Informativeness and the Incumbency Advantage

Scott Ashworth
Ethan Bueno de Mesquita
Amanda Friedenberg

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The Incumbency Advantage

High Incumbent Reelection Rates
(Cummings, 1966; Erickson, 1971)

Reelected as a Percentage of Seeking Reelection
The Office Holding Effect

Governance Period
Office Holding Effect
Exercise Perquisites of Office

Closed Seat Election
Scare-off
High Reelection Rates
The Office Holding Effect

Exercise Perquisites of Office
- Access to Press
- Access to Donors
- Favors for Individual Constituents
Whenever the resources of public office are used to insulate individual politicians from electoral risk, their accountability to their constituents is weakened.... Thus, insulation from electoral risk of the kind suspected would, at a single stroke, debilitate the two fundamental accountability relationships of a democratic system of government.

Alternate Explanation: Electoral Selection

- Open Seat Election
  - Party Match
  - Electoral Selection
- Governance Period
  - Office Holding Effect
  - Exercise Perquisites of Office
- Closed Seat Election
  - Scare-off
  - High Reelection Rates

Electoral Selection

- Before the Governance Period
- Voters Good at Selecting Candidates
Alternate Explanation: Electoral Selection

- Open Seat Election
  - Party Match
  - Electoral Selection
- Governance Period
  - Office Holding Effect
  - Exercise Perquisites of Office
- Closed Seat Election
  - Scare-off
  - High Reelection Rates

Electoral Selection

- Before the Governance Period
- Voters Good at Selecting Candidates
- Welfare: Good!
Empirical Literature:

- Measure Incumbency Effect by Isolating the Office Holding Effect
- Purged of Electoral Selection
- **Regression Discontinuity**: Lee (2008)
Empirical Literature:

- Measure Incumbency Effect by Isolating the Office Holding Effect
- Purged of Electoral Selection
- Regression Discontinuity: Lee (2008)
Information-Based Office Holding Effect

Open Seat Election
  Party Match
  Electoral Selection

Governance Period
  Office Holding Effect
  Signals About Incumbent
  Exercise Perquisites of Office

Closed Seat Election
  Scare-off
  High Reelection Rates
Learning in the Governance Period

Signals in the Governance Period:

- About Incumbent
- Observe Governance Outcomes
- Perks of Office: Access to Press
Learning in the Governance Period

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New Mechanism
- Assume Random Assignment to Incumbency
  - No Electoral Selection
Learning in the Governance Period

Signals in the Governance Period:

- About Incumbent
- Observe Governance Outcomes
- Perks of Office: Access to Press

New Mechanism

- Assume Random Assignment to Incumbency
  - No Electoral Selection
- Signals of Incumbent Quality
  - Voter has Opportunity to Learn about Incumbent
Learning in the Governance Period

Signals in the Governance Period:
- About Incumbent
- Observe Governance Outcomes
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New Mechanism
- Assume Random Assignment to Incumbency
  - No Electoral Selection
- Signals of Incumbent Quality
  - Voter has Opportunity to Learn about Incumbent
- Difference in Information Leads to Incumbency Effect
Incumbency Advantage?

Assume Voters:

- Instrumental Preferences
- Rational: Equilibrium
Incumbency Advantage?

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- Rational: Equilibrium

Implication:
- Governing itself not guaranteed to reelect
- May not provide “good information”
Incumbency Advantage?

Assume Voters:
- Instrumental Preferences
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Implication:
- Governing itself not guaranteed to reelect
- May not provide “good information”

Question:
- Can this effect lead to an incumbency advantage?
- Welfare Implications?
Related Literature

**Empirical: Isolating Office Holding Effect**
- Regression Discontinuity Design: Lee (2008) and follow ups

**Theory: Information in Governance**
- Bevia and Llavador (2009)
- Ashworth, Bueno de Mesquita, and Friedenberg (2017)
- Caselli, Cunningham, Morelli, and Moreno de Barreda (2013)
## Roadmap

1. **Baseline: Pure Learning Model**

2. **Incumbency Advantage vs. Disadvantage**

3. **Incumbency Advantage and Voter Welfare**
   - Pool of Candidates
   - Signals Available in Office

4. **Extension: Endogenous Signals**
Environment

Pool of Candidates

- Nature Draws: $i$ and $C$
- Open vs. Close Seat Election
Environment

Pool of Candidates
- Nature Draws: I and C
- Open vs. Close Seat Election

Candidate Quality
- Type of Candidate: $\overline{\theta} > \theta$
- Prior Probability of $\overline{\theta}$: $\pi \in (0, 1)$
- Voter Preferences: Strictly Prefer $\overline{\theta}$ to $\theta$
Open vs. Closed Seat Election

