Test-Optional Admissions

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Test-Optional Admissions Trend

The Washington Post

A shake-up in elite admissions: U-Chicago drops SAT/ACT testing requirement

By Nick Anderson

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The University of Chicago will no longer require ACT or SAT scores from U.S. students, sending a jolt through elite institutions of higher education as it becomes the first top-10 research university to join the test-optional movement.

> "Debate over admission testing has intensified in recent years . . .
>
> studies have found a strong link between scores and economic background . . .
>
> Schools that drop testing requirements often say they are doing so in the name of wider access"

- By 2019, 33% of colleges did not require test scores (among 900+ Common App)

- Pandemic $\longrightarrow$ In 2021-22 season, 95%

- Vast majority of colleges have stayed test optional

Our Questions

1. **Why would a college benefit from test optional (or blind)?**

   - Tests advantage some students, but are informative

     UC 2020: "Test scores are predictive [of success in college] for all demographic groups and disciplines, even after controlling for HSGPA…"

     Chetty, Deming, Friedman 2023: scores correlate with post-college outcomes

   - Why not require scores, but put low weight on them, or adjust for demographics?

   - Simple impossibility result: under some (broad) conditions, no benefit from test optional

   - Our story: **Social Pressure**

     College bears costs for decisions that "society" does not agree with

     → Not observing test scores can (endogenously) lower disagreement cost

     Tradeoff: Not observing scores also means worse information

Our Questions

Given social pressure mechanism:

2. **What does a test-optional eqm look like?**
   - How might college compare students who do and don't submit test scores?

   - Which students submit?

   - How do admissions outcomes differ from test mandatory?
     - $\rightarrow$ Which students benefit or harmed?

3. **When do colleges prefer to go test optional?**
   - Depends on how flexibly college can treat non-submitters

   - Extended example of affirmative-action ban triggering test optional/blind

   - With compeition, adverse selection $\implies$ complementarity/substitutability

The Puzzle

("The Test-Optional Puzzle", *AEA P&P, 2025)*

Puzzle's Environment

A college, a student, and a testing regime

Timeline:

- College commits to admission policy: message space M and what it sees $\rightarrow [0, 1]$
- Student attributes $x \equiv (z, q)$ realized; student learns z
- Student chooses test-prep effort e (costly and depends on x)
- Test score $t \sim F(\cdot | x, e)$
- Student decides whether to apply (may be costly and depend on x)

If student applies:

- Under test optional, student chooses disclosure: whether or not to submit score
- Student sends cheap-talk message $m \in M$
- College gets "holistic" signal $h \sim G(\cdot | x, e, t, m)$
    (subsumes everthing college sees except t and m)
- Admission determined based on h, t (if disclosed) and m

Arbitrary payoffs, but do not depend on regime, policy, disclosure, or cheap talk

Test Mandatory is Better

Proposition

College (weakly) better off under test mandatory.

Proof: *Any* test-optional policy can be replicated under test mandatory

- ignore test score if student would not have submitted under test optional

- same outcome mapping, preserving student incentives

- a subtlety: use M to have student indicate
  whether they would have submitted

Not a Puzzle?

What can break the "impossibility result"?

- **Direct cost of taking the test or submitting the score**

  Students with high costs *can't* apply under test mandatory (Garg, Li, Monachou '21)

  Not too compelling outside pandemics

  SAT takes 3 hours; costs $60, fee waivers for low-income students

  Pre-Covid, 25 U.S. states required ACT or SAT for HS graduation

- **Non-equilibrium / behavioral factors**

  Students simply like applying to test-optional colleges

  They study differently, even if optional and mandatory have same outcome map

- **External constraints on the college**

  College is forced to make admissions decisions in a particular way
  $\rightarrow$ If test scores submitted, *must* put a lot of weight on them

 College faces **social pressure** on its decisions

Example

An Example

Consider a student with some given observables (GPA, extra-curriculars, . . .).

