

B·E·R·C

Secondary, Postsecondary, and Labor Market Effects of Career and Technical Education in Baltimore City Public Schools

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Research Colloquium

December 15, 2023

Acknowledgements

The research reported here was supported by the Institute of Education Sciences, U.S. Department of Education, through Grant R305A210049. The opinions expressed are those of the authors and do not represent views of the Institute or the U.S. Department of Education

We appreciate the assistance of MLDS Center staff, especially Ross Goldstein, Angie Henneberger, Molly Abend, and Bob Murphy. We also extend gratitude to individuals at Baltimore City Schools, including Chris Wohn, Rachel Pfeifer, and Kumasi Vines.

The Maryland labor force aspect of this research was supported by the Maryland Longitudinal Data System (MLDS) Center. All opinions are the authors' and do not represent the opinion of the MLDS Center or its partner agencies.

Agenda

- Background and Overview of Project
- Data/Methods
- Findings
 - Mechanisms of CTE (BERC data)
 - High school outcomes (BERC data)
 - Postsecondary enrollment (BERC data)
 - Employment stability and earnings (MLDS data)

Overview

Given the general push to promote college and career readiness, more and more researchers and policymakers have turned to CTE as a potential means to promote these desired schooling outcomes.

While the **ultimate goal of CTE programs in secondary school is to better prepare students for eventual entry into the labor market**, there is strong reason to believe that CTE is beneficial in many ways beyond simply labor market outcomes.

One under-researched area of CTE impact is how participation in these programs actually relates to later outcomes on the labor market pipeline. The three theorized mechanisms, as proposed in previous research (Gottfried et al., 2014), have never been tested simultaneously using empirical data.

There is little rigorous research exploring the outcomes of CTE across different clusters and programs of study. Recent research on CTE shows that there are unique impacts in the pipeline from high school to college in the distinct clusters (Plasman, Gottfried, & Sublett, 2017, 2019), suggesting it is important to examine these clusters individually instead of examining CTE as a single unit.

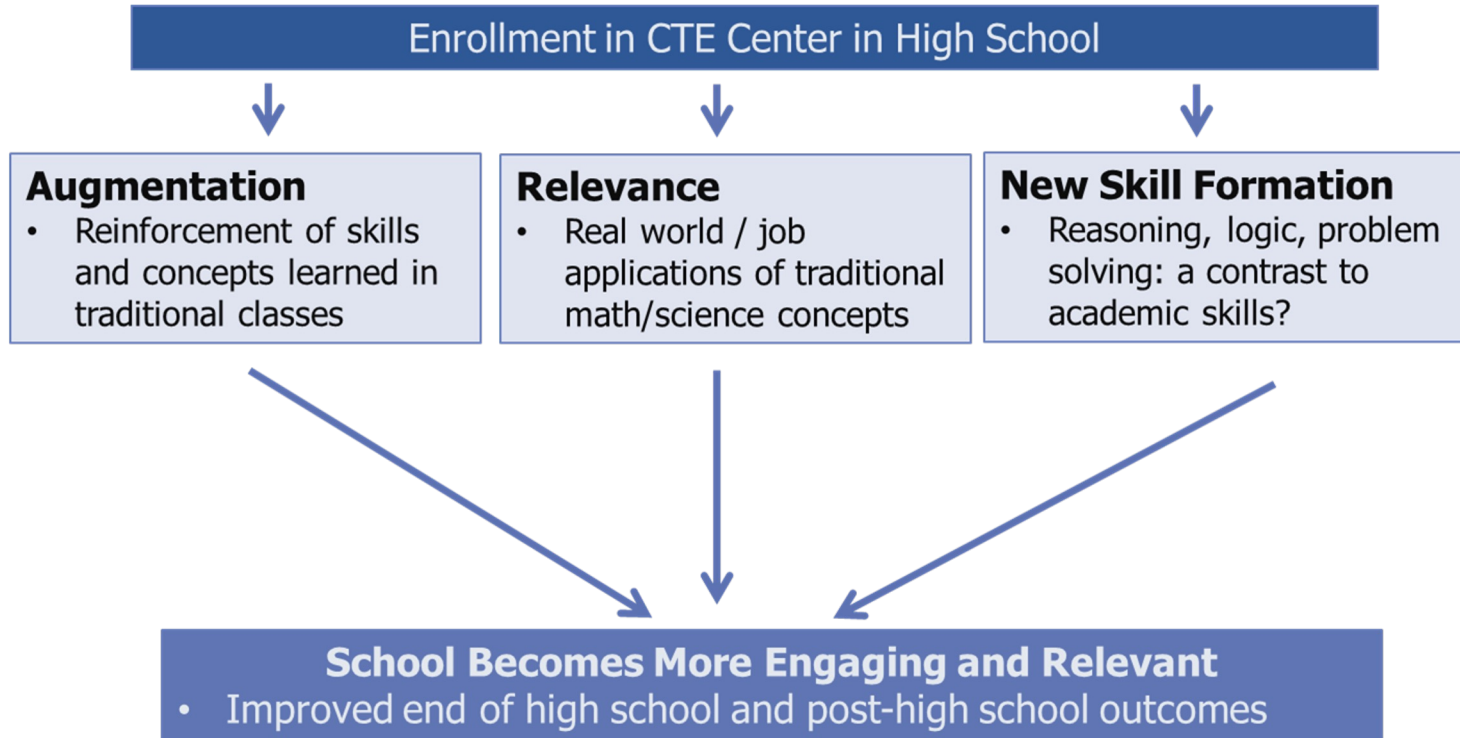
Overall Project: Guiding Questions

How do the theorized mechanisms of the effect of CTE participation manifest themselves empirically in the Baltimore context?

What is the effect of CTE participation on student secondary and postsecondary outcomes?

- high school graduation
- higher education matriculation and persistence
- labor market participation and wages

Overall Project



Context

District serves a population of slightly under 80,000 students, the majority of whom are African-American (79%) and increasingly Latino/a (10%). The district has Community Eligibility Provision status, meaning all students receive free meals. As of 2015-16, the last year free/reduced-price lunch (FARMS) data were available, 76% of students were eligible for FARMS.

The district's cohort graduation rate has hovered around 71% for the past five years (MSDE, 2019).

In recent years, the city has experienced declining population, which is reflected in the district's enrollment as well as by district efforts to create enticing school options for families who may be considering whether to leave.

The district offers a menu of diverse high school options, made available through a district-wide high school choice system.

Context: High School Choice

Student selection and high school assignments take place during the latter part of eighth grade.

Students make up to five ranked choices from a range of school types that include highly sought-after selective admission schools that enroll based on academic criteria as well as non-selective traditional, charter and operator-led high schools that have no entrance criteria and that base admissions on random lotteries.

Context: Selective High Schools

During the time that is focused on in this study there were eight schools with entrance criteria,

- three were CTE focused and select students on academic criteria (hereafter referred to as CTE Centers),
- four are highly selective on academic criteria and are predominately college preparatory in focus, and
- one is an arts focused school that selects on artistic performance.

While CTE programming is offered within many of the district's high schools, both selective and non-selective, the CTE Centers were unique in that they offer a full range of CTE programs and all enrolled students are expected to complete both a CTE pathway and general academic diploma requirements.

When students applied to a CTE Center they applied directly to a specific CTE program that is offered within that school.

