The AP Arms Race:
Is Grade-Weighting to Blame?

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The Educational Arms Race

"In many ways, we are caught up in the educational equivalent of a nuclear arms race. We know that this overemphasis on test scores hurts all involved, especially students. But we also know that anyone or any institution opting out of the competition does so at considerable risk."

Richard Atkinson, former President,

University of California system

February, 2001

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The AP Arms Race

"AP has become a significant factor in... [Atkinson's] 'educational arms race,' as applicants and their parents seek every advantage to improve their chances of acceptance. For example, it is now common for upper middle-class parents to evaluate and choose high schools for their children based on the number of AP courses offered at those schools, thereby placing great pressure on schools to expand their AP offerings."

Geiser and Santelices, 2004
The Role of Advanced Placement and
Honors Courses in College Admissions

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The AP Arms Race

The AP arms race also occurs at the student level when individual students take more AP courses than they optimally would. How might grade weighting drive this?

AP course grades => improve class rank => increase probability of acceptance

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Why Weight?

In the absence of weights, the argument goes, no student would risk damage to their GPA by taking hard classes.

For student x attending school with AP grade weight w:

$$GPA_x = \frac{(RegPts_x)(RegCred_x) + (1+w)(APPts_x)(APCred_x)}{TotCred_x}$$

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Research Questions

1. Why are grade weights so controversial?

2. What do Texas high schools do?

3. Do students increase AP course-taking in response to greater AP grade weights, and do students from different demographic groups respond differently?

4. How do the availability and grade weighting of pre-AP/honors, IB, and dual credit courses influence AP-taking?

5. What is the optimal grade weight?

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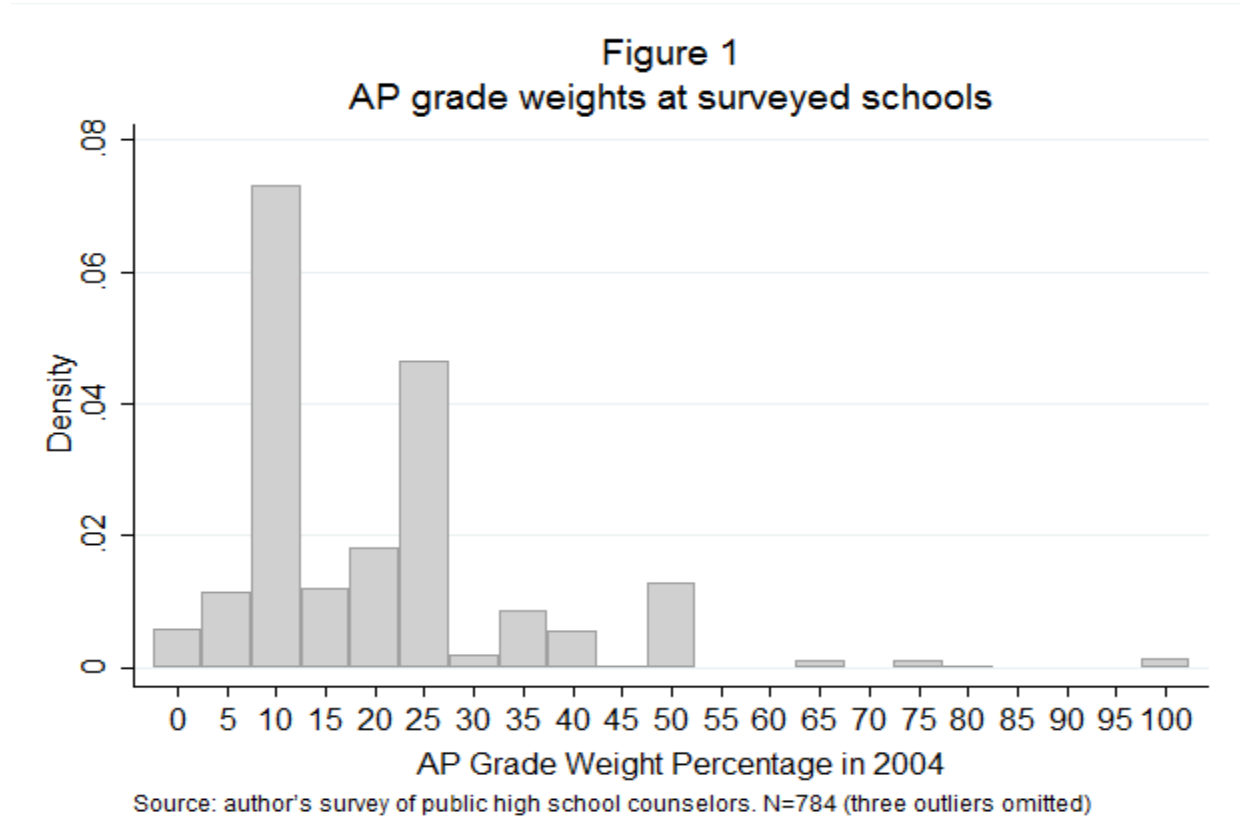State of Texas Education Research Center

Why are grade weights controversial?

