Local Evidence and Diversity in Minipublics

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Why minipublics?

Novel mechanism for citizen participation in public policymaking

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- Lay citizens can access local evidence: privileged insight into how the policy is likely to impact them
- But citizenry-wide deliberation on policies is infeasible
  - rational ignorance (Schumpeter (1950), Downs (1957), Martinelli (2006))
  - minipublics as a small group of "trusted information proxies"

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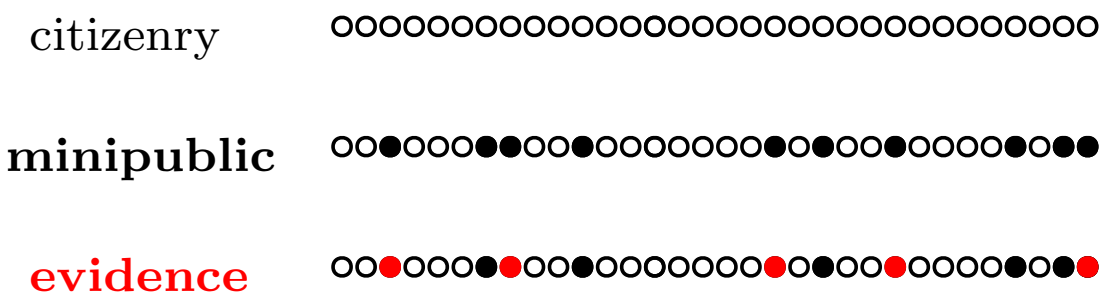
Which social groups ought to be represented in a minipublic?

Evidence production in minipublics



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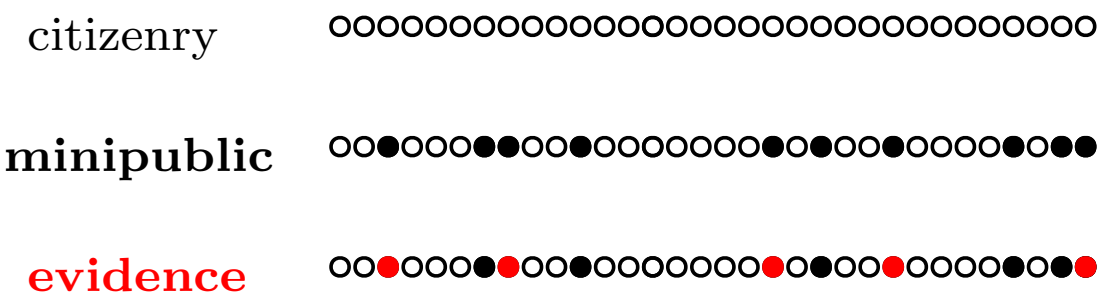

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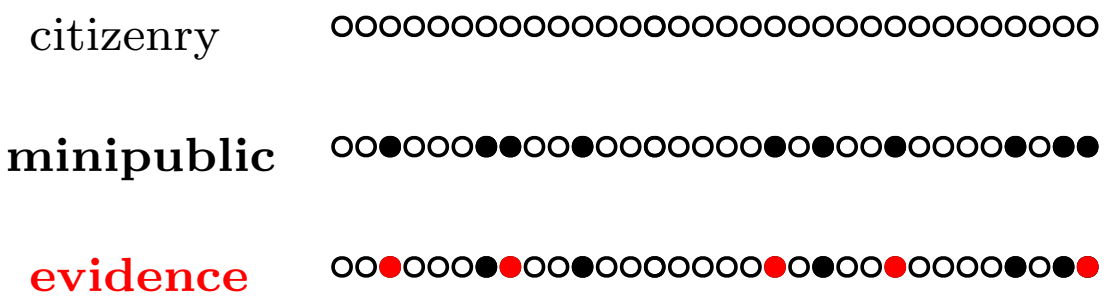

How to select a minipublic from a large citizenry if:

- minipublic citizens produce evidence for a policymaker
- each citizen chooses whether to produce his local evidence
- local evidence is correlated across citizens
- policymaker makes policy decision based on the produced evidence
- minipublic faces uncertainty about the eventual decision threshold

Citizens' Climate Convention in France

- Minipublics recently used across Europe to address climate policy
- CCC: 150 ordinary citizens representative of the French society
  - targeted by gender, age, education, occupation, residence, and geographical area
  - other criteria such as ethnicity or attitudes on climate change not included
- October 2019 - June 2020
- Tasked with advising Macron on France's climate strategy

A plenary session of the Citizen convention for the climate, 20 March 2020. © RFI/Agnès Rougier

Citizens' Climate Convention in France

- Political uncertainty accompanied CCC throughout its proceedings
- Initially Macron pledged to forward recommendations "without filter" to either parliament or a referendum
- Ultimately 10% of CCC's recommendations accepted by the government without modification, 37% modified or watered down, and 53% rejected

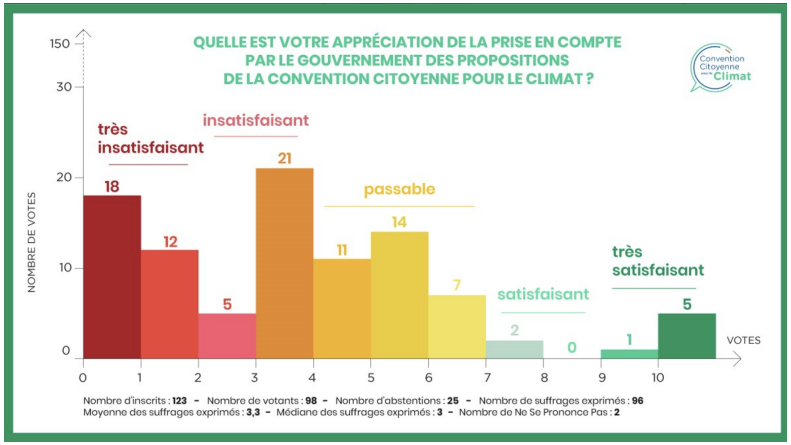

Figure 1: Convention Citoyenne Pour Le Climat, Session 8 (February 26-28 2021)

Concerns about political uncertainty and limited impact spilled over to Scotland's Climate Assembly and the UK Climate Assembly

Questions

This paper is about the link between how representative the minipublic is and how impactful its recommendations are.

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1. Evidence production:

   How does political uncertainty affect citizens' incentives to contribute local evidence in a minipublic?

2. Minipublic design:

   To what degree is the optimal minipublic representative of the citizenry?

