Integrating Econometrics: A Modern Undergraduate Economics Capstone Experience

Chris Clark
Georgia College and State University, christopher.clark@gcsu.edu

Author Biography

Dr. Chris Clark is a Professor in the Department of Economics and Finance at Georgia College and State University. He regularly teaches core courses in economics, including principles of economics, intermediate microeconomics, and econometrics. He also teaches field courses at both the graduate and undergraduate level, including labor economics, public economics, and managerial economics. He recently developed two popular freshman-level critical thinking classes, Freakonomics and Swansonomics. Dr. Clark's research interests include education, health economics, labor economics, economic education, adolescent behavior, gambling, and public policy. His research has been published in a variety of journals including the Journal of Economic Education.

Goal of Activity

I use three specific assignments focused on learning to guide econometric students toward the successful completion of their undergraduate research project. Students begin their project in my Econometrics class and work to improve and refine their work during our Senior Seminar course. The econometrics course serves two purposes. First, it introduces students to the techniques, tools, and approaches used in modern applied economics research. Second, it allows students to begin their undergraduate research project. In the past students had trouble applying the skills they acquired in econometrics and developing research projects relevant to their interests. Therefore, we created three assignments to guide their progress: a topic memo, a data memo, and a results memo. These memos are designed to help them develop their own question, gather and clean their data, develop their programming skills, and perform their own analysis.

Topic memo

The first assignment students complete in Econometrics is a topic proposal. They are expected to present their question, explain the basic model they will employ to answer the question, provide the data sources they hope to use, and convince the econometrics and senior seminar professors their topic is interesting/important enough to warrant the student's attention. This memo is due early in the semester, typically during the first month, to emphasize to students the importance of their projects. I find students do a relatively poor job when they are not personally invested in the topic, so I push them to develop their own questions, suggesting refinements when necessary. In my experience, students who feel personally invested in their project perform better and gain considerable confidence when sharing their findings with others.

Data memo

The second assignment students will complete in Econometrics is a data memo. At this point students begin to become familiar with the statistical software most commonly used by Economists. It is also the point at which they learn the importance of critically evaluating the source and quality of data. These are skills economics graduates must have if they wish to be successful in graduate school and/or when they begin their careers. I carefully walk students through the process of acquiring, cleaning, and verifying data, but they are expected to apply what they've learned to their own work.

Results memo

The final assignment students complete in Econometrics is their results memo. They are presenting their first attempt at answering their question, so they know they will be expected to harshly evaluate their own work and present a game plan for future improvements. If their model suffers from any econometric issues,

and they always do, I expect the student to explain how they will address them moving forward. I also expect the student to provide a correctly specified model and carefully explain their identification strategy.

These three memos are evaluated based on detailed rubrics student receive at the beginning of the course. They are graded on the quality of their writing, the quality of their analysis, and the way in which they present and explain their research. Students are expected to take the three assignments they completed in my econometrics course, and the feedback they've received, and use those to synthesize a completed research paper and presentation during their senior seminar course.

A more detailed description of this undergraduate research program is available in the article "Integrating Econometrics: A Modern Undergraduate Economics Capstone Experience", which my colleagues (Brooke Conaway, JJ Arias, and Jessie Folk) and I published in the *Journal of Economic Education* in 2018. We published this article because this integrated approach is uncommon in the economics discipline. We felt it would be worthwhile to share our innovative approach in order to help other faculty interested in undergraduate research develop their own version. Since adopting this approach our students have received several awards for outstanding undergraduate research at the Academy of Economics and Finance conference, with one student receiving the Frank W. Taussig Award from Omicron Delta Epsilon.

Many of our strongest seniors are particularly interested in graduate school. Some of those students choose to enter Master's program and some select PhD programs. One of the reasons we made these changes to our program was to increase student preparation for and interest in PhD programs. Comparing the five years before and after our adoption of this new approach, we find the percentage of students attending graduate school who chose to pursue a PhD increased from 60% to 88%.

We also adopted this approach to encourage students to ask interesting questions that they are passionate about. The following five questions are examples of the kinds of questions our students have been asking:

Does PTSD affect employment?
Does police militarization affect civilian deaths?
Do different races perceive their financial success differently?
Does legalizing same-sex marriage affect hate crime rates?
Does repeating or skipping a grade affect self-assessed intelligence?

These are challenging questions, both from a societal point of view and econometrically. Our students have used some fairly complex econometric techniques to answer them. A recent example features a student using an ordered probit technique with properly interpreted marginal effect estimates to address the question "Does repeating or skipping a grade affect self-assessed intelligence?" Another student utilized a difference-in-difference technique that exploited the variation in same-sex marriage law across states and over time to address the question "Does legalizing same-sex marriage affect hate crime rates?"

We feel our students are gaining realistic, practical experience using modern econometric techniques to answer important questions. This prepares them for graduate school and careers utilizing data. As we wrote in the paper we published summarizing our approach: "We feel this integrated pedagogical approach to student research in economics is a more effective way to help students learn and prepare for the future."

References

Conaway, B., Clark, C., Arias, J. J., & Folk, J. (2018) *Integrating econometrics: A modern undergraduate economics capstone experience.* The Journal of Economic Education, 49:3, 260-270, DOI: 10.1080/00220485.2018.1464986