

Massachusetts High Schools and Students' Longer-Run Outcomes

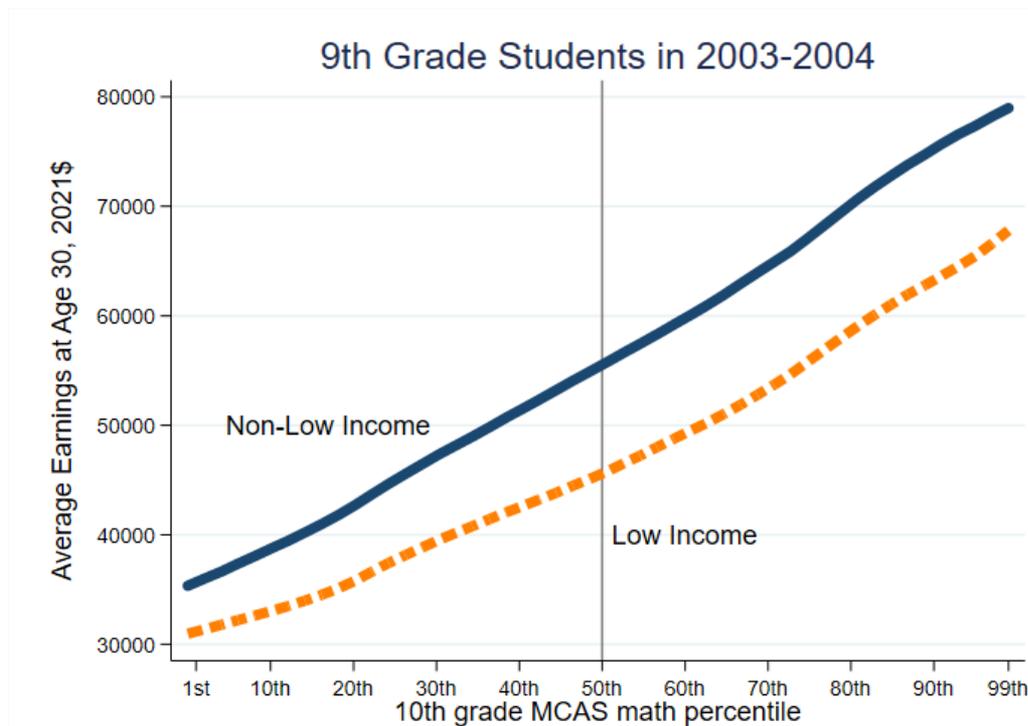
EDUCATIONAL OPPORTUNITY IN MASSACHUSETTS

BROWN UNIVERSITY

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Schools matter for student life outcomes

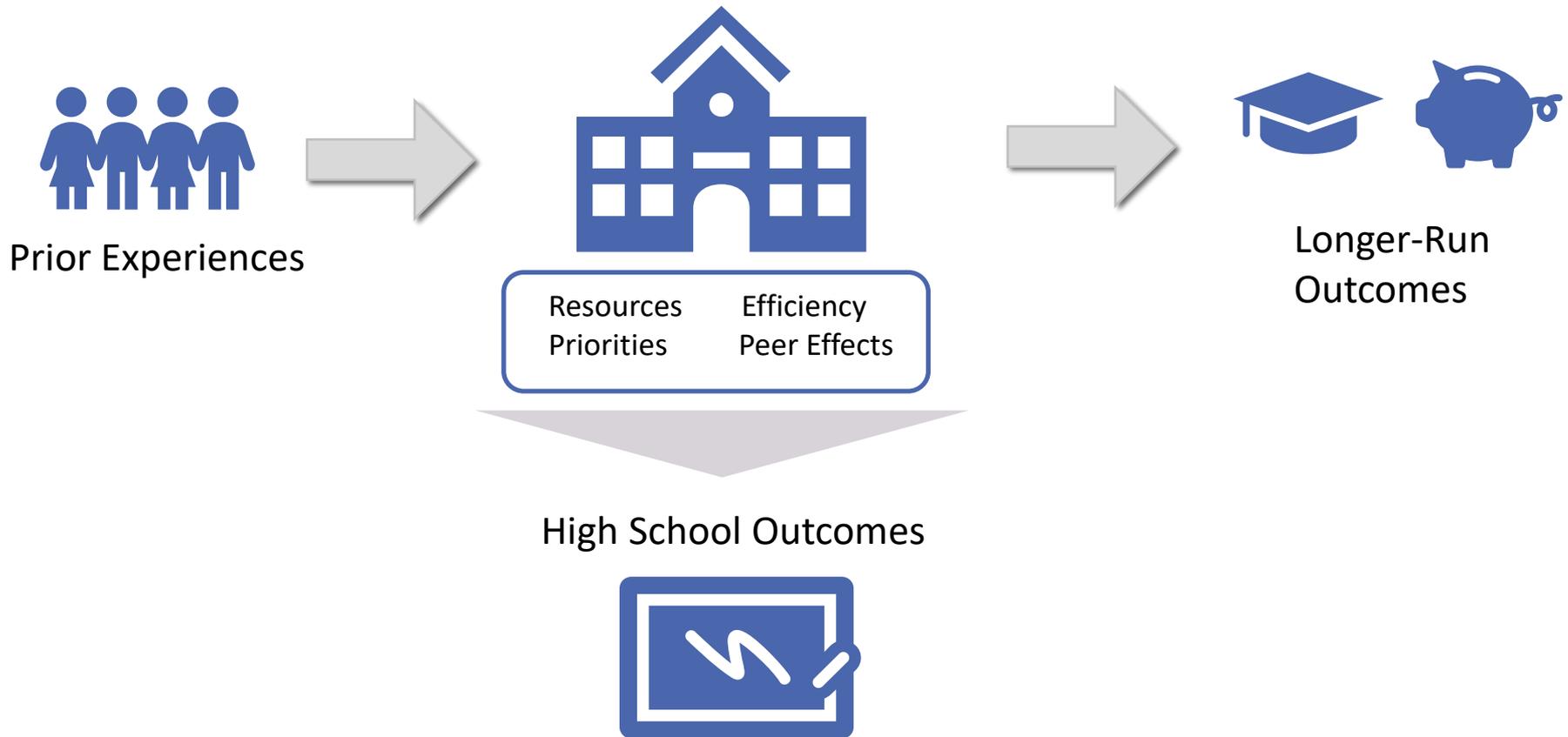
- Schools can be critical drivers of educational outcomes and economic opportunity
- However, as a result of factors inside and outside of school, students living in poverty go on to have substantially lower educational attainments and earnings than peers who grow up in higher-income families



