Barreto
BUS 305: Regression with Microdata
11 April 2025 Name: _____

Exam 2

10 questions; each worth 10 points. 6 minutes per question on average. Watch the time.

Open the Excel workbook called Exam2S25.xlsm, enable macros, then Save As to your folder in the I drive.

Install the MCSim add-in: alt, t, i . . .

I put the LMS and OLSReg functions in the Excel file so you must ENABLE MACROS for them to work.

I believe everything in that workbook is correct. If you find a mistake, let me know—you'll get +1. :-)

Maybe one day the exam will be this one question that reveals what you have mastered: "Tell me everything you know about what is in that Excel file." But today is not that day.

Do NOT open any other workbooks or files or look in your book. This is a CLOSED book exam. Do NOT communicate with anyone during the exam. Any violation of these rules is cheating and will result in an immediate F.

The *Dead* sheet is a deadened version of the Xs in the *Live* sheet. Each sim sheet is named for the question number that it is associated with. I am saving you time running sims, but you can run your own if you wish.

1) Sheet Q1 has a sim of cell H3, the sample slope of a regression of Y on X1. The sim results show that the OLS sample slope estimator is performing well. Explain exactly what in the sim results provide evidence of good performance and please include specific numbers in your answer.

2) It might be surprising to someone that the sample slope in cell H3 is performing well since that model is misspecified—X2 is omitted from the regression of Y on X1. Why is omitting X2 not leading to omitted variable bias here? In your answer, define omitted variable bias.

3) Let's turn our attention to the estimated SE of b1 in the Y on X1 regression. Sheet Q3 has a sim of both cells H3 and H4 to see how the estimated SE of b1 is performing. The sim shows trouble. Explain what is wrong with the estimated SE of b1 and please include specific numbers in your answer.

4) You just showed that there is something wrong with the estimated SE of b1. Then why do we routinely use the estimated SE of b1 in many applications of regression analysis?

5) What is the regression of X1 on X2 useful for and is the R2 value in cell C23 (and also in D18) good or bad? Explain.

6) Sheet Q6 has a sim of a race between the OLS and LMS estimator of b1. What is the difference between the OLS and LMS estimators? Please be sure to explain the recipe for these two estimators.

7) In sheet Q6, OLS wins. Is this victory a demonstration of the Gauss-Markov Theorem? In your answer, please define and explain the Gauss-Markov Theorem.

8) Sheet Q8 has a sim that shows I reject the null in the Whole Model F test 63% of the time at the 5% level of significance. Is this good or bad? Please explain why.

9) Inject heteroskedasticity by changing alpha to 2 in cell D8. Run a sim that shows the effect of heteroskedasticity and use your sim results to explain the effect of het. Please include specific numbers in your answer.

10) Use the Live sheet to run a sim of b1 (cell H3). Compare your results to the Q1 sheet results. Why is the Approximate SE of b1 (and, therefore, the exact SE of b1) bigger for the Live sheet than the Dead sheet?

Save your workbook now and turn in your exam. You're all done!