The Causes and Consequences of Purdue Grade Inflation

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Purdue was (and is) unique among peer universities for our low average GPA.

However, average grades have increased dramatically, starting in the 2009 academic year.

Figure 1: Purdue Average Undergraduate Grade Index, 2000-2019

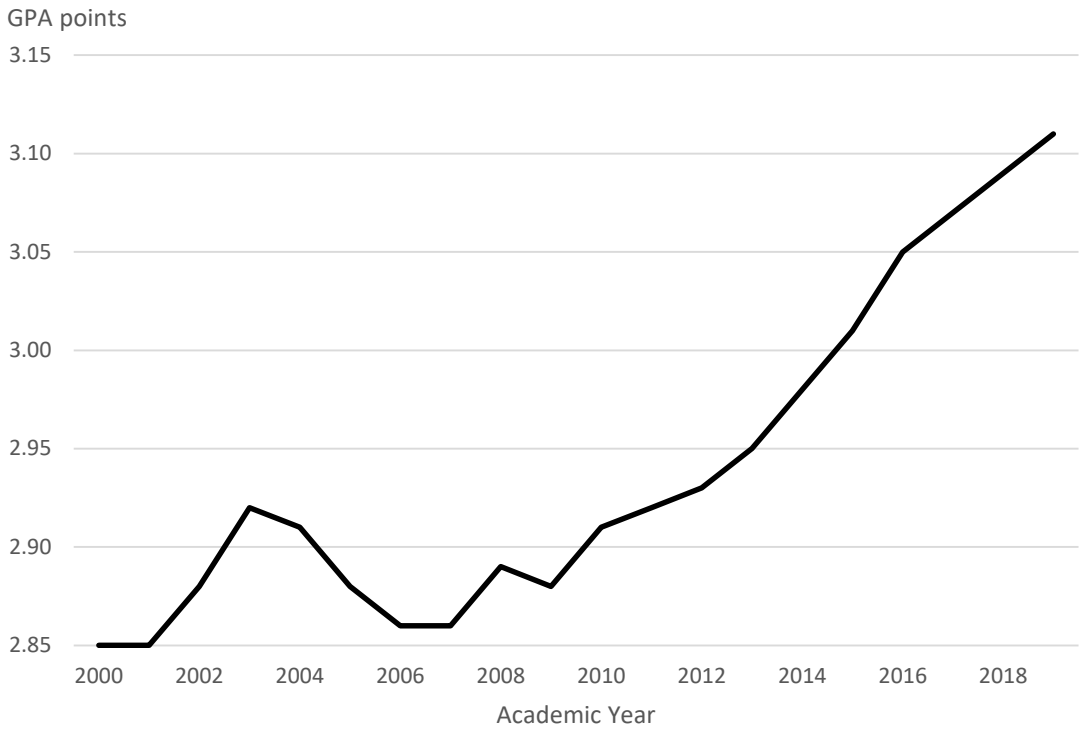


Table 1: Average GPA at Peer Institutions

Institution (year)	Average GPA	Institution (year)	Average GPA
Duke (2014)	3.51	Penn State (2014)	3.12
Florida (2014)	3.35	Princeton (2014)	3.39
Georgia Tech (2014)	3.25	Texas (2014)	3.22
Harvard (2015)	3.65	Texas A&M (2013)	3.08
Illinois (2015)	3.25	UC Berkeley (2014)	3.29
Indiana (2013)	3.19	UCLA (2013)	3.27
Maryland (2014)	3.17	Virginia (2013)	3.32
Michigan (2015)	3.37	Virginia Tech (2015)	3.15
MIT (2015)	3.39	Washington (2015)	3.28
Ohio State (2015)	3.17	Wisconsin (2014)	3.25

Research Findings

Causes of Grade Inflation

- 1/3rd better-prepared students
- 1/3rd course and instructor selection
- 1/3rd unexplained grade inflation

  (better teaching, better facilities, better academic support, and easier grading)

- 4 colleges are responsible for nearly all the grade inflation:

  Engineering, Liberal Arts, Polytechnic Institute, and Science (the reasons are different)

Consequences of Grade Inflation

- Grade inflation increased graduation rates by about 2 percentage points
- Grade inflation helps students persist in higher-paying majors
- Grade inflation has not decrease starting salary for graduates (yet)

Data and Analysis

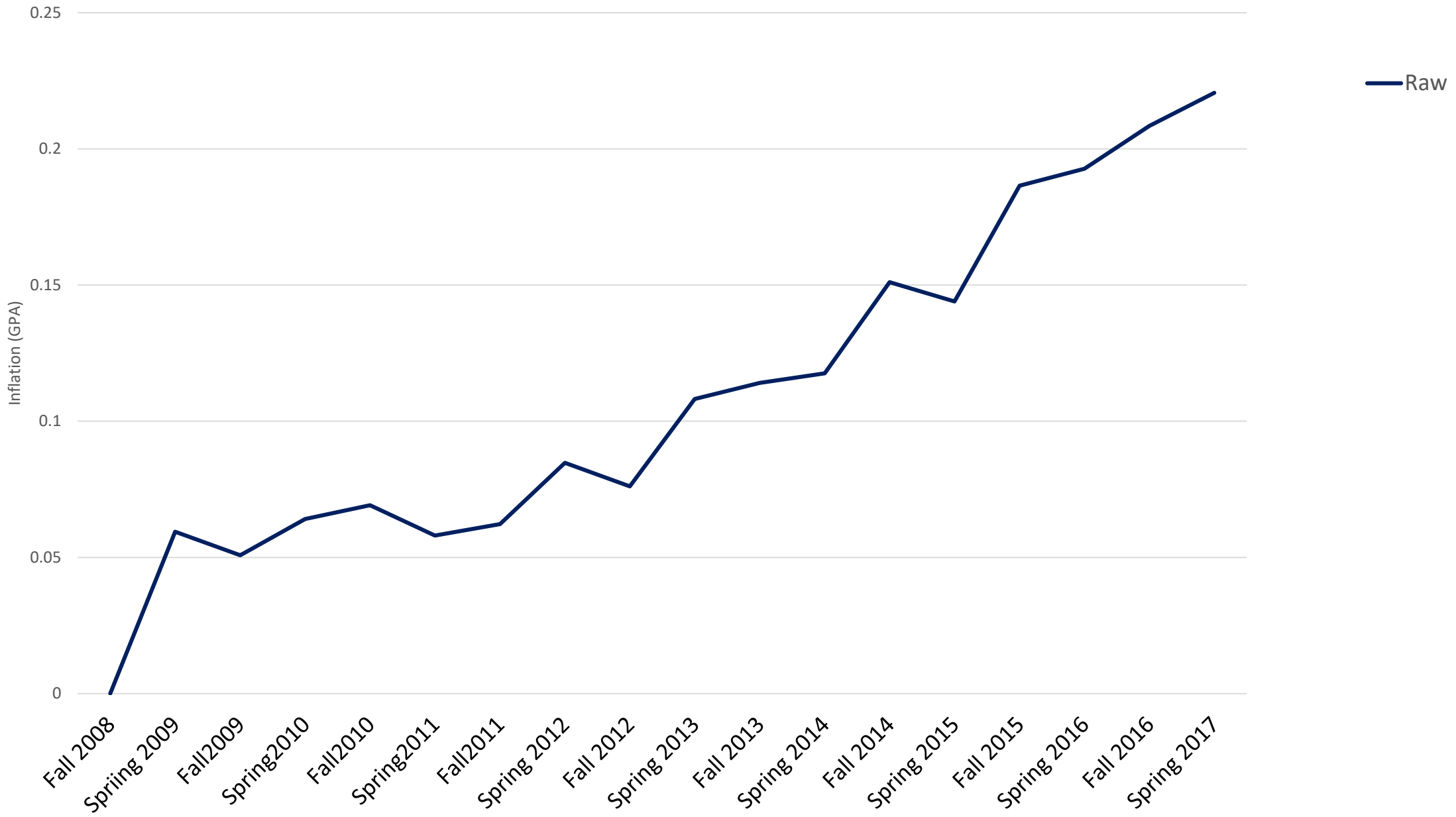
Data:

