Treating the untreated: The long-term benefits of (mental) health screening in high school

Roger Prudon

Lancaster University

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Motivation

- High prevalence of mental health issues
- Onset during childhood
  - Associated with negative short- and long-term outcomes
- Treatment?

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- Onset during childhood
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- Treatment?
  - Only one in two children with mental health issues receive treatment in the US
  - Lower treatment uptake among vulnerable groups

Research question

Is (mental) health screening in high school effective in increasing treatment uptake?

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↓

What are the long-term impacts on educational and labor market outcomes?

Outline

- Related literature
- Intervention and data
- Impact on healthcare utilisation and employment outcomes
- Conclusion

Related literature

- Impact of childhood mental health issues
  - Educational outcomes
    - Currie et al. (2010)
  - Employment status, marital status and criminal behavior
    - Goodman et al. (2011); Anderson et al. (2015); Cornaglia et al. (2015)

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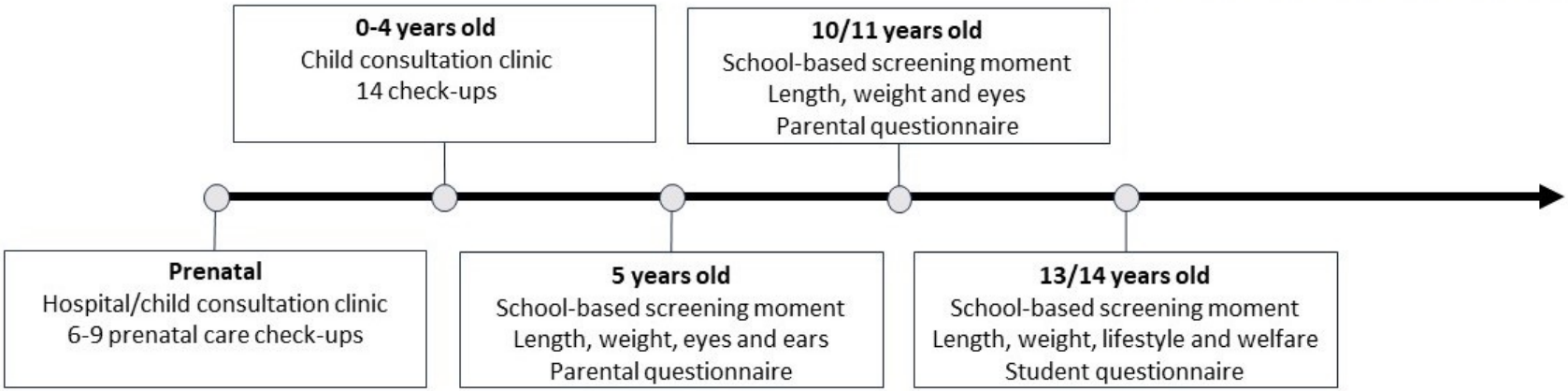
- Impact of childhood mental health issues
  - Educational outcomes
    - Currie et al. (2010)
  - Employment status, marital status and criminal behavior
    - Goodman et al. (2011); Anderson et al. (2015); Cornaglia et al. (2015)
- Treatment of childhood mental health issues
  - Mixed results ADHD medication
    - Chorniy & Kitashima (2016); Dalsgaard et al. (2014): risky behavior and hospital use
    - Currie et al. (2014): no impact on academic outcomes
  - Positive effects pediatric antidepressants
    - Busch et al. (2014): improved academic outcomes
  - Positive impacts of access to youth mental health services
    - Cuellar & Dave (2016); Deza et al. (2022); Jácome (2020); Heller et al. (2017): crime and education
  - Positive effects on employment for adults
    - Biasi et al. (2021); Shapiro (2022)
    - Ongoing work: Waiting times

Related literature

- School-based interventions
  - School-based mental health services (SBMH) increase treatment uptake but have no effects on educational outcomes
    - Golberstein et al. (2023)
    - Limited knowledge on SBMH programs: Heinrich et. al. (2023)
  - Mixed results for school counsellors
    - Reback (2010a,b)
  - Positive impacts in low-income countries
    - i.e. Shah et al. (2023)

The screening intervention

Healthcare in the Netherlands during childhood



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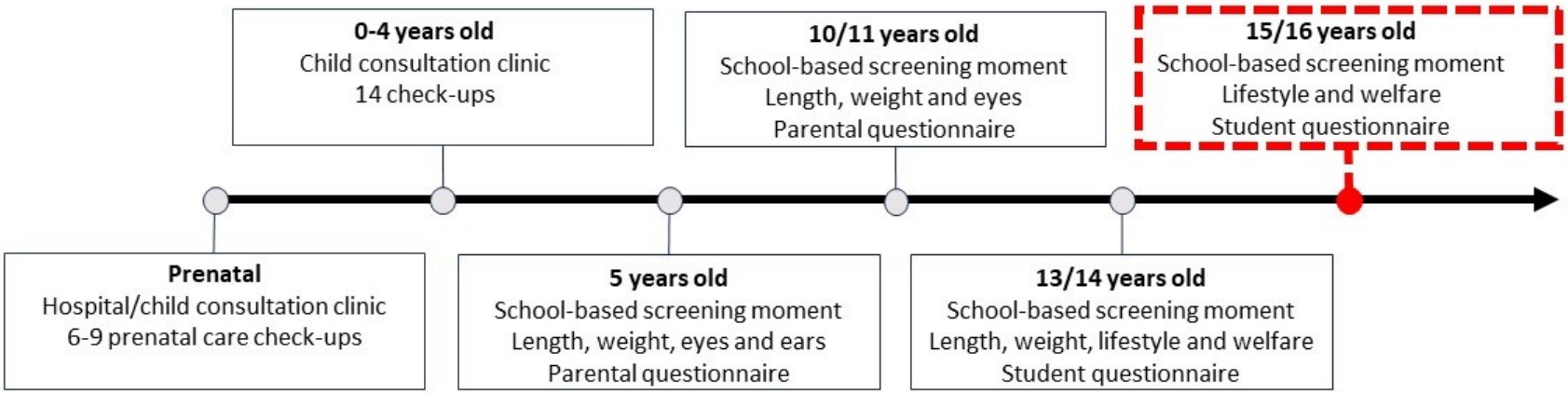

Historical background school-based screening moment

I. Mid 2000s: Call for additional healthcare provision
II. 2008: Investigation on desirability and potential setup
III. 2009: National Institute for Health and Environment advises government to follow recommendations
IV. 2011: First pilot in Amsterdam in 5 schools
V. 2012: Funding becomes available nationally

(Mental) health screening in high school and pilot results

- Nurse visits class and discusses general health-related topics
- Students fill out questionnaire
  - Physical: Obesity, Alcohol, Smoking
  - Mental
  - Self-request

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  - One-in-four mental health-related issues
  - Heterogeneity by educational level

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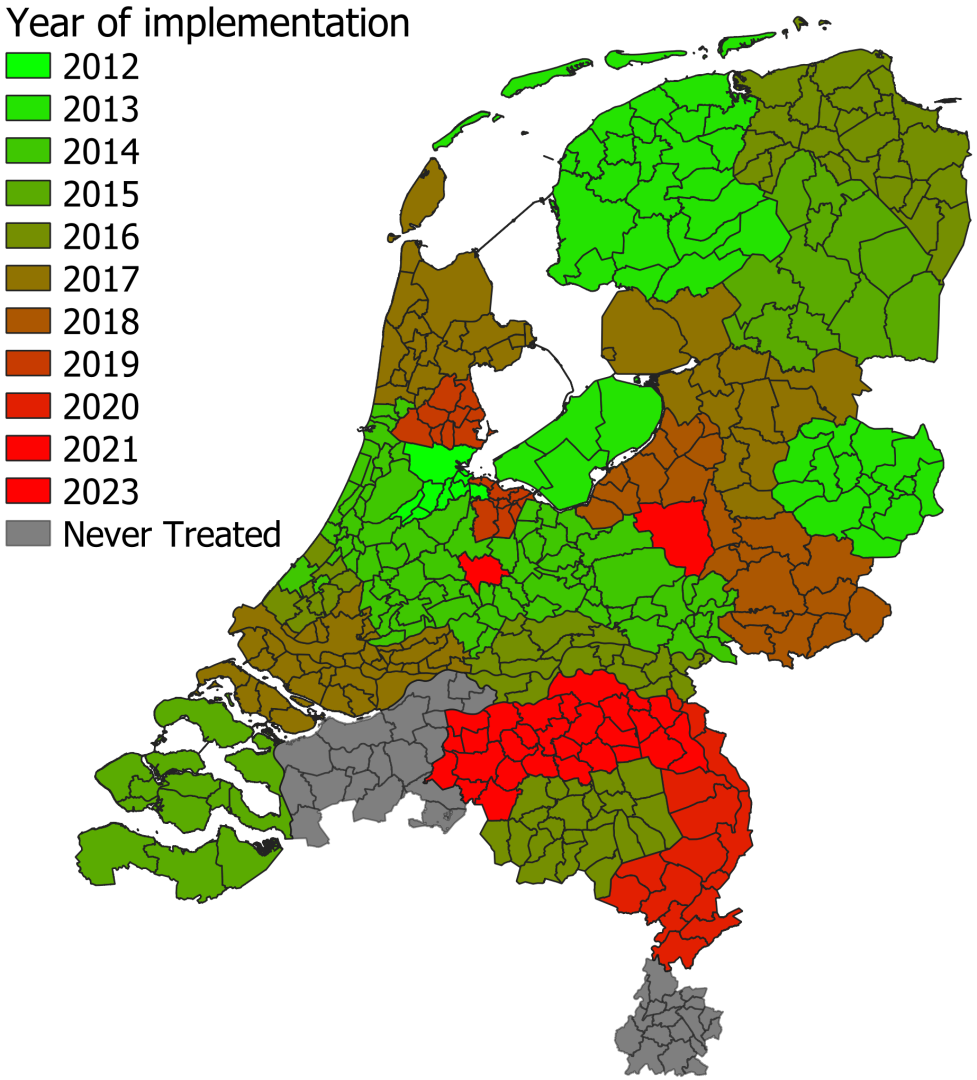
  - Self-request
- In case of indication, one-on-one meeting with nurse or pediatrician (60%)
  - One-in-four mental health-related issues
  - Heterogeneity by educational level
- Referred onward to further care (12%)
  - General practitioner
  - (Specialised) mental or physical care
  - Other care: youth workers, counsellors etc. (Currently not in data)

