

TRENDS IN ECONOMICS AND OTHER UNDERGRADUATE MAJORS

Wendy A. Stock

Abstract

Although economics' share of Bachelor's degrees awarded in the United States has been flat for over a decade, its share of second majors is growing. This paper documents trends and correlations in disciplines' shares of first and second majors for Bachelor's degrees conferred in the United States during 2001-2014. First majors in math, engineering, computer science and technology and in the life and medical sciences (now the modal major among female students) are complements to second majors in economics. Encouraging double majoring in economics among students in these disciplines could grow and diversify the economics discipline while also benefiting graduates.

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There are many reasons to be interested in undergraduate students' choices of majors. Because much of the critical intellectual development of future economists, politicians, scientists, teachers, engineers, medical professionals, and many others occurs at the Bachelor's degree level, undergraduate students' major choices affect how these different professions approach problems and issues. Depending on their exposure to economics as undergraduates, students' choice of major also impacts the degree to which application of "the economic way of thinking" occurs throughout the economy. Furthermore, because a disciplines' undergrads often become its professors and researchers, its intellectual and demographic mix of students influences the direction of its research and teaching across generations.

This paper documents trends in disciplines' shares of first and second majors for Bachelor's degrees conferred in the United States between 2001 and 2014. I summarize trends in economics' share of majors among students in general, as well as among female and minority students separately. I focus on these groups because, as documented by Bayer and Rouse (2016), the continuing underrepresentation of women and minorities in economics at all levels (undergraduate, graduate, and among all ranks of the professoriate) negatively affects the discipline's ability to attract students and to produce robust and relevant knowledge. Finally, I also assess whether the share of students majoring in other disciplines is correlated with first and second majors in economics, which could suggest potential avenues for increasing the number and diversity of economics majors.

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Although dozens of studies examine factors associated with students' choice of first major, relatively few studies examine second majors.¹ Pitt and Tepper (2012) find that the partnering of economics with math, political science, foreign language, other business majors, and engineering comprise five of the top ten undergraduate double majors. Zafar (2012) finds that at least part of students' decision to double major is based on expectations that their major combinations will positively impact their chances of degree completion and finding a job after graduation. Del Rossi and Hersch (2008, 2016) and Hemelt (2009) find that double majoring is associated with higher earnings and better job matches relative to graduating with a single major, provided that the double majors are *across* rather than *within* general disciplinary groups and also when the second major is in a relatively technical or high paying field. For example, there are positive returns to combining business (which includes economics in their studies) with science or art, but not to combining two science or two art majors.

I. First and Second Majors by Discipline and Demographics

In this paper, I use Integrated Postsecondary Education Data System (IPEDS) data to summarize trends in Bachelor's degrees conferred in first and second majors in the United States by discipline, year, gender, and race/ethnicity over the period 2001-2014.² The IPEDS data indicate that roughly 57 percent of the 1.5 million Bachelor's degrees conferred annually during 2001-2014 were earned by females, and 20 percent were earned by minority students.³ An

¹ See Allgood, Walstad, and Siegfried (2015) for a comprehensive review of research on the economics major.

² I accessed the IPEDS data via the National Science Foundation (NSF) webcaspar system (ncesdata.nsf.gov/webcaspar). Because every higher education institution in the United States that participates in federal student financial aid programs is mandated by Title IV of the Higher Education Act of 1965 to participate in IPEDS surveys, they can be viewed as a census of higher education institutions. IPEDS reports institution- rather than individual-level data, so it can be used to assess the aggregate number of first and second majors conferred, but not the first and second major combinations of individual graduates.

³ Minority students are those self-identified as Hispanic or Latino, American Indian or Alaska Native, or Black or African American. Because IPEDS data does not identify the race or ethnicity of temporary residents, I exclude temporary residents when reporting outcomes by race/ethnicity.

average of 26,500 degrees were conferred to economics majors per year. Females earned just under one-third and minority students earned just over one-tenth of these majors. Nearly 96,000 second majors were conferred in 2014, up from about 55,000 in 2001 - a 75 percent increase.⁴ The number of second majors conferred annually to females rose by 74 percent, while the number conferred to minorities grew by nearly 150 percent from 2001 to 2014.

Using the IPEDS data, Figure 1 presents trends in the share of first and second majors earned over 2001-2014 in 12 aggregated discipline groups.⁵ Economics is more popular among second than first majors. Economics' share of first majors remained flat at about 1.7 percent during 2001-2014, while its share of second majors grew from 3.5 to 4.6 percent. Not shown in Figure 1 is that only a tiny and unchanging fraction of female and minority students (0.9 and 1.1 percent, respectively) first majored in economics during 2001-2014. Thus, although we have seen substantial growth over time in female and minority students graduating from college, the demographic mix of majors in economics has not mirrored these trends. However, from 2001-2014, economics' share of second majors grew from 2.3 to 2.9 percent among females and from 1.8 to 2.8 percent among minority students.

