

# Small Distances that Matter: Effects of Local Community College Openings on Enrollment and Degree Completion

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**Disclosure:** The conclusions of this research do not necessarily reflect the opinions or official position of the Texas Education Agency, the Texas Higher Education Coordinating Board, the Texas Workforce Commission or the State of Texas.

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- ▶ Many potential considerations for students making college choices
- ▶ One potentially important factor: distance from home
- ▶ Likely to be more important for disadvantaged students

## Research Questions

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I use [community college openings](#) as variation in students' nearby college choices

## Literature

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## Literature

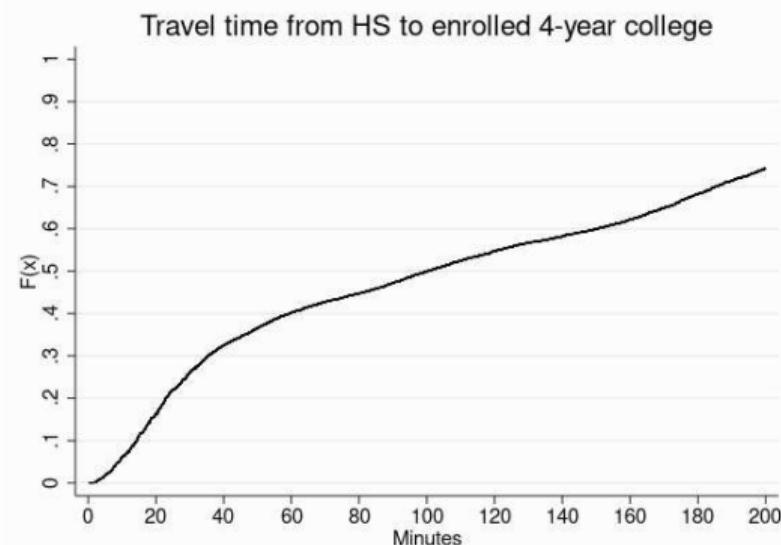
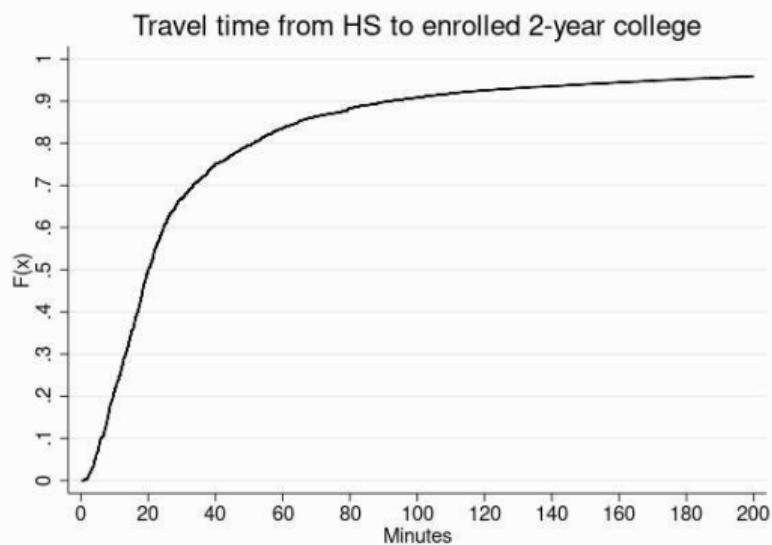
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- ▶ **Papers using 4-year college openings to study enrollment effects:** Frenette (2009), Lapid (2017), Nimier-David (2023), Russell, Yu, and Andrews (2024)

## Literature

**My contributions:** Effects of opening 2-year colleges rather than 4-years; detailed enrollment and degree attainment data to examine substitution patterns



## Challenges

- ▶ In general, the types of students who live near colleges are different from students who live far from colleges
- ▶ Families who value college more may choose to live closer to colleges
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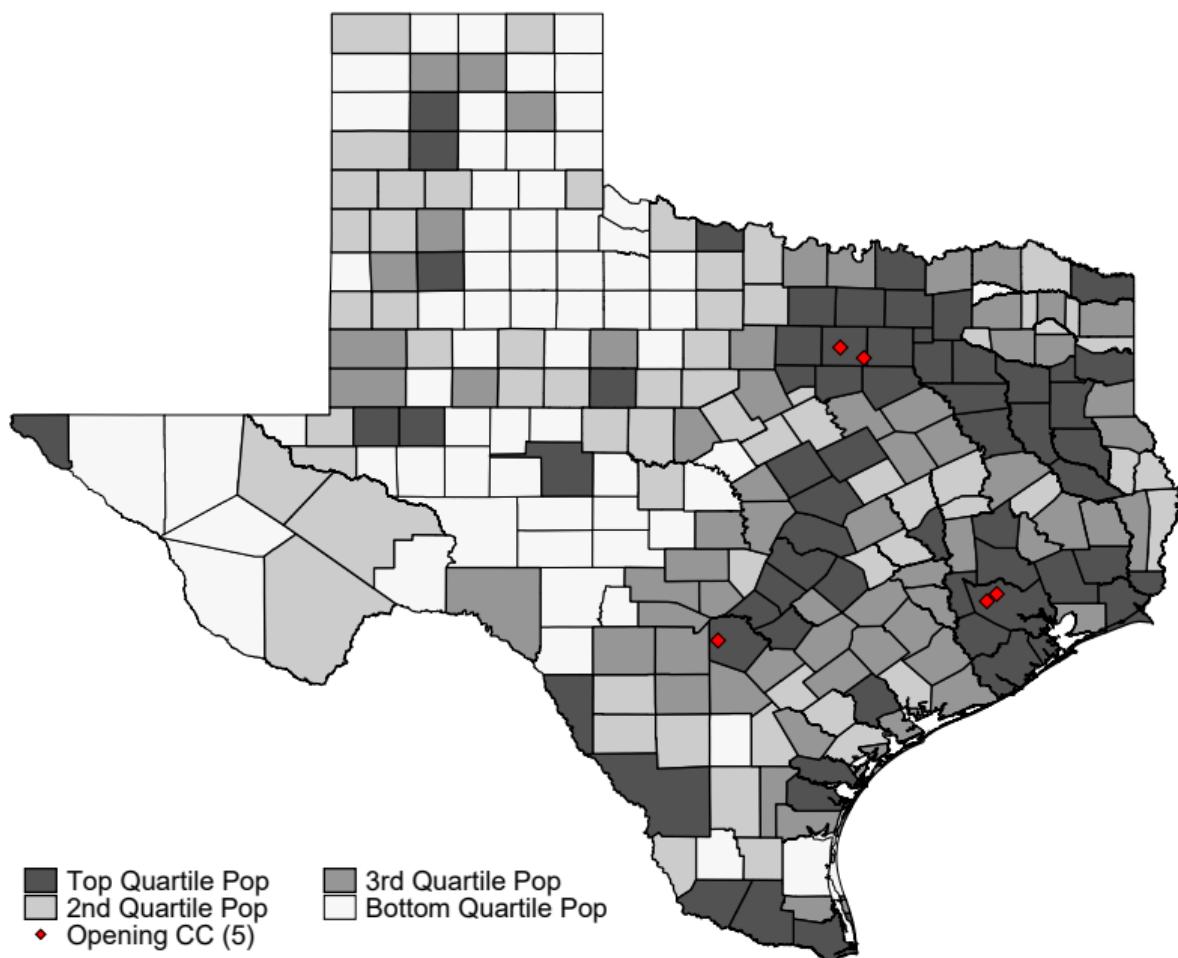
To also account for local trends in enrollment that would have occurred without the new college, compare **nearby** high schools to **slightly further** high schools (difference in difference framework)