Roll-out across the country

◂ 30 providers ◂ Cohorts



Data

- National educational registry
  - Cohorts 2009-2019
  - Completed level of education in 2022
- Municipal administration database and tax registers
  - Background characteristics of students and their parents

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- Municipal administration database and tax registers
  - Background characteristics of students and their parents
- Healthcare
  - Annual expenditures on physical, mental and pharmaceutical (2011-2020)
- Labor market outcomes (2004-2023)
  - Employment, monthly working hours and monthly labor earnings
  - UI, DI, social assistance and other social benefits

◂ Descriptives

Does health screening increase treatment uptake?

Empirical approach

- Compare evolution of healthcare utilization of treated and untreated cohorts

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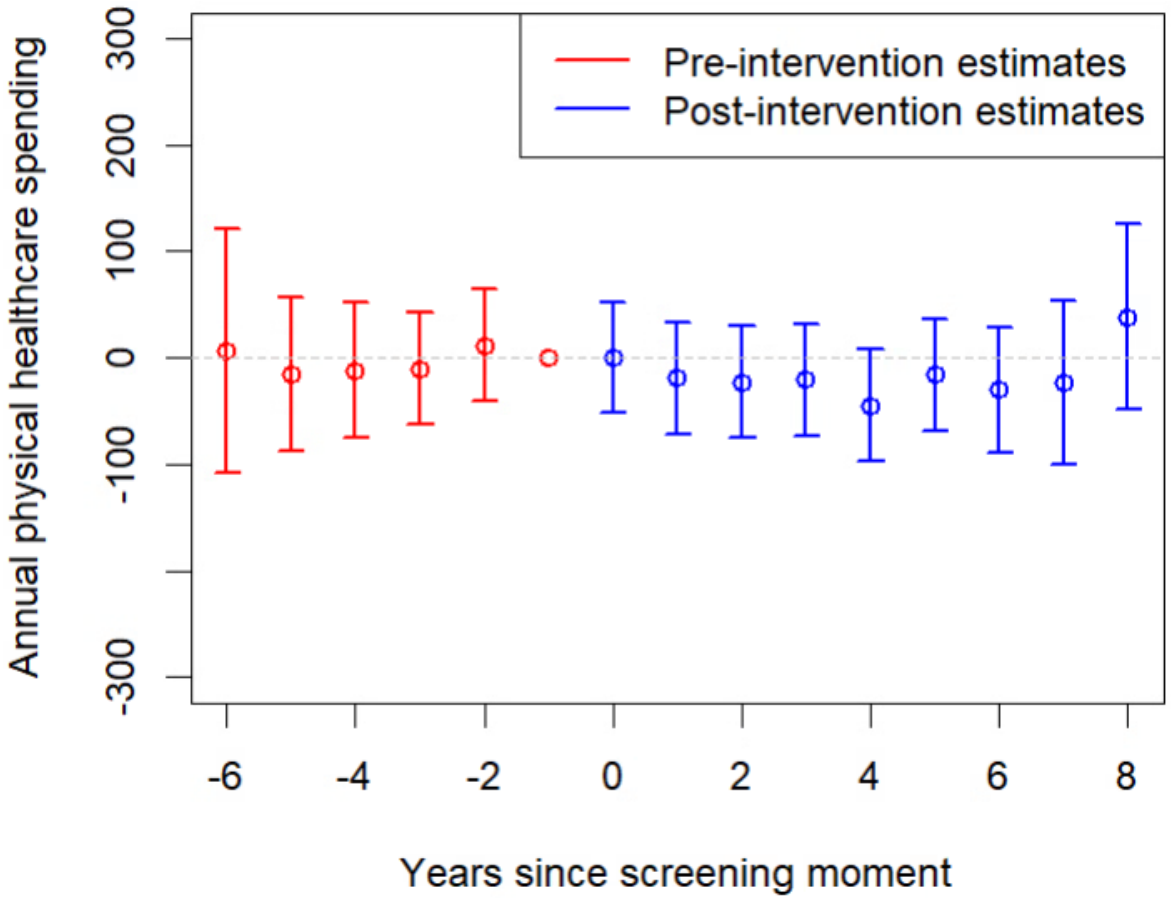
- Difference-in-difference approach exploiting staggered roll-out

$$H_{irt} = \sum_{l} \beta_l D_{ir} I(TSE_{irt} = l) + \tau_r + \tau_t + \varepsilon_{irt}$$

- Control for region r and calendar year t differences
- Staggered roll-out: Callaway & Sant'Anna (2021)
  - Separately estimate for each implementation year
  - Different control group in each event-study (NOT Callaway & Sant'Anna (2021))

Impact on healthcare utilisation

▸ Robustness



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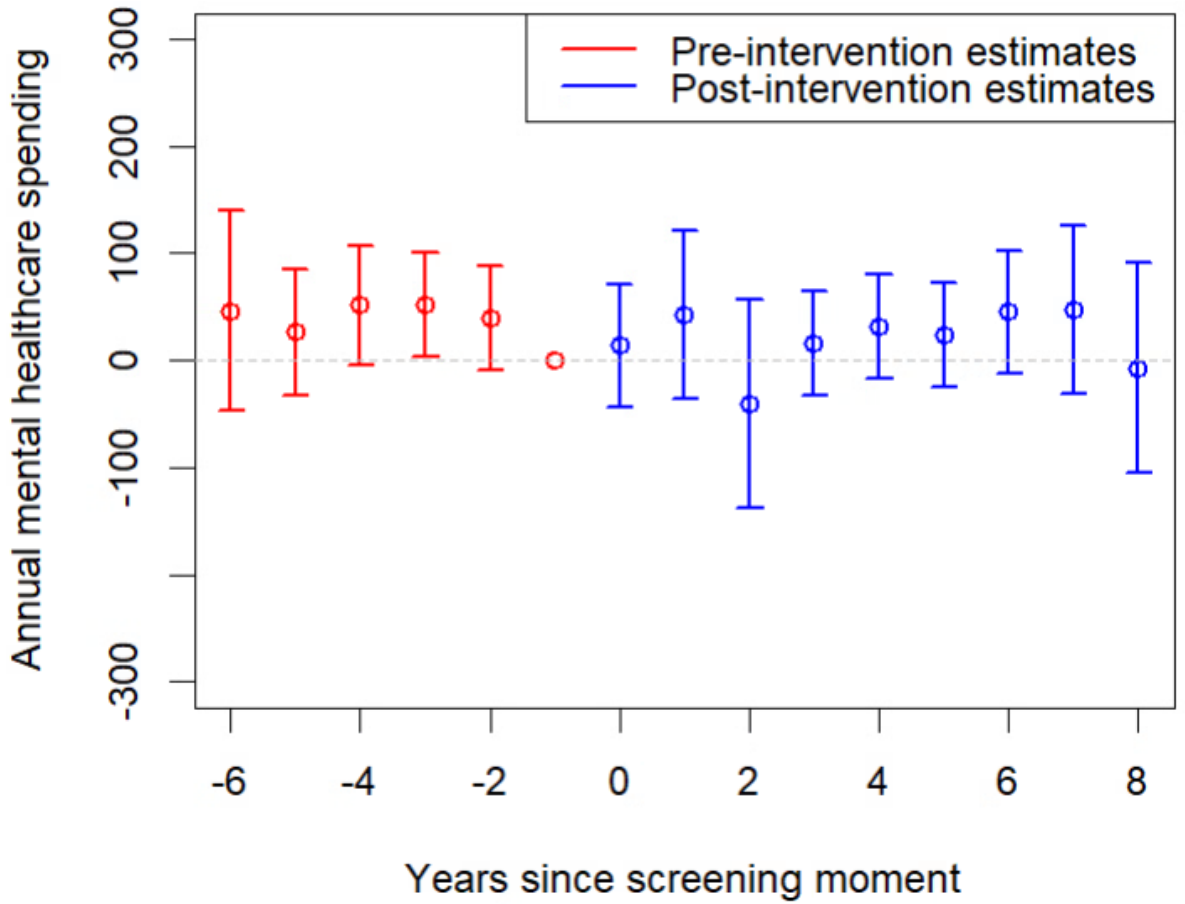

