

## **Persistence in Economics: Differences across Identities and Institutions**

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### **Abstract**

Female and minority students are underrepresented in economics. This paper uses longitudinal data to compare persistence in economics for female and male/non-binary students, as well as minority-identifying and non-minority students, along with the potential role of identity focused institutions (women's colleges and minority-serving institutions) in shaping persistence in economics. Plans to persist in economics diminished over time, although less so for female students than male students and less so for minority students than non-minority students. This finding is contrary to previous research and suggests that efforts to improve representation in economics should focus on recruiting more underrepresented students because it seems that those underrepresented students who are already in the major are at least as inclined to persist as their white male counterparts. Women's colleges and MSIs did not lead to significantly different changes in overall persistence.

**Keywords:** Economics, education, gender, race, ethnicity, women's colleges, minority-serving institutions

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## 1 Introduction

Economics suffers from an underrepresentation of female and minority students. Only a third (34%) of economics bachelor's degree graduates are women and only 18% of full professors are women (Chari 2023). Despite being a third of the population, under-represented minority students<sup>2</sup> received only 18% of economics bachelor's degrees and were 7% of full professors (Committee on the Status of Minority Groups in the Economics Profession (CSMGEP) 2023). The loss of female and minority economists across the stages of career progression is often considered a “leaky pipeline” (Buckles 2019; Gentry, Meer, and Serra 2023; Foster, McEntarfer, and Sandler 2023; Berland, Harman, and Moreau-Kastler 2023). Progress in diversifying the earlier stages of the profession has not translated into progress at later stages (Price 2009). There have even been reversals in progress, with fewer Black recipients of economics degrees over time, and recent declines in PhDs granted to women (Chari 2023; Committee on the Status of Minority Groups in the Economics Profession (CSMGEP) 2023).

Research has identified a multitude of reasons female and minority students may never enter or desist from continuing in economics, ranging from discrimination and hostility to compliance with gender norms (Berland, Harman, and Moreau-Kastler 2023; Jansson and Tyrefors 2022). Drawing on two surveys of students, a year apart, this paper explores patterns of and changes in persistence by students' gender and racial/ethnic identity. Furthermore, we investigate the potential role of identity-focused institutions (which we over-sampled) in fostering persistence. Identity-focused institutions (women's colleges and minority-serving institutions) have been shown to contribute to better mindsets and entry into higher-earning majors, such as economics (Alston et al. 2022; Edwards et al. 2023; Calkins et al. 2023; Butcher, McEwan, and Weerapana 2023).

We find that while baseline persistence predicts subsequent persistence, MSIs and women's colleges do not predict improvements in overall persistence, although MSIs predict increases in graduate study and careers using economics. Furthermore, while students overall become less likely to persist in economics over time, women and minority students actually experience *smaller* decreases in their likelihood to persist than male and non-minority students do. Women and minority students who will not pursue economics may have selected out of the field earlier in their trajectory (Owen 2010; Rask and Tiefenthaler 2008), leaving particularly persistent and high-ability female and minority students in the major. This suggests that policies aimed at improving persistence may be “preaching to the choir” if they focus only on existing economics majors. To be effective at adding diversity to the field, we must focus on earlier recruitment stages.

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<sup>2</sup> Black, Hispanic, and Native American students.

## 2 Data

### 2.1 Surveys and sample

This research uses two waves of survey data on students' perceptions of and persistence in economics. Students who were in economics courses at 24 colleges and universities in fall of 2022 were surveyed. The institutions sampled had undergraduate economics majors (at four-year institutions) or courses (at two-year institutions), but did not offer economics PhDs, in order to focus on undergraduate education. The study intentionally over-sampled minority-serving institutions (MSIs) and women's colleges, in order to be able to compare these identity-focused institutions with predominantly white institutions (PWIs) and co-ed/men's college settings. To our knowledge, this is the only data set examining economics persistence to intentionally oversample these identity-focused institutions.<sup>3</sup> Faculty were also surveyed on their characteristics and attitudes at baseline, as well as the characteristics of their classes. See Krafft et al. (2023) for details on the baseline sample.

