Research Methods for Economics and Policy
Reading an Economics Paper

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Closing the gap

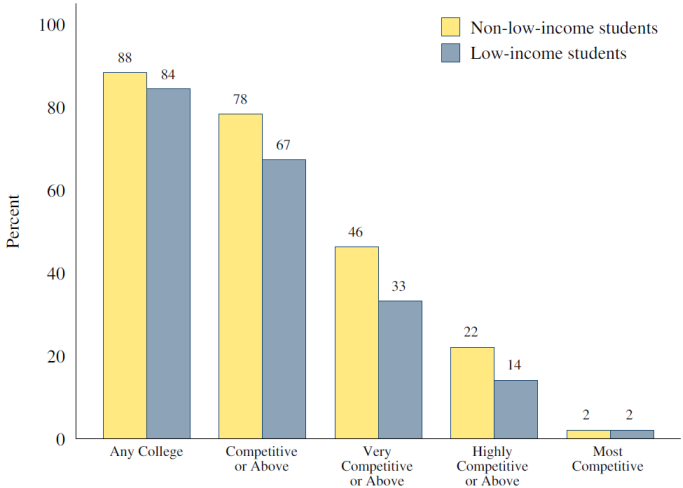
S. Dynarski, C. J. Libassi, K. Michelmore, S. Owen [DLMO]

Background: Closing the achievement gap

- Gaps in educational attainment between low- and high-income students are large and have grown in recent decades
  - → Among those born in the 1980s those from the bottom quartile of family incomes are 50p less likely to attend college than those from the top quartile
- It's not only academic preparation - this disparity is partly due to differences in application rates
  - → **High-achieving, low-income** students don't even apply to selective schools
- Standard models of human capital investment cannot explain these behaviors
  - → Lack of information about the (net) cost of college or suitability for an elite school could lead low-income students to underinvest in education
  - → Behavioral patterns - e.g., present bias, overreliance on routine/defaults, debt aversion - are particularly prevalent among disadvantaged

Background: The enrolment gap

Figure I
Selectivity of Colleges Attended by High-Achieving Michigan Students, by Income



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- Targeted, personalized communications that reframe but do not increase financial aid
- DLMO Design an RCT targeting two cohorts of $2,000$ low-income, high-achieving students in Michigan
- This intervention does not change costs - it offered an early guarantee of a grant for which the students were expected to be eligible and did not require the students to complete complex forms

Empirical Methodology: The RCT Intervention

- Target population: high-achieving, low-income students in Michigan
- Students in the treatment group received personally-addressed packets Control group students received material typically sent to potential applicants by the Univ of Michigan
- Inside the packet: letter from the univ praising the student's achievement and encouraging them to apply for admission.
  - → The letter also guaranteed 4 years of funding in case of acceptance
- Crucial part: the mailing stated that the applicant **did not** have to fill any form to be eligible for financial aid (as it's usually the case)
  - → These are all students who are expected to be eligible anyway
- Eliminating the admin requirement was intended to address a possible behavioural bias: students do not apply because of heavy admin burden in the present

Empirical Methodology: Randomised Treatment Assignment

- The treatment was assigned at high school level that is, all students in a school who meet the income and academic criteria were assigned he same treatment status
- What could happen if we assign a different treatment status to different students within the same school?

Empirical Methodology: Randomised Treatment Assignment

- The treatment was assigned at high school level that is, all students in a school who meet the income and academic criteria were assigned he same treatment status
- What could happen if we assign a different treatment status to different students within the same school?
- The randomisation is done within school strata
  - → The sample is stratified by the number of eligible students into 4 groups and randomisation happens within each group
  - → Then, randomisation is performed *within each group*
- Two cohorts of schools/students. Overall, $1,978$ and 526 treated and $1,932$ and 500 control students and schools

Empirical Methodology: Balancing

Balance Table: Selected School Characteristics
First and Second HAIL Cohorts

Characteristic	Mean		P-value
	Control schools	Treated schools	
School characteristics			
Upper Peninsula	0.150	0.130	0.344
	(0.016)	(0.015)	
West Central	0.449	0.476	0.359
	(0.022)	(0.022)	
Southeast	0.401	0.394	0.788
	(0.021)	(0.022)	
Suburban	0.340	0.360	0.537
	(0.021)	(0.021)	
City	0.129	0.100	0.148
	(0.015)	(0.013)	
Rural	0.530	0.540	0.718
	(0.022)	(0.022)	
# of 11th grade students in school	189.1	175.1	0.055
	(6.188)	(6.126)	
# of HAIL students in school	3.8	3.9	0.649
	(0.140)	(0.163)	
UM application rate in 2015	0.067	0.055	0.016
	(0.004)	(0.004)	
Student characteristics			
Proportion female	0.571	0.605	0.112
	(0.015)	(0.015)	
Proportion white or Asian	0.834	0.844	0.576
	(0.013)	(0.012)	
Proportion black	0.094	0.087	0.618
	(0.011)	(0.010)	
Proportion other race/ethnicity	0.072	0.069	0.803
	(0.009)	(0.008)	
Proportion free lunch eligible	0.709	0.692	0.459
	(0.014)	(0.015)	
Proportion reduced-price lunch eligible	0.291	0.308	0.459
	(0.014)	(0.015)	
Average SAT (or equivalent)	1254	1260	0.194
	(2.690)	(2.896)	
Average GPA	3.82	3.83	0.208
	(0.006)	(0.006)	
Number of school-years	526	500	1,026
Number of students	1,978	1,932	3,910