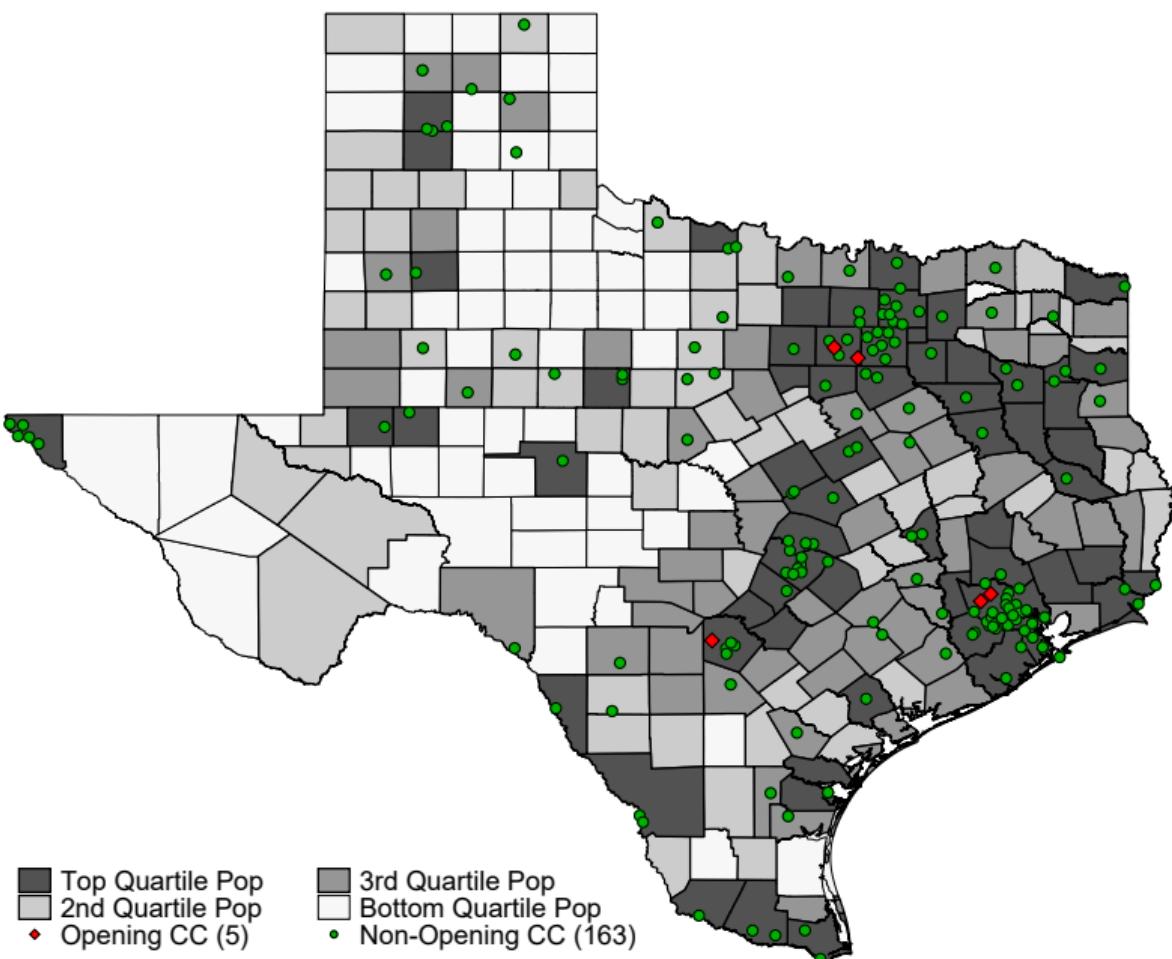
## College Openings in Texas

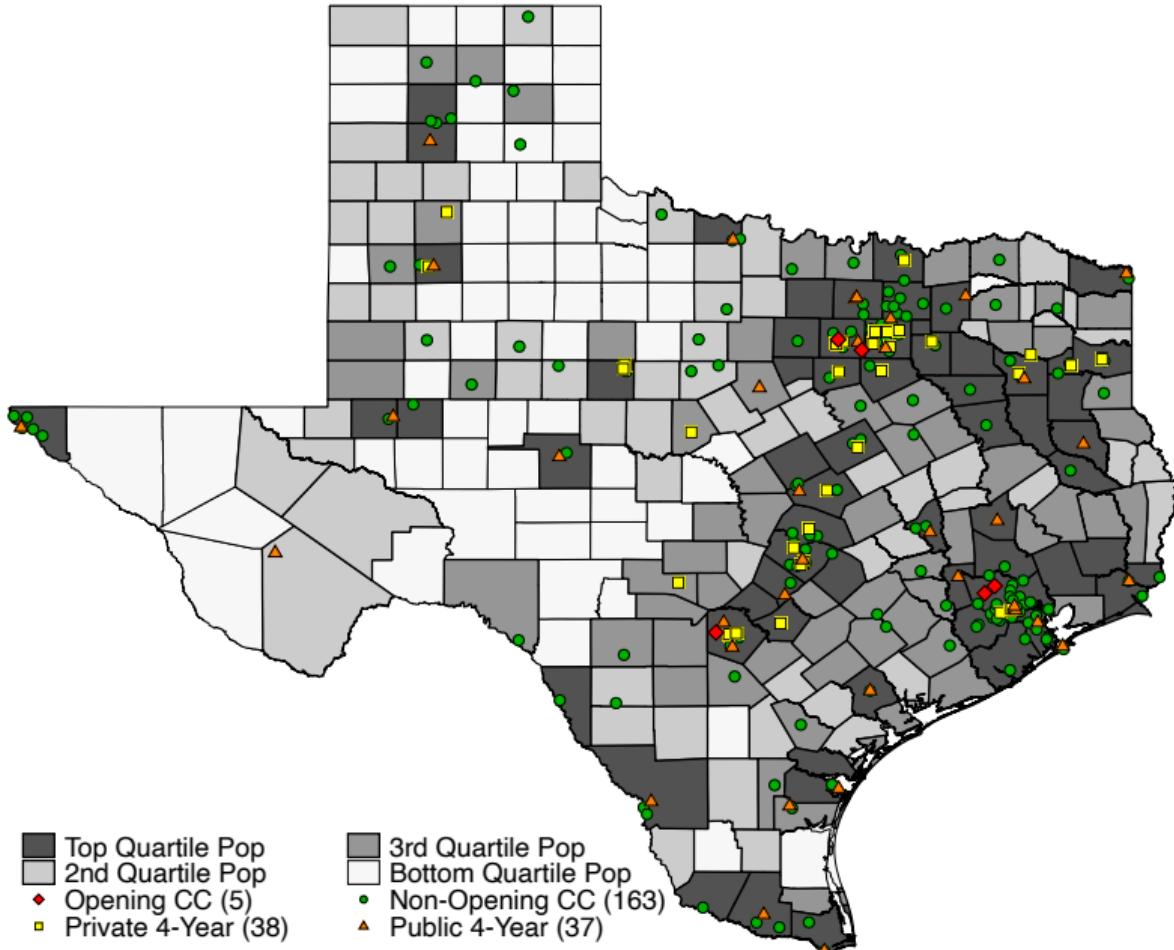
| Year | College                      |
|------|------------------------------|
| 1997 | Tarrant County SE            |
| 1999 | Alamo NW Vista               |
| 2003 | Lone Star Cy-Fair            |
| 2010 | Tarrant County Trinity River |
| 2012 | Lone Star University Park    |

A new college could shift nearby students choices in 2 ways

- ▶ No college → New college
- ▶ Previously existing college → New college







# Data and Key Variables

## K-12 Records (Texas Education Agency)

- ▶ All TX public high school graduates (excluding charter schools), 1994-2019
- ▶ Demographic characteristics (e.g., race-ethnicity, economic disadvantage)
- ▶ High school standardized test scores
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## College Records (Texas Higher Education Coordinating Board)

- ▶ Enrollment in Texas public two-year and four-year colleges
  - ▶ Measured within 1 year of high school graduation
- ▶ Degree completion (associate's and bachelor's)
  - ▶ Measured within 2-8 years of high school graduation

# Data and Key Variables

## Driving time between each high school and college

- ▶ Collected latitudes and longitudes from all colleges reported in the Integrated Postsecondary Education System (IPEDS)
  - ▶ Limitation: not all community college campuses are independently reported
  - ▶ Ex: Lone Star College System has 6 campuses but reports under one unit in IPEDS
- ▶ Supplemented with individual campus locations from the American Association of Community Colleges and various state records
  - ▶ Hand collected geocoordinates from Google Maps in cases of missing data
- ▶ Calculated driving time between high school location (proxy for home location) and college location using Open Route Services and QGIS