Baseline model

Policymaker’s problem

Optimal minipublic

- Minipublic size
- Minipublic composition
- Comparative statics

Discussion

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Players

- A single policymaker
- Unit mass of citizens $i \in [0,1]$
- A minipublic consists of distinct citizens $\mathbf{m} = \{i_1, \ldots, i_k\}$ ordered as

$$0 \leqslant i_1 < \ldots < i_k \leqslant 1$$

- A minipublic can accommodate at most n citizens (minipublic capacity)
- $\mathcal{M}_n$ is the set of all minipublics of size at most $n \geq 0$

Policy evaluation

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- $\beta(\mathbf{m}) := \big(\beta(i_1), \ldots, \beta(i_n)\big)$ local evidence available to minipublic $\mathbf{m}$
- For any minipublic, B and $\beta(\mathbf{m})$ follow a multivariate Gaussian distribution

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- For any minipublic, B and $\beta(\mathbf{m})$ follow a multivariate Gaussian distribution
- Post-minipublic value $B_{\mathbf{m}} = \mathbb{E}[B \mid \mathbf{m}, \beta(\mathbf{m})]$ is distributed according to

$$B_{\mathbf{m}} \sim \mathcal{N}\left(\bar{B}, \Sigma(\mathbf{m})\right)$$

  - centered at prior value $\bar{B}$ for any minipublic
  - what varies with the minipublic is the minipublic informativeness $\Sigma(\mathbf{m})$
  - $B_{\mathbf{m}}$ is more spread out $\Rightarrow$ minipublic is more informative

Minipublic informativeness

Let $\mathcal{M}$ be the set of all finite selections from $[0,1]$

$$\mathcal{M} := \bigcup_{n \geq 0} \mathcal{M}_n$$

Assumption

The minipublic informativeness given by the function $\Sigma : \mathcal{M} \to [0, \sigma^2]$ satisfies the following properties:

(i) $\Sigma(\varnothing) = 0$;

(ii) *for any* $\mathbf{m} \subsetneq \mathbf{m}'$, $\Sigma(\mathbf{m}) < \Sigma(\mathbf{m}')$;

(iii) Σ *is continuous at any* $\mathbf{m} \in \mathcal{M} \setminus \varnothing$.

Payoffs

Both the policymaker and minipublic citizens care about the value of the policy B ("the common good")

- Each minipublic citizen obtains B from adoption and 0 otherwise
- Policymaker obtains $(B - c)$ from adoption and 0 otherwise, where

$$c \sim \mathcal{N}\left(0, \tau^2\right)$$

  - τ^2 captures the extent of political uncertainty
  - c is the threshold of adoption of the policymaker

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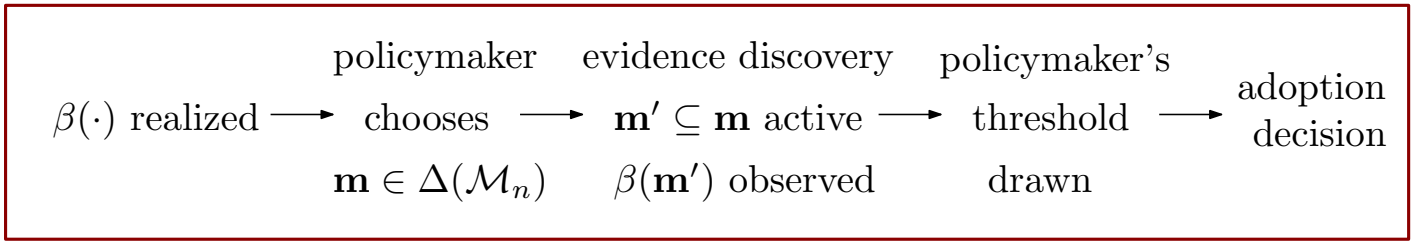
Interpretation: c captures any wedge between the contribution of the policy to the public interest and to other idiosyncratic interests of the policymaker

- shift in priorities due to rare/unexpected events (e.g., pandemics)
- budgetary pressures / bureaucratic friction
- impact on key stakeholders: lobbyists, advocacy groups, party supporters
- implications for policymaker's political legacy

Actions and timing



The game proceeds in 3 stages:

1. Minipublic choice
   - policymaker chooses a lottery over minipublics $\Delta(\mathcal{M}_n)$
   - each $i \in \mathbf{m}$ observes the entire $\mathbf{m}$

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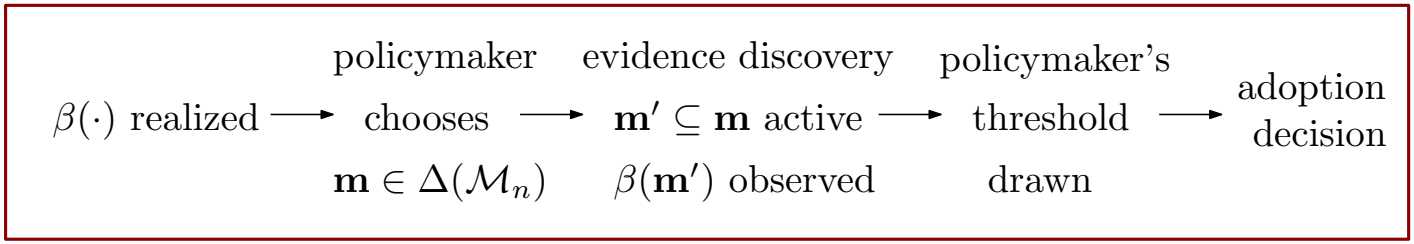

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2. Evidence discovery
   - each $i \in \mathbf{m}$ can costlessly and publicly discover $\beta(i)$
   - all evidence discovery in $\mathbf{m}$ is simultaneous
   - if $i \in \mathbf{m}$ does (not) discover $\beta(i)$, we say i is active (passive)

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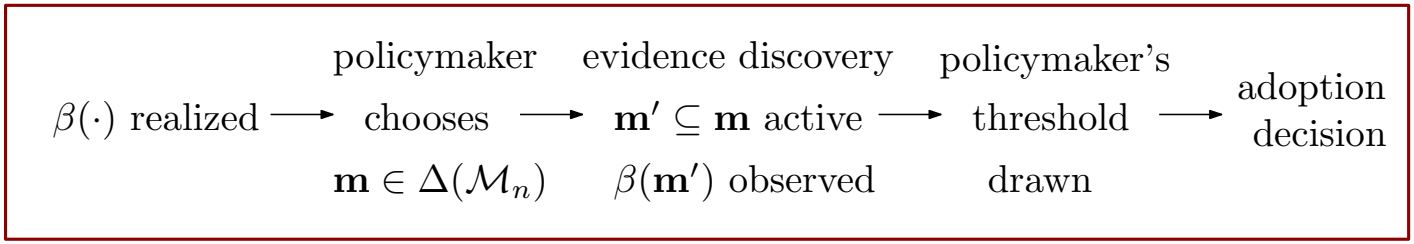

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3. Policy adoption
   - policymaker observes all discovered evidence and the adoption threshold
   - she decides between the policy and the status quo

Stylized features of minipublics

1. Microcosm of the larger citizenry
    - informative about population-wide effects of the policy
2. Targeted recruitment of minipublic citizens
    - not elected or self-selected into minipublic
3. Advisory role, no decisional authority
    - uncertainty about minipublic's eventual impact on policymaking
4. Mechanism for producing public evidence about novel policies
    - rather than aggregating existing private information

Related work

1. Information design with multiple senders: Gentzkow and Kamenica (2016, 2017), Li and Norman (2018), Koessler, Laclau and Tomala (2018), Boleslavsky and Cotton (2018), Au and Kawai (2019, 2020)

   Selective learning among multiple correlated attributes: Liang, Mu and Syrgkanis (2021), Bardhi (2022), Bergemann, Bonatti and Gan (2020)

2. Optimal composition of a team of experts: Hong and Page (2001), Lamberson and Page (2012), Chade and Eeckhout (2018)

   Collective evaluation: Gerardi and Yariv (2008), Moldovanu and Shi (2012), Name Correa and Yildirim (2020)

3. Multi-dimensional learning and Gaussian processes: Jovanovic and Rob (1990), Callander (2011), Callander and Clark (2017), Callander, Lambert and Matouschek (2018), Bardhi (2022), Carnehl and Schneider (2022)