- Comparing students with similar 10th grade MCAS scores, those who grow up in higher-income families go on to earn much more.
- At the state median MCAS score, the difference in earnings is approximately \$10,000 a year.

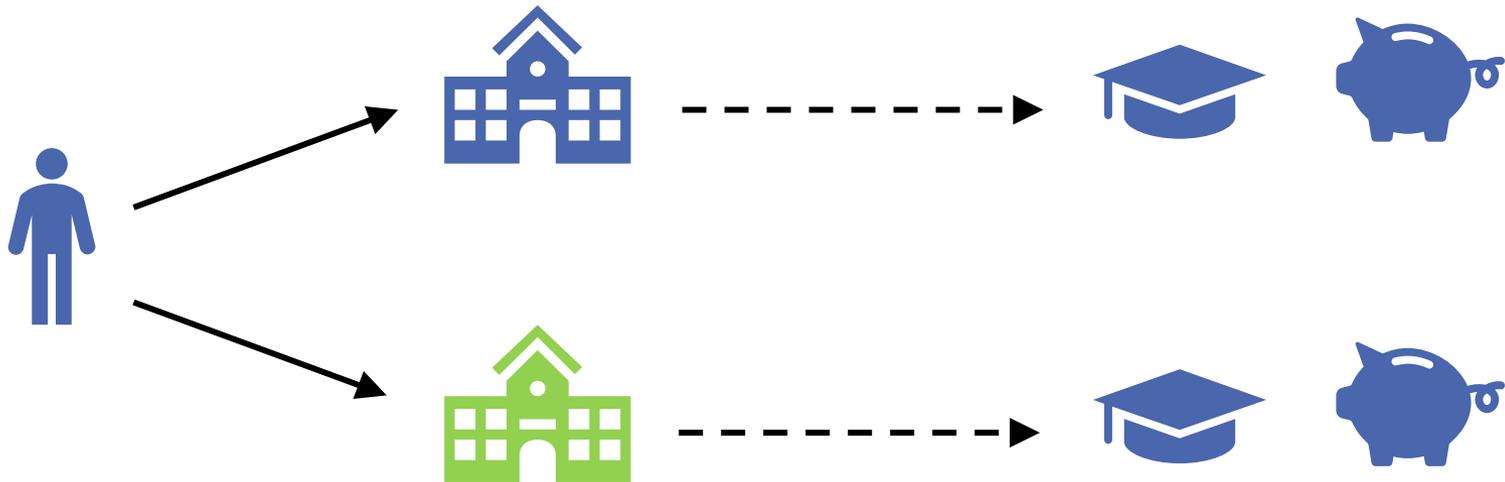
Schools do many things to improve students' life outcomes