Context: Selective High Schools

Admissions offers are generated through a centralized process

Offers are assigned on the basis of student rank-order school and/or CTE program preferences and school rankings (priorities) of students based on a composite score

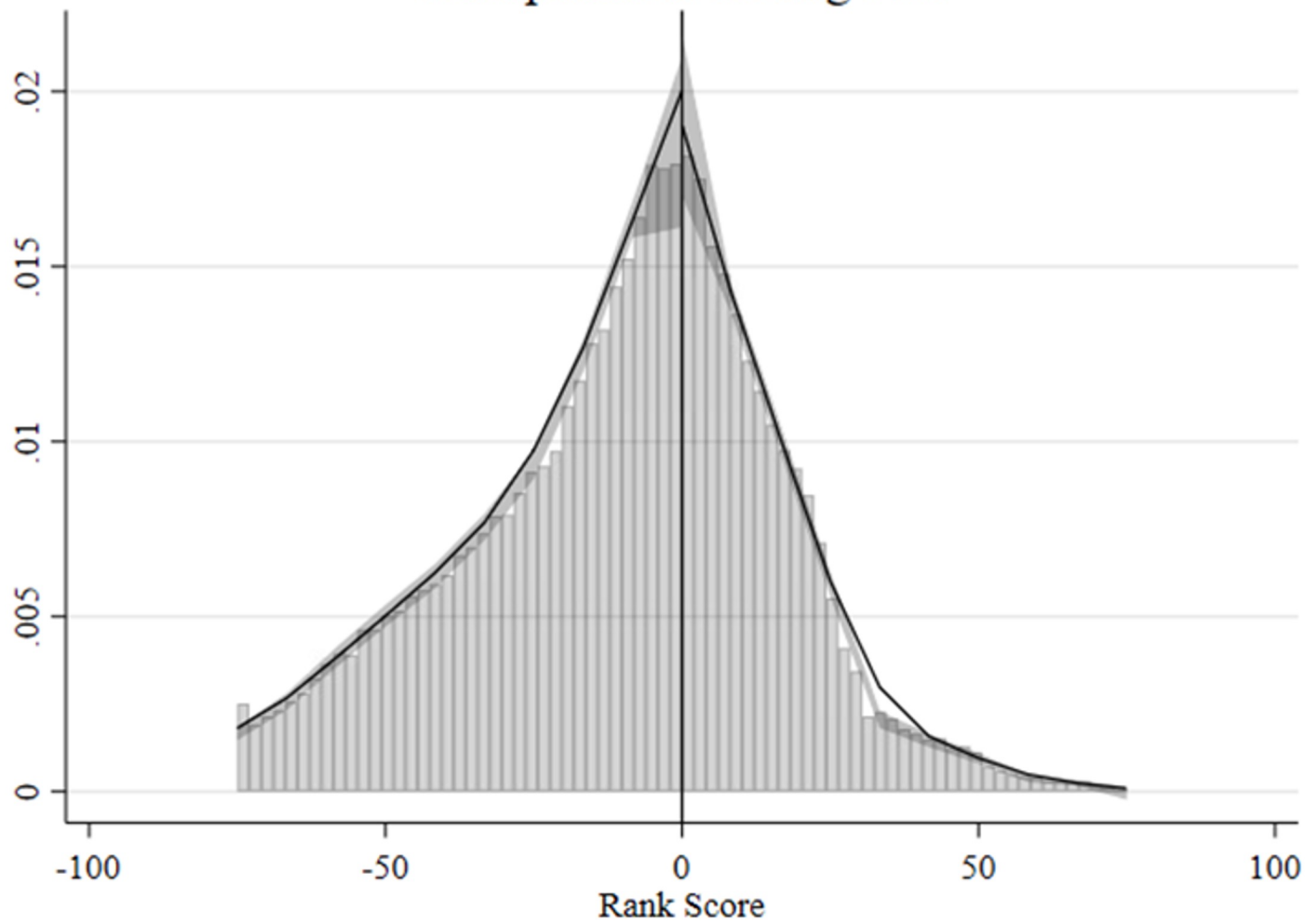
The composite score is calculated as a linear composite of middle school academic performance (course numeric grades and state standardized assessments) and attendance

The centralized admissions offer system, the use of composite scores for ranking of students for each CTE program in CTE Centers, and the concentration of CTE programs in CTE Centers **creates the presence of discontinuities** around the admissions cut-offs