**Open-Seat Election:**
- Incumbent and Challenger identical

**Closed-Seat Election:** Pure Learning Model
- Voter observes signal of Incumbent’s quality
- Decides to reelect or replace Incumbent
Closed-Seat Election: Signals of Quality

Signal Structure: $\mathcal{F} = (S, (f(\cdot | \theta), f(\cdot | \bar{\theta})))$
Closed-Seat Election: Signals of Quality

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- Set of Signals: $S = \mathbb{R}$
Closed-Seat Election: Signals of Quality

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- Set of Signals: $S = \mathbb{R}$
- PDFs: Atomless
Closed-Seat Election: Signals of Quality

Signal Structure: \( \mathcal{F} = (S, (f(\cdot | \theta), f(\cdot | \bar{\theta}))) \)
- Set of Signals: \( S = \mathbb{R} \)
- PDFs: Atomless

Assumption 1: Strict MLRP

\[
\frac{f(\cdot | \bar{\theta})}{f(\cdot | \theta)} \quad \text{Strictly Increasing}
\]
Closed-Seat Election: Signals of Quality

**Signal Structure:** $\mathcal{F} = (S, (f(\cdot | \theta), f(\cdot | \bar{\theta})))$

- Set of Signals: $S = \mathbb{R}$
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**Assumption 1:** Strict MLRP

$$\frac{f(\cdot | \bar{\theta})}{f(\cdot | \theta)} \quad \text{Strictly Increasing}$$

**Assumption 2:** Neutral News Signal

there exists $\nu \in S$ s.t. $f(\nu | \bar{\theta}) = f(\nu | \theta)$
Closed-Seat Election: Signals of Quality

Signal Structure: \( \mathcal{F} = (S, (f(\cdot | \theta), f(\cdot | \bar{\theta}))) \)

- Set of Signals: \( S = \mathbb{R} \)
- PDFs: Atomless

**Assumption 1: Strict MLRP**

\[
\frac{f(\cdot | \bar{\theta})}{f(\cdot | \theta)} \quad \text{Strictly Increasing}
\]

**Assumption 2: Neutral News Signal**

There exists \( \nu \in S \) s.t. \( \mathbb{E}(\theta^I | \nu) = \mathbb{E}(\theta^I) \)
Example: Symmetric Location Experiment

Signal: \( s = \theta + \epsilon \)

- \( \epsilon \sim \phi \): Strictly Logconcave \( \phi \) and Symmetric About 0
- \( f(s \mid \theta) = \phi(s - \theta) \)
Features of the Model

1. Distribution of Types Same for Incumbent and Challenger
   - Mimic the Idealized Experiment

2. Abstract Away from Perquisites of Office
   - Captures: Affects the Voter’s Ability to Learn Information
   - Doesn’t Capture: Affects the Voter’s Utility

3. Abstract Away from Actions that Generate Signals
   - Impact Incumbency Effect
   - Impact Voter Welfare
   - Will come to later . . .
Roadmap

1. Baseline: Pure Learning Model
2. Incumbency Advantage vs. Disadvantage
3. Incumbency Advantage and Voter Welfare
   - Pool of Candidates
   - Signals Available in Office
4. Extension: Endogenous Signals
Incumbency Effect

Ex Ante Probability of Winning:

- Closed Seat:
- Open Seat:
Incumbency Effect

Ex Ante Probability of Winning:

- Closed Seat:
  - Signal only about Incumbent
  - $Pr(I \text{ wins } | \text{ closed seat})$

- Open Seat:
Incumbency Effect

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- Closed Seat:
  - Signal only about Incumbent
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- Open Seat:
  - Ex Ante Same Expectation of Incumbent vs. Challenger
  - \( \Pr(I \text{ wins } | \text{ open seat}) = \frac{1}{2} \)
Incumbency Effect

Ex Ante Probability of Winning:

- Closed Seat:
  - Signal *only* about Incumbent
  - \( \Pr(I \text{ wins} \mid \text{closed seat}) \)

- Open Seat:
  - Ex Ante Same Expectation of Incumbent vs. Challenger
  - \( \Pr(I \text{ wins} \mid \text{open seat}) = \frac{1}{2} \)

Incumbency Effect:
\[
IE = \Pr(I \text{ wins} \mid \text{closed seat}) - \Pr(I \text{ wins} \mid \text{open seat})
\]
Incumbency Effect

Ex Ante Probability of Winning:

- Closed Seat:
  - Signal **only** about Incumbent
  - $\Pr(I \text{ wins} \mid \text{closed seat})$