High School Effectiveness

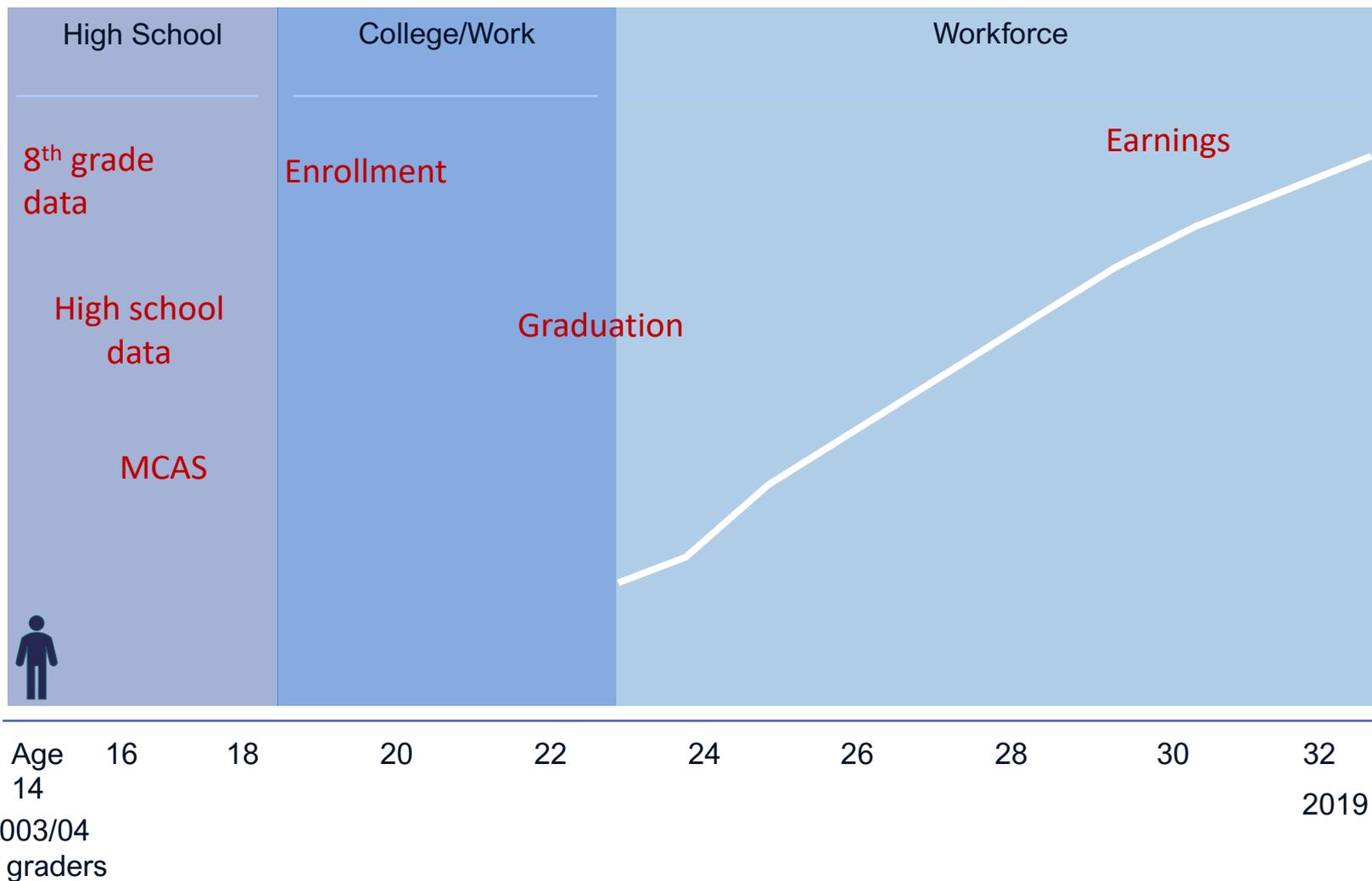


Are some schools more effective than others?

- We ask two questions about high schools serving low-income students:
 - Are some schools more effective than others?
 - Are schools that improve short-term outcomes also those that improve longer-run outcomes?



We use longitudinal data that tracks students through MA public schools to college and the workforce



We focus on low-income students who attend high schools serving large numbers of low-income students

- 26,000 low-income first-time 9th graders **in 2003 and 2004** who attend high schools that have 25% or more low-income students
 - 106 schools (66 urban, 27 CTE, 9 charters)
 - 76% of low-income 9th graders in the state
- Students in these schools have lower attainments, test scores and ultimate earnings than students in the state, on average.

We compare outcomes for students who are similar in many ways but attend different high schools

- We use value-added approaches to compare students who are similar in observable ways.



- We compare students who are similar in a variety of ways:
 - 8th grade test scores
 - 8th grade attendance
 - 8th grade MCAS questionnaire
 - Parental education
 - Course-taking, time on homework, school safety, etc.

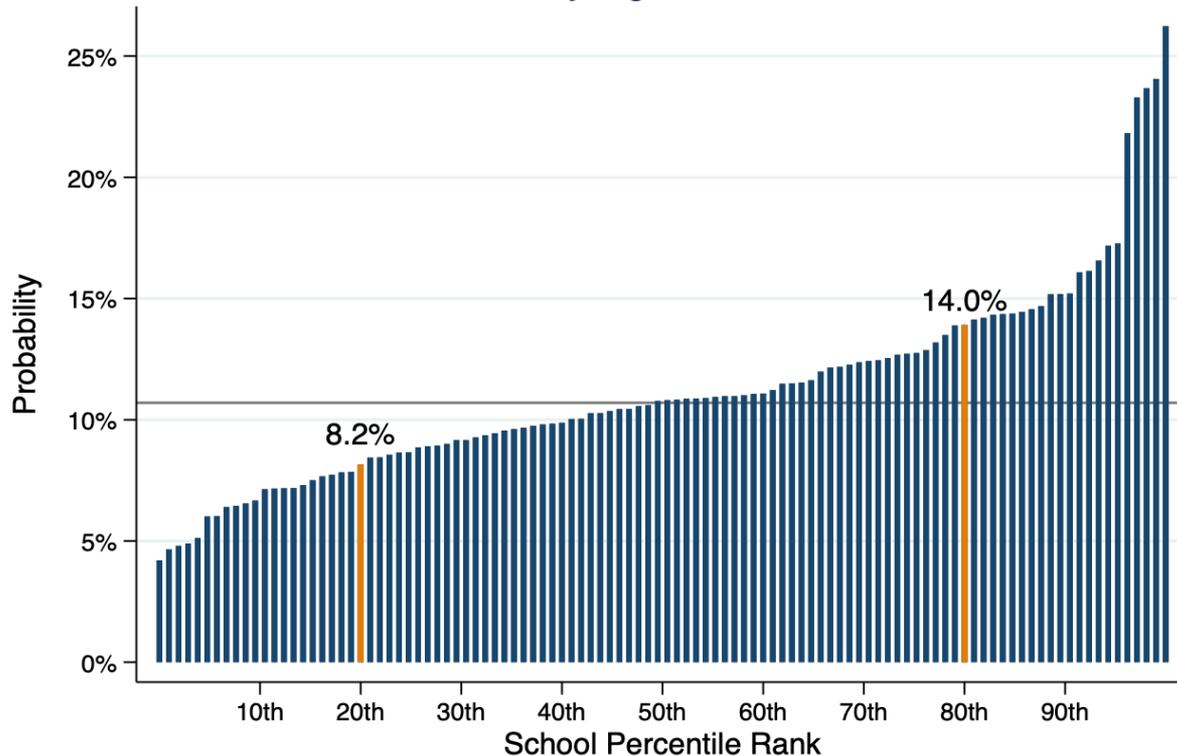
Key Findings

- ***Some schools are much more effective than others***
 - There is substantial variation in high schools' effects on low-income students' college attainment and adult earnings.
- ***Schools that raise test scores raise longer-run outcomes***
 - Schools that improve achievement more than expected also have larger than expected effects on earnings.
- ***But, test scores are not the only thing that matters***
 - Schools' impacts on short-run non-test score measures are correlated with their impacts on longer-run outcomes.
- ***Early indicators relate to longer-run impacts***
 - Schools that improve college enrollment improve college graduation and earnings.