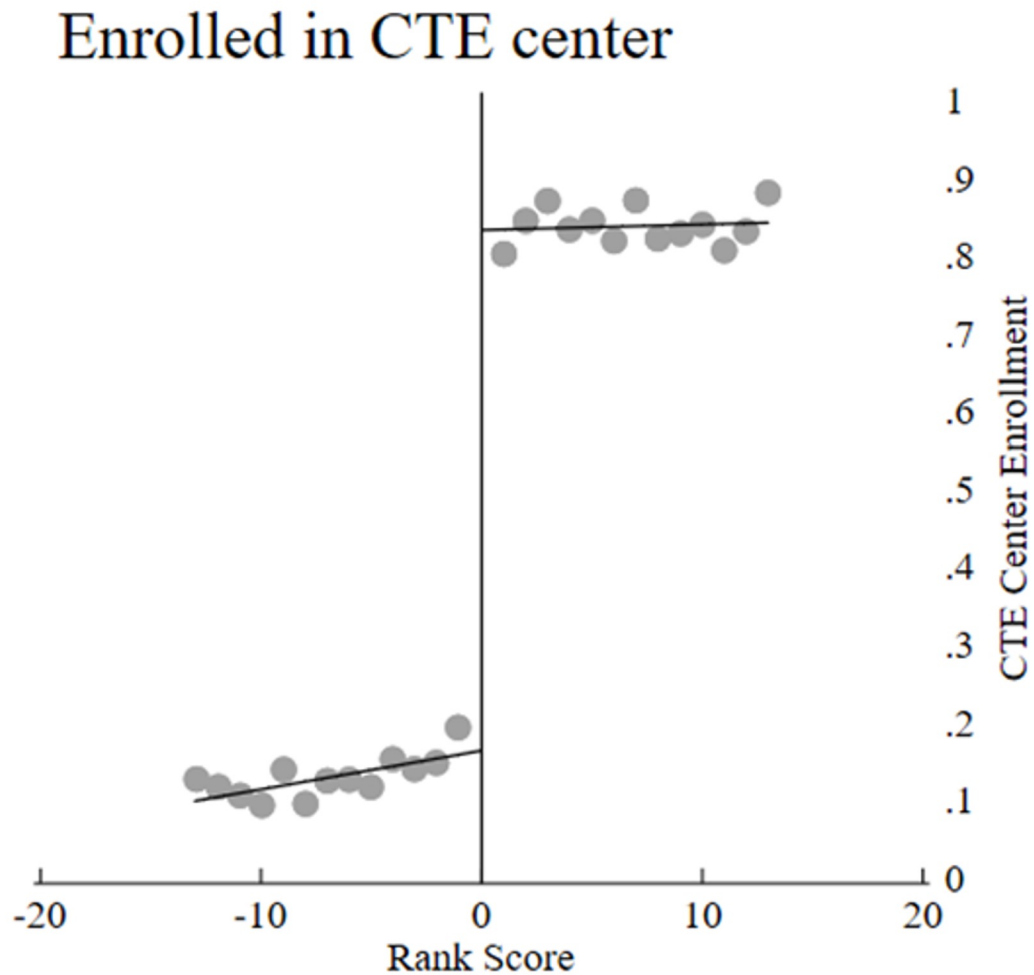
CTE Programs of Study by School

	Edmonson- Westside	Megenthaler	Carver
Academy Of Health Professionals	Yes	Yes	O
Administrative Services	Yes	Yes	Yes
Arts, Media, and Communications	Yes	Yes	Yes
Autobody Collision Repair Tech	Yes	Yes	O
Biomedical Science (PLTW)	Yes	O	O
Business Marketing	Yes	O	Yes
Business Management	Yes	Yes	Yes
Careers In Cosmetology	Yes	Yes	Yes
Early Childhood Education	Yes	Yes	Yes
Baking	Yes	Yes	O
Computer-Aided Design	Yes	Yes	Yes
Construction Design and Management	Yes	Yes	Yes
HVAC	O	O	Yes
Welding	O	Yes	O
Construction Trades	Yes	Yes	Yes
Criminal Justice	O	Yes	O
Design Technology	Yes	Yes	Yes
Electrical Construction	Yes	Yes	Yes
Finance & Accounting	Yes	Yes	Yes
Food And Beverage Management	Yes	Yes	O
Health And Biosciences	Yes	Yes	Yes
IT Networking Academy	Yes	O	O
Interactive Media Production	O	Yes	O
Law And Leadership	O	O	Yes
Manufacturing Technologies	O	O	Yes
Marketing	O	Yes	Yes
Pre-Engineering (PLTW)	Yes	Yes	O
Teacher Academy of Maryland	O	Yes	Yes

Manipulation Testing Plot



RD



Intermediary Mechanisms

Outcomes of Interest

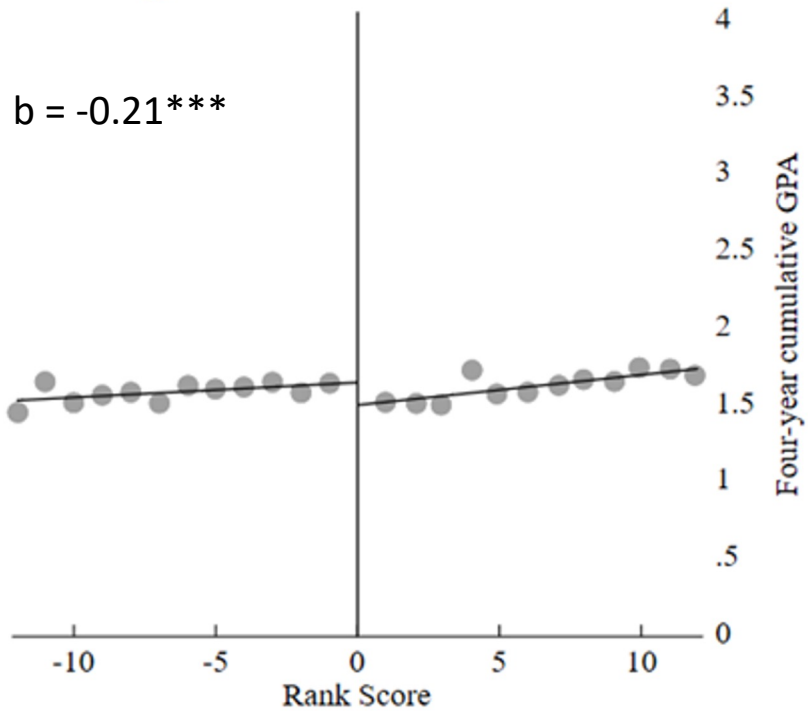
Augmentation - GPA, SAT scores

Relevance and Engagement - Attendance, Consistent HS enrollment

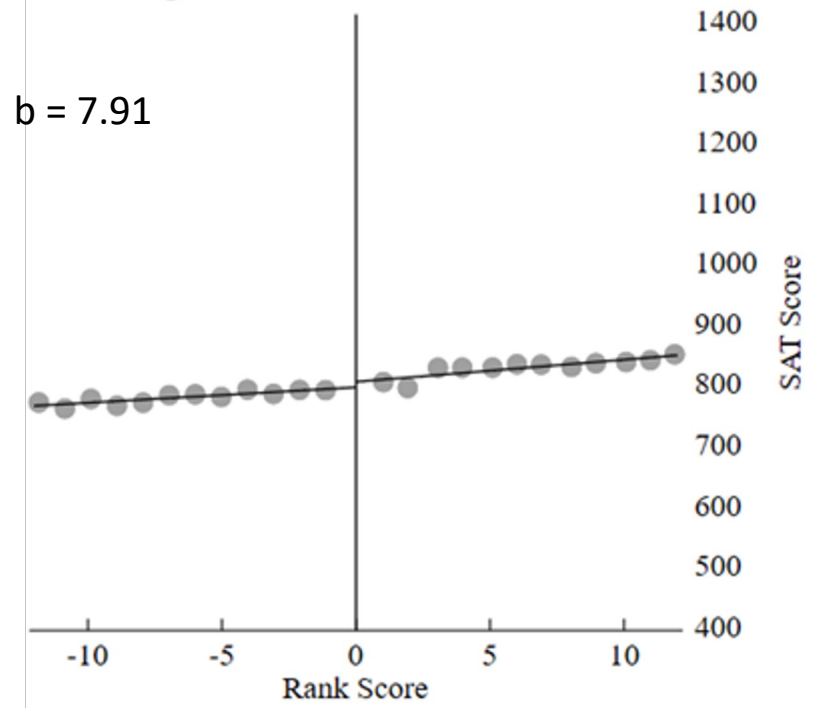
New Skill Formation - CTE pathway completion

