Adverse Impacts of Supply Restrictions in Secondary Schooling

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The most important choice in adolescence

- **High school**: Arguably the most important choices in adolescence
  - Which **school** to attend?
  - Which **track** to pursue?

- Many students are **restricted** from pursuing their preferred choices
  - ➢Previous studies: Important labor market impacts
  - ➢This study: Well-being impacts?

Education and mental well-being

- Adolescent mental health strongly linked with labor market outcomes
  (e.g. Lundborg et al. 2014)

- Positive association between education and mental health
  (e.g. Esch et al. 2014)

- Schooling improves future outcomes related to mental well-being
  (e.g. Frisvold and Golberstein 2011, Crespo et al. 2014, Dursun and Cesur 2016)

- Education type matters more than length
  (Galama et al. 2018)

This paper: Being denied a preferred choice

- Does being **denied admission** to a preferred education choice impact **mental well-being?**

- Norwegian setting: Students rank preferred high school tracks (academic vs various vocational) and schools, then sorting on GPA

- Some track-school combinations are oversubscribed => RDD

- Investigate the role of supply **restrictions** (**tracks** vs **schools**)

Literature

- **Labor market effects of schools and education types**
  - Positive effect of vocational tracks, even in the long run*
    (Krueger and Kumar 2014, Brunello and Rocco 2017, Hampf and Woessmann 2017, Hanushek et al. 2017, Brunner et al. 2019*, Silliman and Virtanen 2022*, Dahl et al. 2023*)
  - Mixed evidence on selective schools
    (Hastings and Weinstein 2008, Jackson 2010, 2013, Pop-Eleches and Urquiola 2013, Dobbie and Fryer Jr. 2014, Abdulkadiroglu et al. 2014, 2017, Butikofer et al. forthcoming)
- **Mental health effects of more selective schools**
  - Butikofer et al. (forthcoming): No immediate mental health effect of attending a more selective high school

Data and institutional details

High school in Norway

- Free and predominantly provided by public schools.
- Students apply for track and school at age 15 / 16.
- Academic (3 years) vs. vocational (4 years) tracks

Admission

- In our setting, students rank (up to) 3 tracks and 3 schools within each track & then compete on lower secondary GPA
- Online centralized system with deferred acceptance assignment scheme

vigo

1. Logg inn
2. Personalia
3. Min historikk
4. Startside søknad
5. Søkerprofil
6. Ønsker
7. Tilleggsopplysninger
8. Søkere med annet morsmål

Ønsker

Velg programområde i skole

Programområde	Skole/bedrift		
1. ELELE1---- Elektrofag (Ordinært løp)	1. ASKIM VIDEREGÅENDE SKOLE 2. MALAKOFF VIDEREGÅENDE SKOLE 3. GLEMMEN VIDEREGÅENDE SKOLE	+	*Fjern programområde*
2. IDRET1---- Idrettsfag Vg1 (Ordinært løp)	4. ASKIM VIDEREGÅENDE SKOLE 5. HALDEN VIDEREGÅENDE SKOLE	+	*Fjern programområde*

Fortsett

Data

- 170,000 applications covering period 2011 to 2016
  - Have data on top-ranked track-school combination
- Exclude smaller tracks and tracks that are partly audition-based
- Link application data to Norwegian register data
  - extensive educational data
  - all GP visits with corresponding diagnoses

High school tracks

Track Name	Sample N	Acceptance rate	Track restricted
General Academic	81,282	68.4%	16.3%
Electrical Engineering	14,435	64.9%	60.2%
Health services	13,839	78.2%	34.4%
Sports	12,207	67.2%	70.0%
Technology & Industry	12,194	73.9%	40.9%
Media & communication	10,089	60.8%	51.2%
Music, dance & drama	6,503	65.0%	69.1%
Construction	6,478	85.3%	48.1%
Service & Logistics	4,709	73.8%	51.0%
Design	3,326	80.9%	47.6%
Restauranteering	2,537	88.4%	55.4%
Nature	2,489	81.2%	41.8%
Academic with arts	2,016	73.3%	62.7%

