# Advertising and Voter Data in Asymmetric Political Contests

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# Motivation

- According to a recent FTC Report on data brokers,
  *"...one data broker's database has information on 1.4 billion consumer transactions and over 700 billion aggregated data elements; another data broker's database covers 1 trillion dollars in consumer transactions; and yet another data broker adds 3 billion new records each month to its databases."*
- Concomitant rise in political campaign spending, especially advertising on social media platforms.
  - In 2016 elections, \$1.4 billion were spent on digital advertising exhibiting a growth rate of 789% from 2012.
- Social media platforms assist data intermediaries in collecting information on voters' preferences.

Increased interest in understanding the links between data intermediaries, social media platforms and election outcomes.

# Key findings

- How candidates' access to voter pertinent data alter candidates' campaign advertising expenditure?

Candidates' campaign advertising expenditure is dependent on voters' predisposition and degree of data access.

- This has implications for
  - profits of social media platform that is the recipient of advertising revenues.
  - profits of data intermediary that receives revenue from sale of voter data to candidates.
  - expected outcomes of election contest.

- While FCC regulates advertising sales prices to political campaigns, there is no law governing candidates' access to voter pertinent information.

# Key findings

- Compare and contrast the incentives of intermediary and platform.

The intermediary and the platform are always at conflict with respect to candidates' information access.

- Social-media platform that is also used for advertising may have incentives to hinder an intermediary's access to data.
- Either the intermediary or the platform always have an incentive to provide asymmetric data access to candidates.
  - Alters the winning likelihood and potentially outcome of the election.

# Model description

- Two candidates: Alice ($A$) and Bob ($B$).
- Candidates spend resources to convince voters to cast a vote in their favor.
  - $c_A$: Alice's campaign spending.
  - $c_B$: Bob's campaign spending.
- Voters have a "favorite".
  - Alice is the favorite, while Bob is the underdog (without loss of generality).
  - $x \sim F(0,1)$: voters' predisposition towards one of the candidates.
- Winning likelihood depends on relative campaign spending and $x$.

$$\text{Probability that Alice wins} = \frac{c_A}{c_A + x c_B}$$

- Campaign spending takes the form of advertising on a media platform.
  - Platform's interest lies in maximizing candidates' ad spending.

# Model description

- A priori $x$ is unknown to candidates, but they share a common prior over $x$.
- Candidates may learn $x$ by procuring data from a data intermediary.
- Intermediary's interest lies in maximizing revenue from sale of data.
- Depending upon whether candidates have access to data, four separate information regimes are possible.
  - Non-exclusive access:
    1. (ND,ND): Neither candidates have data access. (Benchmark Case)
    2. (D,D): Both candidates have data access.
  - Exclusive access:
    1. (D,ND): Only Alice has data access.
    2. (ND,D): Only Bob has data access.
- Candidates' spending varies as a function of the prevailing information regime and $x$ (if known).