Some schools are much more effective than others

School effects on four-year college graduation vary considerably

Estimated School Effect on 4-Year College Graduation
By High School

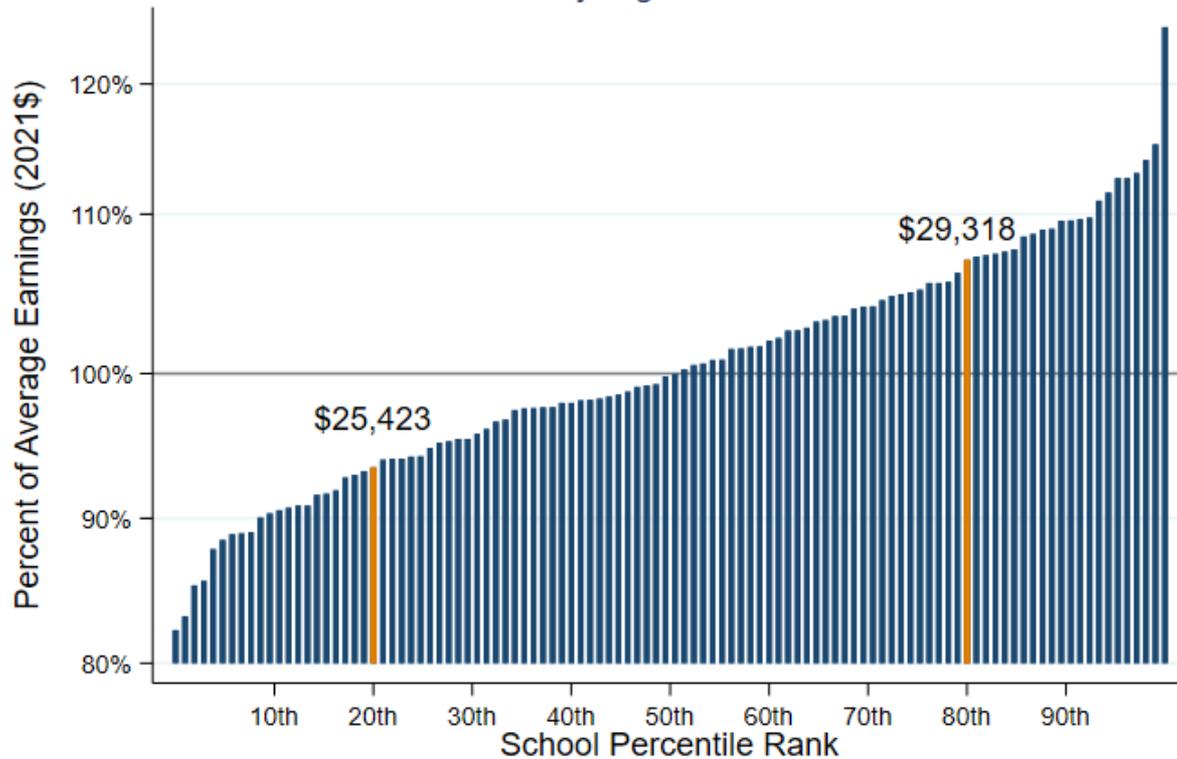


Note. College graduation is measured ten years after students first entered high school. Gray line represents the average 4-year college graduation rate for low-income students in these schools (10.7%).

- For an average low-income student, the probability of four-year college graduation ranges from 4% to 26% depending on which high school you attend.
- Moving from a 20th percentile high school to a 80th percentile school is associated with a more than 70% increase in the probability of graduating from a four-year college (8% to 14%).