4. Minipublics: Dahl (1989), Chambers (2003), Ferejohn (2008), Fishkin (2009), Warren and Gastil (2015), Kwiek (2020)

Baseline model

Policymaker's problem

Optimal minipublic

- Minipublic size
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Discussion

Expected payoffs

Fix a minipublic $\mathbf{m}$ + evidence discovery strategy profile $(\delta_i)_{i \in \mathbf{m}}$

$\Longrightarrow$ lottery over active minipublics $\hat{\mathbf{m}} \subseteq \mathbf{m}$

$\Longrightarrow$ policymaker observes only the realized outcomes $\beta(\hat{\mathbf{m}})$

Key observation: All players' expected payoffs depend on $\hat{\mathbf{m}}$ only through $\Sigma(\hat{\mathbf{m}})$

Policymaker's payoff

Policymaker adopts the policy if and only if $B_{\hat{\mathbf{m}}} \geqslant c$

The expected payoff from adoption is

$$V_P(\Sigma(\hat{\mathbf{m}})) := \int_{-\infty}^{+\infty} \Pr\left[B_{\hat{\mathbf{m}}} \geqslant c\right] \mathbb{E}\left[B_{\hat{\mathbf{m}}} - c | B_{\hat{\mathbf{m}}} \geqslant c\right] \mathrm{d}\Phi\left(\frac{c}{\tau}\right)$$

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Lemma

The policymaker's expected payoff is strictly increasing in Σ.

- Policymaker's problem is to best predict whether $B \geqslant c$
- For any c, higher $\Sigma \implies$ better prediction $\implies$ more accurate decision
- A more informative minipublic preferred before c is realized as well
- Hence, policymaker maximizes informativeness

Expected payoffs

Citizen's payoff

All citizens have the same expected payoff from informativeness Σ:

$$V_C(\Sigma(\hat{\mathbf{m}})) := \int_{-\infty}^{+\infty} \Pr\left[B_{\hat{\mathbf{m}}} - c \geqslant 0\right] \mathbb{E}\left[B_{\hat{\mathbf{m}}} | B_{\hat{\mathbf{m}}} - c \geqslant 0\right] \mathrm{d}\Phi\left(\frac{c}{\tau}\right)$$

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Lemma

The citizen's expected payoff is strictly quasiconvex in Σ, with a minimum at

$$\underline{\Sigma} = \max\left\{0, \quad \frac{1}{2}\left(\sqrt{\tau^4 + 4\bar{B}^2\tau^2} - 3\tau^2\right)\right\}.$$

- If $\underline{\Sigma} = 0$ no conflict between policymaker and citizens
- But citizen's payoff need not be increasing in informativeness

  $\Longrightarrow$ Citizen does not necessarily prefer contributing to informativeness

Expected misalignment for any post-minipublic value

The shape of the interim payoffs (after $B_{\hat{\mathbf{m}}}$ but before c realized) is key for the players' preferences for informativeness:

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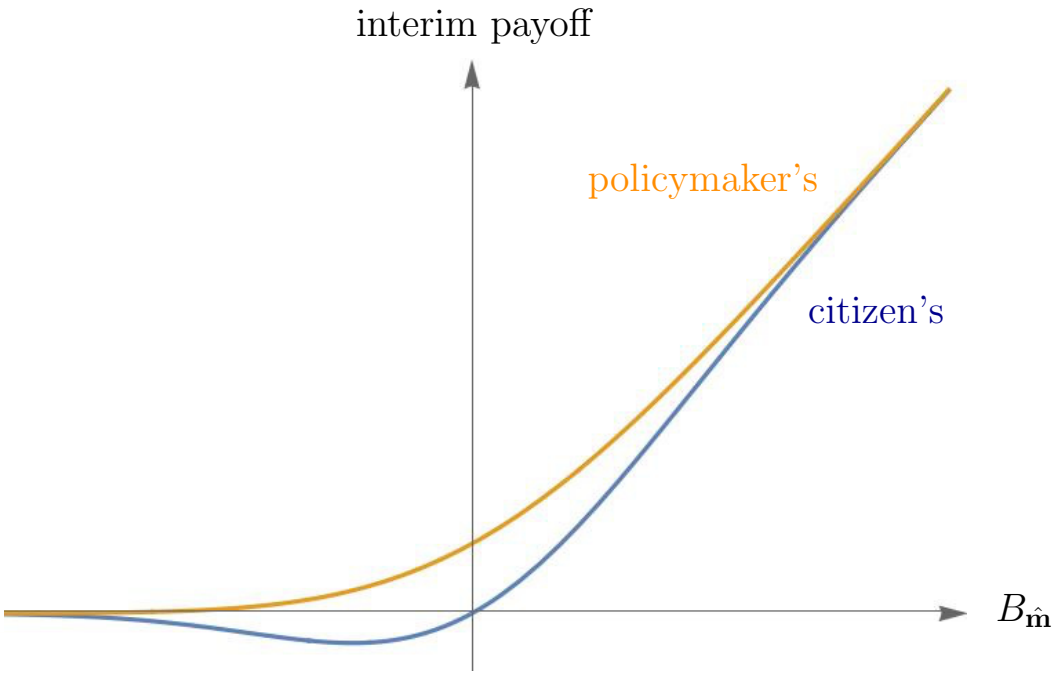

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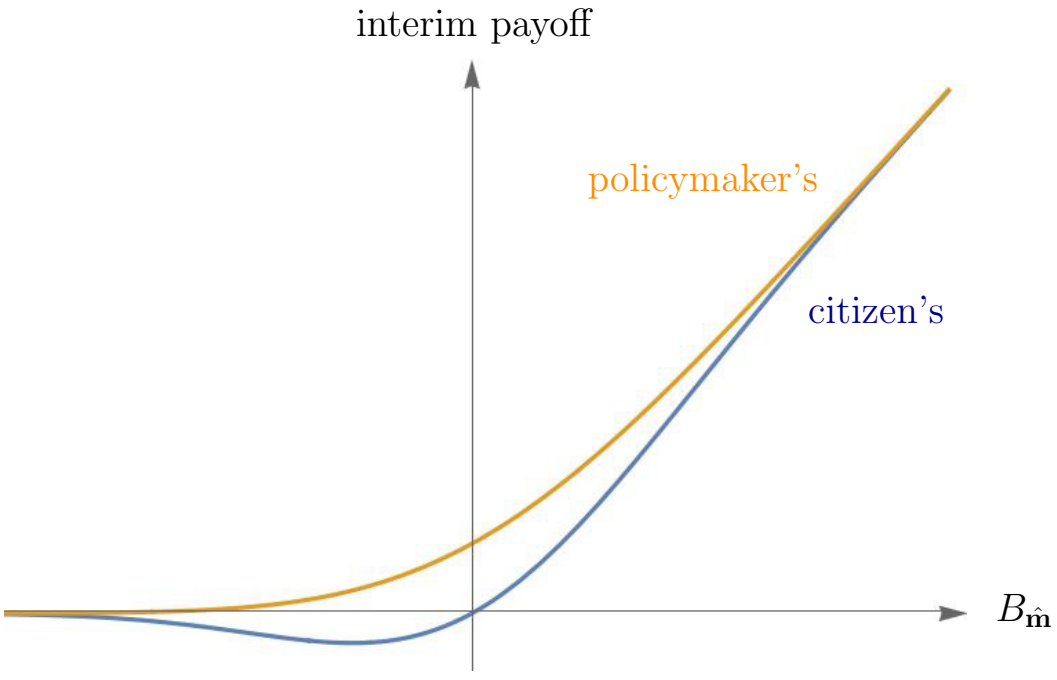

