**Factors Influencing Student Performance in Economics:**

**Class and Instructor Characteristics**

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**Introduction**

 Of the numerous characteristics that influence student performance in economics classes, this chapter focuses on the role played by characteristics of the instructor, different course policies, and the nature of the class environment. We begin with a discussion of various instructor characteristics such as gender, nationality, quality and experience. Next, we highlight the importance of course policies including graded problem sets and mandatory attendance. Finally, we discuss other elements of the class environment that may influence performance and the study of economics. These elements include class size, seating location, and the mathematical rigor of the class.

 Evaluating the role of class and instructor characteristics on student performance necessitates some discussion of measurement.[[1]](#footnote-1) Many different measures of student achievement matter beyond grades within a particular course, namely whether the student decides to drop the economics course in question, the extent to which students take additional economics courses, the decision to major or minor in economics, overall attrition in school, or the pursuit of a graduate degree in economics or a related field. The research surveyed uses a number of these measures, though most focus on grades within a particular class.

**Instructor Characteristics**

 We begin our survey with a discussion of the importance that instructor characteristics play in affecting student outcomes in economics. While this chapter focuses on the discipline of economics, there is a large literature that more broadly studies how instructor characteristics affect student outcomes in post secondary education. One of the big questions facing researchers and academics is the underrepresentation of women undergraduates in certain academic fields such as math and science. One explanation put forth for this student gender gap is instructor gender.

*Instructor Gender*

 Within the discipline of economics, a number of studies have analyzed the role of instructor gender on student outcomes including grades in principles of economics courses and further study in economics. Dynan and Rouse (1997) find no effect of instructor gender on the decision to pursue an economics major. Robb and Robb (1999) obtain similar results: instructor gender has no effect on either performance in economics or the decision to continue in economics and this holds true for both men and women. Results by Jensen and Owen (2001) show that instructor gender does not strongly influence the decision to major in economics for students in general, although it does influence students who were not predisposed to continuing in economics when they signed up for their first course. Thus, they find that instructors are more likely to “encourage” students of the same gender to take another economics course. McCarty et al. (2006) also show that matching student and instructor gender increases student improvement on the Test of Understanding College Economics (TUCE).[[2]](#footnote-2)

 The mixed results found in the economics literature are consistent with the broader higher education literature on the effects of instructor gender on student outcomes. Canes and Rosen (1995) show that the proportion of female faculty in a particular department is not related to students’ major choices. However, their study is limited by the fact that they rely on aggregate measures rather than on microdata of the gender of particular instructor/student combinations.. Bailey and Rask (2002) use detailed information obtained from student records, transcripts, and faculty records to study the impact that instructors have on the probability that students will pursue particular majors. In this paper, there are significant “role model” effects: students that take introductory courses from instructors of the same gender are more likely to pursue a major in that department. This effect holds both for men taking courses from male faculty, and women taking courses from female faculty.

 Bettinger and Long (2005) get mixed results on the effects of instructor gender on student course choice and choice of major. Female students who have a female instructor in introductory mathematics, geology, sociology, or journalism courses are more likely to take an additional course in the respective field. However, in other fields in which women are underrepresented, there are no significant role model effects. Having a female instructor does not increase the likelihood of pursuing additional courses in fields such as engineering, physics, and computer science.

 One difficulty of this literature is that some students may sort into classes that are taught by instructors of the same gender. To address this issue, Carrell et al. (2010) take advantage of a random assignment of students to professors in the U.S. Air Force Academy and find that although instructor gender has little impact on male students, it significantly affects female students’ performance in math and science classes, their probability of taking additional math and science courses, and their likelihood of majoring in math, science, or engineering. On the other hand, Hoffman and Oreopoulos (2009b) find that having a same-gender instructor only marginally impacts student grades and the likelihood of dropping the course and does not have a significant effect on continuation of further courses within the department or major choice.