- Open Seat:
  - Ex Ante Same Expectation of Incumbent vs. Challenger
  - $\Pr(I \text{ wins} \mid \text{open seat}) = \frac{1}{2}$

Incumbency Effect:

$I= \Pr(I \text{ wins} \mid \text{closed seat}) - \frac{1}{2}$
Incumbency Effect

Ex Ante Probability of Winning:

- Closed Seat:
  - Signal only about Incumbent
  - Pr(I wins | closed seat)

- Open Seat:
  - Ex Ante Same Expectation of Incumbent vs. Challenger
  - Pr(I wins | open seat) = $\frac{1}{2}$

Incumbency Effect:

$I\mathcal{E} = Pr(I \text{ wins} | \text{ closed seat}) - \frac{1}{2}$

- Incumbency Advantage: $I\mathcal{E} > 0$
- Incumbency Disadvantage: $I\mathcal{E} < 0$
Incumbency Effect

Ex Ante Probability of Winning:

- Closed Seat:
  - Signal only about Incumbent
  - $\Pr(I \text{ wins} | \text{closed seat})$

- Open Seat:
  - Ex Ante Same Expectation of Incumbent vs. Challenger
  - $\Pr(I \text{ wins} | \text{open seat}) = \frac{1}{2}$

Incumbency Effect:

$IE = \Pr(I \text{ wins} | \text{closed seat}) - \frac{1}{2}$

- Incumbency Advantage: $IE > 0$
- Incumbency Disadvantage: $IE < 0$
The Voter’s Inference Problem

Voter’s Problem

- Reelect if and only if $\mathbb{E}(\theta^l | s) \geq \mathbb{E}(\theta^C)$
The Voter’s Inference Problem

Voter’s Problem

- Reelect if and only if $E(\theta^I | s) \geq E(\theta^C)$

Hypothesis Testing Interpretation

- $H_0 = \{\theta : \theta^I \geq E(\theta^C)\} \text{ vs. } H_1 = \{\theta : \theta^I < E(\theta^C)\}$
- If Voter Rejects Null: Replaces the Incumbent
The Voter’s Inference Problem

Voter’s Problem

- Reelect if and only if $\mathbb{E}(\theta^I \mid s) \geq \mathbb{E}(\theta^C)$

Hypothesis Testing Interpretation

- $H_0 = \{\theta : \theta^I \geq \mathbb{E}(\theta^C)\} \text{ vs. } H_1 = \{\theta : \theta^I < \mathbb{E}(\theta^C)\}$

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Optimal Reelection Strategy: Cutoff Rule
The Voter’s Inference Problem

Voter’s Problem
- Reelect if and only if $\mathbb{E}(\theta^I | s) \geq \mathbb{E}(\theta^C)$

Hypothesis Testing Interpretation
- $H_0 = \{\theta : \theta^I \geq \mathbb{E}(\theta^C)\}$ vs. $H_1 = \{\theta : \theta^I < \mathbb{E}(\theta^C)\}$
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Optimal Reelection Strategy: Cutoff Rule
- Neutral News: $\mathbb{E}(\theta^I | \nu) = \mathbb{E}(\theta^C)$
The Voter’s Inference Problem

**Voter’s Problem**
- Reelect if and only if $\mathbb{E}(\theta^I | s) \geq \mathbb{E}(\theta^C)$

**Hypothesis Testing Interpretation**
- $H_0 = \{\theta : \theta^I \geq \mathbb{E}(\theta^C)\}$ vs. $H_1 = \{\theta : \theta^I < \mathbb{E}(\theta^C)\}$
- If Voter Rejects Null: Replaces the Incumbent

**Optimal Reelection Strategy:** Cutoff Rule
- Neutral News: $\mathbb{E}(\theta^I | \nu) = \mathbb{E}(\theta^C)$
- MLRP:
  - $s < \nu$
  - $\mathbb{E}(\theta^I | s) < \mathbb{E}(\theta^C)$
  - Voter Replaces the Incumbent
The Voter’s Inference Problem

Voter’s Problem

- Reelect if and only if \( \mathbb{E}(\theta^I \mid s) \geq \mathbb{E}(\theta^C) \)

Hypothesis Testing Interpretation

- \( H_0 = \{ \theta : \theta^I \geq \mathbb{E}(\theta^C) \} \) vs. \( H_1 = \{ \theta : \theta^I < \mathbb{E}(\theta^C) \} \)
- If Voter Rejects Null: Replaces the Incumbent

Optimal Reelection Strategy: Cutoff Rule

- Neutral News: \( \mathbb{E}(\theta^I \mid \nu) = \mathbb{E}(\theta^C) \)
- MLRP:
  - \( s > \nu \)
  - \( \mathbb{E}(\theta^I \mid s) > \mathbb{E}(\theta^C) \)
  - Voter Reelects the Incumbent
## Optimal Reelection Strategy: Errors

