

**Political Economics II**  
**Spring 2016**

**Lectures 4-5**

**Part II Partisan Politics and Political Agency**

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# Introduction: Partisan Politics

## Aims

continue exploring policy choice in representative democracy when politicians are “partisan” – like citizens, their preferences are defined over policy outcomes, rather than derived from pure electoral – or rent-seeking – objectives  
this will introduce another set of “work-horse” models

## Agenda

- A. Electoral competition with exogenous citizen candidates
- B. Endogenous citizen candidates
- C. Agenda setting and legislative bargaining

## A. Electoral competition with given citizen candidates

### 1. Quick rehash of results from Lecture 1

Study one-dimensional size of government example

simple model with Condorcet winner and discrete  $y^J \sim F(\cdot)$

voters have no candidate preferences, initially

“Citizen candidates” in Downsian setting

individuals with  $y^J = y^C$ ,  $W^C(g) = (y - g)\frac{y^C}{y} + H(g)$

2 candidates  $C = L, R$  with *exogenous* ideal points  
on opposite sides of the median voter's

$$y^L < y^M < y^R, \quad g^L = G\left(\frac{y^L}{y}\right) > g^M = G\left(\frac{y^M}{y}\right) > g^R = G\left(\frac{y^R}{y}\right)$$

## 2. Different equilibria

### Crucial assumptions

(V1) voters preferences only over policy  $W^J(g)$

(V2) V1 plus preferences over candidates

(P1) politicians can commit to electoral platforms  $(g_L, g_R)$

(P2) such commitments not feasible

### Outcomes

policy convergence: under (V1), (P1), we get  $g_L = g_R = g^M$

policy divergence: if replace (V1) by (V2), or (P1) by (P2),  
we get  $g^R \leq g_R < g < g_L \leq g^L$

But if candidate (party) preferences are endogenous, are we back to convergence of policy through convergence of candidate types?

## B. Endogenous citizen candidates

Add entry stage ahead of election

any citizen, with income  $y^C$ , can enter as candidate at cost  $\varepsilon$   
stay in size of government example:  $\mathcal{J}$  still a large number  
after entry, model like no-commitment case in Lecture **1.E.2.b**

Timing: three stages

1. citizens make entry decisions,  
if no entry  $\Rightarrow g = \bar{g}$ , “status quo” policy
2. plurality election among entering candidates,  
voters cast their ballot *strategically*
3. winning candidate chooses policy

Stage 3

if elected,  $C$  with  $y^C$  implements  $g^C = G\left(\frac{y^C}{y}\right)$

Stage 2

voter in group  $J$  casts ballot for  $C$  that maximizes  $E[W^J]$ ,  
*given* strategy of other voters (meaning of strategic voting)

Stage 1

a member of group  $J$  enters only if that raises  $E[W^J]$ ,  
*given* entry strategy of other candidates

## a. One-candidate equilibria

Existence?

yes, several equilibria may exist (due to entry cost)

of focal interest: will somebody with  $y^M$  run, and win?

$y^M$  beats any other candidate  $y^C$ , as  $g^M$  Condorcet winner

Equilibrium conditions

$y^M$  can run uncontested if

$$W^M(g^M) - W^M(\bar{g}) > \varepsilon$$

and no other type  $J$  finds it profitable to enter,

she cannot win against  $y^M$  and entry is costly

and no other member of group  $M$  enters either,

this does not change  $g$  and entry is costly

## b. Two-candidate equilibria

Existence?

yes, several with  $C = L, R$        $y^L < y^M < y^R$

Two equilibrium conditions

$$W^M(G(\frac{y^L}{y})) = W^M(G(\frac{y^R}{y}))$$

i.e., each candidate has equal chance of winning, and

$$\frac{1}{2}[W^L(G(\frac{y^L}{y})) - W^L(G(\frac{y^R}{y}))] > \varepsilon$$
$$\frac{1}{2}[W^R(G(\frac{y^R}{y})) - W^R(G(\frac{y^L}{y}))] > \varepsilon$$

i.e., each gains enough expected utility by entering



## Additional condition

3rd candidate does not enter in between  $y^L$  and  $y^R$   
voters' equilibrium strategies keep entry unprofitable  
 $y^L$  and  $y^R$  balance each other, votes from either side of  $y^M$

