The Invisible Hand of Politics

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Abstract

This paper models the entire political process in reduced form, as a generalized tug of war between citizens of many competing interests. Political competition roots out inefficient policies, just as market competition roots out inefficient production technologies. However, policy efficiency comes inefficiently, as efforts to pull policy in opposite directions cancel and are wasted. In fact, technologies that make political involvement easier can reduce welfare. The simplicity of the model makes clear the generality of the central mechanism. In this light, welfare results from a variety of existing literature can be seen as instances of the same principle. The analysis gives insights into extremist activism, policy resilience, the frustration of politics, and inequity, with application to democracy, non-democratic governments, organizations and committees, marketing, temptation, and decision fatigue.

1 Introduction

Models of politics often focus on a single step in the political process, such as elections, lobbying, or legislative voting. This is natural, as these components of the political process have the clearest structure. Ultimately, however, they are part of a broader political process that includes unstructured steps, as well. Even after candidates have adopted platforms, voters have cast their ballots, legislative votes have been tallied, and a bill has been signed or vetoed and overriden, for example, unenthusiastic bureaucrats may delay or modify its implementation or funding; opponents of the law may challenge it in court or lobby the legislature to issue superceding legislation; individuals or groups may refuse to comply with the new law or, in extreme cases, resort to political violence such as riots and intimidation or even terrorism and assassination; police and judges may choose not to force compliance.

It would be difficult to impose satisfactory structure on these inherently unstructured processes. Instead, this paper models the entire political process in reduced form, as a "black box" that reacts to the political efforts of all

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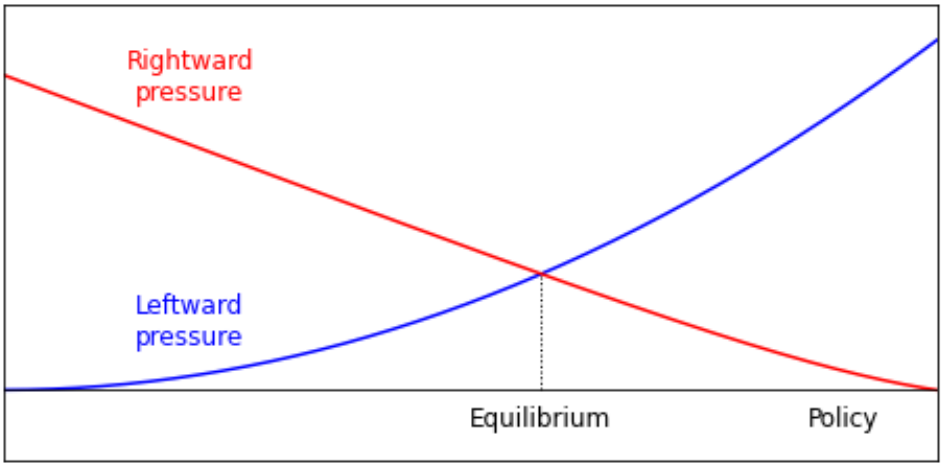


Figure 1: Leftward and rightward pressure, balanced in equilibrium.

citizens involved (just as a production function summarizes the unstructured inner workings of a firm), akin to a children's game of tug of war. The form of this effort is not specified, but could include any of the examples mentioned above.[1]

The model below assumes that citizens have single-peaked preferences, with bliss points scattered along a policy continuum. Each citizen can influence the final policy outcome at a cost that increases (quadratically) with the amount of influence exerted. A citizen whose preferred policy is to the right of the current policy position exerts effort pulling the policy to the right. If the policy moves to her desired position, however, she stops pulling; if others pull it *even* further right, she switches sides and pulls it back to the left.

When a policy is far enough to the left, many citizens wish to pull it to the right while few want to pull it further left, so there is excess rightward pressure, as Figure 1 illustrates, and the policy outcome moves to the right. Similarly, when a policy is far enough to the right, there is excess leftward pressure, so the policy moves left. Somewhere between these extremes, there is a policy position where leftward and rightward forces exactly balance, producing political equilibrium. This process is reminiscent of the way excess supply and excess demand push prices and quantities toward equilibrium in markets.

Citizens' willingness to pull left or right is proportional to their policy disutility, so excess pressure on either side means that the pain one side feels exceeds the opposing side's gain. Movement toward equilibrium reduces this excess disutility, thus improving social welfare. As in markets, then, citizens who are

[1] The examples above are of citizens' efforts to obstruct policies they dislike. Of course, citizens can also promote, reward, or celebrate political outcomes they favor, such as with letters of gratitude, complimentary op-eds or social media posts, cheering at parades or campaign rallies, or erecting monuments.

motivated purely by their selfish idiosyncratic policy interests are guided as if by an "invisible hand" in equilibrium to the policy that maximizes social welfare.[2]

Equilibrium policy efficiency is achieved *inefficiently*, as efforts to pull policy to the left and right negate each other, and are wasted. If citizens could agree to reduce their effort proportionally, for example, the same policy outcome would prevail but all would be better off. In fact, if there were no opposition, a citizen would willingly pay a certain effort cost to move the policy outcome to his desired location, but a citizen may end up paying *more* than this amount in equilibrium, just to prevent the policy outcome from being pulled in the opposite direction. That so much effort can produce so little policy movement can explain why citizens find politics to be so frustrating.

"Left" and "right" are one dimensional concepts, but the logic of balanced political efforts extends readily to multiple dimensions. The analysis below is also equivalent whether the policy outcome is modeled as an inanimate object that citizens manipulate directly, or as the choice variable of a bureaucrat for whom citizens' political pressure generates disutility.

One important implication of the analysis below is that policy outcomes depend on citizens' preferences but do not depend strongly on initial conditions. This implies substantial policy resilience: for example, perturbing equilibrium to induce an extreme status quo has the same (negligible) impact as adding one citizen with extreme policy preferences. Policy resilience manifests empirically in a number of existing studies.

Equilibrium analysis predicts that citizens with the most extreme policy preferences exert the greatest political effort, consistent with a wide array of empirical evidence. As a consequence, policy outcomes are more sensitive to these citizens' preferences than to moderates'. This is actually appropriate, however, in the sense that these citizens suffer the greatest disutility from undesirable policies, so a planner would favor them as well.

