Favoritism and Reverse Discrimination

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May 20, 2005

Abstract

We analyze the inefficiency that may arise in the form of reverse discrimination in the presence of favoritism or nepotism. Favoritism is typically associated with inefficient transfers to the core support of the incumbent government. But inefficiency that is opposite in nature may also arise through the electoral process in a political environment where favoritism is pervasive. We show that if the policy maker is sufficiently office seeking, a socially efficient action may never be taken if it yields benefits to his core support due to reputational concerns. Hence, the core support of the incumbent may fare worse than other groups. We also consider the implications of policies such as anti-nepotism laws or term limits in the presence of favoritism.

JEL Classification Numbers: D63, D72, D78, H41, H42
Keywords: Favoritism, reverse discrimination, election, voting, nepotism

1 Introduction

Distributing income across regions or groups is one of the key roles of government. Some government activities such as security programs or government transfers are directly related to income distribution. There are many other government activities, however, that indirectly affect income distribution by delivering benefits to specific districts or special interests. Providing public goods or carrying out public projects usually yields benefits that are district- or group-specific. Constructing social infrastructure such as roads or dams benefits the whole economy by improving general productivity, but at the same time, it may yield benefits that are specific to the districts in which the facilities are built. These benefits may take the form of increased land price, increased income due to the creation of public employment, and so on.\(^1\) Even the allocation of cabinet posts and other political

\(^1\) Alesina et al. [1] provide evidence that in U.S. cities, politicians use public employment as a redistributive device. Alesina et al. [2] investigate the regional distribution of public employment in Italy as a redistribution device.
patronage can have a similar effect if, for example, a minister advocates policies that are of particular interest to the group or district to which he belongs.

In general, the decision process is discretionary; there is no explicit formula or objective criterion prescribing benefit allocations across regions or appointments of cabinet members, and the final decision is made by the incumbent government. If policy makers are benevolent, they will always make efficient choices. That is, they will always try to maximize social welfare. Indeed, in traditional literature on the role of the president in distributive politics, the president has been modeled as a player who seeks to maximize social benefit. The rationale is that the president should try to maximize benefits to his/her electoral district in the same manner other elected politicians serve their districts. The only difference is that the president’s district encompasses the entire nation. Therefore, in this literature, institutions such as the executive veto power are designed as a means to facilitate presidential universalism to obstruct the legislature’s pork-barrel politics.

However, the president may have preferences over the distribution of government expenditure and therefore make inefficient choices. In some sense, sticking to budgetary efficiency would rarely best promote the reelection prospect. The president may depart from welfare maximization for various reasons. He may, for example, try to reward the regions that supported his election to consolidate his support, or attract the swing regions by strategically directing resources. The president may also have partisan motivations. In countries where severe ethnic diversity or regional rivalry exists, political parties are usually affiliated with specific ethnic groups or geographical regions. In these societies, the president may have strong incentives to favor the ethnic group or region represented by his own party. Consequently, targeted government expenditures in various forms are a big issue, and the government is often accused of its partiality towards its core support.

If a political party represents a group or a coalition of groups that constitutes a majority, the incumbent president can always secure reelection by targeting government expenditures to his core support. Also, in the absence of formal democracy, the govern-

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2See, for example, Carter and Schap [4], Dearden and Husted [11], and Lohmann and O’Halloran [15].

3Cadot et al. [3] find by estimating the contribution of transport infrastructure accumulation to regional growth in France that electoral concerns and influence activities are significant determinants of the cross-regional allocation of investments and that there is little evidence of concern for the maximization of economic returns to infrastructure spending.

4Cox and McCubbins [8] argue that due to risk aversion, the incumbent government tries to secure support by investing in regions where it already gained high support. Lindbeck and Weibull [14] and Dixit and Londregan [12], in contrast, hold that the incumbent government purchases votes by allocating a disproportionate share of redistributive spending to regions in which there are many swing voters who do not have a strong attachment to political parties.
ment faces virtually no electoral concern and may freely direct benefits to a very small group. We observe that in many countries, typically in developing or underdeveloped countries in which democracy in its true sense is not well established, relatives of the man in power often fill the top government posts or take charge of the nationalized industries. Also, allocation of federal transfers are lopsided and directed to the core support of the incumbent government. Favoritism in public employment, or nepotism, was prevalent even in the US. White [20] records the following:

⋯During the Civil War, at least one family member of each Lincoln cabinet member was on the federal payroll. The practice of nepotism has pervaded state governments and, despite legislation, continues in many forms. In Louisiana, nepotism was legal and widespread throughout the tenure of Huey Long (1893-1935). The relatives of most pro-Long legislators (including wives and children) had state jobs. Long himself had at least 23 relatives on the state payroll during his first year as governor but thought nothing of it. ⋯

In Louisiana, nepotism too frequently exists at the highest levels of state government. In 1994 federal prosecutors accused Governor Edwin Edwards of nepotism in the awarding of riverboat casino gambling licenses to ventures in which his own children had vested interests. Edwards had appointed the officials who awarded the contracts to his children, the owners of the riverboat casino companies.

In this case of favoritism or nepotism, inefficiency usually arises in the form of targeted benefits at the cost of social inefficiency; unqualified candidates are hired just because they are related to the president, and government expenditures are spent on something that only benefits a specific group but is not desirable from a social point of view.

However, inefficiency that is opposite in nature may also arise. Consider a society in which formal democracy is well established, and the incumbent government is not affiliated with a majority group or region. In this case, the incumbent who seeks reelection should take into account the effect of his expenditure allocation or appointment of cabinet posts on the electoral outcome, and thus he cannot deliver benefits to his support group in an unconstrained manner. Due to reputational concern, moreover, he may never be able to take a socially desirable action if it generates benefits to his support group. Therefore, somewhat ironically, the core support of the incumbent government may fare worse than
Consider a society in which favoritism is a keen issue. Specifically, voters are suspicious that the president is biased and may care only about the district or group to which he belongs. Suppose the president’s job is to select a certain number of districts and carry out public projects in those districts. The public projects have the following properties. First, they yield national benefits but also deliver district-specific benefits to the regions where they are implemented. Second, the nationwide benefit is stochastic; benefit increases in relation to a district’s productivity, but only in a probabilistic sense. Therefore, voters cannot verify whether the president’s choice was \textit{ex ante} socially desirable just through pure observation of the realized benefits. The incumbent observes the productivity of each district before he makes a decision but cannot credibly transmit that information to the voters. After the projects are implemented, the benefits are realized. An election follows, in which the incumbent competes with an \textit{ex ante} identical challenger. We are interested in the incumbent’s district choice before the election. Without electoral concerns, a benevolent president, who wants to maximize social welfare, will always make an efficient decision, whereas a biased president, who cares only about his own district, will choose his district regardless of its productivity. In the presence of electoral concerns, however, the president behaves differently. In our model, neither type of presidents gets to choose his own district regardless of its productivity if holding office is sufficiently valuable. In this equilibrium, inefficiency arises when the incumbent’s district is productive. Without reputational concerns, a good type will definitely implement the public project in his own district because it is socially efficient. But when it becomes very important whether he chooses his district or not due to the favoritism issue, he cannot afford to do so. This is because he will thereafter be regarded as biased and be thrown out of office if he does. Thus, social welfare increases as the probability that the incumbent’s district is productive decreases. In our model, that probability decreases as the number of districts increases.

\footnote{Reverse discrimination usually means the disadvantage that the members of the majority group, typically white males in the US, get as a result of affirmative action. In this paper, we use this term to refer to a different phenomenon.}

\footnote{Recently, there was a controversy over “reverse discrimination” in Korea. After the current President took office in February 2003, there arose claims that natives of the Southwest region were systematically excluded from top posts in the prosecutors office, the police, and the Ministry of Home Affairs and Government Administration. For example, as a result of the recent personnel change, only 1 out of the 20 top officials at the Home Affairs Ministry is from the Southwest. There are also claims that regional projects have been removed from the new government’s priority agenda. Ironically, the Southwest region has been a core support of the incumbent party for decades and the current President was supported by more than 90% of the electorates in the Southwest region in the presidential election in December 2002.}
Therefore, the model implies that inefficiency is decreasing as the number of districts rises.

