Evolution, Uncertainty, and the Asymptotic Efficiency of Policy

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Views of Politics

Government failure theory:

- Political decision makers have power and can extract from citizens
- Politics involves concentrated benefits and dispersed costs (Olson 1965)
- Politics as social conflict (Acemoglu 2003)

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- Douglass North (1995):

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Can Democratic Politics Be Efficient?

Yes, if

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    - Cheung (1998): "The Pareto condition is always satisfied"

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   - Cheung (1998): "The Pareto condition is always satisfied"
2. No transaction costs (Coase 1960)
   - Wittman (1989): "Democratic political markets are structured to reduce these costs"
3. Democracy selects for efficient policies
   - Today's presentation

Our Evolutionary Middle-ground

- Alchian (1950): profit mechanism selects for firms who have made relatively better choices concerning profit-making
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$\Rightarrow$ In the long-run, production is efficient

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- Our paper: develop model of politics as dynamic, evolutionary process
- In politics, interest group formation replaces explicit choice of politicians

$\Rightarrow$ In the long-run, policy is efficient

A Selection Mechanism

- At any point in time, interest groups may want to leave gains from trade on the table
- Once possible gains are large enough:
    - Interest groups pay cost to form,
    - Enter politics, and
    - Overturn policies
- Interest group entry is a democratic selection mechanism

Preview of Results

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  - Policy inefficiencies are eliminated in the long run

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- **Proposition 3:**
  - Policies remain in the dynamic problem that do not in the static

Building On

- Interest group models of politics
    - Stigler (1971), Peltzman (1976), Posner (1974), Becker (1983), Tollison (1988)
    - Focus on dynamic selection mechanisms

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  - Focus on dynamic selection mechanisms
- Evolutionary perspective of institutions
  - Markets: Alchian (1950), Smith (2007), Todd and Gigerenzer (2012)
  - Common law: Rubin (1977), Priest (1977), Gennaioli and Shleifer (2007)
  - Focus on legislative institutions

Road Map for Talk

1. Simple Coasean Example
    a. Static Bargaining
    b. Dynamic Bargaining
2. Formal Real Option Model
3. Model Results
    a. Formal Propositions
    b. Broader Implications

Static Political "Coase" Theorem

- Suppose competing interest groups bargain over policy
  - e.g. steel producers vs. steel consumers
- Steel producers want to enact tariffs with benefit B to them
- Consumers would incur a cost C
- Without transaction costs, new policy is enacted if $B > C$

Static Political "Coase" Theorem

- In a competitive model, tariffs are inefficient: $B < C$
- Consumers can organize into their own interest group and block tariff
- Consumers can offer to pay producers an amount $B + \epsilon < C$
- Without transaction costs, the no tariff policy is efficient and enacted

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- Consumers can offer to pay producers an amount $B + \epsilon < C$
- Without transaction costs, the no tariff policy is efficient and enacted
- Yet we see many tariffs: why?
- As Coase taught us, there must be relevant transaction costs

Adding Organizational Costs

- Cost of organizing an interest O_i for $i \in \{P, C\}$
- Producers want to organize and enact tariff if $B - O_P > 0$
- If $B < C$, to prevent inefficient tariff, consumers must form and pay a bribe, costing them:

$$\underbrace{B - O_P + \epsilon}_{\text{Bribe/Transfer}} + \underbrace{O_C}_{\text{Organizational Cost}}$$

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- If $B < C$, but $B + \epsilon + (O_C - O_P) > C$, then bribe will never materialize
- Consumers are better off living with C than working to prevent
- $O_C - O_P$ creates friction that prevents efficient bargains (Olson 1965)

Moving to Dynamics

- These examples can't speak to long-lasting vs. temporary policies
  - No distinction in Becker (1983), Wittman (1989), Peltzman (1990), etc
- These examples are like a one time, eternal vote on policy
- A policy passed last week is just as likely to be inefficient as long-lasting and widespread policies