## Implications

*never* policy convergence in two-candidate equilibria  
“candidate identity matters”, but predictions are not  
so sharp because of multiplicity

## Why work-horse model?

intuitively appealing

why can it handle multi-dimensional policy problems?

because it restricts voter choices to ex-post optimal policies

## C. Agenda setting and legislative bargaining

### 1. General modeling

Two steps in developing generalized agenda-setter model

- (i) first: one-dimensional analysis of politician-initiated referenda among voters – readings in syllabus
- (ii) later: multi-dimensional analysis of legislative bargaining among incumbent lawmakers – here and many applications

Incumbent legislators

consider *three* policy-motivated parties (legislators)  $J$   
perfect delegates of three groups: each maximizes  $W^J(g)$

General introduction, then apply to two generic policy problems

**2.a** Size of government example, with  $J = L, M, R$

**2.b** Composition of government example, with  $J = 1, 2, 3$

Closed-rule, one-round bargaining:

agenda-setter,  $A \in \{L, M, R\}$  makes take-it-or-leave-it proposal for single majority vote in legislature

Timing

1. nature picks  $A$

2.  $A$  proposes  $g_A$

3. legislature votes:

if at least one of  $J \neq A$  in favor  $\Rightarrow g^b = g_A$

if not  $\Rightarrow g^b = \bar{g}$ , “status quo” implemented

Status-quo policy?

$\bar{g} = 0$  “close down government”

$\bar{g} > 0$  “last year’s policy”

Requirement for acceptable proposal at stage 3

$$W^J(g_A) \geq W^J(\bar{g}) \text{ for at least one } J \neq A$$

$A$  maximizes  $W^A(g)$  subject to such incentive compatibility

General properties of  $g^b$

- (i)  $A$  puts together minimum-winning coalition: seeks support only from one  $J = X$ , if  $g$  generates conflict of interests
- (ii)  $X$  held to status-quo payoff:  $W^X(g_A) = W^X(\bar{g})$   
costly to overfulfill incentive compatibility constraint
- (iii)  $J = N$  non-coalition member screwed:  $W^N(g_A) \leq W^N(\bar{g})$
- (iv)  $X$  is legislator whose vote “cheapest to get” – will mean small size  $\alpha^J$  or low status-quo payoff  $W^J(\bar{g})$

## 2. Specific results

### a. Size of government example

Three different income groups

one party each  $y^L < y^M < y^R$ ,  $g^J = G\left(\frac{y^J}{y}\right)$

Equilibrium when  $A = M$

$g^b = g^M$  Condorcet winner in legislature

Equilibrium when  $A = L$  ( $A = R$  case analogous)

$$g^b = \begin{cases} g^L & \text{if } \bar{g} \geq g^L \\ \bar{g} & \text{if } g^L \geq \bar{g} \geq g^M \\ \text{Min}[g^L, \tilde{g}^M] & \text{if } g^M > \bar{g} \end{cases}$$

where  $W^M(\tilde{g}^M) = W^M(\bar{g})$

Intuition

$L$  seeks support only from closest incumbent  $M$

cf. properties (i), (iii) and (iv) in **1**

$L$  never sets  $g$  above  $g^L$  and need not go below  $g^M$

$A$  is maximizing

$L$  goes to status quo or equivalent, depending on  $g^M \begin{matrix} \geq \\ \leq \end{matrix} \bar{g}$

cf. property (ii) in **1**

## Implications

party representing “center group”  $M$  politically powerful:  
member of every coalition