Citizens who can exert political effort more effectively can skew policy outcomes in their favor, validating popular concerns of unfair political influence. If all citizens become more efficient at political influence, all exert greater political effort with no net change in the policy outcome, merely exacerbating deadweight loss.

One benefit of the reduced form approach to political influence is that the model below can easily be reinterpreted in the context of democracies, non-democratic governments, businesses or other organizations, and committees. It can also be applied to non-policy settings such as bargaining and marketing, or even to the competing incentives within a single decision maker, with implications for temptation and decision fatigue.

Some of the results presented in this paper have been highlighted (or are present without being highlighted) in existing literature. The model below remains useful because its broader structure applies to a wider range of situations, sometimes with important differences from existing studies. Its broader

[2] As shown below, minimizing policy disutility also minimizes the costs that citizens expend trying to improve policy.

application also shows seemingly unrelated results from existing literature to be manifestations of the same general mechanism. The model is extremely simple, making equilibrium logic more accessible and highlighting nuances not visible elsewhere. Its simplicity and applicability, together with its close parallel to the analysis of markets, may also be useful pedagogically.

The rest of this paper is organized as follows. Section 2 begins by reviewing related literature. Section 3 then introduces the basic model, and Section 4.2 analyzes equilibrium behavior and welfare. Section 5 extends the analysis in several ways, and Section 6 discusses applications. Section 8 then concludes.

2 Literature

In a seminal paper, Becker (1983, 1985) introduces a model where a tax on group A to fund a subsidy for group B is affected by political pressure from both groups. This paper is very much in the same spirit, although the policy issue could be any spatial policy, not limited to subsidies.[3] Becker focuses on marginal shifts in political influence. This paper confirms those results for the more general policy environment, but focuses on efficiency and deadweight loss, which Becker does not formalize. This formalization brings useful clarity: for example, Becker refers to the "tyranny of the status quo", but in the analysis below, the status quo plays almost no role. As noted above, the formulation also connects to other literature in more illuminating ways.

Invoking the same metaphor of a playground tug of war, Duggan and Gao (2020) model political influence using a continuous version of a standard contest function, rather than the pressure function below. With their contest function, congestion dilutes citizens' political influence. In equilibrium, they find that political influence maximizes the *wrong* welfare function: that is, citizens with a certain tolerance for policy disutility push policy to what would be socially optimal if they were more tolerant than they are. Like that paper, this paper finds that policy outcomes favor citizens who can exert political pressure most efficiently. Both papers predict that improved efficiency for all citizens has no impact on the policy outcome, but the welfare impact of this is opposite in the two models: there, it decreases deadweight loss as citizens exert the same effort at lower cost; here, it increases deadweight loss by motivating greater effort.

3 Model

A society consists of n citizens, whose efforts together determine a policy x from a space $X = R$ of policy alternatives.[4] Each citizen has a preferred policy $\hat{x}_i \in X$, and policy utility $u_i(x) = -(x - \hat{x}_i)^2$ is single-peaked in x.[5]

[3] Even in the domain of subsidy negotiation, a continuum of benefits from the tax/subsidy scheme is more realistic than the monolithic pro- and anti-subsidy groups posited in those papers.

[4] Section 5.1 extends the analysis below to multiple dimensions.

[5] Section 9.3 extends to any single-peaked $u_i(x)$ that decreases in $|x - \hat{x}_i|$.

A status quo policy $x_0 \in X$ is given exogenously. Each citizen has the opportunity to alter this status quo by expending effort $e_i \in \mathbb{R}$ at quadratic cost $c(e_i) = e_i^2$ to exert policy pressure $\pi_i = e_i \in \mathbb{R}$.[6] Positive pressure pushes the policy outcome to the right while negative pressure pulls it left. Pressure from different citizens in opposite directions cancel each other out; pressure in the same direction from different citizens perfectly substitute for each other. Let $\Pi^-(x) = \sum_{i;\pi_i \leq 0} \pi_i(e_i)$ denote the total pressure exerted pulling x to the left and let $\Pi^+(x) = \sum_{i;\pi_i \geq 0} \pi_i(e_i(x))$ denote the total pressure exerted pulling x to the right. The (positive or negative) net total amount of pressure is given by $\Pi = \Pi^- + \Pi^+$, and the final outcome from which citizens derive policy utility is simply $x = x_0 + \Pi$.

Citizens choose effort levels simultaneously. e_i^{br} is a best response to the vector $e_{-i} \in R^{n-1}$ of opponent effort levels if it maximizes $U_i = u_i(x) - c(e_i)$. A vector $e^* \in \mathbb{R}^n$ is a (Nash) equilibrium if each component is a best response to e^*_{-i}. In general, the equilibrium policy outcome x^*will depend on the status quo x_0. An equilibrium is a *steady state* if $x^*(x_0) = x_0$. Equivalently, $\Pi^* = 0$ in a steady state, meaning that collective efforts to pull the policy outcome left or push it to the right exactly cancel each other out.

4 Equilibrium Analysis

4.1 Best responses

For any vector $e_{-i} \in R^{n-1}$ of opponent effort levels, Proposition 1 now states the optimal effort level for an individual citizen. An immediate consequence is Corollary 1, which states that a citizen whose ideal policy is farther from the prevailing policy exerts greater effort trying to influence the policy outcome. When the policy outcome lies at a citizen's favored policy position, for example, the citizen exerts no effort to change it. The second part of Proposition 1 states that

Proposition 1. *If $e_i^{br} \in \mathbb{R}$ is a best response to e_{-i} then $e_i^{br} = \hat{x}_i - x$.*

Proof. U_i is concave in a citizen's own effort level, so a citizen's best response to other citizens' effort levels can be obtained by differentiating U_i and equating $U_i'(e_i) = -2(x - \hat{x}_i) - 2e_i = 0$. ■

Corollary 1. $\left|e_i^{br}\right|$ *increases in* $|\hat{x}_i - x|$.

According to Proposition 1, a citizen's best response to peers' efforts depends only on the policy outcome x. Aggregate leftward, rightward, and net pressure Π^-, Π^+, and Π can be expressed as functions of x, as well. As Corollary 2 now states, [rename L and R] Π^- and Π^+ both decrease in x. This means that, as the policy outcome moves further to the right, citizens try harder to pull it left and try less hard to push it further right, as discussed above. Net pressure

[6] Sections 9.1 and 9.2 generalize the pressure and cost functions $\pi_i(e_i)$ and $c_i(e_i)$.

