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# Major Decision: The Impact of Major Switching on Academic Outcomes

Vivian Liu, Soumya Mishra, & Elizabeth Kopko
Community College Research Center
Teachers College Columbia University

# Introduction

- Major switching is common
  - One-third of AA & BA students (2011-12) switch majors
- What we do know
  - Who chooses which majors and why
  - Factors that affect academic outcomes and degree persistence
- Double edged sword
  - A better person-major fit
  - Excess credit accumulation, disrupted academic momentum

# Research questions

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  1. Do major switchers have different demographic and academic characteristics than major-persisters?
  2. How, if at all, do the academic outcomes of switchers differ from major-persisters?
  3. How does the impact of major switching vary by intention declared at enrollment and initial major choice?

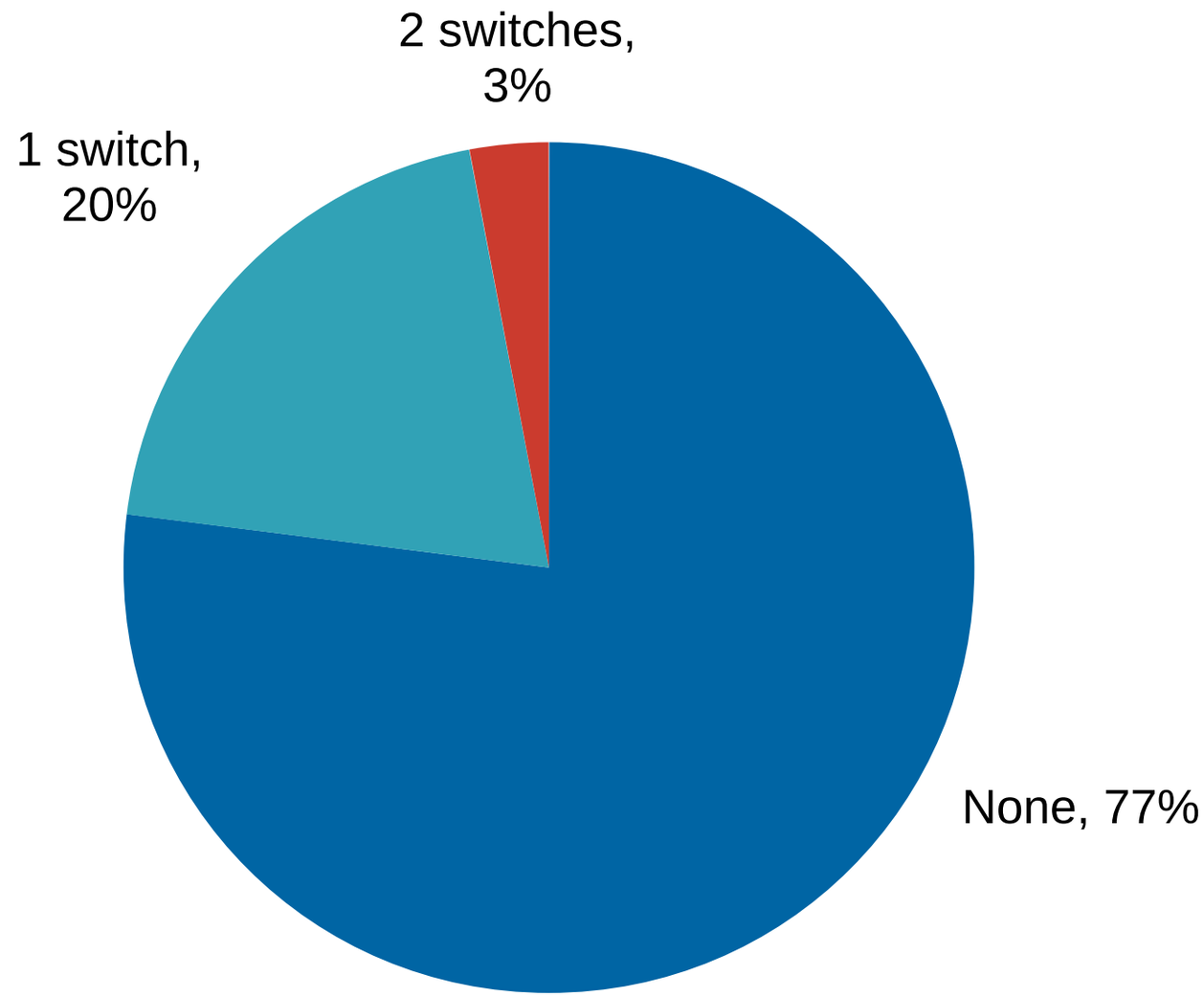
# Related literature

- Mechanisms that link switching and student outcomes
  - Holland (1997), Allen & Robbins (2008), Adelman (2006), Attewell, Heil, & Reisel (2011), Zeidenberg (2012)
- Existing evidence on impact of major switching
  - Micceri (1996, 2001), Murphy (2000), Foraker (2012), Sklar (2014), Yue and Fu (2017)

