On Gans' evaluation of criterion (b) in long-haul rail services

1. INTRODUCTION

1 This paper provides a critical analysis of Joshua Gans' paper titled, "The Evaluation of Criterion (b) in Long-Haul Rail Services" (hereafter citations refer to this paper, unless indicated otherwise).

2 Gans essentially claims that:

- "a *strict application* of the natural monopoly test is not likely to be relevant in the application of criterion (b)" (Gans, page 6, emphasis in original);
- instead, a net social benefit test that considers not only the social costs associated with developing another facility but also social benefits should be used (Gans, page 7); and
- the net social benefit test can be captured in an 'evidentiary' test that asks whether, were the demand of all the access seekers transferred to the infrastructure provider, that provider would rather augment its own existing facility than build a new rail network to accommodate that demand (Gans, page 14).

3 This paper makes the following points:

- From an economic perspective, Gans' formulation of the net social benefits test is incorrect. First, it considers firm revenues instead of the sum of consumer and producer surplus. As a result, the test he considers is more akin to an industry profit test. Second, it excludes significant costs that would be incurred when access is imposed, namely transactions and regulatory costs. In the context of export industries, the first flaw can be ignored, as its effect is to exclude from consideration gains (in the form of consumer surplus) resulting from declaration that would flow to foreigners. This is likely to be consistent with a focus on the welfare of Australians (as required by the *Trade Practices Act 1974*). However, the second of these flaws materially distorts his proposed test in favour of declaration when this would not be to the net social benefit.
- That being said, a net social benefit test (even in Gans' biased formulation) has an important implication in the presence of capacity constraints: if access seeker throughput would displace access provider throughput, then access should only be imposed if access seeker ore delivered a greater surplus than the access provider's ore.

- Gans' proposed 'evidentiary' test is also not a net social benefit test and has no material bearing on criterion (b). That test simply asks whether a single operator would find it more profitable to haul the relevant quantities of iron ore on a single railway line or instead build a substitute facility. It not only ignores crucial costs of access, but additionally assumes that any economies from vertical integration attained by the access provider automatically extend to the access seeker.

2. GANS AND THE NET SOCIAL BENEFIT TEST

4 This section describes Gans' 'net social benefit' test and outlines the components of such a test. The versions of the test developed by Gans omit some of these components, most notably the costs of imposing access, and Gans' analysis, in any case, relies on untenable assumptions. The result is to bias his tests in favour of declaration.

2.1. THE COMPONENTS OF A NET BENEFIT TEST

5 Gans (pages 7-8) appears to argue for a 'net social benefit' test interpretation of criterion (b), whereby a facility should be declared if the net social benefits of access exceed the net social benefits of building separate facilities. That is, in each case he would subtract social costs from social benefits, and then compare the resulting net benefits. If, on net, forced access was more beneficial, then, for Gans, criterion (b) would be satisfied.

6 To see the relationship of the net social benefit test to criterion (b), it is helpful to realise that in adopting a net social benefit test Gans takes uneconomical to mean economically inefficient. In practice, economists typically view a situation to be economically inefficient if some people could, at least conceptually, gain by paying those parties adversely affected by a change an amount sufficient to make them no worse off with the change than they would be without it.[1] Thus, if the net social benefits of forcing access exceed the net social benefits of separate facilities, then, at least conceptually, those benefiting from access could pay the access provider enough to agree to forced access. As a result, if Gans' test were passed, then, compared with imposing access, separate facilities would be economically inefficient.

1 An alternative formulation of this test asks whether the parties potentially adversely affected could pay the proponents of the change an amount sufficient to make them no worse off without the change than they would be with it. If they could not, then the proposed change would be economically efficient.

7 In the context of access to long heavy-haul iron ore rail networks in the Pilbara, social benefit is determined by the total value final consumers gain from iron ore, which turns on final consumers' demands and expected ore shipments. Consumers' valuations, *holding ore shipments constant*, are unlikely to change as between the case with forced access and separate facilities (since consumer valuations are not dependent on the means of ore shipment). However, quantities of ore shipments from the Pilbara could differ for different scenarios. The social benefits of forced access would be lower than those of separate facilities to the extent that shipped volumes were lower under forced access and *vice versa*. Of course, lower or higher volumes need not respectively decrease or increase economic efficiency overall, as social costs must also be taken into account.

