

Minimum Grade Requirements for Economics Majors: Effects on Enrollments and Student Learning

By STEPHEN J. SCHMIDT*

* Dept. of Economics, Union College, 807 Union Street, Schenectady NY 12308 (email: schmidsj@union.edu). I thank all of the members of the department whose policy is evaluated in this paper for their work on the evaluation and for their comments on earlier versions of this work, Wendy Stock for very helpful comments on an earlier draft, Eshragh Motahar for his excellent work on the survey, and the college's registrar for supplying data.

After declining during the Great Recession, the number of economics majors has resumed rising, both in absolute numbers and as a share of degrees awarded.¹ This increase in majors has strained the ability of some colleges and universities to offer seats in economics courses to all students who want them. In response, many schools are adopting policies to decrease the number of students majoring in economics. A survey of major requirements at top liberal arts colleges showed that 15 out of 32 colleges examined had some sort of policy limiting access to the economics major.² Some universities with high demand for the economics major also have similar policies,

such as UC-Berkeley, UCLA, Penn State, and Florida State University, among others.

Little is known about the effects of these policies; how they change the number of economics majors or student effort. Students who must earn a minimum grade of C in a course might study harder to be sure of earning at least a C grade, and hence might learn more than would be the case if the student could continue in the economics major with a grade of C- or D. In response to earlier declines, research has examined how to increase the number of majors (e.g., Okoye 2011) but has looked less at how to keep the number of majors within the capacities of departments.

In this article, I report on the experience of one liberal arts college that implemented a demand-reduction policy as a sharp rise in the number of majors threatened to overwhelm the department's resources. In 2013, it adopted a policy requiring students to earn grades of at

¹ According to IPEDS completion data and the 2017 Digest of Education Statistics, the number of economics bachelor's degrees awarded rose 21.9% in the five years between 2011-12 and 2016-17, and from 1.56% of all bachelor's degrees awarded to 1.74%. In earlier years the trend in economics as a first major was flat, though second majors were rising: see Stock (2017). The increase has affected some schools more strongly than others; see Roose (2013) for some examples.

² This survey was conducted by the author and Prof. Eshragh Motahar as part of a general review of curricular requirements at liberal arts colleges. Details are available from the author on request. All but one of the liberal arts colleges surveyed limit access on the basis of grades in either introductory or core courses. The other one caps the number of economics majors per class, as do some universities that restrict access to the economics major.

least C in each of three core theory courses – intermediate microeconomics, intermediate macroeconomics, and econometrics – to complete the major.

To evaluate the effects of the policy, I examine data on individual student enrollments and grades given in economics courses in the five years prior to the policy change and the five years after the policy change. I find that the policy reduced the number of majors by approximately six per year, slightly over 6% of the total. The majority of students who earned low grades chose not to retake the course, and changed majors. However, most of the students who did retake earned a grade of C or higher and were able to complete the major. This suggests that the policy effectively separates students who are likely to succeed on retaking from those who are not.

Because introductory course grades were not used to determine access to the major, I use a differences-in-differences estimation, with introductory course grades as the control, to evaluate the casual effects of the policy. I find that students in core courses earned significantly fewer grades of C- and D, and significantly more grades of B and C+, but had no change in grades of C, relative to introductory students. These changes suggest that the policy induced greater effort from students both above and below the C cutoff

grade, rather than inducing faculty to change their grading standards and give marginal students the lowest acceptable grade, in order to keep them from having to retake the course.

I. The Core Grade Policy

Starting in academic year 2011-12, the department had a sharp increase in demand for sophomore-level classes. The number of majors, which had historically been around 65-70 majors per year, rose to 95 in the class of 2014. It has subsequently averaged 97 majors per year, nearly 20% of the college-wide graduating class. Because class sizes are capped, and the administration was not able to add enough faculty to the department to accommodate the increased demand, it became difficult for students to enroll in required intermediate level classes. Students who were unable to enroll in the core classes were falling behind in progress through the major.

The department reasoned that if it had to deny access to the major to some students because of capacity limits, it was most appropriate to turn away students who had poor performance in early classes, who might learn more in a different major. In addition, raising the average level of mastery of core material would create a better learning environment in upper level classes. Accordingly, in fall 2013, the department introduced a policy that

required students to earn grades of C or better in each of the three core courses. Students that earned a grade of C-, D, or F in one of those courses could retake that course only once, and if they did not earn a grade of C or better, could not enroll a third time and hence could not major in economics.

This policy change made completing the major more difficult for a relatively small number of students. Both before and after the policy change, a student who earned a grade of C or better was able to major in economics if she chose, and a student who earned a grade of F, or withdrew, had to retake the course in order to major in economics. Thus, the policy changed the options only of students who earned grades of C- or D in one or more of the core courses. Prior to the policy change, they could major in economics without retaking the course. After the change they, like students who failed, had to retake the course to major in economics.

