Why Have College Completion Rates Increased?

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Introduction

- Students who complete college have better outcomes than students who enroll and do not complete (Ost, Pan, and Webber, 2018)
- College completion rates are around 60%–prompting discussion of a "college completion crisis" (Deming 2017)
- Research and policy attention has increasingly focused on college completion

Completion Rates

- Bound, Lovenheim, and Turner (2010) (hereafter BLT) document that college completion rates declined from the 1970s to 1990s
- Additionally, they document that this was largely driven by changes in "supply-side" factors including resources for college, and college type
- This paper was highly influential for at least two reasons:
  - Documenting the fact
  - Emphasized the role of institutions (Cohodes Goodman 2014; Goodman, Hurwitz, Smith 2017; Zimmerman 2014)

What We Do

- What has happened to college completion since 1990?
  - Show completion rates have increased
- Why have college completion rates increased?
  - Explanations in BLT do not explain the change

Outline

Trends in Graduation Rates

Other Trends

Decomposition
- Data
- Empirical Strategy
- Results

Discussion and Conclusion

Plan

Trends in Graduation Rates

Other Trends

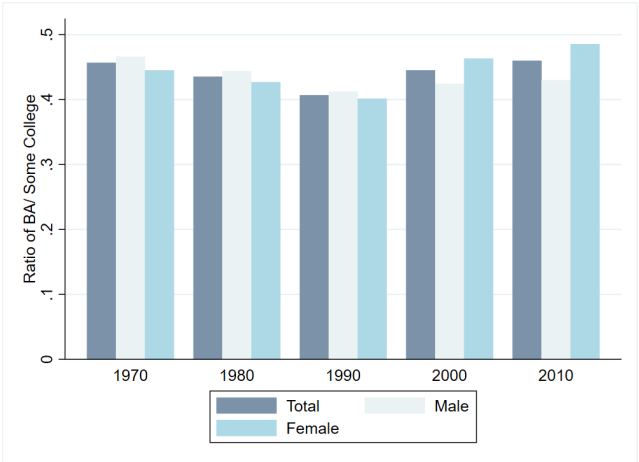
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Trends Data

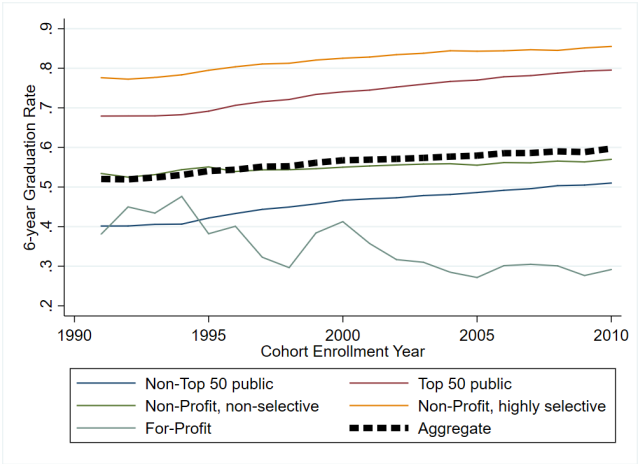
- We use three sources to document the change in graduation rates
  - Census
  - IPEDS
  - Micro NCES data (NELS:88, ELS:2002)
- Each is imperfect but all tell the same story–college graduation rates have increased

Ratio of BAs/Some College, Census



- Ratio of 25 year olds having a bachelor's degree to 25 year-olds with at least some college completed

6 year graduation rates IPEDS



- Considers first-time, full-time students beginning in Fall semester
- Terry Long (2018) documents similar trends in IPEDs

▸ Enrollment Numbers

NCES Micro Data

Sample	NELS:88	ELS:2002	Difference
Full Sample	48.7	52.5	3.76**
			(1.71)
Initial Institution Type			
Non-top 50 Public	56.1	61.0	4.93*
			(2.59)
Top 50 Public	82.1	90.7	8.57***
			(2.57)
Less Selective Private	72.3	71.2	-1.05
			(2.96)
Highly Selective Private	90.5	92.2	1.66
			(2.76)
Total Community College	19.5	24.3	4.81***
			(1.70)
For-Profit College	25.2	24.7	-0.42
			(8.92)