- 9-Year Time Period: Fall 2008 – Spring 2017
- All undergraduate student grades earned at the West Lafayette campus

Analysis:

- Fixed-effects regression decomposition method
- Estimate how much grade inflation is caused by specific factors
- Some grade inflation is left unexplained

Grade Inflation by Semester



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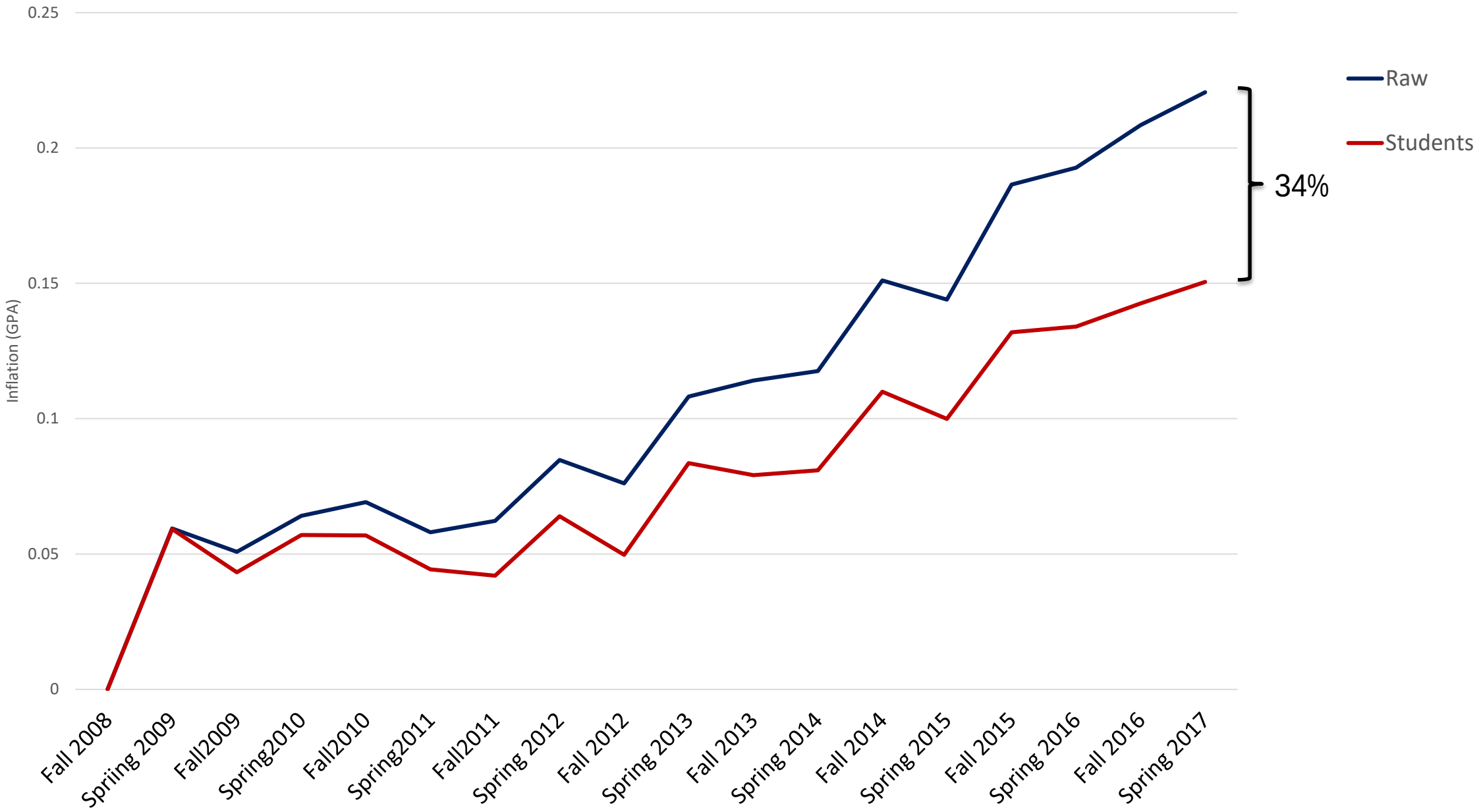

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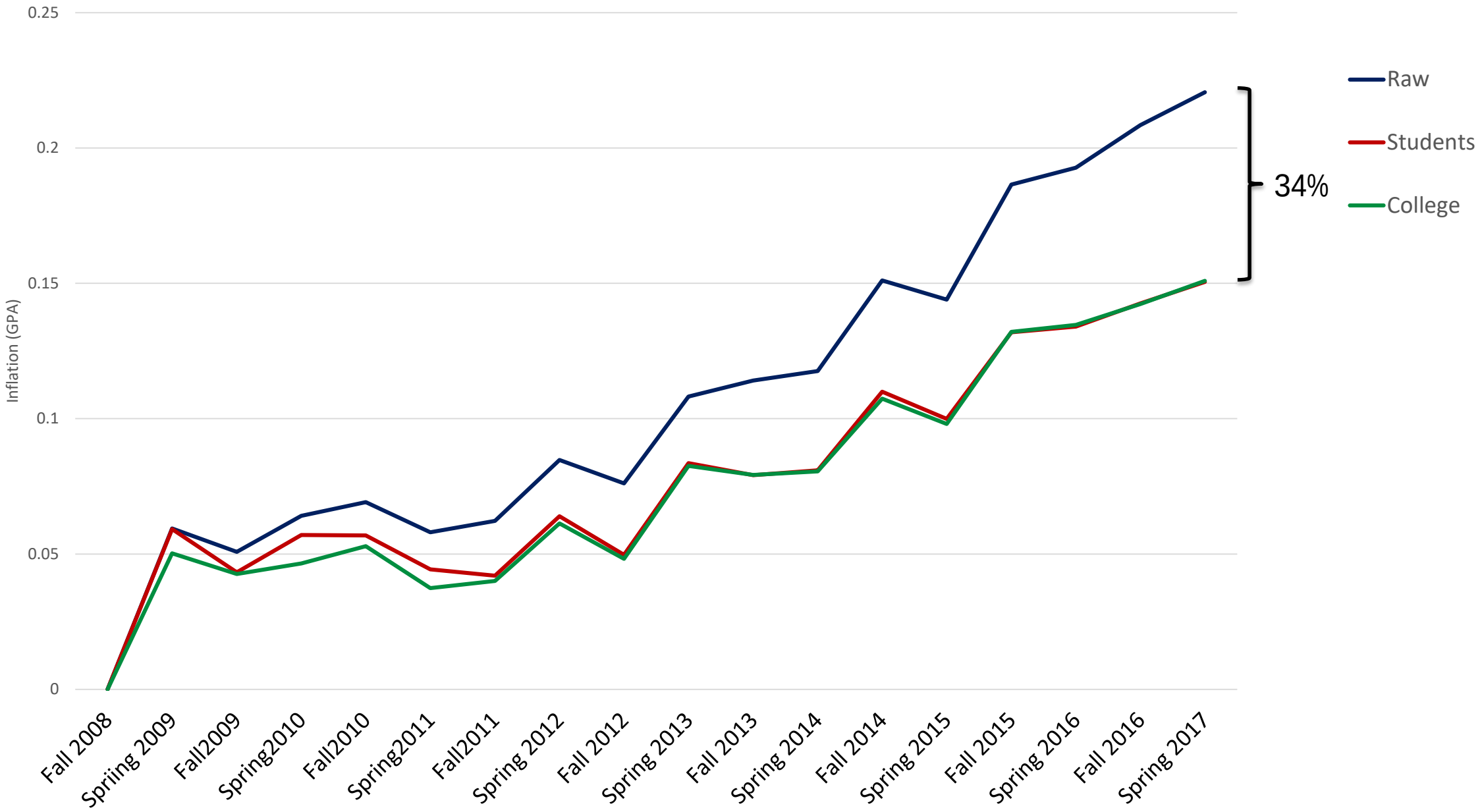

