Competitive Capture of Public Opinion

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IIES

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Special Interest Groups and Public Opinion

- Many actors are interested in influencing public opinion
  - Classical example: political capture of media by **government**

- But SIG interest playing out over media coverage is much more pervasive
  - **Industrial groups** versus **activists** when covering climate, biodiversity and pollution issues (Oreskes and Conway 2011)
  - **Banks** versus **Southern debtors** in narrative over European Debt Crisis (Durante et al 2021)
  - **Car manufacturers** versus **consumer advocacy** groups over car recalls (Beattie et al 2021)

Special Interest Groups and Public Opinion

- Most of the empirical evidence we have describes biased coverage of issues in traditional media

- But many other information sources to be captured:

  - Social media

  - Scientific white papers

  - Religious leaders

Special Interest Groups and Public Opinion

- Presumably, SIG influence public opinion because public opinion influences/constrains policy

- Study of SIG and Government mature area
  - Cheap talk models: correlated preferences
  - Exchanges of **money for policy**

- Influencing Public Opinion presents a different scenario
  - Multiple Channels
  - Exchanges of **money for coverage**. But:
    - Coverage does not directly enter preferences
    - Objective is the Court of Public Opinion
    - Need to model chain of transmission

Special Interest Groups and Public Opinion

- Study of SIG capturing information sources

    - What news do captured information sources publish?
    - How do rational citizens factor in possible pressure from SIG?
    - Do countervailing pressures cancel each other?
    - How do SIG distribute their pressure when there is a plurality of information channels?

Special Interest Groups and Public Opinion

- We set up a general equilibrium model with:

  - Rational viewers with heterogeneous priors.
  - Multiple information sources
  - Two opposite SIGs exert pressure ("capture") on outlets

  - No commitment to:
    - capture effort by SIGs
    - editorial policy by information sources

This Paper

- Novel supply-side implications on information source bias

  - Capture **polarizes** published news
  - Rational citizens discount informative reports
    - Opposite SIG do not cancel each other: resulting **viewer skepticism** hinders social learning
  - Capture efforts are **strategic substitutes**
    - Exacerbates **horizontal differentiation** in coverage
  - Citizens **sort ideologically** across sources
    - Differentiated coverage with segregated viewers most likely when SIG are interested in "firing up the base"
    - Higher demand for information can backfire

Related Literature

- Media Capture by Government: Macmillan and Zoido (2004), Besley and Prat (2006), Gehlbach and Sonin (2014), Prat (2015)

- Media Capture by SIG: Petrova (2008), Corneo (2006), Prat (2018). Binary signal, single SIG, homogeneous priors

- Media Differentiation in Slant:

  - Supply side with Motivated actors: Baron (2006), Anderson and McLaren (2012)

  - Demand side (rational viewers): Gentzkow and Shapiro (2006), Chan and Suen (2008), Sobbrio (2014)

  - Demand side (psychological utility): Mullainathan and Shleifer (2005), Bernhardt et al (2008).

Features of Model

- Underlying binary state of the world $\theta \in \Theta = \{-1,1\}$
  - Fex: "should I worry about global warming?"
- Continuum of citizens with heterogeneous beliefs $p = \Pr[\theta = 1]$
  - Distribution of priors: $F_p(p)$ mass of viewers with prior at most p.
- n information sources cover an issue which is informative about θ
- Two SIG interested in opposite coverage:
  - Left SIG wants public to update towards state -1
  - Right SIG wants public to update towards state 1
- SIG exert covert pressure on each source to capture its coverage of the issue
- If pressure successful, SIG can convey **any** message

- Allow citizen choice of source in later part of talk

Plan of Talk

- Endogenous Capture
    - Monopoly Information Source
    - Multiple Information Sources
    - Endogenous Source Choice
- Conclusions

Model: Honest Coverage

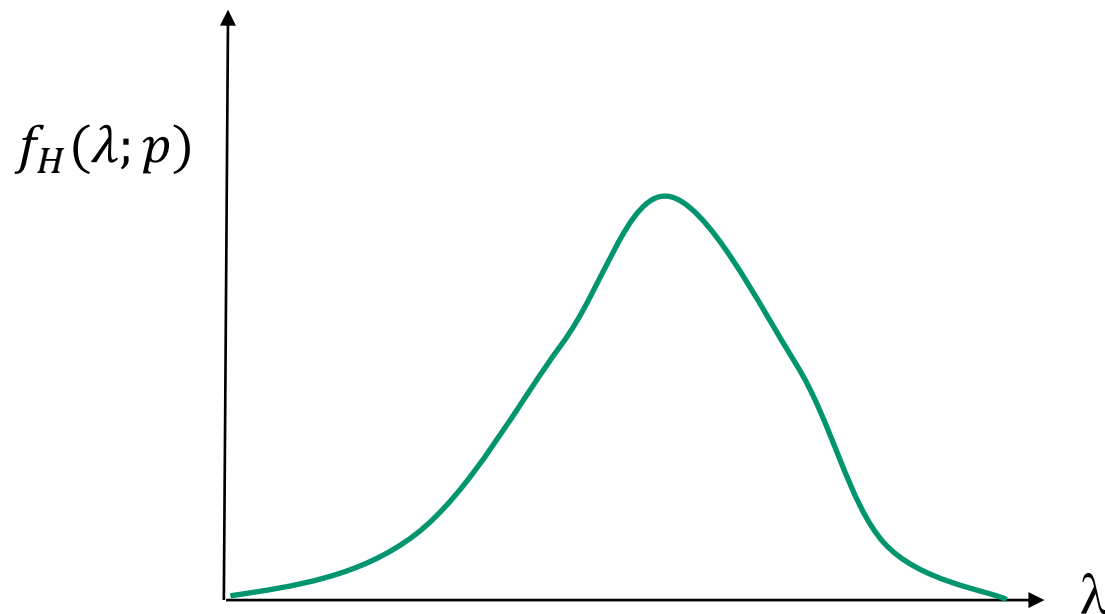- Source receives an informative report $m \in \mathcal{M} \subset \mathbb{R}$ with

$$\Pr[m|\theta = i] = p_i(m), i \in \{-1,1\}$$

- Order messages m according to likelihood ratio

$$\lambda_H(m) = \frac{p_1(m)}{p_{-1}(m)}$$

- Distribution of messages $F_{H,\theta}(\lambda) = \Pr[\lambda_H(m) \leq \lambda|\theta]$

- Prior p: $F_H(\lambda; p) = pF_{H,1}(\lambda) + (1 - p) F_{H,-1}(\lambda)$

Model: Honest Coverage

- Messages have a commonly understood meaning

- If source is known to be honest, message m induces posterior

$$\mu_H(m; p) = \frac{p_1(m)p}{p_1(m)p + p_{-1}(m)(1 - p)} = \frac{1}{1 + \frac{1}{\lambda_H(m)} \frac{1 - p}{p}}$$