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Empirical Framework

Empirical framework

- Regression discontinuity design with cutoff-fixed effects

$$Y_i = a + \beta_1 \mathbb{1}(G_i > \hat{v}) + \beta_2 (G_i - \hat{v}) + \beta_3 (G_i - \hat{v}) \cdot \mathbb{1}(G_i > \hat{v}) + \alpha_{jkt} + bX_i + e_i$$

with: Y= indicator variable for mental health-related GP visit

G = lower secondary GPA

$\hat{v}$ = year-specific admission cutoff for *i*'s preferred track-school

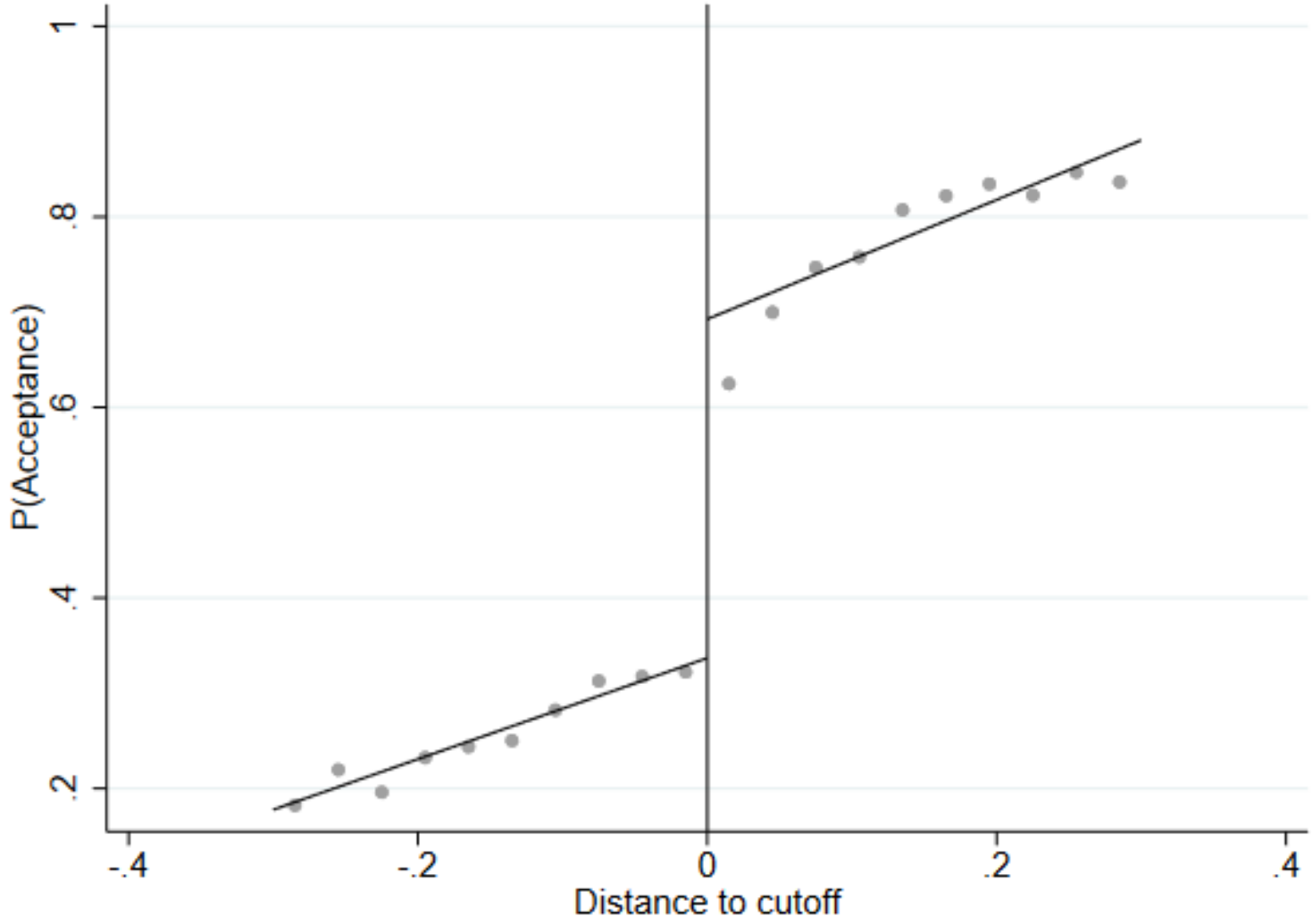
α = FEs for all school-track-year combinations