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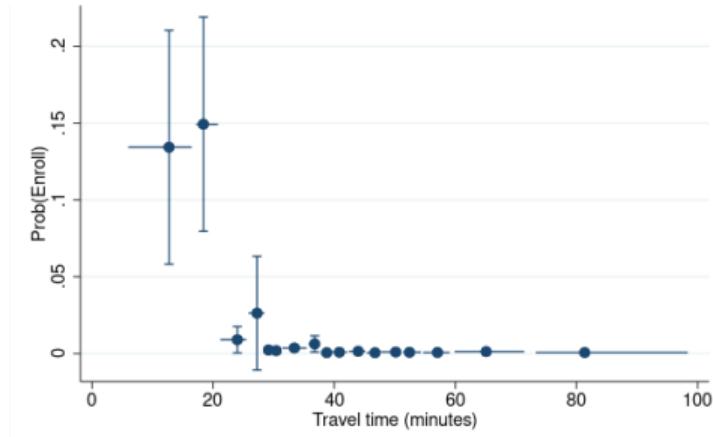
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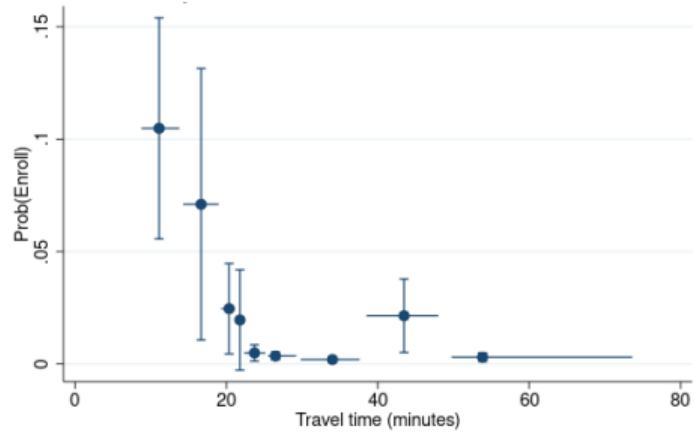
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- ▶ Ring method: inner treated ring(s), outer control ring based on distance from the treatment point
  - ▶ Used by Alexander et al. (2019,) Currie et al. (2015), many others
- ▶ How to pick the rings? Adapt methods from Butts (2022), Cattaneo et al. (2022)

# Enrollment in Opening Colleges by Distance from Opening College

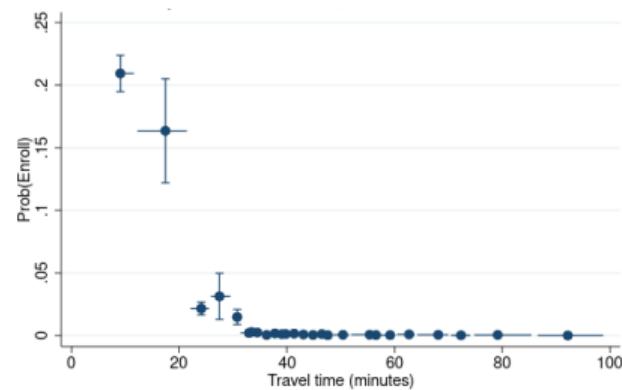


(a) Tarrant County SE

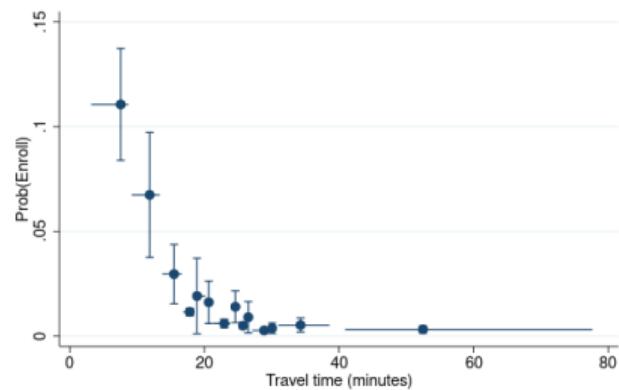


(b) Alamo NW Vista

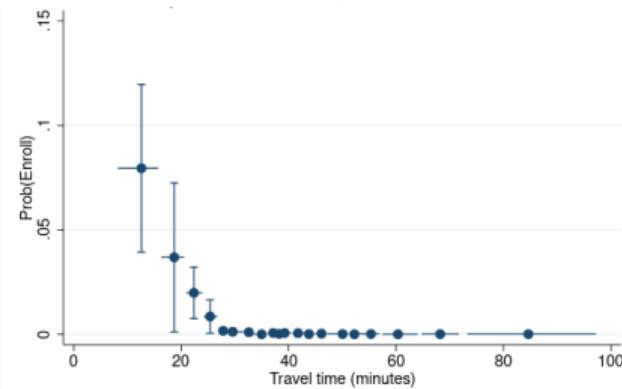
Plots created using partitioning-based binscatter least squares estimation with IMSE-optimal bins (Cattaneo et al., 2022)



(a) Lone Star Cy Fair



(b) Tarrant County Trinity River



(c) Lone Star University Park

## Defining Treatment and Control Groups

To simplify interpretation and maximize power, I define

- ▶ **Treatment ring:** high schools within a 20 minute drive of the opening college
- ▶ **Control ring:** high schools 20-40 minutes from the opening college, in the same commuting zone

## Model

I use the imputation estimator from Borusyak, Jaravel, and Spiess (2024) to estimate

$$Y_{it} = D_{it}\theta + \gamma_t + \phi_{s(i)} + t\rho_{cz(i)} + \beta_X X_{it} + \epsilon_{ist}$$

- ▶  $Y_{it}$  = Outcome of interest
- ▶  $D_{it}$  = treatment indicator
- ▶  $\gamma_t$  and  $\phi_{s(i)}$  = year and high school fixed effects
- ▶  $t\rho_{cz(i)}$  = commuting zone-specific time trend
- ▶  $X_{it}$  = individual characteristics

## Imputation Estimator (Borusyak, Jaravel, and Spiess, 2024)

1. Within the untreated observations only, estimate  $\gamma, \phi, \rho$ , and  $\beta$  by OLS in the regression

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I focus on the estimation of dynamic treatment effects by relative time (opening year, 1 year after opening, 2 years after opening,...)