II. Effects on the Number of Majors

Between fall 2008 and spring 2013, prior to the policy taking effect, 145 students earned grades of C- or D in the core classes (10.4% of

grades awarded). Of these students, 99 (68.3%) chose to major in economics and 46 (32.7%) did not.³

Between fall 2013 and spring 2018, 33 students in the graduating classes of 2018, 2019, and 2020, who were affected by the policy, earned grades of C- or D in the core classes (5.02% of grades earned).⁴ If these 33 students had continued in the major at the same rate as students prior to the policy change, they would have produced 22 economics majors in those three years (68.3% of 33). Instead, only 5 of those 33 students (15.2%) successfully retook the course and completed the economics major. Of the others, 22 did not retake the course, 3 did not get a C or better on the second attempt, and 3 successfully retook but chose not to major in economics.

The difference of 17 majors (22 under the old policy less 5 under the new policy) in those three years is a reasonable estimate of the number of students who were discouraged from majoring in economics by the policy. Thus, the policy discouraged about 5.67 majors per year.

³ Some of these students minored in economics, and a few did not graduate from the college at all.

⁴ The policy only applied to students who entered the college after it was enacted, so some students who received low grades early in the

post-policy period could still major in economics. We also do not observe graduation outcomes for students in the class of 2021 who have not completed their studies yet.

III. Retaken Courses and Results

Only 11 of the 33 students who earned grades of C- or D in core courses chose to retake those courses. Of these, eight resulted in grades of C or better, a success rate of 72.7%, and five of the eight succeeding students went on to major in economics. Even though the success rate of 72.7% was high, only one-third of the students who needed to retake did so. The majority of students did not retake, even though students who did retake usually succeeded. Why would this be the case?

These results are consistent with each other if students have private information about their reasons for getting a C- or D in a core course on their first attempt. If so, then students who earned a low grade for reasons other than lack of ability can reasonably expect to get a C or better in a second attempt. They will retake and mostly succeed. Other students, who got low grades because of weaker abilities and cannot expect to succeed in a second attempt, will not retake the course, and will switch majors. If this is why most students do not retake even though most students who do retake succeed, then the retake policy is doing a reasonably successful job of separating students who have the ability to do better in a second attempt from those who do not have that ability and would perhaps be better off in another major.

The cost of enrolling the retaking students is low; only 3.67 students per year retake a core course. There is a net reduction in demand for enrollments, since the 5.67 students per year who drop out of the major would have to take, on average, 6.5 courses more to complete the major. The net savings in enrollments per year is thus $5.67 \times 6.5 = 37.8$ from students who drop the major, less 3.67 enrollments by students who retake a course, for a net change of about 34 enrollments a year. This is about one-third of a typical professor's annual enrollment load. Thus, the policy is effective in reducing the enrollment burden on the department, though not by a large amount.

IV. Effect of the Policy on Grades

The minimum grade policy could have changed grades in the core courses in two ways. First, it might have induced greater effort by students who knew they needed to earn a grade of at least C to continue in the major. Second, it might have induced faculty to give grades of C to student who would otherwise have earned grades of C- or D, so that they could continue in the major. However, changes in the grade distribution between the two periods may not be due to the policy, if other factors (e.g, changes in student ability levels over time, or faculty turnover) changed grade distributions

between the two periods. This makes it difficult to identify the impact of the policy change.

To address this concern, I use a differences-in-differences method, comparing the change in the grade distribution in the core courses to the change in the grade distribution in introductory economics over the same time periods. Broad trends that are affecting grade distributions at the college or in the department should have similar effects on grades in both core and introductory courses. If grade distributions have changed by more in the core courses than in introductory courses, then it offers evidence that the policy change is the cause of the net change in core course grades.⁵

To tell whether student effort or changes in grade standards are responsible, I look at three different parts of the grade curve: grades of C- and D requiring students to retake the course, grades of C which are just above the threshold to avoid retaking, and grades of C+ to B which are farther above that threshold. Changes in student effort and changes in grade standards both predict a fall in grades of C- and D. If the policy induces faculty to change the standards for a C grade to avoid disqualifying students from the major, then grades of C will increase substantially as faculty move students over the threshold. It might also cause changes in higher

grades, if students who would have gotten grades of C receive grades of C+ in order to give them a higher grade than the students who have been shifted from C- to C. But it seems unlikely that this would result in a significant increase in grades as high as B, or that it would not increase the percent of C grades.

On the other hand, if the policy induces students to work harder, then we would expect more grades in the C+ to B range and a smaller increase, or no change, in C grades. Students do not know what their grade will be when they decide how much effort to put into the course. Thus, both students below the threshold and those somewhat above it might work harder, to reduce the chance of getting a grade below C, and do better in the course as a result. If so, some students who would otherwise have earned grades of C- or D will move up to C or C+, but some students who would have earned grades of C or C+ will move up to B- or B. The upper part of the grade range is less likely to be affected, since students who are expecting grades of B+ or A- are unlikely to change their effort levels; they have little risk of getting a grade of C- or lower.