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- A policy passed last week is just as likely to be inefficient as long-lasting and widespread policies
- We argue there is an important difference
- Long-lasting policies have survived an (imperfectly) competitive selection mechanism

Adding Uncertainty

- If steel productivity in foreign countries follows a random walk, then cost of tariff C will follow a random walk

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- If steel productivity in foreign countries follows a random walk, then cost of tariff C will follow a random walk
- Once C crosses some threshold, the consumer group will enter and select the efficient policy
- The longer a policy survives, the less likely it is inefficient
- Eventually all inefficient policies will cross the threshold

A Real Option Model

Model

- Time is continuous, lasts forever
- Current policy generates:
  - Flow benefits to current interest group: B
  - Flow cost to rest of society: C
- Cost to organize an interest group: O

- Entering politics to overturn current policy:

$$\text{Entry benefit} = \underbrace{E\int_t^\infty e^{-\rho t}C(t)dt}_{\text{Expected Cost Saving}} - \underbrace{\left(E\int_t^\infty e^{-\rho t}B(t)dt + \epsilon\right)}_{\text{Expected Bribe}} - \underbrace{O}_{\text{Entry Cost}}$$

- Alternatively,

$$\text{Entry benefit} = \underbrace{E\int_t^\infty e^{-\rho t}[C(t) - B(t)]dt - \epsilon}_{\text{Expected Net Cost Saving}} - \underbrace{O}_{\text{Entry Cost}}$$

Beyond Political "Coase" Theorem

- $N = C - B$: net social cost of the current policy
- If N is positive, current policy is inefficient
  - Current policy fails standard cost/benefit
- In a Coasean world with no transaction costs, the policy will be overturned

Beyond Political "Coase" Theorem

- $N = C - B$: net social cost of the current policy
- If N is positive, current policy is inefficient
  - Current policy fails standard cost/benefit
- In a Coasean world with no transaction costs, the policy will be overturned
- We have two frictions:
  1. Organizational costs
  2. Uncertainty about future cost of policy

Policy Uncertainty

- Suppose net social cost of the policy varies randomly and exogenously
  - Outside control of any interest group
- Geometric Brownian motion

$$\frac{dN(t)}{N(t)} = \mu dt + \sigma dz$$

  - $\mu \geq 0$: expected rate of change in the net cost
  - σ: conditional standard deviation
  - dz: increment of a Wiener process
  - $dz = \epsilon\sqrt{dt}$, where ϵ is drawn from a standard normal distribution

Real Option to Enter

- The interest group always has the option to enter the political market and end the costly policy
- Option to enter is like a financial option
- Can derive the value of this option as a function of the net cost of existing legislation
- Can determine the precise value for the net cost at which the prospective interest group will decide to enter the market

Option Value

- Let $V(N)$ be the option value to enter the political market

- Recursive Bellman representation:

$$V(N,t) = \frac{1}{1+\rho\Delta t} EV(N', t+\Delta t)$$

  - ρ: rate of time preference
  - E: expectations operator
  - N': net cost of the policy after a time interval of length Δt

- In continuous time

$$\rho V(N) = \frac{1}{dt} EdV$$

Solution

- $\rho V(N) = 1/dt E dV$ has known solution

$$V(N) = \alpha_1 N^{\beta^+} + \alpha_2 N^{\beta^-}$$

- Simplify using economic intuition
- First, option becomes worthless when net cost goes to zero

$$\lim_{N \to 0} V(N) = 0$$

- Only holds if $\alpha_2 = 0$

$$V(N) = \alpha_1 N^{\beta^+}$$

- Second, let N^* be the net cost when the interest group enters
- At N^* the interest group must be indifferent between holding and exercising option

$$V(N^*) = \alpha_1 (N^*)^{\beta^+} = \frac{N^*}{\rho - \mu} - O$$

- We assume that $\epsilon \approx 0$
- Solving this expression for α_1 yields:

$$\alpha_1 = (N^*)^{-\beta^+} \left(\frac{N^*}{\rho - \mu} - O \right)$$

Full Solution

$$V(N) = \underbrace{\left(\frac{N}{N^*}\right)^{\beta^+}}_{\text{Stochastic Discount Factor}} \times \underbrace{\left(\frac{N^*}{\rho - \mu} - O\right)}_{\text{Value at the Exercise Point}}$$