Π and average pressure costs $\bar{c}(x) = \frac{1}{n}\sum_{i=1}^{n} c_i\left(e_i^{br}(x)\right)$ can be related to the mean ideal point $\bar{x} = \frac{1}{n}\sum_{i=1}^{n}\hat{x}_i$.

Corollary 2. *If all citizens play best responses then* Π^- and Π^+ both decrease continuously in x, and aggregate pressure and pressure costs are given by $\Pi(x) = n(\bar{x} - x)$ *and* $C(x) = nV(\hat{x}_i) + n(x - \bar{x})^2$*, respectively.*

Proof. For values of x that do not coincide with any citizen ideal point $\hat{x}_i$, $\Pi^-(x) = \sum_{i;\pi_i<0}\pi_i(e_i(x))$ is continuous in x, with derivative $\frac{\partial}{\partial x}\Pi^-(x) = \sum_{i;\pi_i\leq 0}\frac{\partial}{\partial x}(\hat{x}_i - x) = \sum_{i;\pi_i\leq 0}(-1) < 0$. When $x = \hat{x}_i$ for some i so that $\pi_i = 0$, the sum $\Pi^-(x)$ suddenly gets an extra term, but the value of this term is zero. That $\Pi^-(x)$ decreases in x follows analogously. $\Pi = \sum_i(\hat{x}_i - x) = n(\bar{x} - x)$ follows from simple algebra, substituting $e_i = \hat{x}_i - x$. Similarly, $C(x) = \sum_i e_i^2 = \sum_i(x - \hat{x}_i)^2$ reduces to and $C(x) = \sum_i\left(x^2 - 2x\hat{x}_i + \hat{x}_i^2\right) = nx^2 - 2nx\bar{x} + nV(\hat{x}_i) + n\bar{x}^2 = nV(\hat{x}_i) + n(x - \bar{x})^2$. ■

4.2 Equilibrium

Corollary 2 relates citizens' efforts to the policy outcome, which is defined in relation to citizens' efforts. This then sets the stage for equilibrium: as Proposition 2 now states, the unique equilibrium policy outcome is a weighted average of the status quo and the mean $\bar{x}$ of citizens' ideal points.

Proposition 2. *There is a unique equilibrum* e^**, producing policy outcome* $x^* = \frac{1}{n+1}x_0 + \frac{n}{n+1}\bar{x}$.

Proof. In any equilibrium, all citizens must play best responses. According to Corollary 2, this implies that $x^* = x_0 + n(\bar{x} - x^*)$, which has a unique solution at $x^* = \frac{1}{n+1}x_0 + \frac{n}{n+1}\bar{x}$. ■ Proposition 2 makes clear that if the status quo x_0 happens to be the mean $\bar{x}$ of citizens' ideal points, then x^*coincides with the status quo. Corollary 3 thus states the immediate result that $x^* = x_0 = \bar{x}$ is the unique steady state of the model.

Corollary 3. x^* *is a steady state if and only if* $x_0 = \bar{x} = x^*$.

The steady state policy outcome coincides with the mean $\bar{x}$ of the distribution of citizen ideal points, but Proposition 2 makes clear that policy outcomes *out* of steady state lie close to $\bar{x}$,as well. In general, the equilibrium policy outcome is a weighted average of the status quo and $\bar{x}$, but nearly all the weight is on the latter: the status quo only receives weight $\frac{1}{n}$. In a large population, this weight vanishes, as Corollary 4 now states.

Corollary 4. $\lim_{n\to\infty} x_n^* = \bar{x}$.

4.3 Welfare

This section analyzes social welfare from the perspective of a planner who wishes to maximize (utilitarian) social welfare $W(e) = \sum_i U_i(e, x) = \sum_i u_i(x) - C(e)$.

Proposition 3 gives the effort level $e_i = \frac{n}{n^2+1}(\bar{x} - x_0)$ that each citizen optimally gives, and states the the optimal status quo policy is $x_0 = \bar{x}$.

Proposition 3 (Inefficient efficiency)**.** *For any status quo x_0, the effort e maximizes W if $e_i = \frac{n}{n^2+1}(\bar{x} - x_0)$ for all i. Assuming these effort levels for citizens, the welfare-maximizing status quo is $x_0 = \bar{x}$.*

Proof. W is concave in e_i, so the optimal effort level for citizen i is given by $0 = \frac{\partial W}{\partial e_i} = -n(2x - 2\bar{x}) - 2e_i$, or $e_i = n(\bar{x} - x)$. This is the same for all i, so $\Pi = ne_i$ and optimal effort reduces to $e_i = n(\bar{x} - x_0 - ne_i)$, or $e_i = \frac{n}{n^2+1}(\bar{x} - x_0)$. W is also concave in x_0, so the optimal status quo solves $0 = \frac{\partial W}{\partial x_0} = -2\sum_i (x - \hat{x}_i) = -2n(x - \bar{x})$. ■ In connection with Section 4.2, Proposition 3 implies that the policy outcome that emerges in a steady-state equilibrium is the very best compromise that an unconstrained planner could choose. Efficiency was not the goal of any of the citizens in the model, but like economic efficiency, arises as by an "invisible hand".

Just as a voter's equilibrium effort choice balances maximizing policy utility with minimizing effort costs, a planner must balance maximizing aggregate policy utility with minimizing aggregate pressure costs. In comparison with Corollary 2, however, Proposition 3 implies that equilibrium accomplishes *both* objectives: aggregate costs $C(x)$ are lower for $x = \bar{x}$ than for any other policy choice.

While highlighting the policy efficiency of equilibrium pressure, Proposition 3 also shows that this efficiency comes *inefficiently*: ideally, the planner would set a status quo of $x_0 = \bar{x}$ and voters would exert *no* effort to change it. Even starting from the best same status quo, however, each citizen left to optimize individually has an incentive to influence the policy outcome toward his or her bliss point. When some left and others push right, their efforts cancel out and they are left with the same policy outcome, but non-zero aggregate costs that, according to Corollary 2 are proportional to the variance $V(\hat{x}_i)$ of the distribution of ideal points.[7] Thus, greater differences in voters' policy interests exacerbate deadweight loss.