$A$  's power related to the status quo

### b. Composition of government example

For instance, three different regions  $J = 1, 2, 3$

have one (set of) legislator(s) each

Properties of equilibrium  $g^b$

$$g^{b,N} = 0$$
$$H(g^{b,X}) - \alpha^X g^{b,X} - \alpha^A g^{b,A} = H(\bar{g}^X) - \sum_J \alpha^J \bar{g}^J$$
$$H_g(g^{b,A}) = \alpha^A \frac{H_g(g^{b,X})}{H_g(g^{b,X}) - \alpha^X}$$

$$g^{b,N} = 0 < g^* \text{ (property (iii) in } \mathbf{1})$$

$$g^{b,X} \begin{matrix} \leq \\ \geq \end{matrix} g^* \text{ depending on parameters (property (ii) in } \mathbf{1})$$

$$g^{b,A} > g^*$$

under weak conditions, in particular  $\alpha^X$  not too large

note that  $A$  spends less than if unconstrained,

$$\text{which would mean setting } H_g(g^{b,A}) = \alpha^A$$

## Intuition

if  $A$  spends more on her own group, she must raise  $\tau$

then,  $X$  is worse off and needs compensation by higher

$$\text{spending equal to } \frac{dg^X}{dg^A} = \frac{\alpha^A}{H_g(g^{b,X}) - \alpha^X}, \text{ which costs } A \quad \alpha^X \frac{dg^X}{dg^A}$$

$$\text{total cost of raising } g^A \text{ is } \alpha^A + \alpha^X \frac{dg^X}{dg^A} = \alpha^A \frac{H_g(g^{b,X})}{H_g(g^{b,X}) - \alpha^X}$$



Who does  $A$  choose as majority partner?

compute cost for each level of  $g^A$  and each prospective majority partner – i.e., solve 2<sup>nd</sup> condition for each  $J \neq A \Rightarrow$

$$g^J = Z(g^A, \bar{g}^J, \alpha^J) ,$$

where  $Z$  increasing in all arguments

pick  $J \neq A$  whose vote is cheapest (property (iv) in **1**)

$\Rightarrow$  pick  $X$  such that  $\bar{g}^X$  and/or  $\alpha^X$  are low

## Implications

groups with powerful lawmakers – i.e., with  $J = A$  – are

better off: their representatives often make policy proposals

small, or rather overrepresented, groups – i.e., low  $\alpha^J$  – are

better off: their lawmakers often part of coalition

and so are “weak” – i.e., low  $\bar{g}^J$  – groups,

in apparent contrast with standard, unanimity, bargaining

### 3. Discussion – three natural extensions

Extend to *open-rule* bargaining

proposals can be amended by other legislator(s)  
dilutes power of agenda setter,  $A$

Extend to *multi-round* bargaining

$A_N \neq A_{N-1}$  makes  $N^{\text{th}}$  round proposal if  $g_{A_{N-1}}$  fails  
same logic, only  $A_N$  has to offer coalition partner  
continuation value, rather than status-quo value  
dilutes agenda-setter power

Extend to *multi-period* setting with dynamic status quo

$$\overline{g}_t = g_{t-1}$$

strategic concerns enter the setting of current policy

Why work-horse model?

framework is intuitively appealing

it can handle multi-dimensional policy problems

can easily be extended to represent alternative

legislative arrangements – will do so in Lecture 7

# Introduction: Political Agency

## Aims

explore agency problem between voters and elected representatives

how serious is it? does it spill over on policy?

can voters discipline politicians?