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2. No Anticipation: Treated group does not respond to treatment before it happens
  - ▶ Limited scope for anticipation due to focus on enrollment within 1 year of HS graduation

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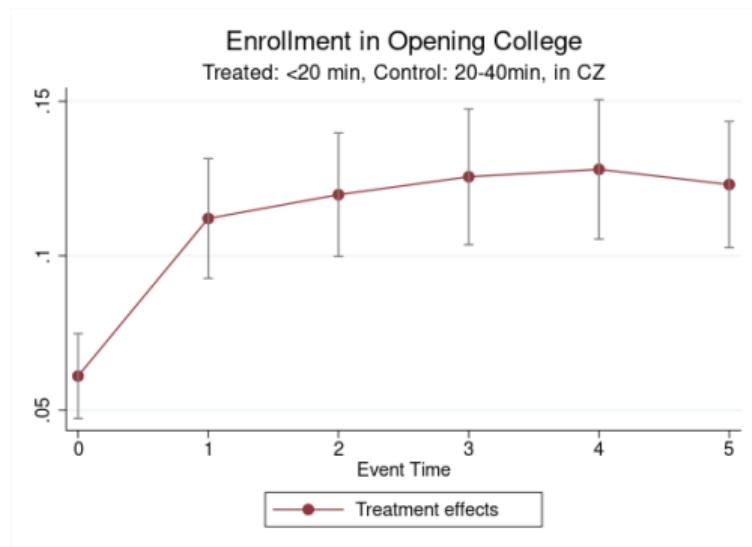
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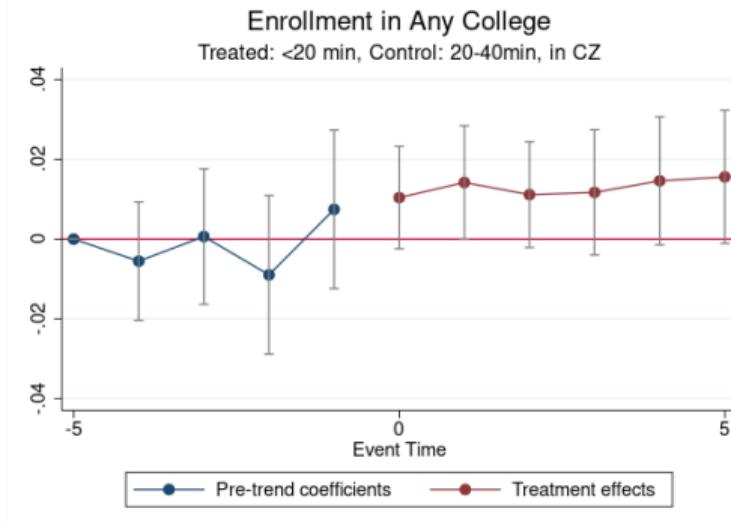
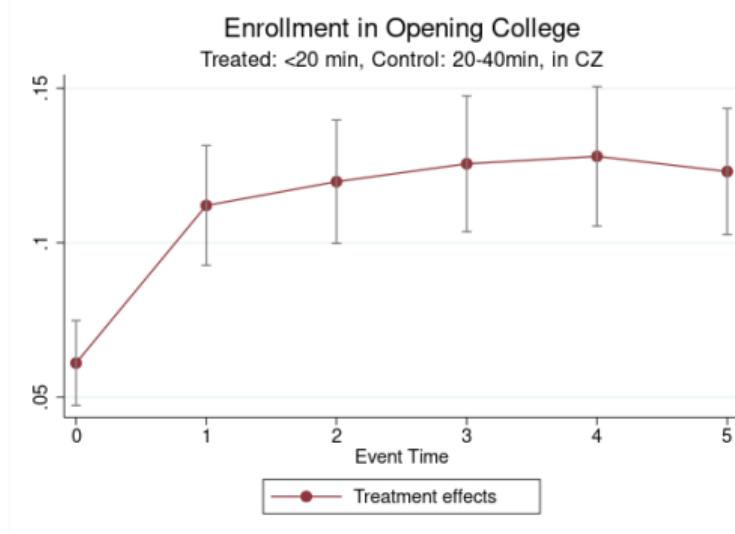
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- ▶ Treatment effect estimation always assumes parallel trends
- ▶ Interpretation of treatment coefficients is not relative to period -1 as in traditional event studies