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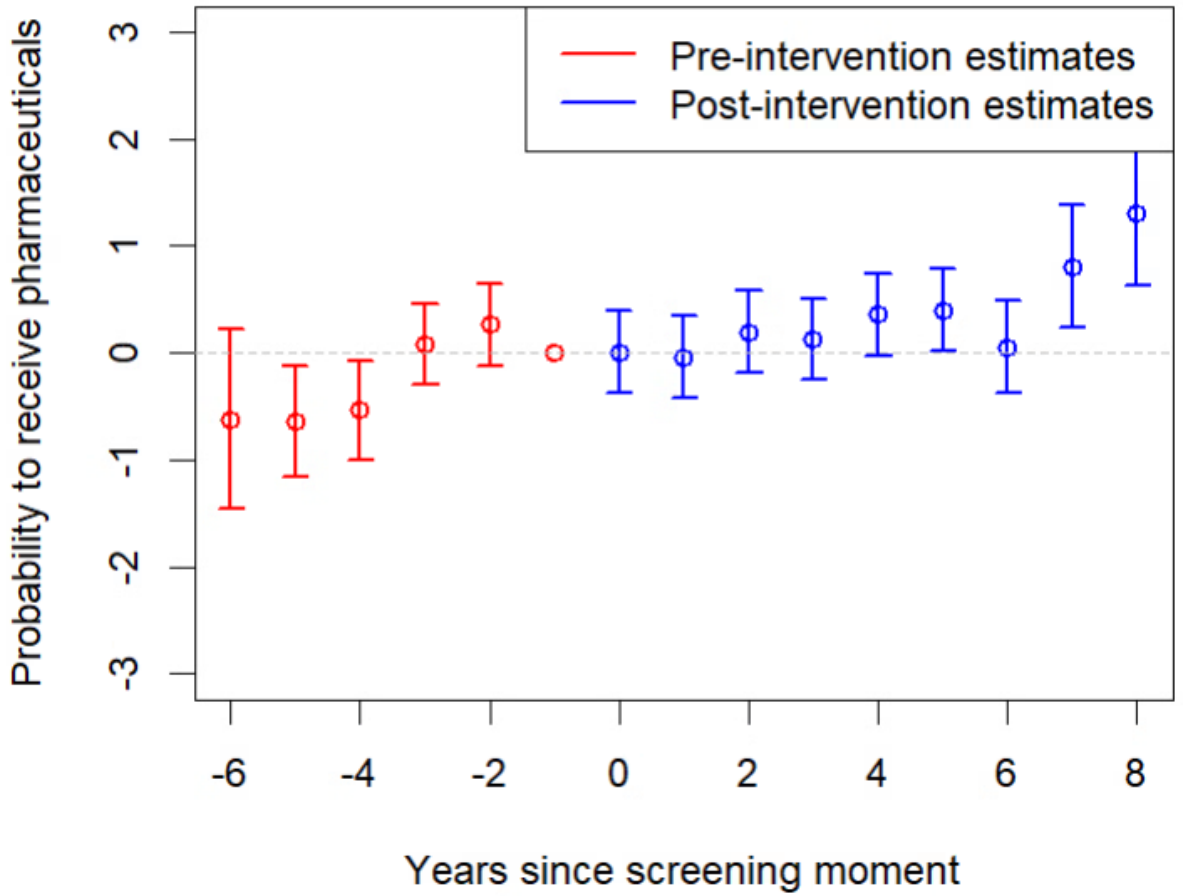

Impact on healthcare utilisation

- No impacts on healthcare utilization
  - Contradicts pilot results
  - Physical health: Focus on health issues which require behavioral change (obesity, smoking, drinking)?
  - Mental health:
    - Substitution towards non-healthcare related care for some?
    - Incorrect role-out?
    - No impact of intervention?

Does health screening affect educational and labor market outcomes (through non-healthcare channel)?

