ECON 900
Advanced Econometrics
Analysis of Efficiency and Production

P.W. Wilson
First Spring 2020

Office: 200D Sirrine Hall
Office hours: 11:00–12:00am Tue. and Thu., or by appointment
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Class Schedule:

In 2020, this class will meet on the “First Spring” semester schedule. There will be two lectures on Tuesdays and Thursdays starting 7 January 2020 through 20 February 2020. Classes will meet 12:30–1:45pm in 204 Sirrine and 4:00–5:15pm in 110 Sirrine.

Required text:

There is no required textbook for this course; readings will be from working papers, journal articles, etc. Additional course materials can be accessed by going to my home page (see above), clicking on the link entitled “course materials for students,” and following the obvious links.

Course Objectives:

This course develops analytical and econometric techniques, both parametric and non-parametric, for benchmarking performances of firms and other decision-making units. The course will begin with a discussion of microeconomic theory of the firm, where producers combine inputs to produce outputs while constrained by a feasible set of input-output combinations. Various notions of efficiency will be introduced, and important features of the economic model will be identified. However, measures of efficiency and other features of interest must typically be estimated from observed data. Various statistical models will be examined by adding probabilistic structures to the economic model; within the context of each statistical model, various estimators of efficiency and other features of interest will be discussed. Special attention will be given to statistical inference and hypothesis testing.

Benchmarking has become a wildly popular idea in management, finance, economics, education, public policy, and other arenas; Google Scholar returned approximately 1,280,000 hits for the keyword “benchmarking” on 5 December 2019. The Oxford English Dictionary defines benchmarking as “the action or practice of comparing something to a benchmark; evaluation against an established standard,” suggesting that while an established standard is important for benchmarking, there may be more than one such standard. Benchmarking may involve detailed evaluation and comparison of a particular unit’s operating procedures with those of a competitor, perhaps using standard accounting ratios such as return-on-assets or other measures. Efficiency analysis is a more formal approach, wherein a statistical model of a production process with a well-defined benchmark for purposes of comparison is specified and then estimated, allowing possibilities for statistical inference.

The performance of firms and other decision-making units in terms of technical efficiency, as well as allocative, cost, and other efficiencies, has received widespread attention in the economics, statistics, management science, and related literature. In the case of private firms,
estimates of inefficiency have been used to explain insolvency rates and merger activities, the
effects of changes in regulatory environments, and overall industry performance. In the case
of public and non-profit entities, estimates of inefficiency are intrinsically interesting because
these entities do not face a market test, and inefficiency estimates often provide the only
objective criteria for gaging performance. Measuring the performance of public entities may
be important for allocating scarce public resources, for deciding which to eliminate during
periods of consolidation, etc. In particular, identifying inefficient entities is a critical first
step in any attempt to improve performance.

Intended Audience:

This is a graduate-level course for Ph.D. students in economics, statistics, management
science, operations research, and perhaps other areas who are interested in benchmarking in
a production context. Students should have a working knowledge of statistics and probabil-
ity at the level of ECON 806 (Econometrics I), and linear estimation at the level of ECON
807 (Econometrics II). Some knowledge of maximum likelihood estimation would be helpful
but is not essential.

Course Grade Determination:

Students will write a paper using some of the methods from the class. If the enrollment
is sufficiently small, I will have students make a presentation, analyzing a paper from the
literature. In this case, 25 percent of your grade will depend on the presentation and 75
percent on the paper. If enrollment is too large to make presentations feasible, the paper
will account for 100 percent of students’ grades.

I anticipate that students will not complete their papers by the end of the class, and
am prepared to give “Incompletes” which will be converted to a grade upon submission of
a paper. Given that in 2020 the course is compressed into the schedule of the Frist Spring
term, students will have the second half of the ordinary semester to complete their papers.
I am willing to grant additional time if needed.

Class attendance is not mandatory in the sense that I will not check the class roster in
each class. However, it is not possible to pass this class (or any other worthwhile graduate-
level class) without attending and actively engaging in the intellectual exercises that take
place in class. Shirking will result in (perhaps severely) reduced grades.

Reading assignments will be made in class. Students should review material from the
previous class as well as any reading assignments before each class.

Office Hours:

My office hours are shown above. If you need to see me at other times, I will be happy
to meet with you; a good approach is to ask me about an appointment after class. I will be
happy to meet with you.