able to stay in their relevant markets. This will increase output in these markets, but will not alter price. Thus, of the second-best options associated with a single price, the regulated price is preferable, provided of course it allows the railway to recover its cost of capital. In Australia, where revenue is capped, rather than price (meaning railway infrastructure owners are less restricted in price discrimination options), the same is true. The point remains, however, that the first-best solution to a diversity of mine costs is for the railway infrastructure owner to overcome the information asymmetries which prevent efficient price discrimination. The first-best option is not assisted by economic regulation, as an economic regulator is no more able to understand mine costs than the railway infrastructure owner.

Market Power in Australian Railways Logistics Chains

If economic regulation is intended to address problems associated with the exploitation of market power, then it seems sensible to examine the logistics chains of which rail is a major part in Australia to determine what kind of rents are available in them. Figure 2 shows the major logistics tasks for the Australian rail networks.

Iron ore and coal comprise almost 80 per cent of the freight task. Grain has a relatively small share, but is important because of the large network required to support it. Alumina and bauxite are not shown on Figure2 because they are only hauled a short distance, even though their tonnages are large (more than steel, nickel and grain). Due to these large tonnages, bauxite and alumina are also examined below. Most of the non-bulk freight is intermodal freight, although a small portion of it is motor-vehicle carriage and other freight.

Figure 2: Major Rail Tasks, 2003, (billions of ntk)



Source: Australian Railway Association (2003).

Market power in iron ore

The National Competition Council (NCC) has recently considered the question of whether iron ore railways should be subject to third party access, and addressed the issue of the competitiveness of iron ore markets in their determination. It concluded that, although demand and supply imbalances resulted in buyers and sellers each having an ability to set price from time to time, overall, the market is competitive (NCC, 2005). Iron ore producers in the Pilbara are, however, very competitive on cost compared to iron ore producers elsewhere in the world. This means that Ricardian or resource rents are likely to be available to parties in the logistics chains which serve these markets. It remains to examine whether the supply chains contain a diversity of mine cost structures or information asymmetry between the railway and the mines. Both of these conditions could result in an inability to price discriminate rail infrastructure services and hence a loss of output to world markets.

In the Pilbara, along with the ports from which the ore is exported, railways are vertically integrated into the iron ore production process and each is owned by the same company which owns the mines it serves. These companies optimise over the whole logistics chain and hence, even if market-power rents were available in global iron ore markets, the railway link would not reduce services and raise price to the mines under common ownership. The railway owner, through the ownership structure, would also have access to information about mine costs such that, even if such transactions were priced, they could be priced efficiently on a mine-by-mine basis. There is no operative third party access regime on the

Pilbara iron ore railways.[1] However, a third party (Fortescue Metals) is currently seeking declaration of these assets in order that it can obtain third party access. It is thus useful to examine the incentives of a railway owner in the position of those in the Pilbara.[2]

To examine this issue, begin by considering the case where access imposes no costs on the railway infrastructure owner other than direct costs which can be incorporated into an access charge. Absent a mandated right of access, would the infrastructure owner provide access (or carry the third-party's ore)? Arguably, it would. The infrastructure owner has as its main business the sale of ore into world markets. The prices it receives and the quantities it sells are not altered by the ore put into the market by the third party, so it cannot be harmed by the extra supply. In fact, since the railway infrastructure owner also has good information about mine costs, it can design access (or haulage) charges which capture all of the resource rents the third party miner might otherwise earn itself. This provides a strong incentive to provide access, since access provides the incumbent with the means to capture the resource rents of the third party without any need to risk its own capital in mining the ore.

In reality, the incumbent owners of railway infrastructure in the Pilbara have fought against third party access. Since costless access can bring them only benefits, this suggests that the provision of access to third parties is not, in fact, costless to the owners of infrastructure. The main indirect costs imposed by access is a reduction in the flexibility with which the incumbents can optimise train movements to shifts in mine output, world demand and ship arrival times. This type of flexibility is very difficult to incorporate into a contract, particularly since the access seeker and access provider are likely to want it at the same time.