Identification comes from random assignment around cutoffs

Random assignment: Suggestive evidence

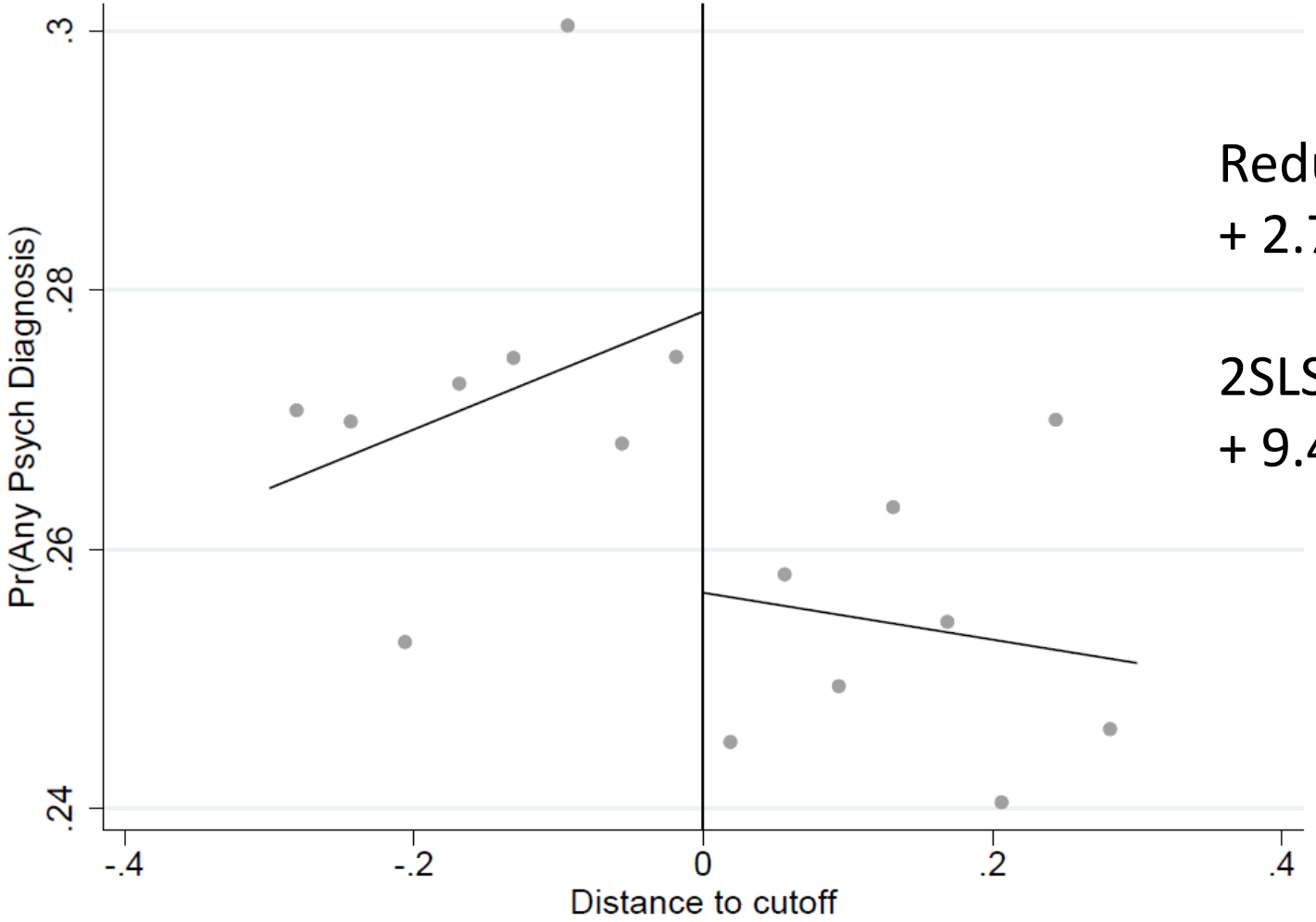
Panel A. Background characteristics			
	(1)	(2)	(3)
	Male	Born in Norway	High-ed parents
Above cutoff	-0.004	0.013	0.020
	(0.0114)	(0.0090)	(0.0138)
N	32347	32390	32390
Panel B. Pre-treatment outcomes			
	(4)	(5)	(6)
	MH diagnosis	MH disorder	# GP consultations
Above cutoff	0.002	-0.002	0.053
	(0.0105)	(0.0060)	(0.1020)
N	32347	32347	32347

