A problem looking for a solution or a solution looking for a problem? Economic regulation of railways in logistics chains

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Abstract

Economic regulation of access to services provided by railway infrastructure is a feature of Australia's National Competition Policy established in the mid-1990s. Railways, like most infrastructure industries in Australia, are now subject to economic regulation to prevent abuses of monopoly power. Questions remain about the value of this policy as it has been applied to railways, including the benefits flowing from third-party access regulation and 'vertical separation'. The paper examines the role of economic regulation, some theory surrounding rents, the likely consequences of regulation in the presence of various types of rents, and their effects in the markets for rail's major freight tasks. Railways are part of logistics chains and their ability to abuse their market power depends on the characteristics of those logistics chains. The paper examines the different types of rents – Marshallian market power rents, Schumpeterian innovation rents and Ricardian resource rents – and the effects each might have on firm behaviour. It examines major logistics chains served by rail in Australia, the extent of economically damaging rents in these logistics chains, the likely behaviour of railways in response to these rents, and the appropriateness of economic regulation of third-party access to rail infrastructure. Subject to important qualifications, the paper concludes there may be a strong case for third-party access in coal chains, a weak case in aluminium, iron ore and steel and a case for line-by-line assessments for intermodal freight and grain.

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1 Introduction

Economic regulation of access to services provided by railway infrastructure is a feature of Australia's National Competition Policy, established as a result of intergovernmental agreements in the mid-1990s. Questions remain about the value of this policy as it has been applied to railways, including the benefits flowing from regulation affecting infrastructure access prices and the 'vertical separation' which applies in several jurisdictions.

Railways, like most infrastructure industries in Australia, are now subject to economic regulation to prevent abuses of monopoly power. Railways are part of logistics chains and their ability to abuse their market power depends upon the characteristics of those logistics chains. This paper examines logistics chains served by rail in Australia, and the availability of rents in each. It also examines the different types of rents and the effects each might have on firm behaviour. Through an examination of these markets and rents the paper assesses the appropriateness of economic regulation for Australian railways.

Section 2 examines the role of economic regulation and what it is designed to prevent. Section 3 examines some of the theory surrounding rents and the likely consequences of regulation in the presence of various types of rents. Section 4 examines the markets for rail's major freight tasks to gauge the extent of economically damaging rents in logistics chains and the likely behaviour of railways in response to these rents. Section 5 concludes with some comments on the appropriateness of regulation in these export chains.

2 The role of economic regulation

The role and purpose of economic regulation can be explained by reference to a simple diagram, shown in Figure 1.

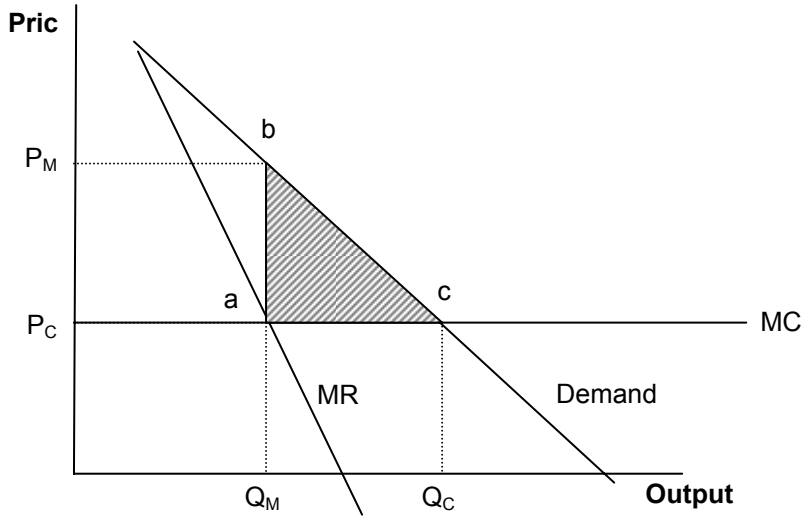

Figure 1: Monopoly and competitive outcomes

Both the monopolist and the perfectly competitive firm produce such that marginal revenue (MC) equals marginal cost (MC). The competitive firm prices at P_C (equal to MC), and hence produces output equal to Q_C, but the monopolist prices at P_M, where its output (Q_M) meets the demand curve at b.

What is immediately clear from the diagram is that the monopolist produces less and at a higher price than a competitive firm. This has two effects, the first of which is a distributional effect: the monopolist earns a greater profit than the competitive firm. The second is an efficiency effect: for the same cost, less is produced in an industry characterised by monopoly. Economic efficiency is the principal aim and cornerstone of economic regulation, whilst the distribution of resources is a normative issue for policy-makers and politicians concerned with the protection of consumers. Economic regulation thus concerns itself with the triangle *a b c* in Figure 1. This is known as the 'deadweight loss', or 'Harberger Triangle'. The problem addressed by economic regulation is not that the producer receives more under monopoly, but rather that less is produced and economic output is lost to all members of society.

2.1 Economic regulation of Australian railways

Economic regulation of railways in Australia is undertaken by the Australian Competition and Consumer Commission (ACCC) and state-based regulators in each of the states except Tasmania. Regulation is aimed at pricing of below-rail infrastructure; the prices of rail transport services are not regulated. The owners of the rail infrastructure are obliged, where requested, to provide access to the track to above-rail train operators ('third parties') on fair and reasonable conditions; the terms and conditions as well as the price of such access are regulated by Part IIIA of the *Trade Practices Act 1974* or by relevant state legislation. State-based rail access regimes are similar in character, but the requirement of train operators carrying freight and passengers across state/territory borders to obtain access under a number of regimes is time-consuming and therefore adversely affects responsiveness to customer requirements.

3 Economic rents and logistics chains

The characteristics of logistics chains are important in considering market power and its potential abuses. This section presents some theory on the nature of economic rents and the effects of different types of rents on logistics chains. This is intended to establish a framework for considering whether economic regulation is the most appropriate way to ensure efficient outcomes for major logistics chains served by Australian railways.

3.1 Types of economic rents

In broad terms there are three types of economic rent. The main distinction among these is the differing behaviours they induce, both in those possessing the rents and in the economy generally. Because economic regulation is concerned with ensuring that economic behaviour gives rise to outcomes which are efficient, if a particular rent is unlikely to change economic behaviour, then regulation to prevent abuse of market power seems misplaced.