⁴ The IPEDS instructions to reporting units do not include specific criteria for distinguishing first and second majors (https://surveys.nces.ed.gov/ipeds/downloads/forms/package_10_80.pdf). Thus, the decision about which is the first and which is the second major is made at the institution level depending on each institution's own criteria. At my own institution, for example, the *student* decides which to declare as their first (or second) major when they complete enrollment and graduation forms. Numbers of first and second majors conferred by year are also reported in the National Center for Education Statistics Data Analysis System. See, for example, https://nces.ed.gov/das/library/tables_listings/Fall2009.asp for summaries of first and second majors by discipline, gender, and race/ethnicity in 2009.

⁵ The discipline groups are aggregated from more than 50 separate majors in the IPEDS data. *Arts and Architecture* includes architecture and environmental design, and arts and music. *Political Science* includes political science, and public administration and law. *Other Social Sciences* includes anthropology, area and ethnic studies, history of science, linguistics, social service professions, and sociology. *Math, Engineering, Computer Science, and Technology* includes mathematics and statistics, all subfields of engineering, computer science, and engineering, health and science technologies. *Humanities* includes English and literature, foreign languages, history, and religion and theology. *Life and Medical Sciences* includes agricultural sciences, biological sciences, medical sciences, and "other" life sciences (e.g., nursing, physical therapy, exercise science, and occupational therapy). *Physical & Geosciences* includes astronomy, atmospheric sciences, chemistry, earth sciences, oceanography, physics, and interdisciplinary sciences. *Other Disciplines* includes communication and librarianship, vocational studies and home economics, and other non-sciences or unknown disciplines.

Figure 1 also illustrates that the largest share of Bachelor's degrees awarded are conferred to students in business and management, which accounted for just over one-fifth of all first and second majors during 2001-2014. The second most common major is life and medical sciences, and its share of students is growing rapidly. Indeed, while the share of majors in business and management has declined in recent years, the share of first majors in life and medical sciences rose from 12 percent in 2001 to 18 percent in 2014. Not shown in Figure 1 is that the share of majors in life and medical sciences among females grew from 14 to 22 percent during 2001-2014, while at the same time the share of females majoring in business and management fell from 19 to 15 percent. As a result of these trends, life and medical sciences has now surpassed business and management as the modal undergraduate major among females.

Figure 1 also illustrates that, like economics, the humanities, political science, and "other" social sciences draw larger shares of second majors than first majors. Also like economics, the share of first majors in political science and other social sciences remained largely unchanged over 2001-2014.

II. Changes in Economics' Share of Majors

Given the growth in economics' share of second majors, economics departments looking to increase enrollments might benefit from focusing recruiting efforts on areas where economics can be part of a double major combination with a growing discipline. Encouraging combinations of second majors in economics with majors that are growing among female and minority groups may also increase gender and racial diversity among economics undergraduates. With those outcomes in mind, I used the IPEDS data to estimate correlations between economics' and other disciplines' share of majors using equation 1.

$$(1) \text{ Economics' Share of Majors}_t = \beta_0 + \beta_1 \text{ Share of Majors}_{d,t} + \beta_2 \text{ Year}_t + e$$

The dependent variable, *Economics' Share of Majors_t*, alternately measures economics' share of first or second majors in year *t*. The *Share of Majors_{d,t}* variable measures other disciplines' share of majors in year *t*, and *Year_t* is a simple linear time trend. Because perfect collinearity in the share of majors across disciplines in each year precludes estimating equation (1) for all disciplines simultaneously (i.e., the sum of the share of majors across disciplines is 100 percent), I estimated equation (1) separately for each discipline.

As noted by Kasper (2008), if the gross flows of majors into and out of economics and another discipline are roughly equal, the correlation between that disciplines' share of majors and economics' share of majors (estimated by β_1) should tend toward zero. For disciplines that are net substitutes to economics, β_1 would be negative, indicating that a larger share of students in that major (e.g., education) correlates with a smaller share of students majoring in economics. For disciplines that are net complements to economics, β_1 would be positive. When economics' share of second majors is the dependent variable in equation (1), positive estimates of β_1 also indicate complements to economics, illustrating, for example, that a larger share of first majors in math correlates with a larger share of second majors in economics.