If the costs of third party access are greater than the resource rents generated by the third party's output and hence subject to capture via an access regime, it is hardly surprising that the incumbent would seek to forestall access. Moreover, this is not simply an issue just between the two parties concerned. The costs imposed on the incumbent relate to the flexibility of the logistics chain and hence on its ability to deliver ore into world markets. If a loss of flexibility reduces the amount of ore carried, regardless of whose ore it is, this has ramifications for the wider economy. The Australian Bureau of Agricultural and Resource Economics (ABARE, 2006) predicts that iron ore will be Australia's largest export income earner in 2006-07, earning some $18 billion in export revenues. The conclusion of the NCC (2005:92) that while '... congestions, delays and flexibility issues may result in costs, such costs are theoretical and unforeseen at this time and therefore impossible to quantify', thus seems a little dismissive. One potential solution may be to examine other forms of access which might impose smaller costs on the incumbents. Industry consultation suggests that one alternative currently under consideration involves access at the level of the wagon through

[1] The railways are subject to common carriage obligations under the terms of the State Agreement Regimes under which they were constructed, but no operational access regime has yet eventuated from this. They are not yet subject to access regimes under Part IIIA of the *Trade Practices Act*.

[2] 'Declaration' refers to a determination by the NCC that a particular piece of infrastructure is of 'national significance', and should hence be subject to third party access. It is covered in Part IIIA of the *Trade Practices Act 1974.*

haulage services. However, the point remains that a railway infrastructure owner, which is also integrated backwards into mining operations, is more likely to be able to overcome the information asymmetries associated with an access seeker's mining costs and thus in a better position to attain the first-best solution of efficient price discrimination. It thus seems unlikely that mandated access and economic regulation could add significantly to the efficiency of iron ore logistics chains in the Pilbara.

Market power in coal

On average, over the past eight years, Australia produced approximately 21 per cent of the world's thermal coal exports and 52 per cent of its coking coal exports (ABARE, 2005). However, Australia accounts for only six per cent of total coal production, and domestic coal is a close substitute for imported coal — the more so when China, one of Australia's largest customers is also the largest producer of coal in its own right and has recently begun investments which will add some 500 million tonnes (twice Australian hard coal production) to its capacity (ABARE, 2006). Both the US and South Africa are also able to act as swing producers, selling coal in export markets when prices rise. Further evidence of the competitiveness of global coal markets was seen in 2005. At the beginning of the year, the thermal coal market tightened, and spot market prices were very close to contract market prices. During the course of the year, Indonesia increased its output by almost 20 per cent, and by early 2006 spot market prices were 10 per cent lower than contract prices and contract prices paid by Japanese consumers had decreased from US$52.50 per tonne to US$41 (ABARE, 2006). This is how competitive markets operate.

It remains to examine the nature of coal production in Australia to ascertain whether there are large differences in the cost structures of mines, or whether railway infrastructure owners are likely to face information asymmetries associated with the marginal costs of the mines they serve. This can establish whether the relevant railway operates in a second-best world which might be improved by regulation. The Productivity Commission (PC, 1998) undertook a benchmarking study of some 27 Australian coal mines against their peers overseas. The study is roughly contemporaneous with the advent of access regimes in coal chains. In general, it finds that the larger Queensland mines perform better than NSW. In terms of truck and shovel operations, the study finds that Queensland mining productivity ranges from seven per cent below US best practice to 46 per cent below, while NSW mines range from 19 per cent below to 57 per cent below. In terms of dragline operations, there was a gap of 30 per cent between the best and worst performers, and in long-wall mines, the best mine was ten per cent below US best practice while the average was 25 per cent below.

The 27 mines in the Productivity Commission study represent 40 per cent of coal production. Given that around 100 mines are in operation, the sample seems likely to be biased towards larger operators and the true range of costs seems likely to be higher than the study's findings suggest. Moreover, neither of the railways serving the coal mines is backwards integrated into mining as in iron ore. For these reasons, the policy decision to provide third party access to coal lines appears to have been the correct one, as a failure to do so may have resulted in

the closure of (or failure to open) some smaller, higher cost mines as railways pursued the Ricardian rents from the larger, lower cost ones.

Market power in alumina and aluminium

Thirty years ago, it might have been appropriate to consider the influence of market power in world aluminium markets, as 'producer prices' were set by the dominant mines in the industry. However, since 1978, aluminium has been traded on the London Metals Exchange and aluminium contracts are now predominantly based on these market-determined prices. Moreover, while Australia produces around a third of the world's bauxite and alumina (Australian Aluminium Council, n.d.), much of this is for vertically integrated aluminium producers with global operations. Australia only produces around seven per cent of the world's aluminium (ABARE, 2006).