3.1.1 Marshallian or market power rents

'Marshallian' or market-power rents accrue to firms due to the structure of the market in which they operate. They are returns to producers above those necessary to cover marginal costs; in general they accrue where barriers to entry to a market preclude the development of competition. Where firms are able to secure market-power rents, they typically adopt monopolistic behaviour, reducing output (supply) and increasing price, causing the efficiency losses or 'Harberger Triangles' shown in Figure 1.

3.1.2 Schumpeterian or innovation rents

'Schumpeterian' rents are rents attributable to innovation. In a static context, they may appear the same as market-power rents because a firm possessing Schumpeterian rents will increase price and reduce output just as a monopolist would. However, in a dynamic context their effects are very different. Innovation is a short-term barrier to entry: firms which observe a rival earning Schumpeterian rents will try to replicate the rival's innovations. If successful, this action will reduce the rents accruing to the original innovator.

Schumpeterian rents play a second crucial role: they are the price the economy pays for innovation and the dynamic efficiency improvements it brings. Since innovation is a fixed cost it will not occur unless it can be compensated through super-normal profits.[2] Without innovation an economy faces stasis, seldom preferable to economic growth regardless of allocative efficiencies obtained.

3.1.3 Ricardian or resource rents

'Ricardian' or resource rents are those which accrue to a firm due to the nature of physical assets possessed by that firm and their scarcity. Resource rents very often pertain to minerals deposits, held by certain countries as 'gifts from nature'.

The cost of extracting minerals varies. For example, the costs to mine Australia's deposits of coal, iron ore and bauxite are among the world's lowest. Because these are not sufficient to supply the global market, consumers of these resources must secure additional supply from higher-cost producers, which become the price-setters. As a result, the owners of lower cost Australian resources are able to earn a resource rent. The Australian producer does not set the market price: rents are earned because costs of production are heterogeneous for the homogenous good and demand is greater than the lowest-cost producer can supply.

The important difference between 'resource' rents and 'market-power' rents is in the nature of the demand curves facing firms in each case, and hence their responses to that demand. Figure 2 below shows the situation of a firm earning Ricardian rents: as the industry is competitive, the firm faces a horizontal demand curve, and it earns the rents shown. This demand curve invokes quite different behaviour from firms than the downward-sloping demand curve of a firm with market power, shown in Figure 1. In particular, the firm has no incentive to hold back supply. Since it cannot influence the price by holding back supply, it would simply incur losses by doing so. There is thus no resource misallocation.

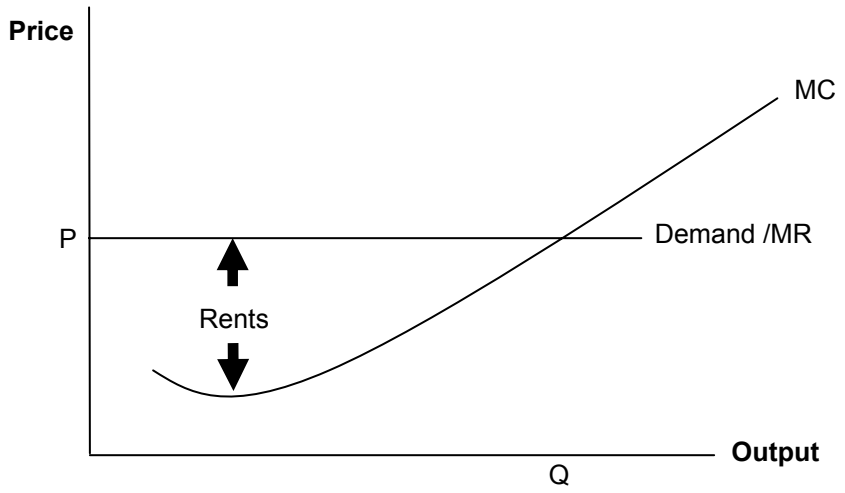

Figure 2: Demand curve faced by a firm with Ricardian rents

2 Unless it is funded exogenously, for example by government grants.

3.1.4 Which rents matter?

The rents which matter for the purposes of economic efficiency are only those which change behaviour away from that which would prevail in a competitive situation, in a manner which is either permanent or has no countervailing benefits. From this perspective, Ricardian rents are not of concern to regulators, because they do not result in a change of behaviour. Schumpeterian rents also do not matter (in general) because they are relatively short-lived and because they are the mechanism by which incentives are given to reward firms which incur the fixed costs of innovation. It is thus only 'Marshallian' or market-power rents which are of prime importance to economic regulation.

3.2 Rent in a logistics chain

Like all transport, railways face a derived demand. They seldom serve final consumer demand, but rather form a link in the service chain which delivers goods to a final consumer market. The effect of a railway exercising its market power in different types of logistics chains is best explored through some simple examples.

Consider first a market for groceries in a city which is served by a dozen supermarkets, each of which is supplied by the same railway. Due to the extent of competition in the market for supermarket goods and services, each supermarket would typically be unable to change its prices for fear of losing all demand to its rivals. However, this does not mean the overall market for groceries cannot be manipulated. The supplier of railway services can separately offer to each supermarket owner a take-it-or-leave-it deal in which the price of rail transport would rise by ten percent. Since this would not alter the supermarkets' relative competitiveness to each other, each would accept the deal: not to do so would result in no supply of groceries and the loss of its entire market share to rival supermarkets. This situation, in which the railway can be a cartel manager, is illustrated in Figure 3.