Table 1 presents the estimated coefficients from equation (1) using economics' share of first and second majors among all students as the dependent variable in the first two columns. Estimates for females and minority students are presented in columns 3-6. The estimates indicate that economics' and most other disciplines' shares of majors are not strongly correlated. However, a larger share of students majoring in "other" social sciences (e.g., anthropology, area and ethnic studies, sociology) or in education is correlated with a smaller share of students first majoring in economics, indicating that those majors are net substitutes for first majors in economics. Economics and life and medical sciences also appear to be substitutes, although to a

smaller degree than other social sciences and education. A one point larger share of students majoring in life and medical sciences is associated with a 0.03 point smaller share of students majoring in economics. This finding is similar to Kasper (2008), who finds that economics and biology (which is included in life and medical sciences) are substitutes.

Estimates indicate a similar pattern of first majors' relationships among females, with three exceptions. First, although there is not a significant relationship between economics' share of first majors and the share of students majoring in math, engineering, computer science and technology (MECT) for students in general, these majors are complements for females. A one point larger share of female students majoring in MECT is associated with a 0.065 point larger share of females majoring in economics. Second, humanities and economics appear to be substitute majors for females but not for students more generally. Finally, the negative relationship between economics' share of majors and "other" social sciences' share of majors does not appear to hold among females.

The estimated relationships between disciplines' shares of majors are also generally similar for minority students, with two exceptions. First, political science and economics are net complements among minority students, with a one point higher share of minority students majoring in political science corresponding to a roughly 0.10 point higher share majoring in economics. Second, arts and architecture appears complementary to economics among minority students, but not among students more generally.

Turning to second majors, the estimates indicate that the share of first majors in MECT is positively correlated with the share of second majors in economics among all students and among females and minorities considered separately. Alternatively, larger shares of majors in education correlates with smaller shares of second majors in economics. There is also a negative

relationship between economics' share of second majors and the share of first majors in the humanities, although this relationship is statistically significant only among female and minority students. Finally, larger shares of female students majoring in either political science or in the "other" majors category is associated with a smaller share second majoring in economics.

III. Conclusion

Economics' share of first majors has been flat for more than a decade. Although we often focus on closely related disciplines (e.g., business or political science) when considering ways to increase undergraduates' exposure to economics, those disciplines' share of majors has also been relatively flat. However, economics' share of *second* majors has increased over time, not only among students generally, but also among females and minorities (two groups chronically underrepresented in economics). This presents an opportunity for economics departments interested in increasing the size as well as the gender, racial, and intellectual diversity of their student body. Because majors in math, engineering, computer science, and technology are complements to second majors in economics, finding ways to encourage double majors in economics among those students could yield growth in economics at relatively low marginal cost. In addition, because it is now the most common major among female students, encouraging second majors in economics among first majors in the life and medical sciences could grow and diversify our discipline. The potential linkages between economics and life and medical science majors are greater than one might suspect. Indeed, Kasper (2008) illustrates many similarities between biology and economics, and Frick (2009) describes myriad overlapping interests and perspectives between nursing and economics. Finally, research indicating that double majoring across relatively dissimilar disciplines yields higher returns to graduates than double majors in relatively closely related disciplines implies that encouraging double majors with economics

would not only benefit the economics discipline, but also students in math, engineering, computer science, and technology and in the life and medical sciences.

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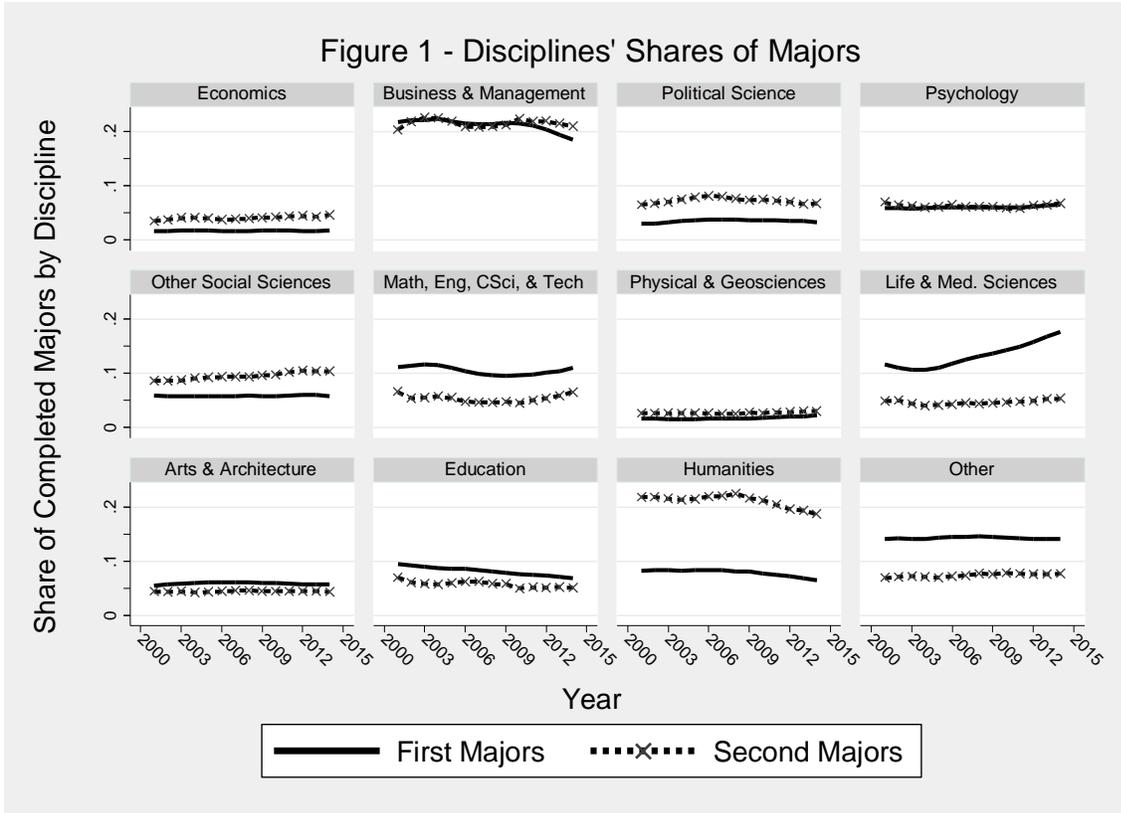
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Source: Author's calculations based on IPEDS completions data (obtained via the NSF webcaspar system (ncesdata.nsf.gov/webcaspar)) on the number of first and second majors conferred in the United States during 2001-2014. See footnote 5 in the text for the description of the disciplinary categories.