*Instructor Race/Nationality*

Another instructor characteristic that has often been linked to student performance and outcomes in higher education is nationality and/or race. Several papers analyze whether or not foreign born instructors have an effect on student outcomes in economics courses. An early study by Watts and Lynch (1989) indicates that teaching assistants at Purdue University that were non-native English speakers had negative learning effects on students in a principles of economics course. Evidence from Borjas (2000) is also consistent with this study. For students in a large intermediate microeconomics class, those assigned to a tutorial section with a foreign born teaching assistant perform worse than those with an American born teaching assistant. However, Fleisher et al. (2002) find little evidence that foreign born teaching assistants at Ohio State adversely affect student performance in a principles course. In fact, their results show that in some cases, foreign born TAs have *positive* effects on student grades in economics course.

 There is also research looking at the effect of student-instructor match along racial lines. Bailey and Rask (2002, also discussed above) find that minority students are more likely to continue studying economics when they have a minority faculty member as an instructor at the introductory level. Price (2010) shows that black students are more likely to continue in the fields of science, technology, engineering, or mathematics (STEM) when they have black instructors at the introductory level. These results are consistent with the broader literature on the effects of having an own race teacher in primary and secondary school. Klopfenstein (2005) finds that increasing the percentage of high school math teachers that are black increases the likelihood that a black geometry student will enroll in a subsequent rigorous math course. There is also research that suggests that teacher perceptions of student performance and effort are strongly affected by racial dynamics (Dee, 2004). Specifically, both white and minority students are likely to be perceived more negatively by a teacher of a different race.

*Instructor Quality*

 Instructor quality is another dimension which may affect college student outcomes. Of course, defining quality is not an easy task, and the literature uses a variety of measurements. Instructor quality is often proxied by indicators such as tenure-track or not, part- or full-time, rank, salary, publication record, etc. The evidence on these effects are mixed. In Ehrenberg and Zhang (2005)the share of faculty employed in part-time or full-time non tenure-track positions is negatively related to graduation rates across a broad set of institutions, based on aggregate data. Bettinger and Long (2010) use data from a large public university in Ohio and find that the number of adjunct instructors in a department has either zero or positive effects on student interest in a particular field. The largest positive effects are present in the fields of education, engineering and the sciences. Hoffman and Oreopoulos (2009a) show that instructor traits such as faculty rank, salary and employment status (part versus full time) do not have significant effects on student performance. However, they find that subjective course evaluations are strongly linked with grades and future course choices. Students who take courses with instructors that generally receive high teaching evaluations receive higher grades, are less likely to drop the course and more likely to continue taking similar courses in future years.

 Two innovative studies attempt to improve our understanding of professor quality impacts by measuring how students in instructors’ introductory courses perform in subsequent courses that build upon the introductory course. Using the exceptionally controlled curriculum of the U.S. Air Force Academy (USAFA) where course sequences are required regardless of performance on previous courses, Carrell and West (2010) find that professors who “teach to the test” and promote higher grades in their contemporaneous courses actually have *negative* effects on the grades in future related courses. Students also reward teachers who provide value added to grades in current courses, but give lower evaluations to those who promote more permanent learning, as measured by performance in future courses. In related work, Weinberg, Fleisher and Hashimoto (2009) use data for nearly 50,000 enrollments in almost 400 offerings of principles of microeconomics, principles of macroeconomics, and intermediate microeconomics at Ohio State University. In this study, learning, measured by future grades, is unrelated to student evaluations (once current grades have been controlled for) even though student evaluations are strongly related to grades.

**Course Policies**

*Recitation session*

 We now turn our focus to various course policies that may affect student learning. Having recitation sessions increases the number of contact hours a student has with an instructor, which may boost student learning. Huynh, Jacho-Chavez and Self (2009) find that introductory economics students who attend a recitation session (induced with grade incentives) improve their final grade by a third of a letter grade. Importantly, to overcome ethical constraints that limit some experimental studies, students were allowed to select into the recitation sessions (i.e., the treatment group) rather than being randomly assigned and the authors controlled for student selection on observables with econometric techniques.[[3]](#footnote-3) Although these authors argue for the efficacy of cooperative learning which was the pedagogical approach used in the recitation sessions, they actually test attendance versus non-attendance at recitation sessions (not a cooperative learning versus a non-cooperative learning session). Thus, one may interpret their results more broadly as the impact of attending a recitation session.