- Test score $t \sim U[0, 100]$
- Society gets $u^s(t) = t - 40$ from acceptance

  Normalize rejection payoff to $u^s = 0$

  $\implies$ Society's test-score bar is 40

- College decides whether to admit student

- Social pressure on College when decision conflicts with Society's pref, given avail info

  $\rightarrow$ Disagreement cost $d \propto$ magnitude of Society's (expected) utility loss from decision

An Example
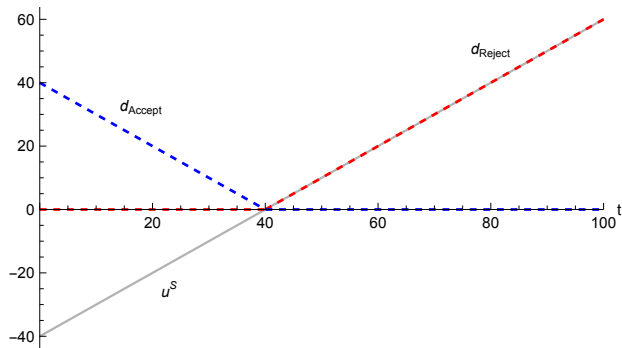
- If $\mathbb{E}[u^s(t)] > 0$, rejecting has cost $d = \mathbb{E}[u^s(t)] = \mathbb{E}[t] - 40$
- If $\mathbb{E}[u^s(t)] < 0$, accepting has cost $d = -\mathbb{E}[u^s(t)] = 40 - \mathbb{E}[t]$
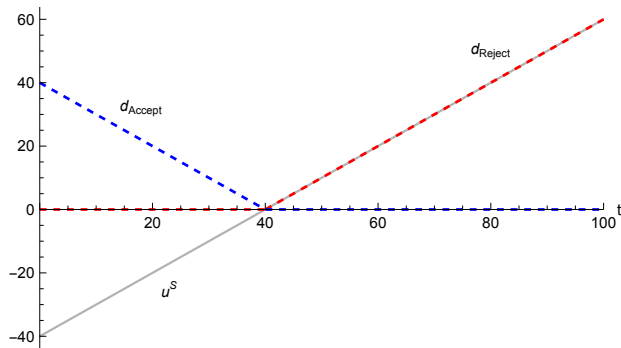
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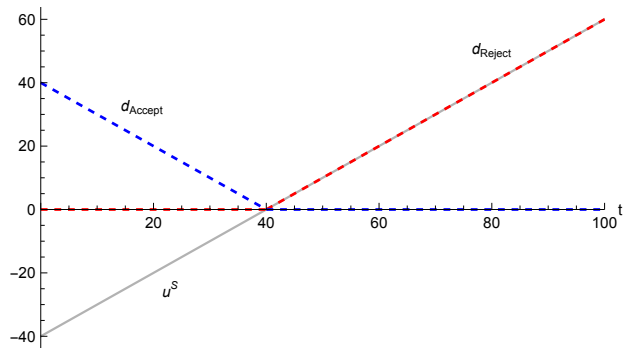
Disagreement cost of Accepting regardless of test score ("Fencing Champion"):

- Test mandatory: > 0 $\left(\int_0^{40} \frac{40-t}{100} \mathrm{d}t \right)$

- Test blind: 0
  - $\because$ Society's expected utility under prior is $50 - 40 = 10 > 0$
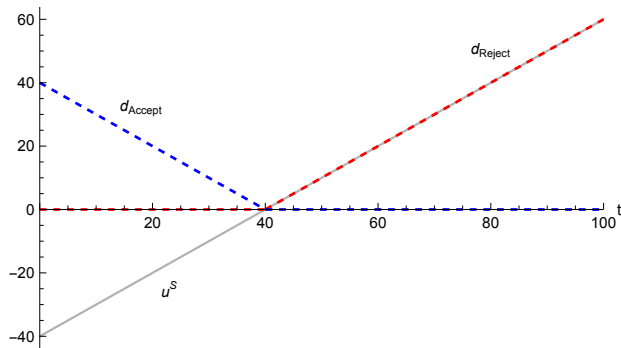
An Example

Disagreement cost of Rejecting regardless of test score ("New Jerseyian"):

- Test mandatory: $\int_{40}^{100} \frac{40-t}{100} \mathrm{d}t = 18$

- Test blind: 10
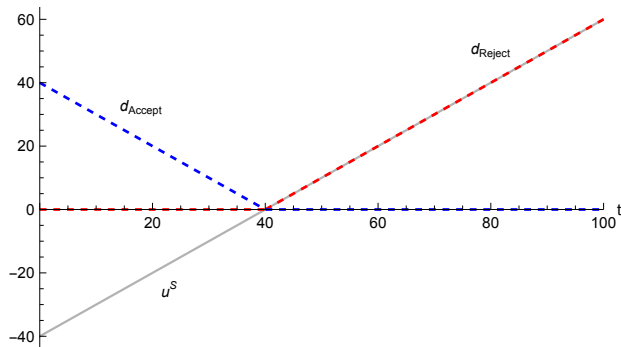   - $\because$ Society's expected utility under prior is $50 - 40 = 10 > 0$