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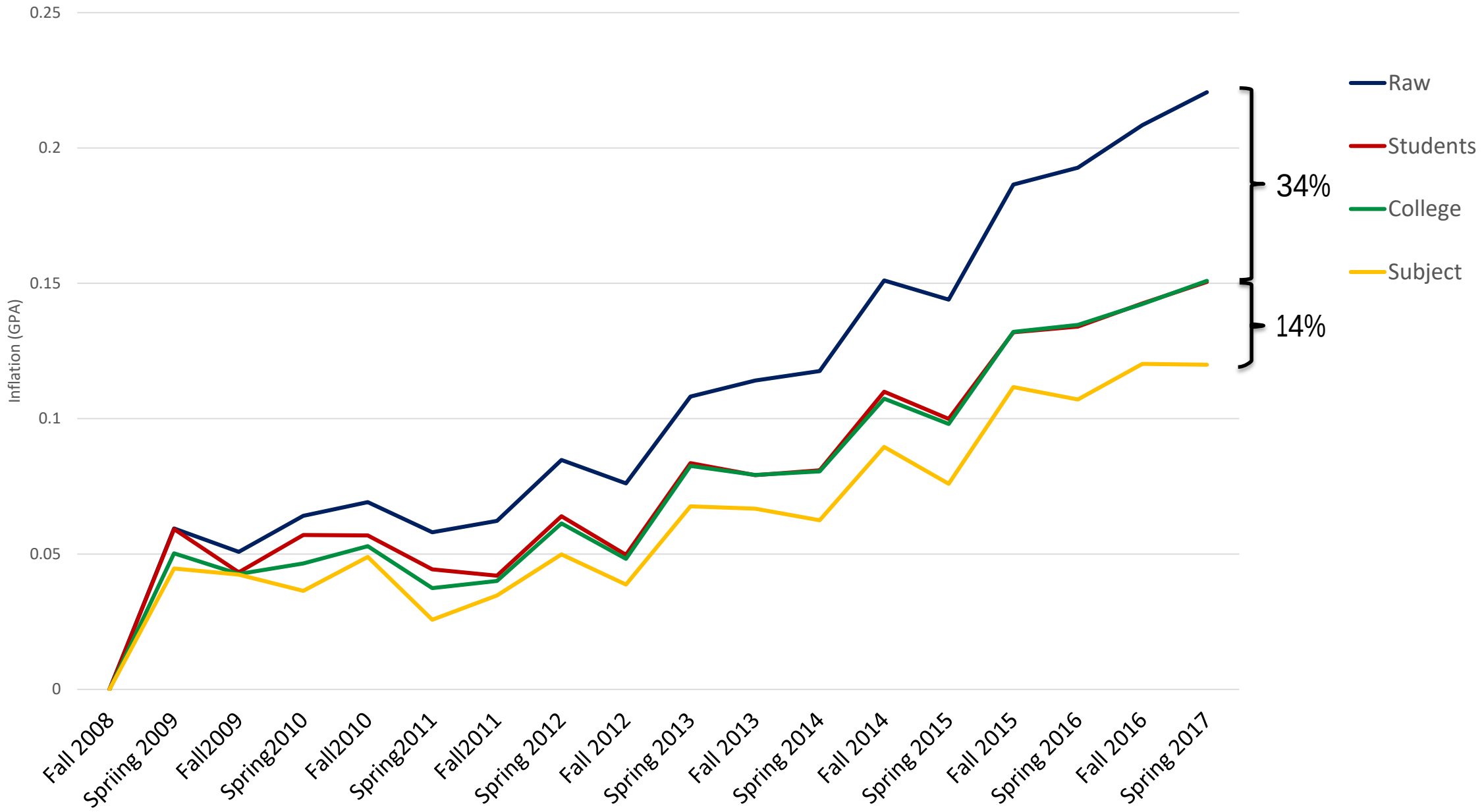

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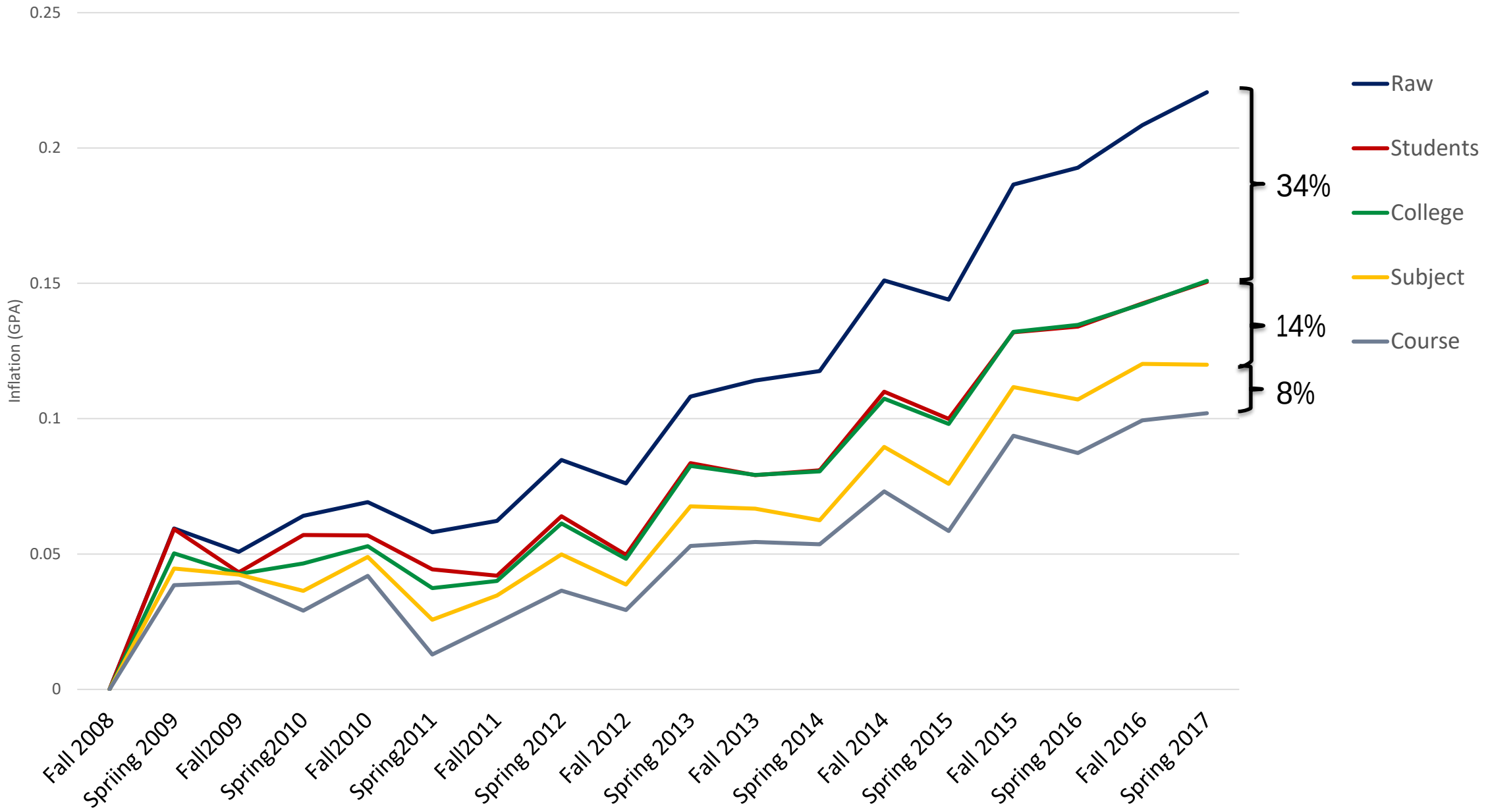