Graduation Rates Summary

- Graduation rates are increasing from 1990 to present
- True across all* institution types

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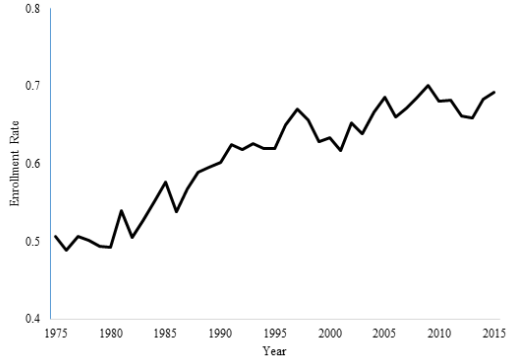
Discussion and Conclusion

Other Trends in Higher Education

Before analysis we discuss other relevant trends in higher education

- Student enrollment/preparation
- Student employment
- Price of college
- Support for higher education
- Study time
- Enrollment sector
- Performance funding

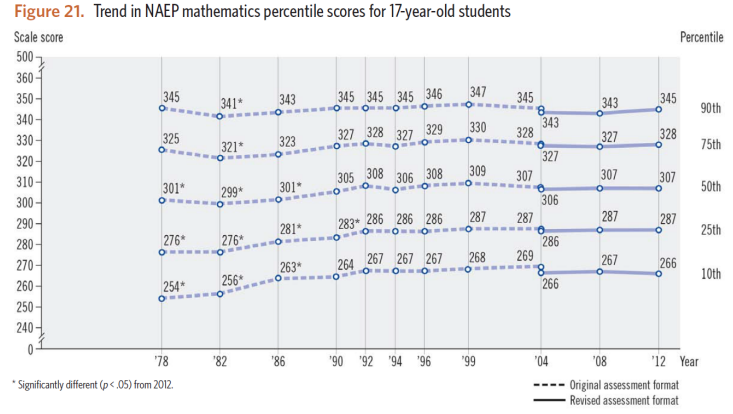
Enrollment/Preparation



Source: NCES Digest of Education Statistics Table 302.30

- Enrollment rate among recent high school completers from CPS
- Enrollment grew from 69.3 for NELS:88 to 78.3 for ELS:2002

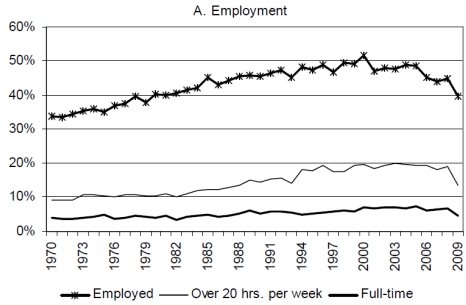
Preparation



Source: Trends in Academic Progress, U.S. Department of Education 2012

- Math (and reading) preparation is unchanged. With increasing enrollment and static preparation, less-prepared students are entering college

Employment



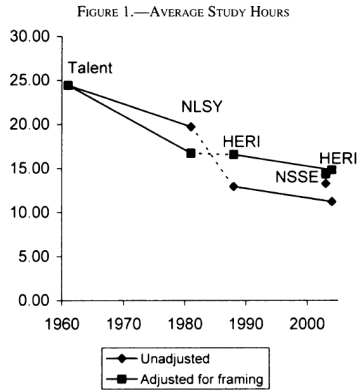
Source: Scott-Clayton 2012

- Student employment in college has increased with the exception of the Great Recession (Scott-Clayton 2012)