Some high schools improve later earnings more than others

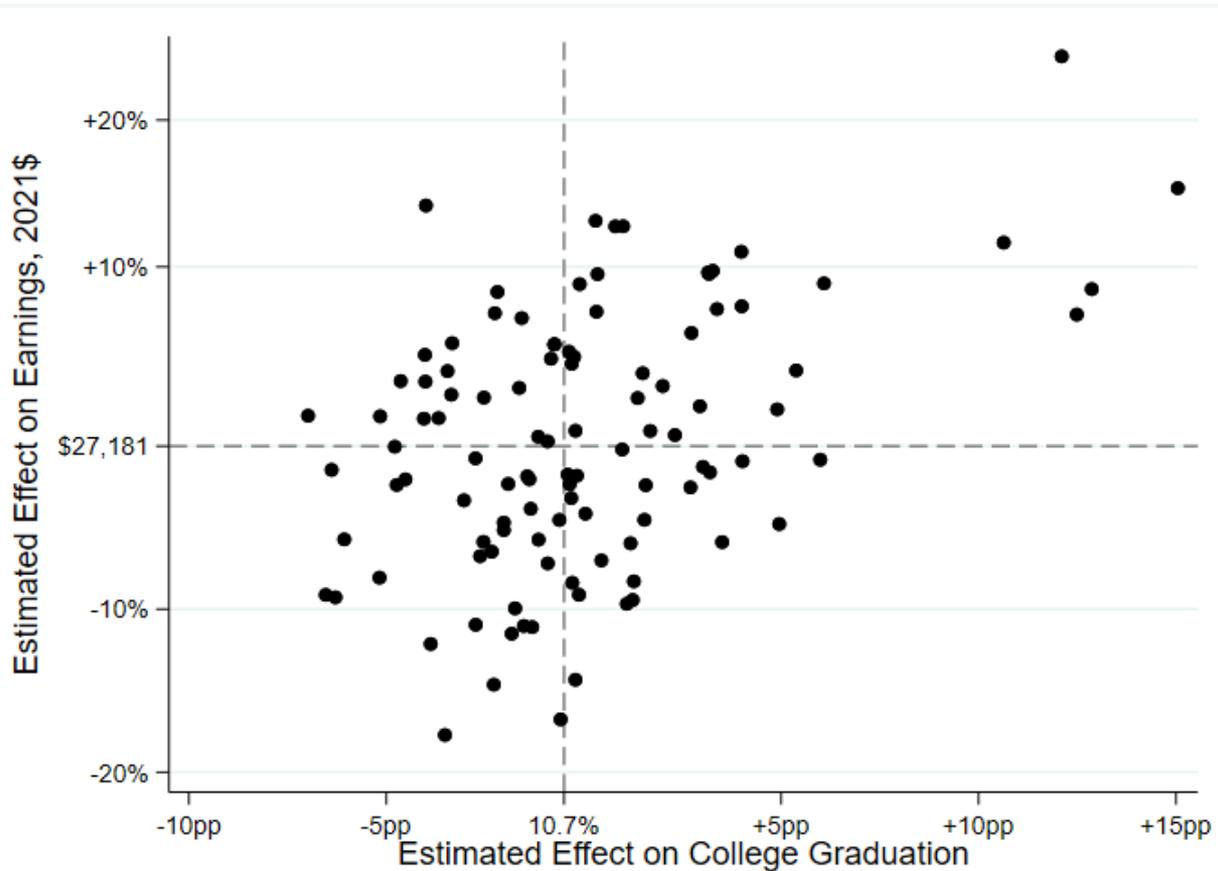
Estimated School Effect on Adult Earnings
By High School



- Moving from a 20th percentile high school to an 80th percentile school is associated with a 15% increase in annual earnings (about \$3,900).

Note. We measure earnings when students are approximately age 30, and we take the average of three years. Gray line represents average earnings for low-income students in these schools (\$27,181).

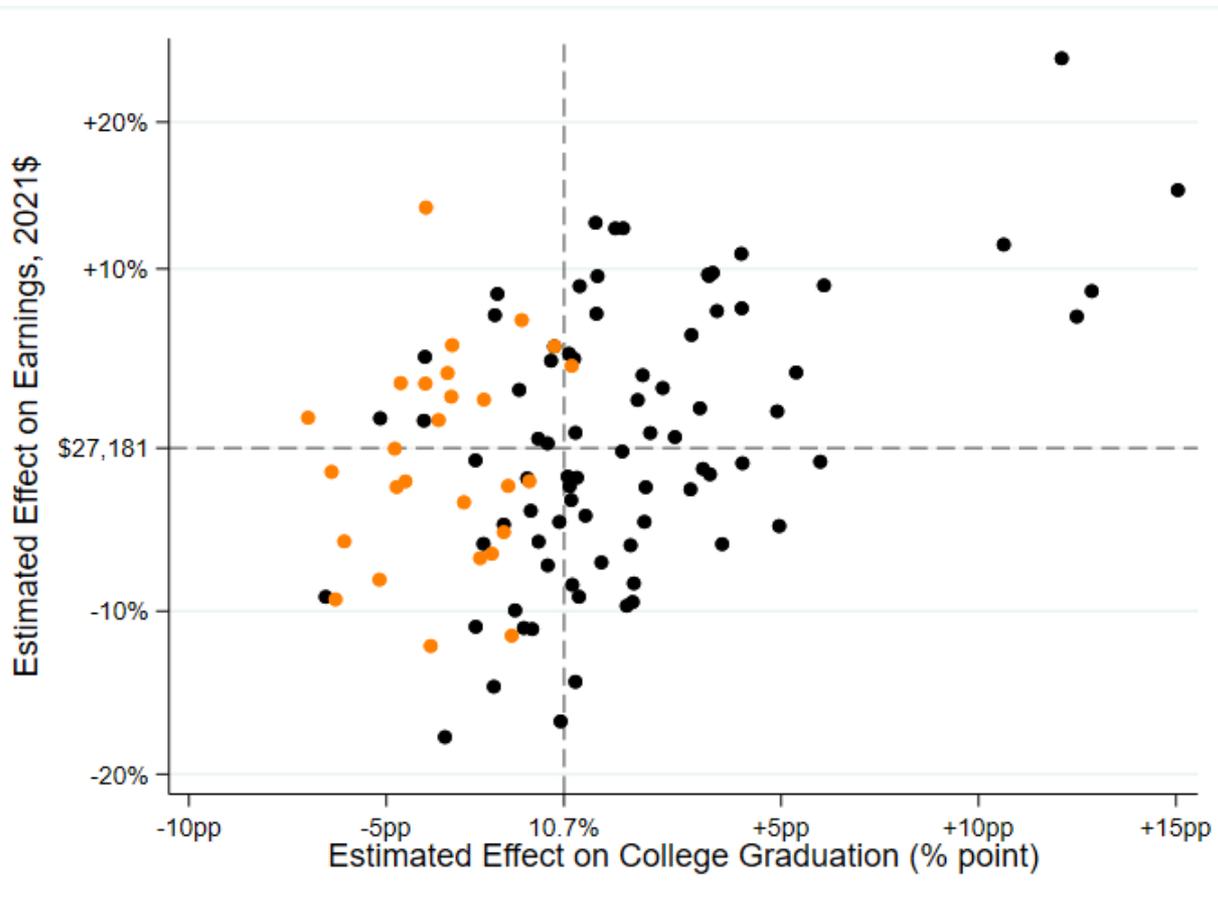
Schools that improve college outcomes tend to improve earnings



- Schools with larger estimated effects on four-year college graduation have larger estimated effects on earnings ($r=0.541$).
- But, some schools raise earnings more than we would expect even with low impacts on college graduation

Note. Dashed lines represent sample average log earnings and 4-year college graduation rate.