Augmentation

B. High School GPA

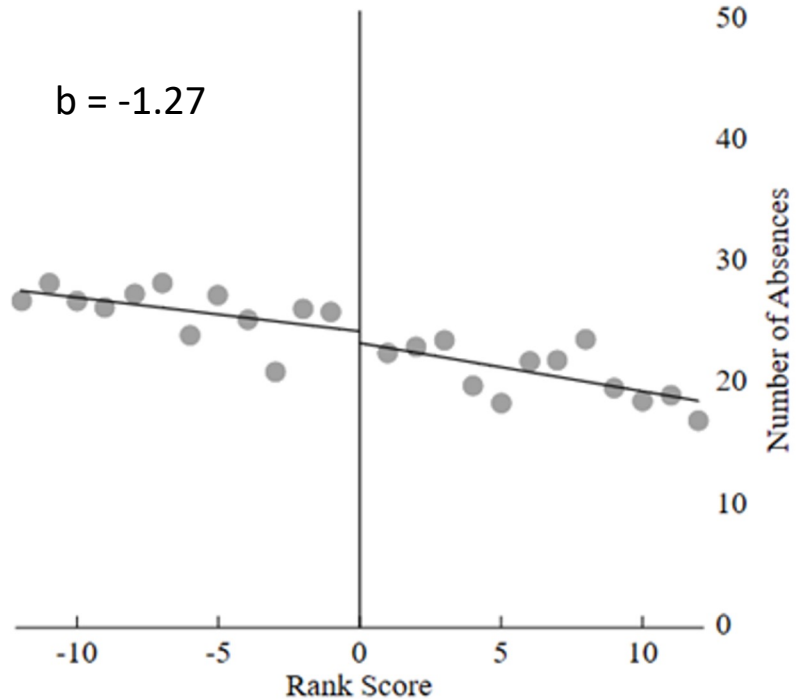


C. Highest Cumulative SAT

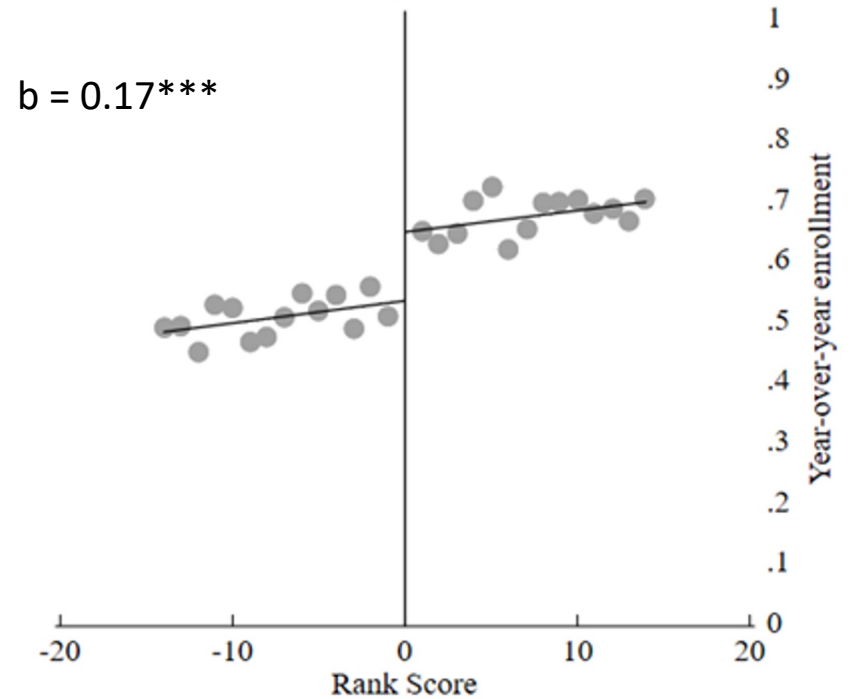


Relevance and Engagement

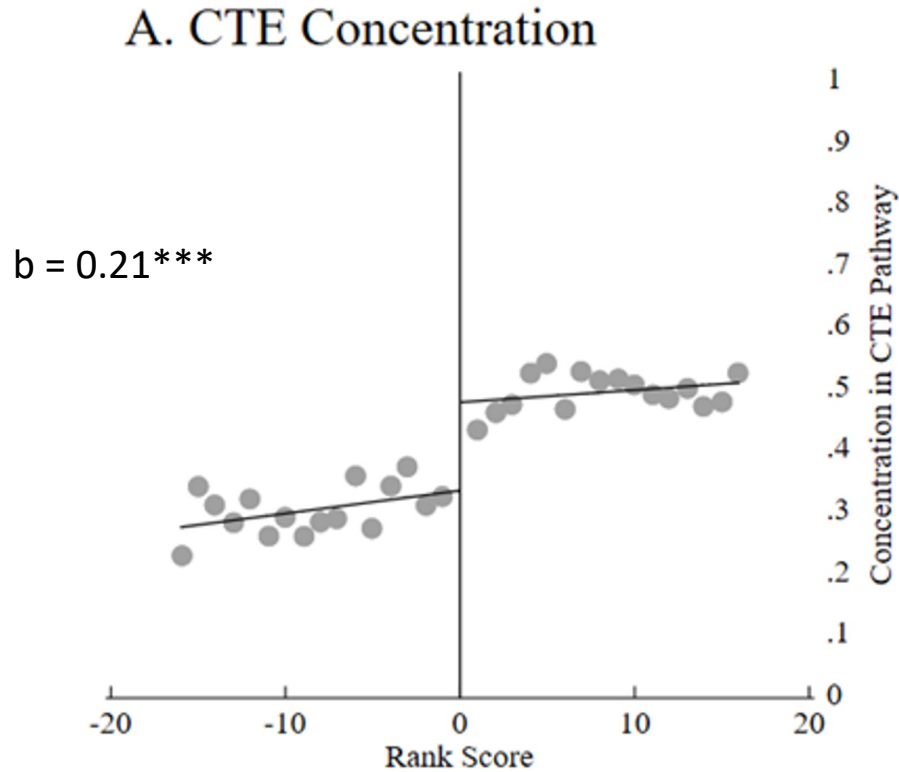
D. First Year Absences



E. Persistent High School Enrollment



New Skill Formation



Takeaways

- Enrollment in CTE center is strongly related to CTE concentration
- CTE Center students are more likely to remain consistently enrolled in HS across four consecutive years
- Slightly lower GPA - based on grading standards? Big fish, little pond theory?

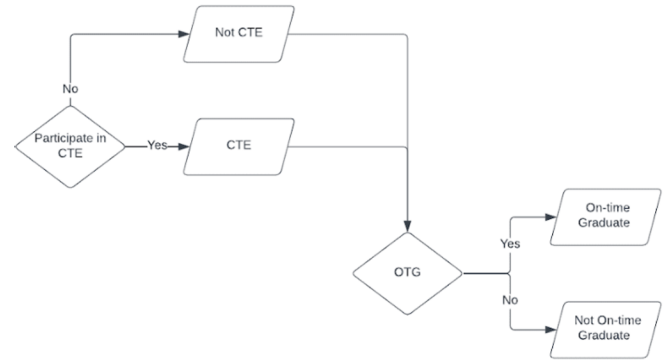
On-time Graduation

On-Time Graduation (OTG)

We want to know the direct effects of CTE on OTG,

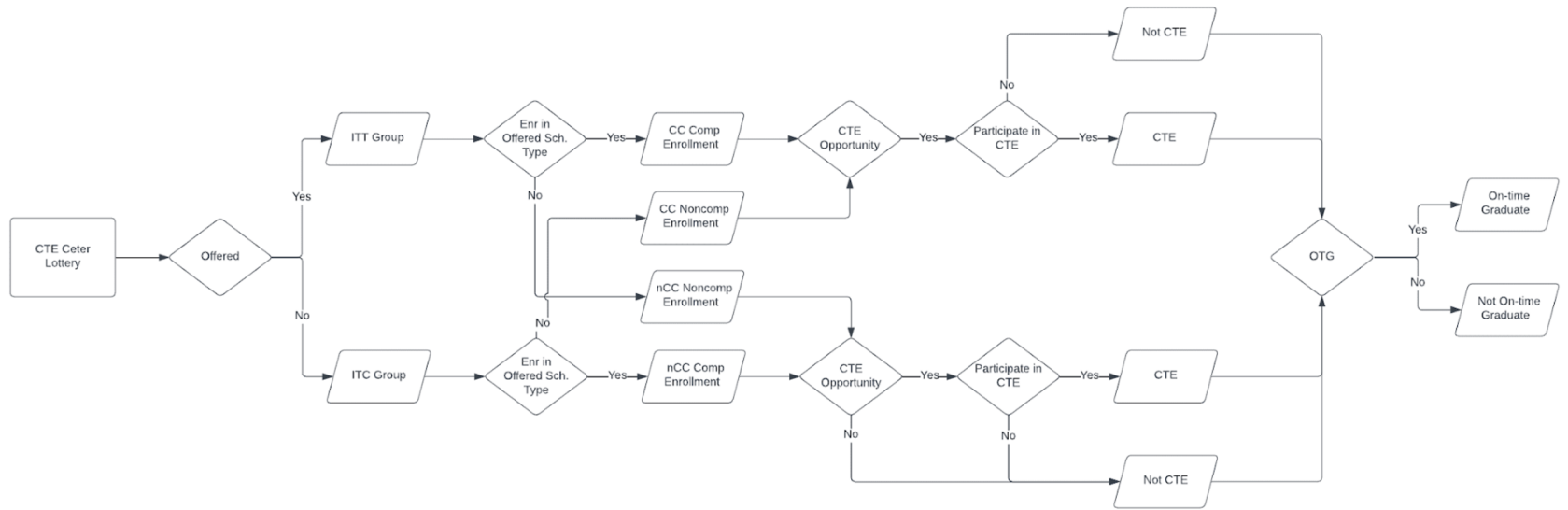
but...