# Campaign spending under non-exclusive access

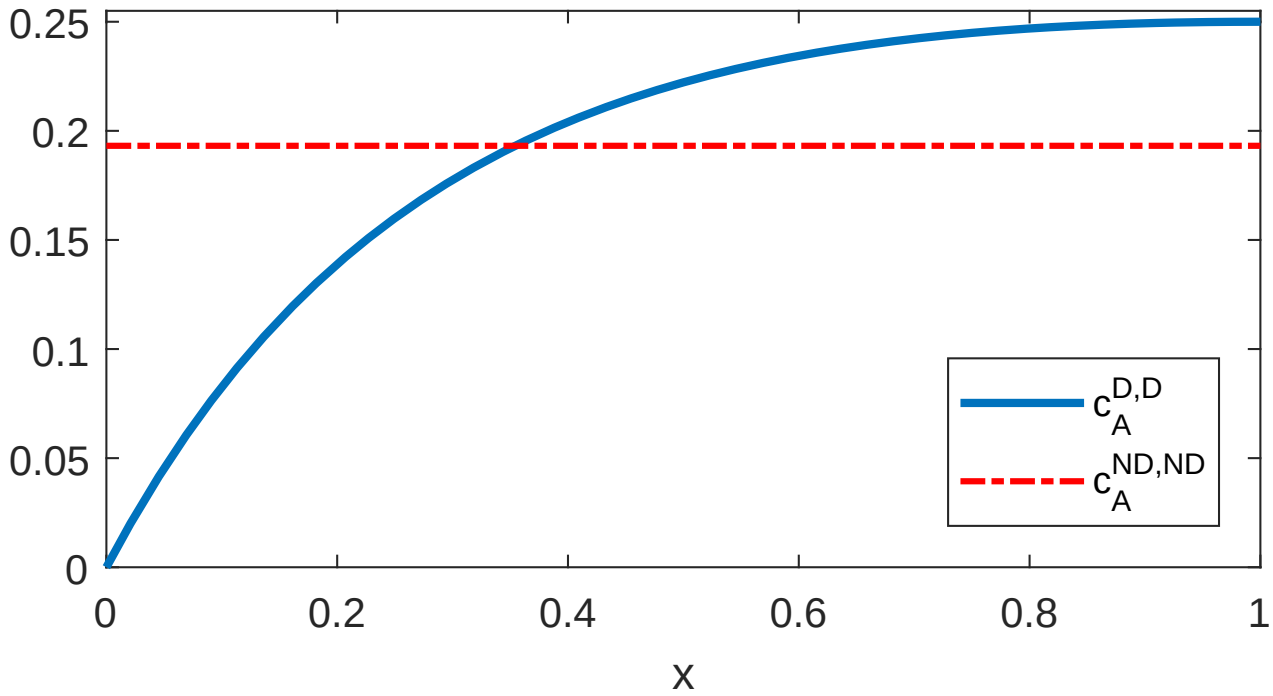


Figure: Candidate A's expenditure when $x \sim U(0,1)$

# Comparing non-exclusive access regimes

The expected advertising expenditures for each candidate is identical under both non-exclusive (equal) access regimes.

This implies that, *ex-ante*

- Expected outcome remains unchanged across the two regimes.
- Platform is indifferent between equal data access and no data access (provided candidates' budgets are not binding, which we assume).
- Intermediary prefers equal data access (to profit from data sale).
- Candidates prefer no data access (lower overall spending).

# Campaign spending when Alice obtains exclusive access

There exists a cutoff $\underline{x}^{D,ND}$ such that candidate $A$ spends **less** when exclusively informed for $x > \underline{x}^{D,ND}$ and spends more for $x < \underline{x}^{D,ND}$.