Price of College, Support for Higher Education

- The price of college has increased substantially (CollegeBoard 2017) over this time period
- The price of college affects college completion (Castleman and Long (2016); Barr (2018); Bettinger et al. (2019); Denning (Forthcoming); Denning, Marx, and Turner (Forthcoming))
- State support for higher education has fallen. (CollegeBoard (2017))
- State funding affects college graduation (Deming and Walters 2017)

Study Time



Source: Babcock and Marks 2011

- The decline not well explained by covariates (Babcock and Marks 2011)

Initial Enrollment by School Type

School Type	NELS:88	ELS:2002
Non-top 50 Public	28.9	32.6
Top 50 Public	10.9	9.6
Less Selective Private	13.3	13.2
Highly Selective Private	6.7	5.2
Total Community College	39.8	37.2
For Profit Colleges	0.4	2.3

- No dramatic changes in the distribution of enrollment (in contrast to BLT)

Performance Funding

- Some states tie funding to graduation
- Much of the evidence on this is mixed (Hillman, Tandberg, and Fryer 2015; Hillman, Tandberg, and Gross 2014)
- Would not (easily) explain changes in the private sector
- Even if graduation rates are increasing as a result of performance funding, we would still want to know what mechanisms schools are using to change graduation rates

Trends Recap with Predictions

- Student enrollment/preparation $\downarrow$
- Student employment $\downarrow$
- Price of college $\downarrow$
- Support for higher education $\downarrow$
- Study time $\downarrow$
- Enrollment sector $\leftrightarrow$

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Micro Data

- We use the NELS:88 and ELS:2002 micro data sets which correspond to the the 1992 and 2004 high school classes respectively.

- Both surveys have
  - Student pre-college characteristics: gender, income, race, math test scores
  - College attended: supplemented with college characteristics from IPEDs
  - Student choices/performance in college: GPA, major
  - Graduation

Sample Choice

- Focus only on college enrollees
- Exclude students who started at 2-year private schools
- We use nearly the same classification that BLT do: Top 50 Public, Non Top 50 Public, Highly Selective Private, Less Selective Private, Community Colleges, For Profit
- We use the 2005 US News rankings. Highly Selective Private–65 highest rated private universities, the 50 highest rated liberal arts colleges, and the armed service academies

Variable Definitions

- College enrollment within 2 years of expected high school graduation
- College graduation within 8 years of expected high school graduation
- When missing, we impute math score, first year GPA, parent income, parent education, major graduation rate.

Summary Stats

	Enrollees		Graduates	
Variable	NELS:88	ELS:2002	NELS:88	ELS:2002
Math Test Percentile	58.85	55.93	71.20	67.66
Student-Faculty Ratio	39.35	40.44	29.70	32.11
Mother BA	0.19	0.23	0.25	0.28
Male	0.49	0.46	0.45	0.44
White	0.75	0.73	0.81	0.79
Major Graduation Rate	0.51	0.54	0.66	0.67
First Year GPA	2.44	2.65	2.88	3.05
N	7,770	8,650	4,110	4,970

Empirical Strategy

- We will decompose the changes in graduation rates into several factors (following BLT)
- We predict college graduation using a logit model
- Use the βs from the later period and apply them to the Xs in the early period
- Next, we compute the difference in actual graduation in the later period and predicted graduation
- This gives us how much change is due to *all* covariates
- Next, we want to know how much is due to individual covariates

Empirical Strategy

- If we were using OLS, the change due to a single covariate would be easy.
- Considering the change due to a single covariate is trickier in our setting because the prediction will depend on the distribution of covariates.
- We replicate the distribution of a x_i by taking each observation and assigning them a percentile in the distribution of their actual survey year
- We then assign observations in the later time period the value from the observation in the early time period with the same rank, breaking ties randomly

Empirical Strategy

- Ex: The top ranked student in the late period gets the test score of the top ranked student in early period and so on. We then look at the predicted graduation using the covariates from the late period, βs from the late period, replacing math scores with the math scores of the early period

- The difference between the predicted graduation and the actual graduation in late period is the amount we attribute to that particular x_i