5 Extensions

5.1 Multiple Dimensions

The model above is one dimensional, but readily extends to multiple dimensions. To that end, generalize x, x_0, π_i, and $\Pi = \sum_i \pi_{i,d}$ to be elements of $\mathbb{R}^d$, where $d \geq 1$, and let $u_i(x) = -\|x - \hat{x}_i\|^2 = -\sum_d (x_{i,d} - \hat{x}_{i,d})^2$. Citizens can still

[7] With a less favorable status quo $x_0 \neq \bar{x}$, Propositions 1 and 3 imply that equilibrium pressure brings the policy outcome almost to $\bar{x}$, but not quite. Optimal pressure closes this gap partly but not completely. The difference between these policy outcomes is negligible, but equilibrium still involves a substantial waste of effort: in the planner's solution, citizens all work together (equally) to pull the status quo in the same direction (toward $\bar{x}$). In equilibrium, one group pulls this direction but another pulls the opposite direction, so that the first group has to pull even harder.

exert pressure $\pi_{i,d} = e_{i,d}$ on issue d at cost $c(e_{i,d}) = e_{i,d}^2$, but can exert pressure on every issue, at cumulative cost $c(e_i) = \|e_i\|^2 = \sum_d e_{i,d}^2$. If voters maximize $U_i = u_i(x) - c(e_i) = \sum_d U_{i,d}(e_{i,d})$ then the model is completely separable, and the analysis above determines equilibrium effort levels for every issue.

5.2 Variation: Bureaucrat

In the model above, the policy outcome x is directly manipulated by every citizen. This section considers another possibility, which is that policy is chosen by one individual, say a bureaucrat or an elected official, and that citizens manipulate x by pressuring this individual. Suppose that the bureaucrat has an increasing distaste for pressure from any individaul i, captured by the utility function $u_B = -\sum_i \pi_i^2$.

If the bureacurat chooses policy x, then by Proposition 1, citizens will respond with pressure levels $\pi_i = e_i = \hat{x}_i - x$. Total policy disutility coincides with the total effort cost exerted by voters collectively. By Corollary can be written as $\sum_i \pi_i^2 = \sum_i e_i^2 = C(x) = nV(\hat{x}_i) + n(x - \bar{x})^2$, and is therefore minimized at $x = \bar{x}$. Thus, as Proposition 4 now states, the bureaucrat implements the same welfare-maximizing policy that voters choose for themselves.

Proposition 4. *If policy is set by a pressure-averse bureaucrat with utility* $u_B = -\sum_i \pi_i^2$ *then in equilibrium* $x = \bar{x}$.

5.3 Universal pressure ability

This section slightly generalizes the pressure function $\pi(e) = \pi e$ and cost function $c(e) = ce^2$ of Section 3 (where $c = \pi = 1$), to explore how equilibruim behavior and welfare change when citizens become more adept at exerting political pressure, whether because effort is less costly (lower c) or translates at a higher rate into political pressure (higher π).

This generalization changes the analysis above only barely, with best response effort levels now given by $e_i = \frac{\pi}{c}(\hat{x}_i - x)$ and the equilibrium policy outcome now given by $x^* = \frac{1}{\frac{n\pi}{c}+1} x_0 + \frac{\frac{n\pi}{c}}{\frac{n\pi}{c}+1}\bar{x}$. Clearly, all that matters for determining equilibrium is the ratio $\frac{\pi}{c}$: citizens will generate twice as much effort (and therefore twice as much political pressure) if they can produce political pressure twice as efficiently, whether because effort costs half as much as before, or transfers at twice the rate into pressure. Either way, the effect is to pull the policy outcome *even* closer to the social optimum.

In a steady state, of course, the policy outcome is already at the social optimum. In that case, citizens exerting twice as much effort or producing twice as much pressure has no effect at all on policy, and merely increases aggregate costs (and thus deadweight loss), which can now be derived as $C(x) = \frac{\pi^2}{c}\sum_i (\hat{x}_i - x)^2 = \frac{n\pi^2}{c} V(\hat{x}_i)$. Note that here, c and π have different impact: halving the cost of effort doubles deadweight loss, while doubling the political efficacy of effort *quadruples* deadweight loss. An intuition for this difference is that doubling efficacy π leads citizens to climb further up on their cost curves,

while halving c has the simultaneous effect of leading citizens to climb less high on their cost curves *and* providing a cost savings on the effort that was already being spent.

5.4 Idiosyncratic pressure ability

The model of Section 3 assumes that all citizens are equally adept at exerting political pressure. More generally, there may be some who are inherently better at this than others (whether because of social standing, wealth, or charisma). This section generalizes the analysis of Section 5.3 to let the cost c_i and efficacy π_i parameters vary by individual.

As in Section 5.3 a citizen's best response effort level is $e_i = \frac{\pi_i}{c_i}(\hat{x}_i - x)$, so aggregate pressure is given by $\Pi = \sum_i \frac{\pi_i}{c_i}(\hat{x}_i - x) = nE\left(\frac{\pi}{c}\right)\left(\bar{x}_{\pi/c} - x\right)$, where $E\left(\frac{\pi_i}{c_i}\right) = \frac{1}{n}\sum_i \frac{\pi_i}{c_i}$ is the average efficacy in the population and $\bar{x}_{\pi/c} = \frac{\sum_i \frac{\pi_i}{c_i}\hat{x}_i}{\sum_i \frac{\pi_i}{c_i}}$ is a weighted average of citizens' bliss points, with greater weight given to those with higher political efficacy $\frac{\pi_i}{c_i}$. The final policy outcome $x^* = \frac{1}{nE\left(\frac{\pi}{c}\right)+1}x_0 + \frac{nE\left(\frac{\pi}{c}\right)}{nE\left(\frac{\pi}{c}\right)+1}\bar{x}_{\pi/c}$ is a weighted average of x_0 and $\bar{x}_{\pi/c}$, with weight on the latter increasing in $E\left(\frac{\pi}{c}\right)$.

The steady state of this modified model is of course the weighted average $\bar{x}_{\pi/c}$ of citizens' bliss points. This is socially optimal from the perspective of a weighted utilitarian welfare function $W = \sum_i \omega_i u_i$ with weight $\omega_i = \frac{\pi_i}{c_i}$. In other words, the final policy outcome takes all citizens into account, but puts greater weight on those who are better able to exert political effort.