*Required homework*

A few studies analyze the effect of homework assignments on student performance in economics courses. There are a few reasons that required and graded homework might affect student performance. Required homework may increase the amount of time spent studying material if students would not necessarily complete optional assignments. Also, if students know that assignments count towards their final grade, they may take them more seriously. This may enhance the learning that occurs during the completion of homework. Grove and Wasserman (2006) show that graded homework increases student performance by a third of a letter grade in an introductory economics course, relative to students in a parallel course taught by the same professor in the same semester without graded homework. Freshmen especially experienced this effect, a particularly important results given the high attrition rate among college students. Emerson and Mencken (2009) design a comparable experiment using weekly, online, automated-graded homework assignments (via Aplia) —for one group, the final grade included the online homework grades, whereas for the other group, the online homework grades did not affect the course grade. In this study, students with the homework grade incentive perform about a third of a grade better on the final exam, but not on the TUCE, than the control group.

*Mandatory attendance*

Numerous studies report a positive association between class attendance and performance (e.g., Marburger, 2006; Romer, 1993; Durden and Ellis, 1995), but to claim causation requires addressing the possible endogeneity between attendance and grades. A positive relationship between attendance and performance may partly be due to unobserved characteristics such as motivation and interest in the subject. This does not necessarily prove that requiring students to come to class will actually improve student outcomes. To solve this problem, two recent studies use rich administrative panel data set of higher education institutions: Arulampalam, Naylor and Smith (2007) for economics student cohorts at a UK university and Stanca (2006) for introductory economics students at the University of Milan. Stanca (2006) concludes that attendance has a small significant effect on performance; specifically, a single missed lecture lowered exam grades by half of a percentage point. While also concluding that missing classes leads to poorer performance, Arulampalam et al., (2007) find that absences are most detrimental for better-performing students.

Dobkin, Gil and Marion (2010) address the endogeneity concerns by imposing mandatory attendance for all students who score below the median on the first of two exams in three large intermediate level courses. Using a regression discontinuity design, they find that the post-midterm attendance was 36 percentage points higher for the compulsory attendance students just below the median grade which led to more than half a standard deviation increase on the final exam.

**Class Characteristics**

*Class size*

Persistent fiscal pressures encourage assigning more students per class to save money. Ultimately, good policymaking requires a cost-benefit analysis weighing any detrimental student outcomes against the cost savings of larger classes (e.g., Krueger and Whitmore’s [2001] analysis of Project STAR). Here we review what is known about (1) whether class size affects college students’, especially economics students’, achievement, (2) if so, by how much, and (3) for what students are the benefits the greatest? Although considerable attention has been paid to the role of class size and student performance in K-12 education, class size varies much more dramatically in higher education, e.g., student enrollment may be less than 10 for seminars but exceed 500 for introductory classes.

In elementary and secondary education, strong evidence indicates that larger classes reduce learning (using experimental data: Krueger, 1999; Krueger and Whitmore, 2001; quasi-experimental data: Angrist and Lavy, 2001; Urquiola, 2006; Browning and Heinesen, 2007), although overall the results are mixed (quasi-experimental data: Hoxby, 2001).[[4]](#footnote-4) So, why might class size matter? Lazear (2001) theorizes that student behavior, namely disruptive in nature, links class size and student achievement. If so, variation in student behavior might explain the mixed evidence regarding class size and achievement in that a group of well-behaved students in large classes might experience no negative effects. In the context of the collegiate classroom, where more self-directed learning occurs, large classes may reduce attentiveness and decrease the time available for individual students during office hours. Alternatively, students and faculty may compensate for larger classes, altering their behavior by, for example, students’ studying more outside of class and instructors specifically preparing for a large class. Finally, larger classes permit instructors little alternative to lecturing and to multiple choice exams.