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  - Do not pay O on low N policies
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- High N^* raises yields greater benefit when option is exercised
  - Do not pay O on low N policies
- However, high N^* means longer wait times on policies
- The optimal N^* trades these off to maximize option value

$$N^* = \left(\frac{\beta}{\beta - 1}\right)(\rho - \mu)O$$

Stochastic Time

- N^* is proportional to organizational cost, O
- If $N \geq N^*$, the interest group will enter the political market and bribe the existing interest group to overturn the inefficient policy
- N is stochastic, the amount of time that an inefficient policy will last is also stochastic
- Let $\tilde{T}$ denote the time period when the interest group enters,

$$\tilde{T} = \inf\{t \geq 0 | N \geq N^*\}$$

Selection Mechanism

- Consider a particular policy j
- Prospective interest groups will enter whenever $N_j \geq N_j^*$
- Interest group entry is a selection mechanism that eliminates inefficient policies
- Inefficient policies will tend to be eliminated faster as N_j^* declines, such as when O declines

Asymptotic Efficiency

Proposition 1: The probability that any inefficient policy j survives goes to zero as time goes to infinity.

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- Equivalent to stating that the stopping time is finite, or $P(\tilde{T} < \infty) = 1$.
- Known result for Brownian motion with a constant barrier
  - See Stokey (2009, Theorem 5.1)

"Every durable social institution or practice is efficient, or it would not persist over time."

George Stigler (1992)

Bounded Inefficiency

Proposition 2: For any parameters ρ, μ_j, σ_j there is an upper bound on the level of inefficiency.

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If a policy is still in place at time t, this implies that the net cost to society $N_j(t)$ is below N_j^*.

$$\frac{N_j(t)}{\rho - \mu_j} \leq \left(\frac{\beta_j}{\beta_j - 1}\right) O_j.$$

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- Corollary: The bound is increasing in the organizational costs, O_j.
- Similar result to static example with $O_C - O_P$

Dynamic vs. Static

Proposition 3: Policies remain in the dynamic problem that do not in the static problem.