It seems difficult to conclude that global aluminium markets (or, by extension, those of its precursors, bauxite and alumina) are not competitive, particularly given the market-made price. It remains to consider whether the cost structures of the bauxite mines, alumina refineries and aluminium smelters around Australia are such that there would be a risk that an incumbent railway might price access or haulage such that one was forced to leave the market or lower output. Refineries on the East Coast of Australia (Gladstone in Queensland and Gove in the Northern Territory) do not receive their inputs by rail, but by conveyor or by ship. In WA, rail is used to transport the ore to the refinery (Kwinana) or to transport alumina from the refinery to port (Worsley, Wagerup and Pinjarra). Detailed cost data for the refineries are not available. However, aside from the cost of energy, generally cost depends upon the scale and age of the refinery. Kwinana is the oldest and smallest of the four refineries, followed by Wagerup, Pinjarra and Worsley. The latter two are roughly the same scale and age. Kwinana, Wagerup and Pinjarra are owned by Alcoa, and Worsley is owned by Worsley Alumina. If all four refineries were in separate ownership, the costliest might fail as the railway attempted to extract Ricardian rents from its lower-cost competitors. However, the fact that three of the four are owned by Alcoa means that this is less likely as Alcoa has some ability to cross-subsidise between refineries in order to make them viable. Whether it would choose to do so in the longer term given global investment opportunities is, of course, another matter. For this reason, the decision to provide third party access on rail lines supporting the bauxite and alumina industries appears justified, albeit in a weaker manner than is the case for coal.

Market power in grain

Australia produces around 3-4 per cent of the world's wheat, 1.25 per cent of the world's coarse grains and less than one per cent of its oilseed (Connell *et al*, 2003). Around 60 per cent of Australia's grain crop is exported, meaning Australia's share of the global export trade in these commodities is higher than its share of production; 16 per cent of wheat, 17 per cent of barley, three per cent of coarse grains and two per cent of oilseeds (PC, 2000). However, there appears to be little evidence that these market shares impart any degree of pricing power to

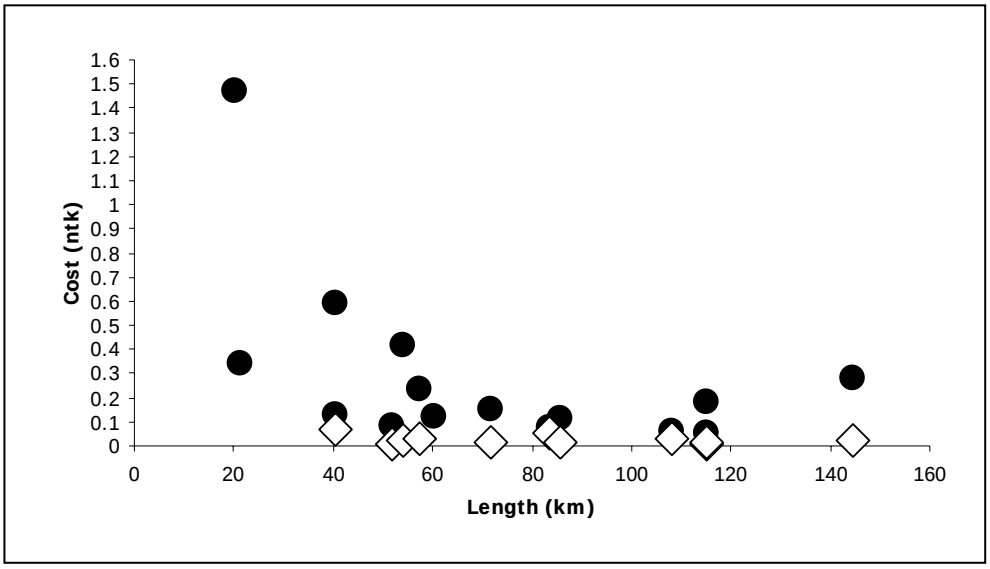
Australian grain producers. The Productivity Commission (PC, 2000), examining the single desk policy for the sale of Australian grain, found no evidence that this policy affords Australian grain growers any ability to influence grain prices, even when the AWB endeavours to target certain sub-markets in grain. Grains have been traded on commodities exchanges in the US from the late 19th Century and are now traded on bourses around the world. Each of the grain types has a benchmark price against which contracts are quoted. The major influences on the supply-side of the global grain market appear to be the weather and government subsidies to grain farmers. The Productivity Commission (PC, 2005) reports subsidies to Australian wheat farmers are less than a tenth of the OECD average.