Once weight grades in one type of class, is a slippery slope. Weights reflect institutional value, hence…

HB 3851 and the ensuing fiasco.

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Why the Controversy?
AP Survey
Texas High Schools

AP Survey

- Telephone survey of Texas public high schools regarding their AP-related policies during the 2003-04 academic year.

- Started with largest schools serving grades 11 and/or 12 and worked to smallest from TEA directory.

- Spoke with counselors whenever possible.

- Among schools contacted, only a handful refused.

- Final sample of 911 campuses, 787 offering AP and with complete survey info on weighting practices.

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What do Texas high schools do?

Weights and school characteristics

	AP weight in 2004	Changed weight
# AP core course offerings	0.19	0.10
	(0.78)	(1.08)
Enrollment	0.00	0.00
	(0.38)	(0.59)
% black	**0.15*****	-0.02
	(3.40)	(1.06)
% Hispanic	-0.04	-0.01
	(0.99)	(0.61)
% economic disadvantage	-0.07	-0.01
	(1.42)	(0.36)
% LEP	**0.27****	0.02
	(2.39)	(0.46)
% special education	0.15	0.07
	(0.98)	(1.22)
% teachers in first year	0.01	0.02
	(0.05)	(0.46)
% taking advanced courses	-0.10	-0.05
	(1.28)	(1.55)
Rural school	-1.34	**1.17***
	(0.81)	**(1.78)**
% graduating with recommended diploma	0.02	-0.01
	(0.47)	(1.19)

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Introduction   **Theory**
Grade Weights   Methodology
Student Responsiveness   Results
Conclusions

Do students increase AP course-taking in response to greater AP grade weights? The theory.

Figure 6

Payoffs When Two Students Vie for Class Rank Under AP Grade-Weighting, $A > B > C > D$

		Student 2	
		No More AP	One more AP
Student 1	No More AP	B / B	D / A
	One More AP	A / D	C / C

Estimating student responsiveness: Methodology

- Cross-sectional analysis of 741 AP-offering public high schools (omit change schools)

- Differences in differences analysis of 29 schools that changed their weight between 2002 and 2004 and 107 well-matched comparison schools

- High school fixed effect models on 29 schools that changed their weight between 2002 and 2004

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Methodology: Differences in differences

$$\Pr(AP_{tsi} = 1) = \beta_0 year_t + \beta_1 apweight_{ts} + \beta_2 school_{ts} + \beta_3 school_s$$

$$+ \beta_4 student_i + \beta_5 student_{ti} + \epsilon_{tsi}$$

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Methodology: Differences in differences

Group comparisons for cold turkey vs. phase in weight changes		
	comparison of juniors	comparison of seniors
cold turkey in year t	jr_{t-1} vs. jr_t	sr_{t-1} vs. sr_t
phased in with seniors graduating in year t	jr_{t-2} vs. jr_{t-1}	sr_{t-1} vs. sr_t

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Cross-Sectional Results: B, W, H

	Took any core AP	Took AP science	Took AP math	Took AP English	Took AP social studies
AP weight percent/100	0.02 (0.12)	-0.27 (1.18)	-0.14 (0.70)	-0.12 (0.46)	0.57** (2.42)
AP weight/100 *black	-0.16 (0.62)	0.13 (0.28)	-0.34 (1.09)	0.25 (0.85)	-0.21 (0.64)
AP weight/100 *Hispanic	0.05 (0.31)	0.26 (1.16)	0.09 (0.50)	0.26 (1.12)	-0.17 (0.78)
AP weight/100 *disadvantaged	-0.05 (0.52)	0.07 (0.82)	-0.19* (1.79)	-0.09 (0.94)	-0.21*** (2.85)

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Cross-Sectional Results: Asians

	Took Any Core AP	Took AP Science	Took AP Math	Took AP English	Took AP Social Studies
AP weight percent/100	-0.27 (0.66)	0.20 (0.47)	0.18 (0.48)	-0.20 (0.40)	0.72* (1.82)
AP weight/100 *disadvantaged	0.19 (0.61)	-0.19 (0.47)	-0.22 (0.60)	0.45 (0.91)	-0.57* (1.67)

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Differences in Differences Results: B, W, H