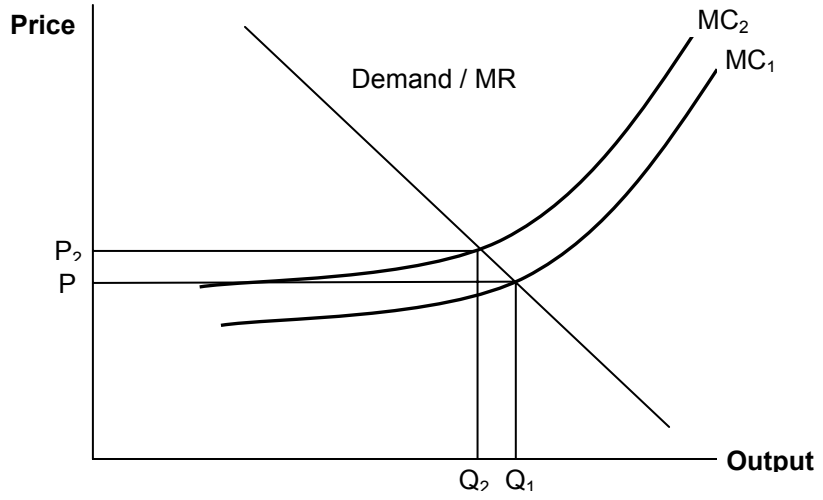

Figure 3: The railway as a cartel manager

Before the increase in railway freight charges supermarkets have a marginal cost curve MC_1. The railway lifts its freight charge and the marginal cost curve moves up to MC_2. This results in a reduction in supply and an increase in price which, due to 'perfect competition' in the market for supermarket goods and services, is captured by the monopolist railway. In this situation, allowing third party access to the railway infrastructure might have positive welfare effects, provided above-rail competition does not impose costs of its own.

Consider now a railway serving a collection of coal mines, all of which are supplying a global coal market. Coal mines are subject to high sunk costs and have a step-shaped marginal cost curve rather than the smooth curve shown in Figure 3. The demand curve for coal is

also elastic, or flat, as the price for coal is set in competitive global markets. In this case, if the railway were to suggest to each coal-miner a price increase of ten percent, there would be three possible scenarios to consider:

- If all mines were earning no Ricardian rents, then all would be equally unable to pay the increased transport fee and the railway's threat could not succeed.
- If all were incurring the same costs and all were earning Ricardian rents, then, provided the increase in transport costs were no greater than the value of the Ricardian rents, then all would pay and the only effects would be distributional.
- If all were incurring different costs and some costs were such that an increase in transport prices would make some uncompetitive, then these might fail and leave the market, and the supply curve of delivered Australian coal might shift inwards.

The first scenario is illustrated in Figure 4 and the second and third in Figure 5.

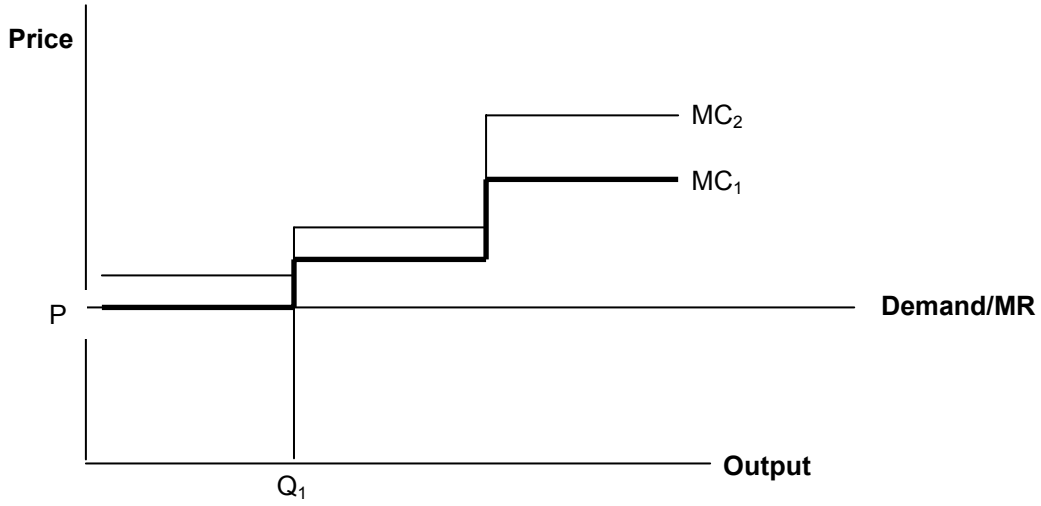

Figure 4: A railway price increase without Ricardian rents

In this instance, if the railway were to increase the freight charge, the costs for the shippers using the railway would exceed the price available in the market, and their output would drop to zero.[3] In such a situation, the railway would have no incentive to raise its price above the costs of serving that particular shipper as to do so would mean the whole value of the shipment would be lost. A third party access regime might have no effect on this case, as access regimes do not create extra below-rail capacity, but rather ration existing capacity.

In Figure 5, the price increase by the railway first lifts the cost curve of the coal mine from MC_1 to MC_2. The railway captures more of the Ricardian rents being earned by the mine (the second dot-point discussed above); the effect on output is zero. A third-party access regime would make no difference to the overall output of coal or to its price. Rather, as rival above-rail firms compete for carriage it would ensure the coal mine recaptures the Ricardian rents. However, if the railway were to increase its prices further, lifting the marginal cost curve of the mine to MC_3, the mine would no longer be viable in the world market, and would fail. A third-party access regime which allowed the coal mine to reduce its costs would have an output effect, but it would have no price effect, as prices are set in the global market.