Australian grain producers and their marketing agencies appear to have little ability to influence global grain prices, meaning each Australian grain producer faces a horizontal demand curve. However, their cost functions are more likely to be curves than stepped due to the smaller fixed costs in farming. Thus a railway might be more likely to force some farms out of business as it raised access or haulage charges. There would thus appear to be a *prima facie* case for allowing third party access to grain lines, and indeed, once access became possible in Victoria, the first applicant was a grain handler.

There are three caveats, however, to the above statement. First, railways face competition in their grain haulage tasks from trucking. As with intermodal freight (below), if the competitive trucking industry is able to provide an effective cap to rail freight prices for grain, then regulation of railway access prices is unnecessary. Comparing freight rates for truck and rail is fraught with difficulty, because cents per net tonne kilometre (ntk) for both modes decrease as distance increases, and do so at different rates.[3] However, Sd+D (2004) in assessing the Victorian network, suggest grain freight prices would increase 25 per cent in the absence of rail freight options. In South Australia, by contrast, the figure is only three per cent. In WA, industry sources suggest that road freight costs for grain range from 6.24 cents per ntk for distances of more than 200km to 7.49 cent per ntk for distances of less than 50km. For rail, the equivalent figures are 4.02 to 7.57 cents per ntk and are thus roughly comparable, particularly as distances decrease. In NSW, a recent study was undertaken comparing the costs of haulage on a number of marginal lines with the cost of the same haulage by road (Grain Infrastructure Advisory Committee, 2004). A plot comparing annual maintenance costs per ntk against the length of the haul is presented in Figure 3. The rail figures are indicated with black dots and the road figures with diamonds. These rail links represent perhaps a 'worst case scenario', as they are amongst the rail links with the highest costs relative to an equivalent road haulage task. Clearly, in this worst case, there is little point in regulating rail access charges, as rates in the road freight industry will ensure that rail cannot even recover its costs, let alone earn monopoly rents.

[3] A referee suggested an industry rule of thumb in regards to the relative economies of truck vs train whereby trucks dominate for hauls of less than 300 km and rail dominates for longer hauls.

Figure 3: Road and Rail Maintenance Costs per ntk Against Route Length (NSW Case Study)



Source: Grain Infrastructure Advisory Committee (2004).

Second, railways do not really face a large group of farmers as their customers for grain haulage. The single-desk policy for grain exports and the small number of bulk grain handlers mean that there is significant monopsony power to counteract the monopoly power of the railways in each state. In such situations of bilateral monopoly, regulation is unlikely to achieve much by way of allocative efficiency (see discussion of the steel industry below).

Third, the main problem facing the grain rail network at the moment is not competition in haulage, but the viability of many grain rail links. The grain networks were constructed more than a century ago and many links have seen little or no maintenance expenditure in decades. Arguably, it seems a little odd for policymakers to concern themselves with a potential monopoly rent which arises from an asset base which is itself close to failure, as the rent may disappear along with the railways unless some other solution to improve the viability of the networks is found. Thus, while third party access to some grain links may be appropriate in principle, arguably the more important focus of policymakers in relation to the grain networks are their viability, not the potential for competition upon them.

Market power in steel

Steel hauled on railways is not, in general, for the export market, but rather for domestic consumption. It is used in such a wide variety of markets that it is impossible to generalise as to market structure in end markets. But at least some major end markets, such as construction, are highly oligopolistic and hence there would appear to be market-power rents available in these chains, providing

potential for rent extraction by the railway carrying the steel. This would seem to indicate a prima-facie case for third party access and regulation.

However, there are only three steel producers in Australia who use rail haulage; Bluescope Steel in Newcastle, Smorgon Steel in Victoria and One Steel in Whyalla. All use the one railway (PN) to carry steel feedstock and intermediate products on the rail network, but each operates in different states and each moves a different range of products. The extent to which PN can play one steel producer off against another to capture rents thus seems limited. PN is also tied to steel haulage to a certain degree, because efficient haulage of steel requires specialist wagons which cannot be used for any other purpose, giving the steel-makers additional bargaining power in negotiations. It seems more likely that a bilateral monopoly exists. There is nothing intrinsic about a bilateral monopoly bargaining situation which provides an advantage to one side over another; advantage rather depends upon the negotiating skills of each of the parties in the negotiation. More importantly, from a public policy perspective, if the problem is monopoly rents in the logistics chain which delivers steel to final markets, then addressing one link in the chain in isolation will not lower rents, but will simply transfer them to other links in the logistics chain. Indeed, a third party access regime in networks serving steel markets would be to the distinct advantage to the steel producers. Regulatory policy would thus become a de-facto industry policy, favouring steel producers over railways. There thus does not appear to be any overwhelming public policy case to be made that third party access on steel networks would lead to significant welfare improvement.