- Because citizens disagree on priors, they land on different posteriors: but they agree on how to update

Model: Sender's Type
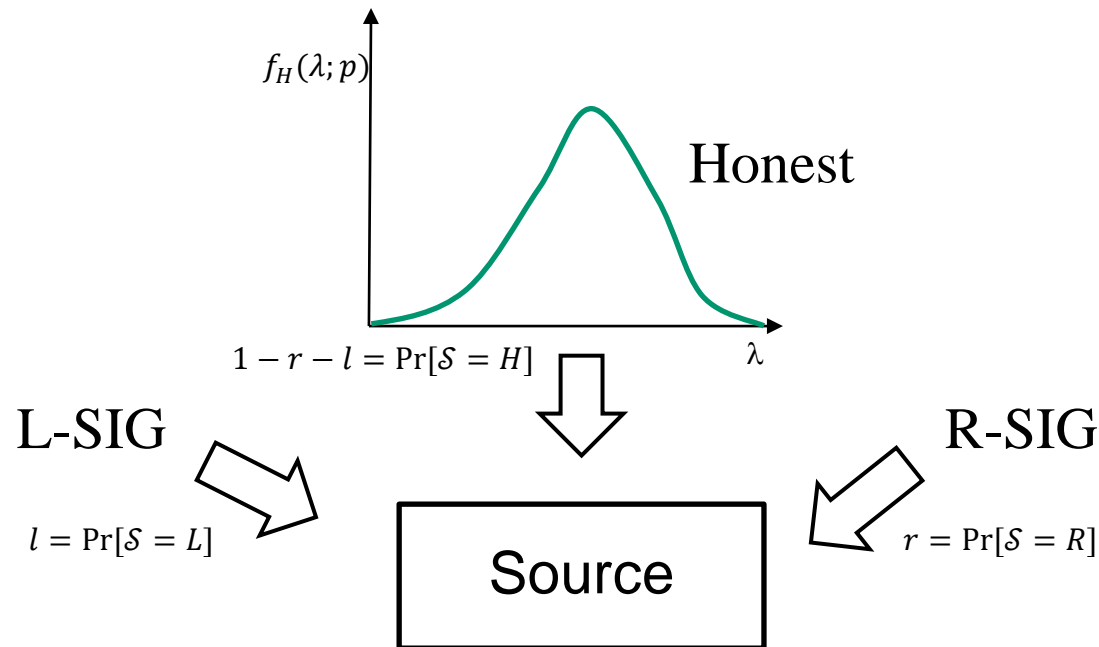
- However, there may be capture:
- Sender $\mathcal{S}$ can be of three types: honest, L-biased, R-biased
    - **Honest sender** is non-strategic and reveals *m* truthfully
    - **L-biased sender** is captured by L-SIG
    - **R-biased sender** is captured by R-SIG

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- Strategic R(L)-SIG wants posteriors μ as high (low) as possible
  - $v_R(\mu)$ strictly increasing.
  - $v_L(\mu)$ strictly decreasing.
  - Facing a distribution of viewers' priors $F_p(p)$, indirect utility

$$V_i(m) = \int_0^1 v_i\big(\mu(m;p)\big)dF_p(p)$$

  - **Biased senders can send any message** $m \in \mathcal{M}$
    - Message space is type-independent
    - Internal reports are non-certifiable

Model: Competitive Capture

- Covertly devoting costly resources raises capture probability
  - R-SIG selects pressure r, L-SIG selects pressure l.
  - Linear contest: $r = \Pr[\mathcal{S} = R]$, $l = \Pr[\mathcal{S} = L]$, $r + l < 1$.
    - Generalizable to $\pi_R(r, l)$ concave
  - Costs of pressure: $C_R(r), C_L(l)$ strictly increasing.
  - Usual conditions: $C_i'(x) > 0, C''_i(x) > 0, \lim_{x \to 0} C_i'(x) = 0$

$f_H(\lambda; p)$

Honest

$1 - r - l = \Pr[\mathcal{S} = H]$

λ

L-SIG

R-SIG

$l = \Pr[\mathcal{S} = L]$

$r = \Pr[\mathcal{S} = R]$

Source

Model: Timing

- Timing:
    - Simultaneously, SIGs select capture efforts r and l
    - Nature decides status $\mathcal{S} \in \{H, R, L\}$ of the source
    - If captured, SIG decides which $m \in \mathcal{M}$ to publish
    - If honest, source conveys m received
    - Citizens update beliefs and payoffs are realized

- Look for PBE of this game.

Communication Equilibria

Proposition (Communication Equilibria)

Fix r and l with $r + l < 1$ and let $\tau_R^*(m)$ $(\tau_L^*(m))$ be the prob R-biased (L-biased) media sends message m. There are unique $\bar{\lambda} = \lambda_H(\bar{m}^*)$ and $\underline{\lambda} = \lambda_H(\underline{m}^*)$ such that for every communication equilibrium we have:

- $m \in supp(\tau_R^*)$ *iff* $\lambda_H(m) \geq \bar{\lambda}$, $m \in supp(\tau_L^*)$ *iff* $\lambda_H(m) \leq \underline{\lambda}$