5.5 Discrete outcomes

Section 3 assumes that the policy outcome is a continuous variable, but this is not essential: if policy outcomes are discrete, one will generically produce greater welfare than the other, and this policy will prevail in equilibrium. Citizens who prefer the opposite outcome will exert effort to overturn the collective decision, but those who prefer the prevailing outcome will exert greater effort to preserve it. None of the analysis above depends on the domain of x having more than two values. In particular, this means that the model above could apply to elections, where the eventual outcome will be that one candidate or the other wins.

6 Applications

One of the strengths of the model above is its simplicity, but despite its simplicity, it sheds light on a variety of facets of political life, as outlined in this section.

6.1 Policy resilience

Corollary 4 implies that, in large populations, the status quo effectively does not matter: wherever the policy begins, it will come to rest essentially at the mean of the distribution of ideal points. To quantify this, consider two populations: both have one million citizens, each with ideal point $\hat{x}_i = 0$. The first population inherits an extreme status quo $x_0 = 100$. The second population has a status quo of $x_0 = 0$, but has one additional citizen with extreme policy preferences $\hat{x}_i = 100$. According to Proposition 2, these populations have the same final policy outcome, $x^* = .0001$. In other words, the effect of perturbing the status quo is the same as the effect of maintaining the status quo but adding one citizen who prefers the perturbed status quo. In a large population, the influence of any one citizen, and thus the influence of the status quo, is negligible.

One implication of this is policy resilience: if some exogenous one-time force somehow pushes policy away from $\bar{x}$, the new inefficient policy will become the new status quo. Happily, the new status quo should not persist: pressure in the opposite direction should naturally increase, restoring equilibrium at $\bar{x}$.

Using a regression discontinuity design, Lee, Moretti, and Butler (2004) show that Democrat and Republican members of Congress vote differently. If the two parties espouse policies left and right of the social optimum, Democratic victory should increase support for Republicans in the next election, and vice versa. Empirically, this can explain why US midterm elections have long favored the party opposing the current president (Erikson, 1988). Similarly, Menuet, Oriola, and Villieu (2024) find that conservative governments are less likely to be (re)elected when the central bank is more conservative.[8]

If citizen preference drift (say to the right) over time, the status quo will be lower than the social optimum, just as if it were perturbed to the left. In that case, the tendency would be for the policy to move to the right, following citizens' preferences. Consistent with this prediction, Page and Shapiro (1983) find empirically that policy outcomes tend to follow voter preferences.

6.2 Political frustration

The field of politics is well known for being contentious and frustrating. The analysis above helps clarify why this might be so. Most basically, citizens exert large amounts of effort to move policy, but it doesn't move, because of others pulling the opposite direction. In fact, the parameterized model above allows this to be quantified: quadratic costs imply that if a citizen were alone in society, she would pull the policy outcome exactly halfway toward her bliss point from x_0. With n members of society, however, she pulls it $\hat{x}_i - \frac{1}{n+1}x_0 - \frac{n}{n+1}\bar{x}$. In steady state, for instance, she exerts enough energy to pull the policy outcome *all* the way to her bliss point: $\pi_i = \hat{x}_i - x_0$. In other words, she pulls the policy

[8] This same logic also suggests that challengers should have an advantage over incumbents. Empirically, incumbents tend to win more than challengers, but this seems to reflect "valence" advantages such as experience, predictability, access to additional resources, and the selection effect of having won previously (Kawai and Sunada, 2025).

outcome twice as far (at four times the cost) as she would if she lived alone, but in the steady state equilibrium, her efforts don't budget the policy at all: they merely prevent it from being pulled in the opposite direction. It is natural, then, for a citizen to feel the victim of negative externalities imposed by the political efforts of others in society.

6.3 Extremist effort

Corollary 1 predicts that citizens whose preferred policies are extremely liberal or extremely conservative will exert greater effort and generate more political pressure than more centrist citizens. Empirically, available evidence seems universally consist with this. For example, I show in McMurray (2017b) that in the US, citizens with extreme viewpoints are the most likely to vote in general elections, Congressional elections, and presidential primaries; to display yard signs or bumper stickers in support of political candidates; to persuade other citizens how to vote; and to donate to campaigns.

Since they exert the greatest effort, extreme citizens are the most prone to the feelings of frustration described in Section 6.2: extremists work harder than moderates do to move the policy outcome, to no avail (other than to prevent it from slipping backwards). Extreme citizens' disproportionate disutility of wasted political effort compounds the disproportionate policy disutility that they already experience.

6.4 Inequity

Many observers of democracy worry that power skews toward individuals who are rich or well-connected. Alternatively, many worry that democracy might allow large numbers of poor voters to take unfair advantage of a wealthy minority, who lack the size to prevent redistribution. This paper lends structure and credibility to both concerns, but suggests the former may be more problematic.

In a pure election model, it is ambiguous whether wealthy voters or poor voters should have the greatest influence, because a voter's main resource is the time it takes to cast a vote. A substitution effect favors poor voters, as high-wage voters have a higher opportunity cost of time, but an income effect endows wealthy voters with the ability to allocate more time to all leisure activities, including voting. In recognizing that much political influence takes place separately from elections, this broader model of political influence gives scope for wealthy citizens to use their wealth for influence. Citizens with high labor income can, for the same amount of time, purchase say more units of time from professional lobbyists. Section 5.4 confirms that imbalance in the ability to produce political pressure translates into imbalance in policy outcomes: the steady state policy outcome is a *weighted* average of voter utilities, with greater weight on citizens with the greatest efficiency $\frac{\pi_i}{c_i}$ of producing political pressure.

On the flip side, if utility is concave in wealth then poor citizens should be more motivated to accumulate wealth from rich citizens than rich citizens are to defend themselves against redistribution. Thus, this paper also corroborates the

concern that democracy may favor redistribution. This seems to be of secondary concern, however, in that redistribution will only occur in equilibrium if it is efficient, in the sense that the gains to those who exerted energy to increase redistribution outweigh the costs to those exerting energy to reduce it.

