

Career & Technical Education Policy Exchange

Georgia Policy Labs

Increasing Individuals' Economic Stability through Massachusetts' Career and Technical Education

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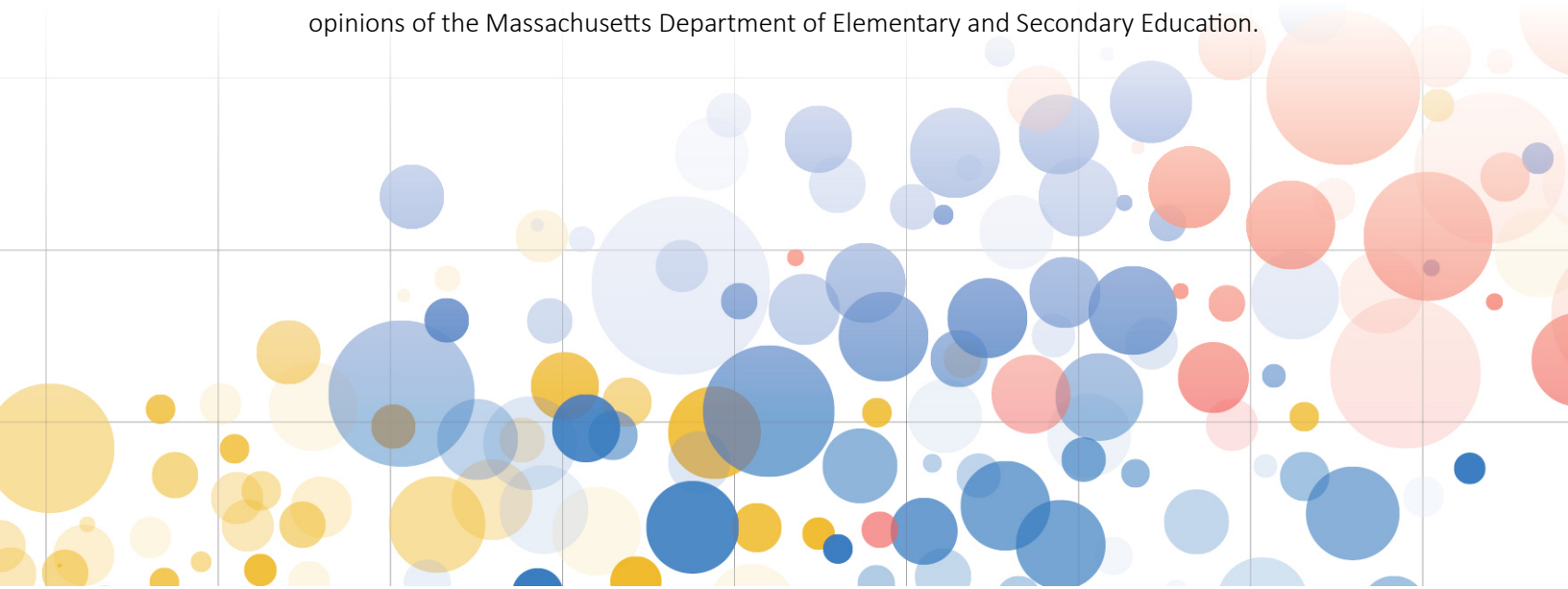
Shaun M. Dougherty
Vanderbilt University

Isabel Harbaugh Macdonald
Harvard University

Walter G. Ecton
Vanderbilt University

Daniel Kreisman
Georgia State University

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HIGHLIGHTS

- CTE participation in high school improves student attendance in ninth grade and high school graduation relative to peers with similar characteristics.
- College enrollment is also higher among all students participating in CTE, compared to otherwise similar peers.
- Higher-income students are more likely to enroll in a four-year college, whereas lower-income students are more likely to enroll in a two-year college than similar peers who did not attend a CTE-focused high school.

MOTIVATION

High-school based career and technical education (CTE) programs continue to grow, fueled by labor market demand and federal funding through the Perkins Act.¹ Amid concerns over declining rates of economic mobility and stagnating earnings for low-wage workers, the academic landscape in America's secondary schools now places extensive focus on workforce preparation as part of the curriculum. Nationally, CTE is the most popular type of elective taken by high school students, with roughly 80 percent of high school students taking at least one course.

CTE in the United States is organized into 16 career clusters, each of which has its own set of career pathways (e.g., the web development pathway within the Information Technology cluster). Roughly 40 percent of students enrolling in a CTE course go on to become "completers," finishing a three-course sequence and a capstone experience such as work-based learning or taking an industry certification examination. Across the country, CTE delivery methods vary, with the majority of students taking courses in their comprehensive high school—some in cross-district regional centers and many others attending a career academy or dedicated technical high school. Further, course

and pathway offerings vary widely across schools, even within a district.

