

Review of econometric modelling of opex and revenue for Commerce Commission New Zealand

Jeff Borland
Professor of Economics
University of Melbourne

July 2012

A. General comments

Overall, on the basis of the information I've been provided with, my opinion is that the empirical analysis of opex and revenue being undertaken by the Commerce Commission New Zealand (Commission) is being done in a sensible way that reflects appropriate practice based on standard textbook treatments of panel data analysis.

It seems to me that the empirical analysis undertaken by the Commission:

- Has been careful in using only data that are seen as not having too high a degree of measurement error;
- Uses approaches to testing model specification that allow what generally would be regarded as the most important specification issues in panel data to be addressed; and
- Have responded to data limitations in a sensible manner.

A first data limitation is the relatively small number of observations (especially for analysis of opex). The alternative to using the data to derive parameter estimates to apply in forecasting would be for the Commission to make assumptions on those values (perhaps based on theory or international empirical literature). I agree with the Commission that there appears to be enough data available to make it reasonable to use econometric estimation as a starting point for choosing the parameter values. Of course the methods adopted need to reflect the data available, and interpretation of findings needs to be done in an appropriately cautious manner. For example, it is important not to 'push the data too hard'; and I do think the Commission follow this approach – such as by concentrating on estimation of average effects; and staying away from estimating models with more complicated dynamic structures.

A second data limitation is the absence of data on other explanatory variables to include in the opex or revenue models. Given that the objective is to estimate specific parameters rather than a model that fully describes opex or revenue, the absence of those variables does not seem 'per se' a shortcoming. However, if it was to be a source of omitted variable bias, then it would constitute a problem for the analysis. I believe the Commission take a sensible approach to this potential problem by focusing on estimating the parameters of interest, and worrying about robustness via analysis of sensitivity to year and supplier effects and testing for omitted variable bias.

B. Recommendations

(i) Presentation

- Include discussion of why the sample periods for data used in model estimation are valid for generating parameter estimates to be used in forecasting.
- Motivate analysis with presentation of some descriptive statistics.

- Expand explanation of some aspects of the econometric modelling: Specification of dependent variable; Approaches to treating exempt and non-exempt EDBs between opex and revenue analysis; Motivation for estimated models.
- Include some discussion of how the preferred models are chosen from amongst the alternative specifications that are estimated; and report on the 'fit' of the preferred models.

(ii) Empirical issues

- Have consistent analysis and presentation of results (to the extent possible) between the modelling of revenue and opex.
- Poolability test: Check application of the poolability test in opex analysis; Consider Zellner-Roy test for poolability as alternative to Chow test.
- Revenue analysis: Expand explanation of analysis using alternative definitions of revenue.
- Opex analysis and exempt EDBs: Report robustness checks relative to the preferred specification; Check test for poolability between exempt and non-exempt EDSs.
- Test for influence of outliers (especially in opex analysis).
- Consider whether weighted or unweighted model is appropriate approach for deriving parameter estimates to be used in forecasting.

Extract from Terms of Reference

Below is an extract from the terms of reference that sets out the scope for my review:

Scope of work

The purpose of the review is to highlight any changes or additions to the modelling to make the modelling as robust as possible within the data limitations (ie., relatively few data points and a limited range of possible explanatory variables).

The review should (but is not limited to)

- Identify errors in the modelling
- Suggest additional/alternative model specifications that would improve the robustness of the analysis
- Suggest additional/alternative diagnostic tests that would improve the robustness of the analysis
- Comment on the possible extent of bias in the parameter estimates

We would also like you to provide a view on the preferred model or models.

We require you to review the following:

- Stata do files with modelling code
- A draft of the write-up of the modelling results.

We will provide the data files along with the review. We do not require a review of the validity of the data itself.