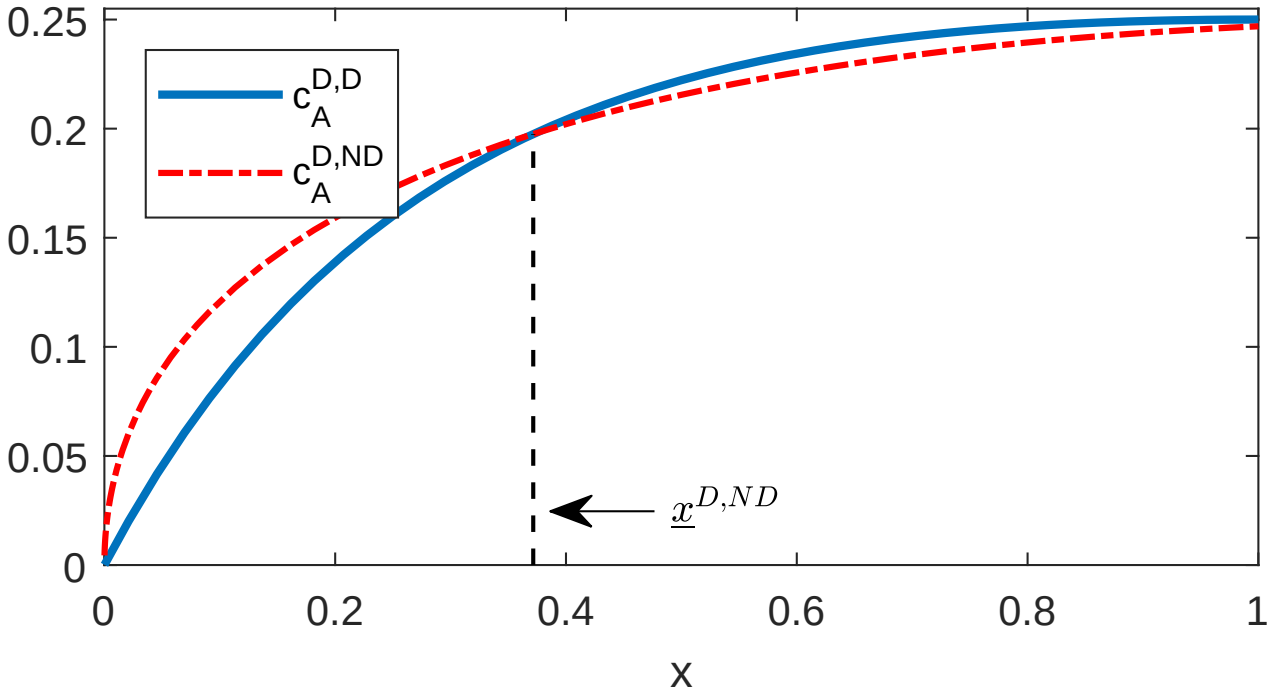


Figure: Candidate A's *ex-post* spending when $x \sim U(0,1)$

Candidate $B$'s spending equals expected spending by candidate $A$.

# Campaign spending when Bob obtains exclusive access

There exists an interval $(\underline{x}^{ND,D}, \overline{x}^{ND,D})$ such that candidate $B$ spends **more** for $x$ inside this interval and less for $x$ outside this interval.