3 This can occur regardless of whether the marginal cost curve is stepped or curved.

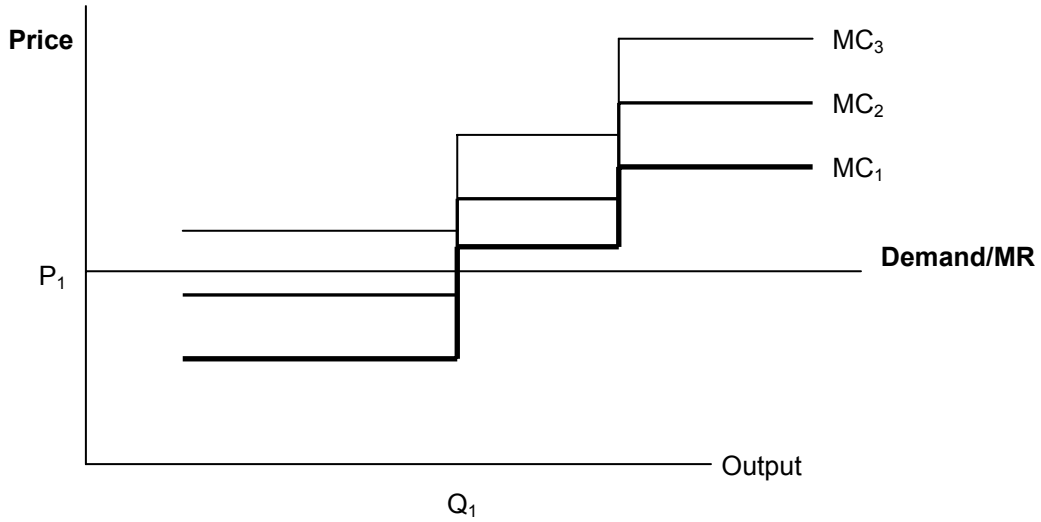

Figure 5: A railway price increase with Ricardian rents

However, consider a strategy by the railway to raise the price of coal haulage so that the mine's costs rise to MC_3. Would this be worthwhile for the railway? Due to the stepped nature of the mines marginal cost curve, the railway would face the risk of losing all coal haulage from the mine, as it could be priced out of the global coal market by the action of the railway. Alternatively, if in Figure 5 the intersection between the MC curve and the demand curve were at the second step, it would risk losing all of the coal haulage at the second level of mine capacity, as the mine found it profitable only to produce at the lower level of capacity. There is a non-linear relationship between the railway's increase in price and the mine's loss in revenue (by it becoming unviable at a certain capacity). Therefore the railway would have an incentive to increase rail prices only if it could recover more revenue using its monopoly power to take Ricardian rents from the lower cost mines (which do not leave the market) than it would lose when some or all of the output from the high cost mine were removed.

So there are only two situations in which the railway would have an incentive to raise the price of its services when this would cause a mine's output to decrease:

- If the mine which fails, or for which input falls is very small relative to the total coal haulage market or, if its output simply moves down by only small steps so that little output is lost when the marginal cost curve rises; or
- If the mine which fails (or reduces output) is much more costly than the next most costly mine, so there are large Ricardian rents in other mines.

3.2.1 Logistics chain rents with price discrimination

The discussion above makes an implicit assumption that the railway operator charges a single price to all shippers of a given type, e.g. all coal miners. However, the monopolist railway provider need not charge the same price to all coal miners, but could structure charges so that the price demanded of each coal mine was just sufficient to extract all of the Ricardian rents from that coal mine, and was thus different from the charges levied on all other coal mines. This is a form of price discrimination by the railway.

Such a pricing regime need not affect the static efficiency, provided the railway were to extract no more than the Ricardian rents specific to each mine. However, the Ricardian rents might be difficult to estimate, as the railway faces an informational asymmetry regarding the cost curve of each mine. If the railway over-estimates each mine's costs (an outcome each mine will try achieve), this need not cause any efficiency concerns. If, however, the railway adopts an aggressive pricing strategy, this could force some mines out of the industry. In this situation a third party access regime could benefit the industry.

4 Market power in logistics chains served by Australian railways

If economic regulation is intended to address problems associated with the exploitation of market power, then it seems sensible to identify Australian logistics chains in which rail plays a major role, in order to examine the kinds of market power rents are available in them. To identify appropriate logistics chains for examination, Figure 6 shows the major logistics tasks in which Australian rail networks have a role.

Iron ore and coal make up almost 80 percent of the freight task. Grain has a relatively small share, but is important due to the large network required to support it. Due to their large tonnages, bauxite and alumina are also examined below; even though their tonnages are large (more than steel, nickel and grain), alumina and bauxite do not appear in Figure 6 because they are hauled only short distances. Most of the non-bulk freight is intermodal freight; a small portion is carriage of new motor-vehicles and other freight.

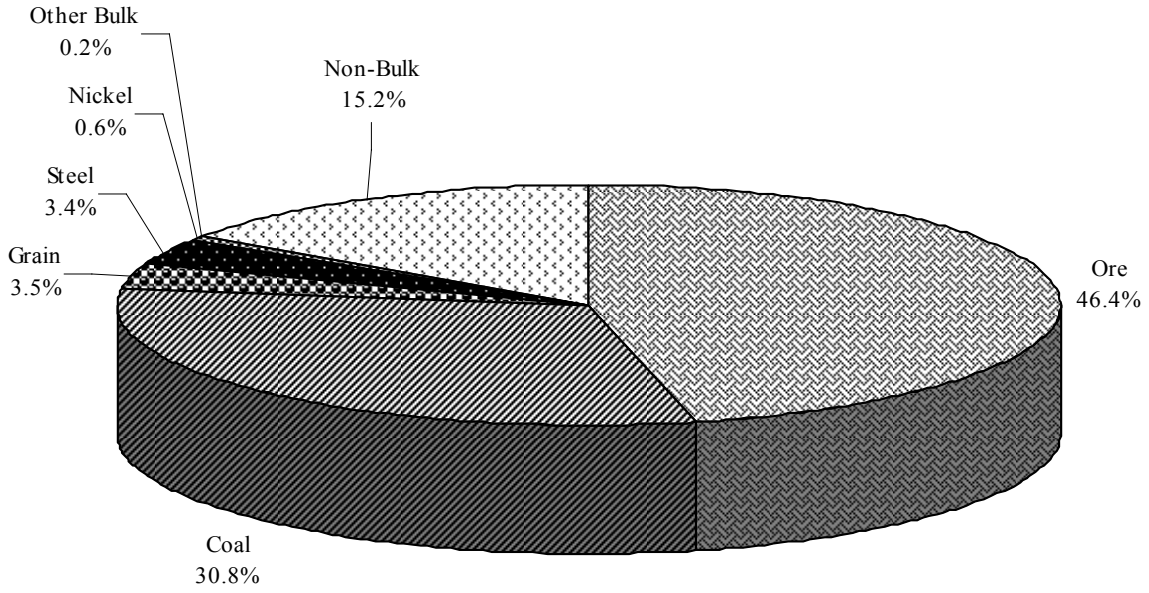

Figure 6: Major rail tasks, 2003 (billions of NTK) (source: ARA 2003)

4.1 Market power in iron ore

The iron ore industry and market power within it have recently been the subject of inquiry by the National Competition Council (NCC) as to whether BHP-Billiton's Pilbara iron-ore railway infrastructure should be subject to third-party access. The NCC's decision to declare the infrastructure was based on its assessment of the probable effects on the market for iron-ore tenements and for rail transport services. However, the NCC also concluded that the global iron ore market is highly competitive and a global market, and that the existing mining companies were unable to exercise any market power in that market (NCC 2005).