The remainder of the paper is organized as follows. We first briefly overview related literature. In Section 2, we lay out the model and solve preliminary steps of the game. In Section 3, we consider a benchmark case where there is no electoral uncertainty, which we extend to a general case in Section 4. In Section 5, we conduct welfare analyses and analyze “reverse discrimination.” In Section 6, we consider the implications of policies such as anti-nepotism laws or term limits. We conclude in Section 7.

1.1 Related Literature

There is a growing body of literature that empirically investigates the pattern of allocation of federal transfers. But there are conflicting results. Levitt and Snyder [13] find that in the US, districts represented by Democratic representatives received more federal spending during the Carter administration than during the Reagan years. This lends support to Cox and McCubbins [8]. Dahlberg and Johansson [10] use a temporary grant program in Sweden to investigate the motives behind the distribution of grants from central to lower-level governments. Milligan and Smart [18] examine a program of discretionary regional development in Canada for the same purpose. Consistent with Lindbeck and Weibull [14] and Dixit and Londregan [12], these studies find that spending is greater in electoral districts in which there are many swing voters. Both of the studies find, however, no evidence that the incumbent government transfers money to its own supporters, which is consistent with the prediction of our model. Milligan and Smart [18] even find that spending is greater in districts where popular support for a regional secessionist party is strong.

As mentioned earlier, the president has been modeled as a social welfare maximizer, and the literature on pork barrel politics has been mostly congress-centered. Recently, some work deals with presidential pork barrels. McCarthy [16] studies the effect of the executive veto on the distribution of spending when the executive has preferences over distribution. He shows that the executive veto may have large effects on the distribution of spending when the executive has particularistic preferences. Our paper shares the feature that the president may have preferences over distribution but is distinct from McCarthy [16] in that we focus on the president’s discretionary decision that is not constrained by the legislature; the legislature is simply not incorporated in our model. Mebane and Wawro [17] empirically study presidential pork barrel politics in the US. They develop and test a theory of expenditure targeting that specifies how patterns of government spending
will vary, depending on whether the spending is a reward for local elites or is aimed at attracting the voter support.

Our paper is closely related to the work of Coate and Morris [6], which analyzes the form of transfers to special interests in a political competition setting where politicians may have incentives to favor special interests. In their model, a bad incumbent may, in equilibrium, undertake a project to provide benefits to special interests, even if it is socially undesirable. Although closely related, our paper is different from Coate and Morris [6] in two important respects. First, there exist both a direct and an indirect way to benefit special interests in Coate and Morris [6], and their main result is about the form of transfers. Their message is that politicians may take advantage of voters’ lack of information and choose an indirect method to deliver pork barrels even if it is socially inefficient. In our model, there is only one policy instrument, and we investigate the pattern of the policy instrument. Second, the inefficiency we highlight in this paper is opposite in nature to that of Coate and Morris [6]. In our model, the inefficiency arises when the incumbent cannot choose his own district because of electoral concern, even if his district is productive.

The inefficiency in our model bears conceptual similarity to those investigated by Cuckierman and Tommasi [9] and Morris [19]. In Cuckierman and Tommasi [9], the incumbent is unable to credibly reveal the state of the world, since voters are uncertain about his ideology. They show that, under some conditions, radical policy changes are implemented only by the political parties that have a historical bias against such policies, since only then can they reveal the state of the world most credibly. Morris [19] investigates a two-period model in which a potentially biased advisor reports the state of the world and a decision maker chooses an action accordingly. It is shown that, due to the reputational concern, no information may be conveyed in the first period if the second period is sufficiently important.

2 The Model

2.1 Setup

**Structure** There are \( N \geq 3 \) districts with the same population. Let \( D \equiv \{1, 2, \ldots, N\} \) be the set of districts. All agents are identical except for their district membership, and thus we can assume without loss of generality that there is only one representative agent in each district. All agents are expected utility maximizers.

There are two periods, \( t = 1, 2 \). In \( t = 1 \), the incumbent policy maker, who is from
district \(i \in D\), chooses \(K\) districts from \(D\), where \(K < N\) and carries out public projects in those selected districts. At the end of \(t = 1\), an election is held. The incumbent competes with a challenger from district \(c \in D\) for office. In \(t = 2\), the winner again selects \(K\) districts from \(D\) and carries out the projects. The discount factor is \(\beta \leq 1\).

**Projects** Each period, \(K\) projects are implemented. Each project yields either a high benefit \(M\) or a low benefit \(m\), where \(M > m > 0\), which affects all the agents in the country. In this sense, this project is a public good. At the same time, the district where the project is carried out gets an additional district-specific benefit \(h > 0\). thus, the project also has the property of a local public good.

In each period, exactly \(K\) districts are productive in the sense that the project will yield \(M\) with higher probability if it is carried out in those districts.\(^7\) In each period, before deciding where to carry out the projects, the policy maker acquires information about the productivity of each district. Formally, before decision making, the policy maker receives a signal \(S \in D^K\), where \(D^K = \{D' \subset D : |D'| = K\}\). That is, a signal is the set of \(K\) districts that are productive in that period. This signal is observed only by the policy maker and not by the voters, and the policy maker cannot credibly convey the information to the voters. We assume that each \(S \in D^K\) has the same probability, i.e., \(1/(\binom{N}{K})\), of being the signal and that this is independent across periods. This means that each district belongs to the set of productive districts with probability \(\binom{N-1}{K-1}/\binom{N}{K} = \frac{N-K}{N}\). Denote by \(S_t\) the signal in period \(t\). If the project is carried out in a district \(d \in S_t\), then it generates \(M\) with probability \(\lambda\) and \(m\) with probability \(1 - \lambda\). If the project is carried out in a district \(d' \notin S_t\), \(M\) and \(m\) occur with probability \(\theta\) and \(1 - \theta\), respectively. We assume \(\lambda > \theta\) so that the benefit is more likely to be high when the project is implemented in a productive district rather than in an unproductive district.

**Voters** Voters care about two things: the expected benefit from the projects and policy makers’ valence value. First consider the expected benefit from the projects. Denote by \(D_t\) the set of districts chosen by the policy maker in period \(t\). Then, the expected utility of an agent in district \(j \in D\) from the projects in period \(t\) given \(D_t\) and \(S_t\) is

\[
\text{Expected Utility} = k_t (\lambda M + (1 - \lambda) m) + (K - k_t) (\theta M + (1 - \theta) m) + I \{j \in D_t\} h,
\]

\(^7\)Assuming that more (or less) than \(K\) districts are productive in each period would not change the main result.
where $k_t = |\{d : d \in D_t \cap S_t\}|$ (i.e., the number of productive districts in $D_t$), and $I \{j \in D_t\}$ is an indicator function such that $I \{j \in D_t\} = 1$ if $j \in D_t$ and 0 otherwise.

In addition to this benefit from the projects, voters also care about the valence values of the candidates. At the voting stage, voters may have preferences for candidates independent of their policy. Let $\varepsilon_I$ and $\varepsilon_C$ be the valence values of the incumbent and the challenger, respectively. Let $\varepsilon \equiv \varepsilon_I - \varepsilon_C$ be the incumbent’s (dis)advantage in popularity over the challenger. When voters vote, their decision depends not only on the policy choice and realized benefits but also on the realized value of $\varepsilon$. Specifically, they will vote for the candidate who they expect will generate the larger expected payoff, which is the sum of the expected benefits from the projects and the realized valence value. We assume that $\varepsilon$ is drawn from a distribution function $F(\cdot)$. The incumbent only knows this distribution and therefore cannot predict its value when he makes a decision about $D_t$. In this sense, $\varepsilon$ basically reflects the uncertainty inherent in the electoral process.

Hence, at the election time, voters observe (1) where the incumbent and the challenger are from, (2) which districts were chosen, (3) whether the benefit was high or low in each of the selected districts, and (4) the incumbent’s advantage in valence values over the challenger.