- *The equilibrium likelihood ratio of message m satisfies*

$$\lambda^*(m) = \begin{cases} \underline{\lambda} \ if \ m \leq \underline{m}^* \\ \lambda_H(m) \ if \underline{m}^* < m < \bar{m}^* \\ \bar{\lambda} \ if \ m \geq \underline{m}^* \end{cases}$$
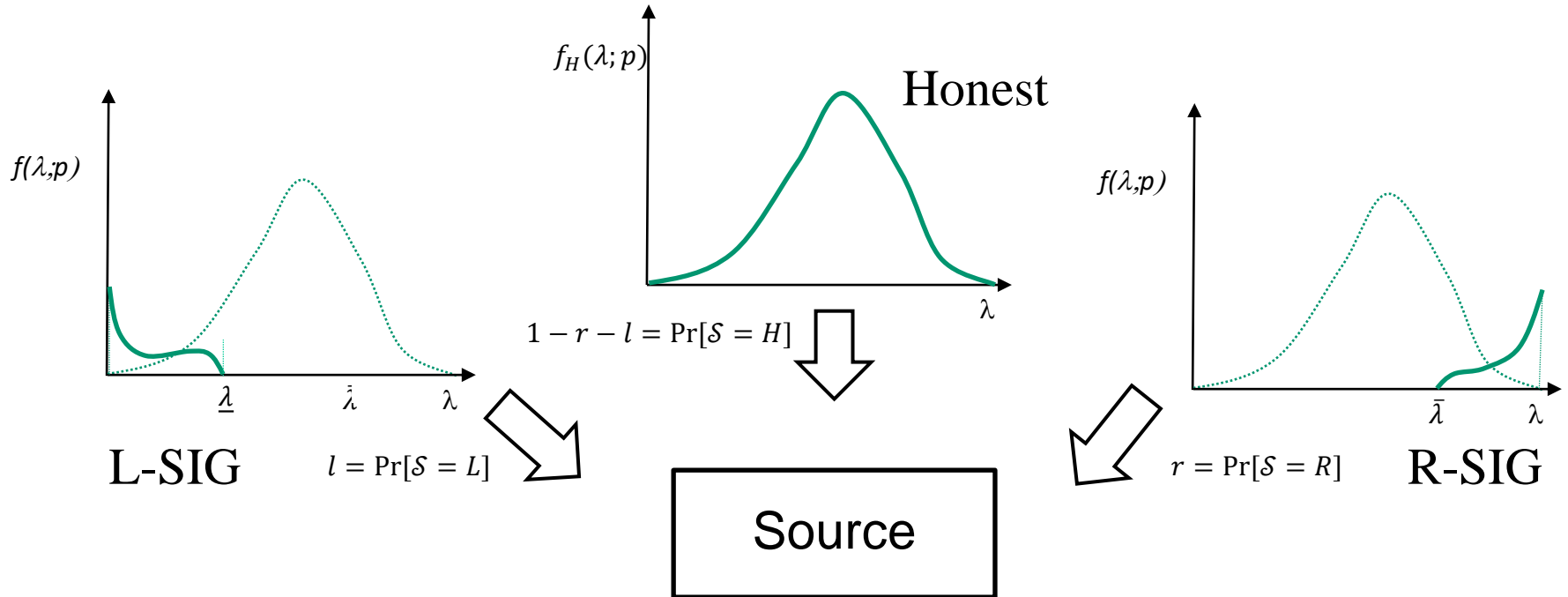
- *The maximum equilibrium likelihood ratios $\underline{\lambda}$ and $\bar{\lambda}$ satisfy*

$$\int_{\bar{\lambda}}^{\infty} \left(\lambda - \bar{\lambda}\right) dF_{H,-1}(\lambda) = \frac{r}{1-l-r}(\bar{\lambda} - 1)$$

$$\int_{0}^{\underline{\lambda}} \left(\underline{\lambda} - \lambda\right) dF_{H,-1}(\lambda) = \frac{l}{1-l-r}(1 - \underline{\lambda})$$

