The Allen Consulting Group

Comment on Joshua Gans, "The Evaluation of Criterion (b) in Long-Haul Rail Services"

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Introduction

1. Joshua Gans of CoRE Research has written a report for DLA Phillips Fox, "The Evaluation of Criterion (b) in Long-Haul Rail Services" (December 2007), in the context of the 16 November 2007 application by The Pilbara Infrastructure Pty Ltd for declaration of the track services of the Mount Goldsworthy iron ore railway. (Criterion (b) refers to s.44G(2)(b) in Part IIIA of the *Trade Practices Act*, which provides that the National Competition Council cannot recommend that a service be declared unless it is satisfied that, inter alia, "it would be uneconomical for anyone to develop another facility to provide the service".)

2. While the hypothetical provider of a substitute facility might conceivably be any party, the demand for the services of the original or a substitute facility arises from participant(s) in a dependent market – in this case primarily the downstream iron ore market. We note that the origins, language and context of the criterion are consistent with it being interpreted *either* as a private test, asking whether a participant in the dependent market could meet the full costs of a substitute service while being able to compete effectively (and profitably) in that market; *or* as a social test, asking which of the alternatives is the more economical considering all costs (and benefits) to society. The latter interpretation has been favoured by the Tribunal in the past, and is the one adopted in Professor Gans' report.

3. The broader context for Professor Gans' report is whether, for iron ore haulage operations in the Pilbara, it is (or is not) economical for any party to provide a substitute for the rail track services provided by the existing iron ore railways.

4. This report provides a critique of the arguments made by Professor Gans, in particular his decision-making framework for determining whether the development of another facility is uneconomical on that interpretation of criterion (i.e. his equation in section 3.4). To aid the exposition, the sub headings in the remainder of this report, until the Conclusion, are those used by Professor Gans.

The Natural Monopoly Test

5. In this section, Professor Gans analyses the test for a natural monopoly in the situation under review. Leaving aside for the moment the substance of that test, he makes the key assumption that Criterion (b) is synonymous with a natural monopoly test. This is not necessarily so. A natural monopoly test is a *social* test i.e. a test of whether, from the point of view of society, production costs in a natural monopoly industry are minimised when there is just one producer.

6. However, as noted above, the phrase "uneconomical for anyone to develop another facility" could be interpreted (in economic reasoning) as a *private* test i.e. a test of whether it is not privately profitable for another person to duplicate the facility in question. These tests are not synonymous. A facility may be a natural monopoly while it is also the case that it is privately profitable (i.e. privately "economical", in the language of Criterion (b)) for someone to duplicate it.

7. In Section 2.1, "Capacity Constraints", Professor Gans discusses the concept of natural monopoly in the presence of capacity constraints. The discussion, which is really just an elaboration of the definition of a natural monopoly, is unexceptional as far as it goes. Professor Gans gives an example where the least-cost option for expanding a facility is to have a single owner co-ordinate the operations of two users i.e. it is a natural monopoly. But this is tautological, because he assumes that optimal co-ordination mechanisms exist that make the facility a natural monopoly.

8. Likewise, toward the end of this section, Professor Gans writes that "in principle, each of these [separate rail] lines could be owned by different entities. The firms could then contract between each other to ensure that economies of coordination are realised. However, this would likely impose transaction costs that would not otherwise be incurred if the system was commonly owned and operated".

9. Here, Professor Gans is once again assuming the answer, by implying that transaction costs would in fact be large and that any saving on those transaction costs (by just having one owner) would decisively swing any benefit-cost calculation towards a conclusion that economies of co-ordination (*if* they exist) are best achieved by having just one owner.

10. The problem with this reasoning is that it can be applied to *any* industry where there may exist economies of co-ordination between different producers. For example, in the telecommunications industry, different mobile service providers have to co-ordinate with each other to terminate calls on each others' networks. This certainly involves transactions costs (record keeping, billing and so on). But nobody claims that economies of co-ordination would be achieved, and transactions costs minimised, by having just one owner of all mobile telecommunications infrastructure.

11. Furthermore, it is not true that transactions costs would be absent by having one owner and an access regime. In reality, an access regime would involve significant costs of negotiation between an access provider and an access seeker, as well as other diseconomies involved (in the present context) in moving from highly integrated single owner/controller/user operations to a multiple user, scheduled regime. All three leading competitors in the global (seaborne) iron ore trade – Vale, Rio Tinto and BHP Billiton – operate their mining, rail and port infrastructure as highly integrated and highly coordinated supply chains, ensuring flexibility to maximise throughput as circumstances change. By contrast, for example, the regime for East Coast rail haulage of coal is a non-integrated, multi-user, scheduled (rather than flexible) open access regime.