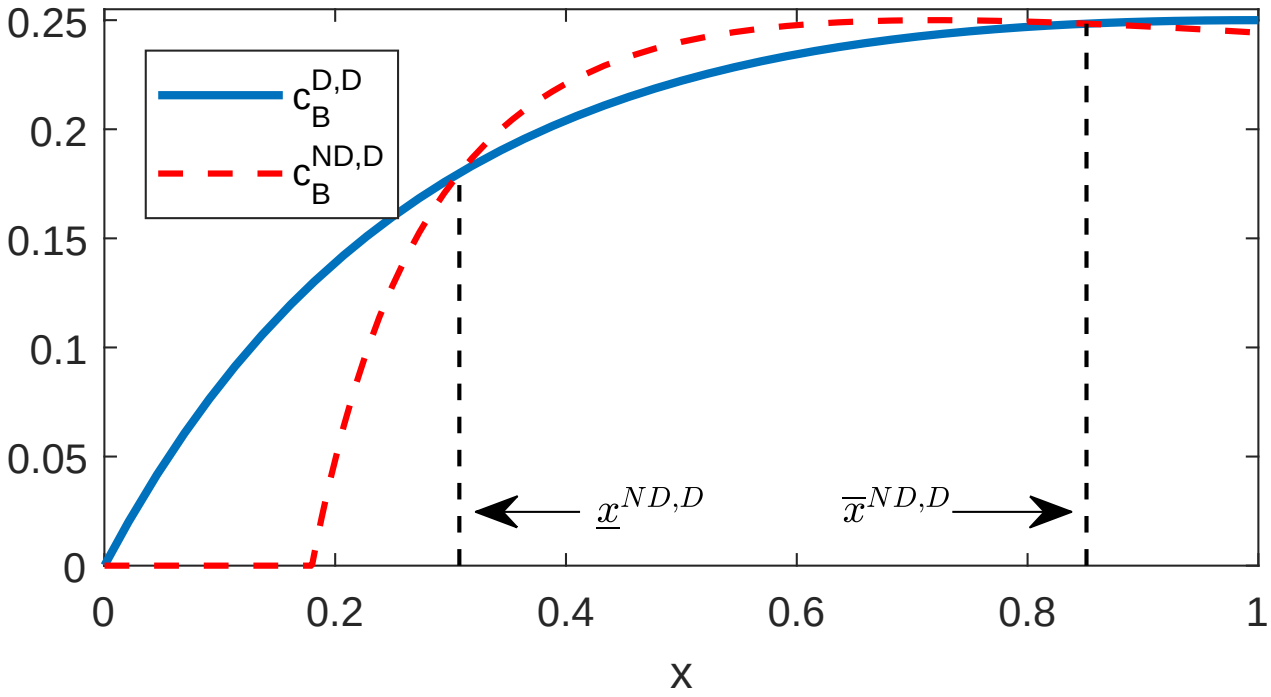


Figure: Candidate B's expenditure when $x \sim U(0,1)$

Candidate $A$'s spending equals expected spending by candidate $B$.

# Platform's preferences

The platform's preference over the information regimes depends on the distribution of $x$.

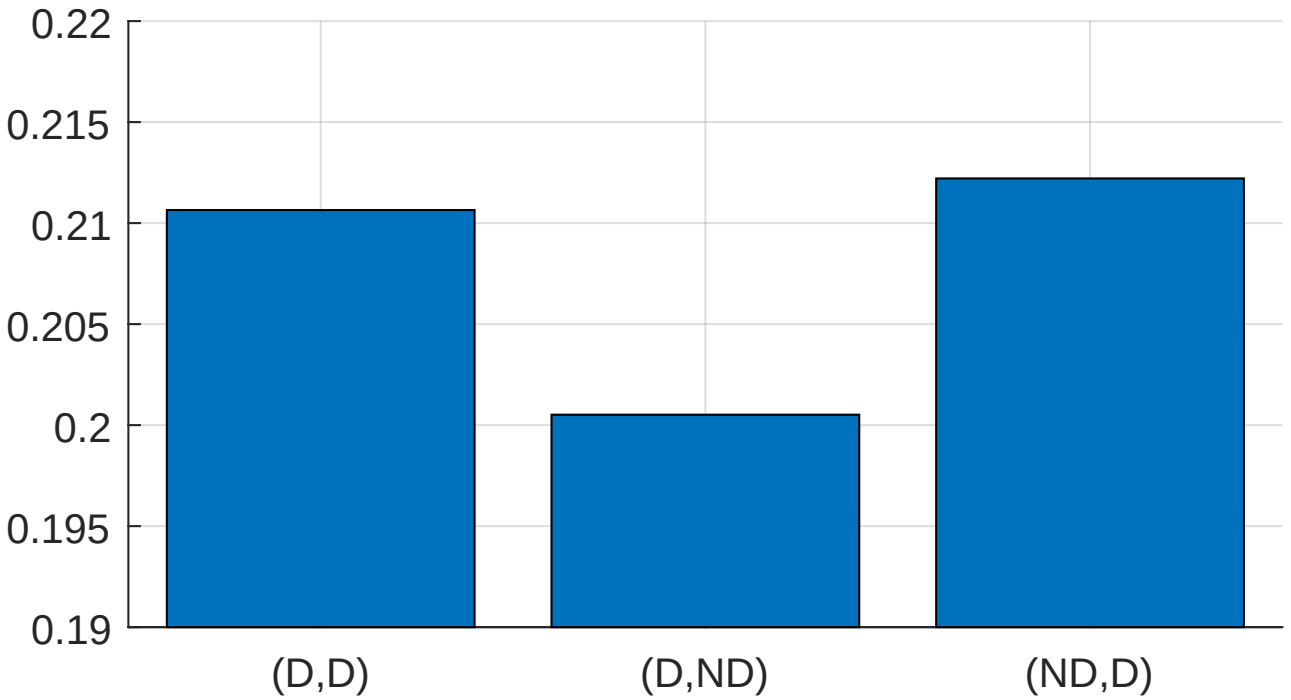


Figure: Platform's profits when $x \sim Beta(1,3)$ with support $(0,1)$

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# Intermediary's preferences

The intermediary's preference over the information regimes also depends on the distribution of $x$.