If the global market for iron ore is competitive it remains to examine the cost structure of the industry. Unlike the situation depicted in Figure 3, the railways carrying iron ore in the Pilbara are vertically integrated into the mining operations of their parent companies. So these railways have an interest only in cost minimisation and none in attempting to extract monopoly rents from the respective mining companies of they are integral parts.

Consider in more detail what would occur if an access regime were in place and one new player were to enter the rail service market by gaining access to infrastructure owned by another mining company; the infrastructure owner is an iron ore company and the only other rail service using the infrastructure is its own. The new entrant is also in the same iron ore market. There is thus only one set of Ricardian rents for the incumbent to earn (other than the incumbent's which it fully captures), those of the new entrant.

The rational response of the incumbent would be to price so that all of the Ricardian rents of the new entrant are captured in the price of access to the rail infrastructure. This will not change the output of the iron ore industry, nor the price it receives in global markets. Even if this strategy causes the new entrant to depart from the market and the incumbent to take over the entrant's operations, there would still be no impact on either output or price. It is thus difficult to see a rationale for providing third-party access to infrastructure in this case.

The situation changes if a second new entrant enters the market for rail services and the incumbent infrastructure owner can charge only one access price. Now the incumbent, as with the coal railways, may have an incentive to force one entrant from the market in order to appropriate a larger share of the rents of the remaining firm. In this case, a third party access regime may prove useful, but the same effect could be achieved by the incumbent charging differential prices.

4.2 Market power in coal

On average over the past eight years, Australia produced approximately 21 percent of the world's thermal coal exports and 52 percent of its coking coal exports (ABARE 2005). This are substantial market shares, but Australia's power in this market is reduced by the fact that it produces only six percent of total world coal output and domestic coal is a close substitute for imported coal in the Australian market; the effect of this on the market is magnified due to one of Australia's largest coal customers also being the largest producer of coal in its own right (and has recently begun investments which will add some 500 million tonnes to its coal producing capacity – twice the total current Australian hard coal production (ABARE 2006). Both the US and South Africa are also able to act as swing producers; selling coal in global 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 was very tight, and spot market prices were very close to contract market prices. During the course of the year, Indonesia increased its output by almost 20 percent, and by early 2006 spot market prices were ten percent 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.

To assess the market power of rail in coal markets, it is necessary to assess whether there are large differences in the cost structures of mines, and hence a prima facie case that railways serving coal mines have an incentive to price some out of the market. Unlike the situation of iron ore, railway serving coal mines do not produce or export coal and there is a large number of coal mines.

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 third-party access regimes in coal chains and suggests some interesting results. In general, it found that the larger Queensland mines performed better than NSW. In terms of truck and shovel operations, the study found that Queensland mining productivity ranged from seven percent below US best practice to 46 percent below, whilst NSW mines ranged from 19 percent below to 57 percent below. In terms of dragline operations, there was a gap of 30 percent between the best and worst performers, and in long-wall mines, the best mine was ten percent below US best practice whilst the average was 25 percent below. The 27 mines in the Productivity Commission study represent 40 percent of coal production. Given that around 100 mines are in operation, the sample seems likely to be biased towards larger operators and that the true range of costs is even higher than the study's findings suggest. It would thus seem that there is a risk that a monopoly railway could price smaller mines out of the market, and hence that the third-party access regimes operating in the market for railway infrastructure services in the export coal chain markets in Queensland and NSW was appropriate.

4.3 Market power in aluminium

Thirty years ago market power in world aluminium markets was wielded by dominant firms in the industry which set 'producer prices'. However, since 1978 aluminium has been traded on the London Metals Exchange and aluminium contracts are now predominantly based on market-determined prices. Australia only produces around seven percent of the world's aluminium (ABARE 2006), but it produces around a third of the world's bauxite and alumina (AAC n.d.); however, much of this is for vertically integrated aluminium producers with global operations. Given the predominance of market-made prices, it must be concluded that global aluminium markets (and by extension those for raw materials bauxite and alumina) are competitive.

It remains to be considered whether the cost structures of Australian bauxite mines, alumina refineries and aluminium smelters provide any incentive for an incumbent railway to price with the aim of forcing one to leave the market or reduce output.

Refineries in eastern and northern Australia (Gladstone in Queensland and Gove in the Northern Territory) receive inputs by conveyor or ship, not by rail.[4] It is the operations in Western Australia which are thus of interest. There are four alumina refineries in WA, three owned by Alcoa and one by Worsley Alumina. Detailed cost data for these refineries are not available. However, aside from the cost of energy, in general cost depends upon the scale and age of the refinery. Kwinana is the oldest and smallest of the four refineries, followed by Wagerup and then Pinjarra and the Worsley refinery (the latter two are roughly the same scale and age). If all four were in separate ownership, there might be scope for an incumbent monopolist rail service provider to price with the aim of eliminating the Kwinana refinery from the market, to maximise Ricardian rents obtained by the remaining three. However, the fact that three of the four are owned by Alcoa means that this is less likely (Alcoa has some ability to cross-subsidise between refineries). In these local circumstances, the case for third party access to railway lines serving the alumina market therefore seems weaker than for coal.

4.4 Market power in grains

Australia produces three to four percent of the world's wheat, one and a quarter percent of its coarse grains and less than one percent of the world's oilseed (Connell, Barrett, Berry & Sheales 2003). However, around 60 percent of Australia's grain crop is exported, so that Australia enjoys a higher share of the global export trade in these commodities: 16 percent of wheat, 17 percent of barley, three percent of coarse grains and two percent of oilseeds (PC 2000). However, there is little evidence that these market shares are sufficient to give significant market power over prices to Australian grain producers.

The Productivity Commission (PC 2000), examining the 'single desk' policy for selling Australian grain, found no evidence that this policy afforded Australian grain growers any ability to influence global grain prices, even when the AWB endeavoured to target strategically 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 depressing global prices. The Productivity Commission (PC 2005) reports subsidies to Australian wheat farmers are less than a tenth of the OECD average.

4 Gladstone receives coal via rail for power generation only. Bell Bay has a short rail link to the adjacent port but there is no access regime in Tasmania at present. The Aluminium smelters in Victoria and NSW are not served by rail.