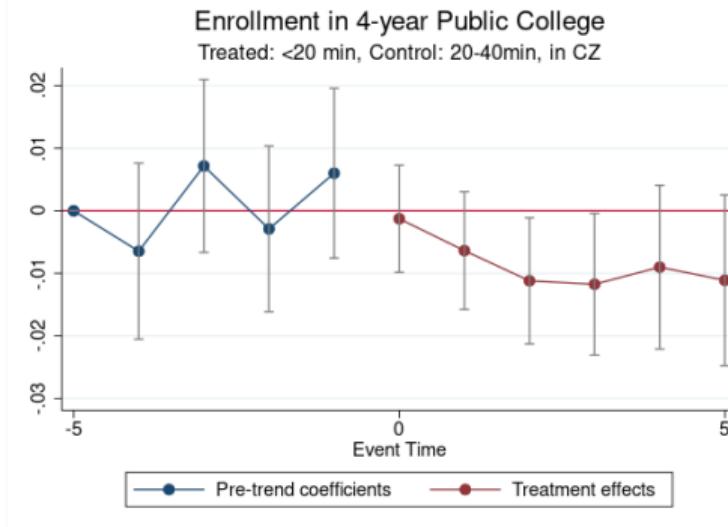
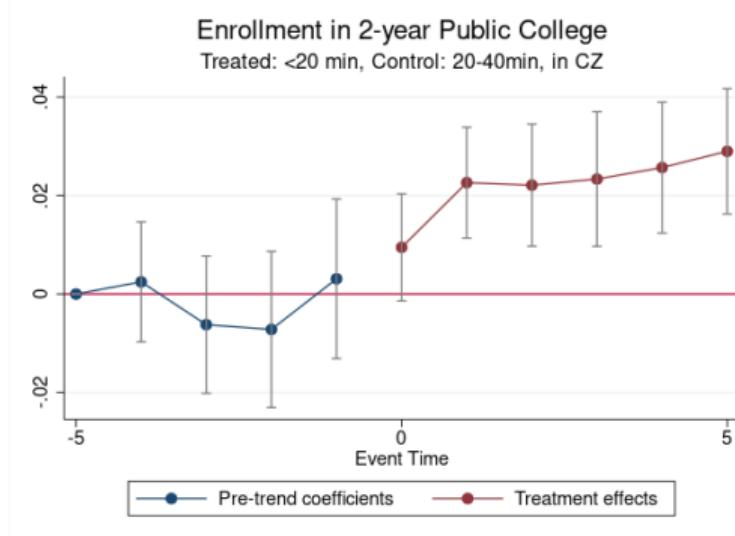
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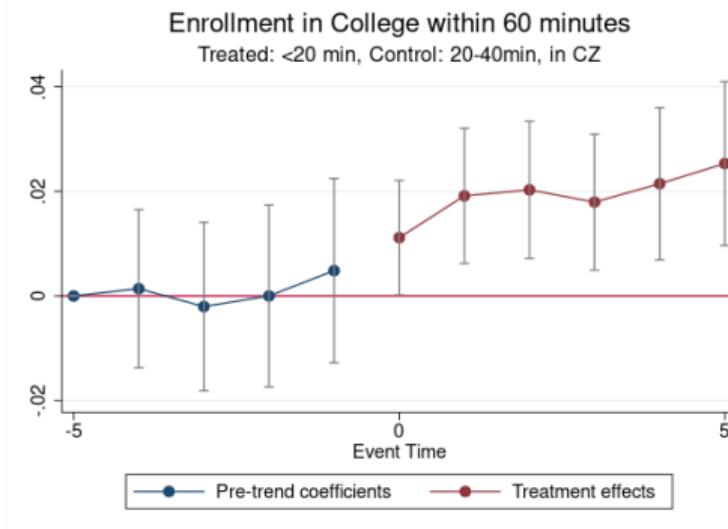
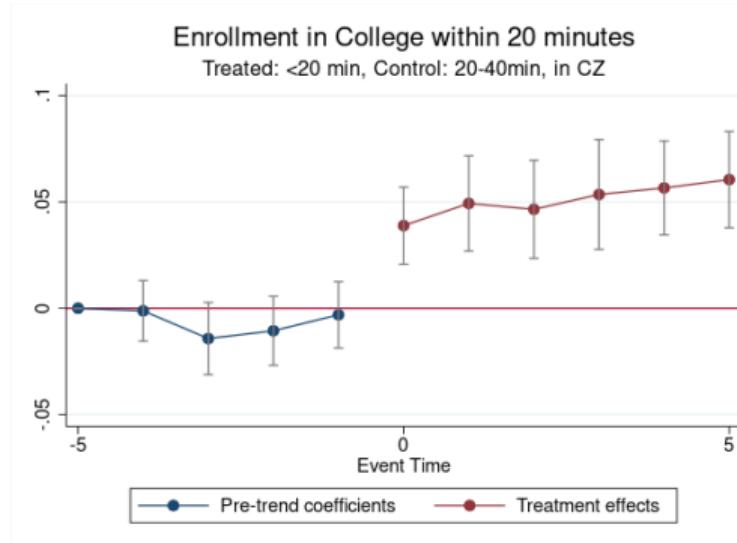
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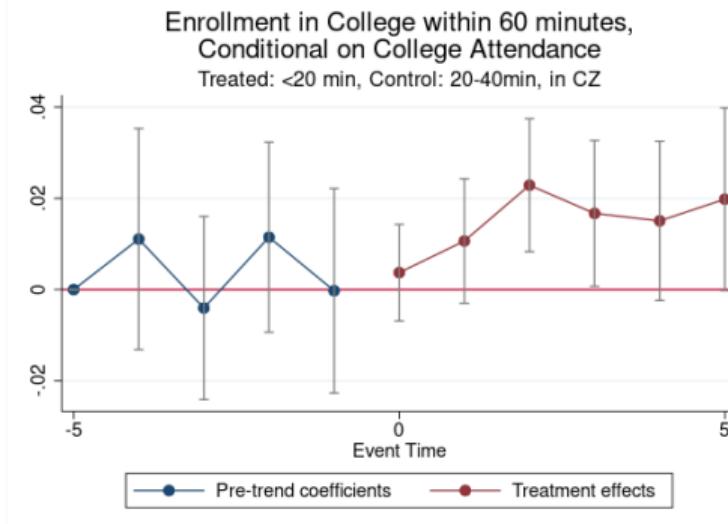
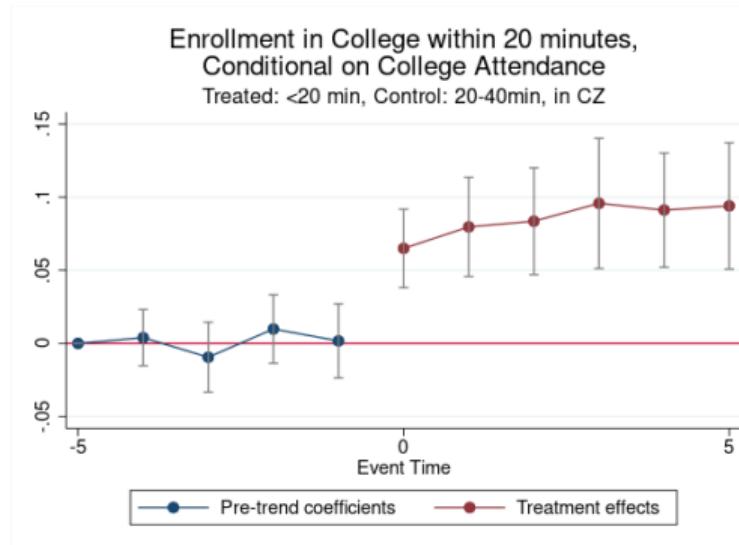
## Results: Some substitution from 4-year to 2-year



