How can we help students make better investments in college? *Financial Aid and STEM*

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Focus: STEM Fields

(Science, Technology, Engineering and Math)

Overall, unemployed people outnumbered job posting by 3.6 to one

In STEM occupations, job posting outnumbers unemployed persons 1.9 to one

Does Need-Based Aid Improve STEM Selection, Achievement, and Attainment?

Possible Financial Barriers

- Added costs (e.g. lab and material fees, etc.) make STEM majors more expensive than other options
- Work commitments make pursuing STEM difficult
- Institutional differences exacerbate gaps in STEM outcomes due to high-quality versus low-quality programs

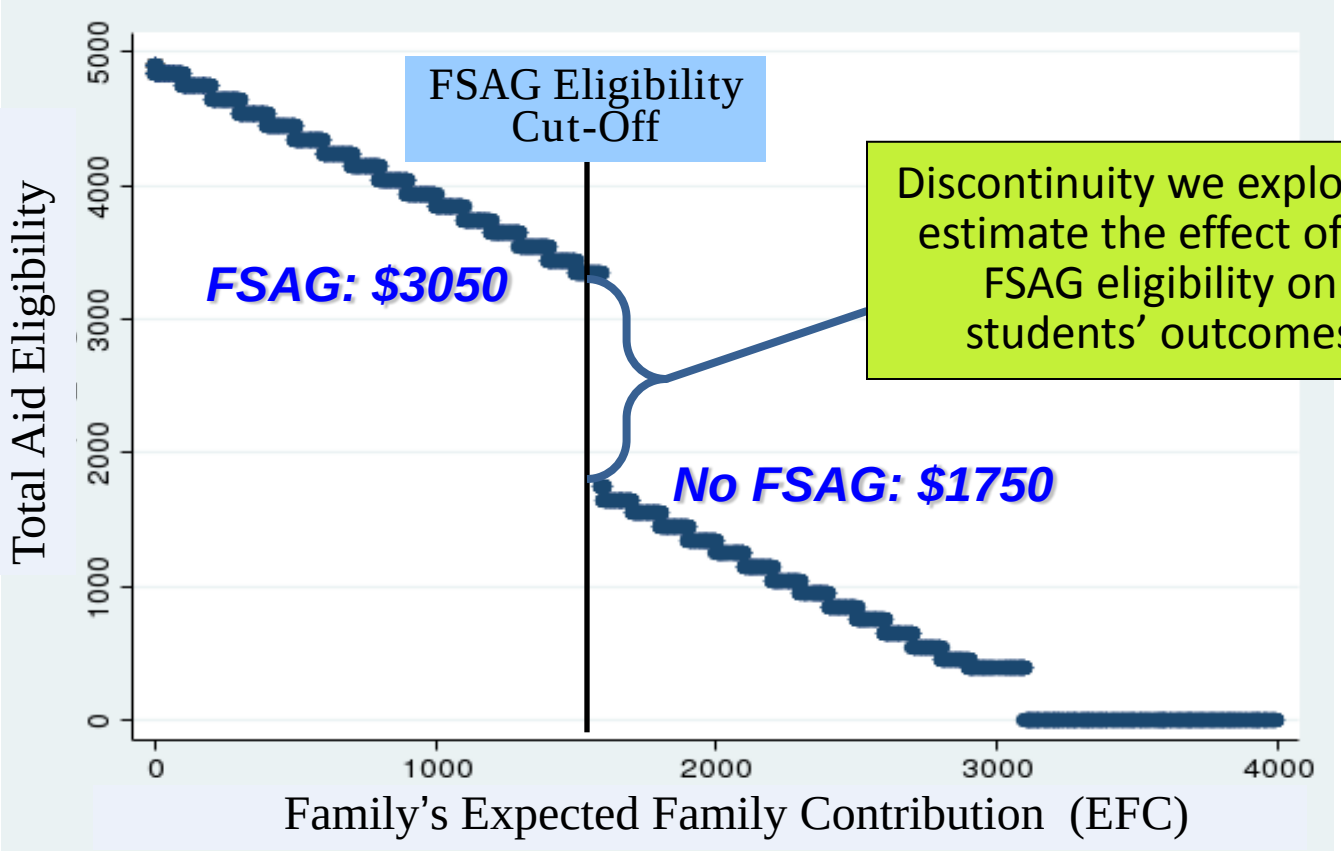
→ *Does eligibility for need-based aid increase the number of STEM credits that students attempt and accumulate in college?*