12. The consequences of having the latter type of regime are drawn out very clearly in the reports of an independent review commissioned in May 2007 by the Queensland Government and the Queensland Resources Council into Goonyella Coal Chain Capacity, by Mr Stephen O'Donnell.[1] His reports describe the great complexity in this non-integrated multi-user supply chain of the inter-dependencies and interactions among users, of the interfaces, and of the consequent issues of lack of coordination and wastage of capacity. Mr O'Donnell concludes that the resulting "... underperformance has resulted in a lost economic benefit in excess of $1 billion during the past year alone".[2] Based on his Queensland experience, Mr O'Donnell has also commented, in the context of issues of access to Pilbara iron ore railways, that "... in a multi user system it is generally necessary to build an additional 10 to 20 per cent capacity into the system to achieve the same throughput as could be achieved with flexible operation of that system, under the control of a single user and operator."[3]

Foreseeable Demand

13. In this section, Professor Gans compares the costs of satisfying the demand for hypothetical rail haulage services using just one line with the costs of building another line. He shows that if demand is allocated optimally across two lines, costs are lower than with one line. However he also argues that if demand is not allocated optimally, costs could be higher with an additional line.

14. Professor Gans' numerical examples simply show that economic inefficiencies are economically inefficient, which is true by definition. More substantively, his analysis assumes that the cost of developing the first line is sunk and so should not be counted in the cost comparison.

15. This is a very myopic point of view. It is generally true that the costs of existing rail lines are sunk, in that all or most of these assets cannot be redeployed to other locations. However, if an access regulator, as a matter of policy, did not take account of the cost of existing assets, then this would surely chill future investment in infrastructure. This is why access regulators of infrastructure industries use such concepts as Depreciated Optimised Replacement Cost (DORC) in determining regulated asset values. The point of this discussion is *not* that access should be granted to existing Pilbara rail assets, but that the cost of existing assets (and the need by the asset owners to earn a return on those assets) is highly relevant to any decision about whether access should be granted.

[1] Released by the Queensland Premier and Minister for Trade under cover of a press release dated 30 July 2007, and available at http://www.transport.qld.gov.au/Home/Industry/Rail/Goonyella_coal_chain_capacity_review.

[2] Goonyella Coal Supply Chain Review, *Supporting Documentation*, at cited website.

[3] Stephen O'Donnell, Affidavit submitted in proceedings before the Australian Competition Tribunal in relation to the application by Fortescue Metals Group Ltd for review of the Commonwealth Treasurer's deemed decision not to declare the track services of the Mt Newman Railway, affidavit affirmed 21 December 2007, para 25.

The Social Decision Tree

16. In this section Professor Gans argues that "an evaluation of whether it is 'economical' to take an action is conducted by comparing the net benefits that flow from taking the action with those that arise from doing the next best alternative".

17. This statement is correct, as it captures the important economic concept of opportunity cost i.e. the net benefit of the next best alternative. However, it leaves open the question of whether the net benefits are private net benefits or social net benefits. That is, whether Criterion (b) is interpreted as a private test or as a social test, the comparison must be on an opportunity cost, or net benefit, basis.

The Factual

18. In this section Professor Gans lists the consequences (in particular, the costs incurred) that will flow from no alternative being developed and seekers being able to access an existing rail line. He concludes with an equation that shows that the net social benefit of access is equal to

$$p(q^a)q^a - c(q^a) + P(Q^a)Q^a - C(Q^a) - A$$

where q^a is the amount of access seekers' usage of the facility, $p(q^a)$ is the price it pays per unit of access at that level of access, $c(q^a)$ is the on-going cost incurred as a result of access seekers usage of the facility (not the price of access), Q^a is the amount of the facility owner's usage of the facility, $P(Q^a)$ is the price it pays to use the facility (presumably to itself), $C(Q^A)$ is the ongoing cost to facility owner of its own use and A is the cost of augmenting the facility so that the access seeker can use it. We note that $c(q^a)$ includes *all* additional costs attributable to access, which Professor Gans enumerates as costs incurred due to:

- managing a more complex schedule;
- additional wear and tear, and maintenance;
- accident costs (including any insurance), and presumably including lost throughput;
- any once-off investment costs for inter-connection etc; and
- if there is congestion on the line, any lost revenue due to displacement of the owner's shipments.

19. In words, the net social benefit of access is the surplus of the access seeker using the facility (the revenue it pays to the access provider, less the access provider's cost) plus the surplus of the access provider using the facility, less the cost of expanding the facility.