In Fall of 2023, we followed up with all of the students who had consented to follow-up at the end of the baseline survey and provided an email address for follow-up (N=553). Table 1 presents the sample size of institutions, classes, faculty, and students at baseline and endline. While faculty and classes were not re-surveyed, we note that the endline sample included students from 21 of the 24 baseline institutions with 45 of the 49 original faculty, in 75 of the 105 classes. We reached 199 of the 805 initial students, an attrition rate of 75%.<sup>4</sup> Two-year schools tended to have somewhat higher attrition, as did MSIs, with the exception of MSI women's colleges, which had the lowest attrition rates. Sample weights account for both initial sampling and non-response by student demographics and baseline persistence.<sup>5</sup>

**Table 1. Sample size (number of schools, classes, faculty, and students at baseline and endline) and student attrition rates (percentages) by MSI and women's college status**

	<u>Institutions</u>		<u>Faculty</u>		<u>Classes</u>		<u>Students</u>		
	Baseline	Endline	Baseline	Endline	Baseline	Endline	Baseline	Endline	Attrition (%)
PWI co-ed 4yr	5	4	10	9	20	16	187	50	73
MSI co-ed 4yr	4	4	8	8	14	12	126	17	87
PWI women's 4yr	6	6	14	13	29	22	219	64	71
MSI women's 4yr	2	2	9	9	18	14	152	54	64
PWI 2yr	4	2	4	2	10	3	30	5	83
MSI 2yr	3	3	4	4	14	8	91	9	90
<b>Total</b>	<b>24</b>	<b>21</b>	<b>49</b>	<b>45</b>	<b>105</b>	<b>75</b>	<b>805</b>	<b>199</b>	<b>75</b>

Source: Authors' calculations based on baseline and endline surveys

<sup>3</sup> See Krafft et al. (2023) for full details of the initial sample.

<sup>4</sup> Students were offered a \$10 gift certificate as an incentive to complete the endline survey and minimize attrition.

<sup>5</sup> Our pre-analysis plan, including details such as weighting for attrition, was registered with OSF (<https://osf.io/project/enrck/files/osfstorage/62f274285a24362376272dd2>). We note anywhere we deviated from our pre-analysis plan. Our study underwent IRB review at St. Catherine University, #1584.

## 2.2 Outcomes

Our key outcome of interest is persistence in economics, which is measured by four different items and a combined summary measure. Persistence is based on the following questions:

- How likely are you to take more courses in economics?
- How likely are you to pursue a degree in economics (associate, concentration, program, major, or minor)?
- How likely are you to pursue graduate study in economics?
- How likely are you to have a career in a field that will use your economics education?

Response options were a seven-point Likert scale: very unlikely, unlikely, somewhat unlikely, neutral, somewhat likely, likely, very likely. Somewhat likely, likely, or very likely were coded as persisting, while very unlikely, unlikely, somewhat unlikely, and neutral were coded as not persisting.<sup>6</sup> A positive outcome for any one of the four individual persistence measures was coded as a combined persistence outcome.

## 2.3 Covariates

We are interested in two key covariates at the individual level: female and minority identities. Female is coded as a dummy variable based on a “female” response to the question on gender with possible responses: Male, female, non-binary/third gender,<sup>7</sup> prefer not to say (set to missing and excluded), and prefer to self-describe. Minority is coded as a dummy based on a question on race with multiple responses possible. Any of Black/African American, Asian/Native Hawaiian/Pacific Islander, Hispanic, or prefer to self-describe (based on review and recoding) were coded as a minority identity. White (non-Hispanic) only is coded as not a minority identity. Prefer not to say is set to missing and excluded. On the institution level, we identify women’s colleges (vs. co-ed/men’s institutions) based on their membership in the women’s college coalition. We identify MSIs based on their inclusion in the Department of Education’s 2020 eligibility matrix.

## 2.4 Controls

Student- and institution-level controls are included in the models. We control for student age, household income, and the type of degree the student is pursuing (all at baseline). We control for age quadratically and household income categorically (possible responses: prefer not to say, less than \$30,000, \$30,000-\$49,999, \$50,000-\$99,999, \$100,000-\$249,999, \$250,000 or more). We control for the type of degree the student is pursuing categorically (possible responses:

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<sup>6</sup> Additionally, for taking additional courses in economics there were options of no more courses available or no more courses because I have completed my studies (excluded from our analyses for this outcome). For the degree question, there were additional options of already declared or completed my degree in economics (both of which are treated as persisting). For graduate studies, there was an additional option of have started a graduate program in economics (treated as persisting). For the career question, there was an additional option of already have a job using economics (treated as persisting).