	Took any core AP	Took AP science	Took AP math	Took AP English	Took AP social studies
AP Weight Percent/100	0.33*** (2.81)	0.21 (1.22)	0.24* (1.94)	0.01 (0.08)	0.33*** (3.29)
AP weight/100 *black	-0.18 (1.22)	0.02 (0.16)	-0.05 (0.64)	-0.28 (1.34)	-0.03 (0.27)
AP weight/100 *Hispanic	-0.31 (0.88)	-0.46 (0.86)	-0.05 (0.22)	-0.61 (0.97)	-0.34 (0.63)
AP weight/100 *disadvantaged	-0.25*** (3.19)	0.05 (0.54)	-0.09 (0.84)	-0.09 (0.54)	-0.26*** (2.59)

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Differences in Differences Results: Asians

	Took Any Core AP	Took AP Science	Took AP Math	Took AP English	Took AP Social Studies
AP weight percent/100	-0.11 (0.39)	0.48* (1.90)	-0.23 (0.84)	-0.60 (1.00)	0.13 (0.44)
AP weight/100 *disadvantaged	0.35 (0.90)	0.04 (0.13)	0.57 (1.39)	0.21 (0.43)	-0.04 (0.09)

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Cross Sectional Results: B, W, H

	Took any core AP	Took AP science	Took AP math	Took AP English	Took AP social studies
Honors courses weighted	0.00 (0.01)	0.04 (0.35)	0.15 (0.98)	-0.02 (0.14)	-0.03 (0.20)
Dual credit courses weighted	-0.06 (0.90)	0.03 (0.41)	-0.07 (1.00)	-0.05 (0.64)	-0.09 (1.21)
School offers AVID	0.35*** (2.98)	-0.16 (1.41)	0.16 (1.31)	0.38*** (2.96)	0.34** (2.53)
School offers IB	-0.28** (2.11)	-0.50*** (3.06)	-0.24 (1.33)	-0.42*** (3.24)	-0.00 (0.03)
School offers dual credit	-0.06 (0.39)	-0.15 (1.00)	-0.15 (0.77)	-0.21 (1.14)	-0.12 (0.74)

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Cross Sectional Results: Asians

	Took Any Core AP	Took AP Science	Took AP Math	Took AP English	Took AP Social Studies
Honors courses weighted	-0.34** (2.46)	0.44** (2.29)	0.06 (0.27)	-0.33** (2.25)	-0.56*** (4.75)
Dual credit courses weighted	0.05 (0.45)	-0.07 (0.52)	0.01 (0.04)	-0.00 (0.02)	0.18 (1.54)
School offers AVID	-0.41 (1.47)	-0.53 (1.37)	-0.27 (1.34)	0.17 (0.82)	-0.04 (0.16)
School offers IB	-0.68*** (3.21)	-0.63** (2.40)	-0.42 (1.60)	-0.99*** (6.01)	-0.44*** (3.06)
School offers dual credit	-0.35 (1.10)	-0.16 (0.74)	-0.13 (0.41)	-0.05 (0.16)	-0.33 (1.28)

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Differences in Differences Results: B, W, H

	Took any core AP	Took AP science	Took AP math	Took AP English	Took AP social studies
School offers AVID	0.50*** (2.91)	0.23 (1.63)	0.16 (0.85)	0.45** (2.37)	0.54*** (3.21)
School offers IB	-0.15 (0.87)	-0.51*** (3.41)	0.09 (0.57)	-0.20 (0.90)	-0.16 (0.67)
School offers dual credit	-0.05 (0.51)	0.07 (0.59)	0.09 (0.67)	-0.14 (0.90)	-0.09 (0.75)

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Differences in Differences Results: Asians

	Took Any Core AP	Took AP Science	Took AP Math	Took AP English	Took AP Social Studies
School offers AVID	0.16 (0.90)	0.24* (1.93)	-0.09 (0.47)	0.20 (0.94)	0.38* (1.89)
School offers IB	0.08 (0.28)	0.29 (0.80)	0.24 (1.06)	-0.74* (1.94)	-0.42 (1.53)
School offers dual credit	-0.27** (2.23)	-0.17 (1.02)	-0.38 (1.48)	-0.09 (0.45)	-0.46*** (3.29)

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What is the Optimal Weight?
Thoughts on the Texas Fiasco

What is the Optimal Grade Weight?

- My definition of "optimal": the weight that incentivizes students by equating the probability of getting 4.0 grade points in an AP class with that of getting 4.0 points in a non-AP class for average student at a school.

- Theory suggests optimal weight potentially different for every school because student abilities and AP course difficulty vary.

- The finding that there is little link between higher weights and AP course-taking behavior indicates a much easier answer: "all weights are equally ineffective at incentivizing AP-taking."

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Thoughts on the Texas Fiasco

- Given heterogeneity in weighting procedures, savings to higher ed from a uniform GPA could be substantial.

- HB 3851 allowed schools to weight courses however they liked for class rank. Even with outrageous weights, unlikely to further disadvantage first gen college students given minimal incentive effects.

- Much of controversy seems to be driven by concerns of "fairness" under the guise of rhetoric on incentives.

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