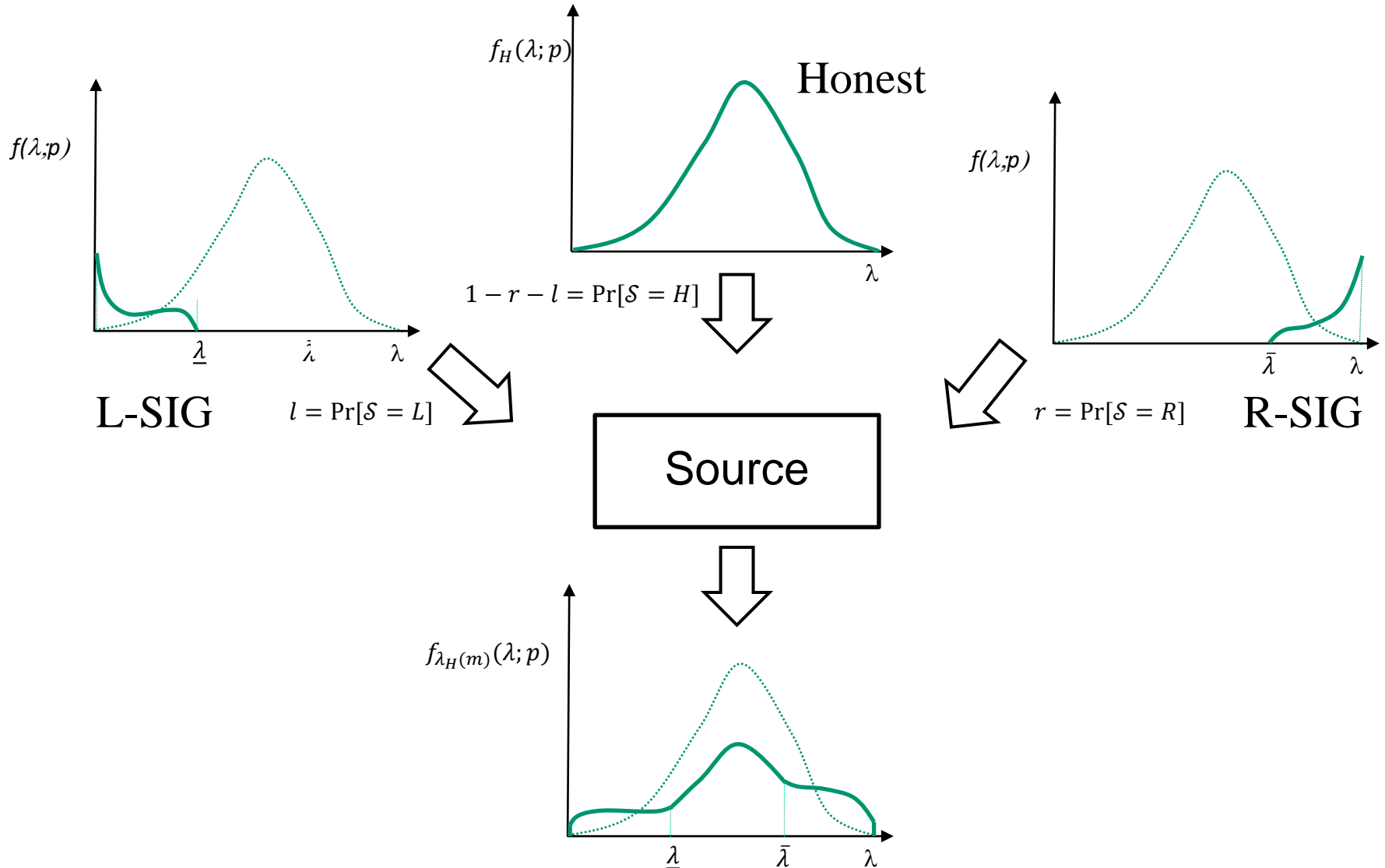# Published News of Captured Sources

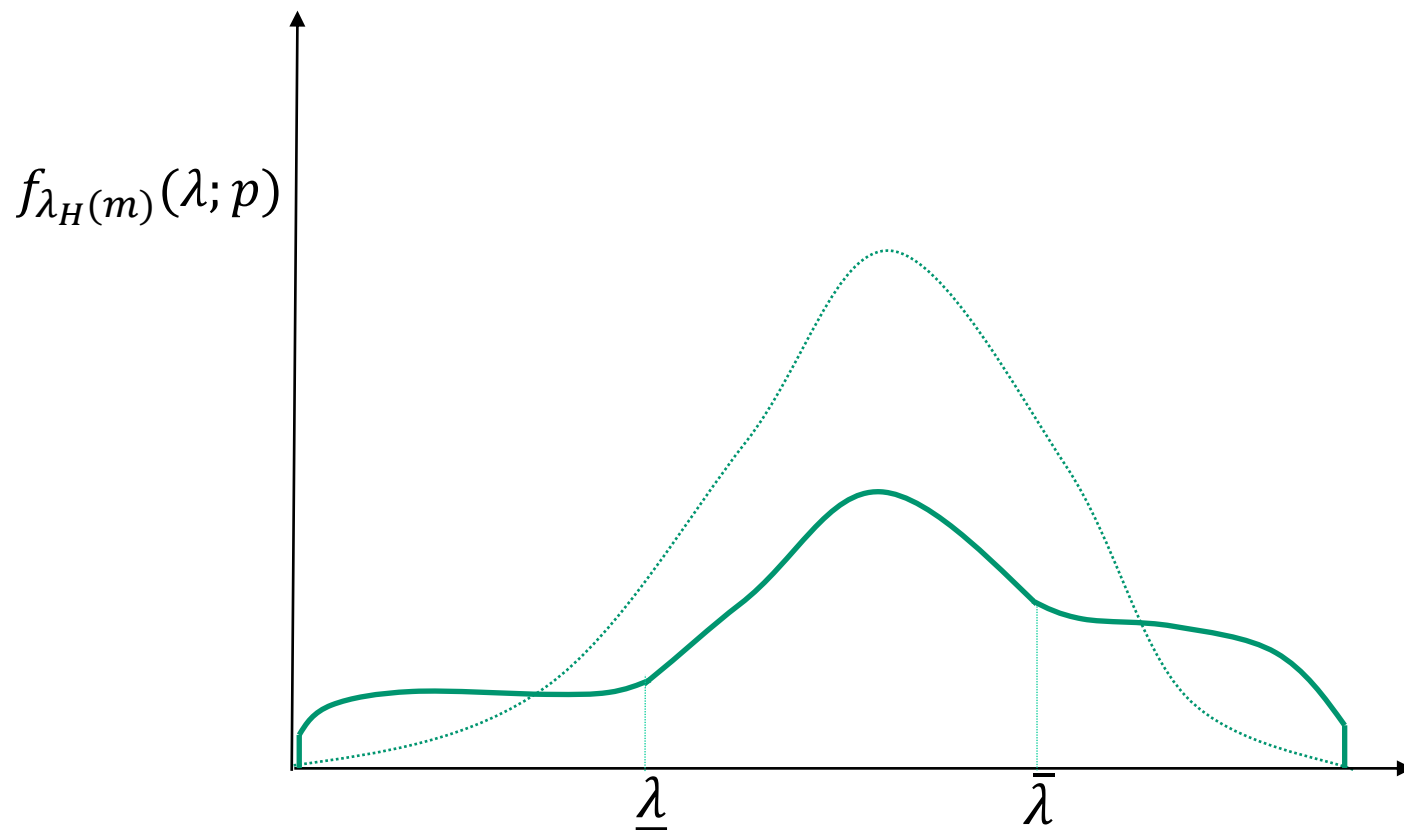- $m \in supp(\tau_R^*)$ *iff* $\lambda_H(m) \geq \bar{\lambda}$, $m \in supp(\tau_L^*)$ *iff* $\lambda_H(m) \leq \underline{\lambda}$

Published News of Captured Sources

- $m \in supp(\tau_R^*)$ *iff* $\lambda_H(m) \geq \bar{\lambda}, \ m \in supp(\tau_L^*)$ *iff* $\lambda_H(m) \leq \underline{\lambda}$

$f_H(\lambda; p)$

Honest

$f(\lambda;p)$

$f(\lambda;p)$

$1 - r - l = \Pr[\mathcal{S} = H]$

$\underline{\lambda}$ $\bar{\lambda}$ λ

L-SIG

$l = \Pr[\mathcal{S} = L]$

$\bar{\lambda}$ λ

$r = \Pr[\mathcal{S} = R]$

R-SIG

Source

$f_{\lambda_H(m)}(\lambda; p)$

$\underline{\lambda}$ $\bar{\lambda}$ λ
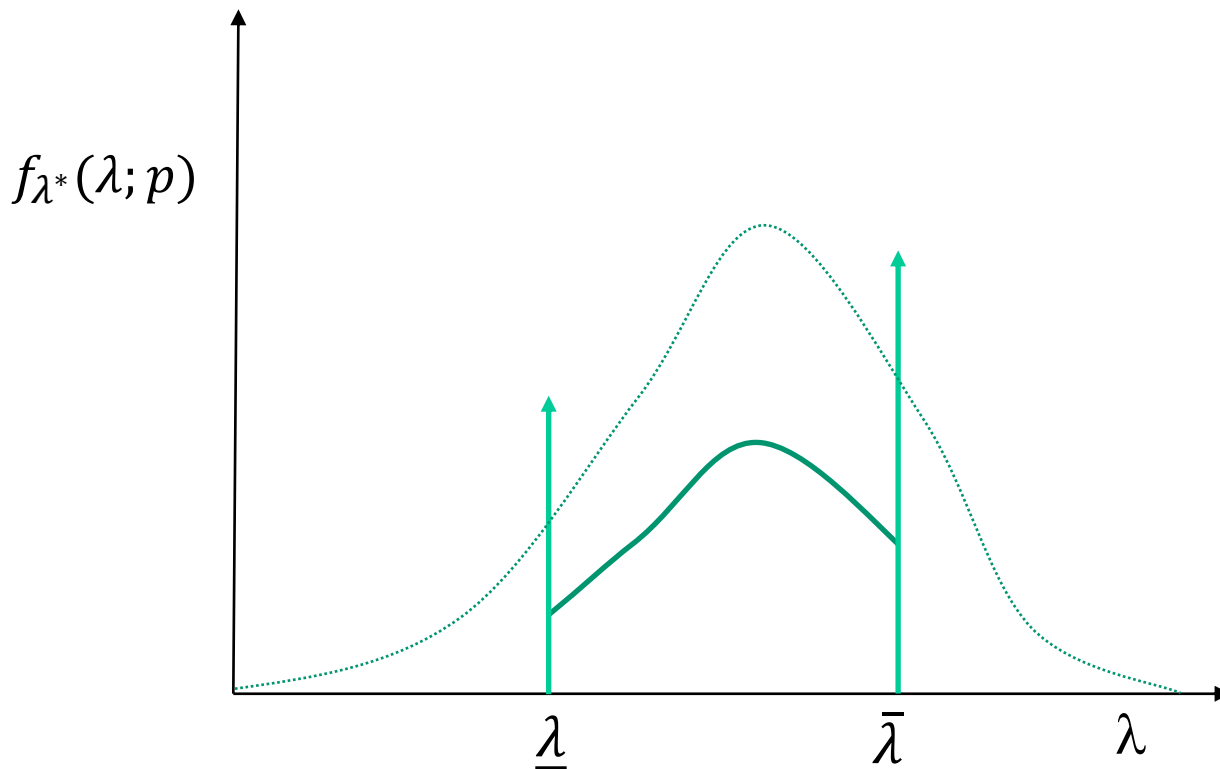
Capture leads to more polarized reports

