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"Distributive Policy Making as a Source of Inefficiency in Representative Democracies "

by

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Abstract

A distributive policy is one which benefits the constituents of one district, but whose costs are bourne collectively. This paper scrutinizes the commonly held view that such policies will be chosen inefficiently in representative democracies. The setting is one in which distributive policies are centrally financed local public goods selected by a legislature consisting of elected representatives from each district. Three different views of distributive policy making from the political science literature are considered. It is shown that only one of these is capable of generating Pareto inefficient local public goods choices, casting doubt on the idea that distributive policy making is an important source of political failure. However, all three views can generate choices of public goods that leave open the possibility for changes that pass standard cost benefit tests.

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1. Introduction

A distributive policy is one which benefits the constituents of one district, but whose costs are bourne collectively. Classic examples are local public goods such as highways, parks, or educational institutions, which are financed by central taxation. Such policies are commonly viewed as an important source of inefficiency in representative democracies. According to the conventional wisdom, the collective sharing of costs leads representatives to obtain too many such "pork barrel" projects for their districts (see, for example, Weimer and Vining (1992)).

Understanding the determination of distributive policies in multi-district representative democracies has been a central concern of research in the rational choice political science paradigm (Collie (1988)). Given that distributive policies benefit only one district, coalitions of representatives must form to pass a package of policies. However, the redistributive nature of these policies means that there is no Condorcet winning package. Thus the problem of predicting the allocation of distributive policies is challenging.

A number of different theories have been put forward in the literature, predicting the composition of coalitions and/or the levels of distributive policies emerging from a majority rule legislature under given assumptions concerning representatives' policy preferences. The theories can be divided into two types; those predicting that distributive policies will be obtained by the districts of a *minimum winning coalition* of representatives (for example, Ferejohn, Fiorina and McKelvey (1987), Baron and Ferejohn (1989), Baron (1991) and Chari and Cole (1997)) and those predicting (or assuming) a *universalistic coalition* (for example, Weingast (1979), Weingast, Shepsle and Johnsen (1981), Niou and Ordeshook (1985), and Schwartz (1994)). A minimum winning coalition is one of the smallest size necessary to obtain a majority, while a universalistic coalition is that of the whole.

These theories, while important and interesting, shed rather little light on distributive policy making as a source of inefficiency. In focusing on the determination of distributive policies for given sets of policy preferences of the representatives, they are partial equilibrium in nature. Thus, to use them to analyze the efficiency of policy choices, it is necessary to assume some relationship between the preferences of citizens and their representatives. It is common, for example, to suppose that representatives' preferences over policy equal the sum of their constituents' utilities. Since any conclusions so reached can always be disputed by asserting that the analysis incorrectly characterizes representatives' preferences, such assumptions are unsatisfactory without some theory of legislative elections to underpin them.

This paper attempts to provide a more satisfactory analysis of distributive policy making as a source of inefficiency. It begins by developing a theory of legislative elections which provides a natural way of closing existing theories of distributive policy making. It then uses this theory to study the normative implications of three specific models of distributive policy making from the political science literature. The analysis is developed in the context of an economic environment in which distributive policies are centrally financed local public goods.

The theory of legislative elections outlined is an extension of the *citizen-candidate* theory of single district elections developed by Osborne and Slivinski (1996) and Besley and Coate (1997a). The political process is modelled as a three stage game. In the first stage, citizens decide whether to run to be their district's representative. In the second, the citizens in each district vote over the set of self-declared candidates and in the third stage, the winning representatives make policy. Decisions are forward looking in the sense that potential candidates anticipate voters' behavior. Voters also, knowing candidates' policy preferences and the way distributive policy making works, anticipate the policy choices they will make. In this way, the policy preferences of the winning candidates are determined in equilibrium and can be related to the specifics of the distributive policy making process.

Of the three different models of distributive policy making analyzed, two assume universalistic coalitions, while the third predicts minimum winning coalitions. The first universalistic coalition model is the now standard theory of *universalism* presented in Weingast, Shepsle and Johnson (1981). Each representative chooses a level of local public goods for his district and the legislature passes a bill consisting of these desired expenditures. This view is often criticized for predicting levels of spending which are inefficient from the viewpoint of the representatives. Accordingly, an *efficient universalism* model, adapted from Inman and Fitts (1990), is considered in which the legislature forces each representative to take account of the costs of his choice for the other representatives. The model predicting minimum winning coalitions is an *agenda setting* model based on the work of Baron and Ferejohn (1989). One representative is randomly selected to be the agenda setter. He then proposes local public goods levels for all districts and this proposal is voted on against the status quo.

The normative analysis evaluates the policy choices predicted by the three different theories under both the criteria of Pareto efficiency and surplus maximization. While the existing literature has focused exclusively on the latter, the paper follows Besley and Coate (1997b) in viewing the Pareto criterion as the relevant one for assessing "political failure". It is demonstrated that only the universalism model can produce policy choices which are Pareto inefficient. It is also shown that when elections are contested by citizens with the majority preferred policy preferences, local public good levels will be higher than the surplus maximizing ideal in every district under both models of universalism. The agenda setting model, however, predicts overprovision only in the agenda setter's district. Over or underprovision is possible in those districts whose representatives are selected to form the minimum winning coalition, while underprovision results in those districts whose representatives are not selected.

This paper contributes to a growing literature reexamining orthodox thinking concerning the efficiency of outcomes emerging from representative democracy. Wittman (1989), (1995) provides a survey and general critique of the extant literature. Besley and Coate (1997a) studies the Pareto efficiency of outcomes in a static, single district citizen-candidate model and Besley and Coate (1997c) examine how these conclusions are impacted by the presence of lobbying. Rogoff (1990) and Coate and Morris (1995) develop imperfect information explanations for inefficient policy choices in a political agency framework. Glazer (1989) and Tabellini and Alesina (1990) show that inefficient policy choices can arise in dynamic environments under majority rule and Besley and Coate (1997b) provide a classification of dynamic inefficiencies in a dynamic citizen-candidate model. Dixit (1996) offers an interesting overview of the subject, from a transactions costs perspective.

The paper also contributes to the literature on legislative elections; specifically, that branch which focuses on multi-district constituencies in which each district elects a representative.[1] In the Downsian tradition, this literature assumes that each district is contested by two candidates who choose platforms in a one-dimensional policy space (Austen-Smith (1984), (1986), (1987)).[2] Candidates have no policy preferences and simply want to win office. Legislative

[1]The other branch deals with single district constituencies electing a legislature via some form of proportional representation. Austen-Smith (1989) provides a valuable survey of both branches.

[2]As will be pointed out below, the approaches of Chari, Jones and Marimon (1997) and Persson (1997) can be given a Downsian interpretation.

outcomes depend on the policy platforms of the elected representatives and, possibly, their party affiliations. As in this paper, voters are forward looking and vote strategically. This paper offers an alternative to this Downsian view of legislative elections. Moreover, it points out that there are very real difficulties involved in using the Downsian approach in the distributive policy making context.

The paper is related to a recent contribution by Chari, Jones and Marimon (1997) which also combines models of distributive policy making with a theory of legislative elections. Their theory, which can be given a Downsian interpretation, assumes that politicians come in a variety of "types" and that citizens in each district select a type for their representative. The sets of possible politician types are specified exogenously and are independent of the types of citizens (who are all identical).[3] While this approach allows them to generate many interesting insights, this paper argues that it is problematic when questions of efficiency are at issue. Persson (1997) combines the same agenda setting model of distributive policy making considered in this paper with Chari, Jones and Marimon's model of legislative elections. However, in contrast to Chari, Jones and Marimon, his analysis allows for heterogeneity among citizens and requires that the set of possible types of legislative candidates is the set of citizen types. It turns out that this approach can be justified as a short cut way of selecting a particular type of equilibrium of the citizen-candidate model. The results of these two papers will be reviewed in more detail below.

The organization of the remainder of the paper is as follows. In the next section the economic environment and the theory of legislative elections is described. This is done for a "black box" representation of the distributive policy making process. In section 3, the three models of distributive policy making are introduced and some positive implications are developed. Section 4 contains the normative analysis, analyzing the optimality of the policy choices produced under the different models of distributive policy making in some detail. Section 5 discusses the general issue of modelling legislative elections in the distributive policy making context, outlines the approaches of Chari, Jones and Marimon (1997) and Persson (1997) and makes the case for the use of the citizen-candidate approach.

[3] A similar approach is taken by Niou and Ordeshook (1985). In the context of the standard universalism model, they ask whether voters would prefer a parochial representative for their district or a representative who values benefits and costs in other districts. They show that voters preferences provide a justification for the assumption of the standard model that all representatives are parochial.

Section 6 provides a brief conclusion.

2. The Basic Model

2.1. The Economic Environment

The underlying economic environment is one which is now quite standard in economic analyses of distributive policy making (see, for example, Chari and Cole (1997), Chari, Jones and Marimon (1997) and Persson (1997)). The economy consists of n citizens divided into m geographically distinct districts indexed by $i \in \mathcal{M} = \{1, ..., m\}$. District i is composed of n_i citizens indexed by $j \in \mathcal{N}_i = \{1, ..., n_i\}$. There are $m+1$ goods in the economy, a single private good, x, and m local public goods, one for each district, $g_1, ..., g_m$. Each citizen j in district i is endowed with an "income" of y_i^j units of the private good. To produce one unit of any local public good, requires c units of the private good.

Each citizen j in district i has preferences over his own consumption of the private good, x_i^j, and the quantity of the local public good in his own district, g_i. Citizens are selfish, caring neither about the consumption of others, nor the public good levels in other districts. The preferences of each citizen j in district i can be represented by the utility function $\theta_i^j B(g_i) + x_i^j$, where the function $B(\cdot)$ is smooth, increasing and strictly concave and satisfies $B(0) = 0$. The θ term is a public good preference parameter. Citizens with higher θ's have both higher absolute and marginal valuations of any given level of local public goods.

The citizens are divided into H different "types" according to their public good preferences. Thus, for all $j \in \mathcal{N}_i$ and $i \in \mathcal{M}$, $\theta_i^j \in \{\lambda_1, ..., \lambda_H\}$, where $\lambda_1 < ... < \lambda_H$. If $\theta_i^j = \lambda_h$, then citizen j in district i is of "type h". Let $\mathcal{N}_{ih}$ denote the set of type h citizens in district i. There are citizens of each type in every district, although their number may vary. In each district i there exists a *median* type, μ_i, with the property that $\sum_{h=1}^{\mu_i} \#\mathcal{N}_{ih} > \frac{n_i}{2}$ and $\sum_{h=\mu_i}^{H} \#\mathcal{N}_{ih} > \frac{n_i}{2}$. Higher types have stronger preferences for public spending and hence citizens in district i whose types are higher (lower) than the median will sometimes be referred to as "liberals" ("conservatives"). For future reference, define ξ to be the largest integer such that for every district i

$$\xi < \min\{\sum_{h=1}^{\mu_i} \#\mathcal{N}_{ih} - \sum_{h=\mu_i+1}^{H} \#\mathcal{N}_{ih} - 1; \sum_{h=\mu_i}^{H} \#\mathcal{N}_{ih} - \sum_{h=1}^{\mu_i-1} \#\mathcal{N}_{ih} - 1\}. \tag{2.1}$$

If, for example, each district consisted of 90 individuals, equally divided into three types, then $\xi = 29$.

Expenditure on local public goods is financed by a uniform head tax.[4] Thus, if the vector of local public goods levels $G = (g_1, ..., g_m)$ is selected, each citizen pays a tax $\frac{c}{n}\sum_{i=1}^{m} g_i$.[5] The *surplus* from the public goods vector G enjoyed by a citizen of type h in district i is thus $\lambda_h B(g_i) - \frac{c}{n}\sum_{j=1}^{m} g_j$. It is assumed that $\lambda_1 B'(0) > \frac{mc}{n}$ so that even citizens of the lowest type prefer a small uniform level of local public goods to none at all.

2.2. The Political Process

Local public good decisions in the economy are delegated to a unicameral legislature, consisting of one elected representative from each of the m districts. The legislature makes its decisions via majority rule. There are m simultaneous elections to determine the identity of each district's representative. All citizens resident in a given district are eligible to become candidates for the post of representative of their district. Citizens vote over the set of self-declared candidates, with the candidate who attracts the most votes becoming his district's representative in the legislature. In the event of a tie, the representative is selected randomly from the set of winning candidates. If only one candidate stands, then he is automatically elected, while, if there are no candidates, the district goes unrepresented. If the latter happens in all districts, then no local public goods are provided. Running for office entails a small utility cost δ, but representatives are provided with a payment $\varsigma \geq \delta$.[6] This payment, which is constitutionally set, is assumed to be sufficiently small so that $\zeta/\delta < \min_{i,h} \#\mathcal{N}_{ih}$ and $\zeta/\delta < \xi$. The first of these inequalities ensures that the number of citizens of a particular type is never a binding constraint on the number of candidates, while the second ensures that the voting decisions of citizens who are not candidates are decisive

[4]There will be no attempt to explain why local public goods are financed by an economy wide tax. This will simply be treated as part of the economy's "fiscal constitution". Following the literature, the focus is solely on the consequences of distributive policy making, while skirting the question of why there is distributive policy making. The justification for this is that the incentives created by distributive policy making will remain in a world where, for example, spillovers between districts create some rationale for central financing.

[5]It will be assumed that each citizen's income is sufficient to cover any tax bill that might be generated by the political process.

[6]The taxes necessary to finance these payments will not be made explicit.

in determining election outcomes.

The task of the analysis is to predict which citizens will run in the elections, which candidates will win, and which policy alternative will be selected. There are three stages to the model. At stage 1, citizens in each district decide whether to run for the post of representative of their district. At stage 2, citizens in each district vote over the declared candidates and at stage 3, the winning representatives from each constituency choose policy in the legislature. These stages are analyzed in reverse order.

2.2.1. Policy Selection

The policy outcome that will emerge from a given group of representatives will depend on how the legislature operates. Each of the three different models of distributive policy making to be studied in this paper implies some mapping from the composition of the legislature into policy outcomes. Rather than derive these mappings at this point, it will be convenient to simply posit the existence of such a mapping and focus on the voting and entry behavior it implies.

Accordingly, let $\omega_i \in \mathcal{N}_i \cup \{0\}$ denote the identity of the representative who has been selected from district i. Here, $\omega_i = 0$ denotes the case in which no representative is selected; i.e., the seat is empty. Let the vector $\omega = (\omega_1, ..., \omega_M)$ denote a selection of representatives. An *outcome function* is a mapping ρ from the set of possible selections of representatives to the set of probability distributions over the set of local public goods vectors G. Thus, $\rho(\omega)$ is the probability distribution over policy alternatives which arises when the selection of legislators is ω. The probability that a legislature with make-up ω will select any particular policy outcome G is therefore $\rho(\omega)(G)$. A stochastic outcome function is allowed for because one of our models of legislative behavior implies some randomization over policy outcomes.[7]

Given the outcome function ρ, a particular selection of representatives ω gives rise to a (net of income) expected utility imputation $\left\{((v_i^j(\omega;\rho))_{j\in\mathcal{N}_i})_{i\in\mathcal{M}}\right\}$, where

[7]By assuming that the outcome function is simply a function of the identities of the representatives, the possibility that policy outcomes also depend on the number of votes received by the representatives is ignored. While one might imagine theories of distributive policy making in which this played a role, it is not a feature of any of the models considered here.

$$v_i^j(\omega;\rho) = \sum_{G\in\Delta(\rho(\omega))} [\theta_i^j B(g_i) - \frac{c}{n}\sum_{k=1}^{m} g_k]\rho(\omega)(G) + I^i_{\{\omega_i\}}(j)\zeta. \qquad (2.2)$$

Here, $\Delta(\cdot)$ denotes the *support* of a probability distribution (i.e., the set of policy outcomes which are selected with positive probability) and $I^i_{\{\omega_i\}}(j)$ denotes the indicator function for the set $\{\omega_i\}$, taking on the value 1 when $j = \omega_i$ and 0 otherwise.

