

Selecting Directors Using Machine Learning

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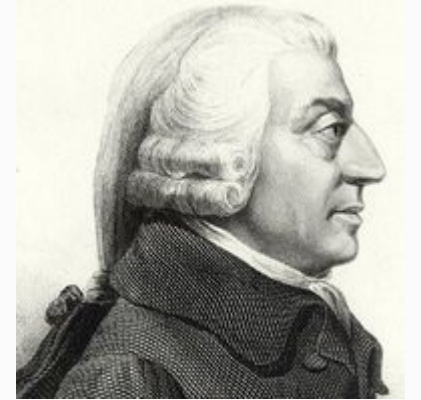
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Adam Smith (1776) : Management Can Control Boards and Take Actions that are not in Shareholders' Interests



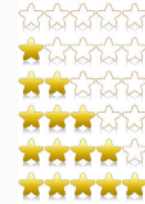
- The problem identified by Adam Smith and Berle and Means (1932) still exists today: CEOs still have a strong influence over the board selection process.
- Collectively, directors of public firms have a big impact on the trajectory of the economy. Yet, no scrutiny over the director *selection process*.

An Alternative Approach to Selecting Directors: An Algorithm

- Hiring directors \Rightarrow A prediction problem! (Kleinberg et al. 2017)
- Purpose of ML algorithm here: predict performance of potential directors.

Why Do We Care about Such an Algorithm??

- Difference between *performance* of algorithm-selected directors and management-selected directors
⇒ **Quality** of hiring decisions.
- Difference in *attributes* of algorithm-selected and management-selected directors
⇒ **Overrated features** in director choice.
- Our model: “first pass” using publicly available data. A more sophisticated model using better data could do a good job of selecting directors for real companies.
- Many other “personnel” applications for machine learning.
- **ML is good at what humans are bad at:** picking up signal, discarding noise, and not being biased.
 - May help address both agency problems and behavioral biases in the board selection process.



“Director Performance”?

- Hart & Zingales (2017): Maximizing shareholder welfare is not always the same as maximizing market value, and managers should maximize shareholder welfare when they differ.
- **Mandate** of the board: Represent shareholders’ interests.
- Decision-making process should involve **prediction** of how well a candidate will represent shareholders
- Director **Performance**: How well she represents shareholders’ interests.
- **Measure** of director performance: Level of **shareholder support** in director elections individual has relative to other directors at the same firm.
- **Market-based individual** measure of director performance.

Bias Propagator?

The **decision maker** and the **evaluator** are **separate** entities: the **board/management** decides on whom to hire while **shareholders** vote.

➔ mitigates **bias propagation concern** if the two groups not subject to same biases/incentives.