Caveats

- We would have to make very strong assumptions to interpret this evidence as causal
- We prefer to think of this as a consistent accounting framework for different trends in graduation

BLT Specification

	Full Sample	Public non-top 50	Public top 50
NELS:88	48.71	56.08	82.15
ELS:2002	52.47	61.01	90.71
Total Change	3.76	4.93	8.57
Change due to Observables	-1.88	-4.35	-0.42
Math Test Percentile	-1.25	-1.99	0.09
Student/Faculty Ratios	-0.29	-1.81	0.00
Initial School Types	0.01		
Change due to Other Characteristics	-0.35	-0.55	-0.52
Residual	5.65	9.28	8.99

- Included controls: demographics (gender, race, income, parent ed), preparation, student/Faculty ratios, initial school types

BLT

- The predictions that worked for BLT would predict graduation *declines*
- The unexplained or residual portion is 150% of the change
- We previewed this in our description of the trends–the trends are going the wrong way
- We need new explanations
  - Standards for degree receipt
  - Major
  - Service expenditures

Standards for Degree Receipt

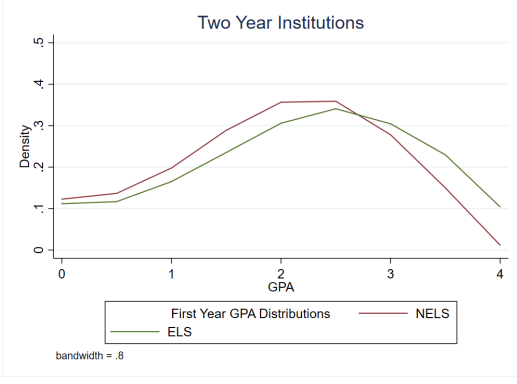
- Measuring changes in standards for degree receipt is difficult
- Ideally, you would have measures of student learning, content, time required, etc.
- Even if such data existed, standards for degree receipt would be hard to directly measure.
- We will present indirect evidence of changing standards for degree receipt.

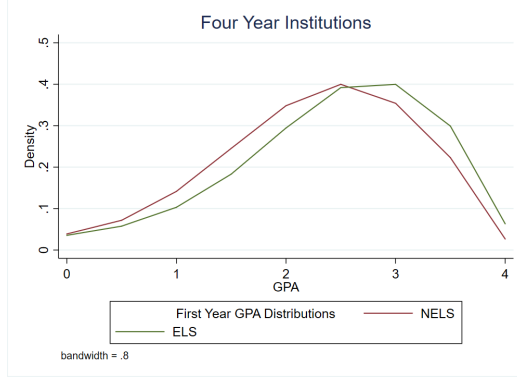
GPA

- Student GPAs have increased by 0.21 over this time frame
- GPAs increased despite concurrent decreases in study time, increases in working
- We document three facts about GPA:
  - GPAs are increasing
  - GPAs are predictive of graduation
  - Increases in GPA are not well explained by student covariates

Where did GPA Increase?

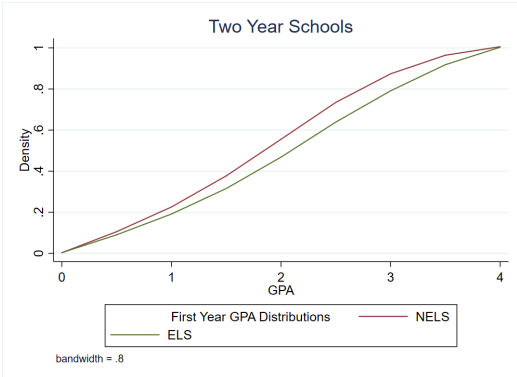
- At all school types
- We present pdfs of GPA for the two time periods by school type