- Proof: In a static environment, interest groups have not entered if

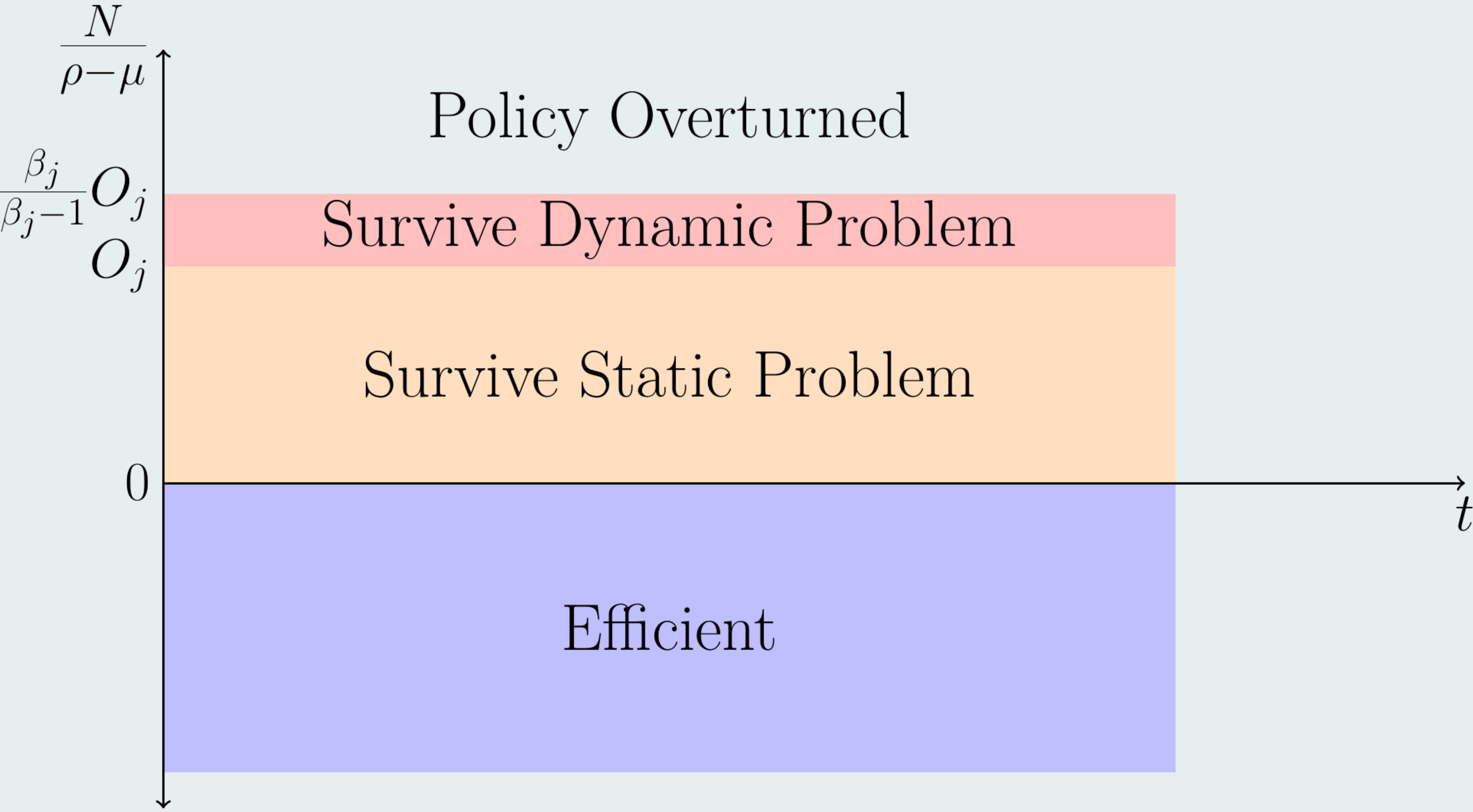
$$E\int_0^\infty e^{-\rho t}[C_j(t) - B_j(t)]dt = E\int_0^\infty e^{-\rho t}N_j(t)dt = \frac{N_j}{\rho - \mu_j} \leq O_j$$