*Generate
RHS
variables*

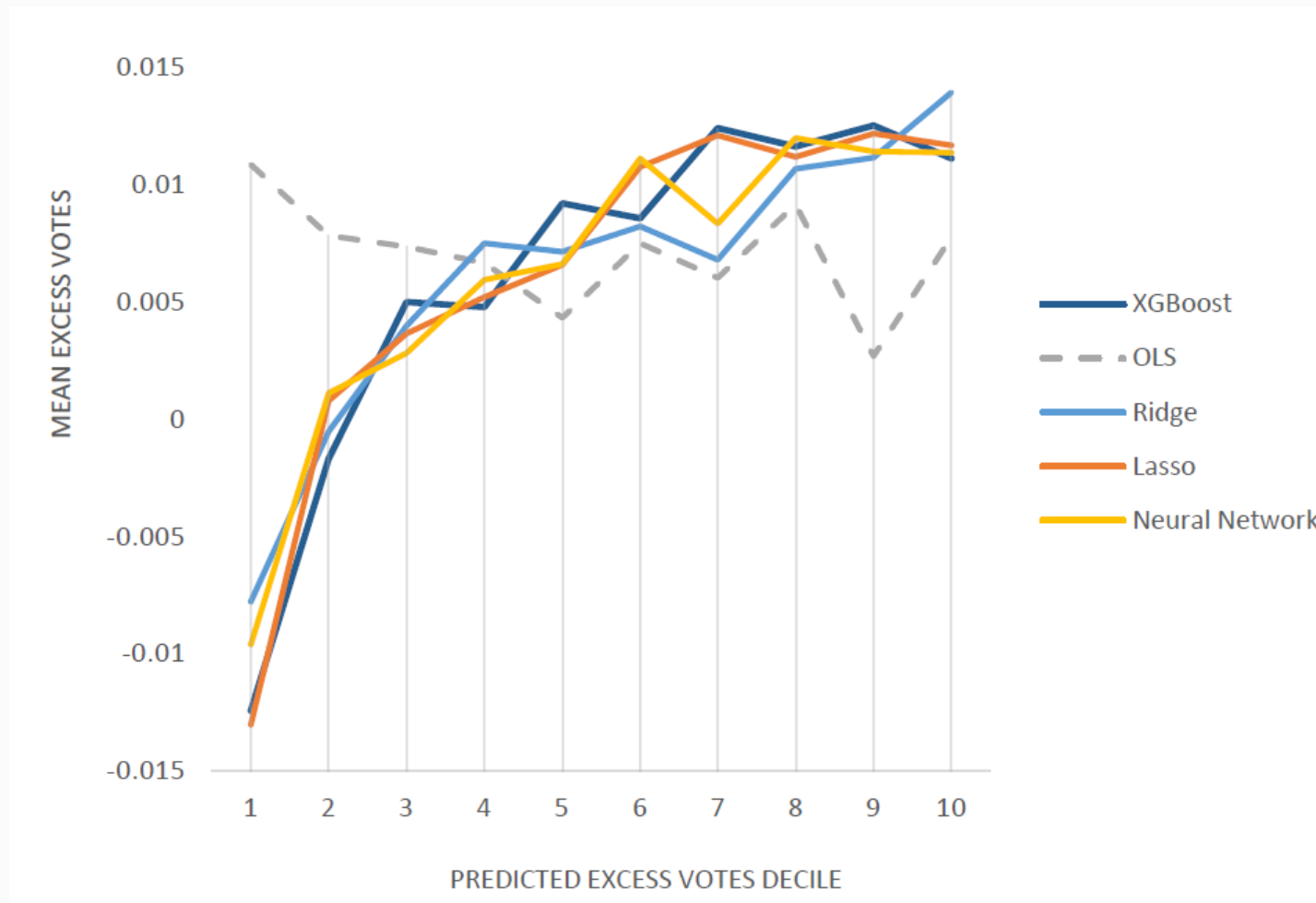


*Generate
LHS
variables*

Data

- **Ex-ante prediction:** only data available to the nominating committee at the time of the hiring decision
- ~25,000 new directors with shareholder support data appointed between 2000-2014 (voting outcomes up to 2016)
 - Training set: appointments between 2000-2011
 - Test set: appointments between 2012-2014
- **Inputs:** firm, board and director level characteristics (BoardEx, CRSP, Compustat, RiskMetrics)
- **Outcome variable:**
 - Main: “Excess” Shareholder Support (ISS Voting Analytics):
(shareholder support - average support for other directors up for re-election at same firm that year)
 - Robustness: Firm Profitability

Predicting Excess Shareholder Support



Can the Algorithm Improve on Board Decisions?

Two big issues (Kleinberg et al. 2017)

#1 **Selective labels**: we only observe outcomes for hired directors

#2 **Unobservables**: boards rely on features the algorithm does not see

- Predicting well out-of-sample on data with observed labels only doesn't mean the algorithm can necessarily improve on boards' hiring decisions.
- If boards are good at using unobservables to make their hiring decisions, hired directors will have higher performance than otherwise similar (based on observables) directors not hired.

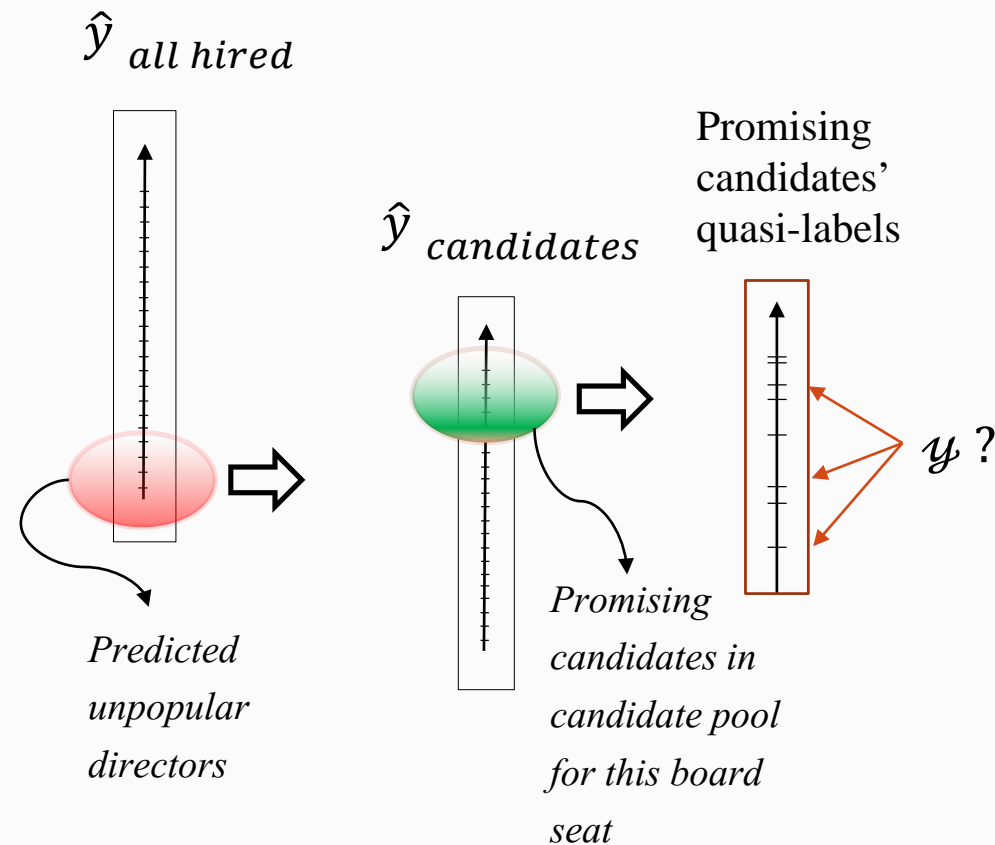
Can the Algorithm Improve on Board Decisions?