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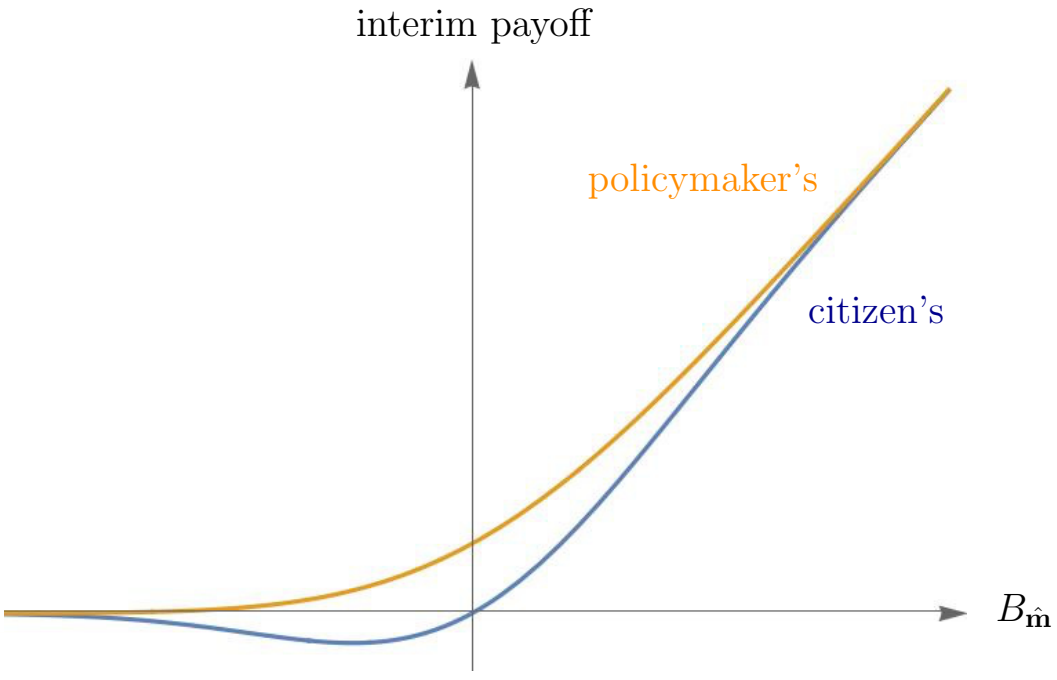

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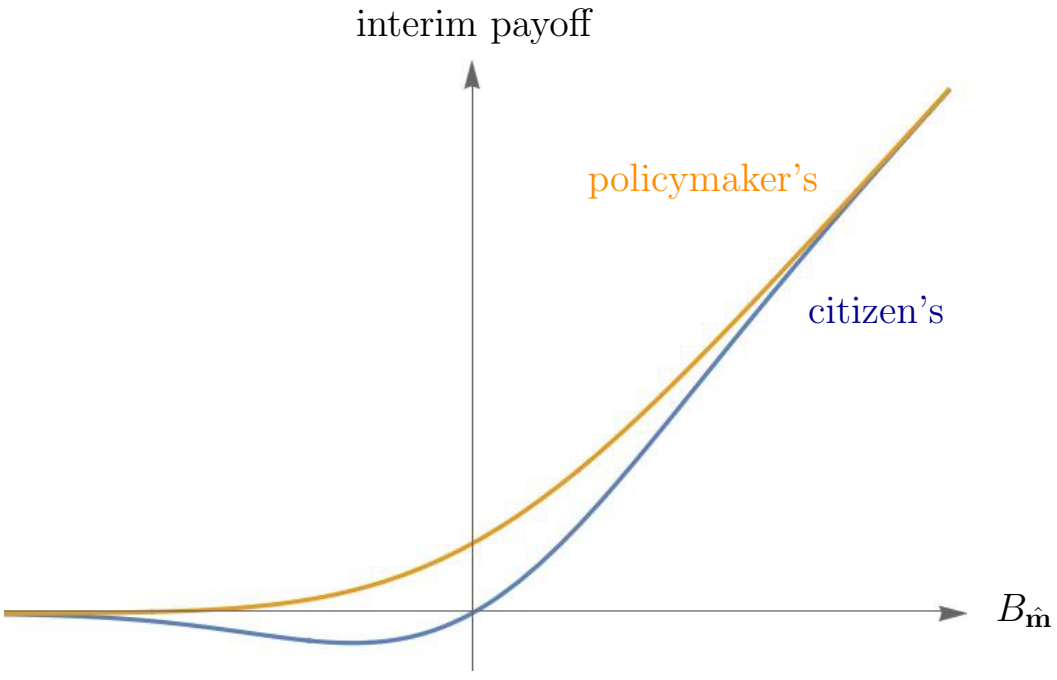

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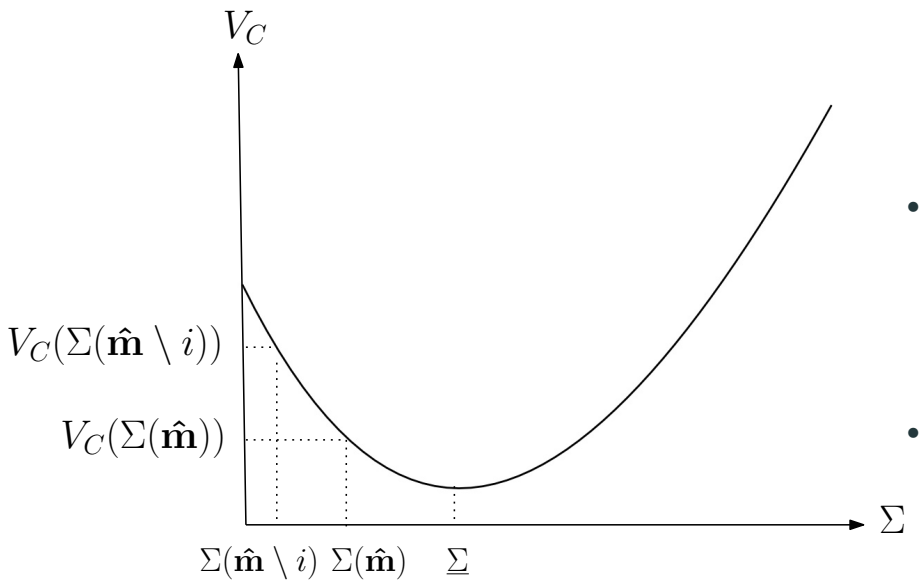
- When does the citizen prefer a mean-preserving spread around $\bar{B}$?