Figure 1 shows graphically how grades changed in both core and introductory courses. The percentage of grades of C- or D dropped

⁵ I have also done a differences-in-differences using lower-level electives (courses with only introductory economics as a prerequisite),

rather than introductory economics, as the control group. The results are broadly similar and available from the author on request.

sharply and significantly in core courses after fall 2013. Before the policy, 10.5% of grades had been C- or D, while afterwards only 5.0% were. In contrast, in introductory economics grades of C- and D changed only slightly, from 9.3% before the policy change to 9.1% after.⁶ The t-statistic for the difference in differences of these two grades is -3.75, implying that the policy was the cause of the change in core course grades.

[Insert Figure 1 here]

Grades of C in core courses were essentially unchanged, 10.5% before the change and 10.6% afterward. In introductory courses, grades of C and higher were also essentially unchanged, 10.8% before and 9.9% afterwards. This difference is not significant ($t=0.82$). The t-statistic for the difference in differences of C grades between the two types of courses is 0.71. This implies that the policy had no effect on the fraction of C grades in core courses.

There was, however, a small increase in grades of C+ and a larger increase in grades of B- and B in the core courses. Grades in the C+ to B range rose by 6.42%. There was also an increase in grades of B- in introductory courses, but it was offset by decreases in grades of C+ and B. Grades in the C+ to B range in

introductory courses rose by only 1.08%. The t-statistic for the difference in differences of these grades is 2.17, implying that the policy increased grades of C+ to B, even as it had no effect on C grades.

Taken together, these results suggest that the effect of the policy is to encourage students to work harder if they expect to get a grade that is not comfortably above the threshold. This results in many students learning the material more thoroughly and thus earning higher grades. Changed grade standards do not appear to be an important effect, since the fraction of C grades did not change due to the policy.

V. Conclusion

Rising demand for enrollments has caused many economics departments to implement policies that limit access to the economics major. I study the effects of one such policy implemented at a nationally ranked liberal arts college. I find the policy reduces the number of economics majors at the college, though not by enough to prevent the number of majors from rising overall. The majority of students who get a low grade in a course do not retake it, but most students who do retake succeed. This suggests that students who are generally good

⁶ There was little change in grades of F or W in introductory or core courses. This implies that the reduction in grades of C- and D in the core was not caused by students withdrawing to avoid earning grades

of C- or D. There is also no significant change in grades of B+ and higher in either group. The differences in differences for both the F/W group and the A/A-/B+ group are not significantly different from zero.

students but who do badly in one course are able to remain in the major. The required minimum grade in the core courses appears to boost student effort in those courses, resulting in more grades of C+, B-, and B as well as fewer grades of C- and D. The policy appears to be effective at reducing demand for the economics major, at relatively low cost in terms of courses retaken. In addition, it increases student effort and student learning in those courses. Since the data are drawn from one school, policies adopted at other schools could have different effects. However, if other schools are similar, then minimum grade requirements could be an effective tool for keeping demand for economics courses within capacity and improving student learning.

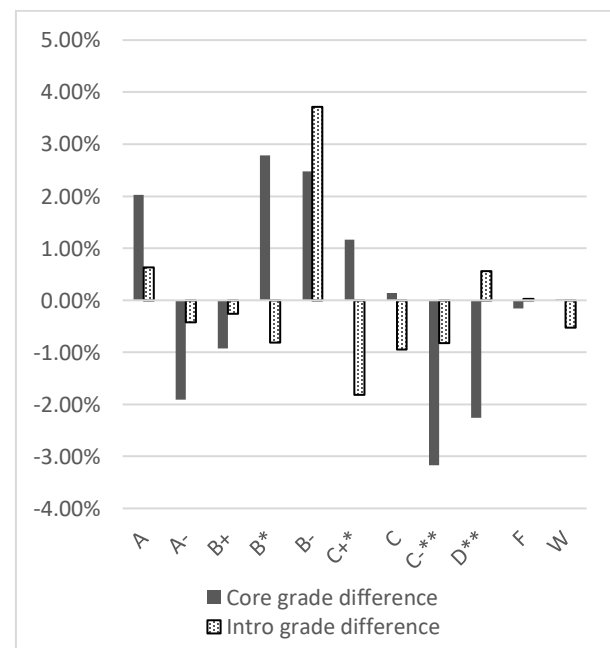
These conclusions come with two caveats. First, minimum grade requirements for majors may help keep economics enrollment within department capacity and induce greater effort, but they deny access to the major to students who have earned passing, if low, grades. Faculty and administrators who feel that all students (who can pass) should be able to major in whatever subject they wish may challenge such policies. Second, any standard for access to the major must be applied equitably to all students. Departments may need to take steps to ensure that all faculty teaching core courses have common standards

for awarding grades that meet the requirements, so that access to the major does not depend on which faculty member a student happened to have for the required courses.

REFERENCES

- Okoye, Ifeakandu. 2011. "Attracting Economics Majors." *American Journal of Business Education*, 4(8):25-30.
- Roose, Kevin. 2013. "Why Are College Students Flocking to Economics?" *New York*, May 29.
- Stock, Wendy. 2017. "Trends in Economics and Other Undergraduate Majors," *American Economic Review Papers and Proceedings* 107(5):644-649.

Figure 1: Grade Differences in Differences



** : difference in differences significant at 5%

* : difference in differences significant at 10%