### Errors the Voter Can Make

- **Type I Error**: Replace High Type Incumbent
  - Probability $\alpha$
- **Type II Error**: Retain Low Type Incumbent
  - Probability $\beta$

\[
f(a^*, \theta) g\left(a^*\right) f(a^*, \theta)\]

\[
f(s | \theta)\]

Type I error $\nu$

Type II error $\gamma$
Optimal Reelection Strategy: Errors

Errors the Voter Can Make

1. Type I Error: Replace High Type Incumbent
   - Probability $\alpha$
Optimal Reelection Strategy: Errors

Errors the Voter Can Make

1. Type I Error: Replace High Type Incumbent
   - Probability $\alpha$

2. Type II Error: Retain Low Type Incumbent
   - Probability $\beta$
Optimal Reelection Strategy: Errors

Errors the Voter Can Make

1. Type I Error: Replace High Type Incumbent
   - Probability $\alpha$

2. Type II Error: Retain Low Type Incumbent
   - Probability $\beta$
Probability of Winning Closed-Seat Election

The Voter Reelects If:

- Retain High:

- Retain Low:
Probability of Winning Closed-Seat Election

The Voter Reelects If:

- Retain High:
  - No Type I Error: \((1 - \alpha)\)
- Retain Low:
Probability of Winning Closed-Seat Election

The Voter Reelects If:

- Retain High:
  - No Type I Error: \((1 - \alpha)\)
- Retain Low:
  - Type II Error: \(\beta\)
Probability of Winning Closed-Seat Election

The Voter Reelects If:

- Retain High:
  - No Type I Error: \( (1 - \alpha) \)
- Retain Low:
  - Type II Error: \( \beta \)

\[
\Pr(\text{I wins | closed seat}) = \pi(1 - \alpha) + (1 - \pi)\beta
\]
Necessary Condition for Incumbency Advantage

Proposition

*If there is an incumbency advantage, \( \alpha < \frac{1}{2} \).*
Necessary Condition for Incumbency Advantage

Proposition

*If there is an incumbency advantage, \( \alpha < \frac{1}{2} \).*

Suppose \( \alpha \geq \frac{1}{2} \):
Necessary Condition for Incumbency Advantage

Proposition

*If there is an incumbency advantage, $\alpha < \frac{1}{2}$.*

*Suppose $\alpha \geq \frac{1}{2}$:*

- Likelihood of Type I Error High
  - Probability of reelecting $\theta$ is less than $\frac{1}{2}$
Proposition

*If there is an incumbency advantage, $\alpha < \frac{1}{2}$."

*Suppose $\alpha \geq \frac{1}{2}$:
  * Likelihood of Type I Error High
    * Probability of reelecting $\overline{\theta}$ is less than $\frac{1}{2}$
  * Likelihood of Type II Error High
    * Probability of reelecting $\theta$ is less than $\frac{1}{2}$
    * MLRP
Proposition

*If there is an incumbency advantage, $\alpha < \frac{1}{2}$.*

Suppose $\alpha \geq \frac{1}{2}$:

- Likelihood of Type I Error High
  - Probability of reelecting $\bar{\theta}$ is less than $\frac{1}{2}$
- Likelihood of Type II Error High
  - Probability of reelecting $\theta$ is less than $\frac{1}{2}$
- MLRP

Implies: $\Pr(I \text{ wins } | \text{ open seat}) < \frac{1}{2}$
Sufficient Condition for an Incumbency Advantage

Proposition (Sufficiency)

Suppose $\alpha < \frac{1}{2}$. There exists some $\hat{\pi} \in [0, 1)$ so that the following hold:

1. If $\pi > \hat{\pi}$, then there is an incumbency advantage.
2. If $\pi < \hat{\pi}$, then there is an incumbency disadvantage.
Sufficient Condition for an Incumbency Advantage

Proposition ( Sufficiency)

Suppose \( \alpha < \frac{1}{2} \). There exists some \( \hat{\pi} \in [0,1) \) so that the following hold:

1. If \( \pi > \hat{\pi} \), then there is an incumbency advantage.
2. If \( \pi < \hat{\pi} \), then there is an incumbency disadvantage

Suppose \( \alpha < \frac{1}{2} \):
Sufficient Condition for an Incumbency Advantage

**Proposition (Sufficiency)**

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Suppose $\alpha < \frac{1}{2}$:

- Likelihood of Type I Error Small
  - Probability of reelecting $\bar{\theta}$ is greater than $\frac{1}{2}$
Sufficient Condition for an Incumbency Advantage

Proposition (Sufficiency)

Suppose $\alpha < \frac{1}{2}$. There exists some $\hat{\pi} \in [0, 1)$ so that the following hold:

1. If $\pi > \hat{\pi}$, then there is an incumbency advantage.
2. If $\pi < \hat{\pi}$, then there is an incumbency disadvantage.