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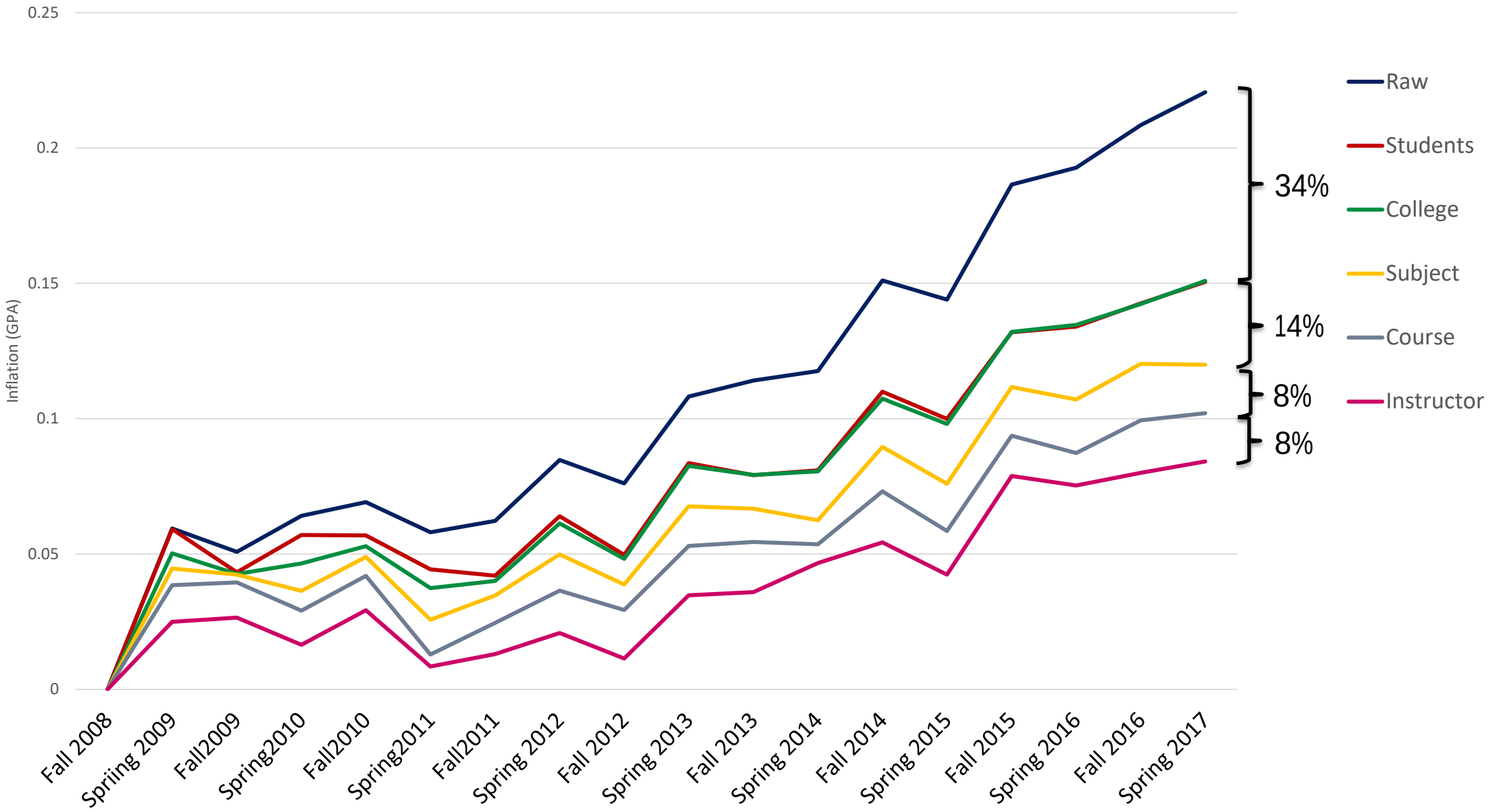

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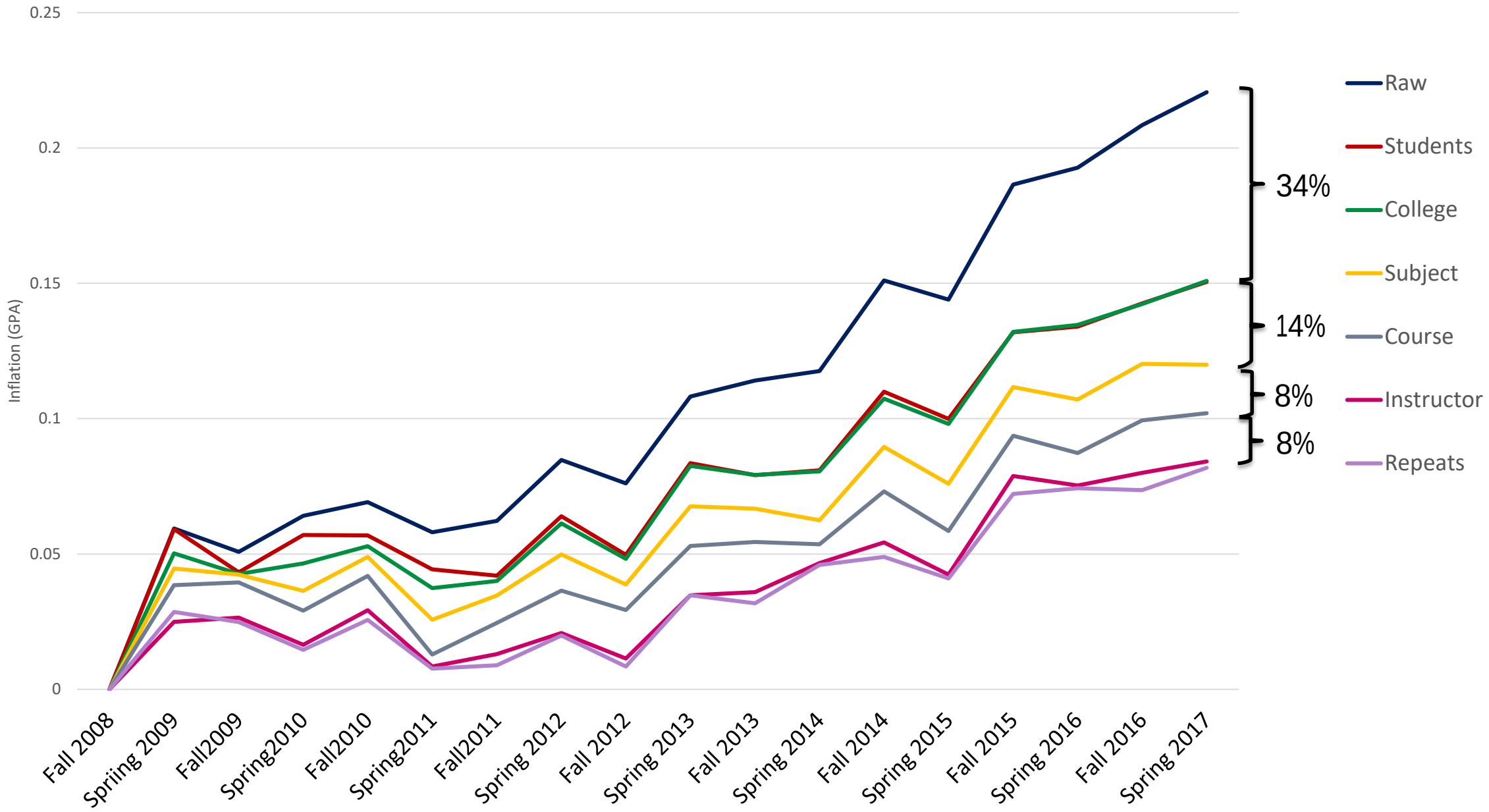