**Policy makers** Policy makers are also expected utility maximizers. Policy makers enjoy rent $R > 0$ in office. In addition to this rent, policy makers also care about the voters’ utility from public projects. Policy makers come in two types, a good type and a bad type. The way voters’ utility is embedded in the policy maker’s utility depends on his type. A good type only cares about the universal benefits from public projects and is not interested in the distribution of $h$. The identity of the districts in which the public projects are carried out per se is not important to him since $K$ districts will receive the district-specific benefit $h$ in every period anyway. Formally, a good policy maker’s expected utility in period $t$ given $D_t$ and $S_t$ is

$$k_t (\lambda M + (1 - \lambda) m) + (K - k_t) (\theta M + (1 - \theta) m) + I \{\text{win}\} R,$$

where $I \{\text{win}\} = 1$ if he wins and remains in office, and 0 otherwise. A bad type cares only about the utility of the agent in his own district. Formally, the expected utility of a

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8This setup includes deterministic cases. Situations in which the incumbent surely enjoys a high advantage or in which voters only care about the candidates’ type can all be modeled within our setting.

9An assumption about $R$ will follow later.
bad type who is from district $i$ in period $t$ given $D_t$ and $S_t$ is

$$k_t (\lambda M + (1 - \lambda) m) + (K - k_t) (\theta M + (1 - \theta) m) + I \{i \in D_t\} h + I \{\text{win}\} R.$$  

Unlike a good type, a bad type cares about whether his own district receives the district-specific benefit $h$.

Voters' prior beliefs are that policy makers are of a good type with probability $\alpha$ and a bad type with probability $1 - \alpha$, where $0 < \alpha < 1$. The belief about the incumbent's type is updated after the voters observe the outcome in $t = 1$.

**Timing** The timing of the game is as follows. In $t = 1$, the incumbent observes a signal and chooses $K$ districts in which to implement the public projects. Then, the benefits from each of the selected districts and candidates' valence values are realized. The voters decide whether to reelect the incumbent based on observations of his district choice, the benefits, and valence values, but not the signal. In $t = 2$, the winner enters office and again chooses districts and carries out the projects after observing a signal. See Figure 1.

We are mainly interested in the incumbent’s district choice in $t = 1$. To that end, we consider preliminary steps. We shall work backwards. We first consider the policy maker’s district choice in $t = 2$. This determines the voters’ voting decision. Then, we define the strategy of the incumbent in $t = 1$.

**2.2 District Choice in the Second Period**

In $t = 2$, there is no concern about election, and therefore the policy maker will make a decision in his own best interest. Then, a good type’s choice is straightforward. He
will always choose $D_2 = S_2$. Since he seeks to maximize benefit, he will always make the efficient decision in $t = 2$.

For a bad type’s decision, we assume the following:

**Assumption 1**

\[ h > (\lambda - \theta) (M - m) \]

Note that the RHS, $(\lambda - \theta) (M - m)$, is the utility loss from choosing an unproductive district instead of a productive district.\(^{10}\) Hence, this assumption implies that $h$ is such that a bad type will choose his own district in $t = 2$ even if his district is not productive. Then, $D_2$ will include his own district and $K - 1$ districts from $S_2$. We assume that each $d \in S_2$ is discarded with equal probability, i.e., $\frac{1}{K}$.

In $t = 2$, therefore, either all the selected districts are productive (which occurs when the policy maker is a good type or when he is a bad type but his own district is productive) or $K - 1$ districts are productive and one district is unproductive (which occurs when the policy maker is a bad type and his own district is unproductive). Also note that the bad type’s action is *ex ante* efficient with probability $\frac{K}{N}$, since he always includes his own district, and the probability that the policy maker’s district is productive is $\frac{K}{N}$.

### 2.3 Voting Decision

Define

\[ U \equiv K (\lambda M + (1 - \lambda) m) \]

and

\[ u \equiv (K - 1) (\lambda M + (1 - \lambda) m) + (\theta M + (1 - \theta) m). \]

The voters know that if the policy maker in $t = 2$ is a good type, the expected utility will be

\[ v_M \equiv U + \frac{K}{N} h, \]

since a good type will always choose the productive districts, and the probability that a specific district will be productive is $\frac{K}{N}$, in which case it receives the district-specific benefit $h$. They also know that a bad type will always include his own district in $D_2$. This will be efficient only when the policy maker’s district is productive, which occurs with probability $\frac{K}{N}$. Therefore, the expected utility if the policy maker is a bad type is

\[ v_H \equiv \frac{K}{N} U + \frac{N - K}{N} u + h \]

\(^{10}\)$(\lambda - \theta) (M - m) = (\lambda M + (1 - \lambda) m) - (\theta M + (1 - \theta) m)$
for the policy maker’s district, and

\[ v_L = \frac{K}{N} U + \frac{N - K}{N} u + \frac{K - 1}{N - 1} h \]

for other districts.\(^{11}\) By Assumption 1, \( v_H > v_M \) and thus, overall we have \( v_H > v_M > v_L. \)

Now, consider the voting decision by the voters. Let \( \alpha' \) be the updated belief about the incumbent’s type at the time of election, and recall that the challenger is a good type with probability \( \alpha \). We assume that the voters always use undominated strategies. Let us first think about the incumbent’s district \( i \). The voter in \( i \) will vote for the incumbent if

\[ \alpha' v_M + (1 - \alpha') v_H + \varepsilon \geq \alpha v_M + (1 - \alpha) v_L, \]

or equivalently if

\[ \varepsilon \geq (\alpha - \alpha') v_M - (v_H - v_L) + (\alpha' v_H - \alpha v_L) \equiv \varepsilon_i. \]

(We assume that if indifferent, the voter votes for the incumbent.) Next, think about the challenger’s district \( c \). The voter in \( c \) will vote for the incumbent if

\[ \alpha' v_M + (1 - \alpha') v_L + \varepsilon \geq \alpha v_M + (1 - \alpha) v_H, \]

or equivalently if

\[ \varepsilon \geq (\alpha - \alpha') v_M + (v_H - v_L) + (\alpha' v_L - \alpha v_H) \equiv \varepsilon_c. \]

Finally, consider a neutral district \( j \neq i, c \). The voter in \( j \) will vote for the incumbent if

\[ \alpha' v_M + (1 - \alpha') v_L + \varepsilon \geq \alpha v_M + (1 - \alpha) v_L, \]

or equivalently if

\[ \varepsilon \geq (\alpha - \alpha') (v_M - v_L) \equiv \varepsilon_n. \]

Since \( v_H > v_L \), it follows that \( \varepsilon_c > \varepsilon_n > \varepsilon_i. \)\(^{13}\) These values are determined once the updated belief \( \alpha' \) is determined. The inequalities basically show that it is hard for the voter in the challenger’s district to vote for the incumbent or for the voter in the incumbent’s

\[^{11}\] \( v_{b_2} = \frac{(N-1)}{K} \left( U + \frac{(K-2)}{K-1} h \right) + \frac{(N-1)}{K} \left( u + \frac{(N-2)}{K-1} \frac{K-1}{K} h \right) = \frac{K}{N} U + \frac{N-K}{N} u + \frac{K-1}{N-1} h \)

\[^{12}\] \( v_H - v_M = \frac{N-K}{N} (h - (U - u)) = \frac{N-K}{N} (h - (\lambda - \theta) (M - m)) > 0. \)

\[^{13}\] \( \varepsilon_c - \varepsilon_n = (v_H - v_L) (1 - \alpha) > 0 \) and \( \varepsilon_n - \varepsilon_i = (v_H - v_L) (1 - \alpha') > 0. \)
district to vote for the challenger. If }c \geq c_i\text{, everybody votes for the incumbent. If }c_i \leq c < c_n\text{, voters in }i\text{ and }j\text{ vote for the incumbent, while voters in }c\text{ vote for the challenger. If }c_n \leq c < c_i\text{, only the voters in }i\text{ vote for the incumbent, and the other voters vote for the challenger. Lastly, if }c < c_i\text{, everybody votes for the challenger. Note that since }n \geq 3\text{, the outcome of the election is decided by voters in neutral districts. The incumbent wins by }N_0\text{ to }0\text{ if }c\text{ and by }N_1\text{ to }1\text{ if }c_n \leq c < c_i\text{, and loses by }1\text{ to }N_1\text{ if }c < c_i\text{. In any case, the winner is the candidate supported by the neutral districts. Hence, in the subsequent analysis, we can focus on the voters’ decision in neutral districts to determine the outcome of the election.}