2.2.2. Voting

Voters know the outcome function and hence the relationship between policy outcomes and the make-up of the legislature. They vote strategically — taking account of the implications of their own and others' voting decisions for the ultimate policy outcome. To describe voting behavior, assume that the set of candidates in district i is $\mathcal{C}_i \subset \mathcal{N}_i$ (if there are no candidates in district i, then $\mathcal{C}_i = \emptyset$) and let $\mathcal{C} = \{\mathcal{C}_i\}_{i\in\mathcal{M}}$ denote the collection of candidates in all districts.

A voting strategy for citizen j in district i is denoted by $\alpha_i^j \in \mathcal{C}_i \cup \{0\}$, where $\alpha_i^j = k$ means casting a vote for candidate k and $\alpha_i^j = 0$ means abstaining. The strategy profile for all the voters in district i is α_i and a community wide strategy profile is $\alpha = (\alpha_1, ..., \alpha_M)$. The notation α_i^{-j} will be used to denote the voting decisions of all citizens in district i other than j, while α_{-i} will denote the voting decisions of all districts other than i.

Given $\mathcal{C}_i$ and α_i, let $W_i(\mathcal{C}_i, \alpha_i)$ denote the set of winning candidates; i.e., those who receive the most votes. If $\#\mathcal{C}_i = 1$ so only one candidate runs, then I adopt the convention that $W_i(\mathcal{C}_i, \alpha_i) = \mathcal{C}_i$. Let $P_i^k(\mathcal{C}_i, \alpha_i)$ denote the probability that district i's representative will be $k \in \mathcal{C}_i \cup \{0\}$. Given our assumptions about the electoral system, if $k \in \mathcal{C}_i$, $P_i^k(\mathcal{C}_i, \alpha_i)$ will equal $1/\#W_i(\mathcal{C}_i, \alpha_i)$ if $k \in W_i(\mathcal{C}_i, \alpha_i)$ and 0 otherwise. If $\mathcal{C}_i = \emptyset$, so that there are no candidates in district i, $P_i^0(\mathcal{C}_i, \alpha_i) = 1$. Otherwise, $P_i^0(\mathcal{C}_i, \alpha_i) = 0$. Letting $P(\mathcal{C}, \alpha)(\omega)$ denote the probability that the selection of representatives is ω when the candidate sets are $\mathcal{C}$ and the voting decisions are α, it follows that $P(\mathcal{C}, \alpha)(\omega) = \times_{i\in\mathcal{M}} P_i^{\omega_i}(\mathcal{C}_i, \alpha_i)$.

With candidate sets $\mathcal{C}$ and voting decisions α, the expected utility of citizen j in district i is given by $\sum_{\omega\in\Delta(P(\mathcal{C},\alpha))} P(\mathcal{C}, \alpha)(\omega) \cdot v_i^j(\omega; \rho)$. A strategy profile α is a *voting equilibrium* given the outcome function ρ and the candidate set $\mathcal{C}$, if for each citizen j in each district i, (i) α_i^j is a best response to the other citizens' voting decisions $(\alpha_{-i}, \alpha_i^{-j})$; (ii) α_i^j is not a weakly dominated voting decision; and (iii)

$\alpha_i^j = 0$ if j is indifferent between the candidates in $\mathcal{C}_i$ given $\mathcal{C}$ and ρ. Conditions (i) and (ii) are standard. Condition (iii) is a variant of the "abstinence of indifferent voters" assumption employed in Besley and Coate (1997a). By citizen j being indifferent between the candidates in $\mathcal{C}_i$ given $\mathcal{C}$ and ρ is meant that for all possible selections of candidates from the other districts $\omega_{-i} \in \times_{k \neq i} \mathcal{C}_k$, the candidates in $\mathcal{C}_i$ provide him with the same payoff; that is, $v_i^j(\omega_{-i}, h; \rho) = v_i^j(\omega_{-i}, k; \rho)$ for all $h, k \in \mathcal{C}_i$.

2.2.3. Entry

Each citizen j in district i must decide whether or not to enter as a candidate to represent his district. The entry decision is denoted $s_i^j \in \{0, 1\}$, with $s_i^j = 1$ representing entry. Let $s_i = (s_i^1, ..., s_i^{n_i})$ be the profile of entry decisions in district i and $s = (s_1, ..., s_m)$ be the community wide strategy profile. Again, s_i^{-j} will be used to denote the entry decisions of all citizens in district i other than j and s_{-i} will denote the entry decisions of all districts other than i. The candidate sets associated with an entry profile s are denoted $\mathcal{C}_i(s_i) = \left\{ j \in \mathcal{N}_i : s_i^j = 1 \right\}$ and $\mathcal{C}(s) = \{\mathcal{C}_i(s_i)\}_{i \in \mathcal{M}}$.

Each citizen's entry decision will depend on who else he expects to run in his and the other districts, as well as on how he expects the electorate to vote. Given any collection of candidates $\mathcal{C} \subset \times_{i \in \mathcal{M}} \mathcal{N}_i$, let $\alpha(\mathcal{C})$ denote the profile of voting decisions the citizens anticipate. Thus, if the vector of entry decisions is s and the citizens anticipate voting behavior $\alpha(\cdot)$, then citizen j in district i has expected utility

$$\sum_{\omega \in \Delta(P(\mathcal{C}(s), \alpha(\mathcal{C}(s))))} P(\mathcal{C}(s), \alpha(\mathcal{C}(s)))(\omega) \cdot v_i^j(\omega; \rho) - s_i^j \delta. \tag{2.3}$$

Citizen j's payoff is therefore the probability that each possible combination of representatives is selected multiplied by his payoff should such a selection arise, less the entry cost if he chooses to enter. A strategy profile $\widehat{s}$ is an *equilibrium of the entry game* given $\alpha(\cdot)$ and ρ, if for all $j \in \mathcal{N}_i$ and all $i \in \mathcal{M}$, $\widehat{s}_i^j$ is a best response to the other citizens' voting decisions $(\widehat{s}_{-i}, \widehat{s}_i^{-j})$.

2.2.4. Political Equilibrium

Combining the analysis of the three stages, a *political equilibrium* is a triple $\{\rho; \alpha(\cdot); s\}$ where ρ is an outcome function; $\alpha(\cdot)$ is a voting function with the

property that $\alpha(\mathcal{C})$ is a voting equilibrium given ρ for all candidate sets $\mathcal{C}$; and s is a vector of entry decisions which is an equilibrium of the entry game given ρ and $\alpha(\cdot)$. When political equilibria exist, predictions can be made about which citizens will run in each district and the subsequent voting behavior. This will tell us which candidates will win and the equilibrium probability distribution over policy outcomes can be recovered via the outcome function.

In this model, as in the single district citizen candidate model, the problem tends to be multiplicity of equilibrium rather than non-existence. The positive analysis of the next section will focus attention on a special class of equilibria, involving homogeneous candidates in each district. Formally, a triple $\{\rho; \alpha(\cdot); s\}$ is a *political equilibrium with identical candidates* if for each district i, $\mathcal{C}_i(s_i) \neq \emptyset$ and for all $j, k \in \mathcal{C}_i(s_i)$, $\theta_i^j = \theta_i^k$. The first requirement is that there be candidates in each district and the second is that they share the same preferences. These equilibria (typically) have the property that the type of candidate running in each district is preferred by a majority of that district's residents to any other type.[8] They can be seen as shedding light on the distributive policies that would emerge with representatives who have the approval of a majority of the voters. They have the additional merit of being relatively straightforward to analyze. While there is no guarantee that they exist for arbitrary outcome functions, for the outcome functions that are generated by the three models of distributive policy making to be considered, political equilibria with identical candidates do exist.

3. Three Models of Distributive Policy Making

To close the model of the previous section, it is necessary to specify a model of distributive policy making. As noted earlier, the problem of predicting the outcome of distributive policy making is challenging, as there is no Condorcet winning package of policies. Moreover, voting one issue at a time as in Shepsle (1979) seems destined to produce no local public goods. One response to this problem is to simply hypothesize a way in which the legislature behaves. This is the approach taken in the first two models considered. An alternative approach is to tightly specify a set of procedural rules which govern the making of proposals and study the non-cooperative game to which these give rise. This is the approach

[8] If the (identical) candidates were not of the majority preferred type, then a citizen of this type could enter and win. Provided that his selection would generate a preferred policy outcome (which is not always the case), such a citizen has an incentive to enter.

taken in the third model considered.

3.1. Universalism

Underlying the universalism concept is the idea that legislators would both face considerable uncertainty and forego surplus enhancing public projects if distributive policies were always determined by a minimum winning coalition.[9] Recognizing this, representatives develop a "norm of universalism", whereby they agree that each district should get its share (Weingast (1979)). In the model introduced in Weingast, Shepsle and Johnson (1981), each representative is assumed to choose the level of public goods that he would like for his own district and the legislature passes a bill consisting of these desired levels (see also Shepsle and Weingast (1981) and Inman and Fitts (1990)).[10] Thus, every legislator agrees to vote for everybody else's spending under the assumption of reciprocal treatment.

It is straightforward to construct the outcome function that this theory implies. Let ω be any particular selection of legislators and let $\Lambda(\omega) = \{i \in \mathcal{M} : \omega_i \neq 0\}$ denote the set of districts who are represented. If $i \notin \Lambda(\omega)$, so that district i is not represented, it will receive no local public goods. If $i \in \Lambda(\omega)$, then district i's representative will select a level of public goods for his district. If he anticipates the other districts receiving the vector of public goods $(g_j)_{j \in \Lambda(\omega)/\{i\}}$, he will choose a level of public goods for district i to solve the problem

$$\max_{g_i}\{\theta_i^{\omega_i} B(g_i) - \frac{c}{n}(g_i + \sum_{j \in \Lambda(\omega)/\{i\}} g_j)\}. \tag{3.1}$$

The optimal level equates his personal marginal benefit of public goods, $\theta_i^{\omega_i} B'(g_i)$, to his tax price, $\frac{c}{n}$. Thus, the optimal level is $g_i = \varphi(\theta_i^{\omega_i}, 1)$, where the function $\varphi(\lambda_h, \eta)$ is implicitly defined by the condition $\lambda_h B'(\varphi) = \eta \frac{c}{n}$. It follows that the outcome function generated by universalism, denoted ρ_U, selects the vector of local public goods such that $g_i = \varphi(\theta_i^{\omega_i}, 1)$ for all $i \in \Lambda(\omega)$ and $g_i = 0$ for all $i \notin \Lambda(\omega)$ when the selection of representatives is ω.

To characterize political equilibria under universalism, it is necessary to understand voters' preferences over different types of representatives. Citizens' pref-

[9]This is certainly the case in the agenda setting model considered below.

[10]Concretely, one can think of a committee of some subset of the legislators being assigned responsibility for making proposals to the floor. Each legislator reports the level of public spending he would like in his own district to the committee. A bill consisting of these desired levels is then proposed to the floor.

erences display a separability property in that they can be written as the sum of a term depending only on the type of the own district representative and a term depending on the types of the other representatives. Specifically, the payoff to citizen j in district $i \in \Lambda(\omega)$ from the selection of representatives ω (assuming that $j \neq \omega_i$) is

$$v_i^j(\omega;\rho_U) = [\theta_i^j B(\varphi(\theta_i^{\omega_i},1)) - \frac{c}{n}\varphi(\theta_i^{\omega_i},1)] - \frac{c}{n} \sum_{k \in \Lambda(\omega)/\{i\}} \varphi(\theta_k^{\omega_k},1). \tag{3.2}$$

The term in squared brackets depends only on the identity of district i's representative, while the second term depends only on the identity of the representatives of the other districts. The key implication of this, is that a citizen's ranking of different candidates is completely independent of the identity of the representatives for other districts. This considerably simplifies the analysis of voting behavior, as each district can be treated independently.

It follows that the optimal type of representative for a citizen of type e is the type $h \in \{1,...,H\}$ that maximizes $\lambda_e B(\varphi(\lambda_h,1)) - \frac{c}{n} \cdot \varphi(\lambda_h,1)$, which is simply type e. Thus, citizens prefer representatives who share their preferences. Moreover, citizens' preferences over types are *single peaked:* given any two types h and h' such that $h < h' < e$ or $e < h' < h$, type e citizens always prefer type h' candidates. It follows that in any district-level election between two candidates of types h and h' ($h < h'$), the candidate preferred by the median type will be preferred by a majority of the voters. This fact allows us to rather easily describe equilibria with identical candidates under universalism.

Proposition 1. *There exists a political equilibrium with identical candidates under universalism. In any such equilibrium, the candidates in district i are of type μ_i and the number of candidates in each district is the largest integer less than or equal to $\frac{\zeta}{\delta}$.*

The intuition underlying this result is straightforward. If, in a political equilibrium with identical candidates, the candidates were not of the median type in some district, then a candidate of the median type would have an incentive to enter. The assumption that voters do not employ weakly dominated voting strategies, implies that such a candidate would attract a majority of votes and win. Since the payment for being a representative ζ exceeds the entry cost δ and policy would be moved in a preferred direction, entry would be worthwhile. If each district has candidates of the median type, no citizen of some other type would have any incentive to enter if he believed that those who preferred the median type would rally behind one of the median candidates. Under the assumption of abstinence of indifferent voters, if another citizen of the median type entered, then he would win with probability $1/K$, where K is the number of candidates. Thus, entry will be worthwhile whenever $\frac{\varsigma}{K} \geq \delta$, which implies that the equilibrium number of candidates in each district is the largest integer less than or equal to $\frac{\varsigma}{\delta}$.

Political equilibria with identical candidates therefore involve representatives whose preferences mirror those of the average voter they represent.[11] This reflects the fact that under universalism, each representative is free to select whatever public good level for his district that he wants. The median type of citizen therefore wants a representative who would do exactly the same as he would, if faced with the choice. This is a representative of his own type.

[11]Equilibria in which two candidates of different types face each other in each district can also exist. Suppose that in each district i (i) the median group exactly splits the electorate in two in the sense that $\sum_{h=1}^{\mu_i-1} \#\mathcal{N}_{ih} = \sum_{h=\mu_i+1}^{H} \#\mathcal{N}_{ih}$, (ii) the number in the median group is slightly less than 1/3 of the local population ($\#\mathcal{N}_{i\mu_i} < n_i/3 - 1$) and (iii) there exists two types h_i and h_i', $h_i < h_i'$, between which citizens of the median group are indifferent. Then, using the arguments in Besley and Coate (1997a), it can be shown that there exists a political equilibrium under universalism in which in each district i the election is contested by two candidates of types h_i and h_i'. Both candidates have an incentive to run against each other, since they each win with probability one half and they have different policy preferences. The supporting voting behavior is such that voters do not switch their votes to entrants for fear of wasting their vote. This means that no other candidates have an incentive to enter. It can also be shown that, under the assumption that voting behavior in each district depends only on the candidates in that district, in any political equilibrium under universalism in which two candidates run in district i, the two candidates must be of types satisfying condition (iii). (The required assumption on the voting function is that for each district i and any two candidate sets $\mathcal{C}$ and $\mathcal{C}'$ such that $\mathcal{C}_i = \mathcal{C}_i'$, $\alpha_i(\mathcal{C}) = \alpha_i(\mathcal{C}')$.) The assumption on voting behavior is necessary to rule out the possibility that a candidate runs simply because he believes that his presence affects voting behavior in some other district. The arguments of Besley and Coate (1997a) can also be applied to rule out the possibility of politicial equilibria under universalism in which three candidates run in one district. Again, this does require the assumption that voting behavior in each district depends only on the candidates in that district. However, political equilibria with four or more candidates and one winner remain a possibility. These equilibria are supported by anticipated voting behavior which says that when a losing candidate withdraws, another losing candidate will win. Thus, losing candidates stay in the race as spoilers to prevent each other from winning. The multiplicity of voting equilibria in elections with three or more candidates permits such voting behavior to be justified.

