Understanding the relationship between high-stakes test scores and long-term outcomes: Evidence from Massachusetts

John P. Papay, Ann Mantil, Richard Murnane, Lily An

PRELIMINARY RESULTS: PLEASE DO NOT CITE OR QUOTE

Background: Validity of MCAS Score Inferences
Since the advent of standard-based reform in the 1990s and the passage of No Child Left Behind in 2001, high-stakes standardized testing has been a key feature of the educational landscape. While there has been substantial research about the statistical properties of these tests, there is surprisingly little evidence about the predictive validity of state tests. Advocates of testing argue that test scores represent meaningful measures of student ability. To test this, we examine how MCAS scores relate to important life outcomes for students.

Data and Methods

Empirical Strategy and Sample
Using student-level data from Massachusetts public high schools, we estimate the relationship between MCAS scores on the 10th grade test and different outcomes measures. Our sample includes ~210,000 first-time 10th grade MCAS test takers in 2003-2005. We track them longitudinally until 2019.

Outcome Measures
We measure three educational attainments: high school graduation three years after students take the test, college attendance within four years after the test, and college graduation within seven years after the test.

We also measure in-state labor market earnings in 2019, when students in our sample are in their early 30s. We focus on 2019 specifically for this cohort because earnings evolve rapidly early in the career, and individuals in their 20s are more likely to be pursuing post-secondary education.

Earnings data come from employer reports to the Massachusetts Unemployment Insurance system. There are several important limitations:
1) We only observe earnings within Massachusetts,
2) We do not observe earnings of workers who are self-employed, work for the federal government, or whose employers do not report to the UI system,
3) We cannot determine whether earnings represent full-time work. That said, we find similar results when we restrict our analyses to annual earnings that represent plausibly full-time work.

Findings: MCAS and Long-Term Outcomes
There is a positive relationship between MCAS scores and long-run outcomes such as educational attainments and labor market earnings.

This relationship could reflect many factors. Thus, we conduct three analyses to explore whether MCAS scores appear to reflect underlying academic skills. Essentially, we examine whether the scores predict long-run outcomes above and beyond other indicators of student ability/advantage.

(1) College readiness: We explore whether MCAS scores predict the probability of earning college credit above and beyond high school GPA. In models where we control for HS GPA, demographics, high school attended, and college attended, students with higher 10th grade MCAS scores are significantly more likely to earn credit college credit towards graduation in their first math course. For example, students who scored Advanced (highest level on the MCAS) are 10 percentage points more likely to earn this credit than the average student scoring Proficient with the same high school GPA. This pattern holds for students with high GPAs and with low GPAs.

(2) Earnings: We explore whether 10th grade MCAS score predicts earnings above and beyond 8th grade MCAS score. When we control for 8th grade math MCAS score and demographic characteristics, students with higher 10th grade MCAS scores are significantly more likely to earn more in their early 30s. For example, a student who scored at the 8th grade MCAS state average but moved to the 75th percentile in 10th grade earns, on average, $10,903 (22%) more in 2019 than a demographically similar student who scored at the state average in both years.

Findings: Predictive Power of MCAS
• (3) Earnings: Finally, we explore whether MCAS score predicts earnings above and beyond educational attainment. Comparing demographically similar students who attended the same high school and observed the same educational credentials, students with higher 10th grade MCAS scores have much higher earnings in their early 30s, on average, than students with lower scores. This holds true across all attainments. For example, a four-year college graduate who scored at the 75th percentile earns, on average, $14,000 (21%) more in 2019 than a demographically similar student from the same high school who scored at the 25th percentile.

Conclusions
MCAS test scores do appear to measure skills that predict success in college and pay off in the labor market. 10th grade scores serve as an initial indicator of a student's long-term success.

However, improved MCAS scores are not the end goal, but should reflect improvements in underlying capacities and skills. As such, improved MCAS scores should follow from better educational opportunities and achievement for all students. Too much emphasis on the scores themselves can result in higher scores without improving students’ education and skills.

The research reported here was supported by the Spencer Foundation and the Institute of Education Sciences, U.S. Department of Education, through Grant R305H190035 to Brown University. The opinions expressed are those of the authors and do not represent views of the Spencer Foundation, the Institute or the U.S. Department of Education.