→ *Does eligibility increase students' probability of earning a bachelor's degree in STEM fields?*

Focus: Florida Student Access Grant

- Need-based Grant: $1,300 in 2000-01
  - 57% of tuition & fees at FL public 4yrs
  - 90% of tuition and fees at CCs
- Students also received the Pell Grant (about $1,750)
  → a good test for an increase in need-based aid

Focus: Florida Student Access Grant



Data Set and Samples

FLDOE K-20 Data Warehouse:

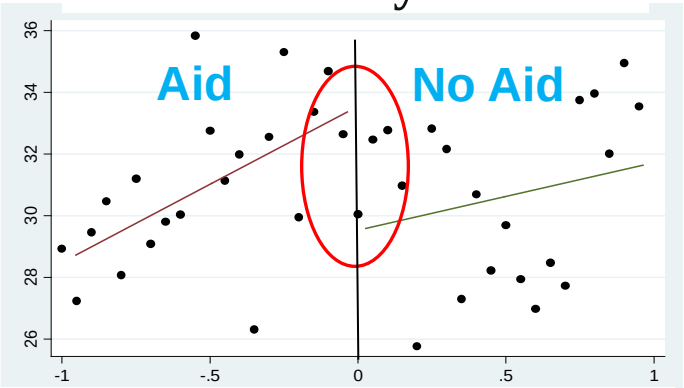
- All FL public HS seniors in AY 1999-00 (N=101,094)
- Detailed student-level data (demographics, HS and college transcripts; aid eligibility and receipt)

Students who completed the FAFSA in 1999-2000 (N=45,727)

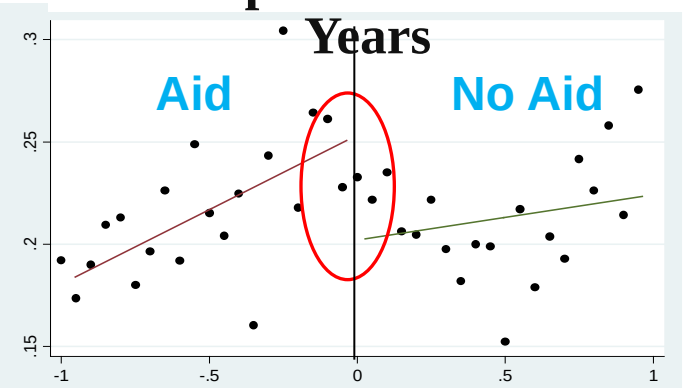
Castleman and Long (2016)

"Looking Beyond Enrollment: The Causal Effect of Need-based Grants on College Access, Persistence, and Graduation"

Credits completed within 3 years



Bachelor's Degree Completion within 6 Years



- ➔ Positive impact on early persistence & credit accumulation
- ➔ Positive impact bachelor's degree receipt within 5, 6, and 7 years (2.5, 3.5, and 4.0 percentage points per $1,000)

Data Set and Samples

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Students who completed the FAFSA in 1999-2000 (N=45,727)

Demonstrate readiness for STEM:

a) Students who surpass college-ready math standards on Florida Math placement test or SAT Math exam (N=20,738)