3.2. Efficient Universalism

Not withstanding the fact that each legislator is choosing the level of public goods that is optimal for his district, the collective consequence of universalism is a policy choice which is inefficient from the viewpoint of the legislators. The budgetary externality gives rise to a common pool problem, whereby all the legislators overexploit the tax base. Given the motivation for the norm of universalism, this is rather paradoxical.[12] Some also argue that it is implausible, arguing, in Coasian fashion, that the legislators should be able to agree to modify their behavior to achieve a mutually preferred outcome (see, for example, Wittman (1995)).[13]

The second model of distributive policy making, which is adapted from Inman and Fitts (1990), is designed to capture this Coasian view. In the spirit of universalism, each representative is assumed to choose the level of public goods for his district. However, he takes into account the costs his spending imposes on the other representatives.[14] Thus, the norm of universalism is extended to include a "norm of consideration" for the impact of public projects on other representatives. The legislature then passes a bill consisting of the representatives' desired levels.

To see the outcome function that this implies, let ω be some selection of representatives. If $i \notin \Lambda(\omega)$, so that district i is not represented, it will receive no local public goods. If $i \in \Lambda(\omega)$, then district i's representative will select a level of public goods for his district. If he anticipates the other districts receiving the vector of public goods $(g_j)_{j\in\Lambda(\omega)/\{i\}}$, he will choose a level of public goods for district i to solve the problem:

$$\max_{g_i}\{\theta_i^{\omega_i}B(g_i) - \frac{c}{n}(g_i + \sum_{j\in\Lambda(\omega)/\{i\}} g_j) - (\#\Lambda(\omega) - 1)\frac{c}{n}g_i\}. \tag{3.3}$$

[12]Under the standard model, it is possible that a majority of legislators would be better off with the default outcome of zero public spending. This raises the question of why they would ever vote for the bill in the first place.

[13]Defenders of the universalism view sometimes cite imperfect information about the benefits of local public goods to local representatives as a barrier to such an efficient Coasian solution. Others redefine legislators' preferences in such a way as to make the universalism solution efficient. For example, Schwartz (1994) argues that legislators care only about the net benefits they bring to their districts; that is, the representative from district i has preferences given by $\sum_{j\in\mathcal{N}_i}[\theta_i^j B(g_i) - \frac{c}{n}g_i]$. Under this assumption, the universalism solution maximizes the sum of legislators' utilities.

[14]Inman and Fitts (1990) study the case in which representatives take into account the costs imposed on other representatives in the same party, rather than the collective as a whole.

The only difference between this and (3.1) is that district i's representative takes into account the costs his spending imposes on the other representatives.[15] The optimal level now equates his personal marginal benefit of public goods, $\theta_i^{\omega_i} B'(g_i)$, to the collective tax price, $\#\Lambda(\omega)\frac{c}{n}$. The optimal level of public goods is therefore $\varphi(\theta_i^{\omega_i}, \#\Lambda(\omega))$.

It follows that the outcome function generated by efficient universalism, denoted ρ_E, selects the vector of local public goods such that $g_i = \varphi(\theta_i^{\omega_i}, \#\Lambda(\omega))$ for all $i \in \Lambda(\omega)$ and $g_i = 0$ for all $i \notin \Lambda(\omega)$ when the selection of representatives is ω. The payoff to citizen j in district $i \in \Lambda(\omega)$ from the selection of representatives ω (assuming that $j \neq \omega_i$) is therefore

$$v_i^j(\omega; \rho_E) = [\theta_i^j B(\varphi(\theta_i^{\omega_i}, \#\Lambda(\omega))) - \frac{c}{n}\varphi(\theta_i^{\omega_i}, \#\Lambda(\omega))] - \frac{c}{n} \sum_{k \in \Lambda(\omega)/\{i\}} \varphi(\theta_k^{\omega_k}, \#\Lambda(\omega)). \tag{3.4}$$

As under universalism, a citizen's ranking of different candidates is completely independent of the identity of the representatives for other districts. It does, however, depend on the number of other districts who have representatives.

Assuming that all other districts have representatives, the optimal type of representative for a citizen of type e is the type $h \in \{1, ..., H\}$ that maximizes $\lambda_e B(\varphi(\lambda_h, m)) - \frac{c}{n} \cdot \varphi(\lambda_h, m)$. I denote this type $h^*(e)$. The important point to note is that the optimal type for a type e citizen is no longer a type e candidate. A representative of type e will select a level of local public goods at which the marginal benefit to a type e citizen equals mc/n, rather than the desired c/n. The level of public goods produced will therefore be much too low. Accordingly, each citizen would prefer a representative of a type with a higher marginal valuation of public goods. Indeed, provided that the highest type's valuation of public goods is less than m times that of a type e's (i.e., $\lambda_H/\lambda_e < m$), the type e citizens' optimal type of candidate is of type H.

Again, preferences over types are single peaked in the sense that given any two types h and h' such that $h < h' < h^*(e)$ or $h^*(e) < h' < h$, type e citizens

[15]The model offers no description of the mechanism which induces representatives to act in this way. One way to think about it is to imagine each representative reporting his desired level of local public goods to a committee which has responsibility for making proposals. This committee then induces representatives to take into account others costs by assigning zero spending to districts whose representatives violate the norm. Obviously, this requires that the committee has perfect information but this assumption underlies the model of legislative elections.

always prefer type h' candidates. Thus, in any district-level election between two candidates of types h and h' ($h < h'$), the candidate preferred by the median type will be preferred by a majority of the voters. Applying the logic of Proposition 1, yields:[16]

Proposition 2. *Suppose that for all districts i, $\lambda_H/\lambda_{\mu_i} \leq m$. Then, there exists a political equilibrium with identical candidates under efficient universalism. In any such equilibrium, the candidates in district i are of type H and the number of candidates in each district is the largest integer less than or equal to $\frac{\zeta}{\delta}$.*

Political equilibria with identical candidates therefore involve representatives whose preferences are much more pro-spending than those of the average voter they represent.[17] This reflects the fact that, while each representative selects the public good level for his district, he is forced by the legislature to take account of the consequences of his selection for the other representatives. The voters are not so constrained in their choice of representative, paying only a fraction of the tax cost of his decisions. They therefore favor a representative who will allow them to exploit the budgetary externality by choosing a high level of local public goods. This is a liberal candidate. This selection of liberal candidates serves to narrow the difference in policy predictions between the two models of universalism.[18]

[16]If it is the case that $\lambda_H/\lambda_{\mu_i} > m$ for all districts i, there will exist an equilibrium with identical candidates involving candidates of type $h^*(\mu_i)$ in each district. However, there may be others involving candidates of types higher than $h^*(\mu_i)$. This is because citizens of type $h^*(\mu_i)$ may have no incentive to challenge higher type candidates as they are likely to deliver a preferred policy outcome.

[17]If for all districts i, $\lambda_H/\lambda_{\mu_i} \leq m$ then, under the assumption that voting behavior in each district depends only on the candidates in that district, equilibria in which two candidates run in some district do not exist under efficient universalism. When the median type of citizen in each district prefers a type H candidate, the median type will always prefer the candidate with the highest type in any two candidate race. Thus, the lowest type candidate will lose and has no incentive to stay in the race, assuming that his candidacy does not affect outcomes in other districts. As under universalism, there also exist no political equilibria under efficient universalism with district independent voting behavior in which three candidates run in one or more districts.

[18]In an ambitious study, Inman and Fitts (1990) develop a methodology to empirically distinguish between the universalism model and their version of the efficient universalism model. The finding that efficient universalism produces representatives with higher preferences for public spending casts doubt on the legitimacy of their implicit assumption that representatives' preferences are the same across regimes.

3.3. Agenda Setting

The two previous models are unsatisfying in that they do not specify a process which generates the predictions they make. Partly in response to such dissatisfaction, Baron and Ferejohn (1989) developed an alternative approach for understanding legislative outcomes. Their approach was to carefully specify the rules by which proposals and counter-proposals could be made and then study the game that these rules gave rise to. This general approach has been influential and usefully applied in a number of contexts. Here, a simplified version of Baron and Ferejohn's model of legislative behavior is considered. One legislator is selected to make a proposal to the floor concerning spending in all districts. The selection is random, with each representative having an equal chance of being selected. The legislators then (simultaneously) vote for or against the proposal. If the proposal receives the support of a strict majority of the representatives, it is implemented. Otherwise the default outcome of zero public spending prevails.

These rules give rise to a game between the elected representatives. A strategy for a representative consists of vector of public goods levels to propose if selected and a rule specifying a voting decision for each possible proposer and proposal. An equilibrium consists of a proposal and voting rule for each representative with the property that (i) each representative's proposal maximizes his payoff given the anticipated voting behavior and (ii) the voting decision selected by each representative's voting rule is always a best response to the voting decisions of the other representatives and is weakly undominated.

Equilibria are straightforward to characterize. In the voting stage, each representative votes sincerely, casting his vote for the proposal if and only if it provides him with at least as much utility than the default outcome. In the proposal stage, each representative selects a minimum winning coalition of representatives and provides public goods only to the districts associated with these representatives. The public goods levels chosen will be such that each representative in the minimum winning coalition (with the exception of the proposer) is provided with just enough utility to induce him to support the proposal. The minimum winning coalition will be formed from those representatives whose votes are cheapest to buy, these being those of the highest type. The minimum winning coalition, and hence the equilibrium proposal, need not be uniquely defined when there are a number of legislators with the same public good preferences.

To formally describe equilibrium proposals, consider a particular selection of legislators ω and suppose that the representative of district $i \in \Lambda(\omega)$ has been selected to propose. The proposer's choice can conveniently be characterized in terms of a pair (Ω_i, τ_i) where $\Omega_i \subset \Lambda(\omega)/\{i\}$ is the set of districts whose representatives (along with the proposer) will make up the minimum winning coalition and τ_i is the level of per capita public spending.

Each district $k \in \Omega_i$ receives a level of local public goods just sufficient to make the representative of district k indifferent between his package and the default outcome. This is an amount $\gamma(\theta_k^{\omega_k}, \tau_i)$, where the function $\gamma(\lambda_h, \tau)$ is implicitly defined by the equality $\lambda_h B(\gamma) = \tau$. Each district $k \notin \Omega_i \cup \{i\}$ receives no public goods, while district i receives a level $\alpha(\Omega_i, \tau_i)$ where $\alpha(\Omega, \tau) = \frac{n}{c}\tau - \sum_{k \in \Omega} \gamma(\theta_k^{\omega_k}, \tau)$. Note that, by construction, $c[\alpha(\Omega_i, \tau_i) + \sum_{k \in \Omega} \gamma(\theta_k^{\omega_k}, \tau_i)]/n = \tau_i$.

The subset Ω_i will be chosen so that $\Omega_i \cup \{i\}$ is a minimum winning coalition in $\Lambda(\omega)$ with the property that $\theta_k^{\omega_k} \geq \theta_h^{\omega_h}$ for all $k \in \Omega_i$ and $h \in \Lambda(\omega)/(\Omega_i \cup \{i\})$. The level of per capita spending will be chosen to solve the problem

$$\max_{\tau} \theta_i^{\omega_i} B(\alpha(\Omega_i, \tau)) - \tau. \tag{3.5}$$

As noted earlier, (Ω_i, τ_i) is not uniquely defined because there can be a number of possible optimal sets of coalition members when some legislators are of the same type.[19] Let $\Gamma_i(\omega)$ denote the set of optimal pairs (Ω_i, τ_i) and let $G^i(\Omega_i, \tau_i)$ denote the policy vector generated by (Ω_i, τ_i).

It follows that ρ_A is an outcome function with agenda setting if and only if for all selections of representatives ω, there exists $(\Omega_i, \tau_i)_{i \in \Lambda(\omega)} \in \times_i \Gamma_i(\omega)$ such that $\rho_A(\omega)(G^i(\Omega_i, \tau_i)) = 1/\#\Lambda(\omega)$ for all $i \in \Lambda(\omega)$. In contrast to the two previous models, this model of distributive policy making does not generate a unique outcome function. This creates a problem when studying citizens' preferences over different types of representatives, as it is possible that citizens might rationally anticipate that only certain citizens of a particular type would be included in the minimum winning coalition. I will ignore this possibility by assuming that if ω and ω' are two selections with the property that $\Lambda(\omega) = \Lambda(\omega')$ and that $\theta_k^{\omega_k} = \theta_k^{\omega'_k}$ for all $k \in \Lambda(\omega)$, then $\rho_A(\omega) = \rho_A(\omega')$. Accordingly, it makes sense to define $(\Omega_i(\theta(\omega)), \tau_i(\theta(\omega)))_{i \in \Lambda(\omega)}$ to be the proposals made by the representatives of districts $i \in \Lambda(\omega)$ when their vector of types is $\theta(\omega) = (\theta_k^{\omega_k})_{k \in \Lambda(\omega)}$.

Using this notation, the payoff of citizen j in district i when ω is the selection

[19] It is the case, however, that the level of per capita spending is unique.

of legislators (assuming $j \neq \omega_i$) is

$$v_i^j(\omega;\rho_A) = \frac{1}{\#\Lambda(\omega)}[\theta_i^j B(\alpha(\Omega_i(\theta(\omega)),\tau_i(\theta(\omega)))) - \tau_i(\theta(\omega))] + \frac{1}{\#\Lambda(\omega)}\sum_{k\in\Lambda(\omega)/\{i\}}[I_{\Omega_k}(i)\theta_i^j B(\gamma(\theta_k^{\omega_k},\tau_k(\theta(\omega))) - \tau_k(\theta(\omega))], \tag{3.6}$$

where I_{Ω_k} is the indicator function for the set Ω_k. It is clear that district i's level of local public goods is affected by the type of the representatives of other districts. This is because the representative of each district gets to determine the policy choice with probability $\frac{1}{\#\Lambda(\omega)}$. Moreover, the public goods vector that he chooses depends on the type of the other representatives.

Assume that each district $k \neq i$ has a representative of type λ_{h_k} and let $\lambda^{-i} = (\lambda_{h_1},..,\lambda_{h_{i-1}},\lambda_{h_i},..,\lambda_{h_m})$. Then, using the fact that $\lambda_h B(\gamma(\lambda_h,\tau_k(\lambda_h,\lambda^{-i})) = \tau_k(\lambda_h,\lambda^{-i})$, the optimal type of representative from the viewpoint of a citizen of type e in district i, solves the problem

$$max_h \frac{1}{m}\{[\lambda_e B(\alpha(\Omega_i(\lambda_h,\lambda^{-i}),\tau_i(\lambda_h,\lambda^{-i}))) - \tau_i(\lambda_h,\lambda^{-i})] + \sum_{k\in\mathcal{M}/\{i\}}[I_{\Omega_k(\cdot)}(i)\frac{\lambda_e}{\lambda_h} - 1]\tau_k(\lambda_h,\lambda^{-i})\}. \tag{3.7}$$

The first term represents the payoff when the representative from district i is selected to propose, an event which occurs with probability $\frac{1}{m}$. The second term is the expected payoff from some other district being selected.

In determining his optimal type of representative, the type e citizen faces three conflicting sets of incentives. First, there is an incentive to have a like minded candidate in office. This is because when the representative from district i is selected as proposer, a representative of type e would choose the optimal public goods vector from the viewpoint of type e citizens.[20] Second, there is an incentive to have a more conservative representative since, conditional on being included in the minimum winning coalition, such a candidate would obtain a larger level of public goods for the district. Finally, there is an incentive to have a more liberal representative because such a representative is more likely to be selected to be in the minimum winning coalition.