An Example

If College wants same decision regardless of score, then better to not observe scores

Why? Society is **Bayesian**, but judges College based on avail info

   Disagreement cost is **convex** $\implies$ benefit of pooling

   ⇝ Bayesian Persuasion logic (Kamenica-Gentzkow '11)

An Example

Now suppose College wants to admit NJ applicants with scores above 70

   $\rightarrow$ Cares about score, but more selective than Society

Under Test Mandatory or Test Blind, cannot implement that without disagreement cost

But can using a Test-Optional policy:

   $\rightarrow$ Admit score-submitters with scores above 70

   $\rightarrow$ Reject non-submitters   (or accept them with tiny prob)

Beyond the Example

More generally, college cannot achieve its first best

$\rightarrow$ Tradeoff between better decisions and more disagreement

Must also account for different student groups

We embed these considerations in a richer model of test-optional admissions

Model

Model

- **Student** applying to a college

    Observables $x \sim F_x$ in $\mathcal{X}$

    Test score $t \sim F_{t|x}$ in $\mathbb{R}$

    (technical: each $F_{t|x}$ either continuous, or discrete with no accumulation points)

- **College** decides $A = $ Accept or Reject

    Utility $u^c(x,t) = v^c(x) + w^c(x)t$ of accepting student

    Normalize rejection utility to 0

- **Society** utility from acceptance $u^s(x,t) = v^s(x) + w^s(x)t$ (rejection utility 0)

- College also bears **disagreement cost**, with Bayesian Society inferring $t^s = \mathbb{E}[t|\mathsf{Info}]$:

$$d(x, t^s, A) = \begin{cases} \max\{u^s(x,t^s), 0\} & \text{if } A = \text{Reject} \\ \max\{-u^s(x,t^s), 0\} & \text{if } A = \text{Accept} \end{cases}$$

- College's full payoff $U^c(x, t, t^s, A) = u^c(x,t) - \delta d(x, t^s, A)$, where $\delta > 0$

Model

No asymmetric information between College and Society

- Observables x: Always observed
- Test score t:

    Test-mandatory regime: observed

    Test-optional regime: student *chooses* whether to submit

Colleges commits to an Admissions policy

- Imputation rule $\tau : \mathcal{X} \to [-\infty, +\infty]$

    College to treat non-submitters as if $t = \tau(x)$

- Acceptance rule $\alpha : \mathcal{X} \times [-\infty, +\infty] \to [0, 1]$

    Probability of admitting student with (x, t) — imputed or submitted t

    Require monotonicity: $\alpha(x, \cdot) \uparrow$

Study both **flexible** and **restricted/exogenous imputation**

More on Imputation

Flexible imputation + monotonic acceptance rule cannot be improved on

But often statements about not penalizing nonsubmitters:

> USC: "Applicants will not be penalized or put at a disadvantage if they choose not to submit SAT or ACT scores."

Possible restricted imputation rules:

- No Adverse Inference: $\tau(x) = \mathbb{E}[t|x]$

- Control for only certain dimensions (e.g., GPA but not race):
  $\tau(x_1, ..., x_N) = \mathbb{E}[t|x_2, x_7]$

Model

How do students decide whether to submit?

- Our assumption: Student with (x, t) submits if $t > \tau(x)$, doesn't submit if $t \leq \tau(x)$