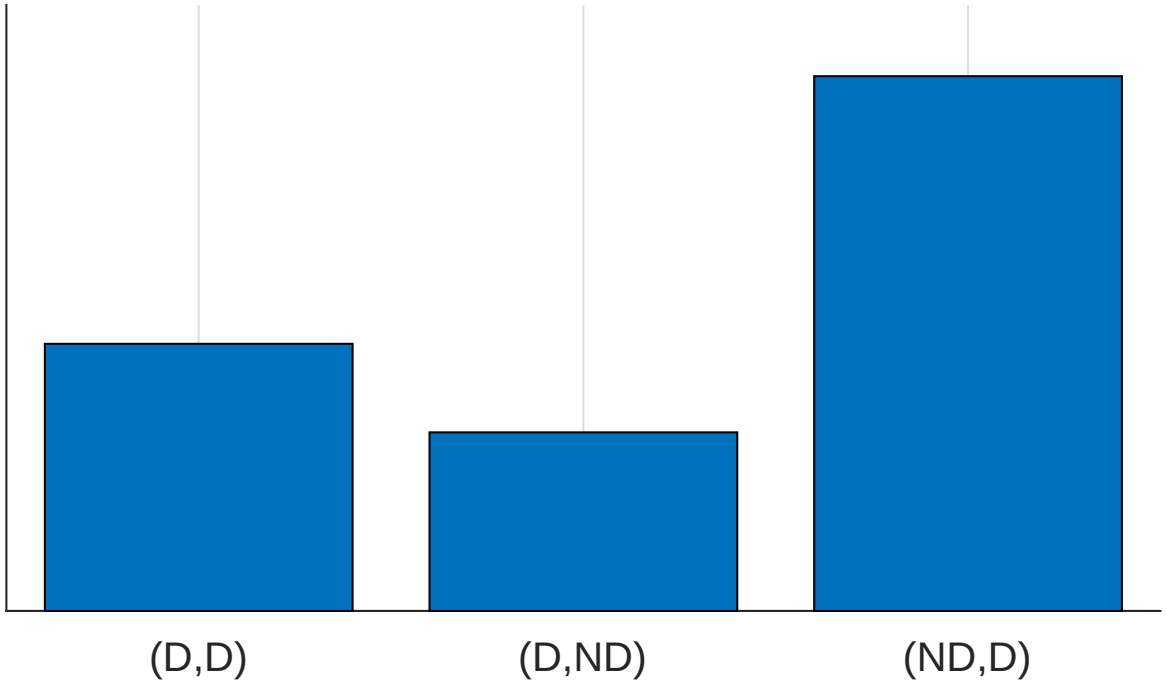


Figure: Intermediary's profits when $x \sim U(0,1)$

# Conflict between Platform and Intermediary

- The sum of the platform's and intermediary's profits is constant across all data-access regimes.
- Their profit rankings of these regimes are mirror opposites.