Market power in intermodal freight

Intermodal freight, like steel, serves domestic markets and faces downward-sloping demand curves. As such, it would seem there is a *prima facie* case for third party access to rail links serving the intermodal freight market. There is, however, a caveat to this statement. Like grain, intermodal freight railways face competition from trucks, which also carry the same freight. In fact, in general, the prices for haulage are set by trucking and followed by the railways. If it is the case that the cost differentials between the two modes is very small, then arguably, the competitive trucking industry could be equally, if not more, effective than regulation in ensuring that railway track owners do not exercise their market power.

The ACCC (2001) assessing the Australian Rail Track Corporation (ARTC) network notes that the ARTC's returns appear lower than the full economic costs of its capital. It further notes that, while the ARTC is intending to move towards a position of full cost recovery, the ACCC does not believe this will be achieved during the course of the life of the first access agreement. Indeed, the ACCC seems more concerned about dynamic inefficiencies resulting from the ARTC being unable to earn rates of return sufficient to fund investment into the longer term than it is about abuses of market power in the short term.

The ACCC also believes that a substantial portion of ARTC's business is highly elastic, due to the existence of a competing road sector. For this reason, the ACCC suggests that the ARTC would be unlikely to be able to increase access prices or reduce service levels compared to those extant at the time of its draft

decision (*ibid*). The ACCC goes on to say that this provides a strong incentive for the ARTC to negotiate access prices which ensure that freight will be carried by rail, and that it disagrees with suggestions that the company will ignore the effects of its pricing on competition. From these comments, it seems unlikely that the ARTC is extracting significant monopoly rents. This, however, may be because of decisions that ARTC have made in relation to how it structures its access charges, and regulation is predicated on the fact that rents can be earned by a monopolist, not that they are being earned at present. It is thus useful to ascertain the extent of rents which might be available by comparing rail costs with the charges of rail's closest substitute — road transport.

The Australasian Railway Association (ARA, 2005) has undertaken an exhaustive study of road and rail freight costs. The ARA is a lobbying agency and the report was produced to advocate more cost recovery from trucking, which means that the costs of rail may be overstated and those of trucks understated. However, the report rigorously documents its sources and uses the assumptions of independent agencies where possible. As such, distortions do not seem to be too egregious. A simple comparison of costs between road and rail from the document is reproduced below, in Table 1. For rail, the costs cited include door-to-door delivery costs at each end of the line haul.

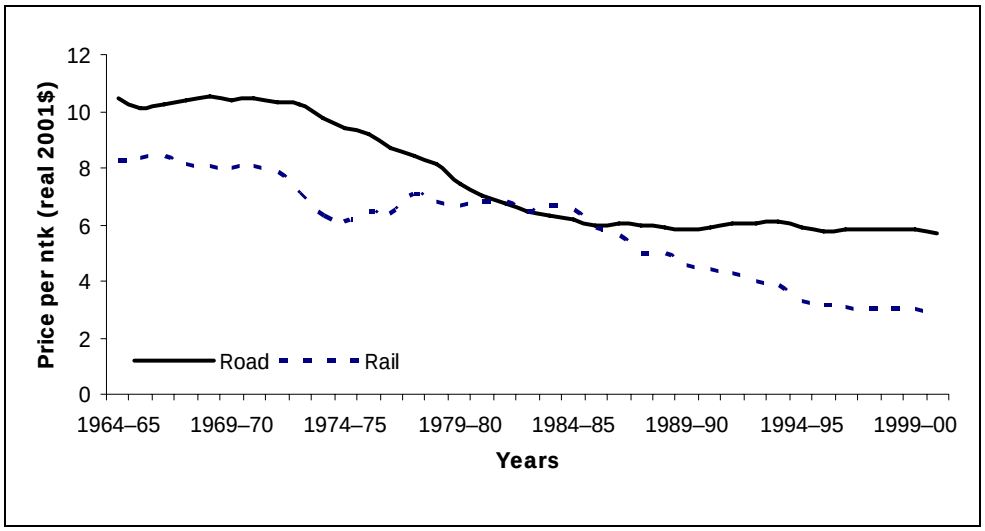
Table 1: Road and Rail Costs by Corridor