  Optimal $\because$ Acceptance prob $\uparrow$ in imputed/submitted score

- Assumes knowledge of τ and best response

Model: Wrapping Up

College chooses test regime and admissions policy (τ, α) to maximize

$$U^c(x, t, t^s, A) = u^c(x, t) - \delta d(x, t, t^s, A), \text{ where}$$

$$t^s = \begin{cases} t & \text{if } t > \tau(x) \\ \mathbb{E}[t|x, t \leq \tau(x)] & \text{if } t \leq \tau(x) \end{cases}$$

$$d(x, t^s, A) = \begin{cases} \max\{u^s(x, t^s), 0\} & \text{if } A = \text{Reject} \\ \max\{-u^s(x, t^s), 0\} & \text{if } A = \text{Accept} \end{cases}$$
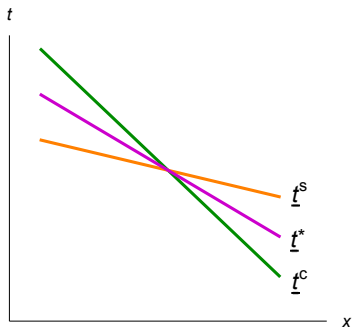
- If $t^s = t$, maximizing U^c is equivalent to maximizing ex post utility

$$u^*(x, t) = \frac{1}{1+\delta} u^c(x, t) + \frac{\delta}{1+\delta} u^s(x, t)$$
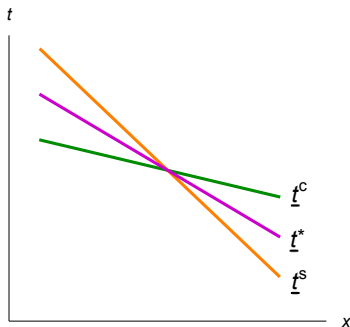
- Test score bars $\underline{t}^i(x)$ defined by $u^i(x, \underline{t}^i(x)) = 0$; ex post bar $\underline{t}^*(x)$

Leading Specification

$$x \in \mathbb{R}, \quad u^i(x,t) = a^i + x + w^i \times t$$

(a) College weights test less: $w^c < w^s$

(b) College weights test more: $w^c > w^s$

- College is more selective than Society at some x, lower at others
- Ex post bar always in-between

Analysis

Test Mandatory

Proposition

Under test mandatory, College accepts type (x, t) if $u^*(x, t) > 0$, and rejects otherwise.

Simply use the ex post bar!

When social-pressure intensity $\delta \uparrow$, college becomes more selective iff $\underline{t}^c(x) < \underline{t}^s(x)$

$\implies$ student with such x harmed; other x benefits

Test Optional with Flexible Imputation

Remark

Test optional with flexible imputation **always** improves (weakly) on test mandatory.

- College has option of setting $\tau(x)$ very low,
  and then replicating test mandatory outcome

- When and how can College do strictly better?

  We show that:

  $\rightarrow$ At x where College less selective than Society: sometimes do strictly better

  $\rightarrow$ At x where College more selective than society: always do strictly better

- Note: Always optimal to set $\tau(x)$ s.t. any submitted $t > \tau(x)$ is accepted
  (pooling argument)

  $\rightarrow$ What $\tau(x)$ is optimal?

  $\rightarrow$ How to treat non-submitters?

Flexible Imputation, College Less Selective

Proposition

Consider flexible imputation and x s.t. College is less selective: $\underline{t}^c(x) < \underline{t}^*(x) < \underline{t}^s(x)$.

Optimal for College to either

- Set $\tau(x) = \infty$ and accept everyone; or
- Set $\tau(x) = \underline{t}^*(x)$; accept iff submit score $t > \underline{t}^*(x)$ (so reject non-submitters)

Logic:

If accepting non-submitters, must accept everyone, set $\tau(x) = \infty$

If rejecting non-submitters, set $\tau(x) = \underline{t}^*(x)$
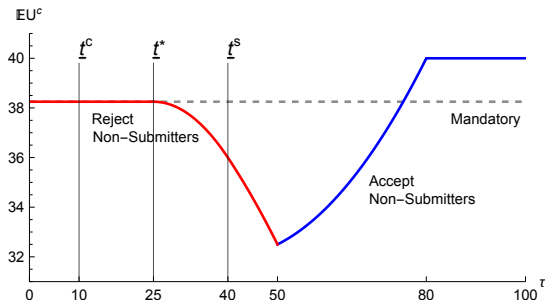
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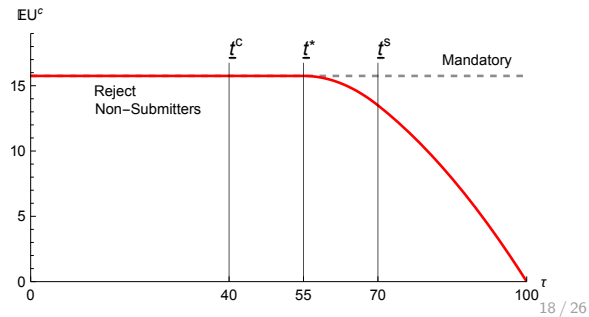
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Case 1:

Case 2:

Flexible Imputation, College Less Selective

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- Set $\tau(x) = \infty$ and accept everyone; or
- Set $\tau(x) = \underline{t}^*(x)$; accept iff submit score $t > \underline{t}^*(x)$ (so reject non-submitters)

In latter case, replicating test mandatory

Student welfare:

Under test mandatory, accepted if $t > \underline{t}^*$

Accept (weakly) more students under test optional

$\therefore$ at observables where College is less selective, students are weakly better off

Flexible Imputation, College More Selective

Proposition

Consider flexible imputation and x s.t. College is more selective: $\underline{t}^s(x) < \underline{t}^*(x) < \underline{t}^c(x)$.

Optimal for College to

- choose $\tau(x) \in [\underline{t}^*(x), \underline{t}^c(x)]$; and
- accept iff submit score $t > \tau(x)$ (so reject non-submitters)

Logic is more involved

But recall example:

Fix $x =$ "from New Jersey"; $t \sim U[0, 100]$

$u^s(t) = t - 40$; $u^c(t) = t - 70$; $\delta = 1$

$\implies \underline{t}^s = 40$, $\underline{t}^c = 70$, $\underline{t}^* = 40$

$\tau = 70$ and reject non-submitters yields college's first best (no disagreement cost)

Flexible Imputation, College More Selective

Proposition

Consider flexible imputation and x s.t. College is more selective: $\underline{t}^s(x) < \underline{t}^*(x) < \underline{t}^c(x)$.

Optimal for College to

- choose $\tau(x) \in [\underline{t}^*(x), \underline{t}^c(x)]$; and
- accept iff submit score $t > \tau(x)$ (so reject non-submitters)

College strictly better off than under mandatory, even if $\tau(x) = \underline{t}^*(x)$
    (so long as $F_{t|x}$ has wide-enough support)

Student welfare:

Under test mandatory, accepted if $t > \underline{t}^*$

Accept (weakly) less students under test optional

$\therefore$ at observables where College is more selective, students are weakly worse off

Restricted Imputation

In general, at any given x, College may be hurt by test optional under restricted imputation

Anything systematic about which students benefit or are harmed? A non-monotonicity:

- Students with "Low" observables: same as test mandatory
  - $\tau(x)$ below $\underline{t}^*$, and reject non-submitters
- "Intermediate" observables: harmed under test optional
  - $\tau(x)$ above $\underline{t}^*$, and reject non-submitters
- "High" observables: benefit from test optional
  - $\tau(x)$ above $\underline{t}^*$, and accept non-submitters

Restricted Imputation

In general, at any given x, College may be hurt by test optional under restricted imputation

Anything systematic about which students benefit or are harmed? A non-monotonicity:
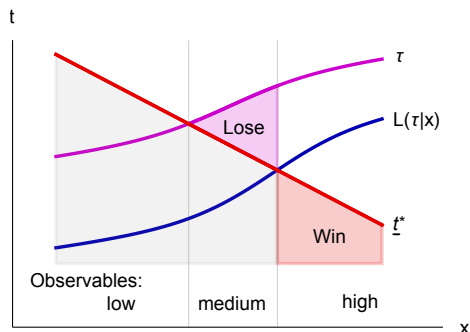
- Students with "Low" observables: same as test mandatory
- "Intermediate" observables: harmed under test optional
    $\tau(x)$ above $\underline{t}^*$, and reject non-submitters
- "High" observables: benefit from test optional
    $\tau(x)$ above $\underline{t}^*$, and accept non-submitters

Formalization of "increasing observables": subset of observables $\mathcal{X}' \subset \mathbb{R}$ on which

- $u^c(x,t) = v^c(x) + t$ and $u^s(x,t) = v^s(x) + t$, with v^c and v^s both $\uparrow$
- test score has MLRP
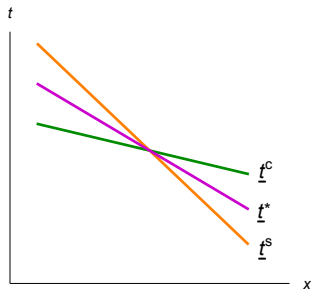- $\tau(x) \uparrow$ (implied by no adverse inference)

Which Students Benefit from Test optional?