<sup>7</sup> In the baseline sample the non-binary/third gender students had an N=11, so could not be analyzed separately.

certificate, associate's, or bachelor's). On the institution level we control for the degree level (two or four-year), as well as state fixed effects for the four states in our sample and the IPEDS variables used in the initial institution sampling - (1) the percentage of full-time first-time undergraduates who receive Pell grants; (2) selectivity as measured by percentage admitted; (3) the student-faculty ratio.<sup>8</sup>

### 3 Methods

We present descriptives on differences in baseline and endline persistence, and the significance of differences in changes, by gender, women's college, minority identity, and MSI. Our multivariate models examine differences in outcomes for an individual student ( $i$ ) at two different points in time ( $t=0,1$ ). Our key student covariates of interest are self-identifying as female ( $f_i$ ), and self-identifying as a minority ( $u_i$ ). Models include  $k$  controls,  $X_{k,i,j,t0}$ , for student ( $i$ ) and institution ( $j$ ) characteristics at baseline, as discussed above. We also examine institution type: attending a women's college or MSI ( $w$  denoting a women's college vs. a co-ed/men's college setting,  $m$  denoting an MSI vs. PWI).

Our research design takes advantage of observing students at two points in time in order to estimate a value-added model (Koedel, Mihaly, and Rockoff 2015). Value-added models assume an underlying education production function for human capital and that various inputs applied between  $t_0$  and  $t_1$  contribute to human capital accumulation. Denote as  $ECON_k$  the  $k$  outcomes related to persistence in economics. We assume a value-added model for endline  $ECON_{k,i,t1}$  depending on  $ECON_{k,i,t0}$ .

We hypothesize that:

H1: Female-identifying students at women's colleges will have greater change in persistence (persistence after accounting for baseline persistence) in economics than female identifying students at co-ed institutions.

To test H1, focusing on female-identifying students, we will estimate:

$$ECON_{k,i,t1} = \beta_0 + \beta_1 ECON_{k,i,t0} + \beta_2 u_i + \beta_3 w_i + \beta_k X_{k,i,t0} + \varepsilon_i$$

with the coefficient  $\beta_3$  estimating the impact of women's colleges on female-identifying students' differential persistence, with the null hypothesis being that the coefficient is zero.

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<sup>8</sup> In the working paper version of this work, following our pre-analysis plan, we also explored whether changes in relevance, belonging, and growth mindset mediated changes in persistence; they did not. Additional analyses also investigated the relationship between peer and faculty race and gender on persistence in economics, as a potential mediator of MSI/women's college's effects, but as there were not significant MSI or women's colleges effects we do not present those results.

H2: Minority-identifying students at MSIs will have greater change in persistence (persistence after accounting for baseline persistence) in economics than minority-identifying students at PWIs.

To test H2, focusing on minority-identifying students, we will estimate:

$$ECON_{k,i,t1} = \beta_0 + \beta_1 ECON_{k,i,t0} + \beta_2 f_i + \beta_3 m_i + \beta_k X_{k,i,t0} + \varepsilon_i$$

with the coefficient  $\beta_3$  estimating the impact of MSIs on minority-identifying students' differential persistence, with the null hypothesis being that the coefficient is zero.

## 4 Results

We start by looking at persistence outcomes at baseline ( $t_0$ ) and endline ( $t_1$ ) by gender and minority identity and also by institution type (women's colleges versus co-ed/men's institutions and MSIs versus PWIs). Overall we see that endline persistence is markedly lower than baseline. At baseline, 85% of students planned to persist in economics (overall persistence: classes, degrees, graduate school and/or careers),<sup>9</sup> and at endline 76% of students planned to persist. Planning to take more classes drops from 69% to 59%; planning to major drops from 57% to 49%; planning graduate school drops from 22% to 19%; and planning a career in economics drops from 77% to 66%.<sup>10</sup> There are some interesting differences in persistence and change in persistence, however, by gender, minority identity, and institution type, which we discuss below.