Corridor	*Road (c/ntk)*	*Rail (c/ntk)*	*RIC-Efficient Rail (c/ntk)*
Sydney-Brisbane	6.4	6.6	4.3
Melbourne-Sydney	6.0	6.9	5.5
Melbourne-Brisbane	5.8	5.9	3.8
Melbourne-Adelaide	6.6	3.8	3.8
Adelaide-Perth	6.3	2.6	2.6
Melbourne-Perth	6.1	2.8	2.8
Sydney-Perth	5.7	3.5	2.5

Source: ARA (2005).

Two sets of figures are presented for rail, to take into account the costs which would eventuate if perceived inefficiencies in NSW's rail network (managed by the Rail Infrastructure Corporation at the time of the report) were addressed. Figure 4 compares road and rail freight rates over the past few decades.

Figure 4: Road and Rail Freight Rates



Source: Bureau of Transport and Regional Economics (BTRE, 2002).

In 2000-01, average road freight rates were 5.66 cents per net tonne kilometre (c/ntk) while average rail freight rates were 2.75 c/ntk. Converting the figures from Table 1 to 2000-01 dollars for the case where no improvements are made to the RIC network, the routes which had rail costs lower than 5.66 c/ntk are Melbourne-Brisbane (5.31 c/ntk), Melbourne-Adelaide (3.42 c/ntk), Adelaide-Perth (2.34 c/ntk), Melbourne-Perth (2.52 c/ntk) and Sydney-Perth (3.15c/ntk). The difference between each of these figures and the road-haulage charge (5.66 c/ntk), multiplied by actual haulage, provides a rough estimate of the total potential rents. Table 2 shows that rail lags road on a number of service quality variables, a fact reiterated by a recent survey of manufacturing customers (Department of Transport and Regional Services, 2006).

Table 2: Road and Rail Service Characteristics

Route	*Transit Time (hrs)*		*Reliability* (%)*		*Availability** (%)*	
	Road	*Rail*	*Road*	*Rail*	*Road*	*Rail*
Sydney-Brisbane	15	21	95	50	99	25
Melbourne-Sydney	11	13.5	95	55	99	50
Melbourne-Brisbane	33	36	95	45	99	60
Melbourne-Adelaide	9	13	95	74	99	70
Melbourne-Perth	43	58	95	66	99	80
Sydney-Perth	55	72	95	70	99	83

Notes:

* reliability defined as per centage of services arriving within 15 minutes of scheduled time

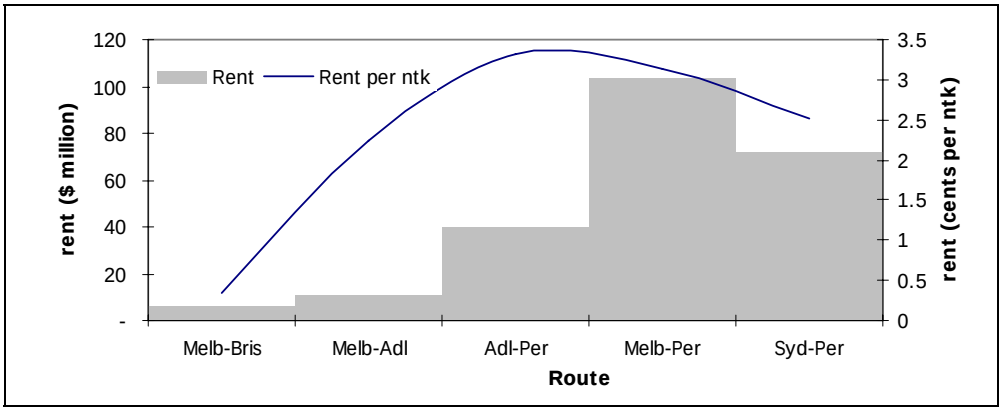
** availability defined as the extent to which each mode provides services at the times the market demands.

Source: ARA (2005:46).