The program offerings and education delivery structures for CTE in Massachusetts continue to be an example to other states. In addition to the standard offerings and structure described above, they also offer an additional level of quality control for the majority of their programs. Specifically, nearly 75 percent of programs receive an additional level of certification (Chapter 74 approval), which indicates the purposeful alignment of programming with local labor markets and the inclusion of employers, colleges, workforce investment boards, and organized labor on advisory boards.² These boards help regulate the supply of new labor in program areas and ensure that the equipment and training programs used in those programs align with the current state of the art in the corresponding industry. However, even in this exemplar state, there is limited evidence of the impact of these programs on student outcomes. (Dougherty, 2018; Dougherty, Grindal, & Hehir, 2018).

Hence, key questions remain. For example, do CTE programs increase high school graduation (potentially by offering a non-

¹ The *Carl D. Perkins Career and Technical Education Act*, now in its fifth iteration, provides significant funding for secondary CTE and includes CTE guidelines.

² Chapter 74 references the state code that authorizes additional state funding for programs that meet these additional standards.

collegiate path to well-paying jobs)? Does CTE participation come at the expense of college attendance? And paramount, does CTE participation improve employment and earnings? Policymakers seek to understand the effects of these programs on student outcomes, especially for low-income students who may choose these pathways seeking economic mobility.

In the following policy brief, we focus on the effects of receiving admission to a Chapter 74 program in Massachusetts. These programs are in high demand among students, leading to oversubscriptions for many programs. Further, oversubscribed programs use a formula with a defined cutoff for admissions (described below), allowing us to compare students just above the threshold with those just below. We use this research design to answer two main questions concerning the effects of Chapter 74 CTE programs on later outcomes.

RESEARCH QUESTIONS

- 1) What is the effect of being admitted to (and attending) a Chapter 74 CTE program in Massachusetts on short- and medium-term measures of academic success and labor market outcomes?
- 2) Are the effects different for students with different family incomes?

DATA, CONTEXT, AND METHODOLOGY

DATA

Our primary data set comprises individual-level data on over 500,000 Massachusetts students in middle and high school for school years 2002 through 2020. These administrative data are provided through a partnership with the state of

Massachusetts Department of Elementary and Secondary Education. The data set includes all student registration and demographic information as well as application and admissions records to seven regional and vocational technical high schools that were collected in partnership with the state. We also use state-mandated test score data, high-school completion, attendance, and discipline data. We supplement this state education data with college enrollment and completion data from the National Student Clearinghouse and Unemployment Insurance records that capture quarterly earnings and employer information.

STATE CONTEXT

In Massachusetts, CTE programs are delivered through traditional comprehensive high schools, 27 Regional Vocational Technical Schools (RVTS) that draw students from multiple surrounding middle-school districts, five Municipal (City) Vocational Technical Schools that are operated by city school districts, one education cooperative, and two countywide and one statewide agricultural school that focus primarily on agricultural subjects. In each of these schools, students alternate on a weekly basis between full-time study in a chosen CTE field and traditional academic coursework. Graduation requirements in core subjects like history, English, math, and science are consistent across comprehensive (i.e., non-vocational) and vocational high schools such that students at vocational high schools must complete the same number of courses in these fields. CTE program options are varied in vocational high schools, with the average RVTS offering 13 program options and no school offering fewer than 10 programs.

Vocational high school programs are also more likely to receive a special statewide distinction as being "Chapter 74-approved

programs," meaning they meet certain requirements around student-teacher ratios, space and equipment guidelines, and maintain partnerships with local labor and industry groups. On average, about 75 percent of all CTE program participants participate in Chapter 74 programs. All Chapter 74-approved programs also have approved admissions policies, which allow for more internally valid comparisons of students who did and did not participate in Chapter 74 CTE programs.

DESIGN

We use two analytic approaches to generate estimates of program effects. Using the applicants to oversubscribed technical high schools, we apply a fuzzy regression discontinuity design where we compare outcomes for students who just cleared the admission threshold to students who just missed being admitted. We use application data to schools, along with a student's position relative to a cutoff imposed by space limitations, to estimate the impact of receiving an offer of admission. This approach allows us to conclude that differences in outcomes we observe are due to the causal effect of attending vocational school, rather than underlying differences between students who do and do not apply to vocational high schools. We then use ordinary least squares (OLS) regression models that control for proxy measures of application data elements, as well as measures of town-of-residence, to approximate an average treatment effect. In both approaches, we estimate heterogeneous impacts by eligibility for federally subsidized meals to determine whether there are differences in impacts for students of different income levels.