### 4.1 Gender

Table 2 shows the baseline and endline persistence outcomes by gender for the sample that responded to the endline survey. At baseline male/non-binary students and female students had similar persistence. Slightly more male/non-binary students indicated they were likely to attend graduate school in economics but, overall, the gender differences at baseline are strikingly small/non-existent. At endline we see that students are, on average, less likely to indicate they plan to persist than at baseline. That drop in persistence has been particularly steep for male/non-binary students so there is now a gender gap that favors female students. Male/non-binary students have dropped from 83% to 64% on the overall persistence measure while female students have increased from 86% to 88%. The largest gender gap emerges for likelihood of taking more economics courses followed by likelihood of using economics in their career, and these differences in changes by gender are significant in the t-tests.

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<sup>9</sup> We present results for persistence at baseline with the endline sample; generally results are very similar using the baseline sample, e.g. 84% of the full baseline sample persisting at baseline. We footnote any substantive differences when using the baseline sample only.

<sup>10</sup> Based on complete sample, small differences may occur in various tables depending on whether the covariate was available for the full sample.

**Table 2. Persistence outcomes at baseline, endline, and change, by gender, all students**

	<u>Baseline</u>			Difference: Female- Male/non- binary	<u>Endline</u>			Difference: Female- Male/non- binary	<u>Change</u>			Difference: Female- Male/non- binary
	Male/non- binary	Female	Total		Male/non- binary	Female	Total		Male/non- binary	Female	Total	
Persistence: take more econ. courses	0.69	0.70	0.69	0.01	0.48	0.69	0.59	0.21	-0.23	-0.00	-0.11	0.23**
Persistence: econ. degree	0.57	0.57	0.57	0.00	0.45	0.52	0.49	0.07	-0.11	-0.04	-0.08	0.07
Persistence: econ. grad. school	0.24	0.21	0.23	-0.03	0.15	0.22	0.18	0.07	-0.09	0.01	-0.04	0.10
Persistence: econ. career	0.77	0.77	0.77	0.00	0.57	0.74	0.66	0.17	-0.20	-0.02	-0.11	0.18*
Overall persistence	0.83	0.86	0.85	0.03	0.64	0.88	0.76	0.24	-0.19	0.02	-0.09	0.21**

Source: Authors' calculations based on baseline and endline surveys

Notes: \*p<0.05; \*\*p<0.01; \*\*\*p<0.001. Baseline and endline include individuals who responded to both surveys; change requires responding to both surveys and being non-missing on both outcomes.

#### 4.2 Women's Colleges

Table 3 looks at the differences in persistence at baseline and endline between co-ed/men's and women's colleges. At baseline, students at women's colleges indicated higher levels of persistence on all measures (92% overall versus 82% for students at co-ed/men's colleges). The biggest difference was that respondents at women's colleges were 21 percentage points more likely to plan to take more economics courses (84% vs. 63%). Given this, it seems that students who select economics at women's colleges are already more predisposed to plan to continue with economics. At both co-ed/men's and women's colleges all of the persistence measures decline from baseline to endline. The differences in the decline were not statistically significant between co-ed and women's colleges. Table 4 presents regression model results for persistence for female-identifying students and confirms this finding. Women's colleges do not show significantly different changes in persistence (contrary to H1). Baseline persistence is, however, often significantly predictive of endline persistence.

**Table 3. Persistence outcomes at baseline, endline, and change, by co-ed/men's vs. women's college, all students**

	<u>Baseline</u>				<u>Endline</u>				<u>Change</u>			
	Co-ed	Women's	Total	Difference: : Women's - Co-ed	Co-ed	Women's	Total	Difference: : Women's - Co-ed	Co-ed	Women's	Total	Difference: : Women's - Co-ed
Persistence: take more econ. courses	0.63	0.84	0.69	0.21	0.54	0.71	0.59	0.17	-0.11	-0.13	-0.11	-0.02
Persistence: econ. degree	0.52	0.7	0.57	0.18	0.44	0.6	0.49	0.16	-0.07	-0.09	-0.07	-0.02
Persistence: econ. grad. school	0.19	0.31	0.22	0.12	0.15	0.28	0.19	0.13	-0.03	-0.04	-0.04	-0.01
Persistence: econ. career	0.74	0.85	0.77	0.11	0.61	0.77	0.66	0.16	-0.12	-0.09	-0.11	0.03
Overall persistence	0.82	0.92	0.85	0.10	0.72	0.87	0.76	0.15	-0.10	-0.05	-0.09	0.05