Suppose $\alpha < \frac{1}{2}$:

- Likelihood of Type I Error Small
  - Probability of reelecting $\overline{\theta}$ is greater than $\frac{1}{2}$
- If Pool of $\overline{\theta}$ is Sufficiently Good
  - Very likely to reelect $l$ in closed seat
Sufficient Condition for an Incumbency Advantage

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Suppose $\alpha < \frac{1}{2}$:

- Likelihood of Type I Error Small
  - Probability of reelecting $\bar{\theta}$ is greater than $\frac{1}{2}$
- If Pool of $\bar{\theta}$ is Sufficiently Good
  - Very likely to reelect $I$ in closed seat
- Increasing $\alpha$ Increases $\hat{\pi}$
  - Less likely to reelect $\bar{\theta}$ requires a better pool
Proposition (Sufficiency)

Suppose $\alpha < \frac{1}{2}$. There exists some $\hat{\pi} \in [0, 1)$ so that the following hold:

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Type II Errors:
Proposition (Sufficiency)

Suppose $\alpha < \frac{1}{2}$. There exists some $\hat{\pi} \in [0, 1)$ so that the following hold:

1. If $\pi > \hat{\pi}$, then there is an incumbency advantage.
2. If $\pi < \hat{\pi}$, then there is an incumbency disadvantage

Type II Errors:

- $\hat{\pi}$ is decreasing in $\beta$
  - Higher Type II errors increase the probability of reelection
  - Worse pool consistent with incumbency advantage
Sufficient Condition for an Incumbency Advantage

Proposition (Sufficiency)

Suppose $\alpha < \frac{1}{2}$. There exists some $\hat{\pi} \in [0,1)$ so that the following hold:

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Type II Errors:

- $\hat{\pi}$ is decreasing in $\beta$
  - Higher Type II errors increase the probability of reelection
  - Worse pool consistent with incumbency advantage

Symmetric Case: $\beta = \alpha$

- $\alpha < \frac{1}{2}$ and $\hat{\pi} = \frac{1}{2}$
Roadmap

1. Baseline: Pure Learning Model
2. Incumbency Advantage vs. Disadvantage
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   - Pool of Candidates
   - Signals Available in Office
4. Extension: Endogenous Signals
Question

Are Higher Levels Incumbency Advantages Associated with Higher Levels of Welfare?
Question

Are Higher Levels Incumbency Advantages Associated with Higher Levels of Welfare?

\[ VW = \mathbb{E}(\theta') + \Pr(\theta^W = \bar{\theta})\bar{\theta} + (1 - \Pr(\theta^W = \bar{\theta}))\theta. \]
Are Higher Levels Incumbency Advantages Associated with Higher Levels of Welfare?

\[ VW = \mathbb{E}(\theta') + \Pr(\theta^W = \bar{\theta})\bar{\theta} + (1 - \Pr(\theta^W = \bar{\theta}))\theta. \]
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Are Higher Levels Incumbency Advantages Associated with Higher Levels of Welfare?

\[ VW = \mathbb{E}(\theta') + \Pr(\theta^W = \bar{\theta})\bar{\theta} + (1 - \Pr(\theta^W = \bar{\theta}))\theta. \]
Proposition

*Both the Incumbency Effect and Voter Welfare are Increasing in Pr(H).*
Improving the Pool of Candidates

Proposition

*Both the Incumbency Effect and Voter Welfare are Increasing in Pr(H).*

Incumbency Effect:

- Follows from the MLRP
Proposition

*Both the Incumbency Effect and Voter Welfare are Increasing in Pr(H).*

**Incumbency Effect:**
- Follows from the MLRP

**Voter Welfare:**
- Expectation of First-Period Office Holder
- Expectation of Second-Period Office Holder
Informativeness of Signal Structure

Lehmann’s Information Order

The signal structure $\mathcal{F}$ is more informative than $\mathcal{G}$ if

$$F^{-1}(G(s | \bar{\theta}) | \bar{\theta}) \geq F^{-1}(G(s | \theta) | \theta).$$
Informativeness of Signal Structure

Lehmann’s Information Order

The signal structure $\mathcal{F}$ is more informative than $\mathcal{G}$ if

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Lehmann’s Information Order

The signal structure $\mathcal{F}$ is more informative than $\mathcal{G}$ if

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Informativeness of Signal Structure