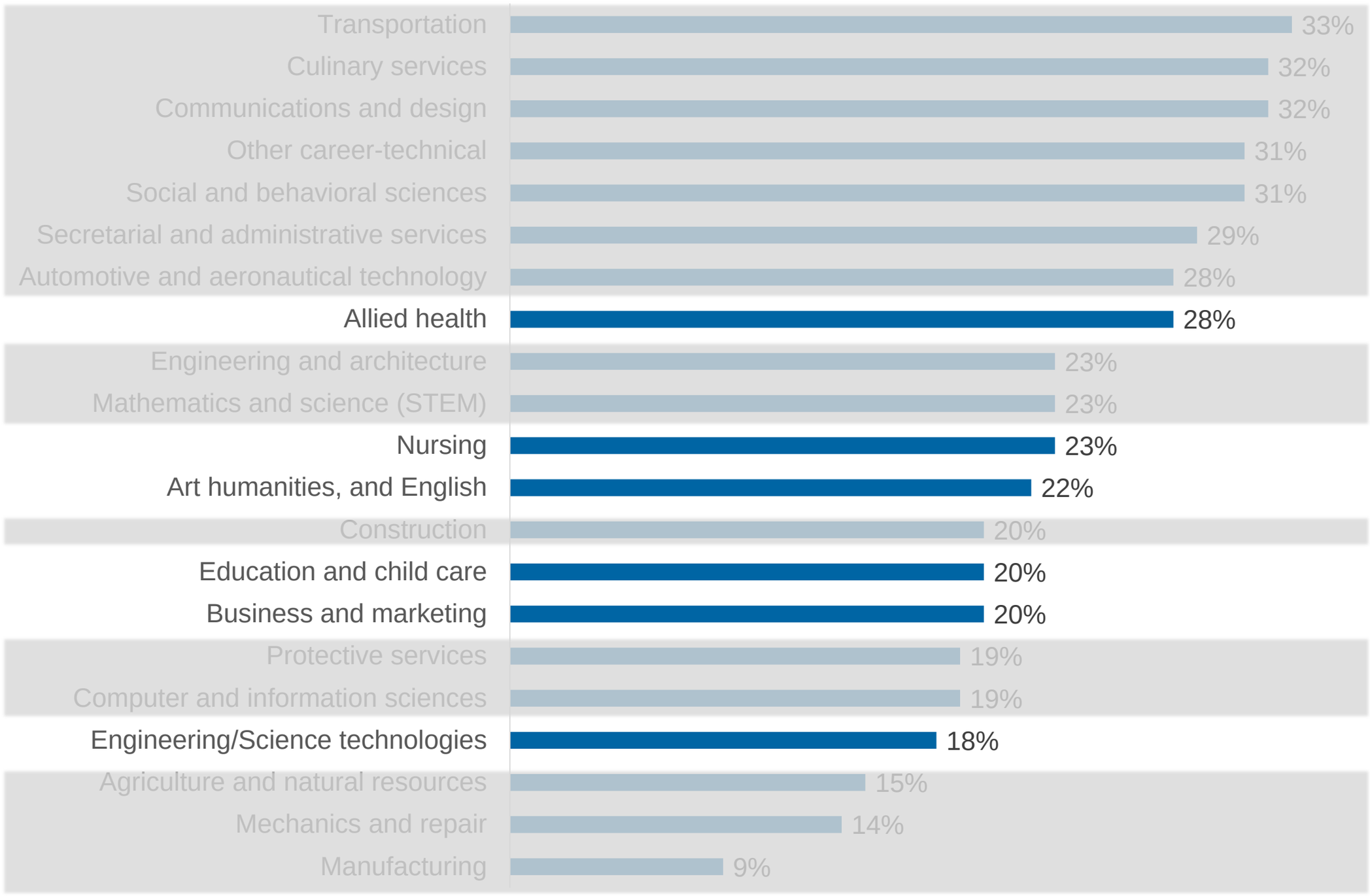
# Data

- 20+ community colleges
- Fall 2012 – Summer 2017
- Demographics, transcript, NSC, and degree data
- Definition of major switching
  - 646 cipcodes categorized into 22 fields
  - Moving from one field to another is a switch
- Sample
  - At least 4 terms of enrollment, declared a major in first term
  - **15,380** students in the final analytic sample