Empirical approach

- Empirical challenge: Outcomes only measured post-intervention

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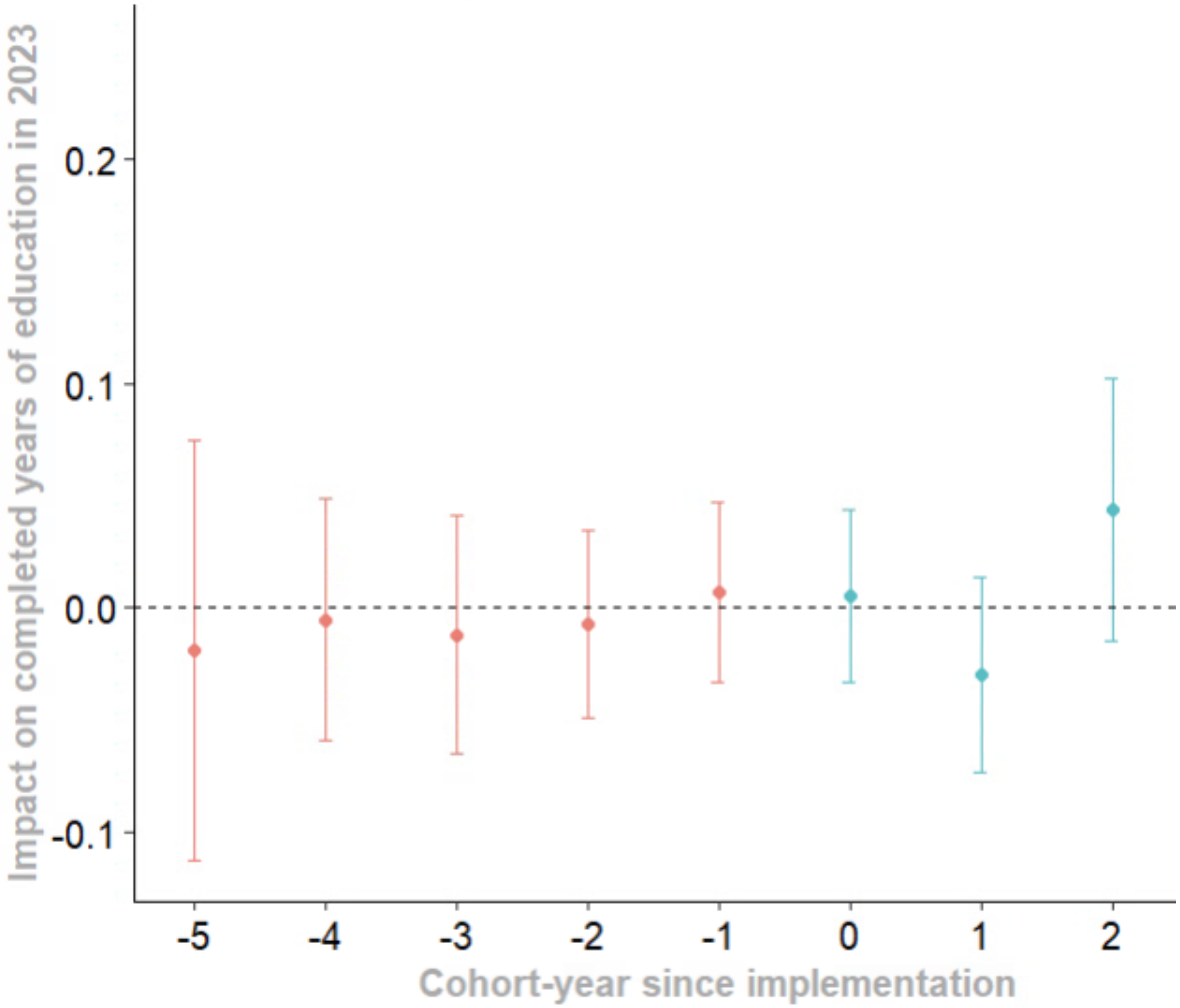
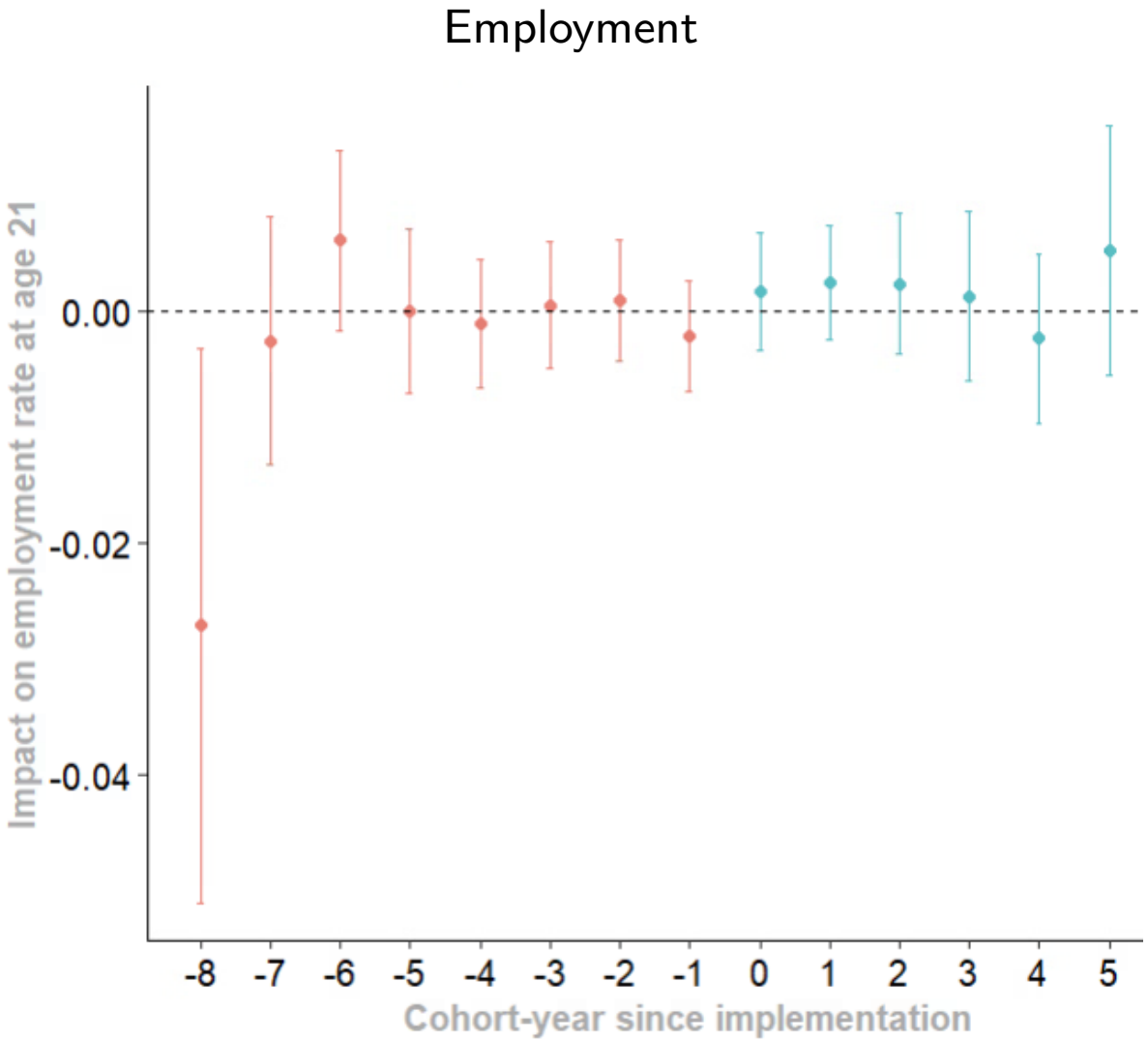
- Fix outcome at age 21 (or 24)
- Compare the cohort-to-cohort evolution in treated and untreated municipalities

Impact on completed years of education



Impact on labor market outcomes at age 21



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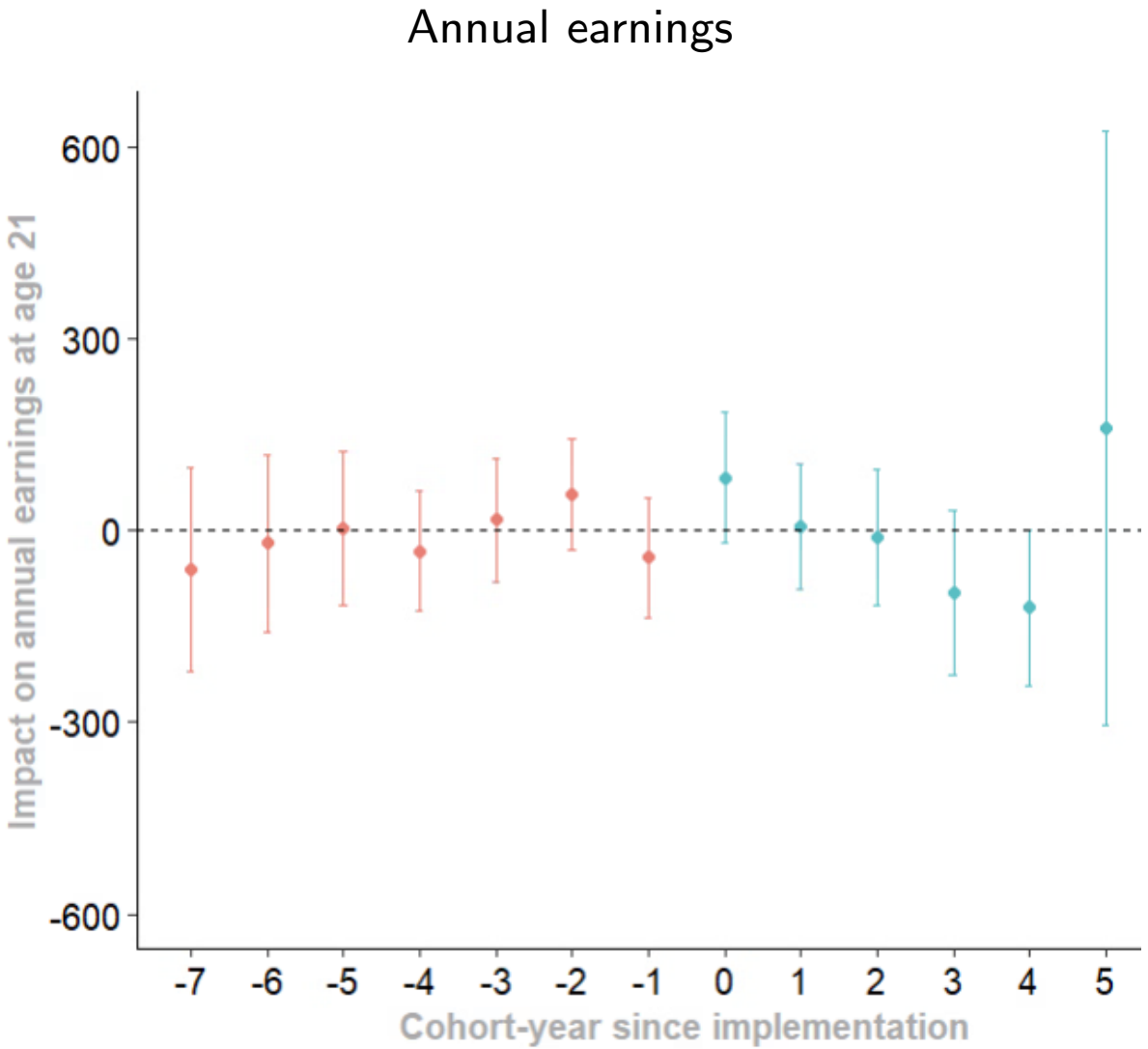