Australian grain producers and their monopoly marketing agencies therefore appear to have little ability to influence global grain prices, so that Australian grain producers face the same horizontal demand curve as minerals producers. However, their cost functions are more likely to be curves than stepped due to the smaller fixed costs in farming. This provides a greater incentive for incumbent monopolist railways to raise prices and potentially force some farms out of business. There would thus appear to be a *prima facie* case for allowing third party access to grain lines; indeed, once third-party access became possible in Victoria the first applicant was a grain handler.

However, there are three caveats. Firstly, railways face competition in their grain haulage tasks from trucking. As with intermodal freight (see below), if the competitive trucking industry is able to provide an effective cap to rail freight prices for grain haulage, then this is a more efficient solution than third party access and associated regulation.

Comparing freight rates for truck and rail is fraught with difficulty, because the cost per net tonne-kilometre (NTK) for both modes decrease as distance increases, at different rates. However, consultants Sd+D (2004a) in assessing the Victorian network suggest grain freight prices would increase 25 percent in the absence of rail freight options. In South Australia, by contrast, the estimated figure is only three percent. In Western Australia industry sources indicate road freight costs for grain range from 6.2 cents per NTK (¢/NTK) for distances of more than 200 km to 7.5 ¢/NTK for distances of less than 50 km. For rail the approximate equivalent figures are 4.0 to 7.6 ¢/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 (GIAC, 2004). A plot comparing annual maintenance costs per NTK against the length of the haul is presented in Figure 7 (the rail figures are indicated with blue dots and the road figures with red triangles);[5] 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 rates, as rates in the road freight industry will ensure that rail cannot recover its costs, let alone earn monopoly rents.

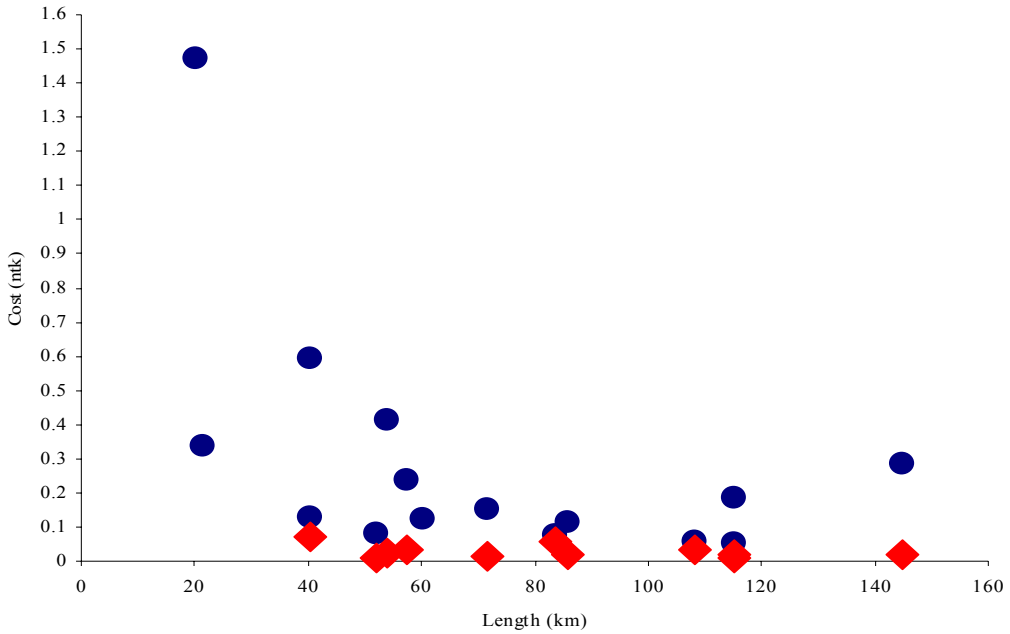

Figure 7: Road and rail maintenance costs per NTK against route length
(Source: NSW GIAC, 2004)

5 The study also compared upgrading costs for road and rail networks; infrastructure costs are not included here as rail charges take into account those costs to maintain rail lines in 'fit for purpose' condition. Rail capex costs were reported for 3 scenarios and road for 1 scenario; most rail figures were several multiples of those for road.

The second caveat is that 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 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.

The third caveat is that it might reasonably be argued that the main problem facing significant parts (not all) of the grain rail network is not competition in haulage, but the viability of rail as a haulier for grain. Most of the grain rail networks were constructed over a century ago and many links receive only rudimentary maintenance, owing to its high cost relative to freight revenue received. Arguably viability is a more urgent focus than competition, and indeed it seems a little odd to concern oneself with a potential monopoly rent which arises from an asset base, some parts of which are close to failure, as the rent may disappear along with the parts of the railway network unless other solutions to improve the viability of failing parts of the network is found. Whilst third-party access to some grain lines may be appropriate, as a general principle for grain networks it seems misplaced.

4.5 Market power in steel

Steel hauled on railways is almost exclusively for domestic consumption. It is used in such a wide variety of markets that it is impossible to generalise about market power in end markets. However, at least some major end markets, such as construction, are highly oligopolistic, so there would appear to be some market-power rents available in these chains, providing some 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.

Three steel producers in Australia use rail transport: Bluescope Steel in Port Kembla (NSW) and Western Port (Victoria), One Steel in Sydney and Newcastle (NSW) and Whyalla (South Australia), and Smorgon Steel in Victoria and Queensland. All use one rail freight carrier, Pacific National, to carry steel feedstock and/or intermediate products on the national rail network; each steel manufacturer moves a different range of products. Thus, in each case there are two equally powerful parties in negotiation. The railway is tied to steel haulage to some degree, because efficient haulage of steel requires substantial investment in specialist wagons and (in some cases also terminal facilities) which cannot be used for other purposes, giving the steel-makers additional bargaining power in negotiations. There is nothing intrinsic about a bilateral monopoly bargaining situation which provides an advantage to one side over another; advantage depends upon the skills of each of the parties in the negotiation.