Expected payoffs

Citizen's payoff



- active informativeness of citizen i:

$$\Sigma(\hat{\mathbf{m}})$$

- passive informativeness of citizen i:

$$\Sigma(\hat{\mathbf{m}}\backslash i)$$

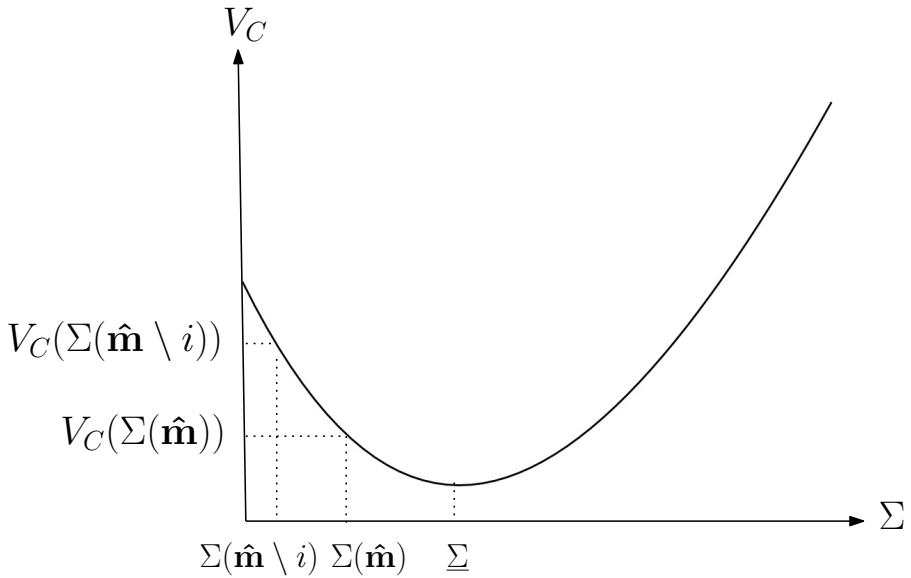
- marginal informativeness of citizen i:

$$M_i(\mathbf{m}) = \Sigma(\hat{\mathbf{m}}) - \Sigma(\hat{\mathbf{m}}\backslash i)$$

Evidence discovery (ED) constraint fixing $\hat{\mathbf{m}}$:

$$\boxed{V_C\left(\Sigma(\hat{\mathbf{m}})\right) \geq V_C\left(\Sigma(\hat{\mathbf{m}}\backslash i)\right)}$$

Curse of too little information



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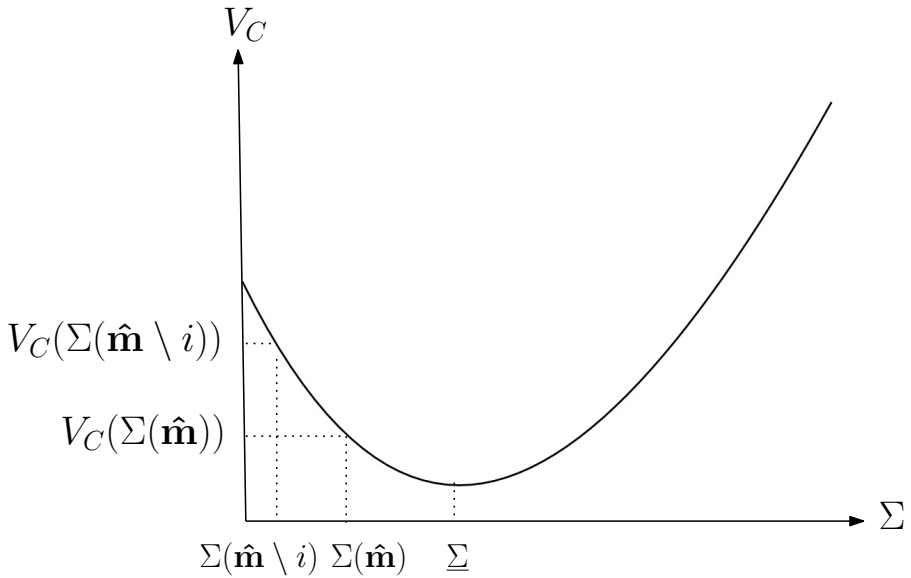

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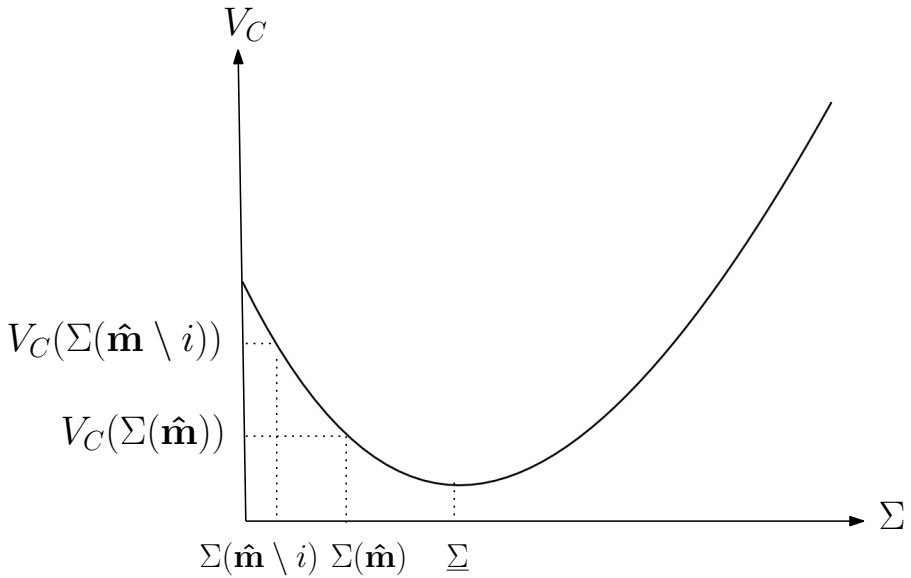

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2. sufficiently uninformative minipublic
   - both $\Sigma(\hat{\mathbf{m}} \setminus i)$ and $\Sigma(\hat{\mathbf{m}})$ must be sufficiently small relative to $\underline{\Sigma}$

Equilibrium selection

We focus on policymaker-preferred Perfect Bayesian equilibria.

Lemma

In the class of policymaker-preferred Perfect Bayesian equilibria, it is without loss to restrict attention to

- *no randomization over minipublics,*
- *pure strategies at the evidence discovery stage (i.e., each citizen in minipublic is active or passive with probability one),*
- *no passive citizens in the minipublic.*

Simplifying policymaker's problem

Policymaker's minipublic choice problem

$$\max_{\mathbf{m} \in \mathcal{M}_n} \quad \Sigma(\mathbf{m}) \tag{P}$$

$$\text{s.t.} \quad V_C(\Sigma(\mathbf{m})) \geq V_C(\Sigma(\mathbf{m} \backslash i)) \quad \forall i \in \mathbf{m}. \tag{ED}$$

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- Policymaker's unconstrained problem: maximizing informativeness
- Set of first-best minipublics $\mathcal{M}_n^f$
- Any first-best minipublic consists of exactly n citizens
- Normative benchmark for minipublic diversity absent strategic considerations

Baseline model

Policymaker's problem

Optimal minipublic

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Discussion

No distortion in minipublic size

Does policymaker ever sample fewer citizens than what capacity allows?

Proposition (Optimal minipublic size)

Given capacity n, the optimal minipublic either is empty or consists of exactly n active citizens.