Some schools raise earnings more than expected given low impacts on college graduation

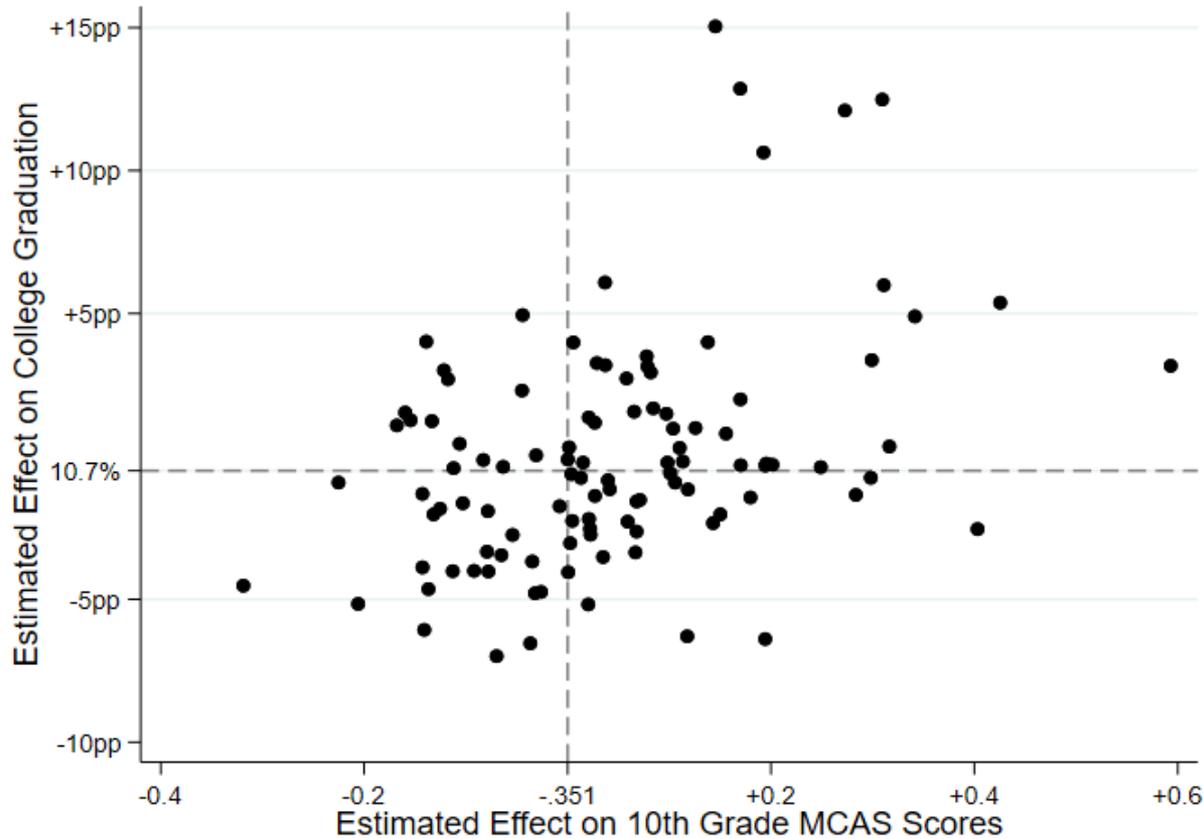


- Many such schools are CTE schools.
- CTE schools show a weaker relationship between earnings impacts and graduation impacts

Note. Dashed lines represent sample average log earnings and 4-year college graduation rate. CTE schools denoted in orange.

Schools that raise test scores raise
longer-run outcomes

Impacts on 10th grade scores are good predictors of longer-term outcomes



- Schools that raise MCAS scores more tend to be those where students have better four-year college graduation ($r=0.461$) and earnings ($r=0.371$).
- But, again, some schools that are effective at raising MCSAS scores do not seem to be particularly effective at improving college graduation or earnings outcomes.

Note. Dashed lines represent sample average 4-year college graduation rate and average 10th grade MCAS scores.

Test scores are not the only thing that matter

We explore three (proxy) measures

Measure	Elements
College-going intent	Students 4-yr college plans
Academic on-track	Math course-taking & on-time MCAS taking
Attendance index	Suspension & attendance rate

- In our value-added models, we estimate schools' impacts on these outcomes.
- We then examine whether schools that improve these outcomes more (from 8th grade to 10th grade) are the same schools that improve college and career outcomes more.

