BENCHMARKING PERFORMANCE IN THE BLACK COAL INDUSTRY — DISCUSSION OPENER — PRODUCTIVITY COMMISSION SEMINARS

Tasman Asia Pacific's report for the Commission *Benchmarking the Productivity of Australia's Black Coal Industry,* like its precursor *The scope for productivity improvement in Australia's open cut black coal industry,* commissioned by Rio Tinto, is at once an indictment of the industry's performance in 1996 — at least in the truck and shovel segment — and a pointer to identifying the improvement opportunities that clearly do exist.

The purpose of this paper, which was presented at the Commission's two seminars on benchmarking, was to provide an introductory comment and critique on the benchmarking work.

Productivity is not an easy concept — unless it's constrained to apply to a single operation with unchanging technology. Tasman defines it as "a measure of the physical output produced from the use of a given quantity of inputs". The only way to hold the denominator in this ratio constant and measure the numerator consistently — against changing or different circumstances, different technologies and different scales — is to derive indexes which comprehend all outputs and inputs, their values and costs, and weight them appropriately. The ratio indicates "total factor productivity".

There is still a question as to whether the measures used in this analysis are sufficiently comprehensive of coal mining activities to be fully representative of them. In particular, the exclusion of most maintenance activities and the exclusion of development work in longwall mining would appear to detract from the TFP concept. Alternatively, the benchmarking work undertaken by Tasman might better be described as addressing various sub-sets of mining activities: "truck and shovel operations", "dragline operations" and "longwall operations".

In concept, TFP attempts to measure output physically (what the mine does — or what it did at a certain time), with the *levels* of resource endowments (and ease of mining), technology employed, scale economies, and the mix and relative prices of all the various inputs held constant. This is what TFP relies on; it can do so rigorously using index number theory if the factor cost shares are not too different. Doing it thoughtfully and carefully is the hard part.

It is always important to remember that productivity — TFP or partial — is not an end in itself (though TFP can get very close to economic performance and competitiveness). Productivity measures are diagnostics. They can help, by

"looking over the fence", to indicate how an operation might be able to "get more for less".

Partial productivity figures (and less than comprehensive TFP figures) are interesting in highlighting differences, and useful in understanding or inferring reasons for differences in TFP. However, all the pertinent circumstances need to be taken into account before it would be sensible to act on the basis of partial productivity indicators. South African mines, for example, have much higher physical inputs of labour than competitors here and in the US — exactly as one would expect with lower unit labour costs and a profit maximising objective. The Tasman report explains that large wage differences preclude the suitability of Indonesia, South Africa and Chile from TFP comparisons with Australia. Also, Tasman's results suggest that the US coal mines in the survey have got it right by over-providing shovel capacity (rather than wrong as the partial indicator might imply), because they achieve much better haulage performances.

TFP is also limited to some extent. For example, when exchange rates move significantly, as they have recently, it would be surprising if the ideal composition of inputs in different countries were not to change. One would expect, for instance, increased emphasis on imported vehicle and equipment maintenance in Indonesia (and Australia), and on substituting local inputs like maintenance in place of foreign capital imports. On the other hand, relatively low real costs of capital at the moment would tend to induce capital spending. Just what the implications of such price changes are for TFP analysis over time is a question that might appropriately be addressed.

The other thing to recall is that, as Tasman cautions, this work is confined to certain activities on the mine side of the mine gate. Competitiveness is so critically dependent as well on the cost of getting the final product to market — notably the price (ie the terms and conditions) of rail access and haulage, port services and ocean transport. This is something the Productivity Commission is well aware of — though many will be inclined to hope that the final report devotes more attention to the contestability of the terms of rail access.

It would not be prudent to make too much of the precision of the Tasman results — especially given the relatively small sample sizes (with quite disparate observations) and possibly inconsistently measured or misunderstood data. None of these comments should be taken to imply that the Tasman work is in any way unreliable, rather that it might be wise to round off many of the numbers and put something of a (subjective) margin of error around them — and this is also Tasman's view. The consultants have, in a couple of places, calculated the rough implications on the TFP estimates of different values for partial figures — and that approach is commended.

