Vanderbilt University
Leadership, Policy and Organizations
Class Number 9522
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Assignment 4

Prediction is central to the interpretation of regression results. In this exercise, you'll be asked to conduct a cost benefit analysis of increasing the number of computers per student for the state of California using both prediction and forecasting.

1. Using the California schools dataset, estimate a model that identifies the predicted impact of an additional computer per student, controlling for student teacher ratios, expenditures per student, cal works percent, and free/reduced meal percent on test scores. Create a graphic that shows the predicted impact of increasing computers per student over its range with uncertainty around the prediction.

2. Assume that a policy has been suggested that will provide each district with an additional 10 computers for every 100 students. Holding all another values at a reasonable level, predict the impact of this increase on student test scores at the district level, with an appropriate statement of uncertainty. Remember that what you'll need to be doing here is forecasting. Assume that you'll be going from around 10 computers per 100 students to the higher value.

3. The legislature is now debating a range of policies, from an increase of 10 computers per 100 students to 40 per 100. Predict the impact of an increase from the minimum suggested level to the maximum suggested level, again with an appropriate statement of uncertainty. Plot the result in a manner appropriate for presentation to an interested lay audience.

4. Assume that each additional computer costs $500. Calculate the cost/benefit ratio of an increase of 10 computers per 100 students for the state as a whole in terms of dollars per increase in test scores. (Hint: you have enrollment numbers for each district in the variable enrl_tot.)

5. In a separate document, comment on the coefficients estimated in the model, including their direction and significance. Report the results of your predictions, interpreting them for an interested policy audience. Describe how much it would cost to increase the number of computers per student in the state by 10 computers per student, both as a total and as a per student measure. Then describe the uncertainty around your forecast of increasing from the current ratio to the higher level. Make sure to include a graphic for your state legislator.