we cannot directly estimate given selection into CTE





Finding: No significant effects on on-time graduation



Unpacking pathways

Potential Outcomes Framework Results

Received CTE Treatment (CTE Concentrator)	Not Offered Admission to CTE Center		Offered Admission to CTE Center		Row Total (CTE Concentrator)
	Not Enrolled in a CTE Center	Enrolled in a CTE Center	Not Enrolled in a CTE Center	Enrolled in a CTE Center	
No	ITC, Compliant, Not Treated OTG = 55.4%*** n = 3,397 [z = -14.39, p = 0.000]	ITC, Non-Compliant, Not Treated OTG = 55.3%*** n = 170 [z = -4.80, p = 0.000]	ITT, Non-Compliant, Not Treated OTG = 81.1%** n = 647 [z = -2.77, p = 0.003]	ITT, Compliant, Not Treated OTG = 45.5%*** n = 1,495 [z = -14.64, p = 0.000]	5,585 OTG = 55.7%
Yes	ITC, Compliant, Treated OTG = 92% n = 1,307 [z = -0.41, p = 0.68]	ITC, Non-Compliant, Treated OTG = 92.5% n = 295 [z = -0.14, p = 0.893]	ITT, Non-Compliant, Treated OTG = 97% n = 234 [z = 0.53, p = 0.595]	ITT, Compliant, Treated OTG = 93.4% n = 2,490 REFERRENT	4,450 OTG = 93.1%
Column Total (Center enrollment by Not Offered Admission status)	4,704 OTG = 65.6%	465 OTG = 78.9%	881 OTG = 85.4%	3,985 OTG = 75.4%	10,035
Column Total (Offered Admission)	5,169 OTG = 66.7%		4,866 OTG = 77.2%		OTG = 71.8%

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Postsecondary Enrollment

Outcomes:

- Any postsecondary enrollment the first fall after HS graduation
- Four-year enrollment first fall
- Two-year enrollment first fall
- Inclusive, selective and more selective (per IPEDS) four-year enrollment first fall

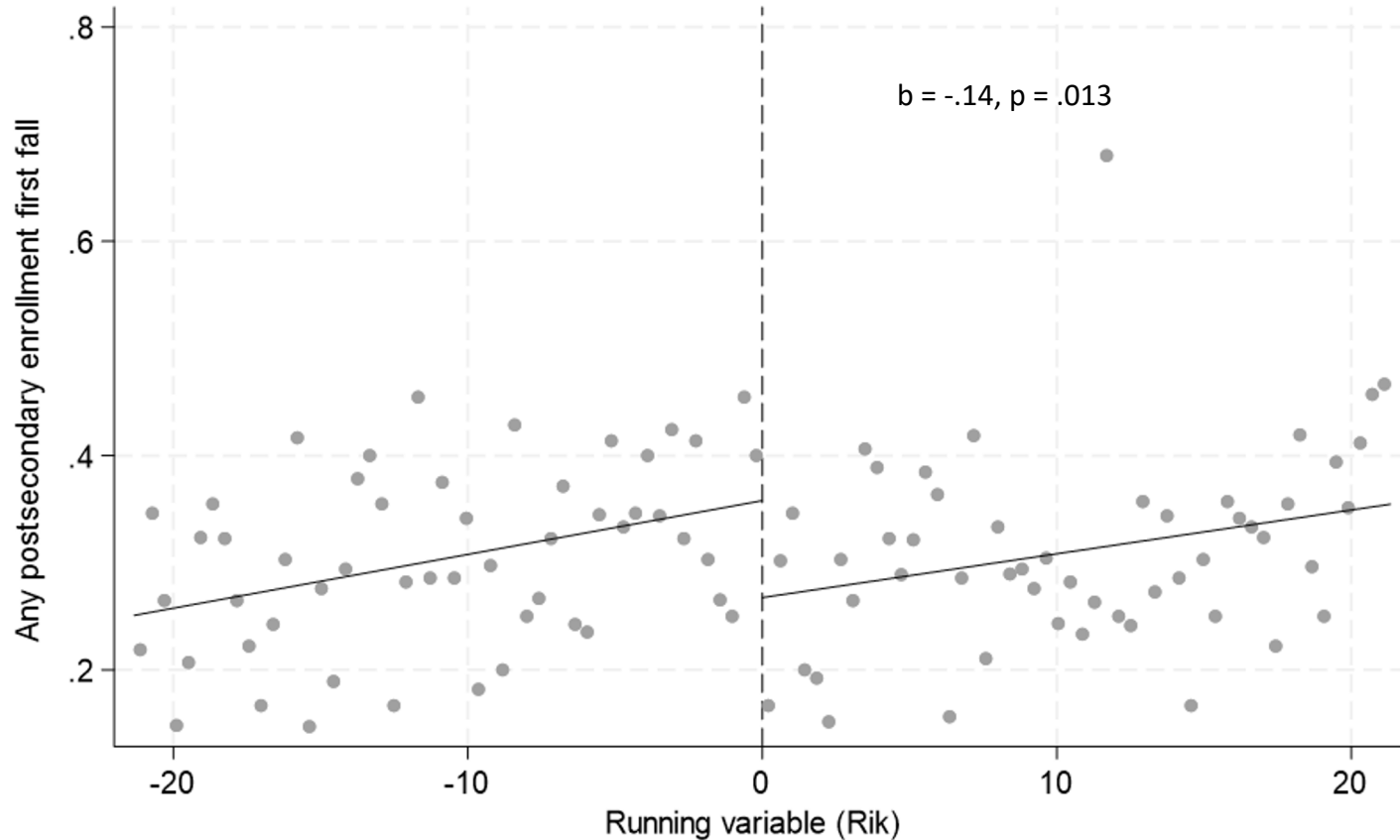
Also controlled for whether CTE pathway would be expected to articulate with further college education (e.g., cosmetology vs. PLTW)