Lehmann’s Information Order

The signal structure $\mathcal{F}$ is more informative than $\mathcal{G}$ if

$$F^{-1}(G(s \mid \bar{\theta}) \mid \bar{\theta}) \geq F^{-1}(G(s \mid \theta) \mid \theta).$$
Increasing Informativeness: Incumbency Effect

Symmetric Around Neutral News:

\[ 1 - F(\nu | \theta) = F(\nu | \bar{\theta}) \]
Increasing Informativeness: Incumbency Effect

Symmetric Around Neutral News:

\[ 1 - F(\nu_F \mid \theta) = F(\nu_F \mid \bar{\theta}) \]
Symmetric Around Neutral News:

\[ 1 - F(\nu_F | \theta) = F(\nu_F | \bar{\theta}) \]

**Proposition**

Let \( F \) be symmetric around neutral news. If \( G \) is more informative than \( F \) and \( G \) is symmetric around neutral news, then the following hold:

1. If there is an incumbency advantage for \( F \), then \( \text{IE}(G) > \text{IE}(F) \).
2. If there is an incumbency disadvantage for \( F \), then \( \text{IE}(F) > \text{IE}(G) \).
Increasing Informativeness: Incumbency Effect

Symmetric Around Neutral News:

\[ 1 - F(\nu_\mathcal{F} | \theta) = F(\nu_\mathcal{F} | \bar{\theta}) \]

**Proposition**

Let \( \mathcal{F} \) be symmetric around neutral news. If \( \mathcal{G} \) is more informative than \( \mathcal{F} \) and \( \mathcal{G} \) is symmetric around neutral news, then the following hold:

1. If there is an incumbency advantage for \( \mathcal{F} \), then \( \mathcal{IE}(\mathcal{G}) > \mathcal{IE}(\mathcal{F}) \).
2. If there is an incumbency disadvantage for \( \mathcal{F} \), then \( \mathcal{IE}(\mathcal{F}) > \mathcal{IE}(\mathcal{G}) \).

Neutral news signals may be different: \( \nu_\mathcal{F} \) and \( \nu_\mathcal{G} \).
Increasing Informativeness: Incumbency Effect

Symmetric Around Neutral News:

\[ 1 - F(\nu_F \mid \theta) = F(\nu_F \mid \bar{\theta}) \]

**Proposition**

Let \( F \) be symmetric around neutral news. If \( G \) is more informative than \( F \) and \( G \) is symmetric around neutral news, then the following hold:

1. **If there is an incumbency advantage for \( F \), then \( IE(G) > IE(F) \).**
2. **If there is an incumbency disadvantage for \( F \), then \( IE(F) > IE(G) \).**

Neutral news signals may be different: \( \nu_F \) and \( \nu_G \)

For \( F \) and \( G \)

- Likelihood of Type I error = Likelihood of Type II error
Increasing Informativeness: Incumbency Effect

Symmetric Around Neutral News:

\[ 1 - F(\nu_{\mathcal{F}} | \theta) = F(\nu_{\mathcal{F}} | \bar{\theta}) \]

**Proposition**

Let \( \mathcal{F} \) be symmetric around neutral news. If \( \mathcal{G} \) is more informative than \( \mathcal{F} \) and \( \mathcal{G} \) is symmetric around neutral news, then the following hold:

1. If there is an incumbency advantage for \( \mathcal{F} \), then \( IE(\mathcal{G}) > IE(\mathcal{F}) \).
2. If there is an incumbency disadvantage for \( \mathcal{F} \), then \( IE(\mathcal{F}) > IE(\mathcal{G}) \).

- Neutral news signals may be different: \( \nu_{\mathcal{F}} \) and \( \nu_{\mathcal{G}} \)
- For \( \mathcal{F} \) and \( \mathcal{G} \):
  - Likelihood of Type I error = Likelihood of Type II error
- Problem if Incomparable
Increasing Informativeness: Welfare

Remark

*Increasing the informativeness of the signal increases welfare.*
Increasing Informativeness: Welfare

Remark

*Increasing the informativeness of the signal increases welfare.*

Implication:

- ↑ Incumbency Advantage → ↑ Higher Voter Welfare
- Opposite from the Normative Concern in the Literature
Roadmap

1. Baseline: Pure Learning Model
2. Incumbency Advantage vs. Disadvantage
3. Incumbency Advantage and Voter Welfare
   - Pool of Candidates
   - Signals Available in Office
4. Extension: Endogenous Signals
Signal Jamming

Signal: Governance Outcome

\[ g = p(a, \theta) + \varepsilon \]