6.5 Non-democracies

Many of the applications listed above describe democratic policy processes. The model above is general enough to accommodate both democratic and non-democratic institutions, however, so this section applies the model to other settings: non-democratic political settings, non-political organizations, bargaining environments, marketing, contests, and even intrapersonal conflicts such as temptation and decision fatigue.

Autocracies

Democratic institutions such as elections that are often the focus of study often do not exist (or function poorly) in autocracies. Because of this, most canonical political economic research has little to say about political processes in many of the most densely populated regions of the world. Even if the institutions are entirely different, however, it seems intuitive that processes similar to the above should take place even in these settings: citizens are impacted by policies, and should influence these policies using whatever means are available to them. Efforts to reshape policy might range from hiding resources so that the government doesn't confiscate them, to bribing enforcers of government edicts, to militant guerilla resistence.[9]

Recent empirical research confirms that non-democratic governments respond to citizens' political activity, just as democracies do. For example, field experiments by Chen et al. (2016) and Buntaine et al. (2024) show that citizen complaints influence municipal governments and environmental regulation in authoritarian China. Chapman (2021) and Shirikov (2024) present evidence that the Russian government seeks to curry public favor both in communicating to citizens and in inviting their feedback. Fisman et al. (2021) present evidence that Chinese municipalities relaxed COVID-19 restrictions with timing that reacted to citizen discontent.

Organizations, committees

If a pressure model applies to non-democracies, it may also apply to non-political organizations. Traditionally, for example, executives are looked at as dictators within a firm. Like the pressure-averse bureacurat of Section 4, however, an executive is likely to take employees' preferences into account when deciding rules about remote work or company culture. Employees can convey these preferences via complaint emails (or emails of gratitude), reluctance (or enthusiasm)

[9] As noted above, it could also take the form of positive reinforcements, such as singing more jubilantly in honor of leaders who exert their dominance more humanely.

to complete assignments, and so on. These activities can bring negative (or positive) utility to the executive if he feels altruism toward the employees or finds complaints to be a nuisance (or loves praise). It could also be driven by a profit motive, as content employees are willing to work at lower wages.

Often, disputes may arise between departments (such as when engineering and marketing disagree over the appropriate level of investment in artificial intelligence), and an executive may need to broker a compromise. When it is not possible to satisfy everyone, all sides are likely to feel frustrated that they exert so much effort with so little affect on company policy.[10] Executive disutility is proportional to the *combined* disutility of all sides, so an executive may feel pulled hopelessly between factions, like the rope in a game of tug of war.

Of course, this same process may occur at the level of a committee within an organization. At every committee meeting, individuals must choose how much effort to invest (both during the meeting and in preparation for it) in lobbying the group to adopt a different outcome. Meetings are notorious for going long but accomplishing little, consistent with the prediction that all sides will exert substantial effort without budging the policy outcome.

Bargaining, marketing, and contests

Applications to democracy, organizations, and even committees presuppose a sizeable number n of individuals. However, none of the analysis above requires this: the same results hold even for $n = 2$. In that sense, the model above can also capture instances of bilateral bargaining, such as when the buyer and seller of a good haggle over its price, or a married couple discuss whether to spend more of their shared wealth on home furnishings or on travel and recreation.

If a buyer and seller know each other's valuations of a good x_1 and x_2, for example, a natural "policy" outcome might be to agree on the midpoint price $\bar{x}$, neither side finding it worth the effort to push for a more favorable price. Alternatively, if differences in wealth or other circumstances make one side more desperate, they may be more willing to exert effort toward getting a good deal than the other side, resulting in a favorable price outcome. This mirrors the conclusion of the bilateral bargaining model of Rubinstein (1982), where a bargaining outcome favors the player with greater patience, but that result relies on a very specific bargaining protocol of alternative offers; bargaining is rarely constrained to follow such a rigid structure.

Baron and Ferejohn's (1989) canonical model of legislative bargaining assumes the very specific protocol of a random legislator chosen to propose policy for legislative vote. In equilibrium, this legislator exploits this opportunity to pull policy in her desired direction. However, such specific structure is rarely (if ever) imposed on a legislature. Rather, bargaining procedures may be very elaborate and very flexible. This lends itself to the reduced form approach above, which makes the more plausible prediction that the policy outcome will

[10] Traditionally, office "politics" are known for being just as frustrating as political politics.

simply be a compromise between the various policies preferred by each of the legislators.

An application similar to bargaining is marketing. A consumer chooses what quantities of goods to buy from different firms (which could be selling the same product or selling different products that the consumer views as substitutes), while each firm tries to influence the consumer to purchase more from them. After experiencing marketing efforts from all sides, the consumer might ultimately choose the same consumption bundle she would have chosen if no marketing had taken place. In that case, all market efforts are revealed as deadweight loss. If one firm is especially motivated to make sales, it may be willing to exert extra effort in convincing the consumer to settle on a spending outcome that favors that firm over others.

Since the model also accommodates discrete outcomes, as described in Section 5.5, a rival marketing application is when a consumer purchases a single good, and rival firms vy for the sale. Alternatively, they could be vying to hire a job candidate who can only accept one position. In a similar vein, if the policy outcome is discrete then the pressure function Π can be interpreted as a contest function, where one side ultimately wins and one loses. Back to the context of democracy, a natural application of this is an election with candidates from two parties.

Temptation, decision fatigue

The tug of war model above can also be useful in understanding conflicts *within* an individual between "multiple selves", jockeying to dominate an upcoming decision. For example, a student says "part of me wants to work on homework, study hard, and get good grades; part of me wants to play video games and go to parties; part of me just wants to sleep in and do nothing". Like the bureaucrat of Section 4 feeling pressured by multiple factions, the student cannot satisfy all of these competing demands, and may settle on a compromise that accomplishes some of each goal.

Once the student settles on a "steady state", exogenous forces might intervene to shift the student's preferred balance, such as when a video game consol breaks. If nothing happens to alter the appetites underlying the student's choices, however, the status quo should exhibit the resilience highlighted in Section 6.1: as soon as the game consol is repaired, the unsatiated appetite for video games will pull more strongly, and the student will forego sleep and homework to binge on video games until the status quo balance has been restored. In a similar way, a new year's resolution to forego sugar might help a dieter succeed for a time, but unless underlying preferences can be altered, the pent up demand for cake and ice cream will continue to intensify until a binge restores the steady state (thus undoing much or all of the health progress achieved previously).