Postsecondary Enrollment

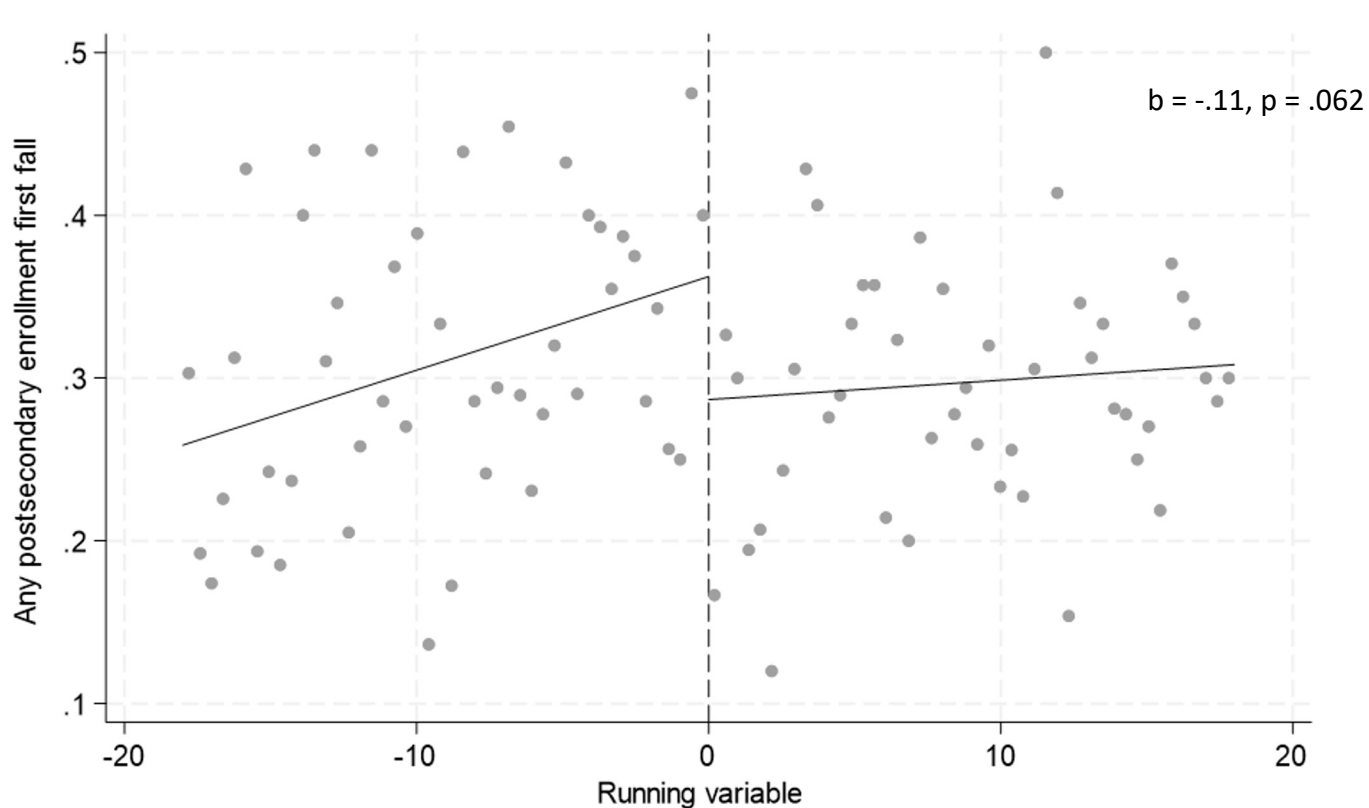
- Historically, college enrollment among *all* graduates of CTE centers has been lower than the district average (i.e., approx. 32-35% enrolling the fall after graduation).
 - Among all CTE center fall enrollees, most enroll in 2-year colleges.
- In our sample (unadj. means):

	No offer	Offer
First fall enrollment (any)	.25	.34
4-year fall enrolled	.08	.17
2-year fall enrolled	.18	.18

