Economic benchmarking workshop 7 — Application of economic benchmarking techniques

1. Purpose

The purpose of this document is to set out some of the issues surrounding the application of the economic benchmarking model and technical paper[1] that we have circulated for the workshop on 6 June 2013. This is the sixth workshop on economic benchmarking techniques (EBT), which is part of consultation on the development of the expenditure forecast assessment (EFA) guidelines.

We are seeking your preliminary feedback on these issues, in addition to any feedback that you are able to provide on the technical paper and models.

To facilitate understanding and discussion, in setting up the models, we have endeavoured to make clear the calculation of the economic benchmarks, and provide numerical examples of how adjustments could be made to provide information and facilitate discussion.

We are interested in having a constructive discussion about these models. Please be aware that the models are not intended to imply that we are proposing a sudden move to a mechanistic application of these techniques. Rather, they will be used in conjunction with consideration of our existing tools for reviewing expenditure and our refined category analysis.

Further, the views expressed in this paper are AER staff's preliminary views on the application of economic benchmarking techniques. These views do not necessarily represent those of the AER Board.

2. Potential applications of EBT

EBTs will be one of a suite of tools to assess expenditure including the new category analysis, repex/augex models, and our other existing assessment tools. EBTs will complement these other tools by providing a top down view of network service provider (NSP) expenditure.

We consider as part of the EFA guidelines, EBTs can assist the AER in assessing NSP expenditure. EBTs can:

1. Provide information on the relative economic efficiency of network service providers (NSPs) and changes in the efficiency of NSPs over time. The AER is required to have regard to efficient costs[2] and the annual benchmarking report in opex and capex assessments.[3] The analysis of efficiency will be relevant to:

    - providing an insight into whether historical expenditures are an appropriate starting point for forecasts. Particularly whether the revealed cost approach and the incentives it creates are still appropriate;

[1] Economic benchmarking technical report, Regulatory Development Branch, ACCC.
[2] NER, cl. 6A.6.6(c)(1), 6A.6.7(c)(1), 6.5.6(c)(1) and 6.5.7(c)(1)
[3] NER, cl. 6A.6.6.(e)(4), 6A.6.7.(e)(4), 6.5.6(e)(4) and 6.5.7(e)(4)

- providing reference forecasts using a high level rate of change formula against which NSP forecasts can be compared as part of the first pass assessment;
- highlighting areas of expenditure forecasts that warrant investigation as part of the first pass assessment, and.
- the annual benchmarking report,[4]

2. Provide a top down view of opex, and inform us of the appropriate opex rate of change.[5] The opex rate of change is composed of changes in output quantity, opex price and opex productivity. Economic benchmarking estimates productivity growth which includes technical change and scale efficiency change.

Question 1: Do you agree with the applications listed above? Are there other applications for EBT that could assist the AER in its role of forming a view about expenditure proposals?

3. *Which EBT do we consider will assist the AER with these applications?*

Application 1 — Provide information on the relative efficiency of network service providers (NSPs) and change in the efficiency of NSPs over time. The analysis of efficiency will be relevant to:

- providing an insight into whether historical expenditures are an appropriate starting point for forecasts,
- providing reference forecasts using a high level rate of change formula against which NSP forecasts can be compared as part of the first pass assessment; and
- highlighting areas of expenditure forecasts that warrant investigation as part of the first pass assessment
- the annual benchmarking report,[6]

For each of the economic benchmarking applications above, we have identified multilateral total factor productivity (MTFP), data envelopment analysis (DEA) and econometric methods. In particular, MTFP can be implemented robustly with a detailed output and input specification with only a small number of observations.

MTFP and DEA have been selected as the EBTs in the near term due to the data likely to be available to us for the next set of regulatory determinations. We consider that it is less likely that the AER will have enough data to produce robust results for more data intensive EBTs such as stochastic frontier analysis in the near term.

MTFP and DEA both include prices in the analysis and produce estimates of overall cost efficiency. DEA can provide us with further information by decomposing cost efficiency into technical efficiency

[4] NER, cl. 6.27 and 6A.31.

[5] The use of economic benchmarking to set the opex rate of change was adopted by the AER in the recent Victorian Gas Access Arrangements for SP AusNet.

[6] NER, cl. 6.27 and 6A.31.

(how good an NSP is at producing outputs for its given level of inputs) and allocative efficiency (the mix of input quantities used provide the greatest benefit relative to costs) but it requires a larger number of observations for more detailed specifications. The application of the two methods can also be used to reinforce each other as a cross check.

These two techniques with the aid of regression analysis can incorporate allowance for operating environment factors that impact the efficiency of NSPs. Economic benchmarking will not be able to incorporate every operating environment factor directly into the analysis. Where operating environment factors cannot be incorporated, judgement should be applied in interpreting the relative efficiency scores, taking into account available empirical evidence on the effect of relevant operating environment factors on efficiency.

3.1 Is an NSP responding to the incentive framework?

In addition to conducting comparative analysis of cost categories, MTFP and DEA could be used to inform the AER of whether an NSP is responding to the incentive framework. These EBTs would enable us to understand an NSP's productivity performance relative to other NSPs, and understand an NSP's productivity performance over time.

Both time series and cross sectional analysis are relevant to the question of whether an NSP is responding to the incentive framework. An NSP may not be responding to the incentive framework where:

- The NSP's productivity performance compares poorly to its peers (i.e. it is a long way from the efficient frontier) and it fails to catch up over time
- The NSP's productivity performance remained constant or declined over time while that of other NSPs continued to grow.