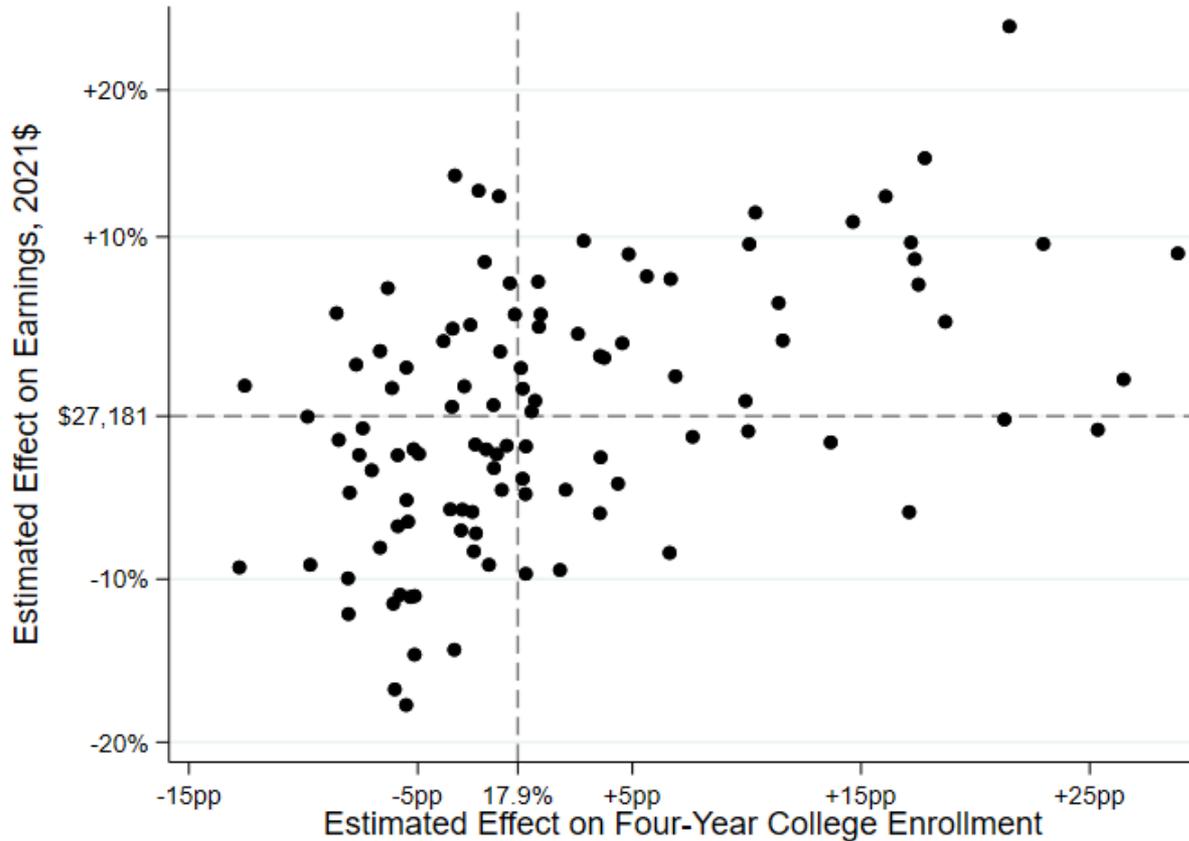
Positive relationships between schools' impacts on short-run measures and longer-run outcomes

- We calculate the **difference in longer-run outcomes** associated with moving from the 20th to 80th percentile on school value-added on these measures

	4-yr Coll Grad	Earnings (Age 30)
10 th Grade MCAS Scores	2.6% pt	5.3%
Plans to Attend 4-Yr College	1.7% pt	1.7%
Academic Index	1.1% pt	2.7%
Attendance Index	0.9% pt	3.2%

Early indicators relate to longer-run impacts

Impact on college enrollment is a strong predictor of longer-term outcomes



- Schools that raise four-year college enrollment more tend to be those that improve four-year college graduation ($r=0.892$) and earnings ($r=0.569$).

Note. Dashed lines represent sample average log earnings and 4-year college enrollment.

Summary Points & Conclusions

- Some schools are much more effective than others in improving life outcomes of students who grow up in poverty
- Schools' impacts on shorter-run outcomes relate to longer-run impacts
- Schools are effective in raising earnings in many ways.
 - Schools that raise four-year college graduation rates tend to improve earnings, but some schools raise earnings with little impact on graduation
 - Schools that improve test scores more raise longer-run outcomes, but test scores are not the only thing that matters.
 - College culture
 - Socio-emotional skills
 - Career skills

Questions?

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Appendix

We focus on low-income students who attend high schools serving large numbers of low-income students