2.4 Incumbent’s Strategy in the First Period

In principle, the incumbent’s strategy should specify the probability that each set }D' \in D^K\text{ is selected as a function of the signal. That is, a strategy is a function }s : D^K \rightarrow \Delta^{(\frac{K}{N})}\text{, where }\Delta^{(\frac{K}{N})} = \{(p_1, p_2, \ldots, p_{\frac{K}{N}}) \in R^{(\frac{K}{N})} : \sum_{j=1}^{\frac{K}{N}} p_j = 1, p_j \geq 0, \forall j\}\text{. That is, }\Delta^{(\frac{K}{N})}\text{ is the set of probability distributions over }D^K\text{. We are mainly interested in the incumbent’s district choice when }i \in S_1\text{ and }i \notin S_1\text{. There are an infinite number of strategies but we put restrictions on the possible set of strategies in order to narrow down the set of equilibria.}

Restriction 1 Suppose }i \in S_1\text{. (1) If the incumbent intends }i \in D_1\text{, then }D_1 = S_1\text{. (2) If he intends }i \notin D_1\text{, then }S_1 \setminus \{i\} \subset D_1\text{ and one district is drawn from }D \setminus S_1\text{ and included in }D_1\text{ with equal probability, i.e., }\frac{1}{N-K}\text{.}

Restriction 2 Suppose }i \notin S_1\text{. (1) If the incumbent intends }i \in D_1\text{, then one district in }S_1\text{ is discarded with equal probability, i.e., }\frac{1}{K}\text{. Hence, }i\text{ and }K-1\text{ of the }K\text{ districts in }S_1\text{ constitute }D_1\text{. (2) If he intends }i \notin D_1\text{, then }D_1 = S_1\text{.}

These restrictions significantly reduce the set of strategies. They basically imply two things. One is that there are no unnecessary welfare-reducing choices, and the other is that the incumbent treats all nonincumbent districts of the same productivity equally. Restriction 1 says that when the incumbent’s district is productive, (1) he will make an efficient choice if he wants to include }i\text{, and (2) }i\text{ will be replaced with a randomly chosen unproductive district if he intends to exclude }i\text{. Restriction 2 says that when the incumbent’s district is unproductive, (1) a randomly chosen productive district will be replaced with }i\text{ if he intends to include }i\text{, and (2) he will make an efficient choice if he wants to exclude }i\text{.}
Due to these restrictions, the incumbent’s strategy in \( t = 1 \) only depends on whether \( i \in S_1 \) and whether he wants \( i \in D_1 \). That is, what matters is (1) whether or not \( i \) is productive, and (2) whether or not \( i \) is included in \( D_1 \). Once these two things are specified, the incumbent’s decision is completely determined by the given restrictions. Denote by \( s(i) \) the incumbent’s decision when \( i \in S_1 \), where \( s(i) = i \) means \( i \in D_1 \), and \( s(i) = \bar{i} \) means \( i \notin D_1 \). Also, denote by \( s(i) \) the incumbent’s decision when \( i \notin S_1 \), where \( s(i) = i \) means \( i \in D_1 \), and \( s(i) = \bar{i} \) means \( i \notin D_1 \). Thus, \( s(i) = i \) and \( s(i) = \bar{i} \) are efficient, whereas \( s(i) = \bar{i} \) and \( s(i) = i \) are inefficient. A strategy of the incumbent in \( t = 1 \) is then a decision profile \((s(i), s(\bar{i}))\). There are only four “pure” strategies: \( ii = (i, i) \), \( i\bar{i} = (i, \bar{i}) \), \( \bar{i}i = (\bar{i}, i) \), and \( \bar{i}\bar{i} = (\bar{i}, \bar{i}) \).

Let \((s_G, s_B) \in \Sigma^2\) be a strategy profile, where \( s_G \) and \( s_B \) each denote the strategy of a good type and a bad type, respectively. Now think about the voters’ updated belief after observing the incumbent’s decision and resulting benefits. Note that if \( i \in D_1 \), the only information relevant to the update of the belief is whether the benefit from the project carried out in \( i \) is high or low. The other \( K - 1 \) districts are all productive by Restrictions 1 and 2. We denote by \( \alpha(i, M) \) and \( \alpha(i, m) \) the updated belief when \( i \in D_1 \) and the benefit from \( i \) is high and low, respectively. When \( i \notin D_1 \), either all districts in \( D_1 \) are productive or only \( K - 1 \) districts are productive. Since \( i \notin D_1 \) in this case, the relevant information is the profile of all realized benefits. Specifically, the relevant information needed to formulate an updated belief is the number of districts that yield a high benefit. We denote by \( \alpha(i, n) \) the updated belief when \( i \notin D_1 \) and \( n \) of the \( K \) projects yield a high benefit \( M \), where \( n = 1, 2, \ldots, K \).

The equilibrium concept that we use in this paper is the Perfect Bayesian equilibrium in undominated pure strategies. A strategy profile coupled with a belief system, \(((s_G^*, s_B^*), \{\alpha^*(\cdot, \cdot)\})\), constitutes an equilibrium if (1) \( s_G^* \) is optimal given \( s_B^* \) and \( \{\alpha^*(\cdot, \cdot)\} \), and \( s_B^* \) is optimal given \( s_G^* \) and \( \{\alpha^*(\cdot, \cdot)\} \), and (2) \( \alpha^*(\cdot, \cdot) \) is derived from \((s_G^*, s_B^*)\) by the Bayes rule whenever possible. As is often the case with the signaling games, there exist equilibria in this game that are sustained by rather unreasonable beliefs. To eliminate implausible equilibria, we adopt the intuitive criterion suggested by Cho and Kreps [5].

Finally, before we analyze the equilibrium strategy in \( t = 1 \), we make an assumption about the incumbent’s preference. We assume that the incumbent is willing to sacrifice his utility in \( t = 1 \) to win the election and remain in office. To state the assumption formally,

\[14\text{They are actually not pure strategies because the incumbent randomizes except when he plays (ii). We call them pure in the sense that he does not randomize over } \Sigma = \{ii, i\bar{i}, \bar{i}i, \bar{i}\bar{i}\}. \]
we define

\[ \hat{U} \equiv \frac{K}{N}U + \frac{N-K}{N}u, \]
\[ v_{GW} \equiv U + R, \]
\[ V_{GL} \equiv \alpha U + (1 - \alpha) \hat{U}, \]
\[ V_{BW} \equiv v_H + R, \]
\[ V_{BL} \equiv \alpha v_M + (1 - \alpha) v_L. \]

Note that \( \hat{U} \) is the universal benefit from projects in \( t = 2 \) when the incumbent is of a bad type. Also note that \( V_{GW} (V_{GL}) \) is the utility for a good type when he wins (loses), and \( V_{BW} (V_{BL}) \) is the utility for a bad type when he wins (loses).

Recall that given the updated belief \( \varepsilon \), the incumbent wins if

\[ (\alpha - \alpha') (v_M - v_L). \]

In principle, \( \alpha' \) depends on the incumbent’s action and the outcome. However, in the special case in which \( \alpha' \) is constant for an action, the incumbent wins with probability \( 1 - F [(\alpha - \alpha') (v_M - v_L)] \). In particular, he wins with probability \( \pi_1 = 1 - F [(\alpha - 1) (v_M - v_L)] \) if \( \alpha' = 1 \), and with probability \( \pi_0 = 1 - F [\alpha (v_M - v_L)] \) if \( \alpha' = 0 \). We assume the following:

**Assumption 2**

\[ u + \beta \{ \pi_1 V_{BW} + (1 - \pi_1) V_{BL} \} > U + h + \beta \{ \pi_0 V_{BW} + (1 - \pi_0) V_{BL} \}. \]

This inequality means that even if his district is productive, a bad type would rather exclude his own district in \( t = 1 \) and make people believe that he is a good type than include it and disclose his type. This obviously implies that the same thing will be true when his district is unproductive. Simple algebra also shows that Assumption 2 implies

\[ u + \beta \{ \pi_1 V_{GW} + (1 - \pi_1) V_{GL} \} > U + \beta \{ \pi_0 V_{GW} + (1 - \pi_0) V_{GL} \}, \]

which means that a good type would rather make an inefficient decision in \( t = 1 \) and convince people that he is a good type than make an efficient choice and make people falsely believe that he is a bad type.\(^\text{15}\)

\(^{15}\)Since \( V_{BW} = V_{GW} - (U - \hat{U}) + h \) and \( V_{BL} = V_{GL} + \left( \alpha \frac{K}{N} + (1 - \alpha) \frac{N - K - 1}{N - 1} \right) h \), Assumption 2 is equivalent to

\[
\begin{align*}
&\quad u + \beta \left\{ \pi_1 \left( V_{GW} - (U - \hat{U}) + h \right) + (1 - \pi_1) \left( V_{GL} + \left( \alpha \frac{K}{N} + (1 - \alpha) \frac{N - K - 1}{N - 1} \right) h \right) \right\} \\
&> \quad U + h + \beta \left\{ \pi_0 \left( V_{GW} - (U - \hat{U}) + h \right) + (1 - \pi_0) \left( V_{GL} + \left( \alpha \frac{K}{N} + (1 - \alpha) \frac{N - K - 1}{N - 1} \right) h \right) \right\}.
\end{align*}
\]
We are ready to solve for the incumbent’s equilibrium strategy in $t = 1$. We first investigate a benchmark case in which the valence issue does not exist, and therefore there is no electoral uncertainty related to it. Then, we introduce the electoral uncertainty to consider the general case.