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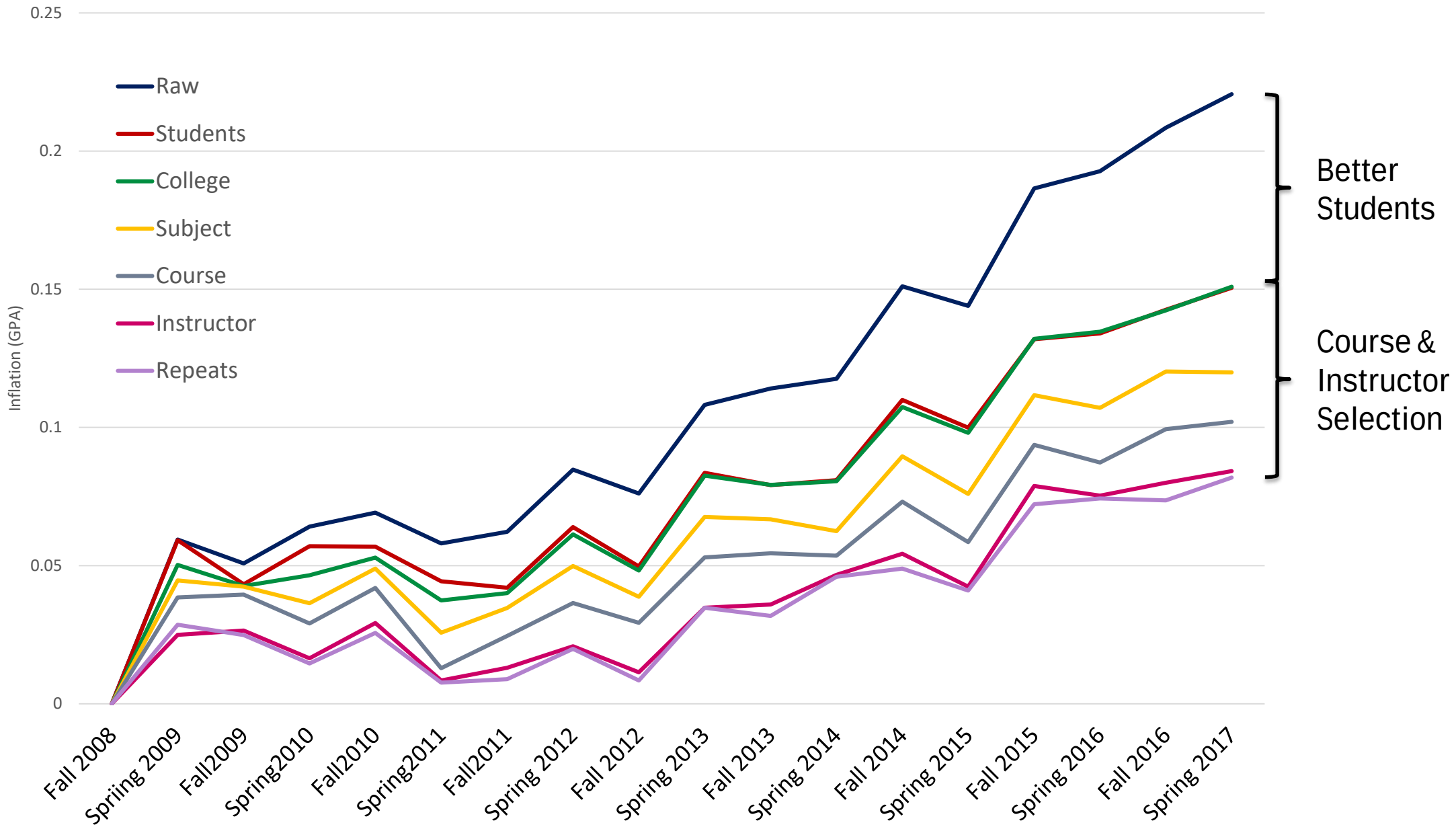

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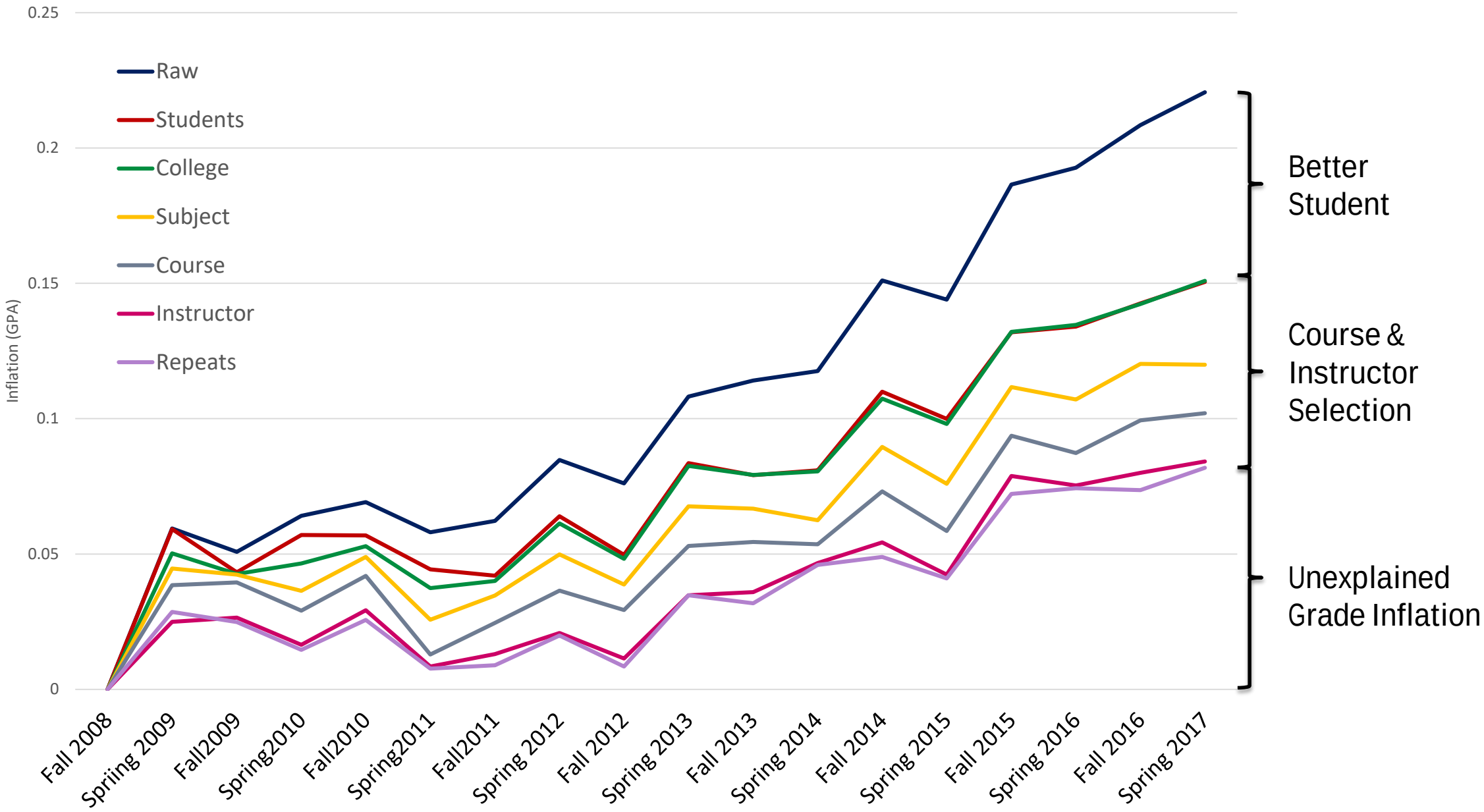