Source: Authors' calculations based on baseline and endline surveys

Notes: \*p<0.05; \*\*p<0.01; \*\*\*p<0.001. Baseline and endline include individuals who responded to both surveys; change requires responding to both surveys and being non-missing on both outcomes.

**Table 4: OLS value-added models of women’s college and persistence outcomes, female-identifying students (Testing H1)**

	Likely to take additional econ courses		Likely to pursue an econ degree		Likely to pursue graduate study in economics		Likely career that will use econ education		Overall persistence	
<b>Baseline persistence</b>	0.277 (0.147)	0.221 (0.160)	0.755*** (0.077)	0.619*** (0.104)	0.404** (0.142)	0.318* (0.126)	0.421** (0.147)	0.244 (0.126)	0.154 (0.124)	0.096 (0.123)
<b>Minority-identifying (no omit.)</b>										
Minority-identifying	0.116 (0.151)	0.069 (0.166)	0.101 (0.111)	0.213* (0.107)	0.132 (0.103)	0.182 (0.100)	0.045 (0.112)	0.099 (0.078)	0.060 (0.068)	0.071 (0.058)
<b>Women's college (co-ed. omit.)</b>										
Women's college	-0.091 (0.149)	-0.405 (0.246)	-0.093 (0.109)	-0.154 (0.222)	0.030 (0.111)	-0.140 (0.140)	-0.051 (0.111)	-0.033 (0.170)	-0.039 (0.062)	-0.210 (0.115)
<b>Controls</b>	No	Yes	No	Yes	No	Yes	No	Yes	No	Yes
<b>N (Obs.)</b>	120	120	136	136	133	133	136	136	136	136
<b>R-squared</b>	0.057	0.399	0.515	0.628	0.209	0.376	0.161	0.483	0.030	0.446
<b>Adjusted R-squared</b>	0.032	0.278	0.504	0.563	0.190	0.264	0.142	0.393	0.008	0.350

Source: Authors’ calculations based on baseline and endline surveys

Notes: \*p<0.05; \*\*p<0.01; \*\*\*p<0.001. Requires responding to both surveys.

### 4.3 Minority Identity

Turning next to minority-identifying students, Table 5 shows that at baseline fully 95% of non-minority identifying (i.e. white) students answered in the affirmative to at least one of the persistence questions. Minority-identifying students were less likely to persist on every outcome and only 84% answered in the affirmative to at least one of the persistence questions – an 11 percentage point gap.<sup>11</sup> At endline there have been across the board declines in persistence, but the declines were steeper for white students. For minority-identifying students there was very little change from baseline to endline except a reduction in their belief that economics would relate to their future career. The difference in the change between minority and non-minority identifying students was statistically significant for plans to take more economics classes and for plans to pursue an economics degree. In sum, amongst students enrolled in economics classes

<sup>11</sup> Gaps are smaller when using the full baseline sample.



minority students had lower persistence at baseline than their white peers but they were less likely to change their mind about economics.

**Table 5. Persistence outcomes at baseline, endline, and change, by minority identity, all students**

	<u>Baseline</u>			<u>Endline</u>				<u>Change</u>				
	Not minority identifying	Minority identifying	Total	Difference: Minority- identifying	Not minority identifying	Minority identifying	Total	Difference: Minority- identifying	Not minority identifying	Minority identifying	Total	Difference: Minority- identifying
Persistence: take more econ. courses	0.91	0.60	0.72	-0.31	0.60	0.59	0.59	-0.01	-0.30	0.01	-0.12	0.31***
Persistence: econ. degree	0.75	0.49	0.59	-0.26	0.57	0.47	0.51	-0.10	-0.17	-0.01	-0.08	0.16**
Persistence: econ. grad. school	0.25	0.22	0.23	-0.03	0.17	0.22	0.20	0.05	-0.09	-0.00	-0.04	0.09
Persistence: econ. career	0.84	0.79	0.81	-0.05	0.75	0.59	0.65	-0.16	-0.07	-0.20	-0.15	-0.13
Overall persistence	0.95	0.84	0.88	-0.11	0.85	0.70	0.76	-0.15	-0.10	-0.13	-0.12	-0.03