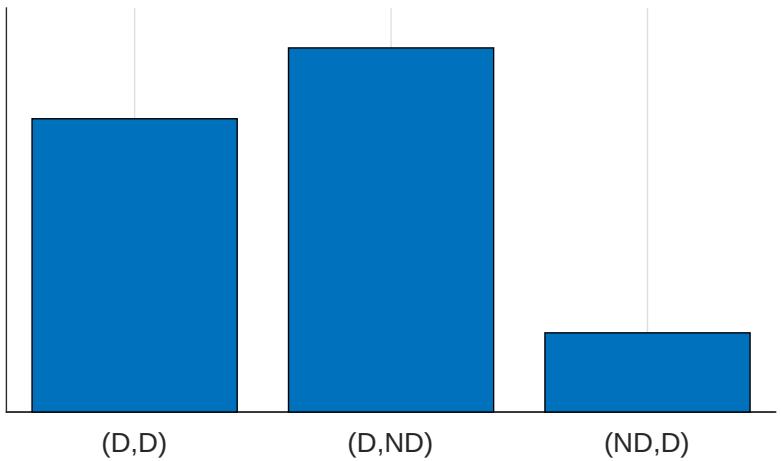


Figure: Platform's profits when $x \sim U(0,1)$

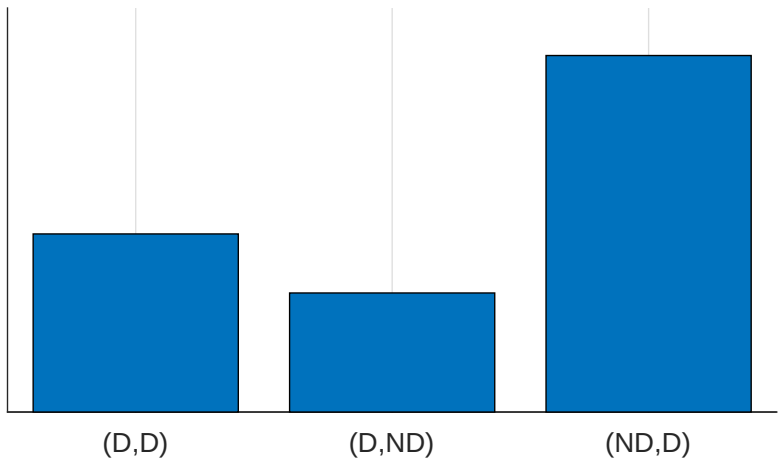


Figure: Intermediary's profits when $x \sim U(0,1)$

The intermediary's and the platform's profit motives are always in conflict!

# Election outcome under non-exclusive access

Candidates' winning likelihoods remain unchanged under non-exclusive data access.

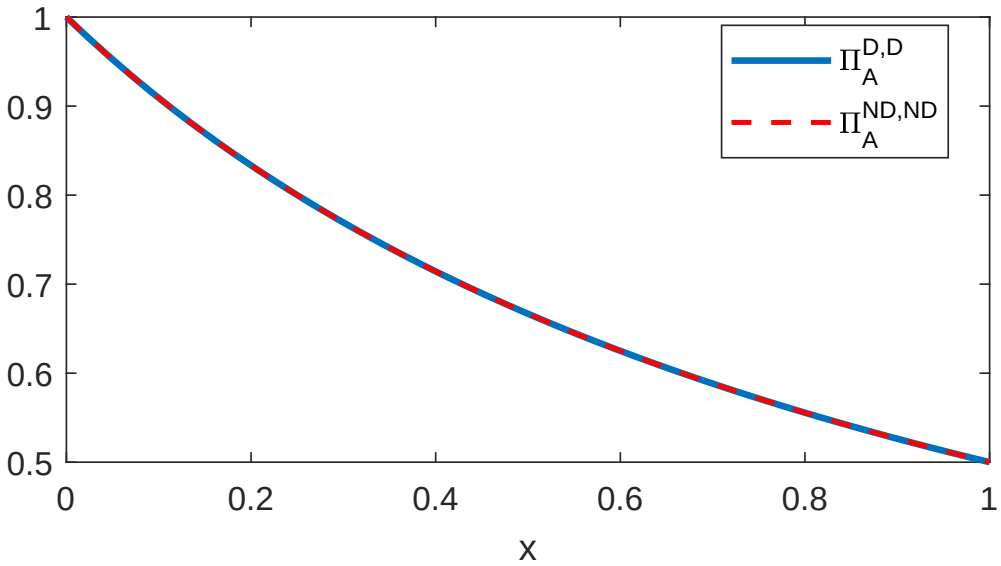


Figure: Candidate A's winning likelihood when $x \sim U(0,1)$

# Election outcome when Alice obtains exclusive access

There exists a threshold $x_A$ such that $A$ is **less** likely to win with exclusive access for $x < x_A$ and more likely to win for $x > x_A$.