Thus it seems unlikely that a railway would be able to charge 5.66 c/ntk (inclusive of access line-haul and delivery charges), meaning rents calculated by the rough approach outlined above are likely to overstate true available rents. It also seems unlikely that road charges are 5.66c/ntk on all routes. Rather, since road transport is also subject to diminishing unit costs as distance increases (see discussion on grain haulage), it seems likely that road-freight rates would be lower on longer routes. This would also reduce the size of available rents which might be captured by railway infrastructure owners. Finally, these rough calculations contain an implicit assumption of inelastic demand for rail freight and tonnages may in fact decrease in response to an increase in rail freight charges.

All of these caveats aside, it is useful to examine where the upper bounds might lie. Figure 4 provides this estimate, with total rents shown as a bar chart using the left-hand axis and rents per ntk shown as a line using the right axis. Haulage figures are for inter-capital city, non-bulk freight, and are derived from BTRE (2006) and Australian Bureau of Statistics (ABS, 2002).[4] Bulk freight is not included as most of this is for export markets with limited market-power rents. Figure 4 does not include rents for Melbourne-Sydney or Sydney-Brisbane, as both of these routes have costs greater than the average charges of trucks.

Figure 4 Upper Bounds on Potential Rents in Australia Railways



The potential rents on the Melbourne-Brisbane and Melbourne-Adelaide routes are very small. Since these are upper bounds, actual rents may not even be positive. For routes to Perth, however, the upper bounds of potential rents are much higher and it seems much less likely that trucks can effectively constrain rail rates, and by extension, rail access charges. Thus, for intermodal freight, regulated access seems most appropriate on the East-West links, and of limited relevance elsewhere on the network, where competition from trucking is likely to constrain pricing and deliver efficient resource allocation without any regulatory action.

[4] BTRE (2006) provides figures from the Eastern States to Perth, but not city-by-city. ABS (2002) provides city-by-city results, but for total rail freight, not just non-bulk freight. Thus the proportion of each city pair on the East-West route from the ABS data was applied to total figures from BTRE (2006).

Conclusions and Policy Recommendations

Mandatory third party access to rail infrastructure and economic regulation currently covers all of the interconnected rail system in Australia. This paper questions such an approach, suggesting that not all rents are equal in terms of their effects on economic behaviour and not all are sufficiently large to warrant regulation. It suggests that in most cases, the rents being earned are Ricardian rents, which do not alter behaviour from that which would prevail under competition. Situations where market-power rents could be earned and are of sufficient size to warrant regulation appear limited, essentially to the East-West links managed by the ARTC. From this finding, the logical policy prescription is to treat market power in railways as the exception, rather than the rule.

This policy prescription is similar to that of the Productivity Commission (2006) in its recent report on road and rail pricing in Australia, and it would result in declaration being removed from many railways around Australia. The paper also suggests a stronger focus on the characteristics of the markets associated with the major freight tasks of Australian railways, rather than just focussing on the rail link itself.

While the paper suggests some substantial changes to access regimes, the policy recommendations made above are subject to some caveats and the recommendations are intended to stimulate, rather than end debate. The caveats are as follows:

- The desktop examination of the industries' rail serves conducted here was cursory. A more rigorous analysis is needed before significant policy changes are contemplated.
- Arguments presented here relate to static efficiency, which is what the neoclassical frameworks of regulation is designed to maximise. The distributional effects of railways capturing more of the Ricardian rents in export logistics chains could have some important dynamic efficiency ramifications which are not captured here. For example, if railways capture most of the Ricardian rents in an alumina chain, the alumina producers would have few incentives to expand output. New entrants to the industry may also be deterred. By the same token, if third party access results in railways not being able to capture any of the Ricardian rents in minerals export chains, then this may dissuade expansion by existing railway operators of their capacity, and act as a deterrent to future investment by new entrants in the rail industry. A balance is required, but this balance is arguably best served by industry policy, not economic regulation.
- No comment has been made here about the technical efficiency of the existing railway compared to a potential entrant. It could be, for example, that the incumbent is not particularly technically efficient and the marginal cost curve for the whole logistics chain could be shifted downwards if the incumbent could be moved out and another monopolist take its place. For example, the Productivity Commission (1998) investigating the black coal industry in NSW and Queensland at the outset of the recent decade of reforms in rail, suggested that the productivity of Australian coal rail operations was some 20 per cent below that of better overseas operations. A third party access regime may have assisted improving productivity in these coal chains by providing a strong incentive for productivity improvement through the pressures of contestability. However, if a railway is earning monopoly rents, then economic regulation will reduce prices, and hence the returns which might otherwise induce

entry. Again, the promotion of technological progress is better addressed through industry policy, not regulation.