8 In turn, social costs amount to the sum of costs incurred in the process that starts with mining and ends with a final consumer. Such costs again vary, in each case, with the expected volumes of produced ore.

9 The social costs of declaration differ from those of having separate facilities in two crucial ways. The first is whether the costs of a single unified production process (that is, one *without access*) are different to the costs of independently operated facilities (that is, whether the facility in question is a textbook natural monopoly). However, this does not take account of the costs incurred due to imposed access. Thus the second way in which the social costs of declaration differ from those of separate facilities is in the regulatory and transaction costs that are incurred when access is forced (these costs are discussed in paragraphs 13 *ff* below).

10 The difference between the total consumer value and the total costs of a particular situation is the net benefit of that situation. It goes without saying that comparing net social benefits is a complex exercise. In general, it requires:

- an estimation of consumer value (which captures all gains made by intermediaries, including gains to producers and governments through taxes);
- the costs of transport (in the rail access example considered here), including the transaction costs of access, under different industry structures;
- the direct and the indirect efficiency costs imposed by regulation; and
- any other production costs, for example, of mining.

Moreover, such an analysis must be done on forward-looking basis, and therefore include effects on investment and innovation.

11 Since iron ore from the Pilbara is almost entirely exported, a net social benefit test may be somewhat simplified (at least in the circumstances considered here, and recognising that the object of the Act "is to enhance the welfare of Australians").[2] In that case, the final price paid at the point where the ore leaves Australia is likely to reasonably approximate the total value gained by Australians. The net social benefit is then obtained by subtracting from the ore export revenues all costs incurred prior to sale.[3]

12 The net social benefit test may be even simpler in some circumstances. If BHPBIO's ore is easier to extract and/or of higher quality than the ore of access seekers, then shared access should not be imposed if that would displace ore that BHPBIO would otherwise ship. This is because BHPBIO's ore would cost less to extract and deliver and/or earn a higher price at port, and so would provide a greater net social benefit (the difference between export revenues and total costs) than the ore of other access seekers. Consequently, if forcing access would merely or mainly lead to access seeker ore displacing BHPBIO's ore, the net social benefit test would fail.

2.2. REGULATORY AND TRANSACTION COSTS

13 Mandating access to a facility creates regulatory and transactions costs that are not incurred when a single firm is involved in a production process. These two costs are now discussed in turn.

14 It is uncontroversial that regulation invariably carries its own costs, and that these can be very high. In the case of third party access, the direct costs of regulation relate to legal, administrative, compliance and monitoring costs (including the costs of resolving disputes). The indirect costs of imposing third party access are the unintended inefficiencies regulation brings, including harm caused by setting inappropriate terms and conditions of access. The consequences of such regulatory errors, notably the distortion of investment decisions, when compounded over time, are typically large. This is especially so in the case of declaration, which is a particularly intrusive form of regulation, substantially diminishing the property rights of the access provider.

15 Transactions costs refer to the costs of coordinating arm's length agreements between independent firms.[4] In the context of forced access on rail transport, transactions costs arise because the operation of, and investment in, the railway must be coordinated between two (or more) parties with conflicting commercial objectives, and include:[5]

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2 Section 2 of the Act, which reads in full: "The object of this Act is to enhance the welfare of Australians through the promotion of competition and fair trading and provision for consumer protection."

3 Taxes should not be subtracted as they are largely a transfer from the tax-paying entity to the government.

4 Williamson, Oliver. 1979. "Transaction Cost Economics: The Governance of Contractual Relations." Journal of Law and Economics 22: 233-61.

5 For a general discussion, see Organisation for Economic Co-operation and Development, 21-Dec-2005, Directorate for Financial And Enterprise Affairs, Competition Committee, "Structural Reform in the Rail Industry", pages 49ff.

- The costs of negotiations between access provider and access seeker(s) to arrive at agreements, for instance relating to the nature of the required service, train scheduling and pricing.

- Delays and other costs that arise because one party's decisions may cause harm or bring benefits to other parties in a manner not envisaged by a contract between the relevant parties (economists call these effects 'externalities'). An example is where one party does not factor into its rolling stock maintenance decisions the costs in terms of delay that breakdown imposes on others, a problem that is especially problematic when some line users are small relative to total traffic. Similarly, the condition of the rolling stock can harm the track, but an access seeker, especially if a relatively small user of the track, may not factor in the harm this imposes on the system. The reverse problem is also possible. Poor track infrastructure can damage rolling stock, but the access provider may not internalise the harm this imposes on third party rolling stock. However, this is less likely to be an issue where the access provider is also a substantial user of rolling stock.