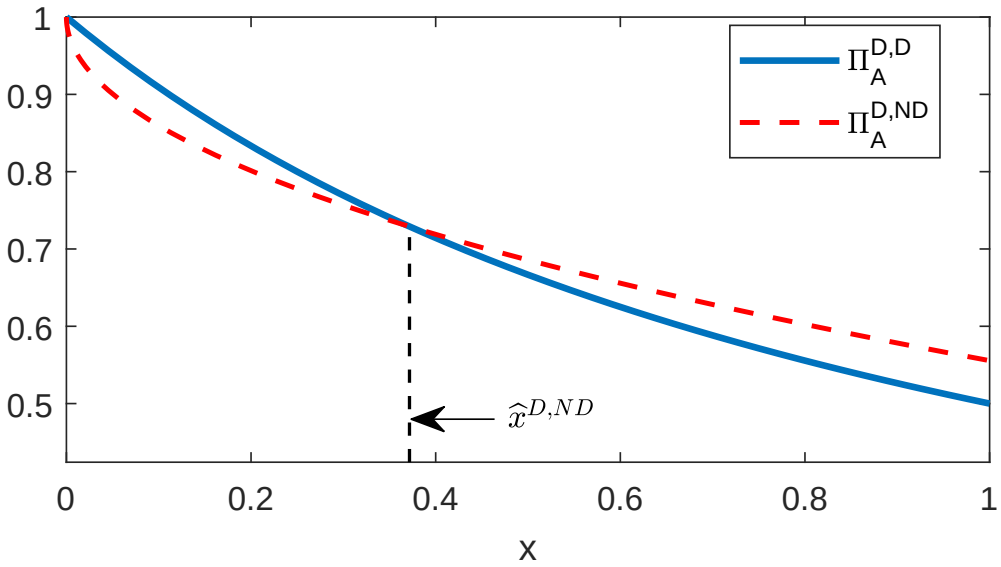


Figure: Candidate A's winning likelihood when $x \sim U(0,1)$

# Election outcome when Bob obtains exclusive access

There exists a threshold $x_B$ such that $A$ is **more** likely to win when $B$ has exclusive access for $x < x_B$ and less likely to win for $x > x_B$.