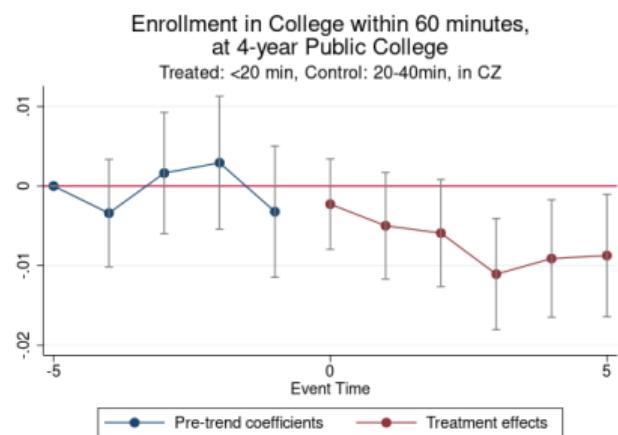
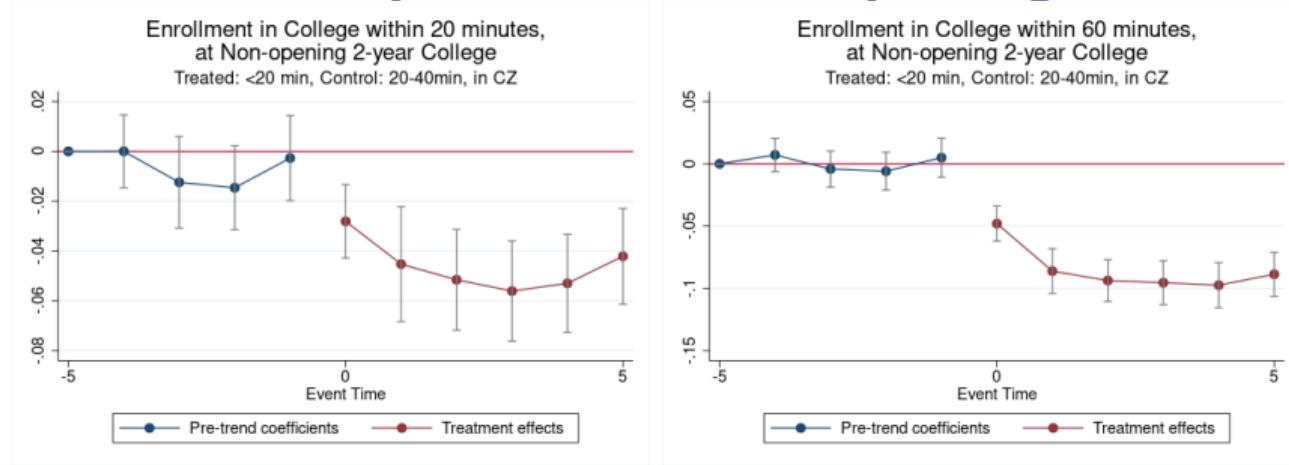
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# Results: Substitution Away From Other Nearby Colleges