Capture leads to citizen skepticism

- *Informational content of extreme messages is equalized*

$$\lambda^*(m) = \begin{cases} \underline{\lambda} \ if \ m \leq \underline{m}^* \\ \lambda_H(m) \ if \underline{m}^* < m < \overline{m}^* \\ \overline{\lambda} \ if \ m \geq \underline{m}^* \end{cases}$$

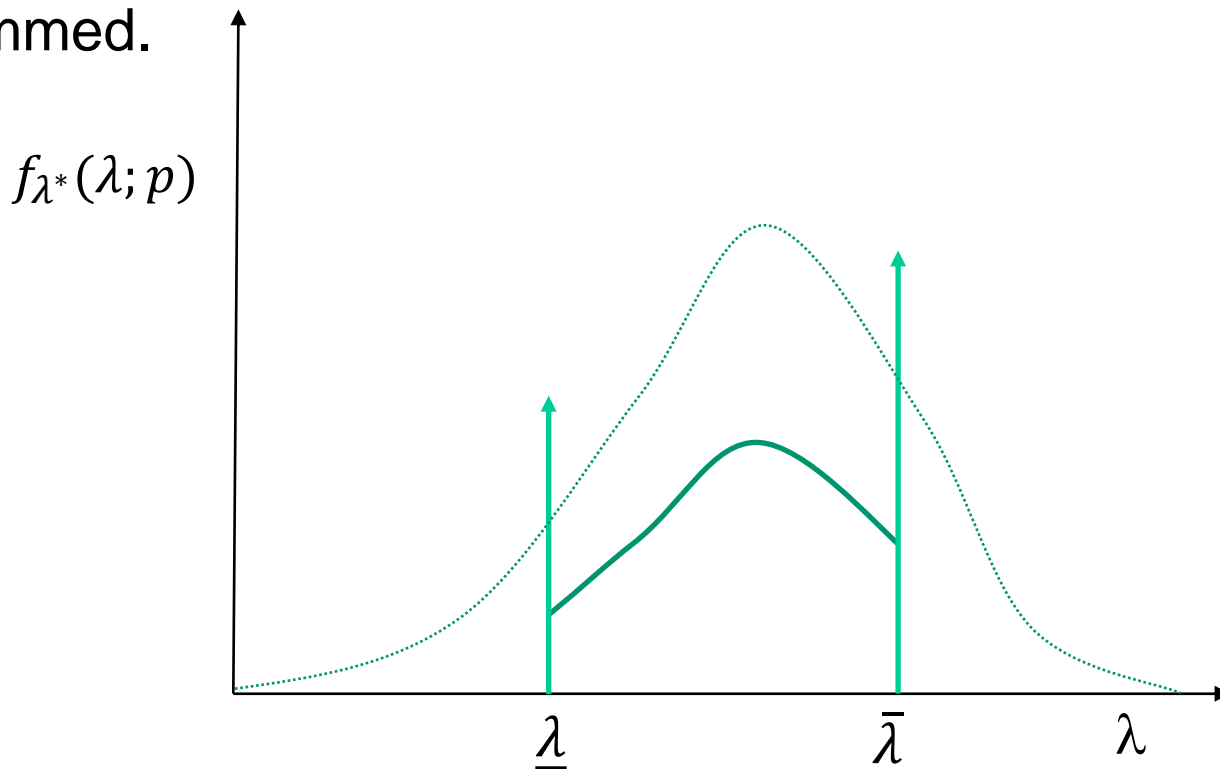- Citizens censor informativeness of messages

Capture leads to citizen skepticism

- *Informational content of extreme messages is equalized*

$$\lambda^*(m) = \begin{cases} \underline{\lambda} \; if \; m \leq \underline{m}^* \\ \lambda_H(m) \; if \underline{m}^* < m < \overline{m}^* \\ \overline{\lambda} \; if \; m \geq \underline{m}^* \end{cases}$$

- Particularly **bad for learning**: most informative messages are jammed.

$f_{\lambda^*}(\lambda; p)$

$\underline{\lambda}$ $\overline{\lambda}$ λ

Comparative Statics of Published Reports

Lemma (Comparative Statics on Informativeness of Lies)

For a communication equilibrium $\bar{\lambda} = \lambda_H(\overline{m}^*)$ and $\underline{\lambda} = \lambda_H(\underline{m}^*)$

- *$\bar{\lambda}$ and $\overline{m}^*$ are decreasing in r and l; $\underline{\lambda}, \underline{m}^*$ increasing in l and r*

- *$\bar{\lambda}, \overline{m}^*, \underline{\lambda}, \underline{m}^*$ are invariant in F_p*

- *$\bar{\lambda}$ increases and $\underline{\lambda}$ decreases if honest outlet is Blackwell more informative*

Marginal Benefit of Capture

- What is the marginal benefit to R-SIG from increasing capture when citizens expect capture levels $\tilde{r}, \tilde{l}$?

$$B_R\left(r; \tilde{r}, \tilde{l}\right) = V_R(\bar{\lambda}) - \mathbb{E}_H[V_R(\lambda); p_R] = \int_{\underline{\lambda}}^{\bar{\lambda}} V_R'(\lambda) F_H(\lambda; p_R) d\lambda$$