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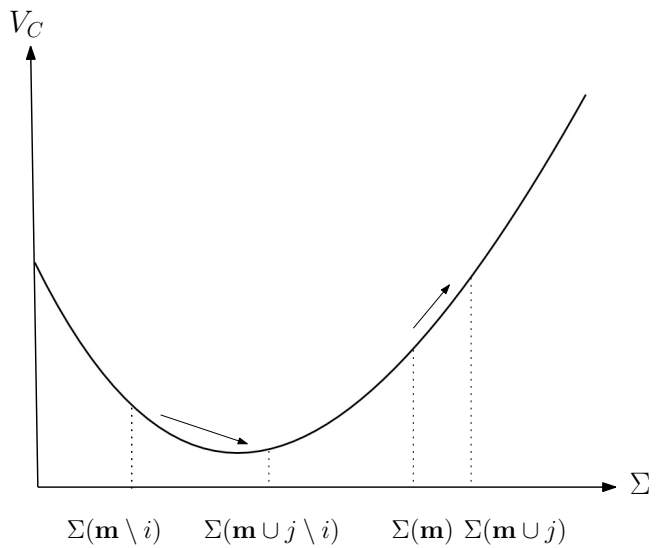
Given capacity n, the optimal minipublic either is empty or consists of exactly n active citizens.

If $\mathbf{m}$ has $n' < n$ citizens, adding a new citizen $j \notin \mathbf{m}$ relaxes all (ED) while improving overall informativeness

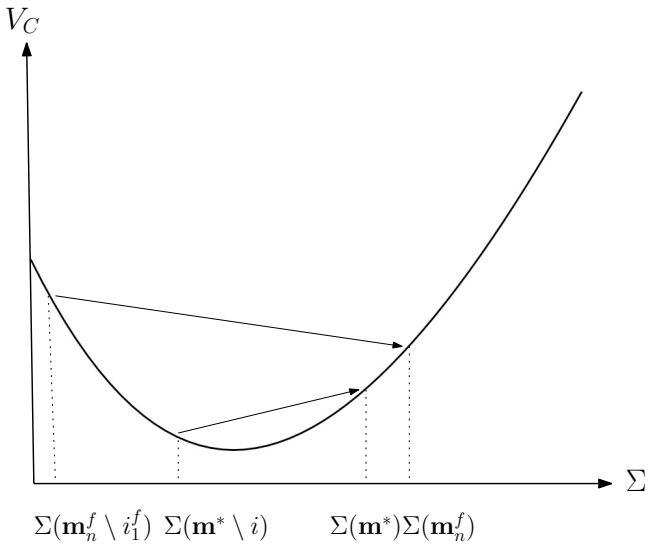


$\Longrightarrow$ If first-best not feasible, then either distorted minipublic composition with n citizens or no minipublic

Reduced marginal informativeness

Passive citizens have excessively high marginal informativeness

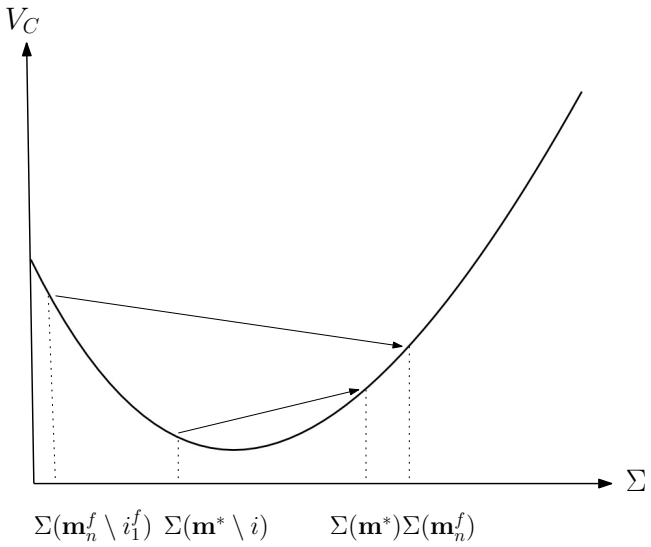
$\Longrightarrow$ If first-best not feasible, marginal info $\searrow$ and passive info $\nearrow$



Reduced marginal informativeness

Passive citizens have excessively high marginal informativeness

$\Longrightarrow$ If first-best not feasible, marginal info $\searrow$ and passive info $\nearrow$



Proposition (Reduced marginal informativeness)

If an optimal minipublic $\mathbf{m}^*$ is neither empty nor a first-best one, then the marginal informativeness for any $i \in \mathbf{m}^*$ is strictly lower than the highest marginal informativeness in any first-best minipublic.

The "largest piece of novel evidence" is less novel than in the first-best minipublic

Ornstein-Uhlenbeck correlation of local evidence

We impose additional structure on the nature of local evidence

(1) The value of the policy corresponds to the policy's average local impact:

$$B := \int_0^1 \beta(i)\mathrm{d}i$$

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Assumption (Distribution of the local impact mapping)

The local impact mapping β is drawn from the set of sample paths of an Ornstein-Uhlenbeck process on $[0,1]$ where for every $i,j \in [0,1]$

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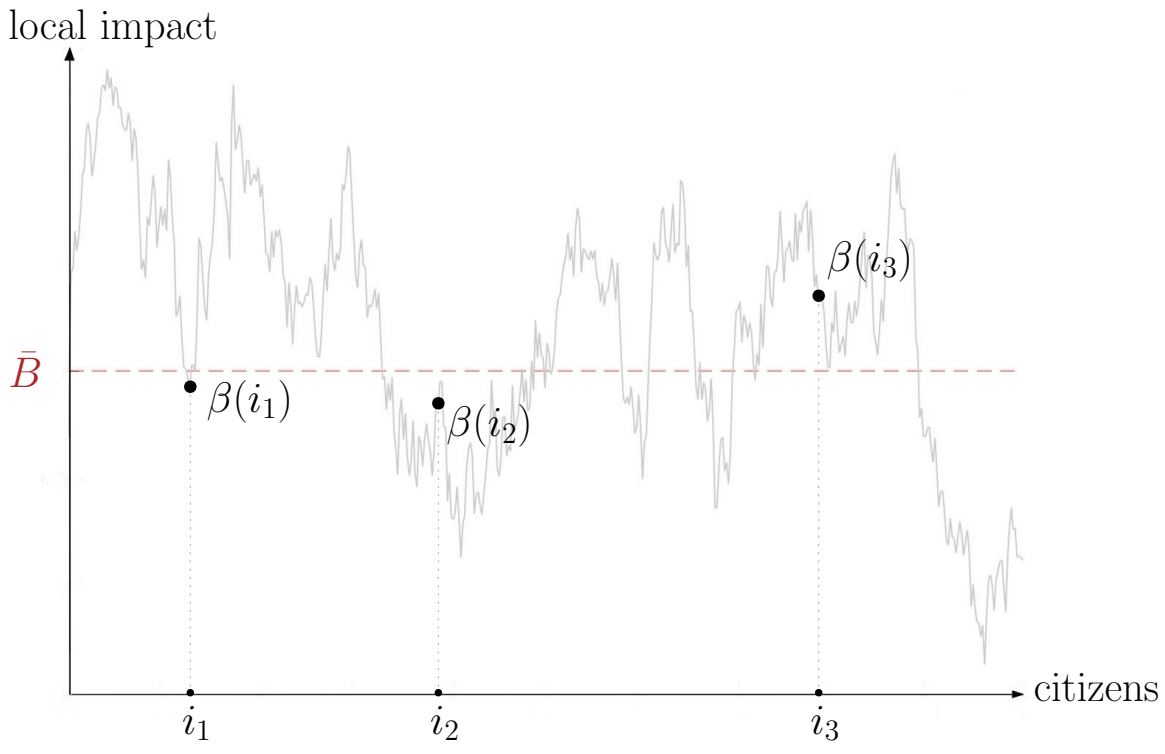
ℓ captures the degree of *homogeneity* among citizens