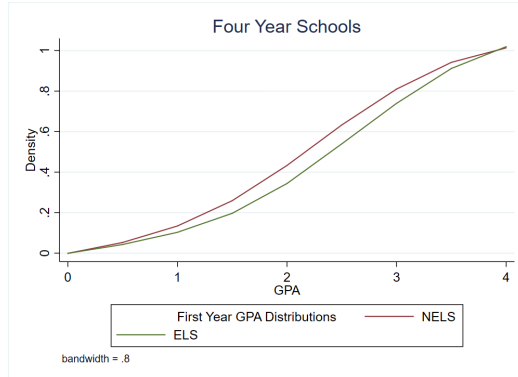




GPA CDFs

- 10% of the distribution shifted above 2.0





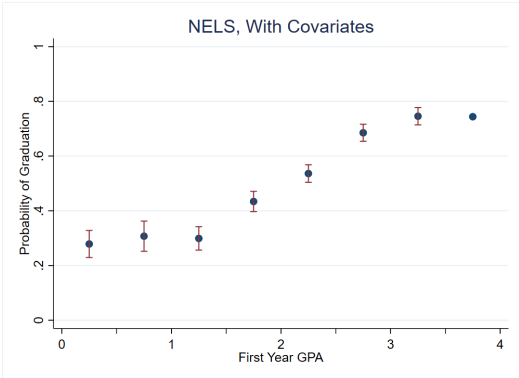
▸ More CDFs

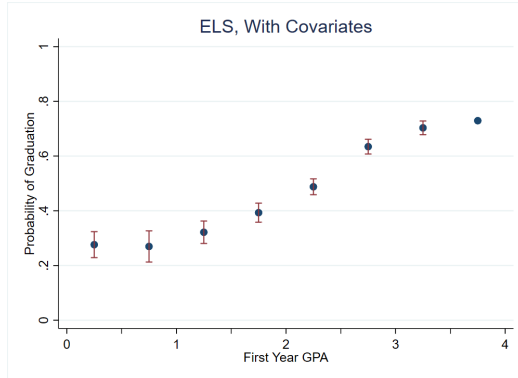
GPA is Predictive of Graduation

	Graduation					
	NELS:88	ELS:2002	NELS:88	ELS:2002	NELS:88	ELS:2002
GPA	0.26	0.24	0.17	0.16	0.16	0.14
	(0.007)	(0.005)	(0.008)	(0.006)	(0.008)	(0.006)
Student Char			X	X	X	X
Major FE					X	X

- Independently correlated with graduation

GPA is Predictive of Graduation





- We regress graduation on bins of first year GPA controlling for student covariates, school type, etc.
- GPA increases from 1.5 to 2.5 are associated with increases in graduation

Observable Student Characteristics do not Explain Increases in GPA

	GPA	GPA	GPA	GPA
ELS Indicator	0.21	0.24	0.21	0.27
	(0.022)	(0.020)	(0.020)	(0.020)
Student Characteristics		X	X	X
Major Grad Rate			X	
Major Fixed Effects				X

- Predicting GPA using student covariates, type fixed effects, major fixed effects, etc.

Interpretting the GPA Evidence

- GPA has increased
- GPA increases are not well-explained by student covariates
- Trends in studying and employment would suggest declining GPAs
- We interpret this evidence as changing standards for degree receipt
- Another consistent explanation would be efficiency gains in studying

Anecodtal Evidence

College Wouldn't Cost So Much If Students and Faculty Worked Harder

I assign far less reading, demand less writing, and give higher grades than I did two generations ago.