  - Increasing capturing effort by R-SIG replaces honest coverage by message that is always interpreted as $\bar{\lambda}$
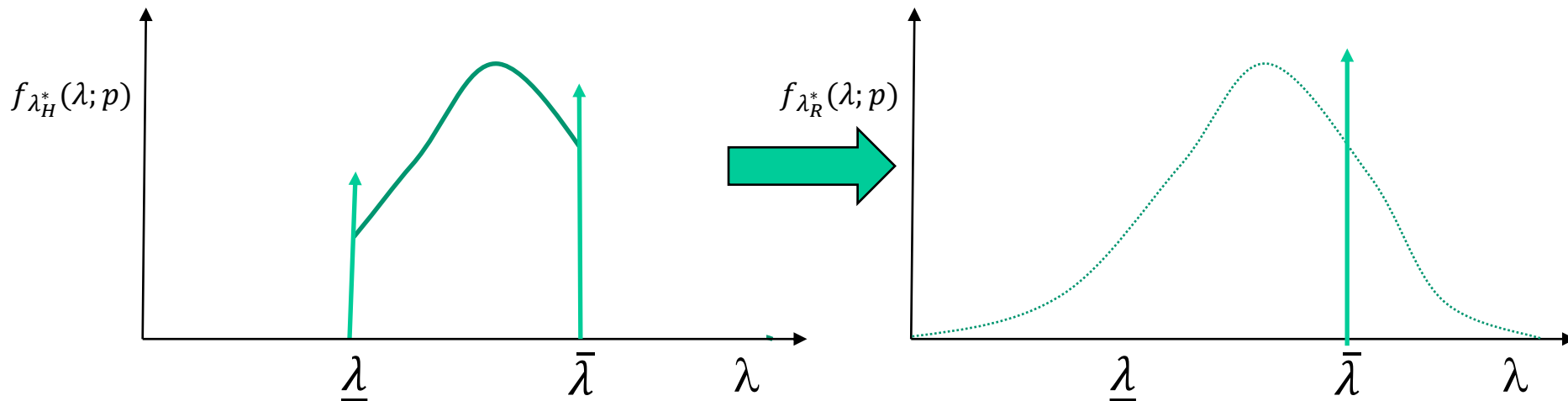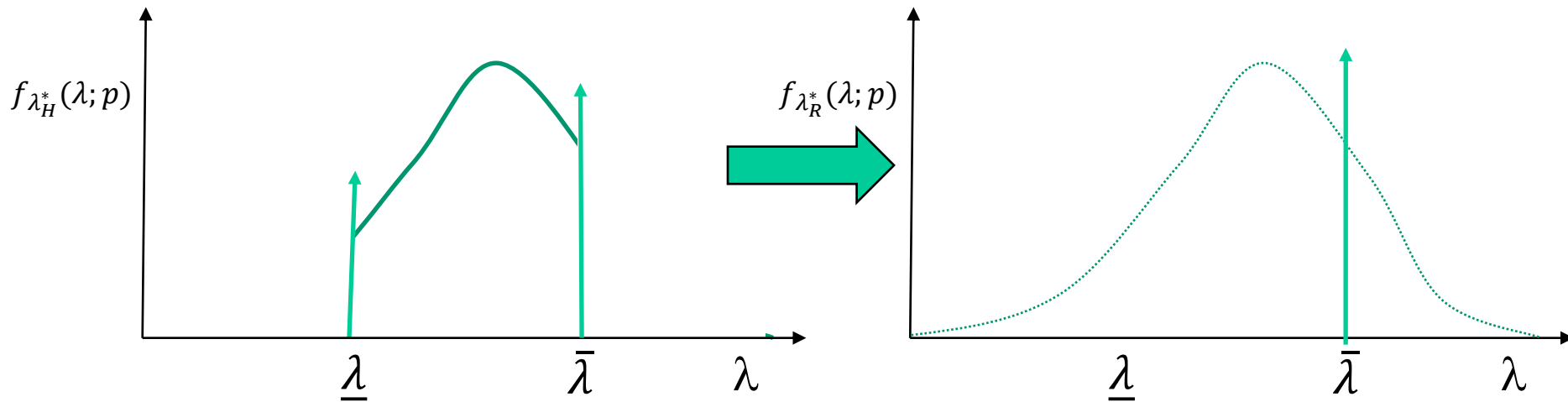
Capturing efforts are Strategic Substitutes

- How does increased L-capture change the returns to R-capture?
  - regardless of priors, and source informativeness, we have

$$\frac{\partial B_R(r; \tilde{r}, \tilde{l})}{\partial \tilde{l}} = V_R'(\bar{\lambda}) F_H(\bar{\lambda}; p_R) \frac{\partial \bar{\lambda}}{\partial l} - V_R'(\underline{\lambda}) F_H(\underline{\lambda}; p_R) \frac{\partial \underline{\lambda}}{\partial l}$$

$\tilde{l} \uparrow$

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$\tilde{l} \uparrow$

$f_{\lambda_H^*}(\lambda;p)$

$f_{\lambda_R^*}(\lambda;p)$

$\underline{\lambda}'$ $\bar{\lambda}'$ λ

$\underline{\lambda}$ $\bar{\lambda}$ λ

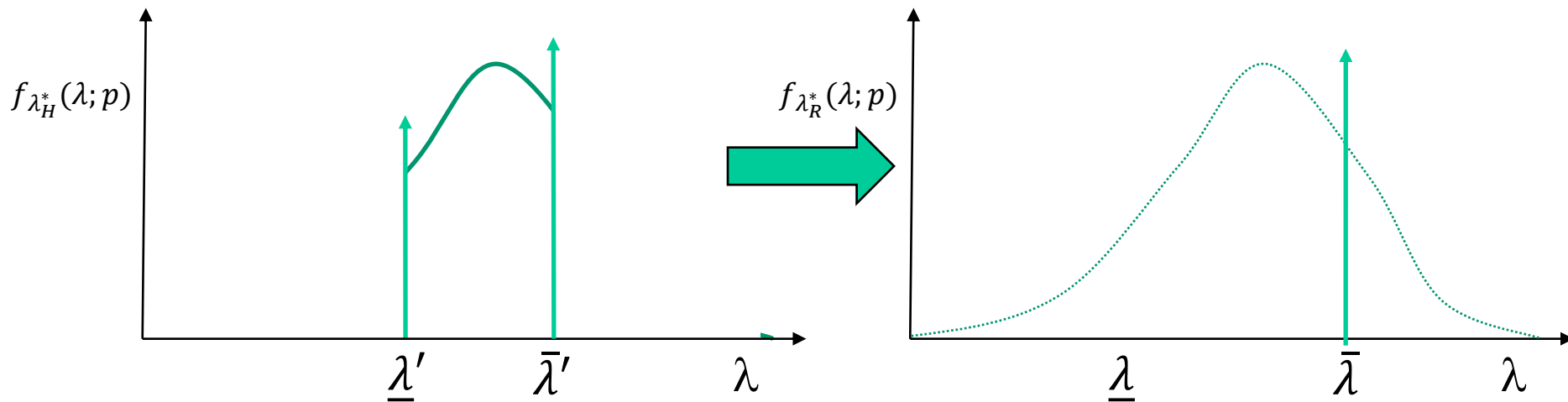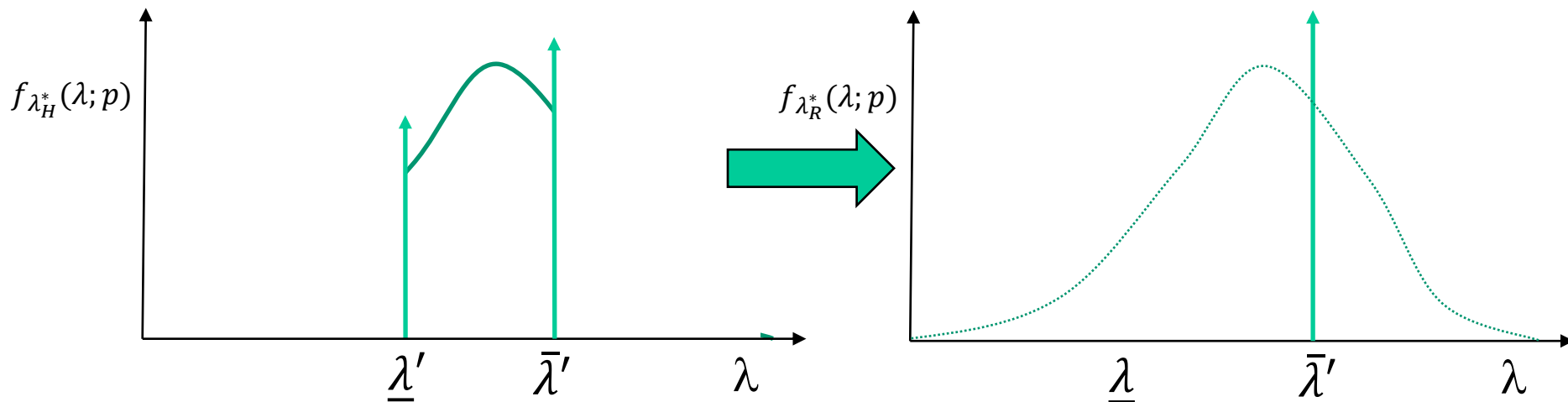Viewers more skeptical of unfavorable messages (L-lies now more favorable to R)