First stage: 29 pp. increase in enrolment



Results

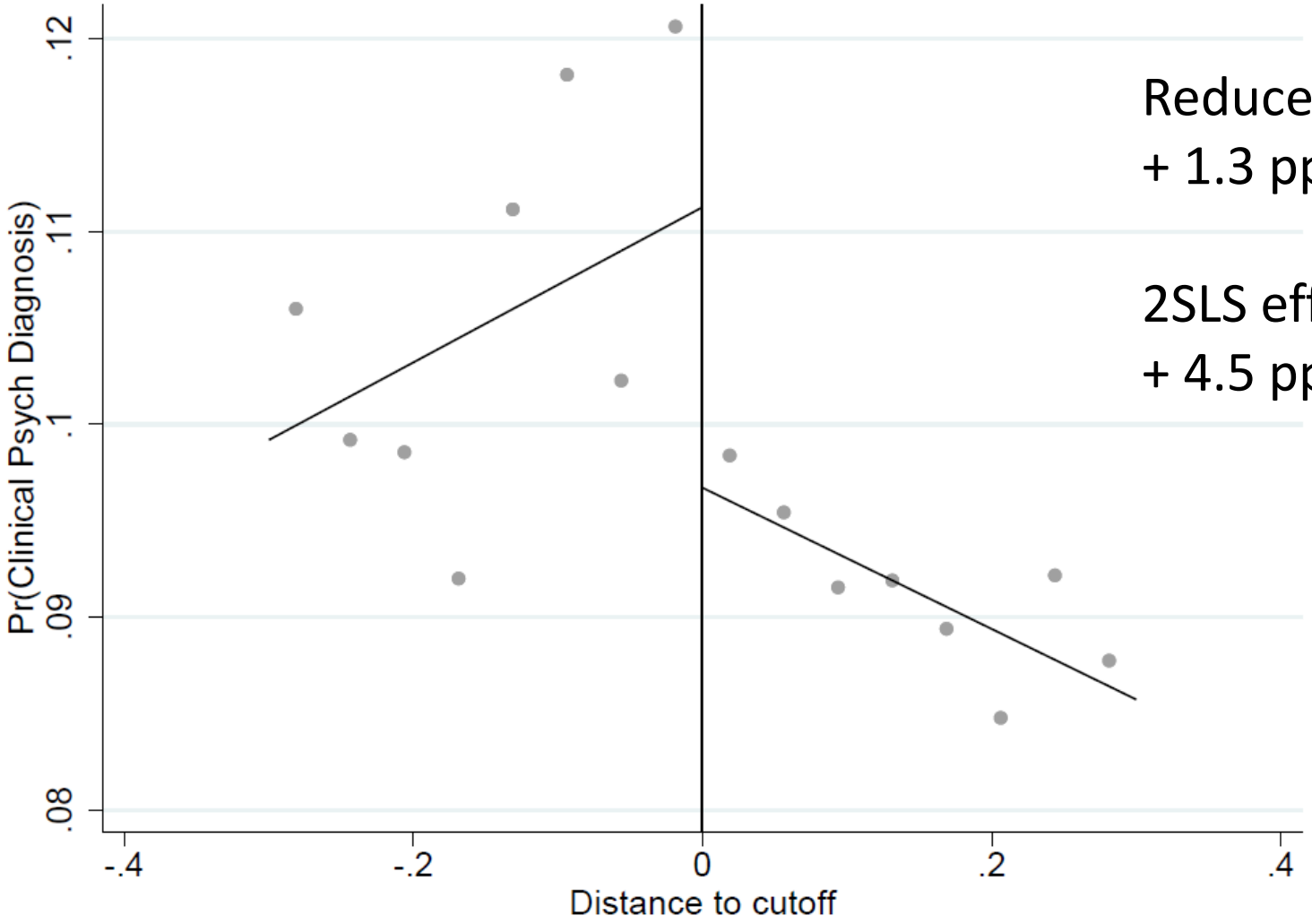
Outcome: Mental health GP consultation



Reduced form effect:
+ 2.7 pp.