# Frequency of major switching



# Switching rate by field



# Major switchers and persisters

| Student characteristics | All | Ever Switched | Never Switched | Major Undeclared |
|---|---|---|---|---|
| Female | 55% | 60% | 53% | 57% |
| White | 74% | 73% | 74% | 76% |
| Black | 15% | 16% | 15% | 11% |
| Hispanic | 4% | 3% | 4% | 4% |
| Other race/ethnicity | 14% | 14% | 13% | 15% |
| State resident | 98% | 98% | 98% | 98% |
| District resident | 33% | 33% | 32% | 45% |
| Age at enrollment: 18 and 19 years | 51% | 53% | 49% | 59% |
| Age at enrollment: Above 20 years | 49% | 47% | 51% | 41% |
| Delayed enrollment after high school | 46% | 45% | 47% | 39% |
| | | | | |
| Ever enrolled in developmental math | 69% | 73% | 67% | 71% |
| Ever enrolled in developmental English | 36% | 41% | 34% | 38% |
| | | | | |
| College credits earned in first term | 6.47 | 6.21 | 6.62 | 5.50 |
| Pass rate in first term | 70% | 69% | 71% | 65% |
| | | | | |
| **Observations** | **16,380** | **3,511** | **11,862** | **1,007** |

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# Methods

# Propensity Scores Matching

1. Calculate propensity scores

$$logit(S_i) = \beta_0 + \beta_1 X_i + \mu_i$$

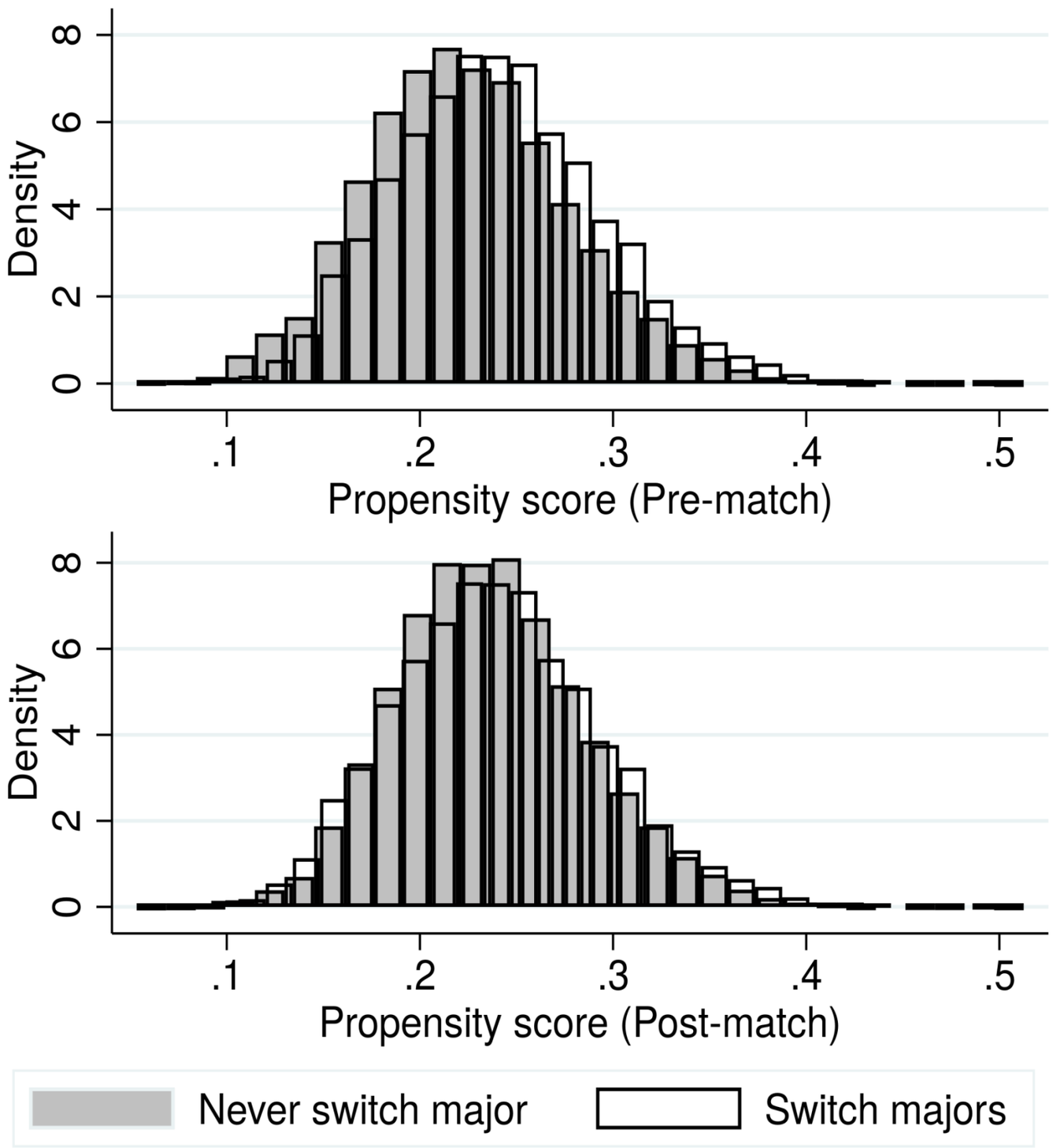
*S: Switch major =1*