Intuitively, one might expect there to exist an equilibrium with identical candidates involving the most liberal candidates. If every other district had a representative of type H, then electing any other type would guarantee that district

[20]It is straightforward to verify that the first term in the above expression is maximized at $\lambda_h = \lambda_e$.

i would never be included in the minimum winning coalition. The issue for citizens in district i would therefore be whether the gains from being included in the minimum winning coalition exceeded the losses from having a very liberal citizen choose policy when district i is selected to propose. Since district i is selected to propose with probability $\frac{1}{m}$, these gains might be expected to exceed the losses when m is large.

A proposition can be established to this effect. The first point to note is that citizens' preferences over different types satisfy a single crossing property.

Lemma 1. *Suppose that type e citizens prefer type h to type h' candidates. Then, (i) if*

$$B(\alpha(\lambda_h)) + \sum_{k \neq i} \frac{I_{\Omega_k(\lambda_h, \lambda^{-i})}(i)\tau_k(\lambda_h, \lambda^{-i})}{\lambda_h} > B(\alpha(\lambda_{h'})) + \sum_{k \neq i} \frac{I_{\Omega_k(\lambda_{h'} \lambda^{-i})}(i)\tau_k(\lambda_{h'}, \lambda^{-i})}{\lambda_{h'}}$$

where $\alpha(\lambda_h) = \alpha(\Omega_i(\lambda_h, \lambda^{-i}), \tau_i(\lambda_h, \lambda^{-i}))$ and $\alpha(\lambda_{h'}) = \alpha(\Omega_i(\lambda_{h'}, \lambda^{-i}), \tau_i(\lambda_{h'}, \lambda^{-i}))$, type $e+1$ through type H citizens prefer type h to type h' candidates, and (ii) if the inequality goes in the other direction, type 1 through type $e-1$ citizens prefer type h to type h' candidates.

This result means that if there are two candidates of distinct types in district i, the candidate who is preferred by the median type will be preferred by the majority. The following proposition may now be established.

Proposition 3. *Suppose that there are an odd number of districts and that for all districts i, $\frac{\lambda_H}{\lambda_{\mu_i}} \leq \frac{m-1}{2}$. Then, there exists a political equilibrium with identical candidates under agenda setting in which the candidates in each district i are of type H and the number of candidates in each district is the largest integer less than or equal to $\frac{\zeta}{\delta}$.*

To prove the proposition it is necessary to show that the majority of citizens in each district i prefer a type H candidate to any other when all other districts are also represented by type H candidates. The inequality condition guarantees that citizens of the median type prefer a type H candidate to any other type and, by Lemma 1, this implies that a majority prefer the type H candidate. The left hand side of the inequality is smaller, the smaller the difference between the preferences of moderates and the most extreme liberals. Intuitively, this reflects the fact that when this difference is small, the losses from having a liberal propose are small. The right hand side of the inequality is larger the larger is m, reflecting the intuition discussed above.

The above proposition says nothing about the existence of other types of equilibria with identical candidates. The next proposition develops sufficient conditions under which, when m is odd, every equilibrium with identical candidates under agenda setting involves type H candidates in at least $\frac{m-1}{2}$ districts. The sufficient conditions are complicated enough to warrant being stated separately. They both serve to bound the increase in expected spending that results from electing a more liberal legislator.

Condition 1. *Let $\lambda = (\lambda_{h_1}, ..., \lambda_{h_m})$ be any vector of representative types. Then for every district i*

$\sum_{k\in\mathcal{M}}[\tau_k(\lambda_H, \lambda^{-i}) - \tau_k(\lambda)]/m < \sum_{k\in\mathcal{M}/\{i\}} \frac{\lambda_{\mu_i}}{\lambda_H}\tau_k(\lambda_H, \lambda^{-i})/m.$

Recall that $\tau_k(\lambda)$ represents the level of per capita spending that would be chosen by the representative from district k if he were selected and the vector of representative types were λ. Thus, since each representative is selected with probability $\frac{1}{m}$, $\sum \tau_k(\lambda)/m$ represents expected per capita spending. The left hand side of the inequality therefore represents the increase in expected spending resulting from replacing district i's representative with a representative of type H. This is expected to be positive because a representative of type H would certainly choose to spend more if selected to propose and, by changing the composition of other proposer's minimum winning coalitions, might induce other representatives to spend more.[21] The right hand side represents the expected benefits from electing a representative of type H enjoyed by a citizen of the median type in district i when the election of such a representative leads to district i being included in every minimum winning coalition rather than none.

Condition 2. *Let $\lambda = (\lambda_{h_1}, ..., \lambda_{h_m})$ be any vector of representative types. Then for every district i such that $\lambda_{h_i} < \lambda_H$ and any subset of districts $\Omega \subset \mathcal{M}/\{j\}$ such that $\#\Omega = \frac{m-1}{2}$*

[21] It can be shown that $\partial\tau_i(\lambda)/\partial\lambda_{h_i}$ is positive, so that a more liberal representative always selects a higher level of spending. It can also be shown that the proposing representative always chooses a higher level of local public goods for his district when he has a more liberal representative in his coalition. However, this does not necessarily lead the proposer to increase spending, since the amount of public goods going to the district with the more liberal representative falls. Thus, the sign of $\partial\tau_k(\lambda)/\partial\lambda_{h_i}$ $(k \neq i)$ is ambiguous and the possibility that electing a more liberal citizen might actually reduce spending in other districts cannot seem to be ruled out.

$\sum_{k\in\mathcal{M}}[\tau_k(\lambda_{h_i+1},\lambda^{-i})-\tau_k(\lambda)]/m < [\sum_{k\in\mathcal{M}/\{i\}}\frac{\lambda_h}{\lambda_{h_i+1}}\tau_k(\lambda_{h_i+1},\lambda^{-i})-\sum_{k\in\Omega}\frac{\lambda_h}{\lambda_{h_i}}\tau_k(\lambda)]/m$,
for all $h\in\{2,...,H\}$.

The left hand side of the inequality represents the increase in expected spending resulting from replacing district i's representative with a representative of type h_i+1. The right hand side represents the expected benefits from such a move enjoyed by a citizen of type h in district i when it leads to district i being included in every minimum winning coalition rather than simply $\frac{m-1}{2}$ coalitions.

Both these conditions appear weak. As argued earlier, when the number of districts are large, the type of any one district's representative should have a very small impact on expected spending. However, the expected gains measured on the right hand side of these conditions are significant.

Proposition 4. *Suppose that there are an odd number of districts and that Conditions* 1 *and* 2 *are satisfied. Then any political equilibrium with identical candidates under agenda setting involves candidates of type* H *running in at least* $\frac{m-1}{2}$ *districts.*

If there are less than $\frac{m-1}{2}$ districts represented by type H candidates, a district can guarantee that it is included in every minimum winning coalition by electing such a candidate. For a district not included in any minimum winning coalitions, Condition 1 guarantees that this is an attractive prospect for a majority of the citizens. This rules out the possibility of equilibria with identical candidates in which some districts only get benefits when their representative is selected. The harder part of the proof involves ruling out equilibria in which all districts are included in some minimum winning coalitions. Two facts are key: first, at least one district must be included in no more than $\frac{m-1}{2}$ of the coalitions of other districts and second, by electing a representative of a slightly higher type, a district can guarantee that it is included in every minimum winning coalition.[22] Condition 2 then guarantees that electing a slightly more liberal representative is desirable.

[22]This step of the argument relies on the assumption of an odd number of districts. If there are an even number of districts, it is possible that all districts are included in at least one other district's minimum winning coalition but that electing a slightly higher type does not result in being included in all minimum winning coalitions. Nonethless, it is the case that when all districts are included in at least one other district's minimum winning coalition, electing a higher type must lead some district to increase the number of coalitions it is included in by $\frac{m}{2}-1$. Thus, the result remains true under a slight modification of Condition 2.

It appears perfectly possible to have equilibria in which candidates of type H run in $\frac{m+1}{2}$ districts and candidates of the median type run in the remaining districts. Voters in the districts represented by moderates could rationally anticipate that their representative would not be included in the minimum winning coalition even if he were a liberal. Similarly, voters in the liberal districts could anticipate that their representative would not be included in any minimum winning coalitions if he were a moderate. Thus, Proposition 4 would appear to be close to the best result available.[23]

In summary, political equilibria with identical candidates involve at least some districts having representatives whose preferences are much more pro-spending than those of the average voter they represent. The reason is much different from that arising under efficient universalism. Under the agenda setting model, one representative is randomly selected to choose policy subject to the constraint of majority approval. When their representative is the agenda setter, voters of the median type would prefer a representative who would make the same decisions as they would. However, they also care that their district is included in the minimum winning coalitions of other districts' representative. Competition to make their district an attractive partner leads voters to favor liberal candidates. This is because such candidates are cheap to include in the minimum winning coalition.

4. Normative Analysis

There are two ways to interpret the claim that distributive policy making is a source of inefficiency in representative democracies. The first is that distributive policy making generates policy choices which are (ex post) Pareto inefficient; that is, there exists alternative feasible choices which would make all citizens at least as well off and some strictly better off. The second is that distributive policy making generates policy choices that are "economically inefficient" in the sense that they fail to maximize aggregate surplus; that is, there exist alternative policy choices a move to which would satisfy the *Kaldor Criterion* that the gainers could compensate the losers. Because the legislature does not have access to lump sum taxes and transfers, the two interpretations are quite different. Pareto inefficiency in policy choice certainly implies economic inefficiency, but the converse does not hold.

[23] An open question is whether there exist equilibria involving two or three candidates of different types in one or more districts.

Besley and Coate (1997b) point out that, if it is to parallel the definition of market failure, *political failure* should be defined as arising only when the political process generates Pareto inefficient policy choices. This suggests the relevance of the first interpretation. However, it is the second interpretation which is taken in all the discussions of efficiency in the formal literature on distributive policy making to date. Accordingly, both interpretations will be analyzed.

4.1. Pareto Efficiency

A vector of local public goods G is *Pareto efficient* if there does not exist another feasible vector of public goods G' such that $\theta_i^j B(g_i') - \frac{c}{n}\sum_{k=1}^m g_k' \geq \theta_i^j B(g_i) - \frac{c}{n}\sum_{k=1}^m g_k$ for all citizens j and districts i with the inequality holding strictly for some subset for some citizens in some district. Any political equilibrium $\{\rho; \alpha(\cdot); s\}$ *generates* a set of possible public goods vectors. A public goods vector G is in this set if and only if there exists some selection of representatives $\omega \in \Delta(P(\mathcal{C}(s), \alpha(\mathcal{C}(s)))$ such that $G \in \Delta(\rho(\omega))$. The task is to understand whether the public goods vectors generated by the political process are efficient under the three different models of the previous section.

The following simple Lemma provides some useful sufficient conditions for public goods vectors to be Pareto efficient and inefficient.

Lemma 2. *A vector of local public goods G is (i) Pareto efficient if for all $i \in \mathcal{M}$ $n_i\lambda_1 B'(g_i) \leq c \leq n_i\lambda_H B'(g_i)$, and (ii) Pareto inefficient if either $n_i\lambda_1 B'(g_i) > c$ for all $i \in \mathcal{M}$ or $n_i\lambda_H B'(g_i) < c$ for all $i \in \mathcal{M}$.*

To understand this result recall that type 1 citizens are those with the lowest marginal valuations of local public goods and type H citizens are those with the highest marginal valuations. The first part of the inequality in (i) implies that type 1 citizens must be made worse off by an increase in the level of local public goods in each district, while the second part implies that type H citizens must be made worse off by a decrease in the level of local public goods in each district. If the first condition in (ii) is satisfied, it is possible to find a way of increasing each district's level of local public goods so as to make all citizens better off, whereas if the second condition in (ii) is satisfied it is possible to find a way of decreasing each district's level of public goods to make all citizens better off.

Using this Lemma, the following result can be established.

Proposition 5. *Suppose that for each district i, $\frac{\lambda_H}{\lambda_{\mu_i}} < \frac{n}{n_i}$. Then, if $\{\rho_U; \alpha(\cdot); s\}$ is a political equilibrium with identical candidates under universalism the public goods vector it generates is Pareto inefficient.*

The intuition here is straightforward. As demonstrated in Proposition 1, in a political equilibrium with identical candidates under universalism the candidates in each district are of the median type. Moreover, under universalism, these representatives demand a level of public goods for their district which equates their personal marginal benefit $\lambda_{\mu_i} B'(g_i)$ to their tax price $\frac{c}{n}$. This leads to excessive spending from the viewpoint of the representatives because of the common pool problem. However, this does not necessarily imply inefficiency since the level of spending may not be excessive from the viewpoint of those citizens with the highest valuation of local public goods. The role of the condition, which bounds the differences in preferences between the highest and median types in each district, is precisely to guarantee that the equilibrium levels of spending are excessive for even the highest types.

If is worth noting that if the inequality conditions of Proposition 5 are not satisfied for every district, then the public goods vector generated by a political equilibrium with identical candidates under universalism will be Pareto efficient. While citizens of the median preference in each district may be made better off by a reduction in spending, this is not the case for citizens of the highest type. Thus, while universalism may give rise to Pareto inefficient policy choices, there is no guarantee that this is the case.[24]

The issue of the efficiency of policy choices emerging from efficient universalism is more straightforward.

Proposition 6. *Let $\{\rho_E; \alpha(\cdot); s\}$ be a political equilibrium under efficient universalism with the property that at least one candidate runs in one district ($s_i \neq 0$ for some i). Then the public goods vectors it generates are Pareto efficient.*

Notice that this result is true for any political equilibrium, not just those involving identical candidates. The logic here is simple. The policy choice under efficient universalism maximizes the combined surplus of the representatives. Given the

[24]Even when the inequality conditions of Proposition 5 are satisfied, equilibria involving two candidates of different types in each district could generate some Pareto efficient policy choices. Pareto inefficiency is, however, guaranteed in any political equilibrium under universalism in which each district has at least one candidate if $\lambda_H/\lambda_1 < \min\{\frac{n}{n_i} : i \in \mathcal{M}\}$.

specification of preferences, this problem has a unique solution. If this solution were Pareto inefficient then there would exist an alternative policy choice which would give the legislators at least as much utility. This contradicts uniqueness.

The same logic suggests a similar result for political equilibrium under agenda setting.[25]

Proposition 7. *Let $\{\rho_A; \alpha(\cdot); s\}$ be a political equilibrium under agenda setting with the property that at least one candidate runs in one district ($s_i \neq 0$ for some i). Then the public goods vectors it generates are Pareto efficient.*

The logic underlying the previous two propositions parallels Proposition 10 of Besley and Coate (1997a) for the case of single district elections. There, Pareto efficiency is guaranteed by the fact that the policy-maker has a unique utility-maximizing policy choice. This implies that any policy change must make the citizen elected to choose policy worse off. In the legislative context, the same result applies provided the representatives select a policy choice which has the property that any change would make at least one of them worse off. Thus, it is only when legislators are unable to bargain their way to a point on their Pareto frontier, that distributive policy making can generate political failure.