Table 1- Relationships Between Economics' and Other Disciplines' Shares of Majors

	<u>All Students</u>		<u>Female Students</u>		<u>Minority Students</u>	
	First Majors in Economics	Second Majors in Economics	First Majors in Economics	Second Majors in Economics	First Majors in Economics	Second Majors in Economics
<i>Share of Majors in</i>						
Business & Management	0.035 (0.027)	0.022 (0.071)	0.004 (0.023)	-0.006 (0.070)	0.021 (0.013)	0.004 (0.089)
Political Science	0.026 (0.063)	-0.175 (0.198)	-0.068 (0.060)	-0.312 (0.173)	0.097 (0.043)	0.148 (0.339)
Psychology	-0.148 (0.131)	-0.049 (0.334)	0.043 (0.072)	0.156 (0.238)	-0.072 (0.050)	0.070 (0.324)
Other Social Sciences	-0.450 (0.052)	-0.671 (0.433)	-0.094 (0.059)	0.060 (0.220)	-0.253 (0.050)	-0.297 (0.703)
Math, Eng, CSci, & Tech	0.018 (0.022)	0.166 (0.052)	0.065 (0.021)	0.247 (0.065)	0.015 (0.017)	0.244 (0.082)
Physical & Geosciences	-0.146 (0.140)	0.114 (0.467)	0.137 (0.135)	0.677 (0.377)	-0.233 (0.123)	-0.508 (0.935)
Life & Medical Sciences	-0.029 (0.015)	-0.029 (0.059)	0.002 (0.014)	0.028 (0.042)	-0.031 (0.010)	-0.051 (0.095)
Arts & Architecture	0.086 (0.070)	-0.095 (0.273)	-0.024 (0.051)	-0.200 (0.160)	0.217 (0.074)	0.360 (0.583)
Education	-0.608 (0.163)	-1.664 (0.407)	-0.353 (0.083)	-0.955 (0.329)	-0.024 (0.050)	-0.760 (0.232)
Humanities	0.006 (0.049)	-0.207 (0.142)	-0.080 (0.039)	-0.335 (0.119)	0.029 (0.089)	-0.725 (0.398)
Other Majors	-0.045 (0.095)	-0.585 (0.235)	-0.051 (0.046)	-0.284 (0.133)	0.008 (0.042)	-0.199 (0.235)

Source: Estimates based on Integrated Postsecondary Education Data System (IPEDS) completions data on the number of first and second majors conferred by discipline in the United States during 2001-2014 available via the NSF webcaspar system (ncesdata.nsf.gov/webcaspar). See footnote 5 in the text for the description of the disciplinary categories.

Note: Each row reports the estimated β_1 coefficient from a separate regression of *Economics' Share of First (Second) Majors*_{*t*} = $\beta_0 + \beta_1$ *Disciplines' Share of Majors*_{*t*} + β_2 *Year*_{*t*}, for each discipline listed. Robust standard errors in parentheses. Numbers in bold represent estimates that are statistically different from zero at the 0.1 level or smaller. The number of observations for each regression is 14.