Empirical Methodology: Estimation

- Students are randomly assigned. We therefore simply need to estimate the following model:

$$Y_{jt} = \beta_0 + \beta_1 D_j + \beta_2 S_{jt} + u_{jt} \tag{1}$$

$$Y_{jt} = \gamma_0 + \gamma_1 D_j + \gamma_2 S_{jt} + \gamma_3 Z_{jt} + u_{jt} \tag{2}$$

where D is an indicator equal to 1 (0) if the school is randomised into the treatment (control)

→ S_{jt} are strata-by-year dummies

→ β_1 and γ_1 are the parameters of interest

→ Z_{jt} is a vector of controls - why do we add them? Because of randomisation they shouldn't make any difference...

Results: Main

Table III
Estimated Effect of HAIL Scholarship on UM Application, Admission, and Enrollment
First and Second HAIL Cohorts

Outcome	Treatment effect		Control mean
Applied	0.422	0.419	0.259
	(0.021)	(0.019)	
Admitted	0.176	0.164	0.149
	(0.019)	(0.017)	
Enrolled	0.151	0.143	0.117
	(0.018)	(0.016)	
Strata dummies	X	X	
Covariates		X	
Number of school-years	1,026		
Number of students	3,910		

Results: Heterogeneous effects

Table IV
Estimated Effect of HAIL Scholarship on UM Application, Admission, and Enrollment by Geography
First and Second HAIL Cohorts

	Panel A. Region			*Panel B. Urbanicity*		
	Southeast	*West Central*	*Upper Peninsula*	*Suburb*	*City*	*Town or Rural*
Applied	0.378	0.466	0.398	0.384	0.318	0.487
	(0.031)	(0.029)	(0.059)	(0.031)	(0.062)	(0.028)
	[0.364]	[0.2]	[0.156]	[0.336]	[0.464]	[0.159]
Admitted	0.159	0.187	0.187	0.156	0.061	0.228
	(0.031)	(0.026)	(0.054)	(0.029)	(0.066)	(0.026)
	[0.202]	[0.116]	[0.105]	[0.164]	[0.319]	[0.097]
Enrolled	0.145	0.152	0.176	0.133	0.117	0.183
	(0.029)	(0.024)	(0.051)	(0.027)	(0.061)	(0.024)
	[0.167]	[0.085]	[0.08]	[0.14]	[0.221]	[0.078]
Number of school-years	408	474	144	359	118	549
Number of students	1,848	1,646	416	1,784	530	1,596

Discussion: Welfare effects

- The effects found by such experiments can be considered 'partial' equilibrium effects
- Three issues:
  - → Did the intervention simply poach students from other selective colleges?
  - → Did students induced to attend quickly drop out?
  - → Did the intervention discourage any students?

Who is Screened Out?

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- These programs aim to provide disability benefits to those individuals who have severe disabilities and are in need of assistance
- The primary system for targeting disability programs is the disability determination process, in which adjudicators determine whether an individual meets the medical eligibility criteria for these programs
- However, even before potential applicants encounter the disability determination system, the cost of applying for disability programs may affect whether they decide to apply

Background: Disability Programs Applications

- To apply for disability, individuals must consider whether they are eligible, submit extensive paperwork, and provide access to medical records

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- The effect of these application costs on the targetingof disability programs is ambiguous:
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- The application process is especially important for the targeting of disability programs because disability is difficult to observe and costly to verify
  - If individuals with severe disabilities do not apply because the application process is too costly, the government has few other ways to identify them and provide benefits
  - Conversely, the government may want to design an application process that discourages low-severity individuals from applying, given the high administrative and time costs of determination

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- However, evidence from behavioral economics suggests that hassles may discourage those most in need (Bertrand, Mullainathan, and Shafir, 2004)
- In addition, even a neoclassical framework can produce the opposite theoretical result if application costs are negatively correlated with ability (e.g., application involving cognitive costs instead of time costs)

Empirical Methodology

- Use variation in the timing of closings of Social Security Administration (SSA) field offices
  - These offices provide assistance with filing disability applications but do not make medical decisions about disability awards
- Use detailed administrative data on disability applications and applicant characteristics
- What's the issue?
  - SSA may be closing offices in areas where disability applications are already falling or where the composition of disability applicants is already changing
- Employ a **difference-in-difference** strategy that compares the number and composition of disability applicants and recipient between a treated and control group. Compare:
  - Treated: areas that experience the closing of their nearest field office
  - Control: areas that do not experience a closing until several years later
  - Before and after the closing