theory:

begin by slightly extending size of government example

modify to illustrate three different functions of elections

## Agenda

A. Electoral competition with rent-seeking

B. Electoral accountability

C. Electoral selection

## A. Electoral competition with rent-seeking

### 1. Policy efficiency

Introduce endogenous rents in size of government model

$r \geq 0$  interpreted as diversion of funds for personal gain, party finance, or mismanagement of government funds

$$\tau y = g + r \quad (1)$$

$\mathbf{q} = (g, \tau, r)$  denotes policy vector

Candidate objectives

rewrite as

$$E(v_C) = p_C(R + \gamma r) \quad (2)$$

$\gamma$  “transaction cost”

direct conflict of interest between politicians and voters

## Voters

rewrite policy preferences

$$W^J(\mathbf{q}) = [y - (g + r)] \frac{y^J}{y} + H(g)$$

new dimension,  $r$ , is a “valence” issue

preferences are again monotonic and well-behaved, despite two dimensions: satisfy condition for “intermediate preferences”

$\Rightarrow$  Condorcet winner exists

$$g^M = G\left(\frac{y^M}{y}\right), \quad r^M = 0$$

## Benchmark Downsian model

same assumptions as in Lecture 1

$y^J \sim F(\cdot)$  discrete with many groups

2 candidates make binding commitment to platforms  $\mathbf{q}_C$

## Probability of winning

as before,  $p_A$  is discontinuous in policy

$$p_A = \begin{cases} 0 & \text{if } W^M(\mathbf{q}_A) < W^M(\mathbf{q}_B) \\ \frac{1}{2} & \text{if } W^M(\mathbf{q}_A) = W^M(\mathbf{q}_B) \\ 1 & \text{if } W^M(\mathbf{q}_A) > W^M(\mathbf{q}_B) \end{cases}$$

by monotonicity in  $y^J$

## Equilibrium

unique outcome is

$$g_A = g_B = g^M, \quad r_A = r_B = r^M = 0$$

identical to the outcomes in Downsian models with

(i) opportunistic and (ii) citizen (partisan) candidates

## Intuition

competition for exogenous rents  $R$  is fierce enough

( $p_A$  discontinuous in policy) to keep endogenous rents  $r$  to zero

cf. results on policy convergence for partisan candidates

another type of political agency (relative to majority of voters)

## 2. Policy inefficiency

Competition may not deliver efficiency when less fierce

Illustrate in probabilistic voting set-up

consider version of model in Lecture **1.3**

$\phi^J = \phi$  all  $J$ , timing as in **A.1**

Probability of winning

swing voters in each group

$$\sigma^J = W^J(\mathbf{q}_A) - W^J(\mathbf{q}_B) - \delta \quad (3)$$



same type of calculations as in Lecture **1.3**  $\Rightarrow$

$$p_A = \frac{1}{2} + \psi[W(\mathbf{q}_A) - W(\mathbf{q}_B)] \quad (4)$$

## Candidate objectives

if purely opportunistic (maximize  $p_C R$ ), (4) gives efficiency  
but, here, objective is (2)  $\Rightarrow$  trade-off between  $r$  and  $p_C$   
intuition analogous to case with partisan candidates

## Equilibrium spending?

candidates converge on policy that maximizes (2), given (4)

$$\frac{\partial E[v_A]}{\partial g_A} = (R + \gamma r_A) \frac{\partial p_A}{\partial g_A} = (R + \gamma r_A) W_g = 0$$

i.e.,  $g = g^*$ , efficient spending

Equilibrium rents?

may not be driven to zero

trade off probability of winning vs. marginal rents

$$\begin{aligned}\frac{\partial E[v_A]}{\partial r_A} &= (R + \gamma r_A) \frac{\partial p_A}{\partial r_A} + p_A \gamma \\ &= -(R + \gamma r_A) \psi + p_A \gamma \leq 0 \quad [r_A \geq 0]\end{aligned}$$

we have ( $p_A = \frac{1}{2}$  in eq.),  $r = \text{Max} [0, \frac{1}{2\psi} - \frac{R}{\gamma}]$

Rents positive if

$R$  small,  $\gamma$  large, or  $\psi$  small

## Intuition

candidates not perfect substitutes (except for swing voters)  
as probability of winning continuous in  $r$ , candidates have  
room to pursue their own agenda – analog to the results on  
policy divergence for partisan candidates