- For each new director appointment, we construct a **realistic pool of potential candidates**:
- Directors who joined a *nearby, smaller* firm around the *same time*. (147 per opening on average)
 - ✓ **Available** to join a new board
 - ✓ **Willing to travel** to that location for board meetings
 - ✓ **Willing to accept**: Directorships at larger firms are better paying and more prestigious.
- Although we do not observe the labels for these candidates, we observe their “**quasi-labels**”: their performance on the “competing” board they joined.

Can the Algorithm Improve on Board Decisions?

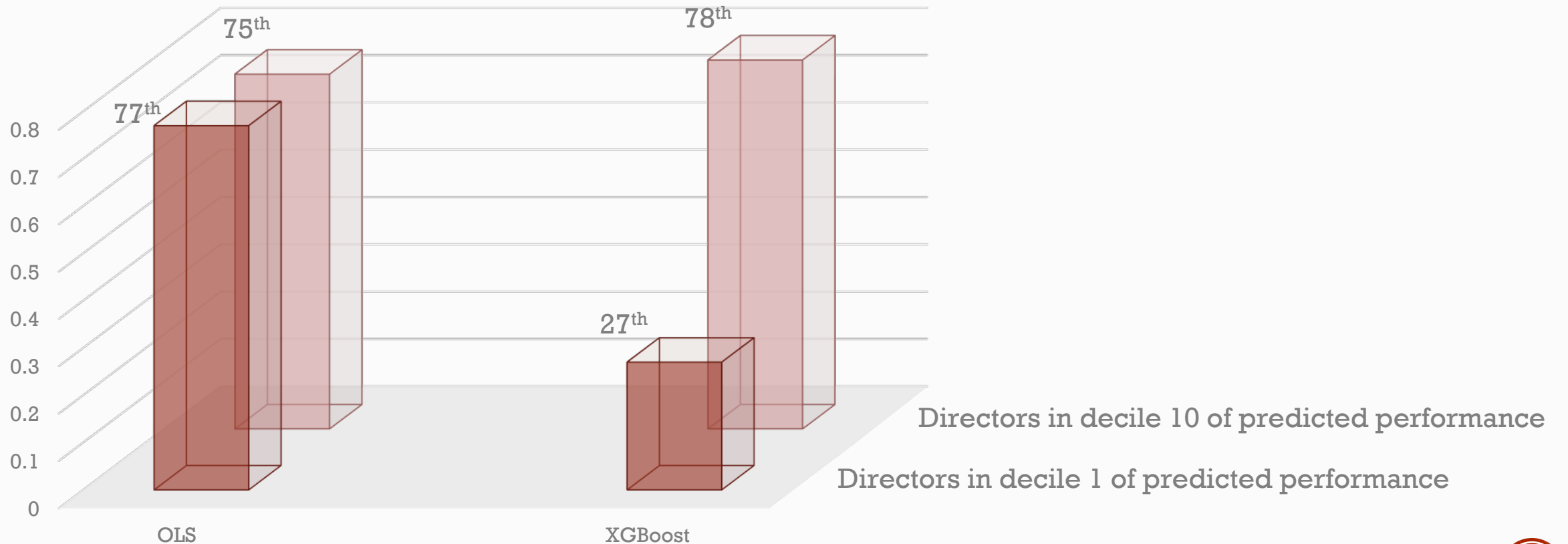
- 1) **Rank** all *hired* directors according to their **predicted performance** (out-of-sample)
- 2) Select the **bottom 10%**: directors with the *lowest predicted performance*
- 3) For these predicted unpopular directors, consider the **candidates** from their associated candidate pool that the algorithm *predicted would do well (top 10%)*.
- 4) **Rank** these candidates' according to their **quasi-labels**, i.e. their performance on the neighboring board they joined.

⇒ **How did the hired director fare compared to available candidates?**



Can the Algorithm Improve on Board Decisions?

Median Rank Among Potential Candidates
(test set only)



Features of Predictably Unpopular Directors



Management-selected directors in bottom decile of both *predicted and observed* performance when compared to directors our algorithm would have suggested (top decile of predicted performance):

■ Overrated features

- Being male
- Network size
- Finance background
- Number of previous and current board seats

■ Underrated features

- Number of qualifications

Concluding Remarks

- We use the selections from the algorithms to **understand the decision-making process** through which **directors are actually chosen**.
- Results confirm an observation that dates back two hundred years: the board selection process leads to the selection of directors who are “nearest at hand” and not necessarily the best choices to serve shareholders’ interests.
- **Tools for change?** By striking the right balance in the **division of labor between humans & machines**, our hope is that algorithmic input can provide **decision aids** that can lead to **improvements in corporate governance**.