3 Benchmark Case

In this section, we consider a benchmark case in which there is no valence issue and thus no electoral uncertainty. In terms of the model, $\varepsilon = 0$ with probability 1, and voters make their decision solely based on the policy issue.

We first consider the voting decision by voters. We can only focus on neutral districts to determine the election outcome as mentioned before, but to highlight the feature of this benchmark case, we consider the decision of all districts. Let $\alpha'$ be the updated belief about the incumbent’s type at the time of election. Let us first think about the incumbent’s district $i$. The voter in $i$ will vote for the incumbent if

$$\alpha'v_M + (1 - \alpha')v_H \geq \alpha v_M + (1 - \alpha)v_L.$$ 

This inequality is satisfied for any $\alpha'$, since $v_H > v_M > v_L$. The voter in the incumbent’s district will vote for the incumbent regardless of his belief about the incumbent’s type. Next, think about the challenger’s district $c$. The voter in $c$ will vote for the challenger if

$$\alpha'v_M + (1 - \alpha')v_L < \alpha v_M + (1 - \alpha)v_H.$$ 

This is always satisfied, since $v_H > v_M > v_L$. The voter in the challenger’s district will vote for the challenger regardless of his belief about the incumbent’s type. Finally, consider a neutral district $j \neq i, c$. The voter in $j$ will vote for the incumbent if

$$\alpha'v_M + (1 - \alpha')v_L \geq \alpha v_M + (1 - \alpha)v_L,$$

which holds when $\alpha' \geq \alpha$. The voter will vote for whoever has a higher probability of being a good type. Since the winner is determined by the neutral districts, the incumbent wins if and only if $\alpha' \geq \alpha$. Therefore, in the following analysis, we can simply compare $\alpha'$

Rearranging, we get

$$u + \beta\{\alpha x_1 + (1 - \pi_1)x_2\} > U + \beta\{\alpha x_2 + (1 - \pi_0)x_1\} + (1 - \beta(\pi_1 - \pi_0) + \beta\left(\frac{\alpha}{N} + (1 - \alpha)\frac{K - 1}{K - 1}\right)h + \beta(\pi_1 - \pi_0)(U - U),$$

which implies (1).
with $\alpha$ to determine the election outcome: if $\alpha' \geq \alpha$, the incumbent wins and if $\alpha' < \alpha$, the challenger wins.

Also note that in this benchmark case, Assumption 2 reduces to

$$u + \beta V_{BW} > U + h + \beta V_{BL}$$

since $\pi_1 = 1$ and $\pi_0 = 0$.\footnote{ Actually, $\pi_0$ is also 1 since the incumbent will win for sure if $\alpha' = \alpha$.} This inequality implies that a bad type prefers to exclude $i$ in $t = 1$ and win the election rather than include $i$ and lose for sure when $i$ is productive.\footnote{ The condition also guarantees that this will be the case when $i$ is unproductive since it implies $U + \beta V_{BW} > u + h + \beta V_{BL}$.}

Also, this implies that a good type prefers to make an inefficient choice in $t = 1$ and win the election rather than make an efficient choice and lose for sure. Now we will solve for the equilibrium of the game in the subsequent subsections.

### 3.1 Separating Equilibrium

We consider whether there exists an equilibrium in which different types use different strategies. There are twelve strategy profiles to check in total. For each of them, we can compute the updated beliefs and hence determine the outcome of the election: the incumbent wins if $\alpha (\cdot, \cdot) \geq \alpha$ and loses otherwise. Then, we can check whether the incumbent has a profitable deviation or not.

It is important to note that by Assumption 2, a profile $(s_G, s_B)$ cannot be an equilibrium profile if one action induces $\alpha' \geq \alpha$ but the other action induces $\alpha' < \alpha$, since then, the one who plays an action that induces $\alpha' < \alpha$ will deviate to the action that induces $\alpha' \geq \alpha$. The detail of the argument will be presented in the Appendix. Here, we briefly sketch the argument.

It is straightforward to see that strategy profiles $(ii, ii)$, $(ii, \bar{i})$, $(ii, \bar{i})$, $(\bar{i}, \bar{i})$, $(\bar{i}, \bar{i})$, $(\bar{i}, \bar{i})$, $(\bar{i}, ii)$ and $(\bar{i}, ii)$ induce $\alpha (\bar{i}, \cdot) \geq \alpha$ and $\alpha (ii, \cdot) < \alpha$. Therefore, these profiles cannot constitute an equilibrium. Similarly, strategy profiles $(\bar{i}, \bar{i})$, $(\bar{i}, \bar{i})$, $(\bar{i}, ii)$, $(\bar{i}, ii)$, and $(\bar{i}, ii)$ induce $\alpha (\bar{i}, \cdot) \geq \alpha$ and $\alpha (ii, \cdot) < \alpha$. Therefore, these profiles cannot constitute an equilibrium, either.

Now, think about profiles $(\bar{i}, \bar{i})$ and $(\bar{i}, ii)$. Since in these profiles both types choose $i \in D_1$ and $i \notin D_1$, depending on the signal, no action reveals a type for sure. In the Appendix, we show that whether $\alpha (i, \cdot) \geq \alpha$ depends on the value of $K$ and the realized
benefit in $i$, and whether $\alpha(\bar{i}, \cdot) \geq \alpha$ depends on the value of $K$ and the number of high benefits, $n$. We show that for any value of $K$ and for any value of $n$, at least one type has a profitable deviation.

In conclusion, there exists no separating equilibrium.\(^{18}\)

3.2 Pooling Equilibrium

In pooling equilibria, both types of incumbents adopt the same strategy, and so the belief is not modified, i.e., $\alpha(i, \cdot) = \alpha(\bar{i}, \cdot) = \alpha$ on the equilibrium path. Thus, both types win and remain in office in equilibrium, if an equilibrium exists.

There are four strategy profiles to check. First, consider $(ii, ii)$. To support this as an equilibrium, we should have an off-equilibrium belief $\alpha(\bar{i}, n) < \alpha$ for at least one $n$, $0 \leq n \leq K$. Otherwise, a good type will deviate to $\bar{i}$. Yet, note that the belief $\alpha(\bar{i}, n) < \alpha$ is unreasonable. A bad type will never choose $s(\cdot) = \bar{i}$, because choosing $i$ maximizes his payoff in $t = 1$ and at the same time, guarantees reelection. However, a good type can benefit by choosing $s(\bar{i}) = \bar{i}$ if doing so successfully reveals his type. Therefore, observing the incumbent’s choice $s(\cdot) = \bar{i}$, one should believe that the incumbent is a good type, implying $\alpha(\bar{i}, n) = 1$. But then, a good type will deviate from $s(\bar{i}) = i$ to $s(\bar{i}) = \bar{i}$. This argument shows that the off-equilibrium belief $\alpha(\bar{i}, n) < \alpha$ does not satisfy the intuitive criterion by Cho and Kreps [5].