4.2. Surplus Maximization

Aggregate surplus in the economy is given by $\sum_{i \in \mathcal{M}}[\sum_{j \in \mathcal{N}_i} \theta_i^j B(g_i) - cg_i]$. The *surplus maximizing* level of public goods for each district i is that which maximizes the sum of benefits minus costs; that is, $g_i^* = \arg\max \sum_{j \in \mathcal{N}_i} \theta_i^j B(g_i) - cg_i$. The surplus maximizing level satisfies the familiar Samuelson condition that the sum

[25]In the single district citizen-candidate model, there is no policy uncertainty once the winning candidate has been selected. This remains true under the two universalism models; once the winning candidates in each district have been selected, the policy outcome is determinate. Under agenda setting, however, uncertainty remains even after the electoral process has determined the identities of the legislators. In particular, it is not clear which representative will be selected to be the agenda setter and which districts will be included in the minimum winning coalition. Thus, it is meaningful to distinguish between ex post and ex ante notions of Pareto efficiency. Proposition 7 demonstrates that the policy choices emerging from the legislature are ex post Pareto efficient, but, from an ex ante viewpoint, before the proposer has been selected, agenda setting produces a probability distribution over policy outcomes. Since individuals' have concave preferences over public goods levels, this uncertainty is costly. Thus, it might reasonably be claimed that political equilibria under agenda setting are ex ante Pareto inefficient.

of marginal benefits equal marginal cost; that is, $\sum_{j\in\mathcal{N}_i}\theta_i^j B'(g_i^*) = c$. The public goods vector G will be said to *overprovide* (*underprovide*) local public goods to district i if $g_i > g_i^*$ ($g_i < g_i^*$).

A parallel result to that established concerning the Pareto efficiency of policy choices under universalism is available for surplus maximization. To simplify notation, it will be helpful to let $\overline{\theta}_i$ denote the average marginal valuation of local public goods in district i; that is, $\overline{\theta}_i = \sum_{j=1}^{n_i}\theta_i^j/n_i$. The following result concerning overprovision can then be stated.

Proposition 8. *Suppose that for each district i, $\frac{\overline{\theta}_i}{\lambda_{\mu_i}} < \frac{n}{n_i}$. Then, if $\{\rho_U; \alpha(\cdot); s\}$ is a political equilibrium with identical candidates under universalism the public goods vector it generates overprovides local public goods to every district.*

It seems almost inconceivable that this condition would not be satisfied, suggesting that overprovision is a reasonable prediction under universalism.[26] This overprovision means that marginal projects in each district will fail traditional cost-benefit tests. This seems consistent with folklore concerning pork barrel projects in the U.S..

The same problem arises under efficient universalism.

Proposition 9. *Suppose that for each district i, $\frac{\lambda_H}{\lambda_{\mu_i}} < m$ and $\frac{n\lambda_H}{m} > n_i\overline{\theta}_i$. Then, if $\{\rho_E; \alpha(\cdot); s\}$ is a political equilibrium with identical candidates under efficient universalism, the public goods vector it generates overprovides local public goods to every district.*

This result is particularly interesting since when the legislature behaves according to the efficient universalism model, the political process has the potential to deliver close to surplus maximizing outcomes. All that is required is that each district elect a representative whose type is close to $\overline{\theta}_i$.[27] Unfortunately, the legislature forcing representatives to account for the collective costs they impose, creates incentives for voters to elect fiscally liberal candidates, which, once again,

[26] In any political equilibrium under universalism in which each district has at least one candidate local public goods are overprovided if $\overline{\theta}_i/\lambda_1 < \frac{n}{n_i}$ for all $i \in \mathcal{M}$.

[27] In this sense, therefore, the efficient universalism model is similar to the standard median voter model of public good provision. Provided that the median voter's preference is close to the mean, the median voter theorem predicts a public goods level which is close to the surplus maximum.

leads to overprovision. Thus, the traditional prediction of overprovision arising from universalism can be preserved without assuming that representatives behave inefficiently or that voters suffer from "fiscal illusion".[28]

When the legislature behaves according to the agenda setting model, local public goods are obviously underprovided to those districts not included in the minimum winning coalition. It is also straightforward to show that in a political equilibrium involving candidates of type H in each district, public goods are overprovided to the agenda setter's district.[29] What is less clear is what happens in those districts which are included in the minimum winning coalition. In fact, it turns out that public goods may be over or under provided in such districts as the following example demonstrates.[30]

Example 1

Assume that there are an odd number of districts all of which are identical. Further supppose that $B(g) = \ln(1+g)$. Let $\overline{\theta}$ denote the average marginal valuation of local public goods in each district. The surplus maximizing level of public goods in each district solves the problem

$$\max \frac{n}{m}\overline{\theta}\ln(1+g) - cg,$$

[28]Under the assumption that $\lambda_H/\lambda_{\mu_i} < \min\{m, n/n_i\}$ for each district i, the degree of overprovision is less than under universalism. In particular, it is not so great that even those citizens with the highest preferences for public spending would like to see it reduced.

[29]This is established in the Appendix. The result proved there requires that $\frac{2n}{m-1}\lambda_H > n_i\overline{\theta}_i$ for each district i.

[30]It is worth noting that even when local public goods are underprovided to every district other than that of the agenda setter, local public goods may be overprovided in the sense that the *average* level of local public goods generated in equilibrium exceeds the average of the surplus maximizing levels $\sum_{i\in\mathcal{M}} g_i^*/m$. In a political equilibrium involving candidates of type H in each district, the average level of local public goods under agenda setting is given by:

$$\{[\frac{n}{c}\tau^* - (\frac{m-1}{2})\gamma(\lambda_H,\tau^*)] + (\frac{m-1}{2})\gamma(\lambda_H,\tau^*)\}/m = \frac{n}{cm}\tau^*,$$

where:

$$\tau^* = \arg\max_{\tau} \lambda_H B(\frac{n}{c}\tau - (\frac{m-1}{2})\gamma(\lambda_H,\tau)) - \tau.$$

In the example to follow it is readily verified that this average level exceeds $\sum_{i\in\mathcal{M}} g_i^*/m$. Thus, agenda setting overprovides local public goods in this sense. Unfortunately, however, a general result of this form appears not to be available.

which implies that it equals

$$\frac{n\overline{\theta}}{cm} - 1.$$

Consider now a political equilibrium with identical candidates under agenda setting in which all the candidates are of type λ_H. If the representative who is selected to set the agenda proposes a policy vector which produces a per capita spending level of τ, he must provide the other members of the minimum winning coalition with a level of public goods $\gamma(\lambda_H, \tau)$. Noting that $\gamma(\lambda_H, \tau) = e^{\frac{\tau}{\lambda_H}} - 1$, this means that the level of public goods received by the agenda setter's district will be:

$$\frac{n}{c}\tau - (\frac{m-1}{2})(e^{\frac{\tau}{\lambda_H}} - 1).$$

The optimal level of spending from the viewpoint of the agenda setter therefore solves the problem:

$$\max_{\tau} \lambda_H \ln[\frac{n}{c}\tau - (\frac{m-1}{2})(e^{\frac{\tau}{\lambda_H}} - 1)] - \tau.$$

The first order condition for this problem can be solved to yield

$$\tau = \lambda_H - \frac{c(m-1)}{2n}.$$

It follows that each district in the minimum winning coalition (other than that of the agenda setter) receives a level of public goods

$$e^{[1-\frac{c(m-1)}{2n\lambda_H}]} - 1.$$

It may be concluded that the districts in the minimum winning coalition receive a smaller (larger) level of public goods than the surplus maximum whenever

$$\ln(\frac{n\overline{\theta}}{cm}) + \frac{c(m-1)}{2n\lambda_H} > (<) 1.$$

In this example, therefore, local public goods may be either under or overprovided to the districts in the minimum winning coalition and the above inequality makes it clear how the various parameters affect this likelihood.

In summary, when elections are contested by citizens of majority preferred types, all three models of distributive policy making predict that public goods levels will be far from the surplus maximizing ideal. Unfortunately, the models do not predict a uniform direction of bias in policy choices. While the two universalism models suggest public goods levels will be higher than the surplus maximizing ideal in every district, this is not a necessary consequence of the agenda setting model even in those districts who make up the minimum winning coalition. Thus, to say that distributive policy making is a cause of overprovision of public goods requires one to adopt a view on the specifics of the distributive policy making process.

5. Why the Citizen-Candidate Approach?

In developing a theory of legislative elections to work with existing theories of distributive policy making, this paper has utilitized the citizen-candidate approach. A legitimate question to ask is why this approach rather than the more familiar Downsian approach? Following Austen-Smith (1986), the Downsian approach would assume that each district was contested by two "candidates" with no intrinsic policy preferences whose sole objective was to win. Political competition would involve candidates announcing "platforms" and citizens voting for the candidate whose platform they prefer. When in the legislature, the candidates could be relied upon to faithfully implement the platforms they had proposed since they have no intrinsic policy preferences.

In the Downsian approach, platforms are typically interpreted as a statement of what policies a candidate will deliver. In this spirit, one could imagine each candidate in district i announcing the level of public goods g_i that he will obtain for his district. This makes perfect sense under the universalism model, since each candidate gets to freely choose the level of local public goods that he wants when in the legislature. The usual median voter logic then suggests that each candidate would announce the level $\varphi(\lambda_{\mu_i}, 1)$, which is precisely the policy outcome generated by the equilibrium described in Proposition 1.

This way of proceeding becomes problematic under the other two models in which the policy received by district i is a function of the policy preferences of the other legislators. To make these models consistent with the Downsian interpretation, one would have to assume that the candidates' platforms somehow determined their policy preferences. For example, one might suppose that a candidate elected promising to deliver his district $\widehat{g}_i$, has preferences $-(g_i - \widehat{g}_i)^2$. However, as well as being completely arbitrary, such assumptions are not sufficient to determine policy outcomes in the agenda setting model where the agenda setter has to choose local public goods for all the districts.

Given that the distributive policy-making literature starts from the presumption that representatives have policy preferences, a more promising approach might be to interpret a Downsian candidate's platform as a statement of his policy preferences. Thus, candidates announce to the voters the policy preferences that will govern their behavior when in office. What would be the outcome of Downsian competition of this form?

In a world in which the median voter desires a candidate with his own preferences the answer seems clear: both candidates would announce that they had the preferences of the median voter in their district. Thus, under the universalism model, this interpretation of the Downsian approach would again work well. However, under efficient universalism and agenda setting, voters do not want candidates who simply represent their preferences; there is a gain to *strategic delegation.* In such environments, the preference selecting interpretation runs into problems. Consider, for example, the efficient universalism model. This assumes that the legislators agree on a policy choice which maximizes their joint surplus. It would seem beneficial for district i to elect a legislator who found district i's public good extremely valuable, while finding expenditure on other districts' public goods extremely costly. This type of logic suggests that Downsian competition in policy preferences would be unlikely to produce a prediction.

One response to these difficulties is to impose restrictions on what preferences candidates can announce. This is the approach taken by Chari, Jones and Marimon (1997). It is worth briefly reviewing their results to highlight the issues this approach raises. The underlying economic model they study is the same as in this paper, except that citizens in all districts are identical. The political process, however, includes a president. Their analysis is divided into two parts: the first part works with a reduced form outcome function, while the second part adopts a specific agenda setting model of distributive policy making. In the reduced form case, the amount of public good received by each district is assumed to be a function of the "types" of the representatives of the districts and the president. The set of possible types of local representatives and presidents is an interval $[\underline{\lambda}, \overline{\lambda}]$, where $\underline{\lambda} < 1 < \overline{\lambda}$. Higher types of representatives generate more public goods for their districts, while higher types of presidents generate more public goods for *every* district. If all politicians are of type 1 then each district receives the surplus maximizing level of public goods. Crucially, the increase in public goods generated by a higher type of representative for district i exceeds the increase in taxes this causes. This formalizes the idea that a budgetary externality is present.[31]

Equilibrium involves candidates for the post of representative of district i selecting the type preferred by their constituents, given the types of the candidates of the other districts and the president. Candidates for president select the type preferred by their constituents (who are all the citizens) given the types of the representatives.[32] Under some additional symmetry and concavity assumptions on the functions relating public goods levels to politicans' types, it is established that in any symmetric equilibrium the types of local representatives exceed 1 and the type of the president is less than 1. Intuitively, citizens prefer a higher type for their representative to get more for their district, while preferring a lower type for their president to restrain aggregate spending.

It is also shown that whenever equilibrium involves a president with a type higher than $\underline{\lambda}$, then the public goods levels generated are surplus maximizing. The idea is that if they were not, voters would vote in a lower type of president who would (by assumption) produce a uniform reduction in local public goods. However, if equilibrium involves a president with a type equal to $\underline{\lambda}$, then the public goods levels generated may be overprovided. Moreover, since a uniform level is provided in equilibrium and the citizens are all identical, the public goods levels will actually be Pareto inefficient.

This analysis is insightful because it highlights, in a general way, the incentives for voters to elect representatives of higher types created by the budgetary externality. It is exactly these forces which lead to overprovision under the efficient universalism model considered in this paper.[33] The analysis also highlights the possible role that a president may play in counteracting these forces. At the end of the day, however, the normative results depend on the size of the inter-

[31]The efficient universalism model generates an outcome function that satisfies these assumptions in so far as they apply to the relationship between policy outcomes and representatives' types. A president might be incorporated by assuming that policy choices maximize a weighted sum of the president's and the legislators' surplus.

[32]Chari, Jones and Marimon adopt the interpretation of the citizens selecting types for their representatives and president, rather than candidates selecting types for their constituents, but the two interpretations are equivalent.

[33]In the universalism model, these forces emerge directly in the legislature, as representatives exploit the budgetary externality in their choices of local public goods for their districts. Notice, however, that citizens could counteract the tendency to overspend by electing in more fiscally conservative representatives.

val of possible politician types and this interval is not related to the underlying tastes and policy technology. Thus, the analysis produces no definitive normative conclusions.

In the specific model they consider, citizens in each district i have identical preferences of the form $B(g_i) - \frac{c}{n}\sum_{j\in\mathcal{M}} g_j$. Candidates for the post of representative of district i must select preferences of the form $\lambda B(g_i) - \frac{c}{n}\sum_{j\in\mathcal{M}} g_j$, while presidential candidates must select preferences of the form $\lambda \sum_{j\in\mathcal{M}} B(g_j) - c\sum_{j\in\mathcal{M}} g_j$. In the spirit of the agenda setting model, once candidates have been selected, either the president or the legislature is randomly selected to make a proposal. If the legislature is selected there is then a further draw to select the representative who gets to propose. Any proposal is voted on by the legislature against the status quo of zero centrally financed public spending. However, in contrast to the model of this paper, local districts can finance their own local public goods, so any district which is assigned less than the surplus maximizing amount by the "federal government" can top up.[34]

Chari, Jones and Marimon establish the existence of an equilibrium in which each representative is of type $\overline{\lambda}$, while the president is of type $\lambda \leq 1$. Effectively, the president plays no role when the legislature is selected to propose, so the choice of president and legislature is separable. The logic of Proposition 3 then governs the selection of representatives. When the president is selected to make a proposal, this equilibrium generates surplus maximizing policy choices. However, when the legislature is selected, outcomes are not surplus maximizing. Because local districts can top up, local public goods are overprovided to all districts in the minimum winning coalition. (In this sense, this model is not a special case of their general model.) Since local public goods are not overprovided uniformly, the policy outcome in this case is not necessarily Pareto inefficient. This will depend upon, among other things, the magnitude of $\overline{\lambda}$.

Again, this analysis is insightful in that it identifies the incentives to elect a higher type to get included in the minimum winning coalition. However, once again the normative results depend upon parameters which are unrelated to the tastes and technology. The obvious way of overcoming such problems is to re-

[34]Chari, Jones and Marimon implictly assume that local policy-makers have the same preferences as their citizens. However, if local elections are held at the same time as elections to the legislature, it is by no means obvious that citizens would choose a local policy-maker of their own type.

quire candidates to select a preference from the set of citizen preferences.[35] This is the approach taken by Persson (1997) who considers basically the same agenda setting model as considered in this paper. More specifically, his model differs from that of Chari, Jones and Marimon's in three ways: first, there is no president; second, citizens in each district have heterogenous preferences of the form $\lambda B(g_i) - \frac{c}{n}\sum_{j\in\mathcal{M}} g_j$ where $\lambda \in [\underline{\lambda}, \overline{\lambda}]$; and third, local districts cannot top-up. He conjectures that competition to be included in the minimum winning coalition will induce all candidates to select the preference type $\overline{\lambda}$.[36] An immediate consequence of requiring that candidates choose citizen types is that the policy choices generated by this equilibrium must be Pareto efficient.[37] Even though Downsian candidates are not themselves citizens, the fact that there are citizens with exactly their equilibrium preferences makes the logic of Proposition 7 applicable.