- Rail carries many types of freight, and logistics chains are often interlinked. It is difficult, in reality, to talk about 'the steel chain' or 'the intermodal network' because trains serving both markets often utilise the same tracks. Practical implementation of the findings of this paper would generally involve making determinations on access based on the majority of freight on a given route, or on the costs if access is not provided for a freight task where it is needed compared to the costs imposed on a freight task where it is not. These determinations will necessarily require judgement, but the fact that they are difficult does not mean that the current blanket coverage is the optimal response.

References

Australian Aluminium Council (n.d.), 'Australian Aluminium Statistics', http://www.aluminium.org.au/Page.php?s=1030, accessed 5 February 2007.

Australian Bureau of Agricultural and Resource Economics (2005), 'Australian Commodity Statistics 2005', Canberra.

Australian Bureau of Agricultural and Resource Economics (2006), 'Australian Commodities 06.01: March Quarter', Canberra.

Australian Bureau of Agriculture and Resource Economics (2006), *Australian Commodities* 13(4), http://www.abareconomics.com, accessed 24 January, 2007.

Australian Bureau of Statistics (2002), 'Freight Movements Australia September 2002', Cat No 9220.0, Canberra.

Australian Competition and Consumer Commission (2001), 'Australian Rail Track Corporation Access Undertaking: Draft Decision', November, Canberra.

Australasian Railway Association (2003), *Australian Rail Industry Report 2003*, Canberra.

Australasian Railway Association (2005), *The Future for Freight 2005*, Canberra.

Bureau of Transport and Regional Economics (2002), 'Freight Rates in Australia', Information Sheet 19, Canberra.

Bitzan, J. (2000), 'Railroad Cost Conditions: Implications for Policy', Paper prepared for the Federal Railroad Administration, US Dept of Transportation, mimeo.

Bitzan, J. (2003), 'Railroad Costs and Competition: The Implications of Introducing Competition to Railroad Networks', *Journal of Transport Economics & Policy* 37:201-25.

Bureau of Transport and Regional Economics (2006), *Freight Measurement and Modelling in Australia*, Report 112, Canberra.

Connell, P., D. Barrett, P. Berry and T. Sheales (2003), 'Grains Outlook to 2007-08', Conference Paper, ABARE Outlook Conference.

Department of Transport and Regional Services (2006), *North-South Rail Corridor Study Report*, Consultants Report by ACIL-Tasman, Hyder Consulting and Ernst & Young, June http://www.austlink.gov.au, accessed 24 January, 2007.

Grain Infrastructure Advisory Committee (2004), 'Report on Rail/Road Options for Grain Logistics', January, mimeo.

Ivaldi, M. and G. McCullough (2001), 'Density and Integration Effects on Class 1 US Freight Railroads', *Journal of Regulatory Economics*, **19** 161-82.

Ivaldi, M. and G. McCullough (2006), 'Subadditivity Tests for Network Separation with an Application to US Railroads', SSRN Working Paper 528542, http://ssrn.com/abstract=528542, accessed 24 January, 2007.

Laffont, J. and J. Tirole (1993), *A Theory of Incentives in Procurement and Regulation,* MIT Press, Cambridge Mass.

National Competition Council (2005), 'Application by Fortescue Metals Group Limited for Declaration of a Service Provided by the Mount Newman Railway Line: Draft Recommendation', November, Canberra.

Productivity Commission (1998), *The Australian Black Coal Industry*, Inquiry Report, Ausinfo, Canberra.

Productivity Commission (2000), *Single-desk Marketing: Assessing the Economic Arguments*, Productivity Commission Staff Research Paper, Ausinfo, Canberra.

Productivity Commission (2005), *Trends in Australian Agriculture*, Research Paper, Ausinfo, Canberra.

Productivity Commission (2006), *Road and Rail Freight Infrastructure Pricing: Discussion Draft*, Ausinfo, Canberra.

Sd+D (2004), 'Single Desk and the Grain Supply Chain: A Study of Power Relationships', mimeo.

Wills-Johnson, N. (2007), 'Separability and Subadditivity in Australian Railways', PATREC Working Paper No 11, http://www.patrec.org/publications/index.php, accessed 7 February, 2007.

The author would like to thank Fred Affleck, the participants of the PATREC Symposium on Rail Competition Policy and two anonymous referees for their helpful comments in the preparation of this paper.