Notes: \* $p < 0.05$ ; \*\* $p < 0.01$ ; \*\*\* $p < 0.001$ . Baseline and endline include individuals who responded to both surveys; change requires responding to both surveys and being non-missing on both outcomes.

#### 4.4 Minority Serving Institutions

Looking by institution type, we see that students at MSIs had lower persistence at baseline than those at PWIs (Table 6). The gap at baseline is particularly large for plans to pursue an economics degree (76% PWIs vs. 31% MSIs,) and plans to pursue economics in graduate school (34% PWIs vs. 7% MSIs). Both groups experience declines in persistence, except students at MSIs see a small tick up in the pursuing economics in graduate school (from 7% to 8%). Students at MSIs also see a smaller decline in the likelihood of pursuing an economics degree compared to PWIs, with a significant difference in the change by institution types for this outcome in the t-tests. Table 7 tests these changes in a multivariate framework, focusing on the relationship between attending an MSI and persistence for minority-identifying students. In the multivariate models, when including controls, minority-identifying students at MSIs have significantly smaller decreases or larger increases in their intent to pursue graduate study in economics and their belief that they will have a career using economics (consistent with H2). Baseline persistence is almost always significantly predictive of endline persistence.

**Table 6. Persistence outcomes at baseline, endline, and change, by MSI vs. PWI, all students**

	<u>Baseline</u>				<u>Endline</u>				<u>Change</u>			
	PWI	MSI	Total	Difference : MSI- PWI	PWI	MSI	Total	Difference : MSI- PWI	PWI	MSI	Total	Difference : MSI- PWI
Persistence: take more econ. courses	0.83	0.52	0.69	-0.31	0.65	0.51	0.59	-0.14	-0.17	-0.04	-0.11	0.13
Persistence: econ. degree	0.76	0.31	0.57	-0.45	0.63	0.30	0.49	-0.33	-0.13	-0.01	-0.07	0.12*
Persistence: econ. grad. school	0.34	0.07	0.22	-0.27	0.28	0.08	0.19	-0.20	-0.07	0.01	-0.04	0.08
Persistence: econ. career	0.81	0.73	0.77	-0.08	0.72	0.58	0.66	-0.14	-0.08	-0.15	-0.11	-0.07
Overall persistence	0.89	0.80	0.85	-0.09	0.79	0.73	0.76	-0.06	-0.10	-0.07	-0.09	0.03

Notes: \* $p < 0.05$ ; \*\* $p < 0.01$ ; \*\*\* $p < 0.001$ . Baseline and endline include individuals who responded to both surveys; change requires responding to both surveys and being non-missing on both outcomes.

**Table 7: OLS value-added models of MSI and persistence outcomes, minority-identifying students (Testing H2)**

	Likely to take additional econ courses		Likely to pursue an econ degree		Likely to pursue graduate study in economics		Likely career that will use econ education		Overall persistence	
<b>Baseline persistence</b>	0.553*** (0.131)	0.484* (0.194)	0.798*** (0.083)	0.802*** (0.095)	0.497*** (0.136)	0.309* (0.135)	0.303 (0.156)	0.547*** (0.151)	0.388* (0.156)	0.489** (0.174)
<b>Gender (male/non-binary omit.)</b>										
Female	0.196 (0.125)	0.266 (0.139)	0.029 (0.060)	0.077 (0.105)	0.114 (0.077)	0.199 (0.118)	0.371* (0.158)	0.243* (0.121)	0.410** (0.147)	0.295** (0.109)
<b>MSI (PWI omit.)</b>										
MSI	0.008 (0.122)	0.155 (0.332)	-0.048 (0.075)	0.162 (0.160)	-0.089 (0.088)	0.491* (0.199)	-0.099 (0.135)	0.492* (0.220)	-0.038 (0.123)	0.260 (0.188)
<b>Controls</b>	No	Yes	No	Yes	No	Yes	No	Yes	No	Yes
<b>N (Obs.)</b>	89	89	99	99	96	96	99	99	99	99
<b>R-squared</b>	0.360	0.507	0.667	0.728	0.338	0.554	0.253	0.558	0.323	0.580
<b>Adjusted R-squared</b>	0.338	0.371	0.656	0.662	0.316	0.443	0.229	0.452	0.301	0.478