- $\ell \longrightarrow +\infty$: almost perfectly correlated outcomes (very homogeneous)
- $\ell \longrightarrow 0$: almost independent outcomes (very heterogeneous)

Ornstein-Uhlenbeck correlation of local evidence



This structure implies a tractable form for $\Sigma(\cdot)$

$\Rightarrow$ precise characterization of the composition of the optimal minipublic

$\Rightarrow$ implications for demographic diversity

First-best minipublic

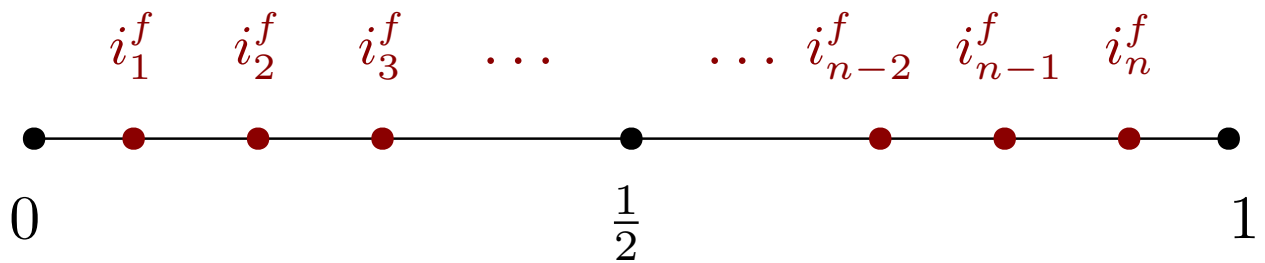
Corollary (Proposition 3.5 in Bardhi (2022))

For any n, there exists a unique first-best minipublic $\mathbf{m}_n^f$ that satisfies the following:

(i) *it is symmetric about the median citizen: $i_k^f = 1 - i_{n-k+1}^f$ for every k;*

(ii) *the distance between adjacent citizens Δ_n^f is constant: $i_k^f - i_{k-1}^f = \Delta_n^f$ for all $k \in \{2, \ldots, n\}$;*

(iii) *the distance Δ_n^f is such that the post-minipublic value $B_{\mathbf{m}_n^f}$ weighs equally the realizations $\beta(i_1^f), \ldots, \beta(i_n^f)$.*



In this first-best minipublic, peripheral citizens i_1^f and i_n^f have the highest marginal informativeness

Small minipublics

- In order to reduce the marginal informativeness of peripheral citizens, their neighbors must be brought closer

$$i_2^* < i_2^f, \quad i_{n-1}^* > i_{n-1}^f$$

- For $n = 1$ and $n = 3$, no distortions possible

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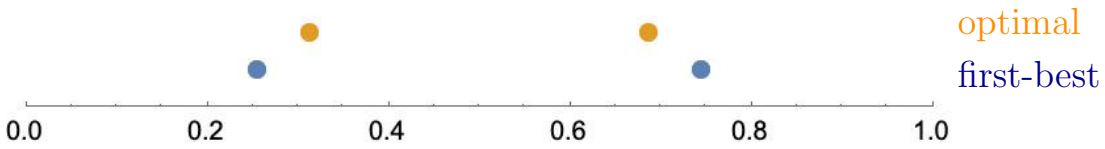

Figure 2: $n = 2$

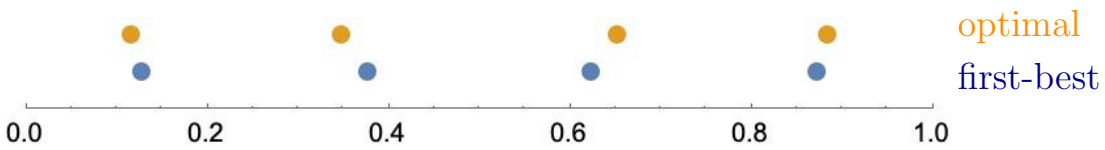

Figure 3: $n = 4$

General characterization

For $n \geq 5$, only two patterns of distortions are possible:

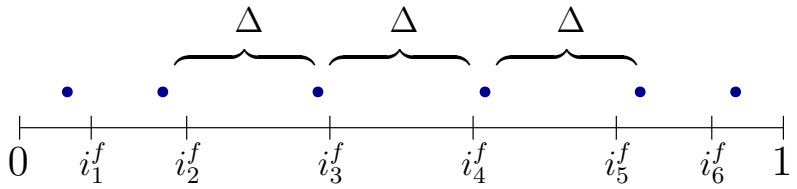

Figure 4: Δ-equidistant

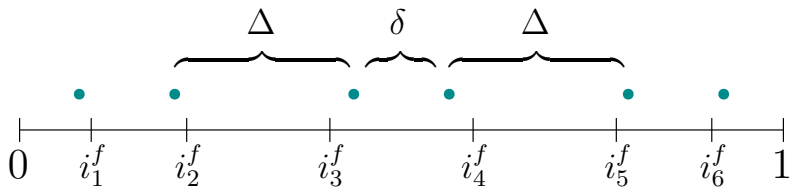

Figure 5: (δ, Δ)-alternating

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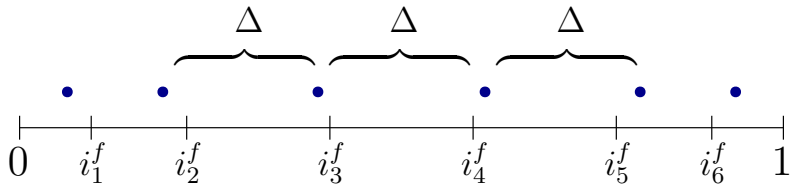

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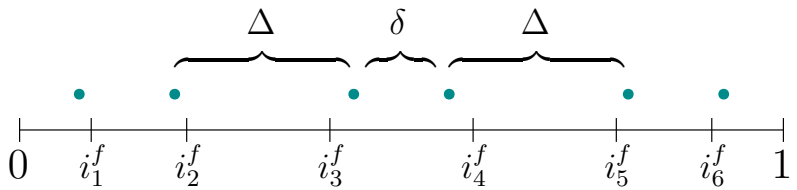

Figure 5: (δ, Δ)-alternating

Of these two patterns, the equidistant one is predominant

- The alternating pattern is suboptimal if an equidistant minipublic is feasible
- The alternating one can arise for at most one capacity

Demographic diversity

Proposition (Distortions in the optimal minipublic)

Let $n \geq 5$. Any optimal minipublic $\mathbf{m}^* = \{i_1^*, \ldots, i_n^*\} \notin \{\varnothing, \mathbf{m}_n^f\}$ satisfies the following properties:

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Computationally, this simplifies the optimization problem

- from n variables (citizens) ...
- to at most two variables (adjacent distances) ...
- and at most two binding (ED) constraints.

Demographic diversity and representativeness

Representativeness and diversity: desirable features in minipublic design (Flanigan et al. (2021), Steel et al. (2020), Fishkin (2011), Brown (2006))

Steel et al. (2020): *"both of these concepts can be interpreted in more than one way, and furthermore the two can lead in different directions"*

Demographic diversity ≡ distance between adjacent demographics

- characterization of $\mathbf{m}^*$ has precise implications for demographic diversity
- equidistant $\mathbf{m}^*$ strictly less diverse than $\mathbf{m}^f$

But to what extent is the optimal minipublic representative of the citizenry?