Results: Dynamic Effects

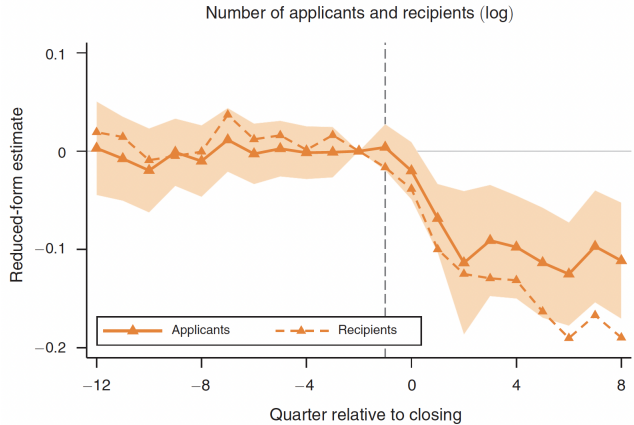

FIGURE 3. EFFECT OF CLOSINGS ON NUMBER OF DISABILITY APPLICATIONS AND ALLOWANCES

Results: Average Effects

TABLE 2—ESTIMATES OF THE EFFECT OF CLOSINGS ON DISABILITY APPLICATIONS

	Count (log)			Proportion/average		
	Point estimate	Standard error	Control count	Point estimate	Standard error	Control mean
All	−0.100	(0.0288)	39.7			
Severity						
Low	−0.0483	(0.0295)	18.0	0.0278	(0.00444)	0.425
Medium	−0.338	(0.0503)	6.9	−0.0274	(0.00402)	0.184
High	−0.173	(0.0367)	8.5	−0.0118	(0.00318)	0.209
Very high	−0.0327	(0.0271)	6.2	0.0114	(0.00239)	0.183
Disability type						
Mental	−0.115	(0.0356)	12.3	−0.00522	(0.00376)	0.289
Musculoskeletal	−0.0576	(0.0298)	10.2	0.0101	(0.00255)	0.276
Other physical	−0.109	(0.0283)	17.2	−0.00485	(0.00353)	0.435
Education (years)				0.0666	(0.0201)	11.8
High school dropout	−0.142	(0.0275)	9.9			
High school graduate	−0.0740	(0.0280)	19.4			
College graduate	−0.0496	(0.0288)	2.4			
Pre-application earnings ($)				413.1	(202.0)	$15,362
$0–$5,000	−0.112	(0.0338)	18.7			
$5,000–$15,000	−0.0887	(0.0331)	8.9			
$15,000–$25,000	−0.0928	(0.0294)	5.0			
$25,000+	−0.0414	(0.0343)	7.0			
Language						
Speaks English	−0.0621	(0.0976)	24.9	0.00719	(0.0172)	0.623
Does not speak English	−0.107	(0.0530)	14.7			
Age (years)				0.469	(0.118)	40.7
18–34	−0.126	(0.0339)	7.9			
35–49	−0.130	(0.0292)	12.9			
50+	−0.0489	(0.0262)	13.1			
Applicant behavior						
Files online	0.135	(0.0682)	2.8	0.0374	(0.00741)	0.075
Files in person or by phone	−0.194	(0.0319)	36.9			
Provides email address	0.260	(0.0795)	4.2	0.0455	(0.00953)	0.111
No email address	−0.158	(0.0309)	35.4			
Has representation	0.264	(0.0711)	2.2	0.0325	(0.00545)	0.054
No representation	−0.139	(0.0297)	37.4			

Channels

- Through which channels do closings affect applications decisions?
- Closings result in the increase of:
  - 36 percent (4.8 minutes) in walk-in wait time
  - 12 percent (3.4 days) increase in processing time
  - 70 percent (5.1 applications) in the number of applications taking longer than 40 days to process
- 54 percent of the reduction in applications is attributable to increased congestion at neighboring offices, 4 percent to increased driving distance, and 42 percent to other costs of switching field offices
- The paper's estimates imply that potential applicants are willingto forgo $670 in expected benefits to avoid increased congestion, $50 to avoid greater driving distance, and $510 to avoid other costs of switching offices

Discussion: Policy Implications

- The services provided by field offices are valuable to disability applicants and are instrumental for 10 percent of applicants in the decision to apply
- Why does private industry not attempt to meet the demand for assistance with disability applications?
  - Credit constraints of disability applicants vs government regulations limiting the compensation of disability representatives
- Field office closings affect certain populations more than others - particularly potential applicants with low levels of education and earnings
- If application costs discourage truly disabled individuals from applying, the disability agency has few other ways to identify these individuals and provide them with benefits
- If disability programs are also intended to address economic inequality, then the results by socioeconomic status indicate that field office closings exacerbate the very inequality that disability programs are intended to mitigate