Differences by Lower- and Upper-Division Courses

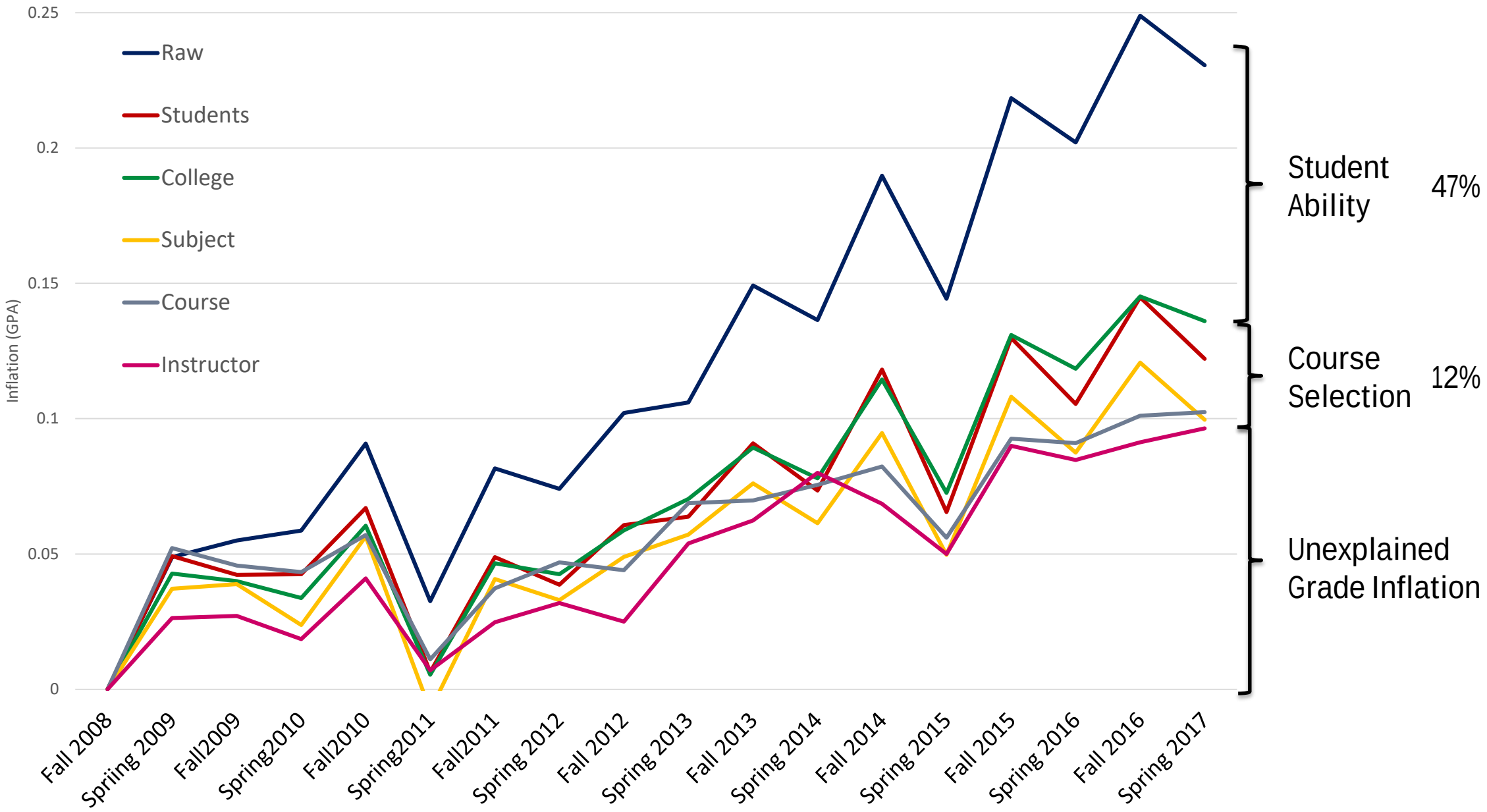
Lower-Division Courses:

- Higher grade inflation, more of it caused by better students (47%)
- 41% of lower-division grade inflation is unexplained
- Only 12% is due to course selection, primarily across subjects

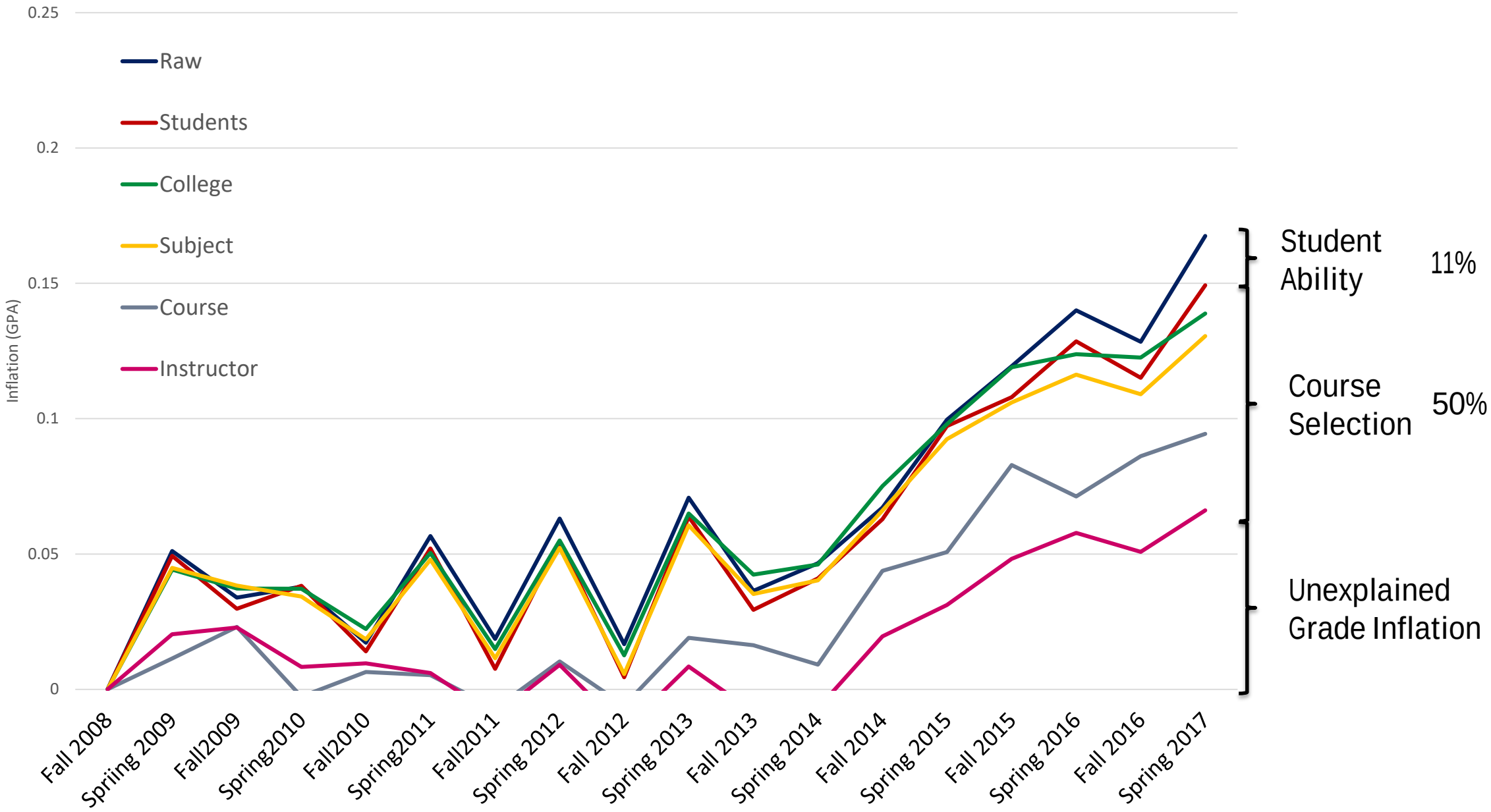
Upper-Division Courses:

- 50% of the grade inflation is caused by course selection, primarily within subjects
  - Better advising, helping students be successful
  - More flexibility and more choice in plans of study (better fit leads to better outcomes)
  - More student hunting for courses that grade easy (& technology)

Grade Inflation in Lower-Division Courses



Grade Inflation in Upper-Division Courses



Grade Inflation by College and Differences in Causes

Grade Inflation Driven by 4 Colleges:

- **Engineering** – unexplained
- **Liberal Arts** – unexplained
- **Polytechnic Institute** – unexplained, high-grade instructors
- **Science** – better students, course selection across subjects