By Richard Vedder
April 10, 2019 6:53 p.m. ET

Next: Add GPA to the decomposition

Adding GPA to Decomposition

	Full Sample	Public non-top 50	Public top 50
NELS:88	48.71	56.08	82.15
ELS:2002	52.47	61.01	90.71
Total Change	3.76	4.93	8.57
Change due to Observables	2.37	2.62	2.07
Math Test Percentile	-0.74	-1.08	0.04
Student/Faculty Ratios	-0.21	-1.68	0.00
Initial School Types	0.04		
Change due to GPA	3.44	5.85	3.18
Change due to Other Factors	-0.15	-0.48	-1.16
Residual	1.39	2.31	6.50

GPA Decomposition

- GPA explains a large portion of the change (91%)
- However, other variables point to graduation rate declines so the overall explained change is 63%
- This is consistent with declining standards for degree receipt explaining a substantial portion of the increase in graduation rates

Major Choice

- Student could choose higher graduation rate majors
- In fact, they are
- We use the major graduation rates from ELS:2002 and determine what the college graduation rate in NELS:88 would have been if student major choice had been the same
- Students are enrolled in higher graduation rate majors
- We add this to the decomposition
- We exclude 2-year schools from this analysis due to differences in majors

Adding GPA and Major to Decomposition

	4Yr Schools	Public Non-Top 50	Public Top 50
NELS:88	68.27	56.08	82.15
ELS:2002	70.60	61.01	90.71
Total Change	2.33	4.93	8.57
Change due to Observables	3.73	5.05	3.50
Math Test Percentile	-0.65	-0.99	0.05
Student/Faculty Ratios	-0.88	-1.56	1.00
Initial School Types	-0.01		
GPA	3.93	5.73	2.97
Major Graduation Rates	1.93	2.51	1.00
Other Factors	-0.60	-0.12	-1.51
Residual	-1.40	-0.12	5.06

Major

- GPA and major have separate effects. Graduation rates are increasing after accounting for major fixed effects.
- GPA's contribution is about twice as large as major choice

Other Explanations

- Schools are be engaging in graduation initiatives.
- IPEDs has a field for service expenditures. Expenditures whose primary purpose is "to contribute to students' emotional and physical well-being...examples include career guidance, counseling, and financial aid administration"
- This is not increasing for the sample overall. Some increases at Public Top 50s and private institutions Table

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Discussion

- We find that changing standards for degree receipt and major choice explain much of the increase in graduation
- Changes in standards for degree receipt could explain some of the flattening of the college wage premium (Valleta 2016; Ashworth Ransom (2018))
- It is unclear what the optimal standard for degree is
- Rarely do we consider the standard for degree as a policy parameter, but this research suggests we could/should

Conclusions

- College graduation rates are increasing
- Student characteristics, enrollment patterns, and school resources collectively do not explain very much of this change
- Standards for degree receipt and changing choice of major explain a substantial portion of the increase

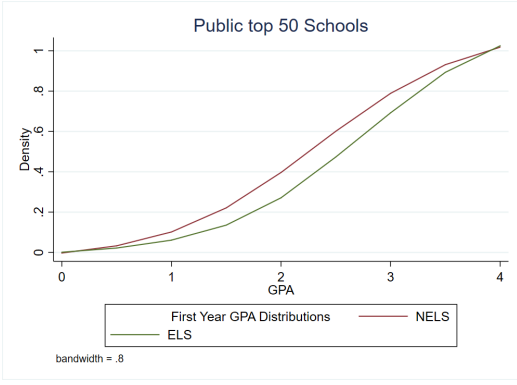
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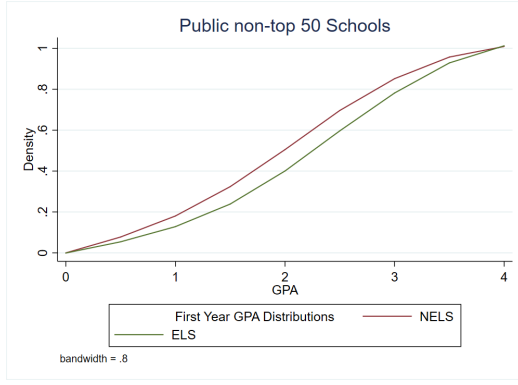
Spending Table