## Positive implications

$r > 0$  means that  $\tau > \frac{g^*}{y}$

rents (measured spending) higher if

more illegitimate regimes (low ego-rents):  $R$  small

weaker checks and balances:  $\gamma$  large

large electoral uncertainty (weak voter response to  $r$ ):  $\psi$  small  
(asymmetric popularity: see Problem 4.1 in P-T, 2000)

## B. Electoral accountability

Assumption of binding commitment too strong?

enforcement and information problems

credibility of platform promises becomes a real issue

2nd function of elections

in models, so far, voters act “prospectively”, i.e., they choose between policies candidates have committed to now instead: vote to influence the behavior of incumbent when there is no commitment

all voters have same utility:  $W(\mathbf{q}) = y - (g + r) + H(g)$  and act “retrospectively”, to punish bad behavior

Timing

(i) voters set reservation utilities  $\varpi^i$ , (ii) incumbent  $I$  sets policy  $\mathbf{q}_I$ , (iii) election is held

Incumbent objective

$$E[v_I] = \gamma r_I + p_I \beta R \quad (5)$$

reflects new timing

Opponent

identical to  $I$  in all respects (no incumbency advantage)

Voter coordination

all voters coordinate on same strategy  $\varpi^i = \varpi$

$$p_I = \begin{cases} 1 & \text{if } W(\mathbf{q}_I) > \varpi \\ 0 & \text{otherwise} \end{cases} \quad (6)$$

alternative assumption: distribution of reservation utilities, works basically as prior probabilistic voting model (see model in **C**)

Basic incentive constraint

intertemporal trade off for  $I$

$$\gamma r_I + \beta R \geq \gamma y \quad (7)$$

comply (LHS): hold back to get re-elected and earn future rents

deviate (RHS): maximize current diversion give up re-election

Best feasible policy for voters?

maximize  $W(\mathbf{q})$  subject to (7) and (1)  $\Rightarrow$

$$r^* = \text{Max} \left[ 0, y - \frac{\beta R}{\gamma} \right] \quad (8)$$
$$g^{**} = \text{Min} \left[ g^*, \frac{\beta R}{\gamma} \right] \quad [\tau \leq 1]$$

$I$  gets away with some rents, unless

$\beta R$  high,  $\gamma$  and  $y$  low – cf. results in **A.2**.

How can voters implement (8)?

$I$  sets policy according to (8) to earn re-election  
if voters set  $\varpi$  at

$$\varpi^* = y - (g^{**} + r^*) + H(g^{**})$$

Extension: asymmetric information (about cost of  $g$ )

more complex case

$I$  earns additional (state-dependent) rents

voters worse off

## C. Electoral selection

3rd role of elections

*neither* pick a policy, *nor* reward good behavior,  
but rather select competent leader

assume that competence (ability): (i) comes in different types,  
(ii) affects performance, and (iii) lasts over time

Simplified two-period model – election at end of period 1

period utility of voter  $i$

$$w_t^i = y - \tau_t + \alpha g_t - D_2^I \sigma^i \quad (9)$$

linearity in  $g \Rightarrow$  risk neutrality

$\sigma^i$  taste bias against  $I_1$ , uniform on  $[-\frac{1}{2\phi}, \frac{1}{2\phi}]$

$D_1^I = 0$ ,  $D_2^I > 0$  only applies in period 2 if  $I_1$  re-elected

note: there is no average popularity shock  $\delta$ , but “ability”  
shock  $\eta$  (see below) will play similar role



Government policy

$$g_t = \bar{\tau} - r_t + \eta_t + \nu_t \quad (10)$$

$\tau_t$  fixed at  $\bar{\tau}$ ,  $r_t \leq \bar{r}$ , i.e., upper bound on  $r_t$