Depends on how test scores are imputed

- With flexible imputation:
  Students for whom College is less selective than Society
- With restricted imputation:
  Students with "good" observables
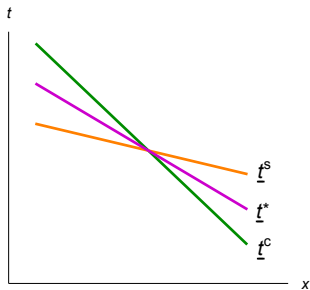
College puts less weight on tests
$\rightarrow$ same direction

more weight on tests
$\rightarrow$ opposite directions

When Does a College Benefit from Test Optional?

Flexible imputation: Always

Restricted imputation:

- Generally ambiguous

    At any given x, can help or hurt

    Need to take expectation over x's

- However, given any restricted imputation, college is harmed when either

    ❶ Info is valuable for the college, and social-pressure intensity $\delta \approx 0$.

    ❷ Information would be valuable for the college if it shared society's prefs, and
    $$\sup_{x \in \mathcal{X}} |\underline{t}^c(x) - \underline{t}^s(x)| \approx 0.$$

When Does a College Benefit from Test Optional?

Extended example in paper:

  With restricted imputation, Ban on Affirmative Action can push College from
    test mandatory → test blind

    ∵ if lower score indicates College's favored group,
      AA ban causes College to put less weight on scores than Society

  Related to, but somewhat distinct from, avoiding lawsuits alleging illegal behavior

  AA ban can backfire on Society

    ∵ Society does not want group membership used, but it does want test scores

Remarks on Competition

Consider multiple colleges

Adverse selection possible when a test optional college C1 competes with a test-mandatory C2

- Among C1's nonsubmitters, those with higher scores more likely to be admitted by C2

- So differential yield

But consequences of AS are ambiguous

- Lower underlying benefit of accepting nonsubmitters
- But social-pressure cost of rejecting nonsubmitters can also go down

Examples showing that can lead to either strategic complements or substitutes

Related Literature

Garg, Li, Monachou (2021)

Chan & Eyster (2003)

Liang, Lu, Mu (2022)

Conclusion

- Model of Test-Optional vs Test-Mandatory college admissions
  - Avoiding info can reduce social pressure $\rightsquigarrow$ à la info design
  - How does college evaluate non-submitters? Imputation $\tau(x)$
  - How do students decide whether to submit? If $t > \tau(x)$

- Which students benefit from test optional?
  - Flexible imputation: students that College prefers relative to Society
  - No-adverse inference: students with good non-test observables

- Banning AA can trigger permanent ignoring of test scores
  - In the past, relevant to Univ California system
  - US Supreme Court decision $\implies$ relevant widely?

- Caveat: recent return to tests at a few elite colleges
  - Discussed in paper

Appendix

Affirmative Action Ban

- College and Society agree on tests t and observable dimension x_1
- Disagree about binary observable $x_0 \in \{r, g\}$
    - $\rightarrow$ College prefers g over r; Society indifferent

- Binary test $t \in \{0, 1\}$, with different average score by x_0 group
    - Race:
        - Blacks, Hispanics have lower avg SAT scores than Whites, Asians
        - College may have stronger desire for diversity than Society (California)

    - Legacy, Donor families:
        - Privileged backgrounds $\implies$ higher scores
        - College cares about legacies & donations, Society doesn't

- College chooses test mandatory or test blind (=optional with $\tau(x) \geq 1$)

Affirmative Action Ban

College wants to give bonus to group g over group r

AA allowed: College can condition admissions on $x_0 \in \{g, t\}$

AA banned: Make x_0 unobservable / unusable
  $\rightarrow$ Now test score becomes signal of x_0

Results

❶ AA allowed: College prefers test mandatory

❷ AA banned, group g has **lower** test scores (race):
    College may prefer test blind
    More likely if test disparity $\uparrow$, social pressure $\uparrow$, College preference for g $\uparrow$

❸ AA banned, group g has **higher** test scores (donors, legacies):
    College prefers test mandatory

❹ Banning AA can backfire for Society
    Fixing test regime, Society prefers AA ban
    Fixing AA regime, Society prefers mandatory