Now, consider $(\bar{i}, ii)$ and $(\bar{i}, i\bar{i})$. The common feature of these profiles is that both $i$ and $\bar{i}$ are played with positive probability by both types. But since these are pooling strategies, updated belief is just $\alpha$ regardless of the action, i.e., $\alpha(i, \cdot) = \alpha(\bar{i}, \cdot) = \alpha$. This means that action does not affect belief and as a result does not affect winning probability. But, the incumbent will then behave in his own best interest. Thus, a good type will play $\bar{i}$ and a bad type will play $ii$. Hence, under $(\bar{i}, ii)$ a bad type will deviate, and under $(\bar{i}, i\bar{i})$ both types will deviate. Therefore, they cannot be a part of an equilibrium.

Finally, consider $(\bar{i}, \bar{i})$. To support this as an equilibrium, we need $\alpha(i, M) < \alpha$ or $\alpha(i, m) < \alpha$. Otherwise, a bad type will deviate to $i\bar{i}$. Note that the intuitive criterion does not apply here, since both types may benefit by choosing $i$ if it makes people believe that they are good types. A good type can benefit if $i \in S_1$, and a bad type can benefit regardless of the signal. We have the following result.

**Proposition 1** The strategy profile $(\bar{i}, \bar{i})$ constitutes an equilibrium that passes the in-

\(^{18}\)Also, discussion in this and the next subsection shows that there exist no semi-pooling equilibria in which the incumbent mixes over $\Sigma$. 

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tuitive criterion with belief \( \{ \alpha (i, \cdot) < \alpha, \alpha (\bar{i}, \cdot) = \alpha \} \).

In this equilibrium, no type of incumbent includes his own district in \( D_1 \). If his own district is productive, he randomly chooses a district from among the unproductive districts to replace his own district, and if his district is unproductive, he does not select it.\(^{19} \) No type can deviate and choose \( i \) because then he will then be regarded as a bad type and lose his job. Let us think more about this equilibrium. Without electoral concern, a good type would definitely choose \( i \) when it is productive. In equilibrium, however, he does not because he does not want to risk his seat by choosing his own district and leading the voters to believe that he is a bad type. Hence, when the incumbent is a good type, the electoral concern is clearly welfare reducing. This is also true of a bad incumbent if \( i \) is productive. On the other hand, the electoral concern is welfare enhancing with a bad type in office if \( i \) is unproductive. Without election, he would choose \( i \) even if it is unproductive, but he is forced to exclude \( i \) in equilibrium. We will consider this welfare effect in more detail later.

4 General Case: Electoral Uncertainty

In this section, we incorporate electoral uncertainty to investigate the general case. Unlike in the absence of uncertainty, convincing the voters that the incumbent is a good type does not guarantee reelection in this case; it merely increases the probability of winning. Also, it is no longer the case that voters in the incumbent’s or the challenger’s district always vote for their kinsfolk. A voter in, say, the challenger’s district may very well vote for the incumbent if he is popular enough. It is still true, however, that the outcome of the election is determined by the choice of voters in neutral districts. Therefore, we can focus only on the decision by the voters in neutral districts as we have done before.

We introduce some notations first. Denote by \( a \in \{ i, \bar{i} \} \) the action taken in \( t = 1 \), where \( a = i \) means \( i \in D_1 \) and \( a = \bar{i} \) means \( i \notin D_1 \). Also, denote by \( o \) the outcome given an action \( a \), where \( o \in \{ M, m \} \) when \( a = i \), and \( o \in \{ 0, 1, \ldots, K \} \) when \( a = \bar{i} \). That is, \( o \) is the realized benefit in \( i \) when \( i \in D_1 \), and the number of high benefits when \( i \notin D_1 \). Let \( \alpha (a, o) \) be the updated belief given \( (a, o) \) for a certain strategy profile \((s_G, s_B)\). Given \( (a, o) \), the incumbent wins if

\[
\alpha (a, o) v_M + (1 - \alpha (a, o)) v_L + \varepsilon \geq \alpha v_M + (1 - \alpha) v_L,
\]

\(^{19} \)There are other off-equilibrium beliefs that support \((\bar{\alpha}, \bar{\alpha})\). See the Appendix for detail.
or equivalently if
\[ \varepsilon \geq (\alpha - \alpha (a, o)) (v_M - v_L). \]

This occurs with probability \( 1 - F[(\alpha - \alpha (a, o)) (v_M - v_L)] \). Note that the outcome \( o \) itself is stochastic given the action \( a \). Let \( p_a (o) \) be the probability that the outcome is \( o \) when the action taken is \( a \). Then, the probability of winning when the incumbent chooses an action \( a \) is
\[
\pi (a) \equiv \sum_o p_a (o) \{1 - F[(\alpha - \alpha (a, o)) (v_M - v_L)]\}.
\]

Note that even for the same action \( a \) and outcome \( o \), the probability \( p_a (o) \) is different depending on whether the action \( a \) is efficient or not. For example, the probability that the outcome is \( M \) when the incumbent chooses \( i \) is \( \lambda \) if \( i \) is productive, but \( \theta \) if it is unproductive. Thus, for distinction, we denote by \( p_a (o) \) the probability that action \( a \) results in outcome \( o \) when the action is efficient, and by \( \tilde{p}_a (o) \) the probability when the action is inefficient. Analogously, we define \( \pi (a) \) and \( \tilde{\pi} (a) \).\(^{20}\) If \( \alpha (a, o) \) is constant at \( \alpha' \) for all \( o \), the probability of winning given \( a \) is simply \( \pi (a) = 1 - F[(\alpha - \alpha') (v_M - v_L)] \).

This value attains its maximum \( \pi_1 \equiv 1 - F[(\alpha - 1) (v_M - v_L)] \) when \( \alpha' = 1 \) and attains its minimum \( \pi_0 \equiv 1 - F[\alpha (v_M - v_L)] \) when \( \alpha' = 0 \). If \( \alpha' = \alpha \), the probability of winning is \( \pi_a \equiv 1 - F(0) \). This is the probability of winning when the prior belief is not updated.

Then the discounted expected payoffs in \( t = 2 \) from choosing an action \( a \) to a good type and a bad type are (assuming \( a \) is efficient), respectively,
\[
V_G (a) \equiv \beta \{\pi (a) V_{GW} + (1 - \pi (a)) V_{GL}\},
\]
\[
V_B (a) \equiv \beta \{\pi (a) V_{BW} + (1 - \pi (a)) V_{BL}\}.
\]

The difference in utilities from two actions \( a \) and \( a' \) is then
\[
V_G (a) - V_G (a') = \beta (\pi (a) - \tilde{\pi} (a')) (V_{GW} - V_{GL}),
\]
\[
V_B (a) - V_B (a') = \beta (\pi (a) - \tilde{\pi} (a')) (V_{BW} - V_{BL}).
\]

The incumbent’s strategies are defined as in the previous section. We now check various profiles in the following subsections. Note that the presence of stochastic valence value does not affect the way in which voters update their belief. Hence, the updated beliefs under each profile are the same as those derived in the previous section.

\(^{20}\)When the distinction is unnecessary, we will just use \( p_a (o) \) and \( \pi (a) \) for notational simplicity.
4.1 Separating Equilibria

We saw that in the benchmark case, there exist no separating equilibria. If we introduce electoral uncertainty, however, some profiles can be supported as an equilibrium under certain conditions. We show in this subsection that strategy profiles \((i; ii), (ii, i)\), and \((ii, ii)\) can constitute an equilibrium under some conditions. No other profile \((s_G, s_B)\), where \(s_G \neq s_B\), can be part of an equilibrium under any conditions, and this is shown in the Appendix.