*X: Student characteristics, 1st term performance, major fixed effect*

*2. Estimate outcome differences*

$$Y_i = \alpha_0 + \alpha_1 S_i + \alpha_2 X_i + \emptyset_i$$

# Common Support Graph



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# Results

# Main Results

| | Model 3 | |
|---|---|---|
| 1. Total credits earned in 6 years | 2.302*** | [0.632] |
| 2. Total college credits earned in 6 years | 2.330*** | [0.613] |
| 3. Ever enrolled in a 4-year college | 0.013* | [0.007] |
| Observations | 15,380 | |

*Note:* Robust standard errors in brackets. All regressions have full set of covariates, including demographic variables, intent at enrollment, institutional fixed effects, cip-level fixed effects and first term academic performance.. *** p<0.01, ** p<0.05, * p<0.1

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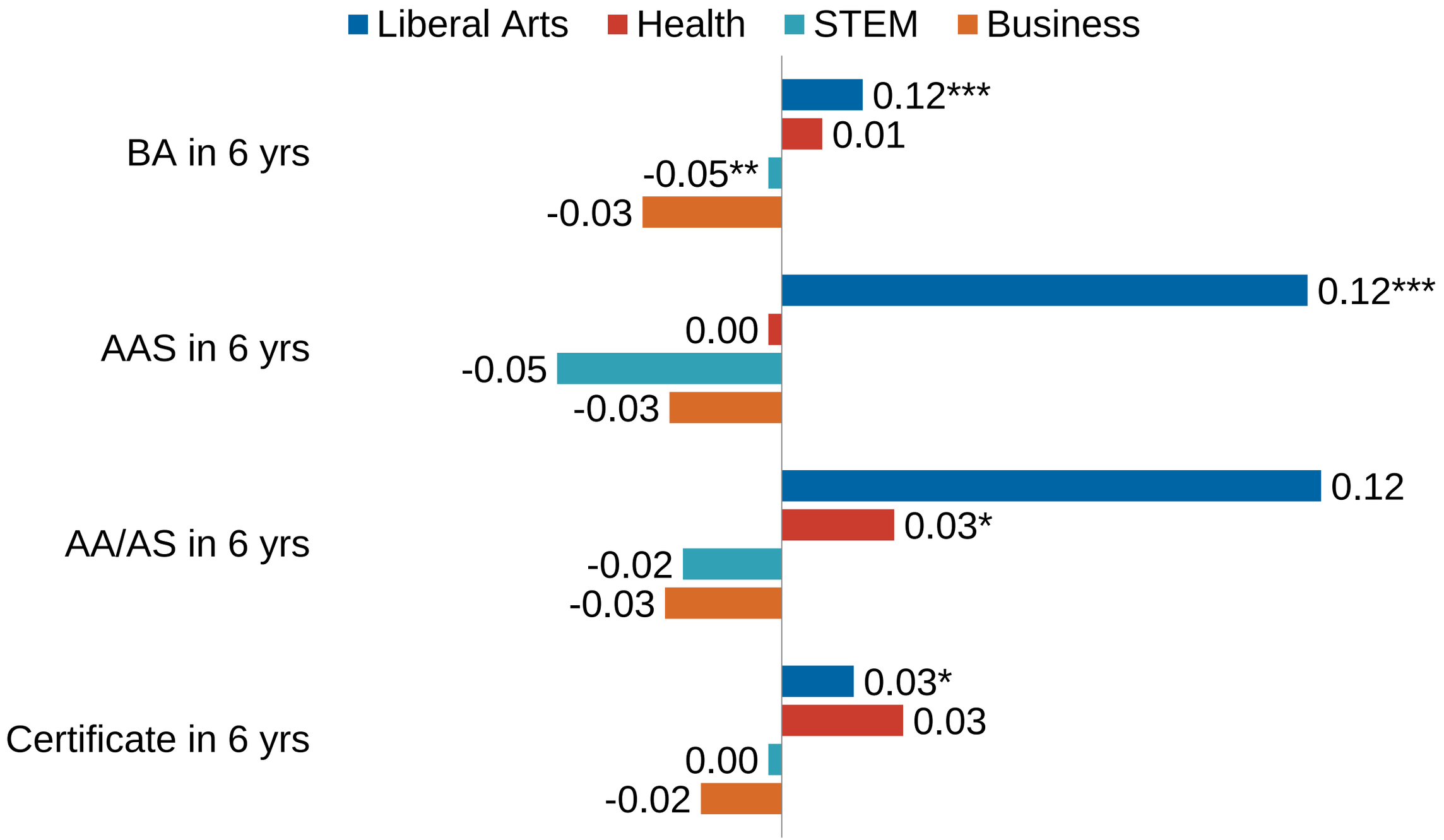
| 1. Total credits earned in 6 years | 2.302*** | [0.632] |
| 2. Total college credits earned in 6 years | 2.330*** | [0.613] |
| 3. Ever enrolled in a 4-year college | 0.013* | [0.007] |
| 4. Earned a Certificate in 6 years | 0.025*** | [0.006] |
| 5. Earned an AA/AS in 6 years | 0.013 | [0.008] |
| 6. Earned an AAS in 6 years | 0.008 | [0.006] |
| 7. Earned a BA in 6 years | -0.010** | [0.005] |
| | | |
| Observations | 15,380 | |