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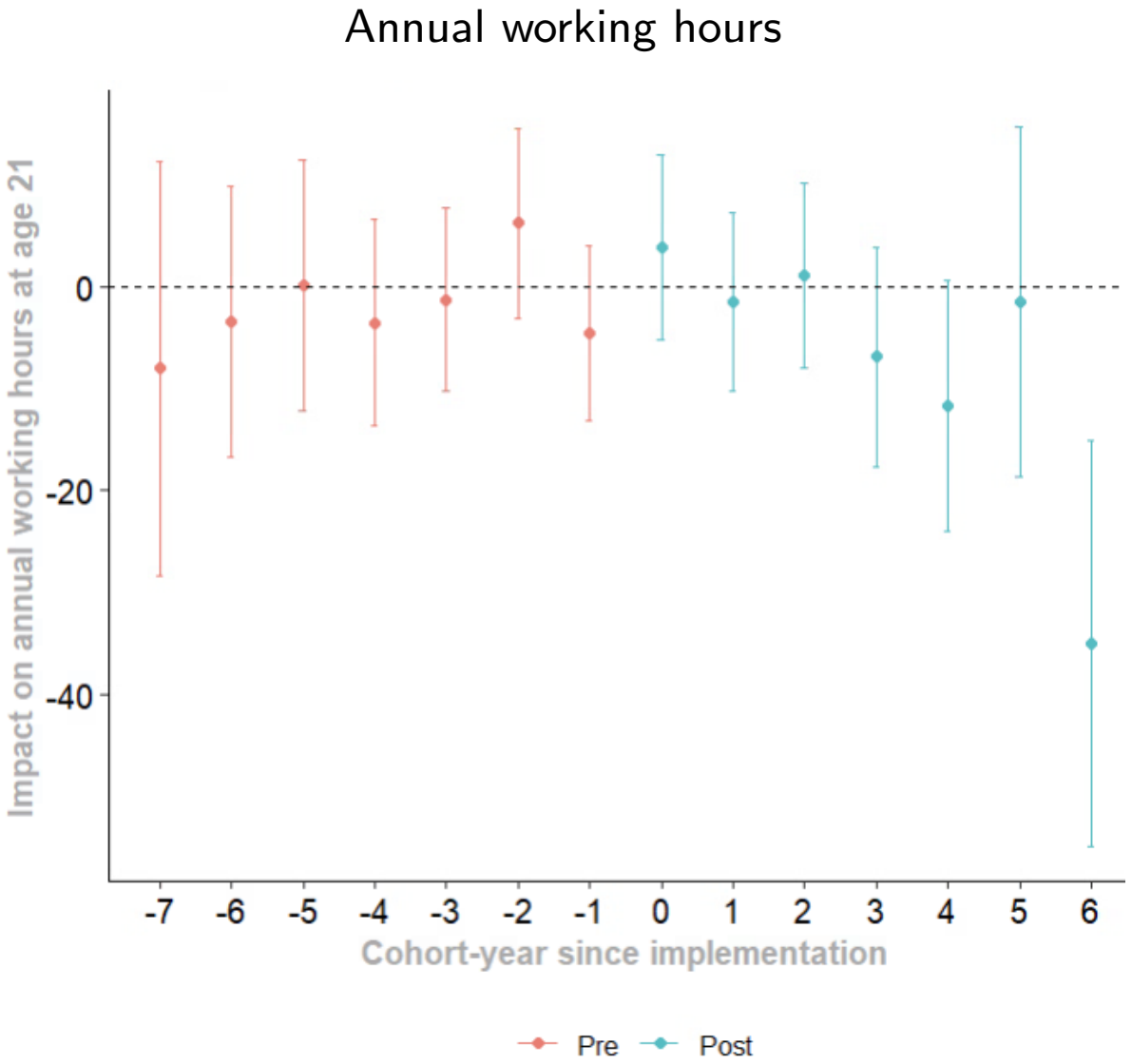

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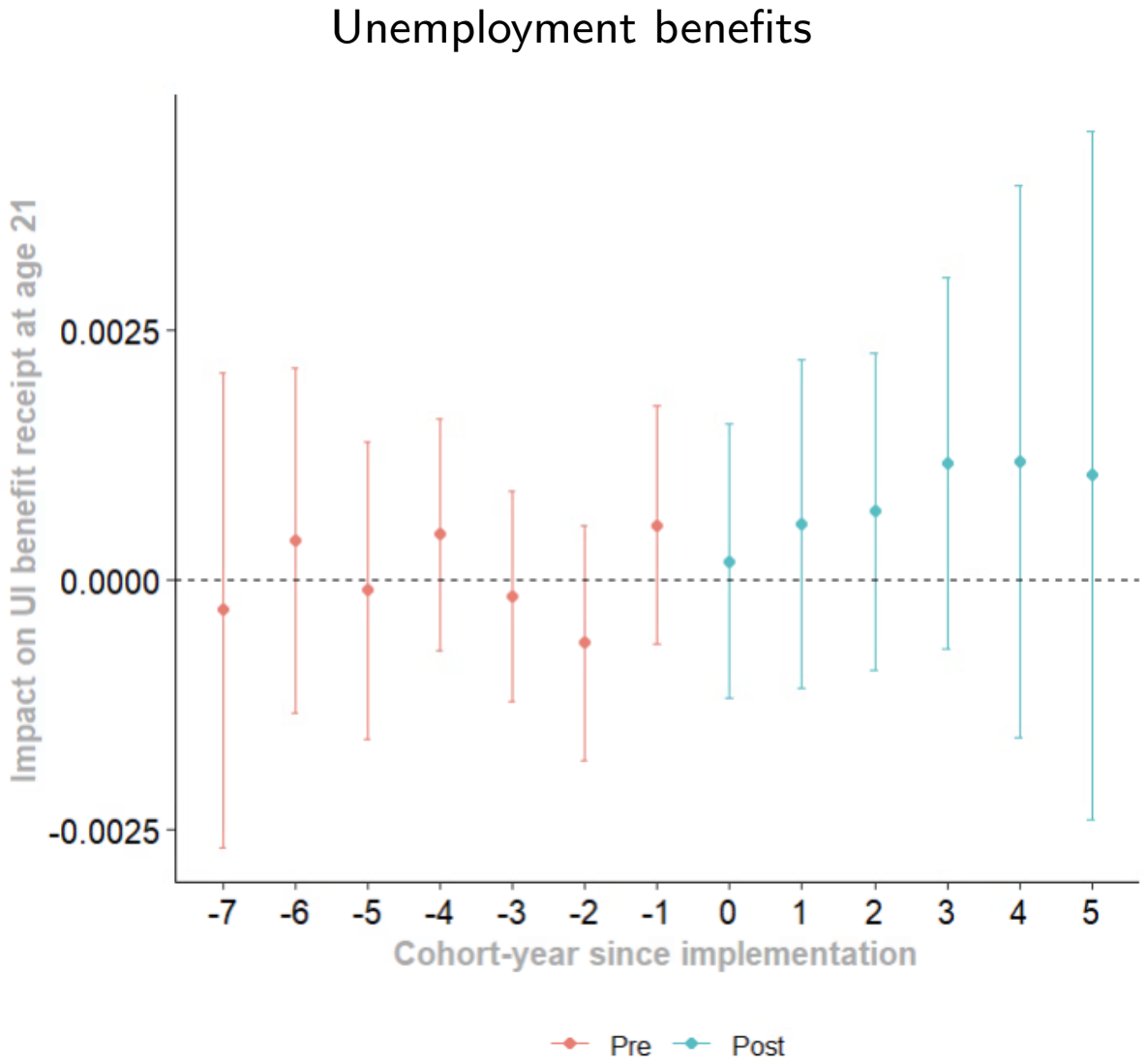