The Downsian approach thus works well, in the sense of providing predictions which can be related to the fundamentals, when candidates are restricted to select preferences from the set of citizens' preferences. Candidates choose the citizen type preferred by their median constituent, given that the candidates for all other districts are doing the same. This produces similar outcomes to those arising in political equilibrium with identical candidates under the citizen-candidate approach. The only added complication under the citizen-candidate approach is that citizens of the majority preferred type must be willing to run. This is not necessarily the case, since citizens may prefer a representative of a type different from their own. However, this problem is taken care of when the salary for holding office is sufficiently large.

But how can one justify restricting Downsian candidates to select preferences from the set of citizens' preferences? It is not enough to say that candidates must be citizens themselves. Under the Downsian assumption that candidates implement what they propose, a citizen may well want to commit to follow the dictates of some policy preferences outside the set of citizens' preferences.[38] How-

[35]Because there are no citizens with preferences of the form $\lambda \sum_{j\in\mathcal{M}} B(g_i) - c\sum_{j\in\mathcal{M}} g_j$, this would cause particular problems for presidential elections in the Chari, Jones and Marimon set-up. One could introduce citizens with broader preferences into the analysis, but this might also impact the elections of representatives to the legislature.

[36]In fact, the existence of an equilibrium in which all districts select candidates of the highest type requires a condition like that of Proposition 3. Moreover, there may exist other non-symmetric equilibria in which some districts have candidates of lower types.

[37]This is not noted by Persson, his normative criterion being surplus maximization.

[38]Of course, the assumption that candidates implement what they propose becomes problem-

ever, assuming that candidates are citizens and that they cannot commit yields the citizen-candidate model. Accordingly, it seems that the only justification for using the Downsian approach with the restriction that candidates must select citizen types, is as a short cut procedure to select political equilibria with identical candidates in the citizen-candidate model.

Even if the Downsian approach could be straightforwardly applied, there are a number of advantages of the citizen-candidate model in this context. In particular, the approach permits an accounting of the preferences of those citizens who have chosen to become politically active and hence facilitates a rigorous normative analysis of the policy choices emerging from the political process. Moreover, the notion of representative democracy that it embodies seems perfectly natural. Citizens are motivated to run by policy concerns and any direct benefits from office. When in office, they pursue those policies which they think are best; that is, they act according to their policy preferences. Voters, accordingly, vote on the basis of candidates' policy preferences.

6. Conclusion

This paper has studied distributive policy making as a source of inefficiency in representative democracies. It has developed a theory of legislative elections which serves as a way of completing existing theories of distributive policy making and has used this theory to analyze the efficiency implications of universalism, efficient universalism and agenda setting. Only universalism is capable of generating policy choices which are (ex post) Pareto inefficient. The possibility for inefficiency under universalism arises because the legislative decision making process produces a policy choice which is inefficient from the viewpoint of the representatives themselves. If one takes a Coaseian position that it is implausible that legislators will not be able to bargain their way to a point on their Pareto frontier, then one should not view distributive policy making as an important source of political failure in the sense defined by Besley and Coate (1997b).

This notwithstanding, when elections are contested by candidates of majority preferred types, none of the three models of distributive policy making predicts that policy choices will be anything close to surplus maximizing. Even when the legislature behaves in a way consistent with surplus maximization, the incentives

atic when they are citizens and hence have policy preferences (Alesina (1988)).

created by distributive policy making lead voters to favor candidates who do not generate surplus maximizing outcomes. It is not clear that this is particularly disturbing, since there seems no compelling reason to accept surplus maximization as a normative benchmark. Moving towards the surplus maximizing policy choice from any initial Pareto efficient policy choice will create gainers and losers and there is no obvious reason to accept the welfare weights implicit in using this objective. However, it does suggest one area in which Wittman's (1995) claim that representative democracy produces close to surplus maximizing outcomes seems suspect. That said, the set-up considered here is a rather basic form of representative democracy and it would be interesting to extend the analysis to incorporate richer institutional settings.

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7. Appendix

Proof of Proposition 1: I begin by establishing the existence of an equilibrium with identical candidates under universalism. Let K be the largest integer less than or equal to $\frac{\zeta}{\delta}$. For each district i select a set $\mathcal{K}_i$ consisting of K citizens of type μ_i. Let $\widehat{s}_i$ be the vector of entry decisions such that $\widehat{s}_i^j = 1$ for all $j \in \mathcal{K}_i$ and $\widehat{s}_i^k = 0$ for all $k \in \mathcal{N}_i/\mathcal{K}_i$. Now let $\widehat{\alpha}(\cdot)$ be any voting function with the following two properties:
(i) Consider any candidate set of the form $\{\mathcal{K}_1, .., \mathcal{K}_{i-1}, \mathcal{K}_i \cup \{k\}, \mathcal{K}_{i+1}, .., \mathcal{K}_m\}$ for some district i and some citizen $k \in \mathcal{N}_i/\mathcal{K}_i$ of some type $h \neq \mu_i$. Then, voting behavior in district i is such that, all citizens (including candidate k) who prefer candidate k to a candidate of the median type given the outcome function ρ_U, vote for candidate k; all those who prefer a candidate of the median type to candidate k (including those candidates of type μ_i) vote for a particular median candidate $f \in \mathcal{K}_i$; and all those indifferent between candidate k and a candidate of the median type abstain. In districts other than i, citizens who are not candidates abstain and candidates all vote for themselves. Note that the voting behavior described here is a voting equilibrium.
(ii) For all other candidate sets $\mathcal{C}$, let $\widehat{\alpha}(\mathcal{C})$ be any voting equilibrium given the outcome function ρ_U.
It will be demonstrated that $\{\rho_U; \widehat{\alpha}(\cdot); \widehat{s}\}$ is a political equilibrium with identical candidates under universalism.

It suffices to show that $\widehat{s}$ is an equilibrium of the entry game given ρ_U and $\widehat{\alpha}(\cdot)$. It will first be demonstrated that the candidates have an incentive to run. In each district i, all citizens who are not candidates are indifferent between all the candidates. Under the assumption of abstinence of indifferent voters, they therefore abstain. All candidates vote for themselves, producing a probability $\frac{1}{K}$ of each candidate winning. Citizen $j \in \mathcal{K}_i$ therefore has an equilibrium payoff:

$$[\lambda_{\mu_i} B(\varphi(\lambda_{\mu_i}, 1)) - \frac{c}{n}\varphi(\lambda_{\mu_i}, 1)] - \frac{c}{n} \sum_{k \in \mathcal{M}/\{i\}} \varphi(\lambda_{\mu_k}, 1) + \frac{\zeta}{K} - \delta,$$

while his payoff if he withdraws is no greater than

$$[\lambda_{\mu_i} B(\varphi(\lambda_{\mu_i}, 1)) - \frac{c}{n}\varphi(\lambda_{\mu_i}, 1)] - \frac{c}{n} \sum_{k \in \mathcal{M}/\{i\}} \varphi(\lambda_{\mu_k}, 1).$$

The definition of K implies that the former exceeds the latter.

It will now be demonstrated that those not in the race have no incentive to enter. Consider first citizens of type μ_i. Such a citizen's equilibrium payoff is

$$[\lambda_{\mu_i}B(\varphi(\lambda_{\mu_i},1)) - \frac{c}{n}\varphi(\lambda_{\mu_i},1)] - \frac{c}{n}\sum_{k\in\mathcal{M}/\{i\}}\varphi(\lambda_{\mu_k},1).$$

If he entered, he would win with probability $\frac{1}{K+1}$ and obtain a payoff

$$[\lambda_{\mu_i}B(\varphi(\lambda_{\mu_i},1)) - \frac{c}{n}\varphi(\lambda_{\mu_i},1)] - \frac{c}{n}\sum_{k\in\mathcal{M}/\{i\}}\varphi(\lambda_{\mu_k},1) + \frac{\zeta}{K+1} - \delta,$$

The definition of K implies that the former exceeds the latter.

Consider then, a citizen of type $h < \mu_i$. Then, for all types $e = \mu_i, ..., H$, it is the case that

$$\lambda_e B(\varphi(\lambda_{\mu_i},1)) - \frac{c}{n}\varphi(\lambda_{\mu_i},1) > \lambda_e B(\varphi(\lambda_h,1)) - \frac{c}{n}\varphi(\lambda_h,1).$$

Thus, under the assumed voting behavior, all citizens of types $e = \mu_i, ..., H$ would vote for a particular median candidate $f \in \mathcal{K}_i$ if the type h citizen were to enter. This implies that the type h citizen would lose, meaning that he would not affect spending levels in any district. Thus, such a citizen has no incentive to enter. A similar argument applies to citizens of types $h > \mu_i$.

For the remaining part of the proposition, let $\{\rho_U; \alpha(\cdot); s\}$ be any political equilibrium with identical candidates under universalism. It must be shown that the candidates in district i are of type μ_i and that the number of candidates in each district is the largest integer less than or equal to $\frac{\zeta}{\delta}$. Suppose that the candidates in some district i were of some type $h < \mu_i$. Pick a particular citizen k of type μ_i. Letting h_j denote the type of the candidates in districts $j \neq i$, his equilibrium payoff, is given by

$$[\lambda_{\mu_i}B(\varphi(\lambda_h,1)) - \frac{c}{n}\varphi(\lambda_h,1)] - \frac{c}{n}\sum_{j\in\mathcal{M}/\{i\}}\varphi(\lambda_{h_j},1).$$

If citizen k entered, he would, by weak dominance, attract the votes of all those citizens with types of μ_i or higher. Accordingly, he would win. Thus, his payoff if he enters is

$$[\lambda_{\mu_i}B(\varphi(\lambda_{\mu_i},1)) - \frac{c}{n}\varphi(\lambda_{\mu_i},1)] - \frac{c}{n}\sum_{j\in\mathcal{M}/\{i\}}\varphi(\lambda_{h_j},1) + \zeta - \delta.$$

It is clear that the latter exceeds the former, which is a contradiction. The argument if the candidates in district i are of some type $h > \mu_i$ is similar.

Now suppose that the number of candidates of type μ_i in some district i is X where X is less than the largest integer less than or equal to $\frac{\zeta}{\delta}$. Pick a particular citizen k of type μ_i. His equilibrium payoff, is given by

$$[\lambda_{\mu_i} B(\varphi(\lambda_{\mu_i}, 1)) - \frac{c}{n}\varphi(\lambda_{\mu_i}, 1)] - \frac{c}{n} \sum_{j \in \mathcal{M}/\{i\}} \varphi(\lambda_{h_j}, 1).$$

If citizen k entered, he would win with probability $\frac{1}{X+1}$. This is because all citizens other than the candidates would abstain (by abstinence of indifferent voters) and all candidates would vote for themselves. Accordingly, his payoff if he enters is

$$[\lambda_{\mu_i} B(\varphi(\lambda_{\mu_i}, 1)) - \frac{c}{n}\varphi(\lambda_{\mu_i}, 1)] - \frac{c}{n} \sum_{j \in \mathcal{M}/\{i\}} \varphi(\lambda_{h_j}, 1) + \frac{\zeta}{X+1} - \delta.$$

It is clear that the latter exceeds the former, which is a contradiction. If the number of candidates exceeds the largest integer less than or equal to $\frac{\zeta}{\delta}$, then one can similarly show that one of the candidates would wish to withdraw. ■

Proof of Proposition 2: The proof is quite similar to that of the previous proposition. I begin by establishing the existence of an equilibrium with identical candidates under efficient universalism. Let K be the largest integer less than or equal to $\frac{\zeta}{\delta}$. For each district i select a set $\mathcal{K}_i$ consisting of K citizens of type H. Let $\widehat{s}_i$ be the vector of entry decisions such that $\widehat{s}_i^j = 1$ for all $j \in \mathcal{K}_i$ and $\widehat{s}_i^k = 0$ for all $k \in \mathcal{N}_i/\mathcal{K}_i$. Now let $\widehat{\alpha}(\cdot)$ be any voting function with the following two properties:

(i) Consider any candidate set of the form $\{\mathcal{K}_1, .., \mathcal{K}_{i-1}, \mathcal{K}_i \cup \{k\}, \mathcal{K}_{i+1}, .., \mathcal{K}_m\}$ for some district i and some citizen $k \in \mathcal{N}_i/\mathcal{K}_i$ of some type $h < H$ such that

$$\lambda_h B(\varphi(\lambda_h, m)) - \frac{c}{n}[\varphi(\lambda_h, m) + (m-1)\varphi(\lambda_H, m)] + \zeta > \lambda_h B(\varphi(\lambda_H, m)) - \frac{c}{n} m\varphi(\lambda_H, m).$$

Then, voting behavior in district i is such that all citizens (including k) who prefer candidate k to a candidate of type H given the outcome function ρ_E, vote for candidate k; all those who prefer a candidate of type H to candidate k (including those candidates of type H) vote for a particular type H candidate $f \in \mathcal{K}_i$; and all those indifferent between candidate k and a candidate of type H abstain. In districts other than i, citizens who are not candidates abstain and candidates all

vote for themselves. Note that the voting behavior described here is a voting equilibrium.
(ii) For all other candidate sets $\mathcal{C}$, let $\widehat{\alpha}(\mathcal{C})$ be any voting equilibrium given the outcome function ρ_E.
It will be demonstrated that $\{\rho_E; \widehat{\alpha}(\cdot); \widehat{s}\}$ is a political equilibrium with identical candidates under universalism.

It suffices to show that $\widehat{s}$ is an equilibrium of the entry game given ρ_E and $\widehat{\alpha}(\cdot)$. The proof that the candidates have an incentive to run, is similar to the analagous claim in Proposition 1. So is the proof that citizens of type H who are not in the race have no incentive to enter. Consider then, a citizen of type $h < H$ who is not in the race. If

$$\lambda_h B(\varphi(\lambda_h, m)) - \frac{c}{n}[\varphi(\lambda_h, m) + (m-1)\varphi(\lambda_H, m)] + \zeta \leq \lambda_h B(\varphi(\lambda_H, m)) - \frac{c}{n} m\varphi(\lambda_H, m),$$

then the citizen would not want to enter even if he won, so assume that this inequality is not satisfied. Suppose the citizen were to enter. Note first that all types $e = \mu_i, ..., H$, would prefer a type H candidate. To prove this, it must be shown that

$$\lambda_e B(\varphi(\lambda_H, m)) - \frac{c}{n} m\varphi(\lambda_H, m) > \lambda_e B(\varphi(\lambda_h, m)) - \frac{c}{n}\varphi(\lambda_h, m) - (m-1)\varphi(\lambda_H, m).$$

The above inequality can be rewritten as

$$\lambda_e B(\varphi(\lambda_H, m)) - \frac{c}{n}\varphi(\lambda_H, m) > \lambda_e B(\varphi(\lambda_h, m)) - \frac{c}{n}\varphi(\lambda_h, m),$$

or, defining the function $\zeta_e(\lambda) = \lambda_e B(\varphi(\lambda, m)) - \frac{c}{n}\varphi(\lambda, m)$, as $\zeta_e(\lambda_H) > \zeta_e(\lambda_h)$. Thus, it is enough to show that $\zeta_e'(\lambda) > 0$ over the range $[\lambda_h, \lambda_H)$. Differentiating yields:

$$\zeta_e'(\lambda) = [\lambda_e B'(\varphi(\lambda, m)) - \frac{c}{n}]\frac{\partial\varphi(\lambda, m)}{\partial\lambda}.$$

Using the fact that $\lambda B'(\varphi(\lambda, m)) = m\frac{c}{n}$ and the hypothesis that $m\lambda_{\mu_i} \geq \lambda_H$, yields

$$\zeta_e'(\lambda) = [\frac{m\lambda_e}{\lambda} - 1]\frac{c}{n}\frac{\partial\varphi(\lambda, m)}{\partial\lambda} > [\frac{m\lambda_{\mu_i}}{\lambda_H} - 1]\frac{c}{n}\frac{\partial\varphi(\lambda, m)}{\partial\lambda} \geq 0,$$

as required.