4.1.1 \((ii, ii)\)

Note that under this profile, \((i; ii) = 1 > \alpha > \alpha (i, \cdot)\) and so \(\pi (i) = \pi_1 > \pi_\alpha > \pi (i)\).\(^{21}\)

For a good type not to deviate from \(s (i) = i\), we need

\[
U + V_G (i) \geq u + V_G (i),
\]

or equivalently

\[
U + \beta \{ \pi (i) V_G W + (1 - \pi (i)) V_G L \} \geq u + \beta \{ \pi_1 V_G W + (1 - \pi_1) V_G L \}. \tag{3}
\]

He will never deviate from \(s (i) = \bar{i}\) since

\[
U + V_G (\bar{i}) > u + V_G (i).
\]

Now, consider a bad type. For him not to deviate from \(s (\bar{i}) = i\), we need

\[
u + h + V_B (i) \geq U + V_B (\bar{i}),
\]

which is equivalent to

\[
u + h + \beta \{ \bar{\pi} (i) V_B W + (1 - \bar{\pi} (i)) V_B L \} \geq U + \beta \{ \pi_1 V_B W + (1 - \pi_1) V_B L \}. \tag{4}
\]

Note that this guarantees that he will not deviate from \(s (i) = i\).\(^{22}\) From (3) and (4), we get

\[
\pi_1 - \pi (i) \leq \frac{U - u}{\beta (V_G W - V_G L)}, \tag{5}
\]

---

\(^{21}\)See the Appendix for the exact expression for \(\alpha (i, M)\) and \(\alpha (i, m)\).

\(^{22}\)Since \(\alpha (i, M) > \alpha (i, m)\) under \((s_{ii}, s_{ii})\), and since

\[
\pi (i) = \lambda (1 - F [(\alpha - \alpha (i, M)) (v_M - v_L)]) + (1 - \lambda) (1 - F [(\alpha - \alpha (i, m)) (v_M - v_L)]),
\]

\[
\bar{\pi} (i) = \theta (1 - F [(\alpha - \alpha (i, M)) (v_M - v_L)]) + (1 - \theta) (1 - F [(\alpha - \alpha (i, m)) (v_M - v_L)]),
\]

it follows that \(\pi (i) > \bar{\pi} (i)\).
and

\[ \pi_1 - \bar{\pi}(i) \leq \frac{u - U + h}{\beta (V_{BW} - V_{BL})}. \]  

(6)

We have the following result.

**Proposition 2** Strategy profile \((\bar{i}, i)\) constitutes an equilibrium if (5) and (6) are satisfied.

Conditions (5) and (6) basically mean that \(\pi_1\) is not significantly bigger than \(\pi(i)\) or \(\bar{\pi}(i)\), and therefore attempting to increase the winning probability at the cost of lowering the payoff in \(t = 1\) yields no real benefits. One such case occurs if the incumbent is sufficiently sure about the election outcome. If the incumbent is sufficiently sure that the advantage will be so large that he will most likely win regardless of his actions, or that the disadvantage will be huge so that he will lose anyway, then it will be in his best interest to just maximize his payoff in \(t = 1\). In this equilibrium, the incumbent, good or bad, behaves as though there were no career concern.

Note that this equilibrium cannot occur if \(R\) is very large. To see this, note that \(R\) appears only in \(V_{GW} - V_{GL}\) and \(V_{BW} - V_{BL}\) but nowhere else in (5) and (6).\(^{23}\) With all the other parameters held constant, the RHS becomes arbitrarily close to 0 as \(R\) increases, but the LHS remains constant. Hence, if \(R\) is large enough, conditions (5) and (6) cannot be satisfied. The intuition is that if the rent is very big, even a small increase in the probability of remaining in office is sufficiently attractive. Thus both types will choose to exclude \(i\) to make people believe that he is a good type, and therefore \((\bar{i}, i)\) cannot be sustained as an equilibrium.

4.1.2 \((\bar{i}, i)\)

Under this profile, the beliefs are \(\alpha(i, \cdot) = 0\) and \(\alpha(i, \cdot) > \alpha\), and hence \(\pi_{\bar{i}} > \pi_{\bar{\alpha}} > \pi_i = \pi_0\). For a good type not to deviate from \(s(i) = \bar{i}\) to \(s(i) = i\), we need

\[ u + V_G(i) \geq U + V_G(i), \]

which yields

\[ \bar{\pi}(i) - \pi_0 \geq \frac{U - u}{\beta (V_{GW} - V_{GL})}. \]  

(7)

\(^{23}\)From the definitions of \(V\)'s, it follows that

\[ V_{GW} - V_{GL} = (1 - \alpha) \frac{N - K}{N} (U - u) + R, \]

\[ V_{BW} - V_{BL} = -\alpha \frac{N - K}{N} (U - u) + \frac{(N - K)(N - \alpha)}{N(N - 1)} h + R. \]
This means that the equilibrium winning probability should be sufficiently large. He will never deviate from \( s (\bar{i}) = \bar{i} \). Now, for a bad type not to deviate from \( s (i) = i \), we need

\[
U + h + V_B (i) \geq u + V_B (\bar{i}) ,
\]

or equivalently

\[
\tilde{\pi} (\bar{i}) - \pi_0 \leq \frac{U - u + h}{\beta (V_{BW} - V_{BL})} .
\]

(8)

This means that the winning probability when deviating should not be too large. Combining (7) and (8) shows that the value of \( \tilde{\pi} (\bar{i}) \) should not be too large or too small. Now, for a bad type not to deviate from \( s (\bar{i}) = \bar{i} \), we need

\[
U + V_B (\bar{i}) \geq u + h + V_B (i) ,
\]

or equivalently

\[
\pi (\bar{i}) - \pi_0 \geq \frac{u - U + h}{\beta (V_{BW} - V_{BL})} .
\]

(9)

Therefore, we have the following result.

**Proposition 3** Strategy profile \((\bar{i}, \bar{i})\) constitutes an equilibrium if (7), (8), and (9) are satisfied.

4.1.3 \((\bar{i}, \bar{i})\)

Again, under this profile, the beliefs are \( \alpha (i, \cdot) = 0 \) and \( \alpha (\bar{i}, \cdot) > \alpha \) and hence \( \pi_1 > \pi_\alpha > \pi_\bar{i} = \pi_0 \). A good type will never deviate from \( s (\bar{i}) = \bar{i} \). For him not to deviate from \( s (\bar{i}) = \bar{i} \), we need

\[
u + V_G (\bar{i}) \geq U + V_G (i) ,
\]

or equivalently

\[
\tilde{\pi} (\bar{i}) - \pi_0 \geq \frac{U - u}{\beta (V_{GW} - V_{GL})} .
\]

(10)

For a bad type not to deviate from \( s (i) = \bar{i} \), we need

\[
u + V_B (\bar{i}) \geq U + h + V_B (i) ,
\]

and for him not to deviate from \( s (\bar{i}) = \bar{i} \), we need

\[
u + h + V_B (i) \geq U + V_B (\bar{i}) .
\]
They each yield

\[ \tilde{\pi} (i) - \pi_0 \geq \frac{U - u + h}{\beta (V_{BW} - V_{BL})}, \]  

(11)

and

\[ \pi (i) - \pi_0 \leq \frac{u - U + h}{\beta (V_{BW} - V_{BL})}. \]  

(12)

Since (11) implies (10),\(^{24}\) we have the following result.

**Proposition 4** Strategy profile \((\ddot{i}, \ddot{i})\) is an equilibrium if (11) and (12) are satisfied.

Comparing (8) and (9) with (11) and (12), we also obtain the following result.

**Corollary 1** Equilibria \((\ddot{i}, \ddot{i})\) and \((\ddot{i}, \ddot{i})\) cannot coexist.

Therefore, if \((\ddot{i}, \ddot{i})\) constitutes an equilibrium, \((\ddot{i}, \ddot{i})\) cannot and vice versa.

Before we move to the pooling equilibria, some remarks are in order for the separating equilibria. First, unlike in the benchmark case, semi-pooling equilibria may exist in this general case. Obviously, there may exist mixed strategy equilibria around the pure strategy equilibria that we obtained in this section. We could characterize those mixed strategy equilibria, but we choose to identify the pure strategy equilibria, which are the limits of those mixed equilibria, to highlight their properties. Second, in both \((\dddot{i}, \dddot{i})\) and \((\dddot{i}, \ddot{i})\) equilibria, a good type never chooses \(i\) regardless of its productivity. Therefore, the welfare analysis results that we present in the next section still hold.