20. Professor Gans' enumeration of cost components is not claimed to be exhaustive, but we note that there are other potentially important costs associated with access that he does not list and which should be considered as elements of $c(q^a)$, including for example:

    - costs due to regulatory induced delays to investment and to the introduction of new technology, new work practices or work organisation etc; and
    - costs due to extinguishing of real options held by the owner – e.g. loss of the option to utilise any spare capacity to meet an unexpected future surge in demand.

21. Subject to those comments about its detailed interpretation in practice, Professor Gans' equation is reasonable, at this level of generality.

The Counterfactual

22. In this section, which is the most important part of his report, Professor Gans analyses the "counterfactual" i.e. the net benefits that are generated if another facility is developed. (As an aside, it is not obvious why the access case is the "factual" – in effect, the default option – and the no access/develop another facility case is the "counterfactual". It seems that Professor Gans has chosen to frame the issue so that access is the default and the burden of proof rests with those who argue against access.)

23. Professor Gans derives an equation to analyse the counterfactual, with the following notation: Q^d and q^d are quantities of rail services utilised by the potential access provider and seeker, respectively; a is the cost of augmenting the existing facility (assumed to be less than A, the cost of augmentation if access is provided); $\underline{Q}^d$ is the lower usage associated with this lesser expansion; D is the capital cost of building another rail line and $c^{ALT}(q^d)$ is the ongoing cost of the alternative rail line.

24. Given this, the net social benefit realised in the counterfactual is

$$p(q^d)q^d - c^{ALT}(q^d) - D$$
$$+\max\left[P(Q^d)Q^d - C(Q^d) - A, P(\underline{Q}^d)\underline{Q}^d - C(\underline{Q}^d) - a\right]$$

25. In words, the net social benefit of the counterfactual is the surplus (revenue less cost) of the potential access seeker building and operating its own facility plus the surplus of the potential access provider expanding and operating its facility, less the cost of expanding the original facility.

26. Combining the two equations into a decision–making rule shows that it is socially uneconomical to develop another facility if

$$p(q^a)q^a - c(q^a) + P(Q^a)Q^a - C(Q^a) - A \geq$$
$$p(q^d)q^d - c^{ALT}(q^d) - D$$
$$+ \max\left[P(Q^d)Q^d - C(Q^d) - A, P(\underline{Q}^d)\underline{Q}^d - C(\underline{Q}^d) - a\right]$$

27. In words, if the net social benefits of access exceed or are equal to the net social benefits of the access seeker building a new facility, then it is uneconomical to build a new facility. The above inequality is true by definition (leaving the aside the question of why access should be granted if the net social benefits of the factual and counterfactual are equal, and assuming that a social test interpretation of Criterion (b) is appropriate), provided, in particular, that all the relevant elements of the costs are included in the conceptual calculation.

28. To give the inequality some more substance, Professor Gans makes three assumptions. The first is that in the counterfactual (no access) the potential access provider would choose a lower level of capacity than in the factual (access). In the notation of the decision rule, the cost of expansion would be *a* rather *A* and the potential access provider would use $\underline{Q}^d$ rail services. The second assumption is that the access seeker would use the same amount of rail services under either the factual or counterfactual, so $q^a = q^d$. Combining these two assumptions, the decision rule becomes: duplication is uneconomic, and thus access should be granted, if D (the capital cost of building the new facility) exceeds the access provider's loss of profits if access is provided and capacity is augmented.

29. Additionally, if it is assumed any augmentation would be purely to satisfy the access seeker's demand, then $Q^a = \underline{Q}^d$ and so the decision rule becomes

$$D \geq A - a$$

30. In words, it would be uneconomic to duplicate the facility if the cost of duplication is greater than or equal to the cost of augmentation under access net of the cost of augmentation that would occur in the absence of access.

31. Two implications of this very simplified decision rule are: (i) if under the counterfactual the potential access provider would not have augmented its facility, so $a = 0$, then the decision rule becomes access should be granted if the access seeker's cost of augmentation exceeds the potential access provider's cost of augmentation; and (ii) if under the counterfactual the access provider would have expanded its facility to the level that it would have under the factual, but not used that capacity, so $A = a$, then the decision rule is just $D \geq 0$ and so access should always be granted, because it would be socially wasteful for the access seeker to build its own capacity.

32. This stripped down decision rule highlights one of the shortcomings of Professor Gans' analysis. He assumes that it would be socially wasteful for the access seeker to build its own facility if there is unused capacity in the potential access provider's facility. However, this is a static analysis, and ignores the option value to the potential access provider of having spare capacity, which it may choose to use at some time in the future, should market conditions (in the present context, the demand for Pilbara iron ore, or mining or weather conditions) warrant it. The holding of spare capacity gives the owner of a facility a "real option", which is the right, but not the obligation, to make a business decision.