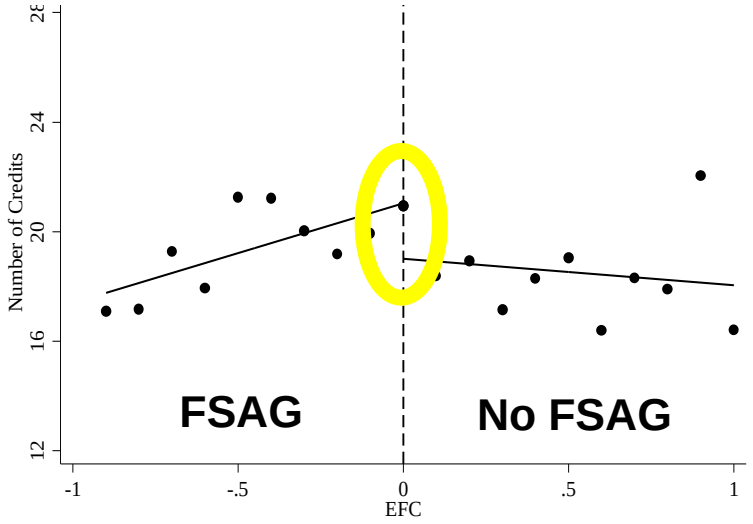
b) Students who completed trigonometry or a more advanced Math class in high school (N=8,907)

Castleman, Long, and Mabel (2017)

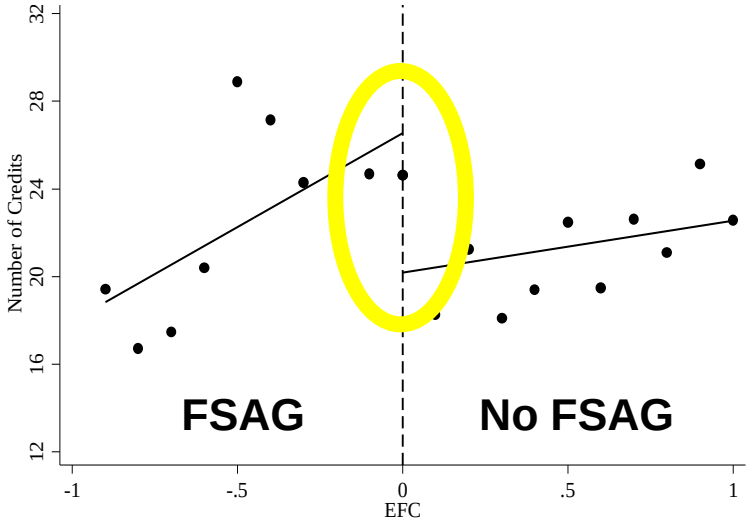
STEM Credits Earned after Seven Years

(Locally Linear Regressions fit on either side of the FSAG cut-off)

A. College Math Sample



B. HS Trig+ Sample

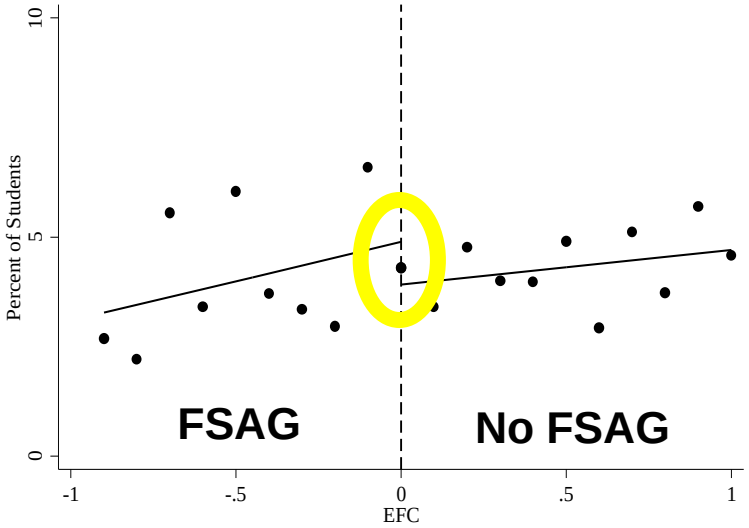


Castleman, Long, and Mabel (2017)