3.2 First pass assessment

For the first pass, the ability of MTFP and DEA to determine the factors driving changes in efficiency scores, either from changes in inputs or outputs, will allow us to form a view on which aspects of an NSP's expenditure proposal should be focused on.

In particular, MTFP and DEA will enable the AER to determine what factors have driven productivity performance historically and how these have changed over time.

For example, it may be that an NSP's productivity performance has declined because output growth has been low, and while the opex input has been increasing at trend there was a significant increase in capital inputs. Where forecast expenditure implied a continuation of this trend, in its first pass the AER would be able to identify investigation of the increase in capital input over time not resulting in an increase in output in the first pass.

Analysis of an NSP's overall economic efficiency taking operating environment factors into account will provide useful information on whether historical expenditures are an appropriate starting point for forecasts and the applicability of the revealed cost approach.

Historical productivity growth estimated by different EBTs could be used to set the basis for the first pass assessment of an NSP's expenditure forecasts. However, one issue to consider is that because different NSPs may have different efficiency scores relative to the frontier, it may not be appropriate to base the productivity growth the NSP is expected to achieve on the average. For NSPs that are close to the efficient frontier, it may be difficult for them to match industry average productivity growth rates as it will not be possible for them to continue to produce efficiency gains relative to inefficient NSPs that have more scope to make catch-up gains by adopting efficient practices already implemented by frontier NSPs.

Application 2 — Provide a top down view of opex, and inform the AER of the appropriate opex rate of change.[7] The opex rate of change is composed of changes in output quantity, opex price and opex productivity.

We also consider that econometric modelling of the opex cost function could be applied in the near term. Econometric modelling of the opex cost function provides a top-down estimate of opex, and the opex rate of change.

The top down estimate of opex could be used to provide information on the relative efficiency of forecast opex, alongside other tools available to the AER including category analysis and engineering advice.

Question 2: Are MTFP, DEA and econometric methods appropriate tools to assess the economic benchmarking applications discussed in section 1? If not, what other EBT could be used to form a view about these applications?

Question 3: Are there any other ways that the AER could use EBT to inform its first pass assessment of a regulatory proposal?

Question 4: Do you consider that EBT will provide information relevant to deciding whether an NSP is responding to the incentive framework? What are your views on the relevant questions that we consider that EBT can provide answers to in section 3.1?

Question 5: MTFP and DEA involve comparison relative to the frontier firm. In each of the applications above, what do you consider the appropriate comparison point to be? What factors should influence the AER consideration of the appropriate comparison point?

4. Model testing and validation

There may be merit in having a testing and implementation phase before economic benchmarking results are published. This process could include independent testing and validation of the backcast data to ensure that it is fit for the purposes of economic benchmarking.

[7] The use of economic benchmarking to set the opex rate of change was adopted by the AER in the recent Victorian Gas Access Arrangements for SP AusNet.

The model testing and validation process could provide the opportunity for the AER to test the robustness of economic benchmarking before it is used to assess expenditure.

There are different ways for this process to be undertaken. The model may be developed by the AER with the aid of its consultants, and then released to stakeholders and their consultants for comment. This may also include a review by a third part consultant independent of the AER's consultant.

Alternatively the AER could commission a consultant to develop the economic benchmarking model, and then based on the findings of the consultant undertake economic benchmarking and then release the model for stakeholder comment.

Question 6: Should the AER conduct a model validation process, or is it sufficient for the AER to implement EBT based on its own assessment of the robustness of the results as data becomes available?

Question 7: If you consider that the AER should undertake a model validation process, how should this be implemented?

5. Timeframes for implementation

Ideally we would want to require a long as time series as possible to support the above applications, and put supporting information requirements in our RINs/RIO.

Based on the information that we have collected from NSPs over time, our initial impression is that the high level nature of the information required for economic benchmarking lends itself to backcast data to be acquired in the RINs/RIO. We note that the backcast data for EBT is less disaggregated than the data required for category analysis. We consider that there should be sufficient disaggregated data from the NSP's current systems to obtain general quantity information required for economic benchmarking. Ideally, the AER would like to conduct obtain backcast data from NSPs as soon as possible in order to provide as much advance guidance to stakeholders on their robustness and likely application. We note that some stakeholders stated in previous workshops that they have developed internal systems for capturing the effects of operating environmental factors such as weather. We consider this data may provide additional insight into which operating environmental factors are material and should be incorporated into the EBTs.

There is a question of how many years of back cast data should be required to be provided in the RINs/RIO.

The AEMC in its review noted that they are of the view that at least 8 years of robust and consistent data will be required to establish a TFP growth rate that could be used in a TFP methodology for price and revenue determinations.[8] Having said that, we note that this was for a different purpose to what we are investigating here (i.e. the intent here isn't to mechanistically determine the appropriate change in prices under a TFP based price setting framework).

[8] AEMC, *Final report review into the use of total factor productivity for the determination of prices and revenues*, 30 June 2011, p. 23.

Question 8: How many years of backcast data should the AER seek to obtain for EBT?

Question 9: What the earliest that NSPs would be in a position to provide backcast data for EBT?

Question 10: In light of the data requirements for EBT in the previous briefing notes, are there any particular impediments to backcasting the types of data listed below?

- **Customer numbers disaggregated by customer type**
- **System capacity**
- **Peak demand**
- **Opex**
- **Asset volumes**
- **Reliability**

Where particular information may be difficult to provide, please provide reasoning and suggest other data that could be used as an alternative. For example, it might be that slight changes to the definitions in the data templates might facilitate the provision of this data.