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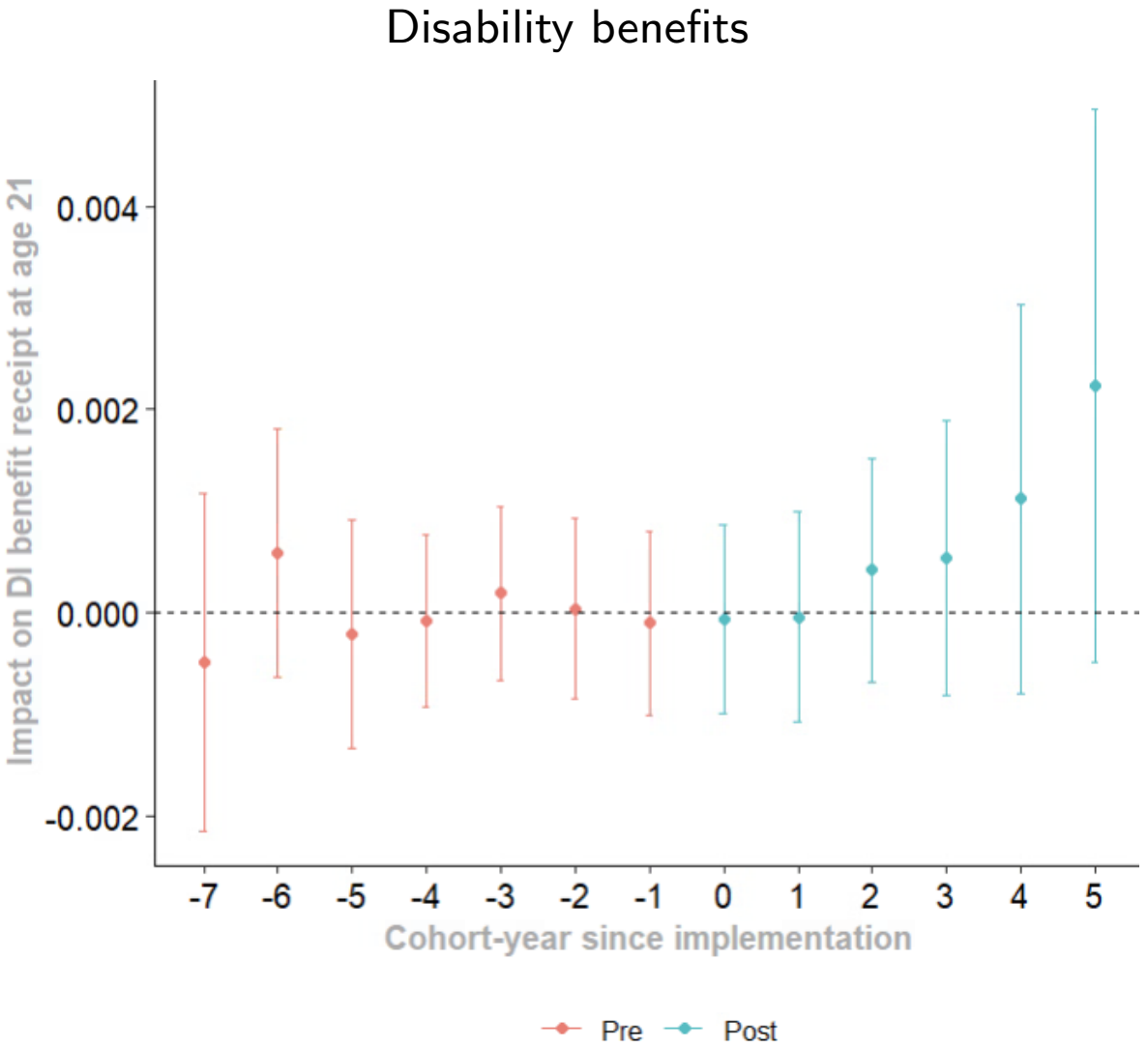

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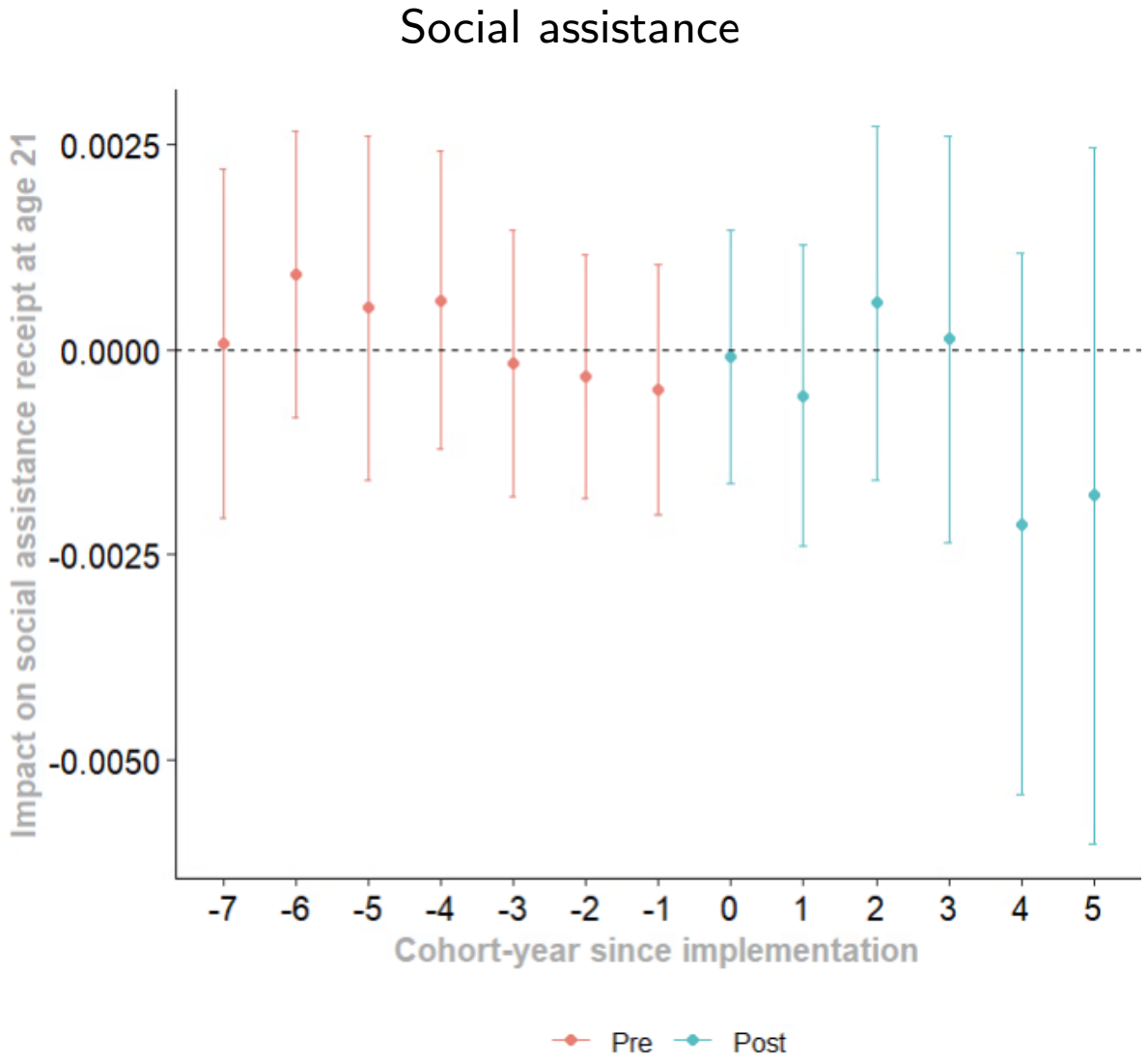

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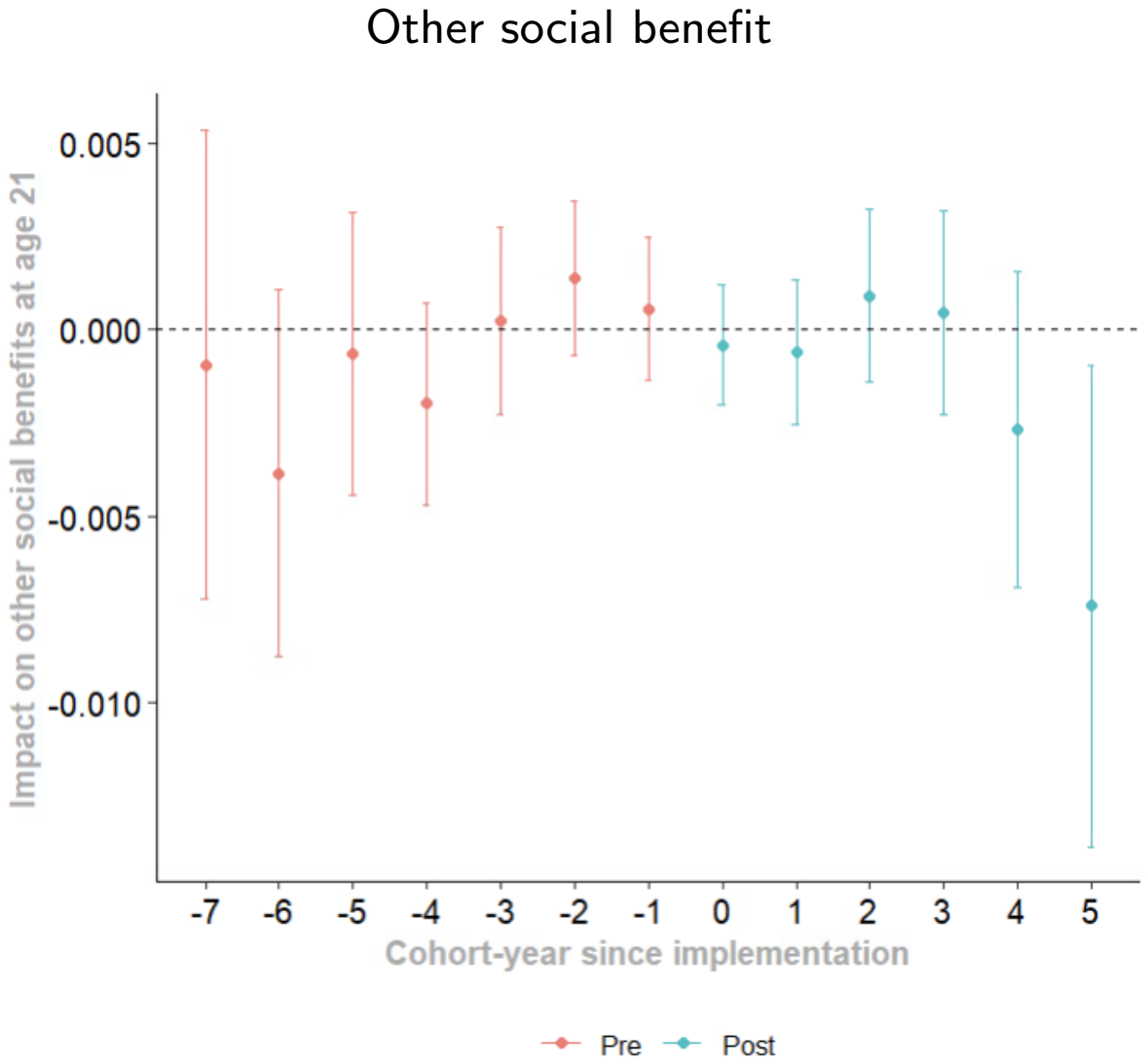


