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## Does Supplemental Instruction for Principles of Economics improve outcomes for traditionally underrepresented minorities?



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### ABSTRACT

Principles of Economics typically have a high non-success rate and traditionally underrepresented minorities (URMs) generally have a higher non-success rate than non-URMs. This paper describes our Supplemental Instruction (SI) course and tests the effectiveness of SI on grade improvement, while accounting for self-selection bias. We find that SI improves grades by a bit less than half a letter grade in the full sample and by a larger amount for URMs and a smaller amount for non-URMs. We also find evidence that weaker URM students and stronger non-URM students are more likely to enroll in our SI course.

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## 1. Introduction

Supplemental Instruction (SI) is a tool to help students succeed in courses that traditionally have high non-success rates (i.e., the percentage of students earning less than a C-, including D, F, and WU (unofficial withdrawal)). It was first developed in 1973 by Dr. Deanna Martin, at the University of Missouri, Kansas City and is based on a number of behavioral learning, cognitive development, and social interdependence principles (Hurley et al., 2006). Students engage in cooperative learning exercises that enhance positive reinforcement of the material, help them to break down complex tasks

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and think differently about core concepts, and work together to discover answers (Hurley et al., 2006). SI is not considered remedial because it focuses on high-risk courses rather than high-risk students (UMKC, n.d.). It is open to all students and all students are encouraged to attend SI sessions.

SI makes use of such high-impact practices as cooperative learning and other active learning techniques. These pedagogical techniques are strongly correlated with student engagement, and hence, success and retention (Kuh, 2008). Based on research about how the brain works, Doyle (2011) concludes that “one who does the work does the learning” (pg 3) and hence learner-centered teaching is essential for higher-level learning and retention of material. There is also empirical evidence that cooperative learning improves academic achievement. For example, Yamarick (2007) incorporates cooperative learning techniques into his intermediate macroeconomics course and finds that student exam grades improve by about a half a letter grade compared to students in his lecture section. Springer et al. (1999) find that small-group learning improves academic achievement in math-based disciplines. Thus, adding SI to lecture-based courses may provide an important opportunity for improved student learning.

Although there has been a plethora of studies demonstrating the effectiveness of SI in terms of grade improvement in targeted courses (see Hensen and Shelley, 2003; Congos and Schoeps, 1993), retention (see Blanc et al., 1983; Ogden et al., 2003), and graduation success (see Bowles et al., 2008; Arendale, 1997), much of the research on SI has not effectively accounted for self-selection bias. Thus, it is unclear if this effectiveness is due to the direct effect of SI, or if it is because more motivated students tend to take SI courses. Alternatively, the benefits of SI might be understated if weaker students tend to take SI courses.

Huynh et al. (2010) use a treatment effects model from the program evaluation literature to account for self-selection bias. They estimate the average treatment effect (ATE) on course grades from students participating in optional collaborative learning recitation sessions and find a positive and significant impact. Stock et al. (2013) use a similar technique and find that collaborative learning techniques in voluntary recitation courses have a positive and significant effect on outcomes in a lower-division general education economics course. Other studies use a two-stage Heckman-like endogenous treatment effects model to account for self-selection bias and find that the benefits of SI are understated by the ordinary least squares (OLS) estimator, indicating that weaker students tend to take SI (see Loviscek and Cloutier, 1997; Bowles and Jones, 2003a,b; Lewis et al., 2005).

In this paper, we focus on traditionally underrepresented minorities (URMs), including Hispanics, African Americans, and Native Americans. Specifically, we measure the impact of SI on grades in our Principles of Economics course, adjusting for self-selection bias. Following Huynh et al. (2010), we use several treatment effects models from the program evaluation literature to measure the average treatment effect (ATE) of SI. We begin by describing our SI program and how it compares to traditional SI programs.

## 2. Our SI program

Principles of Economics courses are “gateway” courses for both the Economics and the Business major and typically have high non-success rates. Our university has a one-semester Principles of Economics course (Econ 210) that covers both micro and macro principles in one four-unit course. There is no evidence that one-semester principles courses have higher non-success rates than two-semester principles courses. Our 2010 “Dissecting Diversity at Humboldt State University Report” found that, in AY 09–10 (prior to our implementation of SI), 19% of all students failed to succeed in Econ 210 and Students of Color (SOC) failed 35% more than White students (Webley and Yancy, 2010).

For several years prior to implementing our SI program, we offered an optional one-hour group tutoring session run by undergraduate student instructors. However, unlike SI, these students were not trained to run these sessions and were not versed in collaborative learning techniques. Most student instructors simply lectured on the more difficult material, answered questions, helped students solve homework problems, and ran review sessions before exams. Some student instructors were better than others. Furthermore, attendance was highly variable. Most weeks only one or two students would attend, whereas before an exam half the class would attend the review session. Given the high non-success rate in the Econ 210 and the ineffectiveness of our voluntary group tutoring model, we decided to implement SI in fall 2011.

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