33. The real option embodied in the holding of reserve capacity is just one of a number of types of real options held by firms in sectors like iron ore mining in which major uncertainties attach to the timing, extent and mix of future demand (including both volumes and market prices), variations in mining conditions, weather etc – and in which investments typically involve long lead times and, once made, are sunk. Examples of such options include ones in respect of timing and size of investments, about choices of technology, which deposits to exploit in which order and mix etc.

34. Like financial options, real options have a dollar value to their owners, and indeed a real social value. If an access seeker was given access to a facility which uses up (in part or whole) the spare capacity of that facility, then that extinguishes (or greatly diminishes) the real option value of that spare capacity to the access owner. Moreover, apart from issues surrounding capacity that might, without access, be held as reserve capacity with option value, augmentation to provide for access would almost certainly extinguish some options held by the firm in respect of whether or not to expand capacity at all, or when to do so. Again, the extinguishing of these options involves real private and social costs. In Professor Gans' notation, this means that under the factual, the cost of expanding capacity, A, where that capacity is taken up by the access seeker, will be higher – quite possibly significantly higher – than would be the case without consideration of the real options.

35. On the other hand, in the counterfactual, the cost to the potential seeker of building its own facility, D, will not change when real options are included in the analysis, because under the counterfactual, neither party can act to extinguish the other party's real options. This means that once account is taken of the cost of extinguishing the access provider's options concerning the timing and extent of any expansion of its capacity, which would be consequent on the granting of access, then under Professor Gans' decision rule, it would be less likely that duplication of a facility would be uneconomic.

36. This conclusion follows directly from the interpretation of Criterion (b) as a social test, and hence is framed as examination of social benefits minus social costs of an access decision. The key difference between social costs and private costs is that social costs include the costs to third parties of the actions of private parties. If an access seeker is provided the right of access to a facility owner's railway capacity, and chooses to exercise that right, a complete and consistent social test would consider the consequent cost to the facility owner of extinguishing the option of using that capacity itself at a later date. Indeed the extinguishing of that (and other) real options is likely to have a significant social, and not only a private, cost.

37. Apart from ignoring this very important aspect of social cost, Professor Gans' analysis under–emphasises the large number of costs that would arise under an access regime, and which would be absent if the potential access seeker built its own facilities.

38. These additional costs include co-ordination costs, which would be particularly acute on a crowded rail line; contracting and negotiation costs; costs of delay to investment or introduction of new technology or practices due to the protracted nature of regulatory decisions;[4] costs of further delays to investment or other changes to operations due to uncertainties about the operation of the access regime; operating costs (such as labour costs) that would be absent without access; and the costs of regulatory error. This includes the possibility that an access regulator will set an incorrect access price. This could arise if the regulator sets a regulatory rate of return that is too low, or if some of the access provider's assets are incorrectly excluded from the regulatory asset base, or if the access provider's operational and other costs (including, e.g. costs of lost real option) are insufficiently recognised in the access revenues that it can recover from the access seeker.

Conclusion

39. At a high level of generality, Professor Gans' report is unexceptional, because his analysis says little more than if the net social benefits of access exceed the net social benefits of duplication, then access should be granted. If s.44G(2)(b) of the Trade Practices Act really is meant to be interpreted as a social test, then his decision rule is really just an algebraic restatement of this definitional rule.

40. However, on closer inspection, Professor Gans' analysis leads the reader unjustifiably towards the conclusion that it is more likely than not that duplication is likely to be uneconomic, and hence the granting of access will be beneficial to the economy. This is because his analysis is static and underplays important sources of costs that are likely to arise under an access regime, including in particular the cost to the facility owner of extinguishing the option to take up for itself any spare capacity in its facility, under favourable future market conditions.

[4] Perhaps the most notorious example of a regulatory delay is that surrounding the expansion of the Dalrymple Bay Coal Terminal. A proposed expansion of the capacity of the terminal (from 60 to 68 mtpa) was delayed for 22 months, between early 2003 and early 2005, while the Queensland Competition Authority was considering the draft access undertaking and determining a terminal user charge. Lost revenues incurred were in the order of $1 billion per annum during this delay, plus demurrage and other costs. Meanwhile, without regulatory intervention, *two* comparable stages of expansion were commissioned at nearby Hay Point before the regulated expansion of Dalrymple Bay finally came on stream in February 2008. (Source: various public announcements.)