$\eta_t$  any *new* politician's ability is iid  $\sim N(\bar{\eta}, \text{Var}(\eta))$

but lasting over time – see below

$\nu_t$  productivity shock is iid  $\sim N(0, \text{Var}(\nu))$

Incumbent objective

$$E(v_I) = \ln(r_1) + p_I \beta [(R + E(\ln(r_2)))] \quad (11)$$

set  $\gamma = 1$ , add curvature over rents, to get simple solutions

## Assumptions about politician ability

$I_1$  does *not* know  $\eta_1$  (and  $\nu_1$ ) when sets  $r_1$  (avoid signaling)  
as in Holmström's career-concern model

$I_1$  re-elected:  $\eta_2^I = \eta_1^I$  (incumbent ability lasts),  $E(\eta_2^I) = E(\eta_1^I)$

$I_1$  ousted:  $E(\eta_2^O) = \bar{\eta}$  (opponent expected to have average ability)

## Period 2 choice of $r$

all incumbents set  $r_2 = \bar{r}$  (as world ends)

$\Rightarrow$  from (9)-(10)  $E(g_2) = \bar{\tau} - \bar{r} + E(\eta_2^C)$ ,  $C = I, O$  and

$$E(w_2^i) = y - \bar{\tau} + \alpha(\bar{\tau} - \bar{r} + E(\eta_2^C)) - D_2^I \sigma^i$$

voters like able politicians better, *ceteris paribus*

Optimal voting strategy

$I_1$  has  $E(\eta_2^I) = E(\eta_1^I)$ , opponent has  $E(\eta_2^O) = \bar{\eta}$   
 $\Rightarrow$  vote for  $I_1$  if  $\sigma^i < \alpha[E(\eta_1^I) - \bar{\eta}]$  such that

$$\pi_I = \frac{1}{2} + \phi\alpha[E(\eta_1^I) - \bar{\eta}] \quad (12)$$

is vote share of incumbent

Information at  $t = 1$  pins down  $E(\eta_1^I)$ : we will study two cases

1. informed voters: observe  $g_1$  and  $\nu_1 \Rightarrow E(\eta_1^I | g_1, \nu_1)$
2. uninformed voters: observe only  $g_1 \Rightarrow E(\eta_1^I | g_1)$

# 1. Informed voters

Voters' inference problem

given (10), can perfectly gauge incumbent ability  $\Rightarrow$

$$E(\eta_1^I | g_1, \nu_1) = \eta_1^I = g_1 - \bar{\tau} + r_1^* - \nu_1, \quad (13)$$

where  $r_1^*$  is expected equilibrium rents

Incumbent choice of  $r$

when  $I_1$  sets  $r_1$  uncertain about  $\eta_1$  (and  $\nu_1$ ) and hence  $g_1$ , so

has to form an expectation  $\mathbb{E}(E(\eta_1^I | g_1, \nu_1))$

knows how  $E(\eta_1^I | g_1, \nu_1)$  is formed and takes  $r_1^*$  as *given*

by (10), (12) and (13), his anticipated vote share

conditional on  $\eta_1$  and  $r_1$  becomes

$$\pi_I = \frac{1}{2} + \phi\alpha[\eta_1^I - \bar{\eta} + r_1^* - r_1]$$

and the perceived probability of winning is

$$p_I = \text{Prob}_\eta [\pi_I \geq \frac{1}{2}] = 1 - F(\bar{\eta} - r_1^* + r_1) \quad (14)$$

where  $F$  is the c.d.f. of  $\eta$  – clearly, larger  $r_1$  cuts (perceived)  $p_I$

### Optimal policy

maximize (11) over  $r_1$  subject to (14), and set  $r_2 = \bar{r}$  to get

$$r_1 = \frac{1}{f(\bar{\eta} - r_1^* + r_1)\beta\tilde{R}}$$

where  $\tilde{R} = R + \ln(\bar{r})$ , and  $f$  is the p.d.f. of  $\eta$

### Equilibrium

voters expectations are correct, such that  $r_1^* = r_1$ , and

$$r_1 = \frac{1}{f(\bar{\eta})\beta\tilde{R}}$$

## Interpretation

voters look like they follow retrospective strategy,  
rewarding high performance (utility) with re-election  
but current performance is an indicator of future ability  
and this creates an intertemporal trade-off for  $I_1$