The contest between competing incentives is not limited to good habits that fight against bad habits, but could include any decisions involving trade offs. For example, one faction within a worker's psyche might favor consumption while

another favors leisure. In a moment of indecision between these competing desires, a decision maker might describe "feeling torn", just like a bureaucrat experiencing pressure from all sides. Agonizing between the two objectives leaves "decision fatigue", especially when a budget constraint is so tight that necessary compromise falls far short of either ideal. Such agony may also be unproductive, eventually bringing an individual to make the same decision they had favored initially.

7 Discussion

7.1 Continuous effort

A key ingredient for efficiency in the analysis above is that effort choice is continuous, so that citizens can exactly calibrate their marginal impact on the policy outcome to their marginal policy disutility. This echoes results from existing literature. For example, Krishna and Morgan (2010) show that elections can be inefficient when voting is compulsory, because majorities win even when minority preferences are more intense. Voluntary voting removes this inefficiency, as the side who collectively cares more about the election outcome is more willing to pay the cost of voting. When candidates compete for discrete votes, as in Downs (1957), they cater to the median voter. This can be efficient if voter utility is linear or the distribution of ideal points is symmetric, but is otherwise inefficient. In that case, efficiency can be restored if abstention is allowed, as in Ledyard (1984), or voting is probabilistic (see Coughlin, 1992).

Buchanan and Tullock (1962) propose vote buying as a way to allow voters with stronger preferences greater influence in elections. However, this need not yield efficiency, either with fixed alternatives (see Casella, Llorente-Saguer, and Palfrey, 2012) or within a game of candidate competition (see Xefteris and Ziros, 2024). Lalley and Weyl (2018) show that efficiency can be guaranteed if the cost of additional votes increases quadratically.

7.2 Efficiency

The literature cited in Section 7.1 suggest that if specific conditions are not satisfied exactly (e.g., if voting is compulsory, if vote buying devolves to an inferior equilibrium, or if the cost of votes is set to be some non-quadratic function) then efficiency may fail. Section 6.5 suggests that the efficiency result of Section 4.2 may apply even to elections, but if an inefficient election outcome occurs, the myriad political activities described in Section 1 should still allow citizens a continuous effort margin on which to optimize, restoring efficiency, as described in Section 6.1.

If political pressure operates in China and Russia just as it does in democracies, as the references in Section 6.5 indicate, the logic above suggests that even autocracies should settle on efficient policies. At one level, this makes sense: dictator with no regard for his subjects' well being might have power to extract

resources from them, but if there is a way to do so that gives them less disutility, he can do so with less resistance or backlash, and can presumably then extract a greater quantity resources. In that case, it is important to keep in mind that efficiency is *weighted* utilitarian, with weights favoring those with greater political influence (e.g., the royal family or other elites). In that light, transitions to democracy might be viewed as an effort to shift to a more uniformly-weighted utilitarian outcomes.

8 Conclusion

Recognizing that political influence takes myriad forms that would be difficult to formalize, this paper adopts a "black box" model translating citizen effort into policy influence. Citizens exert effort in proportion to their marginal utilities, producing policies that are socially efficient. Steady state policy outcomes are achieved with lower effort costs than any other policy would prompt, but political effort is still inefficiently wasted, especially by citizens with extreme policy preferences.

The model above is attractively simple. Pedagogically, it would be easy to introduce to undergraduates in an introductory economics or political science course, where Figure 2 could easily be framed as a reinterpretation of the familiar model of supply and demand, with excess leftward and rightward pressure taking the place of excess supply and demand.[11] The visual image of a tug of war is accessible to lay audiences.

The model above is also flexible: it accommodates multiple dimensions, and citizens can directly influence policy or, equivalently, can influence a policy maker who provides efficient policies to minimize his exposure to pressure. Universal improvements in pressure production actually lower welfare, by prompting additional wasted effort. Heterogeneous efficiency in pressure production produces outcomes that favor the most effective citizens. Steady state policy outcomes are resilient to changes in the status quo. In addition to the above extensions, the appendix shows that the basic logic of equilibrium holds for large classes of utility and cost functions.

The analysis above explains why extremists exert greater political effort, empirically, and why policy changes not accompanied by underlying changes in citizens' interests may be short lived. The model explains why politics is so frustrating, and validates concerns that wealthy or well-connected voters might have undue influence (but still not be able to protect themselves from some redistribution). The model can apply to non-democratic governments, non-government organizations, and even bilateral bartering, marketing, or intrapersonal conflict. The analysis highlights a theme in existing literature, regarding the importance of continuity for efficiency.

It is not entirely clear what the normative implications of the above analysis should be. Certainly, the prediction that policy outcomes are efficient should be celebrated. One possible reaction to this could be political laissez-faire:

[11] Advanced undergraduates could readily solve the parameterized model algebraically.

don't worry about the policy making process; if a policy too far left somehow prevails, citizens' desire to pull it right again will intensify until the mistake is corrected (and vice versa).[12] Similar logic might suggest that, in elections, common-interest considerations such as a candidate's experience or character should take precedence over policy congruence, since the latter cam be achieved later through other political activities. If political effectiveness is heterogeneous, however, utilitarian outcomes may overweight some citizens and underweight others. As Section 6.5 emphasizes, the same may be true in autocracies.

The deadweight loss and associated frustration of politics seem difficult to avoid. Disengaging is ill advised, however, because even when citizens see no policy movement, their political efforts matter, preventing policies from being pulled *farther* from a citizen's bliss point. Agreeing to reduce both sides' political efforts would enhance welfare, but be unstable, like a Prisoner's dilemma: citizens on either side would have incentive to renege and exert effort. Where possible, welfare might be enhanced by decentralization, so that policies can be tailored to smaller groups with less heterogeneous interests (especially if citizens can freely relocate, as in Tiebout (1956)).

An important direction for future work would be to add dynamics to the static model above.[13] It may be, for example, that political victories today provide additional political power for the future, making one side better able to muster additional policy pressure.

9 Appendix

9.1 Generalized pressure production

The basic pressure production function of Section 3 is generalized in Section 5.3 to $\pi_i(e) = \pi e$. This section generalizes further, by assuming simply that $\pi(e)$ is "S shaped". That is, π increases in e but $\pi''(e)$ has the opposite sign as e, so both positive pressure and negative pressure exhibit diminishing marginal returns.