2SLS effect:
+ 9.4 pp. (36%)

Outcome: Diagnosed w/ MH disorder



Reduced form effect:
+ 1.3 pp.

2SLS effect:
+ 4.5 pp. (46%)

Mechanisms: School vs track

School versus track?

- We only have data on the 1st ranked choice
- Counterfactual to admission is
  - Different school, same track
  - Different track (different or same school)

- Likelihood of rejected students having to pursue a different track varies based on local track-level supply restrictions (local within-track school options)

- Sort regions into quartiles of within-track options

Effects by within-track options

	School region, by within-track options		
	Q1 (Least options)	Q2 (2nd-least options)	Q3 & Q4 (Most options)
	(1)	(2)	(3)
Panel A. First stage			
1st choice enrollment	0.269***	0.287***	0.288***
	(0.0288)	(0.0198)	(0.0202)
Panel B. Reduced-form mental health effects			
MH diagnosis	-0.055**	-0.026	-0.013
	(0.0263)	(0.0314)	(0.0147)
	[0.254]	[0.270]	[0.258]
MH disorder	-0.035	0.010	-0.012
	(0.0215)	(0.0204)	(0.0104)
	[0.099]	[0.108]	[0.089]
Cutoff-fixed effects	yes	yes	yes
Controls	yes	yes	yes
School-region#year clusters	127	66	33
N	6363	7879	17728

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Mechanisms: Peers?

Effect on peer characteristics

		School region, by within-track options	
		Q1	Q3 & Q4
	Full sample	(Least options)	(Most options)
	(1)	(2)	(3)
# former schoolmates	2.505***	5.656***	1.100**
	(0.563)	(1.457)	(0.495)
	[19.3]	[28.0]	[14.8]
Share former schoolmates	0.028***	0.060***	0.013**
	(0.0056)	(0.0148)	(0.0055)
	[0.252]	[0.447]	[0.164]
Share classmates with MH diagnosis	-0.001	0.002	-0.002
	(0.0018)	(0.0053)	(0.0023)
	[0.158]	[0.144]	[0.159]
Share classmates with MH disorder	-0.002	0.001	-0.003*
	(0.0013)	(0.0030)	(0.0017)
	[0.050]	[0.054]	[0.045]
Cutoff-fixed effects	yes	yes	yes
Controls	yes	yes	yes
School-region#year clusters	228	127	33
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Student responses

Reapplications, enrolment and completion

Effect on applications and enrolment

		School region, by within-track options	
		Q1	Q3 & Q4
	Full sample	(Least options)	(Most options)
	(1)	(2)	(3)
Exact repeat application	-0.009**	-0.044***	0.003
	(0.0041)	(0.0134)	(0.0032)
	[0.016]	[0.022]	[0.011]
Application to any first-year program	-0.015**	-0.064***	0.004
	(0.0068)	(0.0210)	(0.0052)
	[0.044]	[0.063]	[0.032]
Enrollment after initial track rejection	-0.006**	-0.027***	0.001
	(0.0030)	(0.0092)	(0.0026)
	[0.008]	[0.013]	[0.005]
On-time completion	0.012	0.070*	-0.010
	(0.0141)	(0.0370)	(0.0178)
	[0.663]	[0.581]	[0.714]
Completion within one extra year	0.001	0.093**	-0.027
	(0.0146)	(0.0422)	(0.0170)
	[0.772]	[0.721]	[0.805]

Effect on applications and enrolment

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	(1)	(2)	(3)
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Effect on applications and enrolment

2SLS effect of rejection:
÷ 42% likelihood of
on-time completion

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Concluding remarks

- We provide new insights into the adverse effects of educational supply restrictions and merit-based admittance

- In other settings, the introduction of similar restrictions disproportionately hurt disadvantaged groups at no benefit to the admitted students (Bleemer and Mehta 2021)
  - Policy makers could increase welfare by easing supply restrictions