Thus, under the assumed voting behavior, if a citizen of type h were to enter, all citizens of types $e \in \{\mu_i, ..., H\}$ (with the exception of the entering citizen) would vote for a particular type H candidate $f \in \mathcal{K}_i$. Thus, the number of votes for citizen f would be at least $\sum_{h=\mu_i}^{H} \#\mathcal{N}_{ih} - 1$, while the number of votes for the type h entrant would be at most $\sum_{h=1}^{\mu_i - 1} \#\mathcal{N}_{ih}$. Since $\sum_{h=\mu_i}^{H} \#\mathcal{N}_{ih} - 1 - \sum_{h=1}^{\mu_i-1} \#\mathcal{N}_{ih} > \xi \geq 1$, the citizen of type h would lose. He therefore has no incentive to enter.

For the remaining part of the proposition, let $\{\rho_E; \alpha(\cdot); s\}$ be any political equilibrium with identical candidates under efficient universalism. It must be shown that the candidates in district i are of type H and that the number of candidates in each district is the largest integer less than or equal to $\frac{\varsigma}{\delta}$. The proof of the latter statement is similar to the analagous claim in Proposition 1, so I deal only with the former. Suppose that the candidates in some district i were of some type $h < H$. Pick a particular citizen k of type H. Letting h_j denote the type of the candidates in districts $j \neq i$, his equilibrium payoff, is given by

$$[\lambda_H B(\varphi(\lambda_h, m)) - \frac{c}{n}\varphi(\lambda_h, m)] - \frac{c}{n} \sum_{j \in \mathcal{M}/\{i\}} \varphi(\lambda_{h_j}, m).$$

Suppose citizen k were to enter. Under the assumption that $m\lambda_{\mu_i} \geq \lambda_H$, all citizens of types $e \in \{\mu_i, ..., H\}$ (who are not candidates) prefer k to a type h candidate (see above). Thus, by weak dominance all these citizens would vote for citizen k. If $h \notin \{\mu_i, ..., H\}$, then it is immediate that citizen k would win. If $h \in \{\mu_i, ..., H\}$ then, since there can be no more than ζ/δ type h candidates, the number of votes received by citizen k is at least $\sum_{e=\mu_i}^{H} \#\mathcal{N}_{ie} - \zeta/\delta$, while the number of votes received by any of the type h candidates can be no greater than $\sum_{e=1}^{\mu_i-1} \#\mathcal{N}_{ie} + 1$. The assumption that $\zeta/\delta < \xi$ (where ξ is defined in (2.1)) implies that citizen k must win. Thus, if k were to enter, he would obtain a payoff

$$[\lambda_H B(\varphi(\lambda_H, m)) - \frac{c}{n}\varphi(\lambda_H, m)] - \frac{c}{n} \sum_{j \in \mathcal{M}/\{i\}} \varphi(\lambda_{h_j}, m) + \zeta - \delta.$$

Since $h < H$, this exceeds his equilibrium payoff, which is a contradiction. ■

Proof of Lemma 1: This is obvious from (3.7). ■

Proof of Proposition 3: An equilibrium will be constructed with the desired properties. I begin with the outcome function. Recall that ρ_A is an outcome function under agenda setting if and only if for all selections of representatives ω, there exists $(\Omega_i, \tau_i)_{i \in \Lambda(\omega)} \in \times_{i \in \Lambda(\omega)} \Gamma_i(\omega)$ such that $\rho_A(\omega)(G^i(\Omega_i, \tau_i)) = 1/\#\Lambda(\omega)$ for all $i \in \Lambda(\omega)$. Let $\widehat{\rho}_A$ be any outcome function under agenda setting with the additional property that when ω is any selection of representatives such that $\theta_i^{\omega_i} = \lambda_H$ for all districts i, then $\Omega_1 = \{2, ..., \frac{m+1}{2}\}$; $\Omega_2 = \{3, ..., \frac{m+1}{2} + 1\}$; $\Omega_3 = \{4, ..., \frac{m+1}{2} + 2\}$. Notice that under this outcome function, when each district is represented by a citizen of type H, then each district has a probability $\frac{1}{2}$ of being included in the minimum winning coalition when its representative is not selected to propose. Let $\psi_e(\lambda_h)$ denote the payoff of a type e citizen in district i under this outcome function when district i has a representative of type h and all other districts have representatives of type H.

I now turn to the entry decisions and voting behavior. Let K be the largest integer less than or equal to $\frac{\zeta}{\delta}$. For each district i select a set $\mathcal{K}_i$ consisting of K citizens of type H. Let $\widehat{s}_i$ be the vector of entry decisions such that $\widehat{s}_i^j = 1$ for all $j \in \mathcal{K}_i$ and $\widehat{s}_i^k = 0$ for all $k \in \mathcal{N}_i/\mathcal{K}_i$. Let $\widehat{\alpha}(\cdot)$ be any voting function with the following two properties:

(i) Consider any candidate set of the form $\{\mathcal{K}_1, .., \mathcal{K}_{i-1}, \mathcal{K}_i \cup \{k\}, \mathcal{K}_{i+1}, .., \mathcal{K}_m\}$ for some district i and some citizen $k \in \mathcal{N}_i/\mathcal{K}_i$ of some type $h < H$ such that $\psi_h(\lambda_h) + \zeta > \psi_h(\lambda_H)$. Then voting behavior in district i is such that all citizens of types e such that $\psi_e(\lambda_h) > \psi_e(\lambda_H)$ together with citizen k vote for candidate k; all citizens of types e such that $\psi_e(\lambda_h) < \psi_e(\lambda_H)$ (including type H candidates) vote for a particular type H candidate $f \in \mathcal{K}_i$; and all those indifferent between candidate k and a candidate of type H abstain. In districts other than i, citizens who are not candidates abstain and candidates all vote for themselves. Note that the voting behavior described here is a voting equilibrium.

(ii) For all other candidate sets $\mathcal{C}$, let $\widehat{\alpha}(\mathcal{C})$ be any voting equilibrium given the outcome function $\widehat{\rho}_A$.

It will be demonstrated that $\{\widehat{\rho}_A; \widehat{\alpha}(\cdot); \widehat{s}\}$ is a political equilibrium with identical candidates under agenda setting.

It suffices to show that $\widehat{s}$ is an equilibrium of the entry game given $\widehat{\rho}_A$ and $\widehat{\alpha}(\cdot)$. The proof that the candidates have an incentive to run, is similar to the analagous claim in Proposition 1. So is the proof that citizens of type H who are not in the race have no incentive to enter. Consider then, a citizen of type $h < H$ who is not in the race. If $\psi_h(\lambda_h) + \zeta \leq \psi_h(\lambda_H)$ then this citizen has no incentive to enter even if he could win. Suppose, therefore, that this inequality is not satisfied. Note first that under the condition of the proposition, if the type h citizen were to enter, citizens of the median type would prefer type H candidates; that is, $\psi_{\mu_i}(\lambda_h) < \psi_{\mu_i}(\lambda_H)$. To see this, let $\alpha^*(\tau)$ denote the level of local public goods received by the agenda setter's district when he proposes a spending level

τ and all the other districts have type H candidates. From the discussion in the text:

$$\alpha^*(\tau) = \frac{n}{c}\tau - \frac{m-1}{2}\gamma(\lambda_H, \tau).$$

In addition, let $\tau^*(\lambda_e)$ denote the level of spending that would be selected by a type e representative; that is,

$$\tau^*(\lambda_e) = \arg\max \lambda_e B(\alpha^*(\tau)) - \tau.$$

Using these functions, I may write:

$$\psi_{\mu_i}(\lambda_H) = \frac{1}{m}[\lambda_{\mu_i} B(\alpha(\tau^*(\lambda_H))) - \tau^*(\lambda_H)] - \frac{m-1}{m}[1 - \frac{1}{2}\frac{\lambda_{\mu_i}}{\lambda_H}]\tau^*(\lambda_H).$$

and

$$\psi_{\mu_i}(\lambda_h) = \frac{1}{m}[\lambda_{\mu_i} B(\alpha(\tau^*(\lambda_h))) - \tau^*(\lambda_h)] - \frac{m-1}{m}\tau^*(\lambda_H).$$

These expressions make clear the trade offs involved; a type H representative is included in other districts' minimum winning coalitions with probability $\frac{1}{2}$, but a type h representative may make a better choice when selected to propose. Since $\alpha(\tau^*(\lambda_H)) > \alpha(\tau^*(\lambda_h))$, a sufficient condition for the claimed inequality is that

$$\frac{1}{m}\tau^*(\lambda_H) < \frac{m-1}{2m}\frac{\lambda_{\mu_i}}{\lambda_H}\tau^*(\lambda_H),$$

or, equivalently,

$$\frac{\lambda_H}{\lambda_{\mu_i}} < \frac{m-1}{2}.$$

Now notice that

$$\frac{1}{m}B(\alpha(\tau^*(\lambda_H))) + \frac{m-1}{2m}\frac{\tau^*(\lambda_H)}{\lambda_H} > \frac{1}{m}B(\alpha(\tau^*(\lambda_h))),$$

which implies, by Lemma 1, that for all types $e \in \{\mu_i, ..., H\}$ $\chi_e(\lambda_H) > \chi_e(\lambda_h)$. Thus, under the assumed voting behavior, if a citizen of type h were to enter, all citizens of types $e \in \{\mu_i, ..., H\}$ (with the exception of the entering citizen) would vote for a particular type H candidate $f \in \mathcal{K}_i$. Thus, the number of votes for citizen f would be at least $\sum_{h=\mu_i}^{H} \#\mathcal{N}_{ih} - 1$, while the number of votes for the type h entrant would be at most $\sum_{h=1}^{\mu_i - 1} \#\mathcal{N}_{ih}$. Since $\sum_{h=\mu_i}^{H} \#\mathcal{N}_{ih} - 1 - \sum_{h=1}^{\mu_i-1} \#\mathcal{N}_{ih} > \xi \geq 1$, the citizen of type h would lose. He therefore has no incentive to enter. ∎

Proof of Proposition 4: Suppose, to the contrary, that there exists a political equilibrium with identical candidates involving candidates of type H running in fewer than $\frac{m-1}{2}$ districts. Let $\lambda = (\lambda_{h_1}, ..., \lambda_{h_m})$ denote the vector of candidate types in this equilibrium and let $(\Omega_i, \tau_i)_{i \in \mathcal{M}}$ denote the coalition members and spending levels chosen by the representatives. Define the set Θ to be the districts whose representatives are the lowest types; that is,

$$\Theta = \{i \in \mathcal{M} : \lambda_{h_i} \leq \lambda_{h_j} \ \forall j \in \mathcal{M}\}.$$

In addition, let Φ_i be the set of districts (other than i) whose representatives include district i in their coalitions; that is

$$\Phi_i = \{j \in \mathcal{M}/\{i\} : i \in \Omega_j\}.$$

Two mutually exclusive possibilities may be identified: (i) there is some district $i \in \Theta$ who is excluded from every other district's minimum winning coalition, meaning that $\Phi_i = \emptyset$, and (ii) every district $i \in \Theta$ is included in the minimum winning coalition of at least one other district, meaning that $\Phi_i \neq \emptyset$ for all $i \in \Theta$. Both possibilities will be ruled out, leading to a contradiction.

Case (i): Consider a particular district $i \in \Theta$ for whom $\Phi_i = \emptyset$. A (non-candidate) citizen of type h in district i has an equilibrium payoff of

$$\frac{1}{m}[\lambda_h B(\alpha(\Omega_i, \tau_i)) - \tau_i] - \frac{1}{m} \sum_{k \notin \mathcal{M}/\{i\}} \tau_k.$$

Now pick a particular citizen of type λ_H. It will be shown that this citizen has an incentive to enter.

Electing the type λ_H citizen would mean that district i were included in every other district's coalition. This is because there are less than $\frac{m-1}{2}$ districts with type H candidates. Thus, letting $\Omega_j^* = \Omega_j(\lambda_H, \lambda^{-i})$ and $\tau_j^* = \tau_j(\lambda_H, \lambda^{-i})$, the payoff of a (non-candidate) type h citizen if the type H citizen were elected would be given by:

$$\frac{1}{m}[\lambda_h B(\alpha(\Omega_i^*, \tau_i^*)) - \tau_i^*] + \frac{1}{m} \sum_{k \notin \mathcal{M}/\{i\}} [\frac{\lambda_h}{\lambda_H} - 1]\tau_k^*.$$

Subtracting the equilibrium payoff, yields

$$\frac{1}{m}[\lambda_h (B(\alpha(\Omega_i^*, \tau_i^*)) - B(\alpha(\Omega_i, \tau_i)))] + \frac{1}{m} \sum_{k \notin \mathcal{M}/\{i\}} [\frac{\lambda_h}{\lambda_H} - 1]\tau_k^* + \frac{1}{m} \sum_{k \notin \mathcal{M}/\{i\}} \tau_k.$$

Condition 1 together with the fact that $\alpha(\Omega_i^*, \tau_i^*) > \alpha(\Omega_i, \tau_i)$ implies that this difference is positive for citizens of the median type λ_{μ_i}. Lemma 1 then implies that this difference is positive for all citizens of types μ_i through H (excepting possibly those who are already candidates). Thus, by weak dominance, all those citizens of types μ_i through H (excepting possibly those who are candidates) would vote for the type H entrant. If $h_i \notin \{\mu_i, ..., H\}$ then it is immediate that the type H citizen would win. If $h_i \in \{\mu_i, ..., H\}$ then, since there can be no more than ζ/δ type h_i candidates, the number of votes received by the type H citizen is at least $\sum_{e=\mu_i}^{H} \#\mathcal{N}_{ie} - \zeta/\delta$, while the number of votes received by any of the type h candidates is less than $\sum_{e=1}^{\mu_i - 1} \#\mathcal{N}_{ie} + 1$. The assumption that $\zeta/\delta < \xi$ implies that the type H citizen would win. Since ζ exceeds the entry cost δ, it is clear that the type H citizen has an incentive to enter. Thus, case (i) cannot be true in equilibrium.

Case (ii): Note first that in this case there must exist at least one district from Θ in each district's coalition. To see this suppose, to the contrary, that there exists one district j such that $\Theta \cap \Omega_j = \emptyset$. There are two possibilities: (a) $j \notin \Theta$ and (b) $j \in \Theta$. In case (a), since $\#\Omega_j = \frac{m-1}{2}$, there must exist at least $\frac{m+1}{2}$ districts who are not in Θ. Since each representative needs to find only $\frac{m-1}{2}$ other representatives (other than himself) to join his coalition and will not choose a representative of the lowest type if he can avoid it, it must be the case that $\Theta \cap \Omega_i = \emptyset$ for every district i. This contradicts the fact that $\Phi_i \neq \emptyset$ for every district $i \in \Theta$. In case (b), there must exist at least $\frac{m-1}{2}$ districts who are not in Θ. It follows that $\Theta \cap \Omega_i = \emptyset$ for every district $i \in \Theta$. Districts $i \notin \Theta$ will choose at most one member of Θ and will do this if and only if there are no more than $\frac{m-1}{2}$ citizens who are not in Θ. Thus, a necessary condition for $\Phi_i \neq \emptyset$ in every district $i \in \Theta$ is that $\#\Theta = \frac{m+1}{2}$. But since only districts not in Θ select districts in Θ and since each district not in Θ chooses only one district in Θ, a further necessary condition is that $\#\mathcal{M}/\Theta \geq \#\Theta$ or that $\#\Theta \leq \frac{m}{2}$. These two necessary conditions are inconsistent, which yields a contradiction. Thus it may be concluded that $\Theta \cap \Omega_i \neq \emptyset$ for all districts i, as claimed.