Low Grade Inflation:

- **Agriculture** – better students, course selection within subjects
- **Management** – better students, high-grade instructors

No Grade Inflation:

- **Education**
- **Health & Human Science**

Consequences of Grade Inflation for Students

Cohort Data:

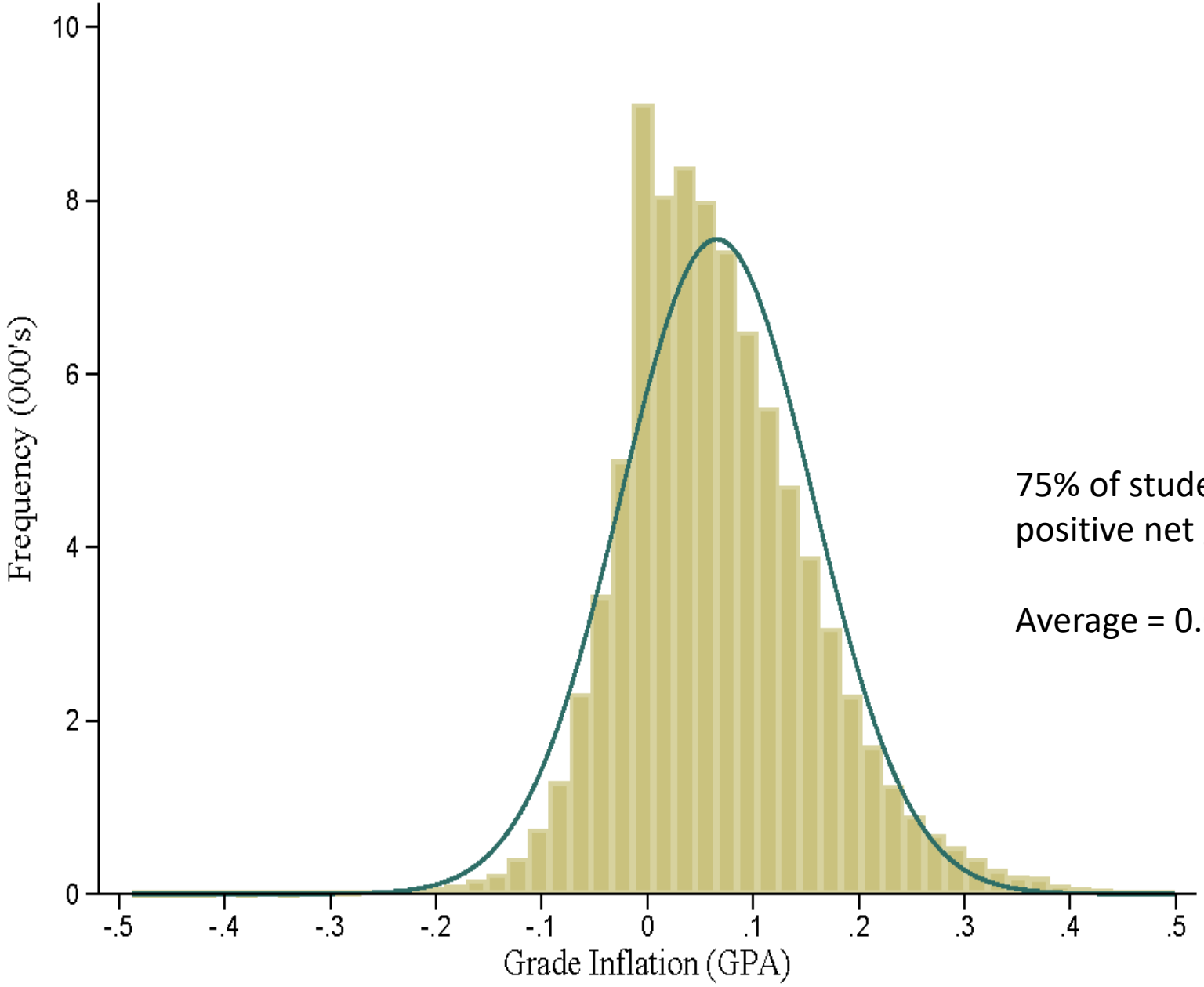
- Undergraduate students entering between fall 2008 and fall 2012 (5 cohorts)
- All courses they take between 2008 and 2017

Analysis:

- We deflate grades: given the student characteristics, we compute the grade they would have earned in each course if it had been taken in fall 2008.
- Using credit-hour weights, we compute the student's Real GPA:

  the GPA he or she is predicted to have earned had he or she taken all courses in fall 2008
- Net Grade Inflation is the difference between the Nominal GPA and the Real GPA