In the dynamic model, it is

$$\frac{N_j(t)}{\rho - \mu_j} \leq \frac{\beta_j}{\beta_j - 1}O_j$$

The Role of Uncertainty

- People prefer to wait and see if the net costs are moderate before paying the organizational costs
- If costs remain moderate, people will be willing to tolerate them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Policy Overturned
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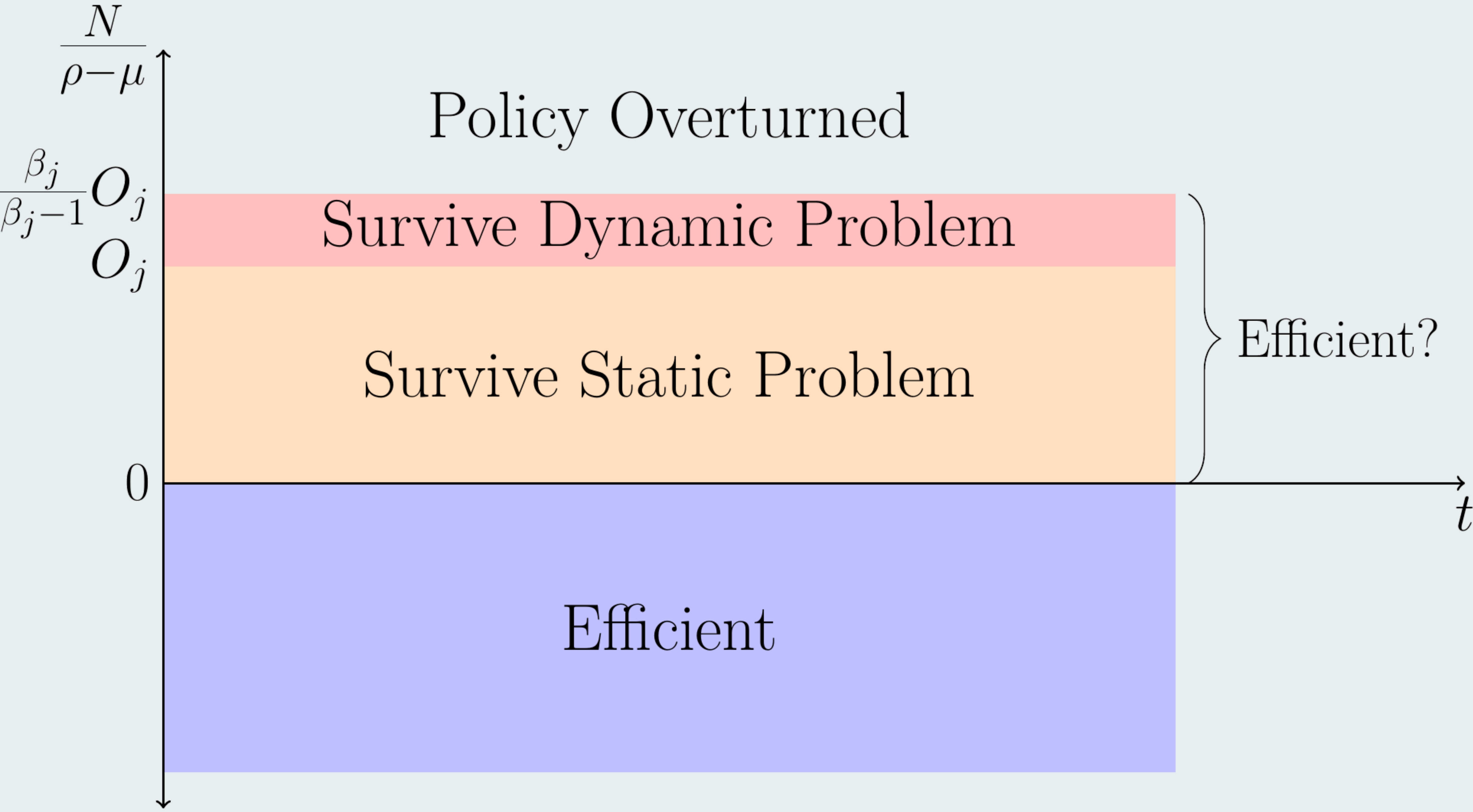

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Model Implications

1. Losers must be compensated
2. Durable legislation improves efficiency
3. Lowering political organizational costs improves efficiency

Just Compensation (Cutsinger 2018)

- In 2010, the House of Representatives changed significantly
- They eliminated a housing counseling assistance program
- Program had given $88 million to non-profit organization
- Justice Department's settlement authority restored half of funding
- $30 million came from large banks based on their conduct in the mortgage backed securities market

Durability of Legislation

- Settlement authority makes policy effectively more durable: even if overturned, must be paid value of rents
- Durability raises $E \int_0^\infty e^{-\rho t} C_j(t) dt$ and encourages entry
- If legislation is likely to be overturned later legislatures, willingness to pay O_j drops