*Note:* Robust standard errors in brackets. All regressions have full set of covariates, including demographic variables, intent at enrollment, institutional fixed effects, cip-level fixed effects and first term academic performance.. *** p<0.01, ** p<0.05, * p<0.1

# Heterogeneous Impact by Enrollment Intent

| | BA Intents | | Others Intents | |
|---|---|---|---|---|
| | | | | |
| 1. Ever enrolled in a 4-year college | -0.016 | [0.018] | 0.016** | [0.008] |
| 2. Earned a Certificate in 6 years | 0.036*** | [0.013] | 0.023*** | [0.007] |
| 3. Earned an AA/AS in 6 years | 0.044** | [0.020] | 0.000 | [0.009] |
| 4. Earned an AAS in 6 years | 0.012 | [0.016] | 0.005 | [0.007] |
| 5. Earned a BA in 6 years | -0.030* | [0.016] | -0.003 | [0.004] |
| | | | | |
| Observations | 3,074 | | 12,301 | |

# Heterogeneous Impact by Field



# Conclusion

- Major switching within first 2 years has an mild impact
  - Small gains in Certificates and transfer rate
  - Small reduction in BA completion rate
- Policy implications
  - Important to assist students with major choice
  - Common course sequencing across programs
  - Flexible choices of elective requirements
- Future research
  - Why do students switch? What is the mechanism?

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# Thank you!

## Correspondent: Vivian Yuen Ting Liu

ytl2102@columbia.edu
@VivianYTLiu

**https://sites.google.com/site/vivianytl**

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# Appendix

# Fields used for switching definition

| Fields (22) | Areas (9) |
|---|---|
| Business and marketing<br>Secretarial and administrative services | Business |
| Allied health<br>Nursing | Health professions |
| Art humanities, and English | Arts, humanities, & English |
| Social and behavioral sciences<br>Communications and design | Social & behavioral sciences |
| Computer and information sciences<br>Mathematics and science (STEM)<br>Engineering and architecture<br>Engineering/Science technologies | Stem |
| Agriculture and natural resources | Agriculture & natural resources |
| Education and child care | Education |
| Automotive and aeronautical technology<br>Construction<br>Manufacturing<br>Mechanics and repair<br>Transportation<br>Other career-technical | Applied technology |
| Protective services<br>Culinary services | Public services & administration |