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Witness: Julia Frayer
Request from: Public Utilities Regulatory Authority

Question:

(OM&A PFP AND S-FACTOR) Exhibit CLP-PBR-3, p. 44; Interrog. Resp. OCC-444.
LEI explains its use of Akaike Information Criterion (AIC) and Bayesian Information Criterion (BIC) in selecting its preferred econometric benchmarking model specifications. The total-cost and capital-cost models include both the natural log of customers and its squared term, while the OM&A cost model includes only the natural log of customers.

a. Beyond the AIC and BIC model-selection criteria discussed by LEI, explain the economic basis for assuming a nonlinear relationship between customer count and total and capital costs but not OM&A costs.
b. Re-estimate the preferred OM&A model including the squared natural log of customers and provide the resulting coefficient estimates, model fit statistics, and CL&P benchmarking results. Compare the results with LEI's preferred OM&A specification.
c. Provide any code and associated output used to estimate and compare the alternative specifications, including the calculations of AIC and BIC used in selecting the preferred specifications.

Response:

a. LEI tested both linear and nonlinear customer-scale specifications during model development. In the OM&A model testing, the squared customer term was not statistically significant and therefore was not retained in the final model specification. By contrast, the squared customer term was statistically significant in the total-cost and capital-cost models and was retained to allow the effect of customer scale to vary across utilities of different sizes. This treatment is also economically reasonable because capital-related costs reflect network infrastructure requirements that may increase non-proportionately with the number of customers served by the utility, whereas OM&A costs are likely to be more linear in their relationship with customer count.

b. LEI re-estimated the OM&A model to include the squared natural logarithm of customers. The coefficient estimates, model-fit statistics, and CL&P benchmarking results for both LEI's preferred OM&A specification and the alternative specification are provided in the table below.

Variable / Statistic	**Preferred OM&A specification**	**p-value**	**Alternative specification with Customers squared**	**p-value**
Customers	0.8703	0.000	-0.3114	0.321
Customers squared	—	—	0.0438	0.000
Labor price	0.9725	0.000	0.9112	0.000
Distribution business share	0.5163	0.000	0.5604	0.000
Time trend	-0.0067	0.160	-0.005	0.295
Constant	-11.1059	0.000	-2.4813	0.339
R-squared	0.8872	—	0.8896	—
Root MSE	0.3164	—	0.3132	—
AIC	477		460.19	
BIC	500.9		488.87	
CL&P's average percentage deviation from the applicable benchmark over the 2015–2024 period	**11.90%**		**15.40%**	

LEI nevertheless continues to prefer its original OM&A specification. The fact that the preferred total-cost and capital-cost models include a nonlinear customer-scale term does not, by itself, imply that the same functional form is appropriate for OM&A costs. In LEI's judgment, the appropriate specification should reflect the economic characteristics and cost drivers of the particular cost category being modeled. Network- and capacity-related characteristics can lead to discrete capital investments, while customer count provides a

reasonable indicator of the scale of recurring operating activities, which tend to change more gradually as the number of customers changes.

c. Please refer to UPA-058, Attachment 1, for the existing Stata code and associated output used to evaluate the alternative specifications. AIC and BIC for the preferred and alternative OM&A specifications can be reproduced using Stata's *estat ic* and *estimates stats* commands following estimation of the respective specifications.