The first-order condition for optimization is $0 = U_i'(e_i) = -2\pi'(e_i)(x - \hat{x}_i) - 2e_i$, implying that the best response effort level $e_i\pi'(e_i)(\hat{x}_i - x)$.[14] As before, this has the same sign as $(\hat{x}_i - x)$, so citizens with ideal points above and below x exert positive pressure and negative pressure, respectively, and extremists exert greater effort than centrists.[15] Aggregate pressure is then given by $\Pi = \sum_i \pi'(e_i)(\hat{x}_i - x) = n\sum_i \pi'(e_i)(\bar{x}_{\pi'} - x)$, implying that the policy outcome is $x^* = x_0 + n\sum_i \pi'(e_i)(\bar{x}_{\pi'} - x^*)$, or $x^* = \frac{1}{n\sum_i \pi'(e_i)+1}x_0 + \frac{1}{n\sum_i \pi'(e_i)+1}\bar{x}_{\pi'}$, where

[12] On the flip side of this, celebrations of political victories should be tempered by the recognition that deviations from the steady state might be short lived.

[13] Acemoglu (2003) argues that commitment problems are likely to be a central obstacle to efficiency.

[14] At any such solution, U_i is locally concave in e_i, since $U_i'(e_i) = -2\pi''(e_i)(x - \hat{x}_i) - 2e_i$ and $\pi'(e_i)$ and $(x - \hat{x}_i)$ have the same sign.

[15] That is, $\left|e_i^{br}\right| = \pi'(e_i)|\hat{x}_i - x|$ increases in $|\hat{x}_i - x|$.

$\bar{x}_{\pi'} = \frac{\sum_i \pi'(e_i)\hat{x}_i}{\sum_i \pi'(e_i)}$ is a weighted average of citizens' bliss points, with weights proportional to the citizen's marginal ability to generate political pressure. This is also the policy outcome in a steady state. As before, this maximizes a weighted social welfare function $W = \sum_i \omega_i u_i(x)$, with weights $\omega_i = \frac{\sum_i \pi'(e_i)\hat{x}_i}{\sum_i \pi'(e_i)}$.

9.2 Generalized costs

The model of Section 3 assumes quadratic costs; this section shows that analogous results hold for more general convex $c(e)$. To that end, suppose that $c(e) = 0$ but that $c'(e)$ has the same sign as e, while $c''(e) > 0$. $U_i(e_i)$ is then convex in e_i (since $U_i''(e) = -2 - c''(e) < 0$), so the unique best response effort level solves the first-order condition $0 = U_i'(e_i) = 2(\hat{x}_i - x) - c'(e_i)$. This solution cannot be derived explicitly, but has the same sign as $(\hat{x}_i - x)$. Extremists still exert greater effort, since $U_i'(e_i) = 0$ and $\hat{x}_i = x$ together imply that zero effort is a best response, and since (by the envelope theorem) marginal utility evaluated at the best response level of effort is zero, it does not increase with $\hat{x}_i$. Thus, $0 = \frac{\partial U_i'(e_i^*)}{\partial \hat{x}_i} = 2 - 2\frac{\partial e^*(\hat{x}_i)}{\partial \hat{x}_i} - c''(e_i)\frac{\partial e^*(\hat{x}_i)}{\partial \hat{x}_i}$, implying that best response effort $e^*(\hat{x}_i)$ increases in $\hat{x}_i$ (i.e., $\frac{\partial e^*(\hat{x}_i)}{\partial \hat{x}_i} = \frac{2}{c''(e^*)+2} > 0$), and thus the magnitude $|e^*(\hat{x}_i)|$ has the same sign as $\hat{x}_i - x$.

Averaging over the first-order best-response conditions for each citizen yields $\frac{1}{n}\sum_i c'(e_i^*) = 2(\bar{x} - x)$. Approximating $c(e) \approx c'(0)e + c''(0)e^2 = c''(0)e^2$ by its second-degree Taylor polynomial, this reduces to $2(\bar{x} - x) \approx \frac{c''(0)}{n}\sum_i e_i^* = \frac{c''(0)}{n}\Pi$. In a steady state $\Pi = 0$, so $x = \bar{x}$.

9.3 Generalized utility

The model of Section 3 assumes quadratic utility. This section generalizes to any concave function of the distance from x to $\hat{x}_i$: let $u_i(x) = -v(|x - \hat{x}_i|)$, where v is a differentiable, increasing, and convex function. $U_i(e_i)$ is concave in e_i (since $U_i''(e_i) = -v''(|x - \hat{x}_i|) - 2 < 0$), so a best response is given by the first-order necessary condition, $0 = U_i'(e_i) = -v'(|x - \hat{x}_i|)(-1)^{1_{\hat{x}_i > x}} - 2e_i$, or $e_i^* = \frac{1}{2}v'(|x - \hat{x}_i|)(-1)^{1_{\hat{x}_i < x}}$.[16] Thus, citizens with bliss points above or below x push to the right or pull to the left. Extreme citizens exert the most pressure, since $|e_i^*| = \frac{1}{2}v'(|x - \hat{x}_i|)$ increases in $|\hat{x}_i - x|$.

Social welfare $W = \sum_i u(x, \hat{x}_i) = -\sum_i v(|x - \hat{x}_i|)$ increases in x by the amount of $W'(x) = \sum_i v'(|x - \hat{x}_i|)(-1)^{1_{\hat{x}_i < x}} = \sum_i 2\pi_i = 2\Pi$. In a steady state $\Pi = 0$, so social welfare is maximized. Out of steady state, $x = x_0 + \Pi = x_0 + \frac{1}{2}W'(x) = x_0 + \frac{n}{2}\bar{u}'(x)$, where $\bar{u}'(x) = \frac{1}{n}\sum_i u_i'(x)$ is the average marginal utility across voters. Since the last term in this expression is multiplied by n, the policy outcome x can only be close to x_0 if it is also close to the social optimum, and therefore close to being steady state.

[16] In these expressions, $1_{\hat{x}_i > x}$ is an indicator function that equals 1 if $\hat{x}_i > x$ and 0 otherwise. $1_{\hat{x}_i < x}$ is defined analogously.

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