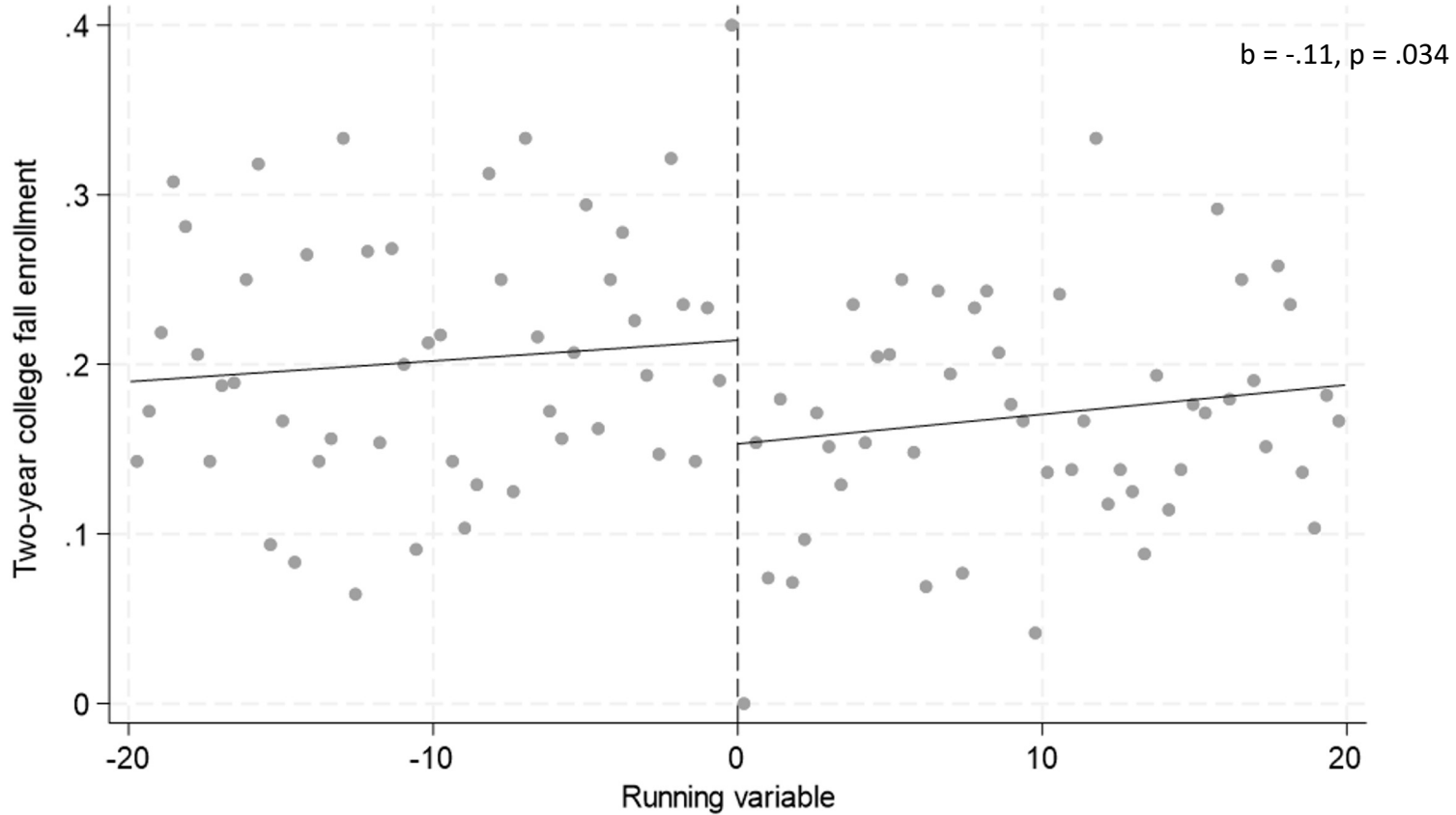
Any postsecondary enrollment first fall



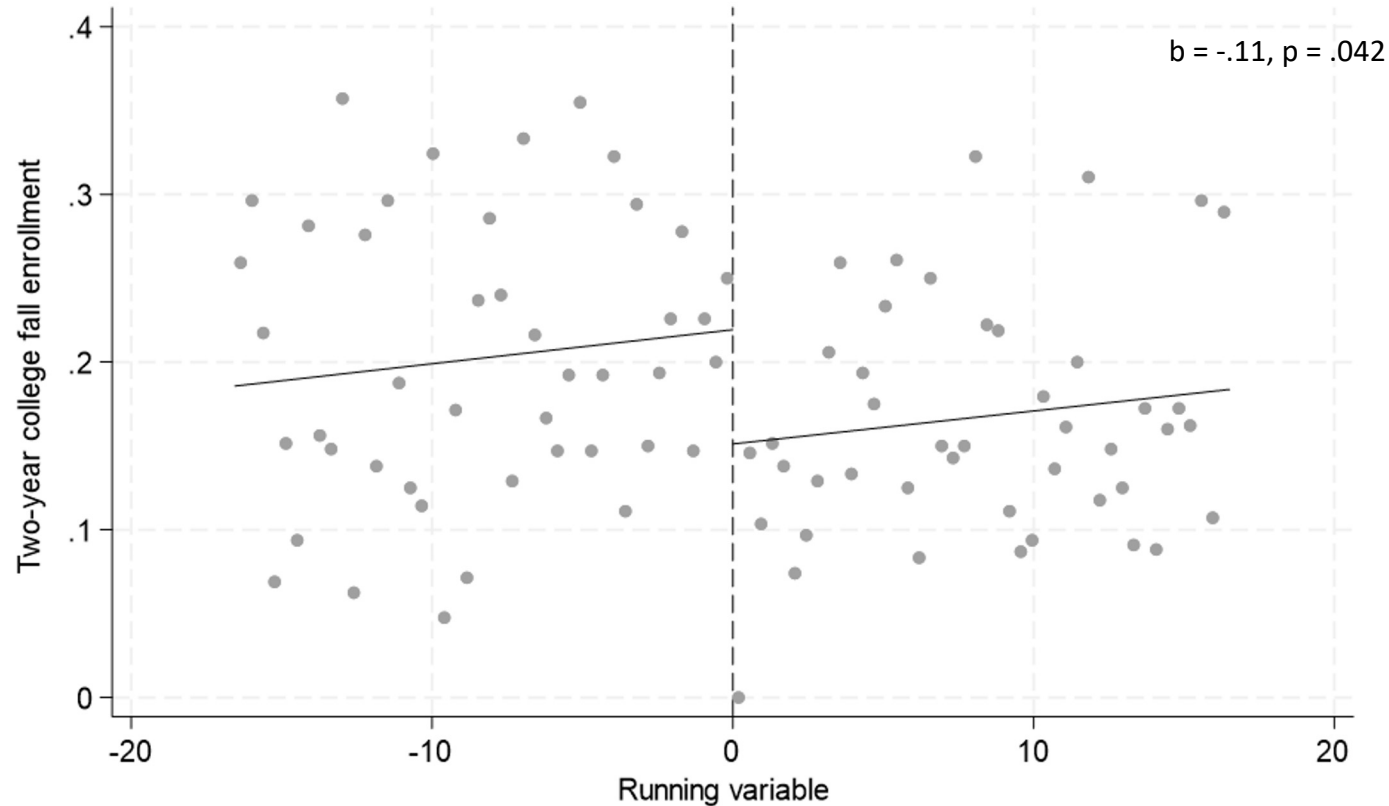
Any postsecondary enrollment first fall (controlling for pathway having an expected college articulation)



Two-year college enrollment first fall



Two-year college enrollment first fall (controlling for pathway having an expected college articulation)



Four-year college enrollment and college selectivity?

No effects of selective CTE Center high school offer on:

- four-year college enrollment
- Inclusive four-year college enrollment
- Selective four-year college enrollment
- More-selective four-year college enrollment

Postsecondary Takeaways

(-) Any postsecondary enrollment the first fall after HS graduation

(-) Two-year enrollment first fall

(ns) Four-year enrollment first fall

(ns) Inclusive, selective and more selective (per IPEDS) four-year enrollment first fall