Now observe that there must exist one district in Θ which is included in less than $\frac{m-1}{2}$ of the other districts minimum winning coalitions. To see this note first that $\sum_{k \in \mathcal{M}} \#\Omega_k = \sum_{k \in \mathcal{M}} \#\Phi_k$ or, equivalently,

$$m(\frac{m-1}{2}) = \sum_{k \in \Theta} \#\Phi_k + \sum_{k \in \mathcal{M}/\Theta} \#\Phi_k.$$

Since each district selects at least one district in Θ, every district not in Θ must be included in the minimum winning coalitions of every other district. This implies that

$$\sum_{k\in\mathcal{M}/\Theta} \#\Phi_k = (m - \#\Theta)(m-1).$$

It follows that

$$\sum_{k\in\Theta} \#\Phi_k = m(\frac{m-1}{2}) - (m - \#\Theta)(m-1).$$

The average number of minimum winning coalitions a group Θ member is included in is therefore

$$\frac{\sum_{k\in\Theta} \#\Phi_k}{\#\Theta} = (m-1) - \frac{m}{\#\Theta}(\frac{m-1}{2}) \leq \frac{m-1}{2}.$$

Since all districts in Θ cannot be above average, the claim follows.

Now consider some district $i \in \Theta$ for whom $\#\Phi_i \leq \frac{m-1}{2}$. A (non-candidate) citizen of type h in district i has an equilibrium payoff of

$$\frac{1}{m}[\lambda_h B(\alpha(\Omega_i, \tau_i)) - \tau_i] - \frac{1}{m}\sum_{k\in\mathcal{M}/\{i\}} \tau_k + \frac{1}{m}\sum_{k\in\Phi_i} \frac{\lambda_h}{\lambda_{h_i}}\tau_k.$$

Now pick a particular citizen of type λ_{h_i+1}. It will be shown that this citizen has an incentive to enter.

Because each district's minimum winning coalition contains at least one district in Θ, electing the type λ_{h_i+1} citizen would mean that district i were included in every other district's coalition. Thus, letting $\Omega_j^* = \Omega_j(\lambda_{h_i+1}, \lambda^{-i})$ and $\tau_j^* = \tau_j(\lambda_{h_i+1}, \lambda^{-i})$, the payoff of a (non-candidate) type h citizen if the type H citizen were elected would be given by:

$$\frac{1}{m}[\lambda_h B(\alpha(\Omega_i^*, \tau_i^*)) - \tau_i^*] + \frac{1}{m}\sum_{k\notin\mathcal{M}/\{i\}} [\frac{\lambda_h}{\lambda_{h_i+1}} - 1]\tau_k^*.$$

Subtracting the equilibrium payoff, yields

$$\frac{1}{m}\{[\lambda_h(B(\alpha(\Omega_i^*, \tau_i^*)) - B(\alpha(\Omega_i, \tau_i)))] + \sum_{k\notin\mathcal{M}/\{i\}} [\frac{\lambda_h}{\lambda_{h_i+1}} - 1]\tau_k^* + \sum_{k\notin\mathcal{M}/\{i\}} \tau_k - \sum_{k\in\Phi_i} \frac{\lambda_h}{\lambda_{h_i}}\tau_k\}$$

Condition 2 together with the fact that $\alpha(\Omega_i^*, \tau_i^*) > \alpha(\Omega_i, \tau_i)$ implies that this difference is positive for citizens of types $h \in \{2, ..., H\}$. Thus, by weak dominance, all those citizens of types 2 through H (excepting possibly those who are candidates) would vote for the type $h_i + 1$ entrant, which implies that he would win. Since ζ exceeds the entry cost δ and $h_i+1 \geq 2$, it is clear that the type h_i+1 citizen has an incentive to enter. Thus, case (ii) cannot be true in equilibrium. ■

Proof of Lemma 2: (i) Suppose that G satisfies the stated condition but is not Pareto efficient. Then there exists some vector of local public goods G^* such that for all citizens j in each district i

$$\theta_i^j B(g_i^*) - \frac{c}{n}\sum_{k\in\mathcal{M}} g_k^* \geq \theta_i^j B(g_i) - \frac{c}{n}\sum_{k\in\mathcal{M}} g_k,$$

with the inequality holding strictly for some subset of citizens. In particular, then, for each district i

$$\lambda_1 B(g_i^*) - \frac{c}{n}\sum_{k\in\mathcal{M}} g_k^* \geq \lambda_1 B(g_i) - \frac{c}{n}\sum_{k\in\mathcal{M}} g_k,$$

and,

$$\lambda_H B(g_i^*) - \frac{c}{n}\sum_{k\in\mathcal{M}} g_k^* \geq \lambda_H B(g_i) - \frac{c}{n}\sum_{k\in\mathcal{M}} g_k.$$

Rewriting these inequalities, yields

$$\lambda_1[B(g_i^*) - B(g_i)] \geq \frac{c}{n}\sum_{k\in\mathcal{M}} (g_k^* - g_k),$$

and

$$\lambda_H[B(g_i^*) - B(g_i)] \geq \frac{c}{n}\sum_{k\in\mathcal{M}} (g_k^* - g_k).$$

In each district i, there are three possibilities; (a) $g_i^* > g_i$; (b) $g_i^* < g_i$; and (c) $g_i^* = g_i$. Using the concavity of $B(\cdot)$, in case (a) it must be that

$$\lambda_1[B(g_i^*) - B(g_i)] < \lambda_1 B'(g_i)(g_i^* - g_i) \leq \frac{c}{n_i}(g_i^* - g_i),$$

which implies that

$$nc(g_i^* - g_i) > n_i c \sum_{k\in\mathcal{M}} (g_k^* - g_k).$$

In case (b), it must be that

$$\lambda_H[B(g_i^*) - B(g_i)] < \lambda_H B'(g_i)(g_i^* - g_i) \leq \frac{c}{n_i}(g_i^* - g_i),$$

which also implies that

$$nc(g_i^* - g_i) > n_i c \sum_{k \in \mathcal{M}} (g_k^* - g_k).$$

Finally, in case (c), it follows trivially that

$$nc(g_i^* - g_i) \geq n_i c \sum_{k \in \mathcal{M}} (g_k^* - g_k).$$

Summing these inequalities over the m districts and noting that $G^* \neq G$, yields

$$nc \sum_{i \in \mathcal{M}} (g_i^* - g_i) > \sum_{i \in \mathcal{M}} n_i c \sum_{k \in \mathcal{M}} (g_k^* - g_k),$$

which is a contradiction.

(ii) Suppose that $n_i \lambda_1 B'(g_i) > c$ for all $i \in \mathcal{M}$. It must be shown that G is Pareto inefficient. Consider increasing expenditure on local public goods in each district i by an amount $\frac{n_i}{n}\varepsilon$. Then citizen j in district i enjoys a utility level

$$U_i^j(\varepsilon) = \theta_i^j B(g_i + \frac{n_i}{n}\varepsilon) - \frac{c}{n} \sum_{k \in \mathcal{M}} (g_k + \frac{n_k}{n}\varepsilon).$$

Notice that

$$dU_i^j(0)/d\varepsilon = \frac{n_i}{n}\theta_i^j B'(g_i) - \frac{c}{n} \geq \frac{n_i \lambda_1 B'(g_i) - c}{n} > 0.$$

Thus, by continuity, for sufficiently small ε, all citizens are better off with the vector of local public goods $(g_i + \frac{n_i}{n}\varepsilon)_{i \in M}$ than G, which implies that G is Pareto inefficient. The argument for the case in which $n_i \lambda_H B'(g_i) < c$ for all $i \in \mathcal{M}$ is similar. ■

Proof of Proposition 5: Let $\{\rho_U; \alpha(\cdot); s\}$ be a political equilibrium with identical candidates under universalism. Proposition 1 implies that in each district i the candidates are of type μ_i. Thus, if G is the public goods vector generated by $\{\rho_U; \alpha(\cdot); s\}$, it must be the case that $g_i = \varphi(\lambda_{\mu_i}, 1)$ for each district i. By definition, this means that $n\lambda_{\mu_i} B'(g_i) = c$ for each district i. Under the condition of the proposition, it follows that $n\lambda_{\mu_i} B'(g_i) > n_i \lambda_H B'(g_i)$ and hence that $n_i \lambda_H B'(g_i) < c$ for each district i. The result now follows from Lemma 2. ■

Proof of Proposition 6: Suppose the contrary. Then there exists some selection of representatives $\omega \in \Delta(P(\mathcal{C}(s), \alpha(\mathcal{C}(s)))$ which generates a Pareto inefficient vector of local public goods G. This implies that there must exist a public goods vector $G' \neq G$ which Pareto dominates G. Given that $g_i = \varphi(\theta_i^{\omega_i}, \#\Lambda(\omega))$ for all $i \in \Lambda(\omega)$ and $g_i = 0$ for all $i \notin \Lambda(\omega)$, it must be true that for each representative of district $i \in I(\omega)$,

$$\theta_i^{\omega_i} B(g_i') - \frac{c}{n} \sum_{k \in \mathcal{M}} g_k' \geq \theta_i^{\omega_i} B(\varphi(\theta_i^{\omega_i}, \#\Lambda(\omega))) - \frac{c}{n} \sum_{k \in \Lambda(\omega)} \varphi(\theta_k^{\omega_k}, \#\Lambda(\omega))$$

Summing over all the representatives yields:

$$\sum_{i \in \Lambda(\omega)} [\theta_i^{\omega_i} B(g_i') - \frac{c}{n} \#\Lambda(\omega) g_i'] \geq \sum_{i \in \Lambda(\omega)} [\theta_i^{\omega_i} B(\varphi(\theta_i^{\omega_i}, \#\Lambda(\omega))) - \frac{c}{n} \#\Lambda(\omega) \varphi(\theta_i^{\omega_i}, \#\Lambda(\omega))].$$

But since

$$\varphi(\theta_i^{\omega_i}, \#\Lambda(\omega)) = \arg\max_g [\theta_i^{\omega_i} B(g) - \frac{c}{n} \#\Lambda(\omega) g],$$

this implies that $g_i' = \varphi(\theta_i^{\omega_i}, \#\Lambda(\omega))$ for all $i \in \Lambda(\omega)$ and $g_i' = 0$ for all $i \notin \Lambda(\omega)$, which contradicts the fact that $G' \neq G$. ■

Proof of Proposition 7: Suppose the contrary. Then there exists some selection of representatives $\omega \in \Delta(P(\mathcal{C}(s), \alpha(\mathcal{C}(s)))$ and some $\widehat{G} \in \Delta(\rho_A(\omega))$ such that $\widehat{G}$ is Pareto inefficient. If $\widehat{G} \in \Delta(\rho_A(\omega))$ then it must be the optimizing choice of the representative of some district $i \in \Lambda(\omega)$. Thus, there must exist $(\Omega_i, \tau_i) \in \Gamma_i(\omega)$ such that $\widehat{G} = G^i(\Omega_i, \tau_i)$. If $\widehat{G}$ is Pareto inefficient, then there must exist a Pareto dominating public goods vector $G' \neq \widehat{G}$. Let $\tau' = \frac{c}{n} \sum_{k \in \mathcal{M}} g_h'$ denote the per capita tax bill associated with this vector. Since G' Pareto dominates $\widehat{G}$, it must be the case that for all districts $j \in \Omega_i$

$$\theta_j^{\omega j} B(g_j') - \tau' \geq \theta_j^{\omega j} B(\gamma(\theta_j^{\omega j}, \tau_i) - \tau_i \ = 0.$$

Thus, for all $j \in \Omega_i$, $g_j' \geq \gamma(\theta_j^{\omega j}, \tau')$ which implies that

$$g_i' \leq \frac{c}{n} \tau' - \sum_{j \in \Omega_i} \gamma(\theta_j^{\omega j}, \tau').$$

Thus,

$$\theta_i^{\omega_i} B(g_i') - \tau' \leq \theta_i^{\omega_i} B(\alpha(\Omega_i, \tau')) - \tau' \leq \theta_i^{\omega_i} B(\alpha(\Omega_i, \tau_i)) - \tau_i.$$

Since G' Pareto dominates $\widehat{G}$, it must be the case that

$$\theta_i^{\omega_i} B(g_i') - \tau' = \theta_i^{\omega_i} B(\alpha(\Omega_i, \tau_i)) - \tau_i.$$

This implies that $\tau' = \tau_i$ and hence that $G' = \widehat{G}$ - a contradiction. ■

Proof of Proposition 8: Let $\{\rho_U; \alpha(\cdot); s\}$ be a political equilibrium with identical candidates under universalism. Proposition 1 implies that in each district i the candidates are of type μ_i. Thus, if G is the public goods vector generated by $\{\rho_U; \alpha(\cdot); s\}$, it must be the case that $g_i = \varphi(\lambda_{\mu_i}, 1)$ for each district i. By definition, this means that $n\lambda_{\mu_i} B'(g_i) = c$ for each district i. Under the condition of the proposition, it follows that $n\lambda_{\mu_i} B'(g_i) > n_i \overline{\theta}_i B'(g_i)$ and hence that $n_i \overline{\theta}_i B'(g_i) < c$ for each district i. This implies that $g_i > g_i^*$ for each district i. ■

Proof of Proposition 9: Let $\{\rho_E; \alpha(\cdot); s\}$ be a political equilibrium with identical candidates under efficient universalism. Proposition 2 implies that in each district i the candidates are of type H. Thus, if G is the public goods vector generated by $\{\rho_E; \alpha(\cdot); s\}$, it must be the case that $g_i = \varphi(\lambda_H, m)$ and hence that $\lambda_H B'(g_i) = \frac{mc}{n}$.Thus, under the conditions of the proposition, it follows that $n_i \overline{\theta}_i B'(g_i) < c$ for each district i, which implies that $g_i > g_i^*$ for each district i. ■

Proof that Local Public Goods are Overprovided to the Agenda Setter's District: Let $\{\rho_A; \alpha(\cdot); s\}$ be a political equilibrium under agenda setting involving type H candidates in each district. Let (Ω_i, τ_i) be the coalition and spending level picked by the representative of district i. Then, since all the representatives are of type H, it must be the case that:

$$\tau_i = \arg\max_{\tau} \{\lambda_H B(\frac{n}{c}\tau - \frac{m-1}{2}\gamma(\lambda_H, \tau)) - \tau\}.$$

Letting α_i denote the level of local public goods in district i, it follows that

$$\lambda_H B'(\alpha_i)[\frac{n}{c} - \frac{m-1}{2}\gamma_2(\lambda_H, \tau)] = 1.$$

Recalling that $\gamma_2(\lambda_H, \tau) = 1/\lambda_H B'(\gamma)$, this can be rewritten as

$$\lambda_H B'(\alpha_i)[\frac{n}{c} - (m-1)/2\lambda_H B'(\gamma)] = 1.$$

Since α_i must be at least as large as $\gamma(\lambda_H, \tau_i)$, it follows from this inequality that

$$\lambda_H B'(\alpha_i)\frac{n}{c} - \frac{m-1}{2} \leq 1,$$

or, equivalently, that

$$\lambda_H B'(\alpha_i) \leq \frac{m-1}{2}\frac{c}{n}.$$

Thus, if $\frac{2n}{m-1}\lambda_H > n_i\overline{\theta}_i$, public goods are over provided in district i when i's representative is the agenda setter. ■

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