- Production Function: \( p \)
  - Strictly Increasing in Action and Type
- Action: \( a \in A \)
  - \( A \subseteq \mathbb{R}_+ \) closed
  - Least Element \( \underline{a} \)
- Types: \( \bar{\theta} > \theta \)
- Prior Probability of \( \bar{\theta} \): \( \pi \in (0, 1) \)
- Noise: \( \varepsilon \)
  - PDF \( \phi \): Strictly logconcave and symmetric around 0
  - Likelihood ratio onto \( \mathbb{R}_+ \) with strictly positive derivatives
The Model

Timeline:

1. Nature Draws Types and Noise
   - Not Observed by Politicians or Voter
2. Period-1 Incumbent chooses a level of effort $a_1$
3. Voter Observes Governance Outcome $g_1$
4. Voter Chooses to Reelect or Not
5. Period-2 Incumbent chooses a level of effort $a_2$
6. Voter Observes Governance Outcome $g_2$
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Payoffs:

Voter: $g_1 + g_2$

Politician in Office: $B - c(a)$

$c$ is strictly increasing

$B > c(a)$
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Equilibrium

- Second-Period:
  - Lowest Action

- First-Period:
  - Equilibrium action $a^*$
## Incumbency Effect and Voter Welfare

### Incumbency Effect:

\[ \text{IE} (a^*) = \text{Pr}(I \text{ wins} \mid a^*) - \frac{1}{2} \]

### Ex Ante Voter Welfare:

\[ \text{VW}_1 (a^*) + \text{VW}_2 (a^*) \]

Equilibrium Action Directly Impacts First-Period Welfare

Equilibrium Action Indirectly Impacts Second-Period Welfare

Changes the Likelihood of Selecting a High Type

Question: How do the Incumbency Effect and Voter Welfare change, as we change the equilibrium action?
Incumbency Effect and Voter Welfare

Incumbency Effect:

\[ IE(a_*) = Pr(I \text{ wins} | a_*) - \frac{1}{2} \]
Incumbency Effect and Voter Welfare

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\[ I\varepsilon(a_\ast) = \Pr(I \text{ wins}|a_\ast) - \frac{1}{2} \]

Ex Ante Voter Welfare:

1. \[ V\varepsilon_1(a_\ast) + V\varepsilon_2(a_\ast) \]
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Question:

How do the Incumbency Effect and Voter Welfare change, as we change the equilibrium action?
Incumbent’s Reelection Probability

Hypothesis Testing Interpretation:

- $H_0 = \{ \theta : \theta^I \geq \mathbb{E}(\theta^C) \}$ vs. $H_1 = \{ \theta : \theta^I < \mathbb{E}(\theta^C) \}$
- If Voter Rejects Null: Replaces the Incumbent

Errors the Voter Can Make

1. Type I Error: Replace High Type Incumbent: $\text{Prob } \alpha(a_*)$
2. Type II Error: Retain Low Type Incumbent: $\text{Prob } \beta(a_*)$

Incumbent is Reelected If:

- $\theta^I = \bar{\theta}$ and no Type I error
- $\theta^I = \bar{\theta}$ and Type II error
Complements versus Substitutes

Fix $a^{**} > a_*$. Effort and type are **complements** at $(a_*, a^{**})$,

$$p(a^{**}, \overline{\theta}) - p(a^{**}, \theta) \geq p(a_*, \overline{\theta}) - p(a_*, \theta)$$

- **Complements**: Complements at all $(a_*, a^{**})$ with $a^{**} > a_*$. 
Complements versus Substitutes

Fix $a^{**} > a^*$. Effort and type are **complements** at $(a^*, a^{**})$,\[ p(a^{**}, \bar{\theta}) - p(a^{**}, \underline{\theta}) \geq p(a^*, \bar{\theta}) - p(a^*, \underline{\theta}) \]

- **Complements**: Complements at all $(a^*, a^{**})$ with $a^{**} > a^*$.

Fix $a^{**} > a^*$. Effort and type are **substitutes** at $(a^*, a^{**})$,\[ p(a^*, \bar{\theta}) - p(a^*, \underline{\theta}) \geq p(a^{**}, \bar{\theta}) - p(a^{**}, \underline{\theta}) \]

- **Substitutes**: Substitutes at all $(a^*, a^{**})$ with $a^{**} > a^*$.
Impact on the Voter’s Experiment: Complements
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Impact on the Voter’s Experiment: Substitutes

\[
g(a) f(a, \theta) g_1 p(a, \theta_1) p(a, \theta_2) g(a) f(a, \theta) g_1 p(a, \theta_1) p(a, \theta_2) g(a)
\]
Impact on the Voter’s Experiment: Substitutes
Proposition (ABF 2017)

Fix $a^{**} > a^*$. 

