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Public Policy and Machine Learning - Quiz

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In the early 90s, an enormous number of papers were published that try to explain differences in GDP across countries. They mostly vary in terms of the variables they include, each with the claim that they found the set of variables that determine GDP.

One could imagine that the authors of these papers had 2 goals:

- They want to understand why some countries grow while others don't.
- They want to know which countries will stay poor.

Question 1

1.0/1.0 point (graded)

Which would be a more useful tool for these researchers?

- a. Machine learning
- b. Estimation

c. Both ✔

d. Neither

Explanation
The researchers would want to use an estimation framework to understand *why* some countries grow and others don't (A), because they want to interpret their estimates. However, it would probably make more sense to use machine learning to predict *which* countries are likely to stay poor (B). Since the goal is more about predicting GDP rather than understanding it's determinants, it doesn't really matter to them what goes into the "black-box".

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Question 2

1/1 point (graded)

One big debate in this literature is whether human capital is a reason for why countries stay poor.

True or False: Since this is a question about whether or not human capital can explain some of the GDP differences, machine learning is not useful in this context.

a. True

◉ b. False ✔

Explanation
Although in this case, the question of interest is not really a prediction problem, as Prof. Mullainathan explained in class, machine learning can still be helpful in assessing the relevance of human capital in explaining GDP if applied to this data.

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✔ Correct (1/1 point)

Question 3

1/1 point (graded)

Suppose a researcher decided to combine all the data and features included in these papers, because he thinks machine learning can help him understand the role of human capital in explaining GDP. To this goal, he trains his algorithm on two subsets of the data: once including the entire set of available features (model 1), and once excluding the human capital variables (model 2).

Which of the following findings would suggest that human capital is an important determinant of GDP? (Select all that apply)

- a. The out-of-sample prediction error using model 1 is almost the same as the out of sample prediction error of model 2.
- b. The out-of-sample prediction error using model 1 is much lower than the out of sample prediction error of model 2. ✔
- c. The out-of-sample prediction error using model 1 is much higher than the out of sample prediction error of model 2.
- d. All of the above

Explanation

Like in the example of prices and consumer purchase decisions example Prof. Mullainathan used in class, comparing the out-of-sample prediction error of both models doesn't tell you anything about what the coefficient on human capital measures should be. But, if you find that including measures of human capital in your feature set leads to much better predictions relative to if you exclude them, then that tells you that human capital is pretty important for explaining why countries grow.

If your model does just as well whether or not you include human capital from your feature set, then that tells you it doesn't really matter.

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