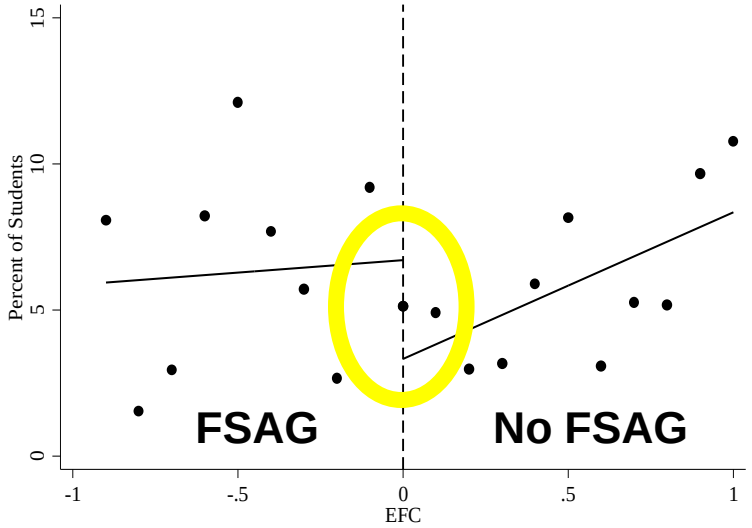
BA/BS Degree in STEM after Seven Years

(Locally Linear Regressions fit on either side of the FSAG cut-off)

A. College Math Sample



B. HS Trig+ Sample



Castleman, Long, and Mabel (2017)

Table 5: The Effect of FSAG Eligibility on STEM Outcomes Through Year 7

	STEM Credits Attempted	STEM Credits Completed	BA/BS Degree in STEM
Panel A: College Math Sample (N = 2,834)			
Eligible for FSAG	**2.701** **[2.076]**	**3.705**** **[1.800]**	**0.027*** **[0.015]**
R-squared	0.195	0.204	0.191
Outcome mean above cut-off	23.55	18.27	0.043
Panel B: HS Trig+ Sample (N =1,283)			
Eligible for FSAG	**5.456** **[4.115]**	**7.259**** **[3.533]**	**0.028** **[0.032]**
R-squared	0.300	0.310	0.290
Outcome mean above cut-off	26.47	20.98	0.059

*** p<0.01 ** p<0.05 * p<0.10 Notes: Robust standard errors, clustered at the HS level, are shown in brackets. All results are from multiple imputation OLS/LPM specifications estimated with an EFC window +/- $1,000 around the FSAG cut-off and include the following covariates: race/ethnicity dummy variables; female dummy variable; HS senior year GPA; SAT math and verbal scores (imputed where missing); whether the student was in a gifted and talented program; parental AGI; student age, and whether the student was eligible for the Bright Futures Scholarship. All models also include high school fixed effects and a constant.

Castleman, Long, and Mabel (2017)

"Can Financial Aid Help to Address the Growing Need for STEM Education?

Conclusions: Eligibility for additional need-based aid…

- Increased STEM credit completion 16-19 percent over students who were ineligible for FSAG (33 percent for the sample who had taken at least trigonometry in HS)
- Robust to different specifications
- Effects on degree attainment are imprecise but suggest that STEM degree production may have increased by 50 percent
- Results appear to be driven by shifting students into STEM-heavy courseloads, suggesting aid availability impacts the academic choices students make after deciding to enroll

Policy Implications

- For academically-qualified students, need-based aid may be an effective instrument to increase STEM attainment
- Policy efforts should continue to focus on improving the math and science preparation in high school
- But aid also helps with academic persistence

Additional Questions for Future Research

- Are academically-qualified students experiencing a STEM mismatch (given institutional differences)?
- Do the impacts of financial aid on STEM achievement and attainment vary by STEM field?

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