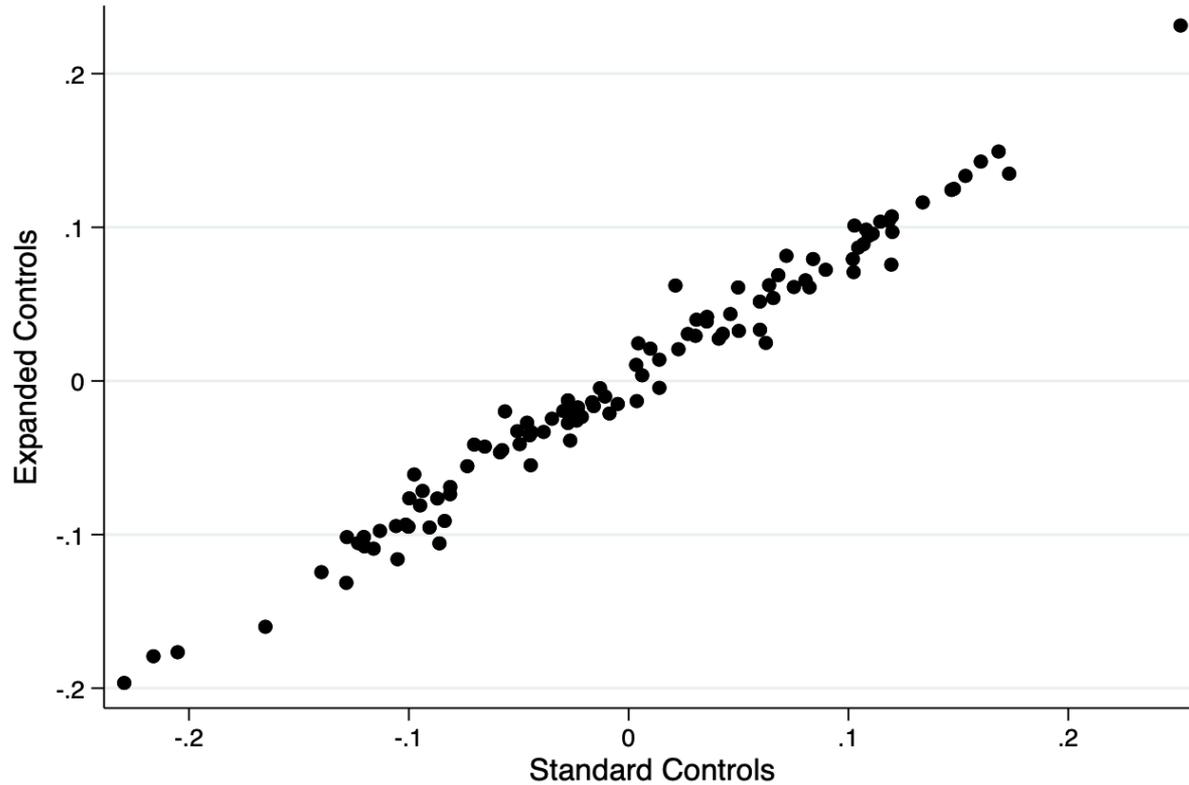
Student Outcomes 2003-2004

	Analytic Sample		
	All MA Schools	Low-Income Students	Higher-Income Students
10th grade math std. score	0.031	-0.695	-0.204
High School Graduation	77%	59%	78%
College Enrollment	62%	38%	57%
Four-year degree	36%	11%	26%
Median Earnings Age 30 (2021\$)	\$43,781	\$32,464	\$41,290
Sample size	151,855	26,422	24,030

- Students in these schools have lower attainments, test scores and ultimate earnings than students in the state, on average.
- Low-income students in these schools have worse outcomes than their higher-income peers.

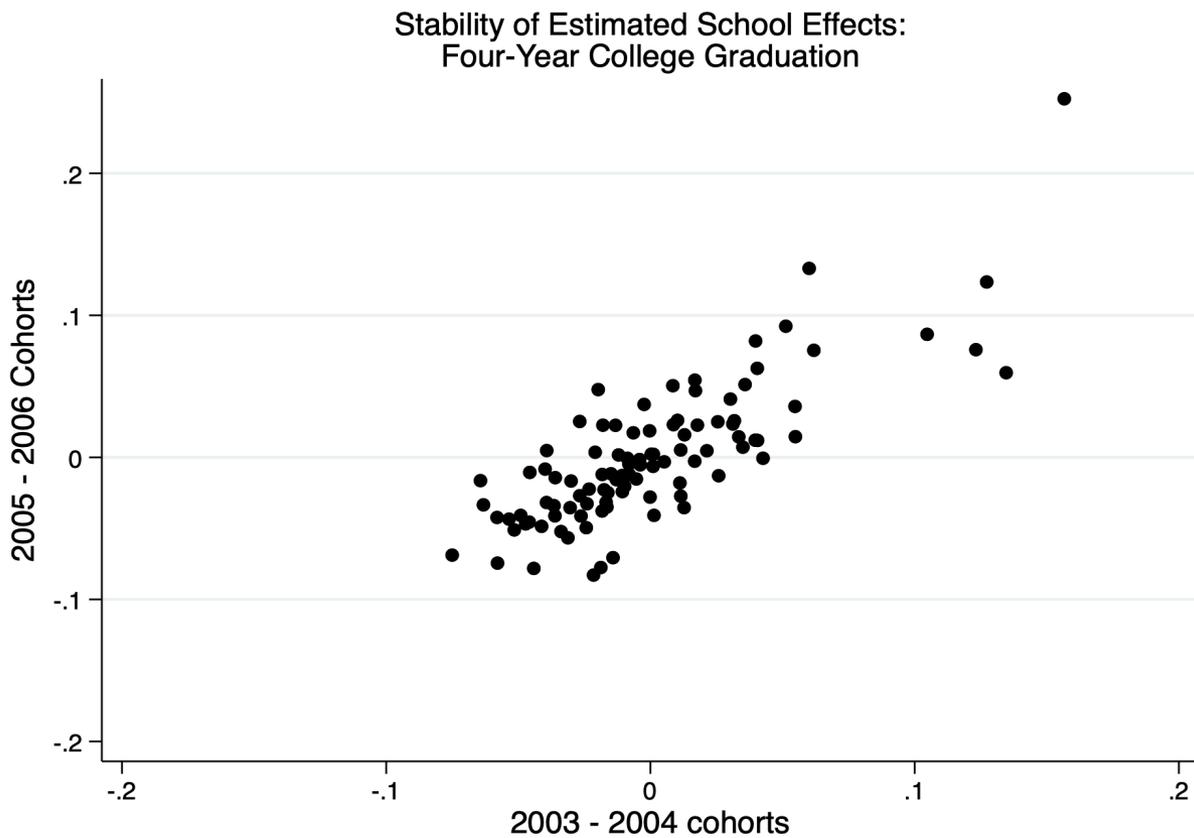
Comparing students with similar 8th grade test-scores, attendance, demographics, and family resources seems to lead to reasonable impact estimates

Estimated School Effects on Adult Earnings



- The central concern is that students (or parents) choose which schools to attend.
- We compare students who are similar on a rich set of dimensions.
- Adding other important measures that we know influence outcomes (such as parent's educational attainments) do not change our estimates, providing some validity evidence ($r=0.989$)

Estimates of school effects appear reasonably stable over time



- A secondary concern is that estimates are insufficiently reliable – in other words, they are filled with measurement error.
- We find that schools are reasonably consistent over time in their impacts on long-run outcomes ($r=0.963$ disattenuated).