More importantly from a public policy perspective, if the issue is the presence of monopoly rents in the logistics chain which delivers steel to final markets, addressing one link in the chain in isolation will not lower rents, but simply transfer them to other links in the logistics chain. Indeed, a third-party access regime in networks serving steel markets would be distinctly advantageous to the steel producers, as they are a monopsonist on each line and, if a second above-rail service provider entered the market, they could play each off against the other to capture more of the monopoly rents for themselves. On this evidence, there does not appear to be a strong public policy case that third-party access for the carriage of steel would lead to a significant welfare improvement.

4.6 Market power in intermodal freight

Intermodal freight, like steel, serves a domestic market and faces a downward-sloping demand curve for the services provided by rail in each of the markets served. So it would seem there is a *prima facie* case for third-party access to rail links serving the intermodal freight market. However, there is a caveat to this statement. Like grain, intermodal freight rail services face competition from trucks, which also carry the same freight. 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 are small, then arguably the competitive trucking industry could be equally if not more effective than regulation in ensuring that railways do not exercise their market power in tis market.

The ACCC (2001) in assessing the access 'undertaking' proposed by the Australian Rail Track Corporation Ltd (ARTC) noted that its returns appear lower than the full economic costs of its capital and that as a result of inter-modal competition, full cost recovery is unlikely to eventuate. It further noted that, whilst the ARTC was intending to move towards a position of full cost recovery, it (the ACCC) did not believe this would be achieved during the life of the first access undertaking. 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 potential abuses of market power.

The ACCC also believed that a substantial portion of the ARTC's business (both non-bulk freight and passenger) is highly elastic, due to the existence of a competing road transport sector. For this reason, the ACCC suggested that it was unlikely the ARTC would be able to increase its prices or reduce its service levels compared to those applying at the time of its draft decision (ibid). The ACCC went on to say that this provided a strong incentive for the ARTC to negotiate prices which ensured that freight would be carried by rail, and that it disagreed with suggestions that the company would ignore the effects of pricing on competition. From the ACCC's discussion, it seems unlikely that the ARTC was extracting monopoly rents. However, this might be due to decisions made by the ARTC about how the structure of their access charges, and the rents extracted by the rail industry (of which it could capture more, if it so chose) might be higher. This issue is evaluated by examining the relative cost structure of rail and road directly.

The Australasian Railway Association (ARA 2005) has undertaken an exhaustive study of road and rail freight costs. Whilst the ARA is an industry peak body which represents the rail industry to governments and the study was undertaken to provide evidence to advocate more cost recovery from trucking, the study report rigorously documents its sources and uses, where possible, the assumptions of independent agencies such as the National Transport Commission. A simple comparison of costs between road and rail from the document is reproduced below, in Table 1.

Table 1: Road and rail costs by corridor

Corridor	Road (cents/NTK)	Rail (cents/NTK)	RIC-Efficient Rail (cents/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 stated inefficiencies in the rail network of New South Wales (which was managed by the Rail Infrastructure Corporation (RIC) at the time of the report) were rectified. From Table 1 it is clear that at present rail has a cost advantage only in east-west freight, where it appears there might be limited scope for trucking to act as a constraint on rail freight rates. It is possible therefore that, in this case, there might be a need for separation and

regulation on this corridor, provided there is sufficient freight to induce competition in the above-rail sector.[6]

Figure 8 illustrates the relative levels of road and rail freight rates in the past four decades.

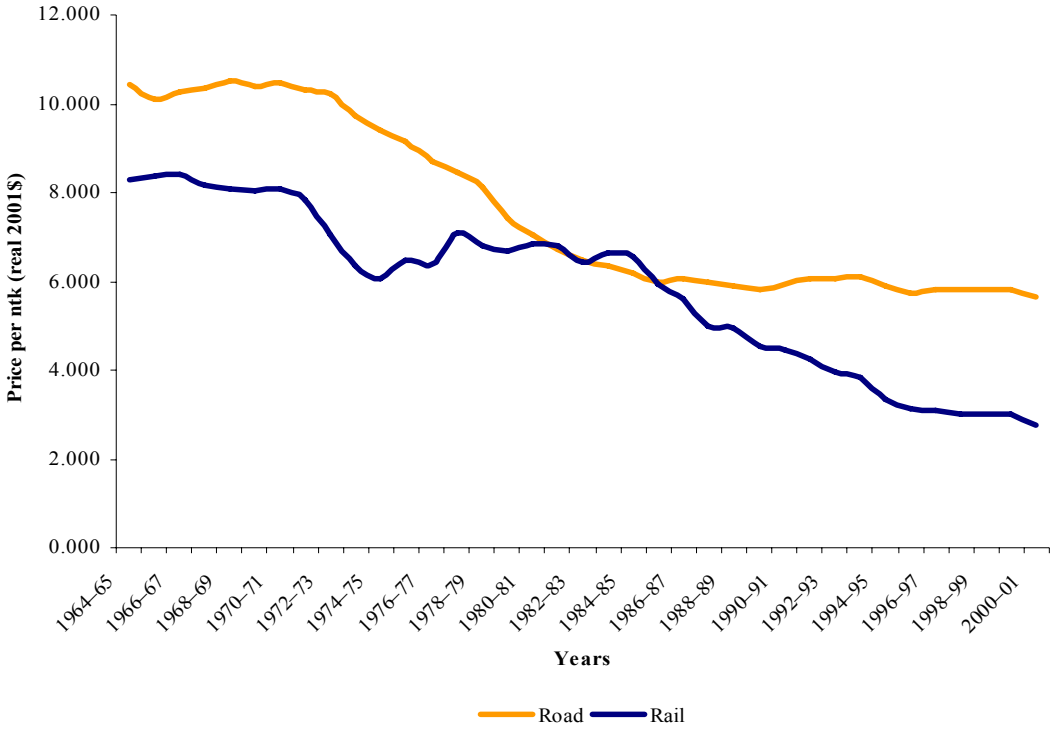

Figure 8: Road and rail freight rates, 1964/65-2000/01 (source: BTRE 2002)

Converting the ARA's cost figures to 2001 dollars, the costs of the railway freight task lie in the range from approximately 2.34 ¢/NTK (2.25¢ if efficiency improvements were made in NSW) to 6.22 ¢/NTK, whilst road ranges from 5.14 ¢/NTK to 5.95 ¢/NTK. By comparison, the actual rates in 2001 were 5.66 ¢/NTK for trucks and 2.75 ¢/NTK for rail. These are average rates for the country as a whole and the road freight rates were based on all truck configurations, whilst the ARA cost figures are based solely on B-doubles. Even so, it seems likely that only the longer links between Adelaide and Perth and Melbourne and Perth have railway rates greater than the cost of rail service provision.