- Delays or even cancellation of line expansions or the introduction of innovative practices, since obtaining agreement to investment projects may entail prolonged and costly negotiations between the different parties (referred to as 'hold-up' risks).

16 These transactions costs would be expected to rise with multiple access seekers. Hence the Organisation for Economic Co-operation and Development quotes the Bureau of Transport and Regional Economics:[6]

> *The complexity of interaction between the infrastructure manager and the train operators increases disproportionately because, as arrangements become more intricate, disproportionately more resources are required to coordinate and resolve conflicts*

2.3. FLAWS IN GANS' FORMULATION OF THE NET SOCIAL BENEFIT TEST

17 While Gans considers that criterion (b) calls for the application of a net social benefit test, the test he develops (over pages 8-13), and which he presents in a complex formula (at page 11), is not such a test. In particular, Gans' formulation differs from a generally applicable net social test in two crucial ways that bias his approach towards imposing access:

- he excludes crucial components of the test; and

- he treats costs in an unjustifiable manner.

6 Organisation for Economic Co-operation and Development, 2005, page 51.

18 Gans' formulation of the net social benefit test substitutes the combined revenues of the access provider and the access seeker for consumer benefits (which, as suggested by paragraph 11 above, may be reasonable in the circumstances considered here). Consequently, Gans' test does not ask whether the net social benefit of forced access exceeds that of separate facilities. Rather, it asks whether industry profits under forced access are greater than industry profits with separate facilities.

19 Furthermore, Gans' test is missing important cost components in that Gans does not include the transactions and regulatory costs that are a consequence of enforced third party access.[7] As a result, the test formulated by Gans would give different results than a net social benefit test. In particular, the omission of regulatory and transaction costs leads Gans' test, relative to a properly formulated net social benefit test, to favour the imposition of access (since regulatory and transaction costs lower the net social benefit of access without changing the net social benefit of separate facilities). It should further be noted that the omission of regulatory and transactions costs is relevant not only for the costs of access, but may also feed through to (and reduce) revenues, for instance, if output is reduced as a result of forced access.

20 Gans' test is also flawed in that he treats the costs of supplying access as being independent of the cost of transporting the access provider's iron ore. That is, the cost to the access provider of carrying the access seeker's ore does not change if the access provider is carrying zero or a hundred thousand tons of ore. This is simply untenable. The transport, regulatory and transaction costs of access certainly vary and likely rise with total volume carried, not merely the access seeker's volumes. For example, as capacity limits are approached:

- the cost of obtaining more capacity likely rapidly increases;
- the need to maximise scheduling efficiency and to avoid delays associated with train break-downs can be expected to greatly increase the need to coordinate among the parties using the line, and hence raises transaction costs;
- as track congestion increases, so will conflict and ultimately disputes among the parties wishing to obtain track access, raising the need for regulatory oversight and its costs.

21 In other words, even if the initial transactions costs of access are high, they may be even higher as the volumes being transported increase. This aspect of the "access cost function" is ignored in Gans' formulation. As a result, Gans' assumption that access seeker and access provider costs are 'separable' will generally bias his tests in favour of forcing access.

22 Gans (pages 11-14) then develops three variations of his basic framework to reflect three different scenarios relating to the railway line in question, namely that:

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7 Gans refers in passing to transactions costs (page 5), but these do not feature in the range of costs considered in Gans' 'net social benefit' test. Specifically, Gans' modelling assumption, that the access provider's and seeker's respective cost functions are independent of one another (Gans, page 9; see discussion in this paper at paragraph 20) essentially implies that transaction costs are zero (since by definition transactions costs arise due to the interaction of access provider's and seeker's demands).

- third party access requires additional augmentation of that railway;
- the railway is augmented regardless of third party access; and
- the railway is capacity constrained.

23 In each case, Gans simplifies his so-called net social benefit test (which, as noted, is more like a profit test net of regulatory and transaction costs), variously by assuming access seeker costs, and access seeker and provider volumes, are the same under imposed access and separate facilities. These assumptions again are implausible and would tend to bias Gans' tests toward imposing access.