Source: Authors' calculations based on baseline and endline surveys

Notes: \* $p < 0.05$ ; \*\* $p < 0.01$ ; \*\*\* $p < 0.001$ . Requires responding to both surveys.

## 5 Conclusions

Economics suffers from under-representation of female and minority students and faculty, with limited progress over time (Chari 2023; Committee on the Status of Minority Groups in the Economics Profession (CSMGEP) 2023). Past research has explored the profession's "leaky pipeline" (Buckles 2019; Gentry, Meer, and Serra 2023; Foster, McEntarfer, and Sandler 2023; Berland, Harman, and Moreau-Kastler 2023) and also flagged that progress on inclusion for earlier stages of the profession has not necessarily translated into progress at later stages (Price 2009). Identity-focused institutions may improve persistence in economics and similar fields (Alston et al. 2022; Edwards et al. 2023; Calkins et al. 2023; Butcher, McEwan, and Weerapana 2023).

In this paper, we used longitudinal data from surveys that intentionally over-sampled women's colleges and MSIs, exploring persistence over time. A key initial finding is that, at least in our sample, there is a decrease in students' plans to persist in economics over time. Baseline plans to persist were related to endline persistence, unsurprisingly and consistent with the literature (Bayer et al. 2020).

Women were, however, more likely to persist than male/non-binary students. Past research has noted that women who receive lower grades in introductory economics classes tend not to persist in the major (Owen 2010; Rask and Tiefenthaler 2008). Since our sample included students from all course levels, women may have already selected out of the major before we observed them, leaving a more persistent group. Other research has identified women's colleges as important for increasing the rate of women majoring in economics (Calkins et al. 2023; Butcher, McEwan, and Weerapana 2023). These results may be reconciled if impacts of women's college occur in the initial economics decision rather than persistence once students take economics.

Minority-identifying students, compared to non-minority students, had lower initial persistence, but were significantly less likely to desist on some of the outcomes. Although this area has not been explored as thoroughly in past research as for women, it may be that minority-identifying students, like women, desist from economics relatively earlier in their trajectories, such that those we observe taking economics classes are strongly selected. MSIs were associated with more positive (less negative) changes in persistence for graduate school and careers in the models including controls, but not overall persistence.

We note a number of limitations of our results that point to important areas for future research. Our sample intentionally over-sampled MSIs and women's colleges, as critical sites for educating minority and female economists, but therefore was not representative of the national landscape of higher education. Similar research should be undertaken with a sufficiently large sample to assess persistence, RBG, identity, and identity-focused institutions in a nationally representative sample. Particular attention should be paid to issues of attrition and power, which limited our analyses.

Although we improved on past research on persistence (Bayer et al. 2020) in undertaking longitudinal analyses, our data were only 12 months apart. Growth may happen over longer time horizons. Furthermore, we did not differentiate between introductory and upper-level students, who may have heterogeneous experiences; challenges with persistence may occur more frequently at the introductory level, leaving a selected sample in upper-level classes. Nationally representative research looking at major switching finds economics has a relatively low rate of switching (Astorne-Figari and Speer 2019), but this could be because students select out more often before declaring their major. Fully investigating trajectories from high school and through college would be very valuable. Future research also needs to investigate actual outcomes for employment and graduate studies; we used self-reported intentions, as that was what was available at the time, but realized behaviors could be different. Furthermore, while in our research identity-focused institutions did not clearly mediate changes in persistence, the impact of such institutions on majoring in economics is appreciable (Butcher, McEwan, and Weerapana 2023; Calkins et al. 2023) and mechanisms need to be further researched.

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