If it is assumed that the cost structure in railway corridors in 2001 was the same as in 2005, and that charges in the east-west corridor were at the average rate in Figure 8, this would indicate that costs were 2.34 ¢/NTK between Adelaide and Perth and 2.52 ¢/NTK between Melbourne and Perth. If we assume rates on both links are 2.75 ¢/NTK for all freight,[7] this would yield profits of approximately 0.41 ¢/NTK for Adelaide-Perth and 0.23 ¢/NTK for Melbourne-Perth. According to the Australian Bureau of Statistics (ABS 2002), some 3.9 billion NTK of freight travelled between Victoria and Western Australia, and a further 1.1 billion NTK travelled between South Australia and Western Australia by rail. Assuming for

6 This is the implicit assumption underlying all conclusions regarding the likely success of regulation; if there is no scope for either competition or contestability in the above-rail sector, then separating the business into above and below rail will not induce the benefits of competition. The issue is one of the 'subadditivity' of the above-rail task, and this issue is one being pursued by the authors as a separate line of research. In the east-west corridor, however, there has been competition ever since third parties were first able to gain access to the track in 1995.

7 And make the implicit assumption that this rate is based upon competition with trucking rather than being set by public policy.

simplicity that all of this freight earned the same rate of profit, this would represent approximately $18.8 million in monopoly rents on this corridor.
Sd+D (2004b) suggest that 60 percent of the freight on the east-west link is non-bulk freight. Bulk freight (with the exception of steel) is generally priced at lower rates than intermodal freight. If it were assumed that bulk freight rates are equal to average costs and no monopoly rents are earned from bulk freight, then this would give a lower-bound for profit of $11.25 million. For other corridors, using the same calculation mechanism, the figures would be zero or negative. As rough guide, this rent equated to between 3.7 and 5 percent of revenues (freight income earned by the National Rail Corporation Ltd at the time was between $400 and $500 million per annum).

It seems, then, that the potential monopoly rents available on the east-west link are not trivial.[8] However, the ARA's cost figures and the ACCC's assessment of ARTC's network in general suggests that many other lines show little ability to earn monopoly rents. Thus, in a similar manner to grain, it seems there is a stronger case for a line-by-line assessment of potential monopoly power and hence of regulation than for a regulatory regime imposed on the network in general.

5 Conclusions

From the discussion above, there appears to be a strong case for third-party access in coal chains, a weak case for access in aluminium, iron ore and steel and a case for a line-by-line assessment for intermodal freight and grain. However, these conclusions must be qualified in three important ways.

The first qualification is that the desktop examination of the cost structures conducted for this paper was cursory and provides a basis only for questioning the current policy. Further more detailed work would be required to consider altering it. The second qualification is that the arguments presented here relate to maximising static efficiency, the aim of neoclassical frameworks of regulation. The distributional effects resulting from 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 supply chain, the alumina producers would have few incentives to expand output. New entrants to the mining industry might also be deterred. By the same token, if third party access were to result in railways being unable to capture any of the Ricardian rents in minerals export chains, then this may dissuade existing railway operators from expanding their capacity, and act as a deterrent to future investment by new entrants in the rail industry. Since rail is used for more than just carrying minerals, this could have important widespread implications.

Thirdly, no comment has been made here about the technical efficiency of existing railway services compared with potential new entrants. If incumbents were not technically efficient and the marginal cost curve for whole logistics chains could be shifted downwards, then the incumbent could be displaced and another monopolist take its place. For example, the Productivity Commission's investigation of the black coal industry in NSW and Queensland at the outset of the recent decade of reforms in rail (PC 1998), suggested that the productivity of Australian coal rail operations was some 20 percent below that of best-practice overseas operations. Market contestability through a third-party access regime might have assisted in improving productivity in these coal chains by providing strong incentives for technical efficiency improvement.

8 In its access arrangement, ARTC proposes rates which the ACCC (2001) believes will not earn the cost of capital still less a monopoly rent, which suggests that much of the rent is taken by above-rail operators. However, Part IIIA of the Trade Practices Act 1974 is predicated on the potential for abuse of market power, not actual abuse. The fact that the ARTC had not abused its market power in the past would not, in itself, excuse it from regulation in the future.

Rail is carrying many types of freight and the logistics chains described in this paper often overlap. Therefore it is difficult to discuss "the coal export chain" or "the intermodal network" in isolation, as has been done in this paper, when in reality many trains use the same track infrastructure to serve two or more markets or chains. However, the tentative findings in this paper indicate there could be merit in examining each rail link and the freight carried on it, allowing third-party access only where a sufficient proportion of the freight task comprises (actually or potentially) commodities for which third-party access is warranted, and avoiding the cost of administering access regimes for which it is not.[9] This would not be a perfect solution, but it is unclear whether the outcomes would be worse than at present.

References

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

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

Australian Aluminium Council (AAC) (n.d.) *Australian Aluminium Statistics* retrieved 20th June 2006 from http://www.aluminium.org.au/Page.php?s=1030.

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

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

Australian Bureau of Statistics (ABS) (2002) *Freight Movements Australia* September 2002 ABS Cat Mo 9220.0 Canberra.

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

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

Connell, P Barrett, D Berry P & Sheales, T (2003) Grains Outlook to 2007-08 *ABARE Outlook Conference 2003 Conference Paper.*

Garnaut R & Clunies Ross A (1974) Uncertainty, Risk Aversion and the Taxing of Natural Resource Projects *The Economic Journal* 85 (338) 272-87.

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

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

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

Productivity Commission (1999) *Progress in Rail Reform*, Inquiry Report No. 6. Canberra.

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

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

Strategic design & Development (Sd+D) (2004a) *Single Desk and the Grain Supply Chain: A Study of Power Relationships* mimeo.

Sd+D (2004b) *Market Power and Logistics Chains: An Integrated Logistics Network Discussion Paper* mimeo.

9 In its report on progress in rail reform (PC 1999), the Productivity Commission commented that "no single structure or access regime is appropriate for all networks" (p xxix).