Summary

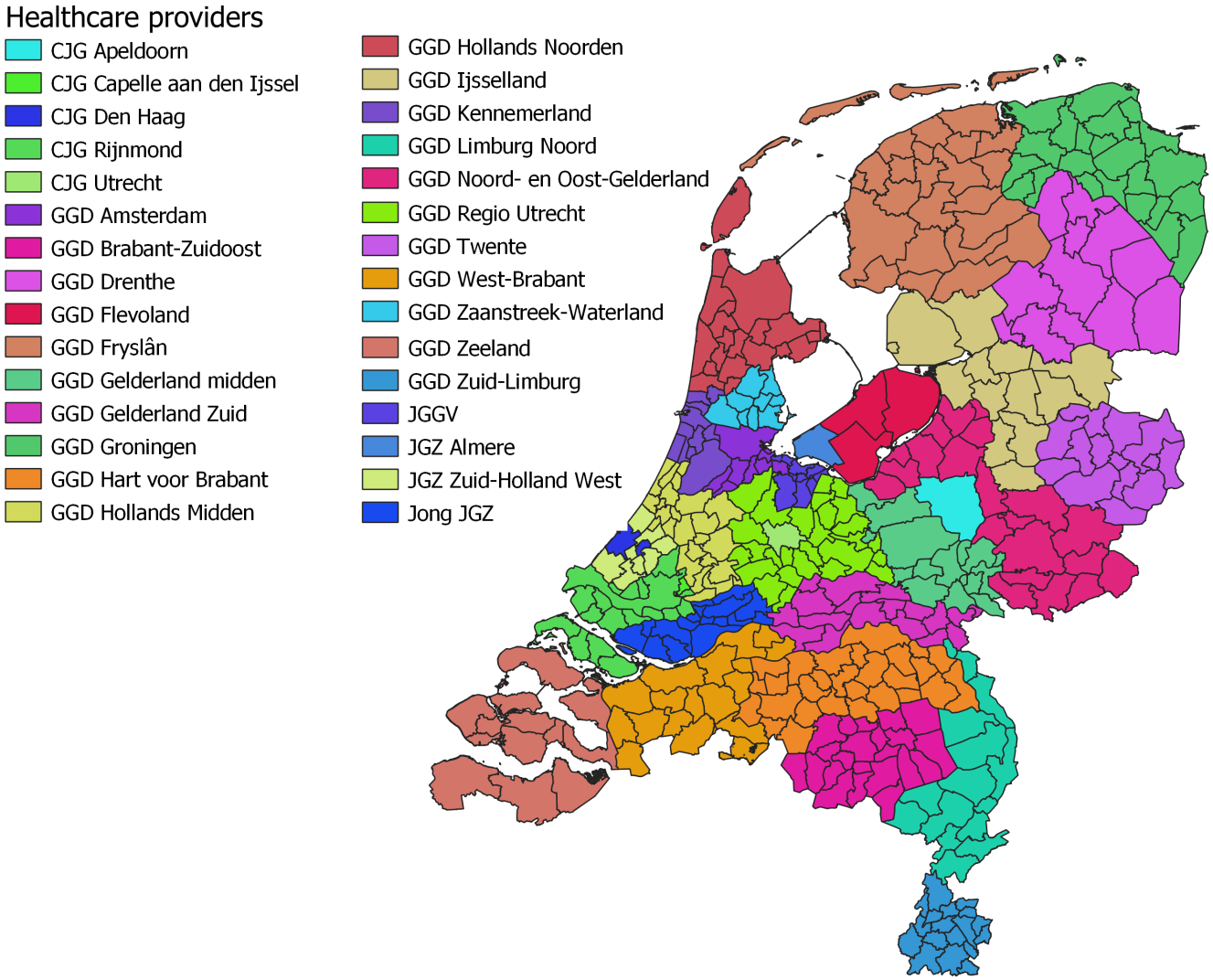
- No impact on healthcare utilisation
- No impacts on long-run educational and labor market outcomes
  - Similar estimates at age 24
- No significant impacts on subpopulations

Conclusion

- Contradiction of pilot results
  - Substitution towards non-healthcare?
  - Impact on other (subjective) outcomes
  - Ineffectiveness of intervention or ineffectiveness of treatment?
  - Highlights the importance of ex-post policy evaluation on top of pilot studies
- Closing the gap in treatment uptake?
  - Requires measure of utilisation AND need

30 Youth care providers

◂ Roll-out



Roll-out across the country

Roll-out

Cohort year year	Cohort size[a]	Percentage living in treated municipality
2009-2011	158.161	0.0%
2010-2011	156.850	0.0%
2011-2012	153.478	0.0%
2012-2013	159.591	10.8%
2013-2014	160.193	16.8%
2014-2015	163.669	33.6%
2015-2016	166.152	42.9%
2016-2017	166.502	57.7%
2017-2018	164.761	72.0%
2018-2019	164.085	74.6%
2019-2020	155.783	77.4%

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Descriptive statistics of pre-intervention cohort

◂ 30 providers

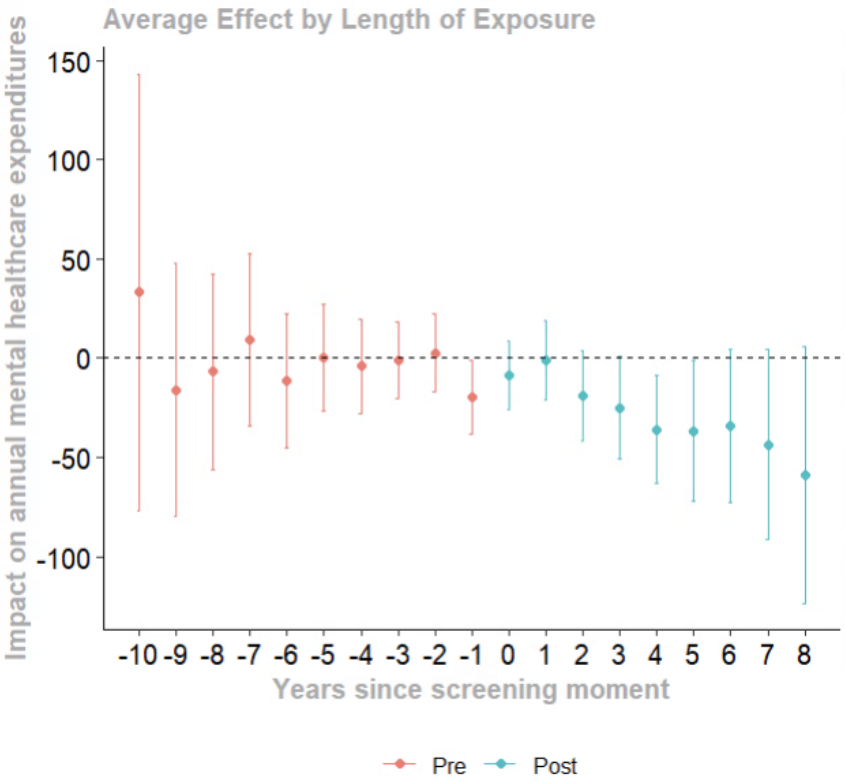
	Full 2011-2012 cohort	Subsample receiving mental healthcare
Annual healthcare utilization:		
Receiving mental healthcare	9.2%	100.0%**
Mental healthcare expenditures	403.90	4,373.41**
Receiving pharmaceuticals	17.8%	21.8%**
Pharmaceutical expenditures	53.19	69.00**
Physical healthcare expenditures	594.55	1,049.98**
Demographics:		
Age	15.2	15.2
Male	51.3%	50.2%**
Dutch native	78.5%	80.6%**
Educational outcomes:		
Educational track:		
VMBO	56.3%	67.6%**
HAVO/VWO	43.7%	32.3%**
Total years of education	14.5	13.5**
Number of individuals	153,478	14,134