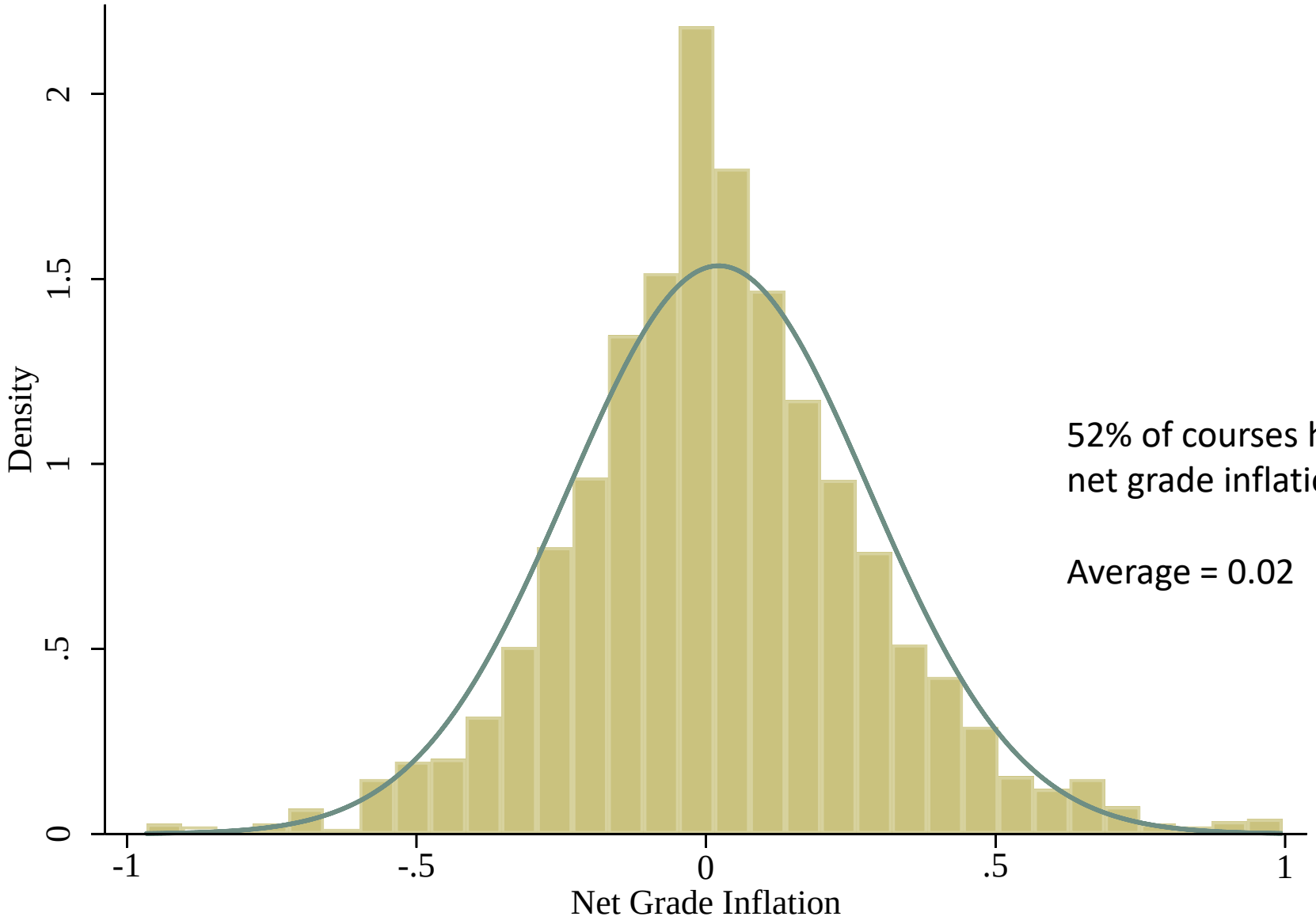
Net Grade Inflation for Students



75% of students have positive net grade inflation

Average = 0.06

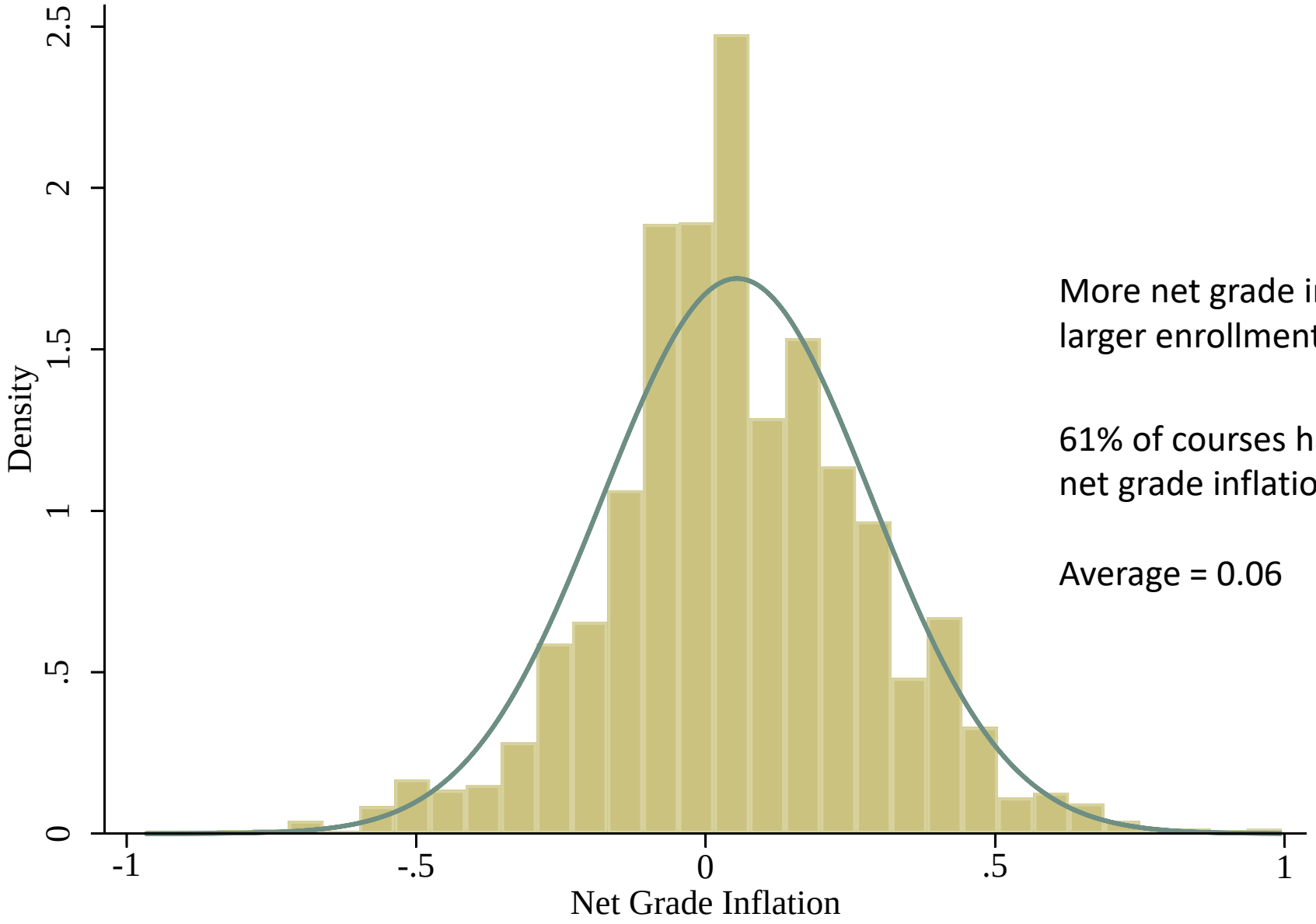
Net Grade Inflation for Courses



52% of courses have positive net grade inflation

Average = 0.02

Net Grade Inflation for Courses Weighted by Enrollment



More net grade inflation in larger enrollment courses

61% of courses have positive net grade inflation

Average = 0.06

Effect of Grade Inflation on Probability of Graduation

	(1) 4-year rate	(2) 5-year rate	(3) 6-year rate
Real GPA	0.323***	0.349***	0.343***
	(0.0036)	(0.0032)	(0.0032)
Net Grade Inflation	**0.086****	**0.197*****	**0.210*****
	(0.0344)	**(0.0297)**	**(0.0282)**
Constant	-0.431***	-0.294***	-0.246***
	(0.0108)	(0.0103)	(0.0102)
N	23,547	23,547	23,547
R^2	0.229	0.312	0.324
Mean Grad. Rate	0.527	0.745	0.775

Notes: this table reports the effect of Net Grade Inflation on 4-, 5-, and 6-year graduation rates. The estimates suggest that grade inflation has a positive effect on graduation rates. Standard errors in parentheses: * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$

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Effect of Lower-Division Grade Inflation on Graduation

	(1) 4-year rate	(2) 5-year rate	(3) 6-year rate	(4) Switch college
Real GPA (lower)	0.226***	0.219***	0.208***	-0.073***
	(0.0039)	(0.0040)	(0.0041)	(0.0065)
Net Grade Inflation (lower)	**0.258*** **	**0.311*** **	**0.311*** **	**-0.126*** **
	(0.0231)	**(0.0198)**	**(0.0192)**	**(0.0239)**
Constant	-0.135***	0.100***	0.162***	0.502***
	(0.0115)	(0.0125)	(0.0128)	(0.0207)
N	20,579	20,579	20,579	16,328
R^2	0.166	0.196	0.194	0.341
Mean dep. var.	0.537	0.755	0.784	0.271

Notes: this table reports the effect of Net Grade Inflation in only 100- and 200-level courses on 4-, 5-, and 6-year graduation rates. The estimates suggest that grade inflation has a positive effect on graduation rates and a negative effect on switching out of the college to which the student was originally admitted. Standard errors in parentheses: * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$

Effect of Grade Inflation on Log Salary

	(1) Naïve	(2) Full controls	(3) Non-switchers	(4) Switchers
Real GPA	0.061***	0.095***	0.097***	0.098***
	(0.011)	(0.010)	(0.012)	(0.022)
Net Grade Inflation	**0.687*** **	**0.202** **	**0.229*** **	**0.044**
	(0.075)	**(0.083)**	**(0.083)**	**(0.163)**
Constant	10.589***	12.575***	13.014***	12.496***
	(0.037)	(1.614)	(2.108)	(2.820)
N	6,999	6,999	5,278	1,669
R^2	0.016	0.493	0.499	0.525
Mean Salary	$52,816	$52,816	$54,052	$49,237

Notes: this table reports the effect of Net Grade Inflation on the log of the student's starting salary after graduation. The estimates suggest that grade inflation has a positive effect on salary, with effects concentrated on students who graduate from the same college to which they were originally admitted. Standard errors in parentheses: * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$

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Conclusions

Consequences

- Grade inflation increased graduation rates by about 2 percentage points
- Grade inflation helps students persist in higher-paying majors and has not hurt starting salary (yet)

Remaining Questions

- What caused the large unexplained grade inflation in Engineering, Liberal Arts, and the Polytechnic Institute?
- How has increased student choice contributed to grade inflation?
- How did the introduction of the core curriculum contribute to grade inflation?
- Has competition for students across majors lead to relaxed grading standards?