Perhaps the most pressing question relates to the appropriateness of using total material excavated and transported as the measure of total output. No question, it is more realistic in terms of measuring the activity undertaken at a coal mine than just counting coal produced. For example, if I read the averages data correctly, say in truck and shovel, the selected mining costs per tonne of coal produced are $2 or $3 in Queensland and about $10 in NSW. That's a huge disparity. When the big difference in strip ratios (overburden to coal) is taken into account, the disparity in costs is substantially reduced (and NSW doesn't look nearly as bad). Even so, total costs incurred at the mines are considerably higher than these figures — emphasising again the importance of being concerned about how comprehensive is the TFP measure adopted.

As previously mentioned, maintenance is a topic that also engenders some unease in relation to Tasman's indicators. The scale of the maintenance function at an open cut coal mine — elsewhere as here — is always impressive. And yet its coverage in the analysis is implicit and maintenance staff, where identified, are excluded. The report provides some figures on the relative scale of the maintenance function — though it is not clear what size is a "typical" mine.

Maintenance is, in effect, subordinated to the object of mining coal. However, this begs the question: isn't mining overburden in the same category? It isn't an end in itself, but rather, like maintenance, just a necessary means to accessing the coal. If the activity were out-sourced (as it sometimes is) would it be treated differently? And would it matter?

In relation to truck and shovel, Tasman has analysed 22 mines in all, including 5 US coal mines and 4 Australian hard rock mines. The reported ratio of coal, in total material excavated, in NSW mines is a low 10%, compared with 30% for Queensland and 40% for the US. While the identities of the participating coal mines are properly protected, one might guess that Queensland includes Blair Athol and maybe NSW includes some of the deeper open cuts. The question has been raised as to how representative all this is, given the relatively small total tonnage surveyed. Again the issue is: to what extent does it matter? Significantly, if the NSW overburden removal task was indeed smaller, the productivity result for NSW mines would be even worse.

One might also question the quality of the data on replacement cost of equipment items. And what exchange rate was used to convert the US capital costs to $A? Do taxes on these capital items affect the figures?

Irrespective of these queries, however, the Tasman's findings reflect an unsatisfactory situation. The Tasman results suggest Australian truck/shovel mines lag far behind their US counterparts in productivity and mining costs; equipment is clearly over-manned; truck utilisation is poor; turnaround times are slow; and idle time is excessive.

As to the reasons for these deficiencies, the Tasman study proposes that many of them are due to work practices and working arrangements. Some of these links are self evident — and material presented elsewhere in the Commission's report tends to confirm that often asserted relationship.

Not all the results reported by Tasman are bad: in draglines, the surveyed Queensland mines established best practice. Also, in some of the categories where the average productivity performance of Australian mines appeared to be wanting, some individual mines ranked much more highly.

However, as noted above, the report card overall is poor. Specific diagnostics, and prescriptions for improvement, necessarily demand attention to the partial indicators — and some of those reported in the study are particularly impressive: in longwalls, the finding that Australian miners, compared with their US counterparts, spend 30 minutes extra joining and leaving shifts is indicative of important differences, if not immediately of possible remedies. It is also instructive that safety appears to be a key productivity indicator: the lost time injury rate of 20 per million man hours at best practice mines compares with a rate of 50 at moderately performing mines.

The partial figures also lend credence to assessments of the scope for improvement: for instance, it is revealing that truckloads per shovel per 8 hour shift vary between 185 at best practice and 135 for moderately performing mines. Some of these indicators provide reassurance that Tasman's TFP estimates — which must be preferred for general assessment purposes — are reasonably reliable.

Ultimately, the quality and usefulness of the productivity comparisons, as Tasman is the first to acknowledge, is dependent on the selection of benchmarking partners whose operations are reasonably similar and on co-operation between them over time to ensure consistency of terminology, classification and measurement. Some of the better performing Australian mines might be very useful benchmarking partners for the poorer performers.

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