	NELS:88	ELS:2002
Full Sample	$796	$806
Non Top 50 Public	$828	$822
Top 50 Public	$922	$1,093
Private Less Selective	$1,820	$2,365
Private Highly Selective	$2,245	$2,815
Community College	$552	$555

back

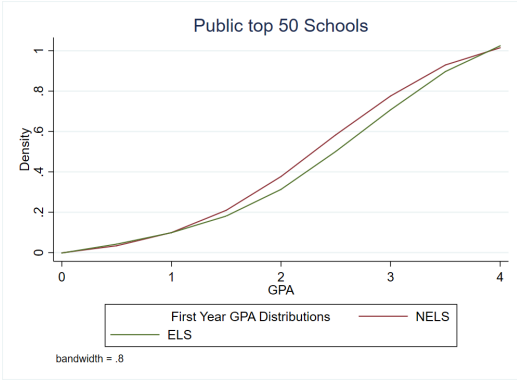
GPA CDFs Public

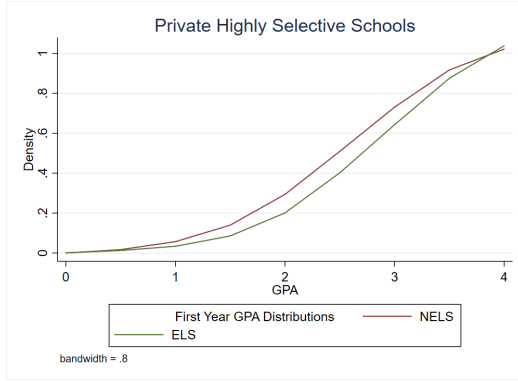




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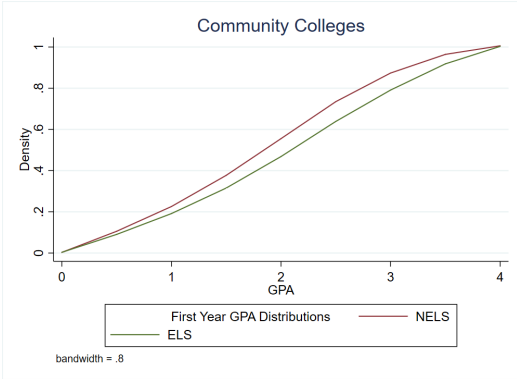
GPA CDFs Private

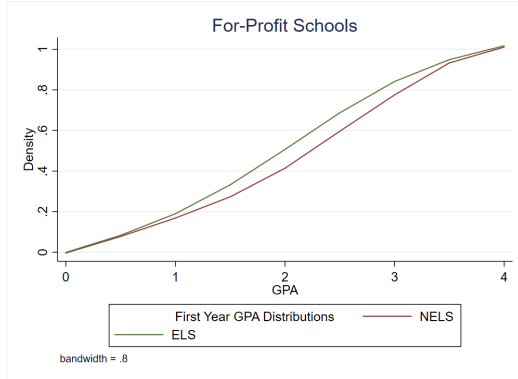




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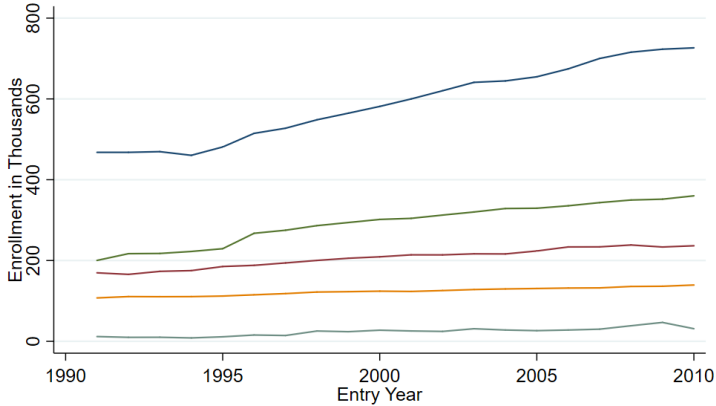
GPA CDFs CC For Profit





back

Enrollment Over Time



back