Capturing efforts are Strategic Substitutes

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$$\frac{\partial B_R\big(r; \tilde{r}, \tilde{l}\big)}{\partial \tilde{l}} = V_R'(\bar{\lambda}) F_H\big(\bar{\lambda}; p_R\big) \frac{\partial \bar{\lambda}}{\partial l} - V_R'(\underline{\lambda}) F_H\big(\underline{\lambda}; p_R\big) \frac{\partial \underline{\lambda}}{\partial l}$$

$\tilde{l} \uparrow$

$f_{\lambda_H^*}(\lambda; p)$

$\underline{\lambda}' \qquad \bar{\lambda}' \qquad \lambda$

$f_{\lambda_R^*}(\lambda; p)$

$\underline{\lambda} \qquad \bar{\lambda}' \qquad \lambda$

Viewers more skeptical of favorable messages (R-lies induce lower $\bar{\lambda}$)

Capturing efforts are Strategic Substitutes

- How does increased L-capture change the returns to R-capture?
  - regardless of priors, and source informativeness, we have

$$\frac{\partial B_R(r; \tilde{r}, \tilde{l})}{\partial \tilde{l}} = V_R'(\bar{\lambda}) F_H(\bar{\lambda}; p_R) \frac{\partial \bar{\lambda}}{\partial l} - V_R'(\underline{\lambda}) F_H(\underline{\lambda}; p_R) \frac{\partial \underline{\lambda}}{\partial l} \leq 0$$

  - **Capturing efforts are strategic substitutes**!

- This insight is robust to the presence of an arbitrary fraction of naïve viewers

Strategic Substitutes

Proposition (Strategic Substitutes)

Let $\pi_i(r, l)$ be the probability that an i-sender captures the news outlet given effort levels r and l with $i \in \{H, R, L\}$ and suppose that capture by one sender weakly decreases both the probability that the message is generated by the other sender and by an honest source. If

$$\frac{\partial^2 \pi_i}{\delta r \delta l} = 0,$$

then $B_R(r; \tilde{r}, \tilde{l})$ decreases in $\tilde{l}$ and $B_L(l; \tilde{r}, \tilde{l})$ decreases in $\tilde{r}$.

Example:

- $\pi^R(r, l) = r - \eta l$
- $\pi^L(r, l) = l - \eta r$

Audience Priors and Incentives to Capture

- SIGs capture incentives depend on expected audience.

$$V_i'(\lambda) = \int_0^1 \partial v_i\big(\mu(\lambda; p)\big)/\partial\lambda \, dF_p(p)$$

- An R-SIG (L-SIG) wants to **_fire up the base_** if $\partial v_i\big(\mu(\lambda; p)\big)/\partial\lambda$ increases (decreases) with the prior p.

- If the opposite is true, then SIG wants to **_moderate the opposition_**

- We show this depends on curvature of v_i :

  - If preferences concave enough: moderate the opposition
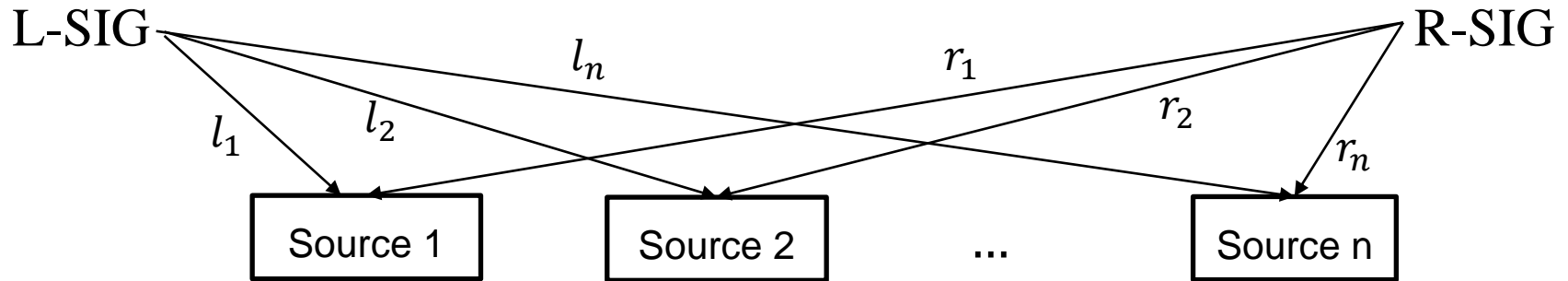
  - If preferences convex enough: fire up the base

Lemma (Firing-up-the-base): *Suppose $v_R(\mu) = g_R\left(\frac{\mu}{1-\mu}\right)$ and $v_L(\mu) = g_L\left(\frac{1-\mu}{\mu}\right)$ with g_i increasing and convex. Then both SIGs want to fire up their base.*

Plan of Talk

- Endogenous Capture
    - Monopoly Information Source
    - Multiple Information Sources
    - Endogenous Source Choice

- Conclusions

Multiple Sources

- *n* (possibly heterogeneous) information sources
  - SIGs exert vector of pressure $r_j, l_j, j \in \{1, \ldots, n\}$
  - Costs of pressure $C_R(\sum_{j=1}^{n} \beta_R^j r_j), C_L(\sum_{j=1}^{n} \beta_L^j l_j)$

L-SIG
l_n
r_1
R-SIG

l_1
l_2
r_2
r_n

| Source 1 | | Source 2 | ... | Source n |

Multiple Sources

- Sources can be heterogeneous *ex ante*

  - Ease of capture β_R^j and β_L^j

  - Informativeness if not captured $(p_{-1}^j(m), p_1^j(m))$

  - Audience: prior distribution among citizens who watch it

- Strategic substitutes exacerbates differences across sources

  - Any cost/return reason that gives relative advantage to one SIG gets amplified

  - Because of general equilibrium considerations, these differences spread across the information source landscape:

*n-1 ex ante* symmetric media ⟹ ALL media unbalanced *ex post*

Multiple Sources

- Supply driven mechanism for differentiation in slant: if one source is dominated by your rival, other things equal, you want to go to the neutral source

  - Bezos bought the Washington Post, not Fox News

Plan of Talk

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Endogenous Citizen choice of Source

- Allow citizens choice of source anticipating capture (r_j^*, l_j^*).
  - Fraction $1 - \gamma$ of viewers sorted exogenously across outlets
  - Fraction γ viewers pick most informative channel *to them*
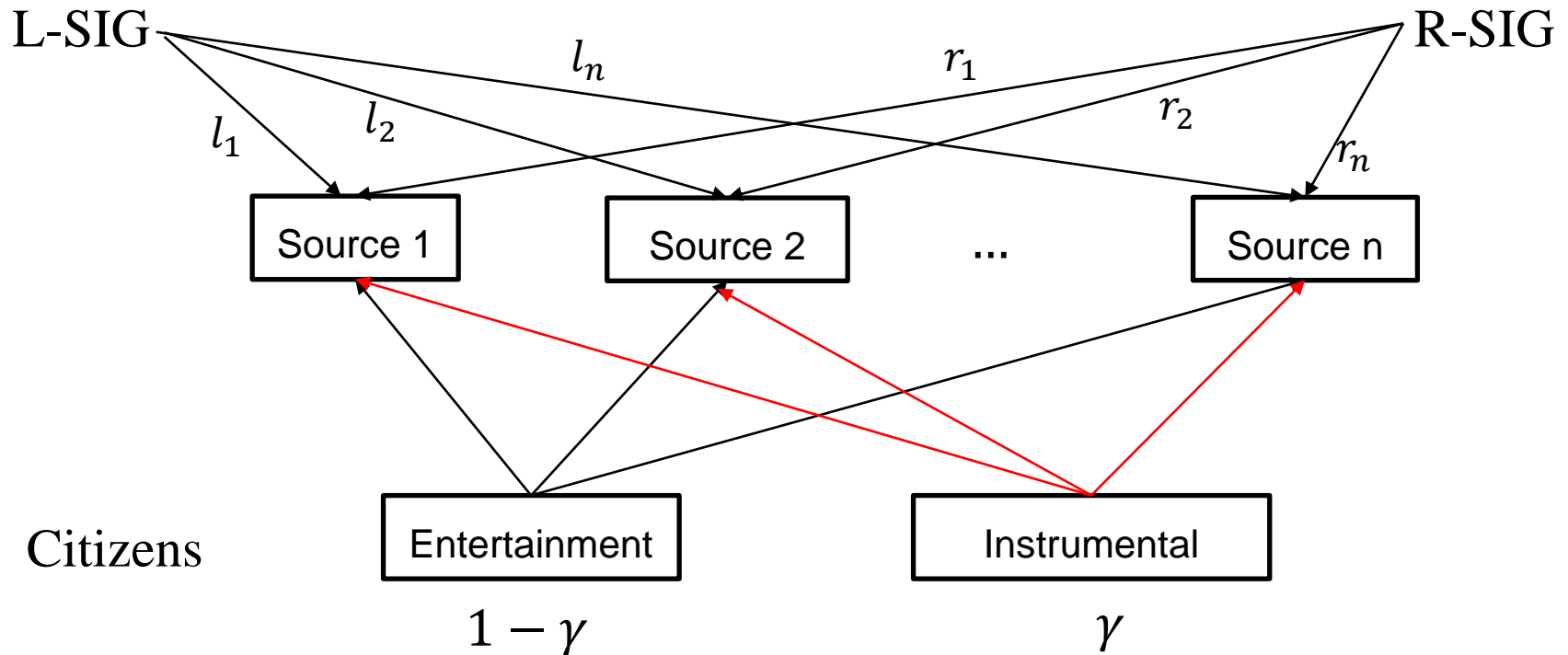
Citizens Choice of Source

- Viewers who are interested in information **endogenously sort according to ideology**
  - Rightwing viewers need a credible low message to change $action$: no point watching media with a high $\underline{\lambda}$
  - Leftwing viewers need a credible high message to change $action$: no point watching media with a low $\bar{\lambda}$

- Partial sorting if degree of capture or precision of honest coverage not identical across outlets

- Similar as Suen(2004) but specific mechanism is very different:
  - We do not impose filtering
  - Value of media decreases for all viewers as capture increases

Polarized Media Landscape

- Capturing efforts being strategic substitutes generates horizontal differentiation

- Viewer sorting:

  - Exacerbates differentiation if SIG want to fire up the base

  - Ameliorates differentiation if SIG want to demobilize the opposition

Polarized Media Landscape

- Capturing efforts being strategic substitutes generates horizontal differentiation
- Viewer sorting:
  - Exacerbates differentiation if SIG want to fire up the base
  - Ameliorates differentiation if SIG want to demobilize the opposition
- Information landscape characterized by
  - very polarized coverage
  - segmented audiences

  can be generated with **fully rational audiences** provided SIG are interested in firing up the base

Demand for Information can Backfire!

Proposition (Viewers Sorting increases Polarization)

Consider two media, A and B, and $v_R(\mu) = g_R \left(\frac{\mu}{1-\mu} \right)$ and $v_L(\mu) = g_L \left(\frac{1-\mu}{\mu} \right)$ with g_i increasing and convex. Both media have the same entertainment value. Fix an asymmetric equilibrium with $\overline{\lambda}_A$ ($\underline{\lambda}_B$) the highest (lowest) likelihood ratio in the R-dominated media outlet A (L-dominated media B). Suppose that citizen priors are such that their most informative source is ideologically aligned.

Then any increase in γ increases the degree of media polarization.

Demand for Information can Backfire!

Intuition:

- Public split according to ideology (action absence news);
  - Viewers with $p > 1/2$ (right-leaning) choose to act, need strong evidence not to act
  - Viewers with $p < 1/2$ (left-leaning) do not act, need strong evidence to act
- SIG prefer to fire-up-their-base
- Increased sorting according to value of information:
  - Increases the prior distribution of right-captured media (in the FOSD sense) decreases it for left-leaning media.
  - This polarizes their respective bases and increases incentives to capture the respective outlet and abandon the other outlet
- If there was full differentiation to begin with: unambiguous reduction in information

Plan of Talk

- Communication Equilibria
- Endogenous Capture
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Conclusions

- Pressure on information landscape: polarized reports but viewers' skepticism

- Symmetric pressure does not cancel and hurts social learning

- SIGs capture leads to ideologically more differentiated landscape

- Citizens sorting according to value of information may exacerbate capture (when SIGs seek to fire up their base) or dampen capture (when SIGs seek to demobilize opposition).

- Increased demand for information can exacerbate coverage polarization and reduce equilibrium informativeness of information landscape

Thank You!