## Positive implications

rents higher (cf. results in **A** and **B**) when  
electoral reward is small:  $\beta \tilde{R}$  low  
electoral uncertainty is large:  $f(\bar{\eta})$  low, i.e.,  $\text{Var}(\eta)$  large  
like result in **A.2** about uncertainty over  $\delta$  (value of  $\psi$ )

## 2. Uninformed voters

Voters' inference problem

can no longer gauge  $\eta_1^I$  perfectly, as  $\nu_1$  unobserved using (10), they can only infer the sum  $\Rightarrow$

$$E(\eta_1^I + \nu_1 \mid g_1) = \eta_1^I + \nu_1 = g_1 - \bar{\tau} + r_1^* , \quad (15)$$

let voters form an optimal (OLS) estimate of  $\eta_1^I$ , given that they see  $E(\eta_1^I + \nu_1 \mid g_1)$  and have unconditional (prior) mean  $\bar{\eta}$

This yields

$$E(\eta_1^I \mid g_1) = h_\eta \bar{\eta} + h_\nu E(\eta_1^I + \nu_1 \mid g_1) , \quad (16)$$

where  $h_\eta = \frac{\text{Var}(\nu)}{\text{Var}(\eta) + \text{Var}(\nu)}$  and  $h_\nu = \frac{\text{Var}(\eta)}{\text{Var}(\eta) + \text{Var}(\nu)}$

so, observation of  $g_1$  is less valuable in inference about  $\eta_1^I$  the more noisy is  $\nu_1$

## Incumbent expectations

by (10), (12), (15) and (16),  $I$  anticipates a vote share

$$\pi_I = \frac{1}{2} + \phi\alpha h_\nu [\eta_1^I + \nu_1 - \bar{\eta} + r_1^* - r_1]$$

$\pi_I$  responds less to rents when voters uninformed  
perceived probability of winning is

$$p_I = \text{Prob}_{(\eta+\nu)} \left[ \pi_I \geq \frac{1}{2} \right] = 1 - G(\bar{\eta} - r_1^* + r_1) \quad (17)$$

where  $G$  is the c.d.f. of random variable  $\eta + \nu$  : the sum of two normals with mean  $\bar{\eta} + 0$  and variance  $\text{Var}(\eta) + \text{Var}(\nu)$

## Optimal policy

maximize (11) over  $r_1$  subject to (17) to get

$$r_1 = \frac{1}{g(\bar{\eta} - r_1^* + r_1)\beta\tilde{R}}$$

where  $g$  is the p.d.f. of  $\eta + \nu$



In equilibrium ( $r_1^* = r_1$ )

$$r_1 = \frac{1}{g(\bar{\eta})\beta\tilde{R}}$$

Compare to the case with informed voters

$G$ , distribution of  $\eta + \nu$ , has same mean (i.e.,  $\bar{\eta}$ ), but larger variance (i.e.,  $\text{Var}(\eta) + \text{Var}(\nu)$ ) than  $F$ , distribution of  $\eta$  therefore, it must be that  $g(\bar{\eta}) < f(\bar{\eta})$

so  $r_1$  is larger with uninformed voters, and more so the larger is  $\text{Var}(\nu)$  – the more difficult is inference about  $\eta$

### 3. Discussion – three natural extensions

Informed *and* uninformed voters

combination of **1** and **2**

larger share of uninformed (less availability of media)

implies larger rents and smaller voting response to misbehavior

Embed in multi-period model

elections every two periods, and MA process for  $\eta \Rightarrow$

electoral cycle: cut  $r$  (raise spending) in election periods,

unless there is a term limit

Assume  $\eta$  known by incumbent  $\Rightarrow$  incentives to signal

more complex solution, but many results similar