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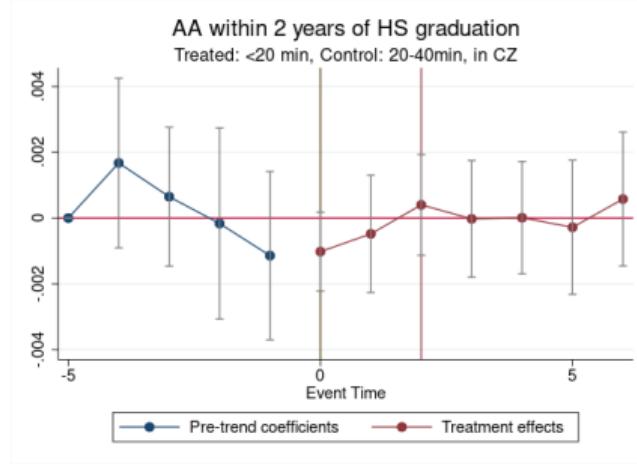
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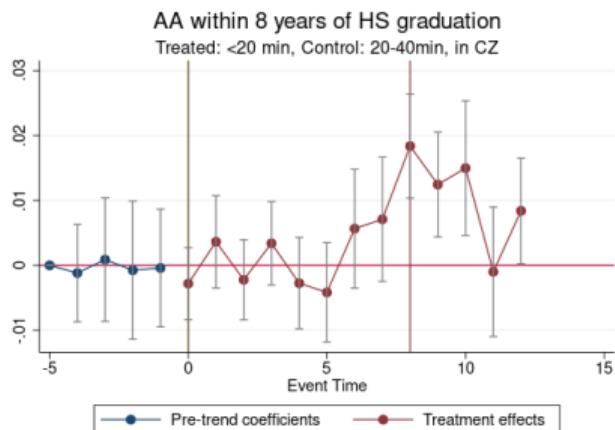
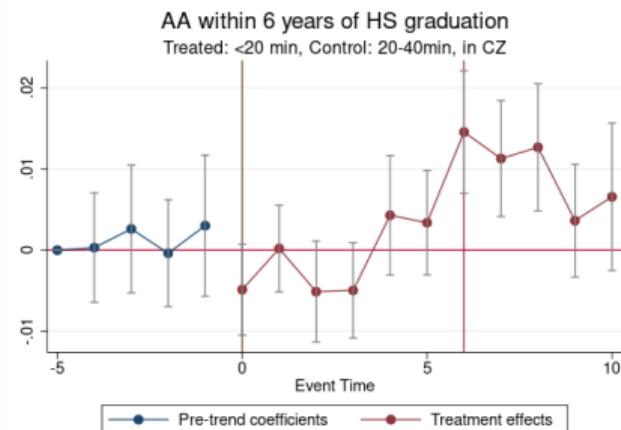
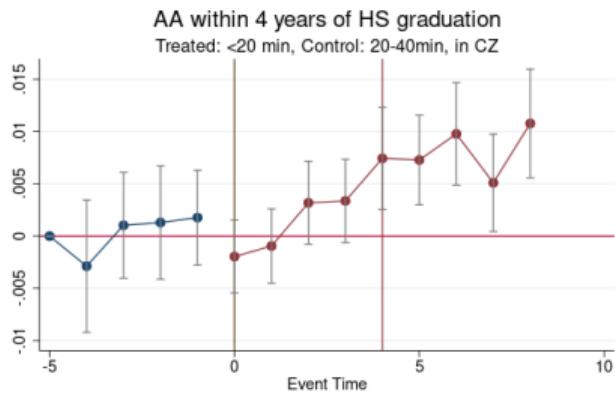
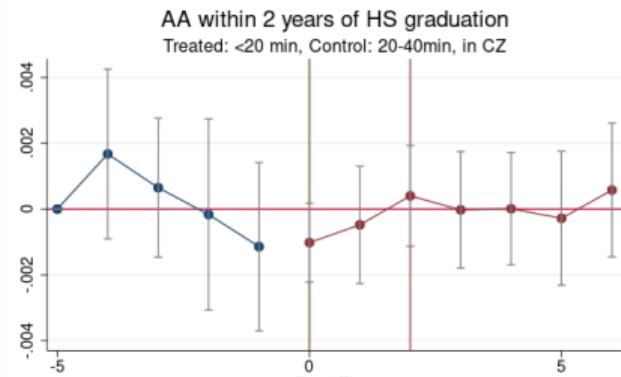
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- ▶ Both treatment years are marked in the figures

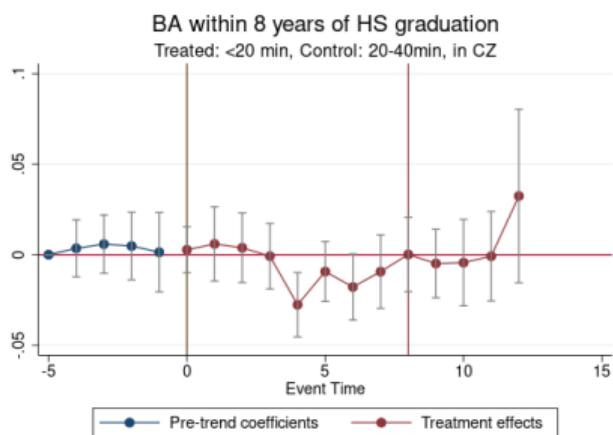
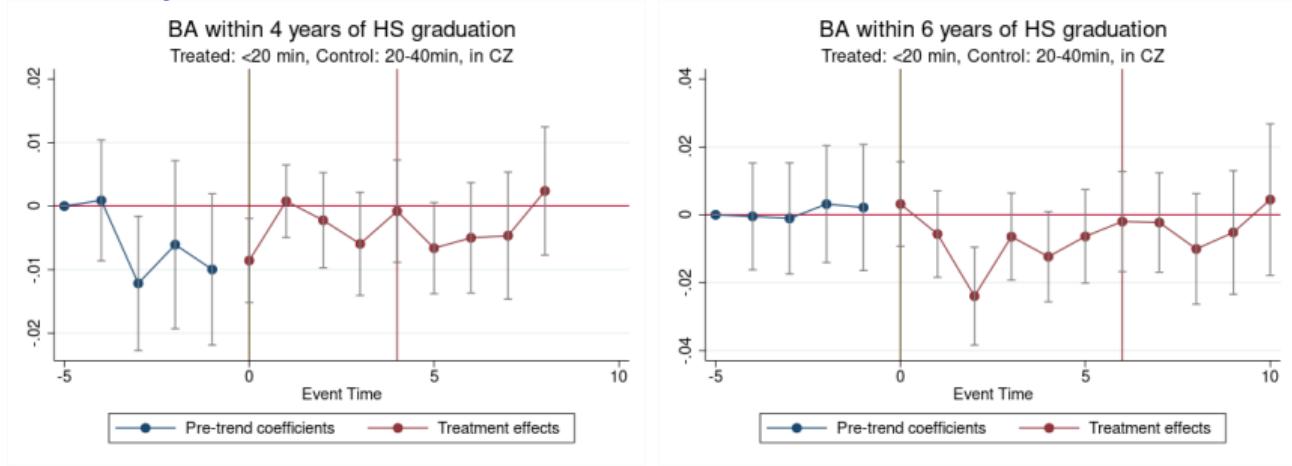
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## Conclusion

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- ▶ Important context: new colleges are only about 10 minutes closer than existing colleges for treated students
  - ▶ In complementary work, coauthors and I find bigger gaps in enrollment and degree completion for students living 30 min or more from the nearest CC (Acton, Cortes, Miller, and Morales, 2024)
- ▶ The addition of a nearby 2-year college increased AA degree completion within 4-8 years of high school graduation
- ▶ BA degree completion did not change meaningfully, suggesting that initial diversion of 4-year students did not have long-term effects

Thank you!

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Website: [Loismiller.info](http://Loismiller.info)