1. **Complements**: The experiment induced by $a^{**}$ is more informative than the experiment induced by $a^*$.

2. **Substitutes**: The experiment induced by $a^*$ is more informative than the experiment induced by $a^{**}$.
Informativeness of Governance Outcomes

Proposition (ABF 2017)

Fix \(a^{**} > a^{*}\).

1. **Complements:** The experiment induced by \(a^{**}\) is more informative than the experiment induced by \(a^{*}\).

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| \(\pi > \frac{1}{2}\) | \(\mathcal{IE}(a)\) increasing in \(a\) | \(\mathcal{IE}(a)\) decreasing in \(a\) |
| \(\pi < \frac{1}{2}\) | \(\mathcal{IE}(a)\) decreasing in \(a\) | \(\mathcal{IE}(a)\) increasing in \(a\) |
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Fix $a^{**} > a_*$.

1. **Complements:** The experiment induced by $a^{**}$ is more informative than the experiment induced by $a_*$.

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<thead>
<tr>
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<tbody>
<tr>
<td><strong>Inc Adv</strong></td>
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Increasing Accountability and Voter Welfare

**Expected First-Period Welfare**

\[ VW_1(a_*) = \Pr(H)p(a_*, \bar{\theta}) + (1 - \Pr(H))p(a_*, \theta) \]

**Ex Ante Expected Second-Period Welfare**

\[ VW_2(a_*) = \Pr(\theta_2 = \bar{\theta}|a_*)g(a, \bar{\theta}) + (1 - \Pr(\theta_2 = \bar{\theta}|a_*))g(a, \theta) \]
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- Complements: Increasing in \( a_* \)
- Substitutes: Decreasing in \( a_* \)
Suppose:

- **Incumbency Advantage**: $\pi > \frac{1}{2}$
- **Increase Equilibrium Action**: From $a_*$ to $a_{**}$
Suppose:

- **Incumbency Advantage**: \( \pi > \frac{1}{2} \)
- **Increase Equilibrium Action**: From \( a^* \) to \( a^{**} \)

Complements

- Increases Voter Information
- Increases the Incumbency Advantage
- Increases Voter Welfare
Co-variation of Incumbency Effect and Voter Welfare

Suppose:

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- **Increase Equilibrium Action**: From $a_*$ to $a^{**}$

Complements

- Increases Voter Information
- Increases the Incumbency Advantage
- Increases Voter Welfare

Opposite of the Co-variation Underlying the Literature’s Concern!
Co-variance of Incumbency Effect and Voter Welfare

Suppose:

- **Incumbency Advantage**: $\pi > \frac{1}{2}$

- **Increase Equilibrium Action**: From $a^*$ to $a^{**}$

**Substitutes**

- Decreases Voter Information
- Decreases the Incumbency Advantage
- Voter Welfare Can Increase or Decrease
  - **If** $\pi < \overline{\pi}$: Voter Welfare Decreases
  - **If** $\pi > \overline{\pi}$: Voter Welfare Increases
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Opposite of the Co-variance Underlying the Literature’s Concern!
Thank You!

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Candidate Quality

- Two Candidates: Incumbent and Challenger
- Type of Candidate: $\theta_n > \theta_{n-1} > \cdots > \theta_2 > \theta_1$
- Prior: Distribution $\pi$
- Voter Preferences: Strictly Increasing in $\theta$

Timeline

1. Voter Observes a Signal of Candidate Quality
2. Voter Decides to Reelect vs. Replace
Incumbency Advantage

Favorable Prior $\pi$:

- Types Centered Around Median
- Matched According Image Around Median
- Higher Matched Type Gets Higher Probability
**Incumbency Advantage**

**Favorable Prior \( \pi \):**

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**Proposition**

1. *There is an Incumbency Advantage, if the prior is favorable.*
2. *There is an Incumbency Disadvantage, if the prior is unfavorable.*
Incumbency Effect and Voter Welfare

Proposition
Suppose there is an improvement in the pool of candidates, in the sense of FOSD. Then both the Incumbency Effect and Voter Welfare increase.

Proposition
Suppose \( F \) is more informative than \( G \).

1. If the prior is favorable, then \( \mathcal{IE}(F) > \mathcal{IE}(G) \).
2. If the prior is unfavorable, then \( \mathcal{IE}(G) > \mathcal{IE}(F) \).
The Importance and Fragility of Neutral News

Location Experiment

- $\Theta = \{-2, 0, 2\}$
- Favorable Prior: $\pi(2) = .4$ and $\pi(-2) = .25$
- $s = \theta + \varepsilon$
- $\varepsilon \sim \mathcal{N}(0, .5)$

But Incumbency Disadvantage