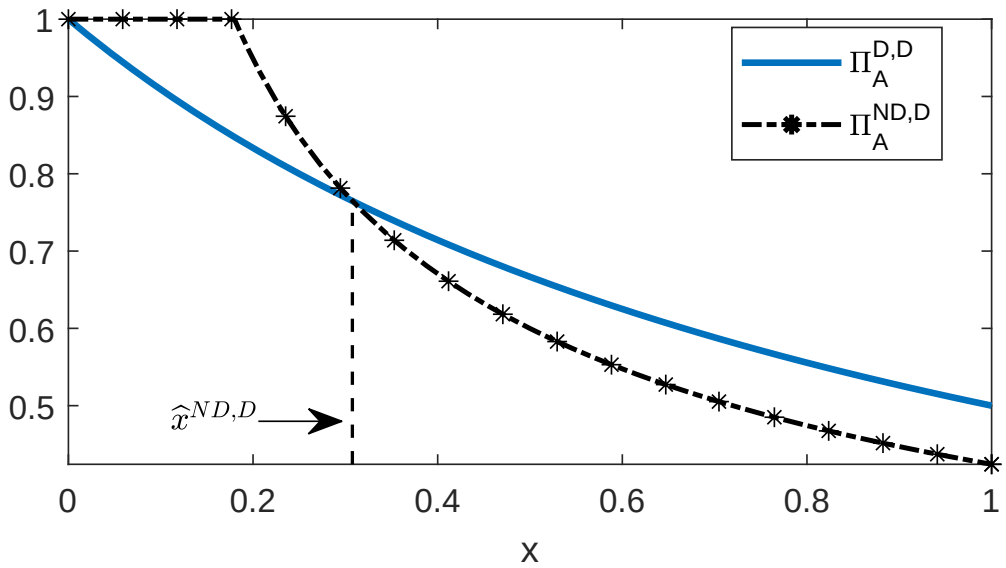


Figure: Candidate A's winning likelihood when $x \sim U(0,1)$

# Winning likelihoods

Ex ante, candidates' winning likelihoods in each data-access regime depend on the distribution of $x$.

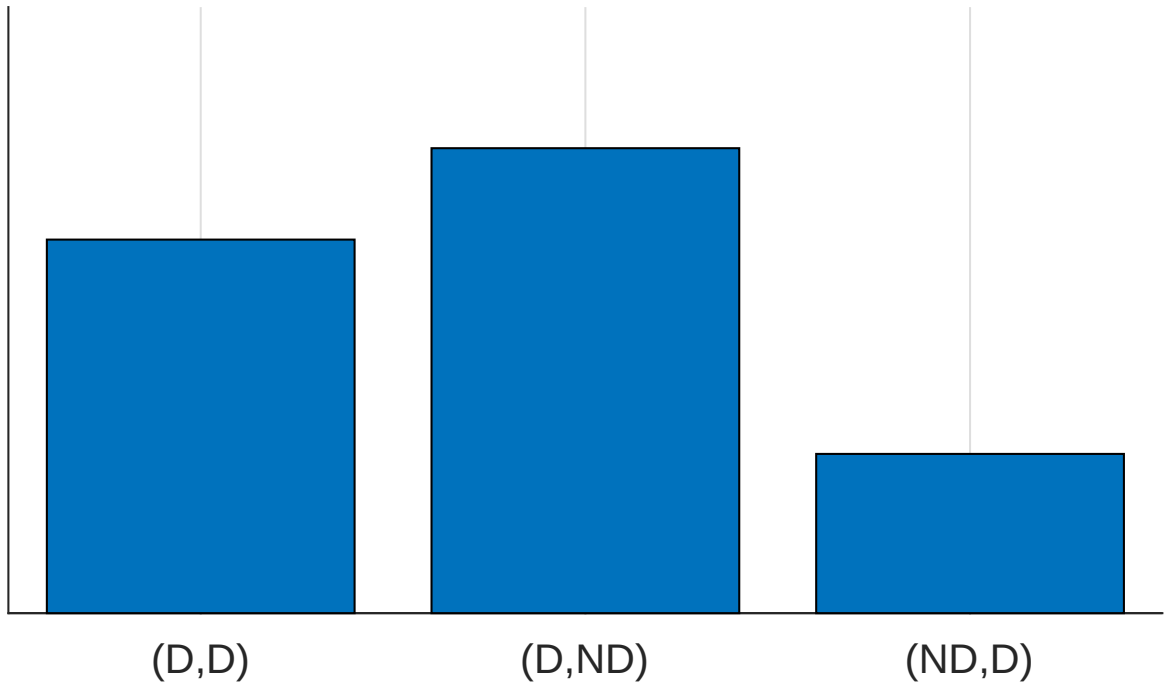


Figure: Candidate A's ex-ante winning likelihoods when $x \sim U(0,1)$

# Practical implications

1. Existence of a data intermediary alters candidates' winning likelihoods and potentially influences the outcome of an election.

2. Either the intermediary or the platform **always** has an incentive for voter information to be exclusively shared with one of the candidates.

3. A social-media giant that is also a political advertising platform may have incentives to hinder an intermediary's access to its data.

**Thank you for your attention!**