RESULTS

In this policy brief, we show impacts of CTE programs at seven RVTS that received more applicants than they could accommodate. For three of these schools, we observe students up to seven years after high school graduation, including both college and workforce outcomes. For the four schools, we lack data on long-term outcomes, but we find similar impacts on short-term outcomes, which we describe as a leading indicator of potential future impacts. We pay particular attention to differential impacts on students who are eligible for federally subsidized meals (Free- and Reduced-Price Lunch, an imprecise but best available measure of low-income status) to determine if impacts are larger or smaller across this dimension. Extending this analysis to the larger sample of students who were eligible to apply to one of these schools and to the state as a whole, we demonstrate that impacts estimated in the oversubscribed, specialized schools appear similar to impacts across the rest of the state.

We find that relative to otherwise similar applicants who were (just) not admitted, students who are (just) admitted to oversubscribed technical high schools

- are more likely to pass both the English language arts and math tests required to earn a high school diploma;
- have higher ninth-grade attendance, regardless of family income;
- are more likely to graduate from high school on time; and
- are more likely to enroll in two-year college, though four-year college going differs by family income.

- Higher-income students are more likely and lower income students are less likely to attend a four-year college if they had received an offer to attend a technical high school.
- While a relatively small sample led to imprecise measures of labor market effects, our results are suggestive of positive returns to attending a technical high school at one, three, five, and seven years after graduating.
- Results do not vary meaningfully by location.

IMPLICATIONS FOR POLICY AND PRACTICE

Our results suggest that, on average, participating in high-quality and focused CTE

programming in Massachusetts high schools provides academic and workforce preparation benefits. Attendance and test score impacts suggest that CTE programs may impart similar math and English language arts skills while improving engagement and smoothing transition to college or the workforce. One area of potential concern is the lower rate of four-year college going among lower-income students—all else equal. Understanding whether perceived college costs, differences in the college-level programming aligned with CTE programs in high school, or some other mechanism explains this is an important next step in understanding the effects of CTE for low-income students.

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ABOUT THE AUTHORS

Shaun M. Dougherty is an associate professor of public policy and education at Vanderbilt University's Peabody College of Education & Human Development. His work focuses on education policy analysis, causal program evaluation and cost analysis, and the economics of education, with an emphasis on career and technical education. He is a co-founding member of the Career & Technical Education Policy Exchange (CTEx)—a consortium of researchers and state partners working to inform the future of CTE policy—and co-PI on the IES-funded CTE Research Network. Shaun has a Bachelor of Science in mathematics from the University of Massachusetts, a master's degree in educational leadership from Gwynedd Mercy University, and a Doctor of Education in quantitative policy analysis from Harvard University.

Walter G. Ecton is a Ph.D. candidate in educational leadership, policy, and organizations at Vanderbilt University's Peabody College. His research focuses on the intersections between high school, higher education, and the workforce and the pathways students take as they navigate those sectors. His work primarily explores career and technical education, both in the K-12 and higher education spaces. Prior to his doctoral work, he taught high school social studies at Booker T. Washington High School in the Atlanta Public School system and served as associate director of new business development at the Education Advisory Board. He holds a bachelor's in political science and theater studies from Emory University and a master's in peace and conflict studies from the University of St. Andrews in Scotland.

Isabel Harbaugh Macdonald is a doctoral candidate in public policy at Harvard University, with a focus on labor and development economics. Her research focuses on education and financial inclusion, both domestically and in countries like Pakistan and Kenya. Prior to her graduate studies, Isabel worked as a consultant for private businesses on their human capital and talent challenges. Isabel graduated summa cum laude with a Bachelor of Arts in economics and international relations from Claremont McKenna College.

Daniel Kreisman is an associate professor of economics at Georgia State University. His research addresses topics at the intersection of public economics, labor economics, and education policy. Dan is the founding director of the Career & Technical Education Policy Exchange (CTEx)—a consortium of researchers and state partners working to inform the future of CTE policy. Dan holds a Ph.D. in public policy from the University of Chicago and a B.A. in history and philosophy from Tulane University. Before graduate school, Dan taught high school English in New Orleans.

ABOUT THE GEORGIA POLICY LABS

The Georgia Policy Labs (GPL) is a collaboration between Georgia State University and a variety of government agencies to promote evidence-based policy development and implementation. Housed in the Andrew Young School of Policy Studies, GPL works to create an environment where policymakers have the information and tools available to improve the effectiveness of existing government policies and programs, try out new ideas for addressing pressing issues, and decide what new initiatives to scale. The goal is to help government entities more effectively use scarce resources and make a positive difference in people's lives. GPL has three components: The Metro Atlanta Policy Lab for Education works to improve K-12 educational outcomes; the Career & Technical Education Policy Exchange focuses on high-school-based career and technical education in multiple U.S. states; and the Child & Family Policy Lab examines how Georgia's state agencies support the whole child and the whole family. In addition to conducting evidence-based policy research, GPL serves as a teaching and learning resource for state officials and policymakers, students, and other constituents. See more at gpl.gsu.edu.