Labor Market

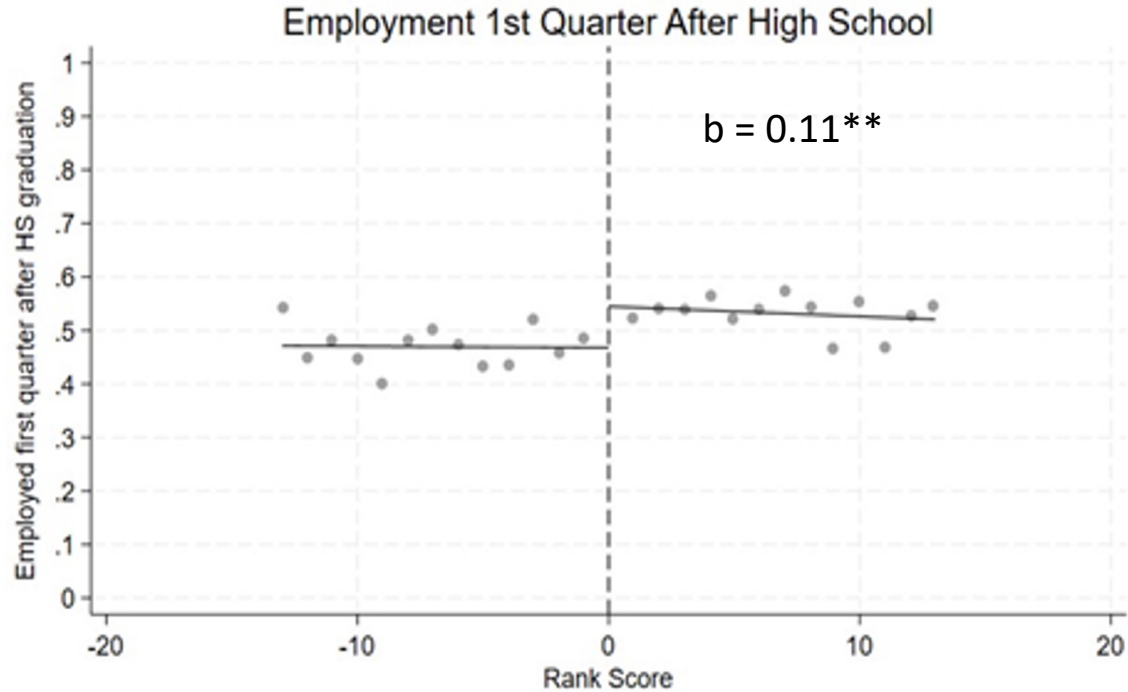
Outcomes--

Employed - immediately after HS

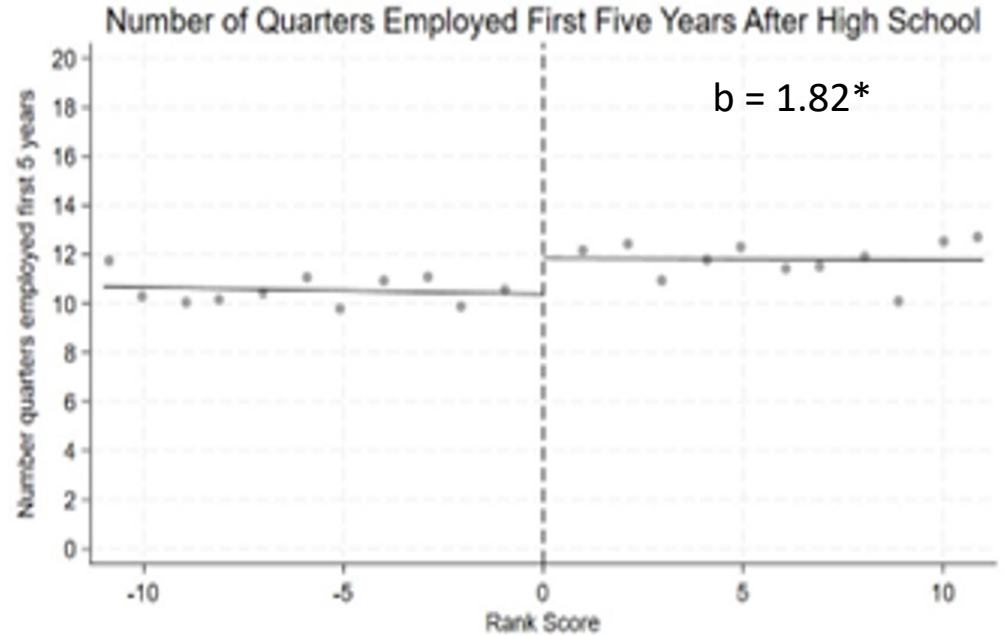
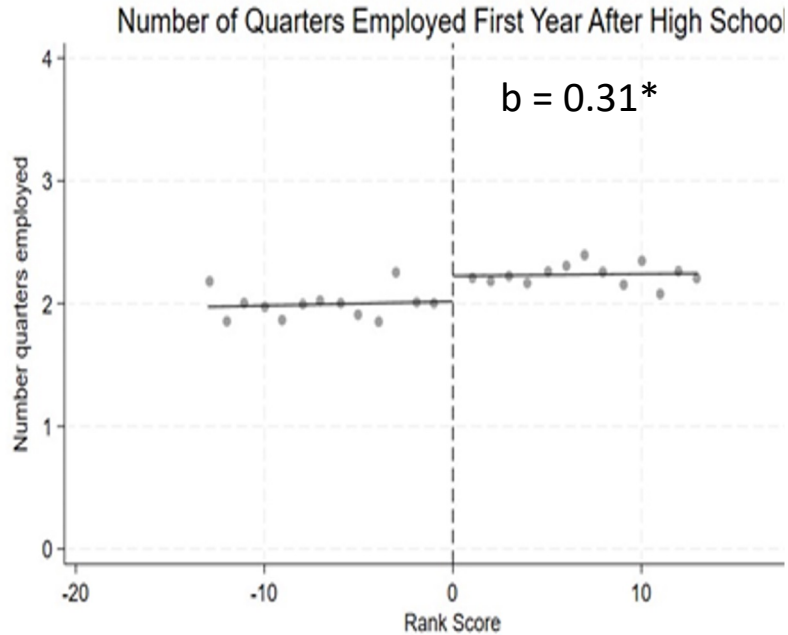
Quarters employed - first year after HS, first five years after HS

Wages - First year after HS, Fifth year after HS

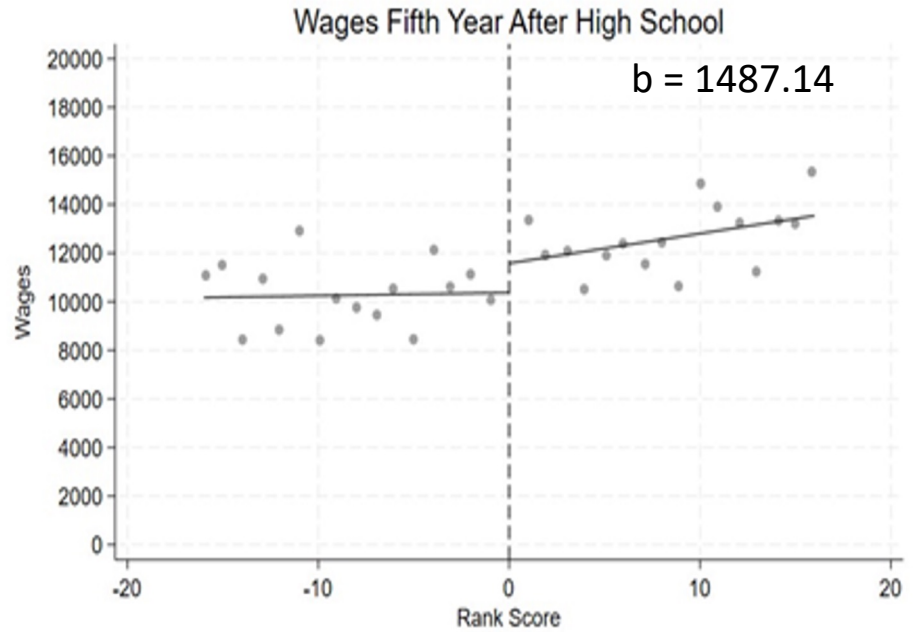
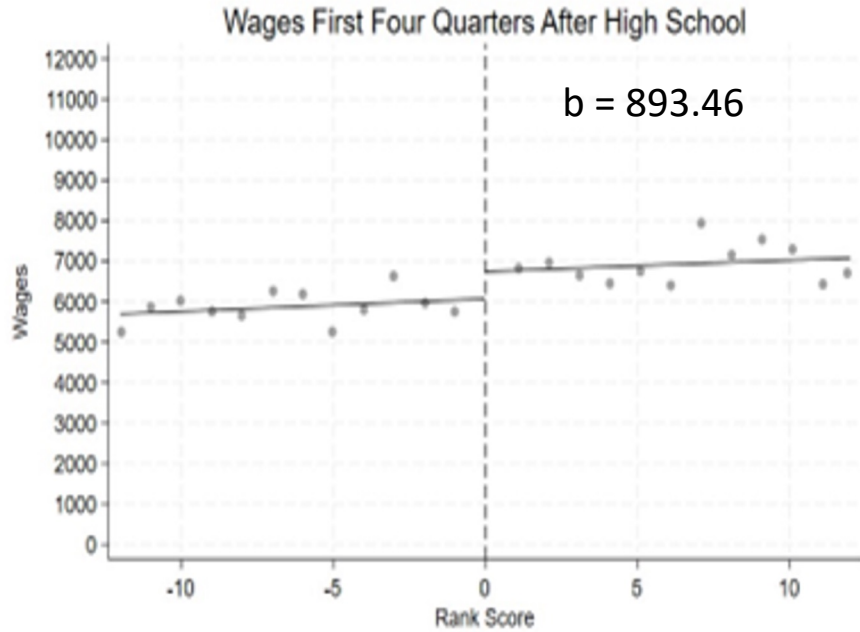
Immediate Employment



Quarters Employed



Wages



Takeaways

- CTE Center students are more likely to be employed and be more employed over time
- No significant differences in wages at the margins
 - Though across full population, CTE center students do see wage benefits

Conclusions

CTE: Good

- Increased CTE Concentration
- Increased HS persistence (continued enrollment)
- No effect on on-time graduation (per RDD), but some evidence of a general relationship between CTE and high OTG
- Divergent paths to College and Career

OFFER → CTE Concentration → OTG = Labor Market Readiness? (vs college enrollment at 2-year colleges)

Thank you!

Questions?

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