Better Court Structure, Better Judgments:

Exploring the Impact of Term Limits, Court Specialization and Rule Clarity with a Diagnostic Model of Judging in Securities Class Action Litigation

Paul Connell [1]

[1]University of Wisconsin Law School; paul.connell@wisc.edu

Diagnostic Model

Judge j cannot perfectly observe the state of the defendant's conduct, x_i, but instead observes a noisy signal:

$$w_{ij} = x_i + \frac{\epsilon}{\gamma_j}$$

ϵ is a noise term and γ_j is judge's skill. An optimal case disposition rule will take the form:

$$d_{ij} = \begin{cases} 1, \text{ if } w_{ij} \geq \tau_j \\ 0, \text{ if } w_{ij} < \tau_j \end{cases}$$

for some cut-point τ_j. The judge receive utility from classifying case i per:

$$u_{ij} = \begin{cases} -1, \text{ if } x_i = 0 \text{ and } d_i = 1 \\ -\beta_j, \text{ if } x_i = 1 \text{ and } d_i = 0 \\ 0, \text{ otherwise} \end{cases}$$

Here β_j captures relative aversion to false negatives vs. false positives. Assuming $\epsilon \sim \mathcal{N}(0,1)$, the optimal cut point is:

$$\tau_j^\star = \frac{b_{ij}}{\gamma_j^2} + \frac{1}{2}$$

where $b_{ij} = (ln(1-\pi) - ln(\pi) - ln(\beta_j))$ and π is the prevalence of $x_i = 1$.

Empirical Strategy

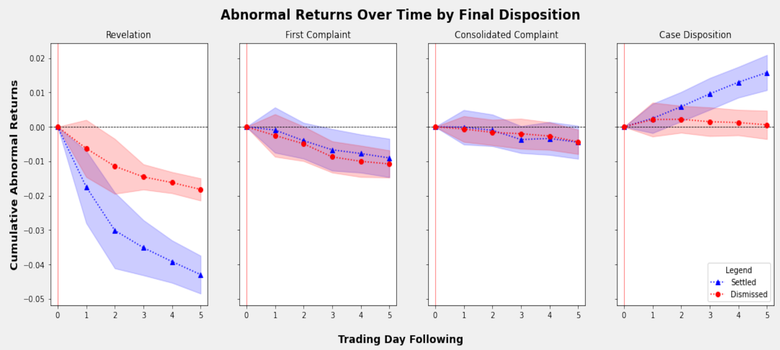
- Using empirical data* on securities litigation including:
  - **Market reaction** of the defendant company's stock ($\widehat{CAR}_i$);
  - **Complaint text**, to train a text-based random forest classifier ($\mathbb{E}_{RFC}[d_i = 1|\text{text}_i]$);
  - **Settlement data** to compute an implied likelihood of the plaintiff's success ($\hat{\eta}$).
- I construct a measure ζ_i of a case's merit, defined as:

$$\zeta_i = \mathbb{P}\left(x_i = 1 \mid \widehat{CAR}_i, \mathbb{E}_{RFC}[d_i = 1|\text{text}_i], \hat{\eta}_i\right)$$

- By comparing ζ_i to d_{ij}, I estimate judicial skill, γ_j, and preferences, β_i, and these parameters' evolution with judicial age and experience.
- Using these evolution rules, I evaluate counterfactual court structures.

*Some of this data was obtained from the Securities Class Action Clearinghouse. The views expressed in this paper are the views of the author and do not represent in any way the views of Cornerstone Research or Stanford Law School.

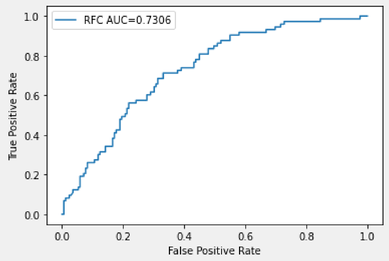
Information Source 1: Stock Price Reactions



Where CAR_i is computed using a Fama-French four factor model.

Information Source 2: Complaint Text

Random Forest ROC Curve on Hold-Out Test Set



$\mathbb{E}[d_i|\text{text}_i]$ were obtained from the trained random forest classifier.

Information Source 3: Settlement Data

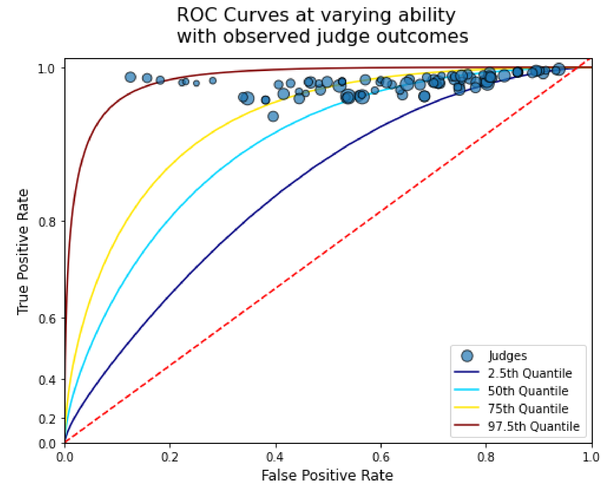
Assuming the following are common knowledge:

- The plaintiff's probability of winning at trial is $\eta \in [0,1]$
- Damages of amount D will be recovered if the plaintiff wins
- Trial costs, which may be avoided by settlement, are: $\{C_d, C_p\}$
- Plaintiff's lawyer's contingency fee is κ

And **further assuming** that the plaintiff's bargaining constraint binds, **then** the parties will bargain for a settlement amount S_p, which is observed. From this data I estimate:

$$\eta_i = \frac{\kappa S_p + C_p}{\kappa D_i + (1-\kappa)C_p}$$

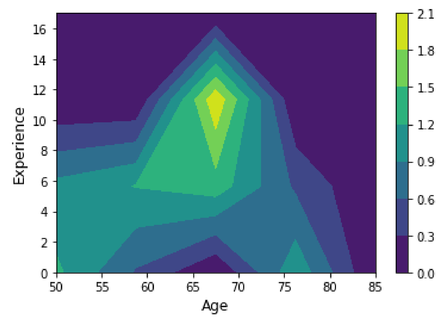
Results



Each dot indicates a judge, scaled to represent their number of observations (cases before them) in the sample. The estimation only includes judges with 10 or more cases in my sample.

Counterfactuals

Estimated Evolution of Judicial Skill with Age and Experience



Estimates of skill with observations binned by age and experience (i.e., number of prior relevant cases). Higher levels of estimated judicial skill ($\hat{\gamma}$) are shaded yellow.

- **Estimated optimum**: {8 yr. term limit, 4x more specialization}
- **Estimated increase in total accuracy**: 13.9%
- **Savings**: if implemented in 1995 (date of the PSLRA), by 2023 these reforms would have
  - avoided $\$17.2$ billion in non-meritorious settlements and
  - returned $\$4.5$ billion to shareholders through fewer erroneous dismissals

Support for this research was provided by the Office of the Vice Chancellor for Research at the University of Wisconsin—Madison with funding from the Wisconsin Alumni Research Foundation.