Descriptive statistics of pre-intervention cohort

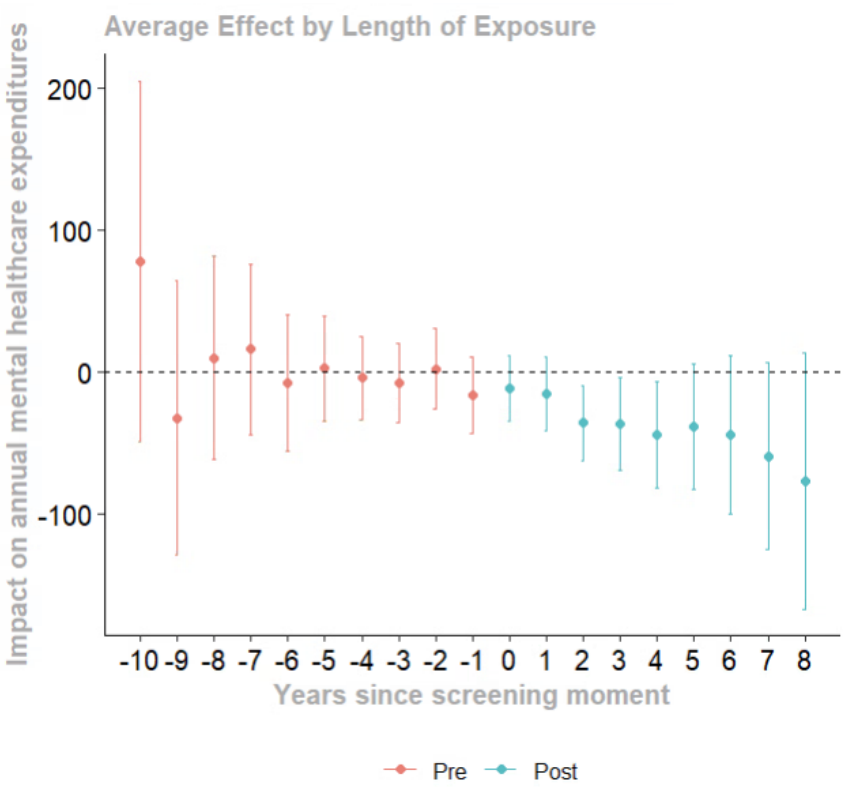
	Full 2011-2012 cohort	Subsample receiving mental healthcare
Parental background		
Father's age	48.1	48.1
Mother's age	45.4	45.3
Father native	81.8%	85.1%**
Mother native	78.3%	81.0%**
Single parent household	18.7%	28.8%**
Father's years of education	14.0	14.0
Mother's years of education	13.1	13.2*
Fathers income	€65,597.24	€66,186.12
Mothers income	€24,367.24	€25,169.15**
Household income	€89,132.17	€90,512.87
Number of individuals	153,478	14,134

Robustness healthcare estimates

Results



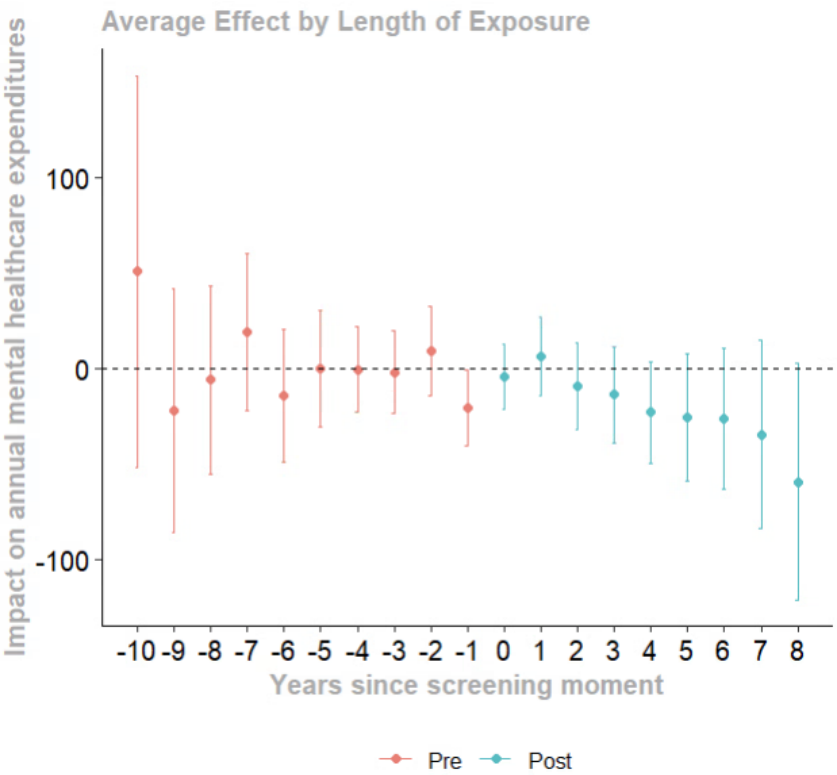
Baseline specification



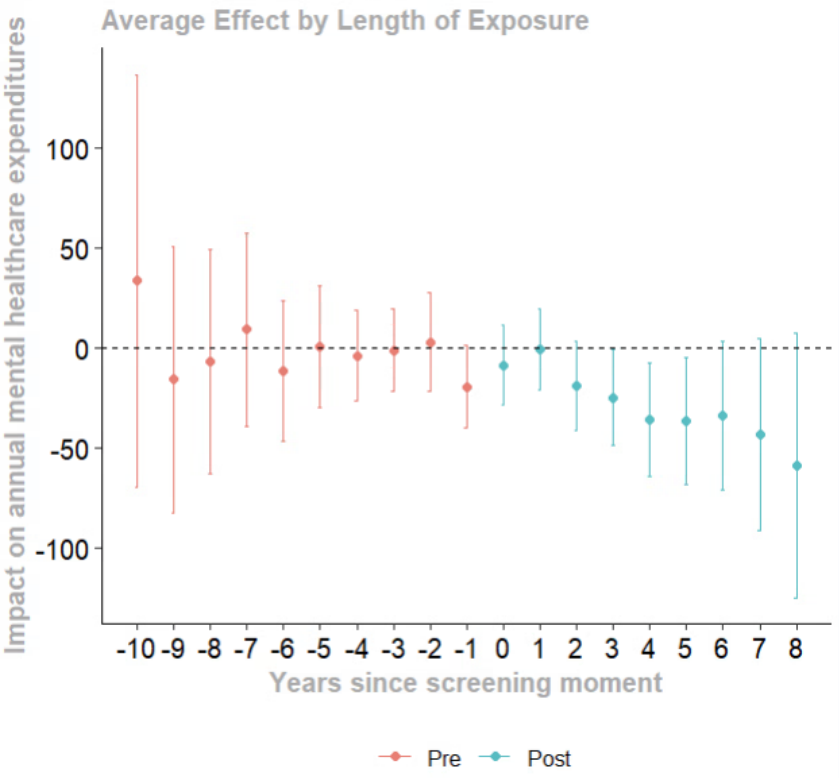
Balanced panel

Robustness healthcare estimates

Results



Not-yet-treated included in control group



Repeated cross-sections/non-panel

References

Anderson, D. M., Cesur, R., & Tekin, E. (2015). Youth depression and future criminal behavior. *Economic Inquiry*, *53*(1), 294–317.

Biasi, B., Dahl, M. S., & Moser, P. (2021). Career effects of mental health. *NBER working paper, 29031*.

Busch, S. H., Golberstein, E., & Meara, E. (2014). The fda and abcs unintended consequences of antidepressant warnings on human capital. *Journal of Human Resources*, *49*(3), 540–571.

Callaway, B., & Sant'Anna, P. H. (2021). Difference-in-differences with multiple time periods. *Journal of Econometrics*, *225*(2), 200-230.

Chorniy, A., & Kitashima, L. (2016). Sex, drugs, and adhd: The effects of adhd pharmacological treatment on teens' risky behaviors. *Labour Economics*, *43*, 87–105.

Cornaglia, F., Crivellaro, E., & McNally, S. (2015). Mental health and education decisions. *Labour Economics*, *33*, 1–12.

Cuellar, A., & Dave, D. M. (2016). Causal effects of mental health treatment on education outcomes for youth in the justice