24 To summarise, despite calling for a net social benefit test, Gans formulates what really amounts to an industry profit test that ignores regulatory and transaction costs. Moreover, that test incorrectly assumes the costs of transporting access seekers' and providers' ore are independent of each other. Finally, in his scenario analysis, Gans make a range of untenable simplifying assumptions. The effect of all these moves is to bias Gans' analysis in favour of imposing access.

3. GANS' EVIDENTIARY TEST

25 Although Gans devotes considerable effort advocating and then developing a net social benefit test (that is flawed for the reasons set out above), he concludes (page 14) that "in reality, a social test is difficult to apply." In fact, this is so not merely because (per Gans, page 14) "*demand will fluctuate… and overall demand growth will be an estimate*," but because measuring transport, regulatory and transactions costs is complex (see paragraph 10 above). As a consequence of the difficulties Gans perceives, he recommends what he refers to as an 'evidentiary test', which he claims is simpler than, and can stand in for, a net social benefit test. However, this section shows that Gans' evidentiary test is not a net social benefit test and is difficult to relate to criterion (b).

26 Gans describes the evidentiary test (on page 14) as follows:

> *Consider the following hypothetical scenario whereby the demand of all seekers is transferred to the infrastructure provider. Then, a facility will be considered uneconomic to duplicate if the provider would rather augment their own existing network than build a new rail network to accommodate that demand.*

27 In plain English, this amounts to asking whether a profit-maximising single owner of the relevant mines (that is, the mines of both the access provider and the access seekers) would prefer to haul the relevant quantities of iron ore on a single railway line or instead build a substitute facility. This test differs from a net social benefit test in three ways:

- it compares the profits a single owner would obtain, rather than net social benefits, when single and separate facilities are used;

- it takes no account of the regulatory or transactions costs of access, since a single owner does not face these (which biases the test in favour of declaration); and

- it assumes that when access is provided, the access seeker can claim the same (technical) scope economies that the access provider obtains through vertical integration of mining and transport. However, these are not present when an access seeker horizontally transacts with an access provider. This creates a further bias in favour of declaration.[8]

28 As such, the fact that the 'evidentiary' test may be passed allows no conclusion to be drawn about the economic efficiency of mandating access.

29 More to the point, Gans' evidentiary test is difficult to relate to any question about access, because it only demonstrates whether a single firm operating a unified facility is more profitable than a single firm that makes use of separate facilities. It provides no information about the efficiency or profitability of independent supply using separate facilities (since a single firm may be more or less efficient at operating separate facilities than several competing firms), and so provides no meaningful way of comparing the case of separate *independent* facilities with the case of forced access.

4. CONCLUSION

30 Gans proposes two tests to decide the merits of declaration of a facility, a 'net social benefit' test and an 'evidentiary' test. As a general matter, Gans' formulation of the net social benefit test is flawed in two key respects. First, it looks at revenues when it should focus on consumer and producer surplus (including tax payments), and, second, it ignores regulatory and transactions costs. In the circumstances considered here, the iron ore in question is exported. As a result, a focus on only producer surplus and tax payments is reasonable. However, the second flaw is highly relevant, because the question of whether declaration is efficient depends crucially on the regulatory and transaction costs of access.

31 Putting that aside, Gans' formulation implies that if the facility in question is capacity constrained, then access to that facility should only be forced if the ore of the access seeker is likely to generate greater profits than that of the access provider (in this case, BHPBIO). If, however, BHPBIO's ore is cheaper to extract and/or fetches a higher price at export, then a capacity constraint implies that access should not be imposed. Of course, if the full costs of access (including regulatory and transactions costs) are appropriately accounted for, then the case against declaration is strengthened.

8 In the context of the Pilbara railways, vertical scope economies might arise from the choice of the railway route (to suit both loading and unloading), integration of loading and unloading facilities at mine and port with the railway operation, and integration of the below and above track operations.

32 As regards Gans' evidentiary test, it is difficult to see how it is relevant. The test offers no insight as to the relative efficiency or profitability of shared or separate facilities if there are multiple (independent) firms. The evidentiary test is further biased in favour of declaration since it assumes that the access provider's vertical scope economies extend to the access seeker, as well as failing to consider transactions and regulatory costs.