 Studies of college student learning of economics and class size variation typically evaluate introductory courses and largely find no negative effects on standardized test scores of class sizes greater than 20 students (Kennedy and Siegfried, 1997). Beyond test scores, though, enrollment in large classes is associated with the following negative effects: (1) greater attrition from the course (Becker and Powers, 2001), (2) less enjoyment of the course, controlling for course grades (McConnell and Sosin, 1984; DeCanio, 1986), (3) lower student evaluation of teacher effectiveness (controlling for instructor and course fixed effects—Bedard and Kuhn, 2008), and (4) less subsequent enrollment in economics courses (Maxwell and Lopus, 1995).

 Kennedy and Siegfried (1997) evaluate the impact of class size using TUCE III data (Saunders, 1994) for 36 introductory microeconomics and 33 introductory macroeconomics classes taught by many different professors at many different institutions of higher education with class sizes ranging from 14 to 109. Kennedy and Siegfried (1997) find that once proper control is made for student ability, class size does not influence achievement. As the authors note, a standardized exam comprised of multiple choice questions provides a limited measure of student achievement. They argue that the lack of class size impact is due either to the fact that faculty fail to teach classes of different sizes differently or that different class sizes affect some students positively and others negatively.

 Two recent studies—one including data about economics courses but both focused on college students generally—find strong negative effects of larger classes. Kokklenberg, Dillon and Christy (2007), using data for over 760,000 undergraduate observations at a northeast public university, find average grade point declines as class size increases, precipitously up to twenty students and then more gradually beyond that (estimated using ordinal logit with and without fixed effects). The negative effect holds for economics courses (and those in other disciplines), controlling for peer effects, student ability, year of student, level of course, gender, and minority status.

 Using data for masters students at a leading UK university between 1999 and 2004, Bandiera, Larcinese and Rasul (2010) estimate class size effects from within-student variation based on their scores on end-of-semester standardized exams. They find large and negative effects only for the smallest and largest classes, but not for intermediary sizes. More precisely, moving a student from a class of 10 to a class of 25 students or from 25 to 45 lowers their exam score by around 12.5 percent of within-student standard deviation, whereas moving from a class of 80 to one of 150 caused a further 25 percent drop. Interestingly, the best performing students are most hurt by increases in class size, the reverse of what largely has been found for elementary and secondary students (see Schanzenbach, 2010).

*Other class characteristics*

 In a multi-school study of on-line versus in-class student learning of principles of economics, Coates et al. (2004) show that selection-corrected TUCE scores were significantly lower for the on-line course, especially so for first and second year students. In Dills and Hernandez-Julian (2008), there is some evidence that college students generally earn higher grades in classes that meet more often. In addition, students appear to perform better in late afternoon classes that they select into. There is even evidence that where you sit in a classroom affects exam performance (Benedict and Hoag 2004). Specifically, students that are forced to move closer to the front of the classroom tend to receive higher grades, despite their preferences for seats in the back of the classroom.

**Conclusion**

Given the fiscal pressures facing colleges and universities, faculty and administrators should have a clear understanding of the benefits of policy variables, for example class size and pedagogical approaches, on student outcomes. Among academics, economists have the necessary analytic methods to provide comparative cost-benefit analyses of higher education policies to improve student achievement. Thus, what economists and higher education administrators need is a systematic research plan to conduct experimental studies, like what we have reported regarding class size, to evaluate the efficacy of different pedagogical approaches and of policy variables, like online classes, the day and time of classes and split or single course introductory economics courses.

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1. For information on measuring student performance, see the chapter on Assessment Methods and Measurement Techniques of Student Performance and Literacy. [↑](#footnote-ref-1)
2. See the Measurement Techniques of Student Performance and Literacy chapter. [↑](#footnote-ref-2)
3. See “Econometric Training Modules,” developed by William Becker, <http://www.vanderbilt.edu/AEA/AEACEE/Econometrics_Handbook/index.htm> [↑](#footnote-ref-3)
4. See Schanzenhach (2010) for a brief review of this literature. [↑](#footnote-ref-4)