Demographic diversity and representativeness

We compare representativeness of the $\mathbf{m}^*$ and $\mathbf{m}^f$ according to three natural representativeness measures:

1. random sampling of minipublic citizens (Fishkin, 2009)
    - demographic distance from the expected random sample
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3. Ψ-representativeness

$$\Psi(\mathbf{m}) := \int_0^1 \left(1 - \text{var}\left[\beta(i) \mid \beta(\mathbf{m})\right]\right) \mathrm{d}i$$

    - a Rawlsian criterion: how well the local impact of the minipublic citizens predicts the local impact of any randomly drawn citizen
    - the ranking of the representativeness of $\mathbf{m}^*$ and $\mathbf{m}^f$ can go either way

Dependence on political uncertainty

Greater political uncertainty $\Longrightarrow$ harder to motivate evidence discovery?

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Proposition (No distortions under high or low political uncertainty)

Fix all parameters other than τ^2. There exist cutoffs $0 < \underline{\tau}^2 \leqslant \bar{\tau}^2 < \infty$ such that $\mathbf{m}^* = \mathbf{m}_n^f$ if political uncertainty is either

(i) *sufficiently low (i.e., $\tau^2 \leqslant \underline{\tau}^2$), or*

(ii) *sufficiently high (i.e., $\tau^2 \geqslant \bar{\tau}^2$).*

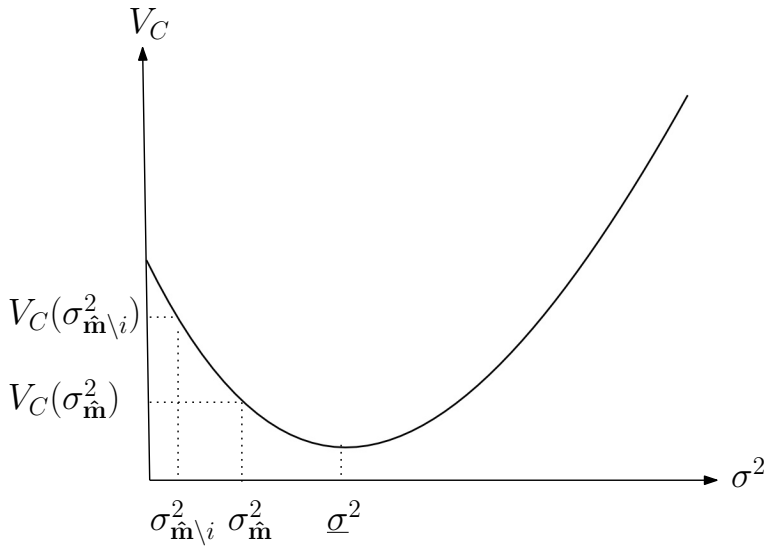
$\Longrightarrow$ **What hampers evidence is moderate, rather than high, uncertainty**

Dependence on political uncertainty

τ^2 determines the V_C-minimizing level of informativeness $\underline{\sigma}^2$

$$\underline{\sigma}^2 = \max\left\{0, \quad \frac{1}{2}\left(\sqrt{\tau^4 + 4\bar{B}^2\tau^2} - 3\tau^2\right)\right\}$$

- as $\tau^2 \to 0$ and as $\tau^2 \to +\infty$, informativeness $\underline{\sigma}^2 \to 0$
- V_C strictly increasing in informativeness (in the limit)
- any minipublic becomes active



However the economic intuition is different at each extreme...

Dependence on political uncertainty

Low uncertainty: $\tau^2 \to 0$

As political uncertainty vanishes

- policymaker prefers the same adoption decision as the citizens ex post
- expected misalignment vanishes for any post-minipublic value
- $V_C - V_P \to 0$

Dependence on political uncertainty

High uncertainty: $\tau^2 \longrightarrow +\infty$

As political uncertainty becomes arbitrarily large

- policymaker's decision fully unpredictable
- probability of adoption $\longrightarrow 1/2$
- expected misalignment unboundedly high for any post-minipublic value
- citizens cannot affect expected misalignment by being passive
- interim payoff strictly convex for any $B_{\mathbf{m}} \in (-\sqrt{2}\tau, \sqrt{2}\tau)$

Dependence on political uncertainty

Moderate uncertainty

But...

when political uncertainty is moderate, citizen might find it worthwhile to remain passive because

1. ex post misalignment sufficiently likely

+

2. citizen can influence significantly the likelihood of ex post misalignment

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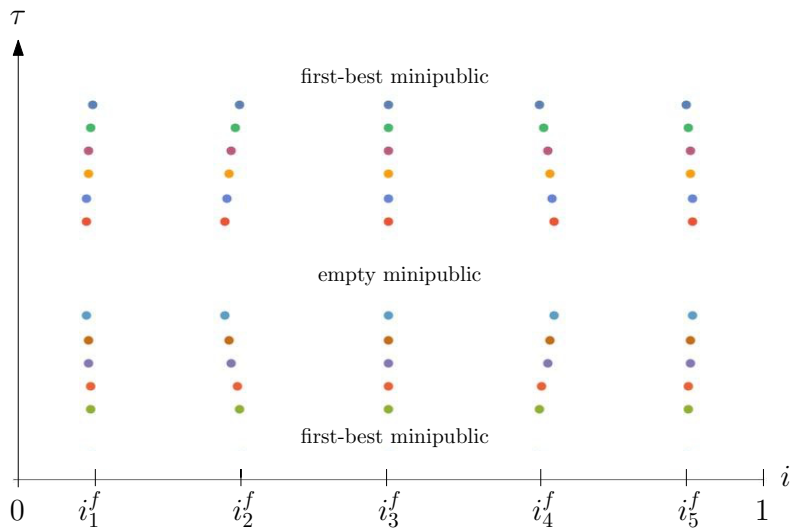

Other comparative statics (in $\bar{B}$, n, and ℓ) in the paper

Baseline model

Policymaker's problem

Optimal minipublic

- Minipublic size
- Minipublic composition
- Comparative statics

Discussion

Implications for minipublic design

- Increasing interest on how to optimally select minipublic citizens so as to strike tradeoffs between representativeness and other considerations (Flanigan et al. (2021), Steel et al. (2020), Jacquet (2017))

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- OECD (2020): *policy impact* and *representativeness* as two desiderata for minipublic design

  policy impact: "the commissioning public authority should publicly commit to responding to or acting on participants' recommendations"

  representativeness: "the participants should be a microcosm of the general public"

- Our analysis sheds light on the interaction between these desiderata

Implications for minipublic design

No tension if political uncertainty either very high or very low

- CCC faced low political uncertainty when it was formed, as it was preceded by the Grand Débat National

But if uncertainty is greater, citizens might self-select out

- UK Climate Assembly (CAUK)
- Preceded by a general election:

  > "a change of Chairs and members of the six CAUK commissioning committees, with some of the newcomers less supportive of CAUK and the net zero target"

- Selection criteria suggestive of targeting greater diversity
  - oversampling of extreme education levels, oversampling of marginal groups, sampling based on climate change attitudes etc.

When impact of minipublic not guaranteed, representativeness might get sacrificed.

Robustness

- Noisy evidence discovery
- Biased policymaker
- Uncertain thresholds for citizens
- Private evidence discovery
- Coordination within a minipublic
- Privately interested citizens
- Delegation of decisional authority

Thank you!