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- Durability raises $E\int_0^\infty e^{-\rho t} C_j(t)dt$ and encourages entry
- If legislation is likely to be overturned later legislatures, willingness to pay O_j drops
- Similar result to principal-agent models of politicians:
    - Future benefits encourage efficient action today
- $\Rightarrow$ Institutions that enhance durability improve efficiency

Independent Judiciary

- If durability has value, then legislatures will have an incentive to make it difficult to overturn legislation
- Landes and Posner (1975): independent judiciary can favor original interpretations and need not be subservient to current legislatures
- Anderson, Shughart, and Tollison (1989): legislatures reward judges who display independence with higher salaries
- Implication: judicial independence could explain variation in interest group formation and the efficiency of policy

Free Speech

- Our most direct implication: lower o_j improves efficiency
- U.S. Supreme Court upheld freedom of speech for corporations, unions, and non-profits making explicit reference to interest groups
- Justice Kennedy argued in favor of the informational role of interest groups, not just constitutional rights
- Speech restrictions increase the organizational costs
- If our theory is correct, the ruling is efficiency enhancing

Re-framing Political Economy

Normative Implications:

- Propositions 1 and 2 lead to a *pre*sumption of efficiency (Breton 1993)
- However, policies are not efficient by assumption
  - Avoid "whatever is, is efficient" tautologies

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Normative Implications:

- Propositions 1 and 2 lead to a *pre*sumption of efficiency (Breton 1993)
- However, policies are not efficient by assumption
  - Avoid "whatever is, is efficient" tautologies
- Between government failure theory and "efficiency always"
- Long last policies likely have a hidden efficiency justification
  - Hendrickson, Salter, and Albrecht (2018): capital taxation helps for national defense

Implication for Political Economy

- Political economists who want to argue that a particular long-lasting policy is inefficient must

  1. Reconsider the magnitude of the cost of the policy, or

  2. Explain why the organizational costs are so high

- Otherwise, political economists can go around claiming there are $10 trillion bills on the sidewalk

Re-framing Political Economy

Positive Implications:

- Role of political economist is to identify the relevant organizational costs
- Retain efficiency as a tool for positive economics
- Mirrors Steven Cheung's (1998) approach to study of markets:

> "whenever the Pareto condition fails to hold we would immediately know that some constraints are missing."

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Downside

- Only applies to long-lasting policies

Paper: bit.ly/bca-evolution

Slides: bit.ly/bca-clemson

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Continuous Time

$$V(N,t) = \frac{1}{1+\rho\Delta t} EV(N',t+\Delta t)$$

- Multiplying both side of by $1+\rho\Delta t$ and re-arranging yields

$$\rho V(N) = \frac{1}{\Delta t} EdV$$

where $EdV := EV(N',t+\Delta t) - V(N,t)$.

- Taking the limit as Δt goes to zero.

$$\rho V(N) = \frac{1}{dt} EdV$$

- Return

Solving Differential Equation

Using Ito's Lemma option formula can be written as

$$\rho V(N) = \frac{1}{dt} E\left[V'(N)dN + \frac{1}{2}V''(N)(dN)^2\right]$$

Substituting and simplifying yields:

$$\frac{1}{2}\sigma^2 N^2 V''(N) + \mu N V'(N) - \rho V(N) = 0$$

Second-order differential equation has a known solution of the form:

$$V(N) = \alpha_1 N^{\beta^+} + \alpha_2 N^{\beta^-}$$

Solving Differential Equation

$$V(N) = \alpha_1 N^{\beta^+} + \alpha_2 N^{\beta^-}$$

where α_1 and α_2 are positive constants and β^+ and β^- are the positive and negative solutions, respectively, to the quadratic equation:

$$\frac{1}{2}\beta^2 + \left(\mu - \frac{1}{2}\sigma^2\right)\beta - \rho = 0$$

- Return