4.2 Pooling equilibria

We can easily see that \((\dddot{i}, \dddot{i})\) and \((\dddot{i}, \ddot{i})\) cannot be an equilibrium. Consider \((\dddot{i}, \ddot{i})\). Since \(\alpha (i, \cdot) = \alpha (\ddot{i}, \cdot) = \alpha\), it follows that \(\pi (i) = \pi (\ddot{i}) = \pi_\alpha\). But then a bad type will deviate from \(s (\ddot{i}) = \ddot{i}\) to \(s (i) = i\). Hence, this cannot be an equilibrium. Similarly, consider \((\dddot{i}, \dddot{i})\). Again, \(\alpha (i, \cdot) = \alpha (\dddot{i}, \cdot) = \alpha\) and hence \(\pi (i) = \pi (\dddot{i}) = \pi_\alpha\). Then, a good type will deviate to \(\ddot{i}\), and a bad type will deviate to \(\dddot{i}\). Therefore, this cannot be an equilibrium.

We now check \((i, i)\) and \((\dddot{i}, \ddot{i})\) in detail. Under these profiles, some actions are never played in equilibrium \((i, i)\) in \((\dddot{i}, i)\) and \(i\) in \((\dddot{i}, \ddot{i})\), and the off-equilibrium beliefs play a crucial role in sustaining the equilibrium. As we will see, what matters is whether or not the probability of winning when they deviate is bigger than \(\pi_\alpha\). For the sake of simplicity, we only focus on the off-equilibrium beliefs such that (1) under \((\dddot{i}, \ddot{i})\), \(\alpha (\ddot{i}, o)\) is constant.

\(^{24}\)This can be shown as in footnote 15.
for all \( o \), and (2) under \((\bar{t}, \bar{n})\), \( \alpha (i, o) \) is constant for all \( o \). This restriction means that the off-equilibrium belief is completely determined by the action choice and not by the outcome. The purpose of this is to have \( \pi (\bar{i}) = \bar{\pi} (\bar{i}) \) under \((i, ii)\), and \( \pi (i) = \bar{\pi} (i) \) under \((\bar{n}, \bar{n})\). This simplifies our analysis without much loss of generality.

### 4.2.1 \((ii, ii)\)

Consider \((ii, ii)\), in which both types always include \( i \) in \( t = 1 \) regardless of its productivity. Since \( \alpha (i, \cdot) = \alpha \), it follows that \( \pi (i) = \bar{\pi}_0 \). The probability \( \bar{\pi} (i) \) depends on the off-equilibrium beliefs \( \alpha (i, n), n = 1, 2, \ldots, K \). Now, consider the deviation incentive by a good type. In order for him to not deviate from \( s (i) = i \), we should have

\[
u + V_G (i) \geq U + V_G (\bar{i}),\]

which is equivalent to

\[eta (\pi_0 - \bar{\pi} (\bar{i})) (V_{GW} - V_{GL}) \geq U - u.
\]

Therefore, we get

\[
\pi (\bar{i}) \leq \pi_0 - \frac{U - u}{\beta (V_{GW} - V_{GL})}.
\]

Notice that (13) is not possible if the RHS is smaller than \( \pi_0 \) since \( \pi_0 \leq \bar{\pi} (\bar{i}) \). Therefore, this condition requires

\[
\pi_0 - \frac{U - u}{\beta (V_{GW} - V_{GL})} \geq \pi_0.
\]

As long as (14) is satisfied, we can always construct \( \alpha (\bar{i}, n) \) such that (13) is satisfied. Condition (13) implies that \( \pi (\bar{i}) < \pi_0 \), which also guarantees that he will not deviate from \( s (i) = i \) and that a bad type will not deviate.

Now, we check whether the off-equilibrium belief \( \alpha (\bar{i}, \cdot) < \alpha \) is reasonable. A good type will definitely deviate from \( s (\bar{i}) = i \) to \( s (\bar{i}) = \bar{i} \) if doing so successfully reveals his type. So, for the above not to violate the equilibrium domination test, a bad type should also have such incentive. Otherwise, it should be that \( \alpha (\bar{i}, \cdot) = 1 \), and this is incompatible with \( \alpha (\bar{i}, \cdot) < \alpha \). Consider a bad type’s deviation from \( s (i) = i \). Under \( s (i) = i \), he gets

\[
U + h + \beta \{\pi_0 V_{BW} + (1 - \pi_0) V_{BL}\}.
\]

If he deviates to \( s (i) = \bar{i} \) and if this makes people believe that he is a good type, his payoff becomes \( u + \beta \{\pi_1 V_{BW} + (1 - \pi_1) V_{BL}\} \). Hence, we should have

\[
U + h + \beta \{\pi_0 V_{BW} + (1 - \pi_0) V_{BL}\} < u + \beta \{\pi_1 V_{BW} + (1 - \pi_1) V_{BL}\}.
\]
Likewise, for $s(i) = i$, we need

$$u + h + \beta \{\pi_0 V_{BW} + (1 - \pi_0) V_{BL}\} < U + \beta \{\pi_1 V_{BW} + (1 - \pi_1) V_{BL}\}. \quad (16)$$

Since we need at least one of (15) and (16) to hold, and since (16) encompasses (15), the condition we need is (16), or equivalently

$$\pi_1 - \pi_0 > \frac{u - U + h}{\beta (V_{BW} - V_{BL})}. \quad (17)$$

If this condition is satisfied, both types may have incentive to deviate, and so the intuitive criterion does not apply. If this is not satisfied, then it should be that $\alpha(i, \cdot) = 1$, since a bad type will never deviate regardless of the situation. But then, a good type will deviate from $s(i) = i$, and the equilibrium breaks down. In summary, we have the following result.

**Proposition 5** Strategy profile $(ii, ii)$ constitutes an equilibrium if (13), (14) and (17) are satisfied.

Note that this equilibrium is not compatible with the separating equilibrium $(ii, ii)$.

**Corollary 2** Separating equilibrium $(ii, ii)$ and pooling equilibrium $(ii, ii)$ cannot coexist.

**Proof.** Note that (6) implies

$$\pi_1 - \pi_0 < \frac{u - U + h}{\beta (V_{BW} - V_{BL})},$$

since $\pi_0 > \pi(i)$ under $(ii, ii)$. But then $(ii, ii)$ cannot be an equilibrium because (17) is not satisfied. ■

The reason is straightforward. In the $(ii, ii)$-equilibrium, a bad type does not deviate although $\pi(i) = \pi_1$ because $\pi_1$ is not significantly bigger than $\pi(i)$. This implies that in the $(ii, ii)$-equilibrium, a bad type will never deviate from $ii$, since his winning probability when choosing $i$ is bigger in this equilibrium than in the $(ii, ii)$-equilibrium. But then, the off-equilibrium belief $\alpha(i, \cdot) < \alpha$ is unreasonable.

### 4.2.2 $(\bar{i}, \bar{i})$

Finally, consider $(\bar{i}, \bar{i})$. Under this profile, $\alpha(i, \cdot) = \alpha$. For a good type not to deviate from $s(i) = \bar{i}$, we need

$$u + \beta \{\pi_0 V_{GW} + (1 - \pi_0) V_{GL}\} \geq U + \beta \{\pi(i) V_{GW} + (1 - \pi(i)) V_{GL}\}, \quad (18)$$
which implies \( \pi(i) < \pi_\alpha \). This guarantees that he will not deviate from \( s(i) = \bar{i} \). Now, for a bad type not to deviate from \( s(i) = \bar{i} \), we need
\[
u + \beta \{\pi_\alpha V_{BW} + (1 - \pi_\alpha) V_{BL}\} \geq U + h + \beta \{\pi(i) V_{BW} + (1 - \pi(i)) V_{BL}\}, \tag{19}\]
which also implies \( \pi(i) < \pi_\alpha \). This guarantees that he will not deviate from \( s(i) = \bar{i} \). Since (19) implies (18), we only need (19). Hence, for \((\bar{i}, \bar{i})\) to be an equilibrium strategy profile, the off-equilibrium belief \( \alpha(i, \cdot) \) should be such that
\[
\pi(i) \leq \pi_\alpha - \frac{U - u + h}{\beta (V_{BW} - V_{BL})}, \tag{20}\]
which also requires
\[
\pi_\alpha - \frac{U - u + h}{\beta (V_{BW} - V_{BL})} \geq \pi_0. \tag{21}\]
Condition (20) basically means that \( \alpha(i, \cdot) \) should be such that \( \pi(i) \) is small enough relative to \( \pi_\alpha \).\(^{26}\)

Now we check if the off-equilibrium beliefs \( \alpha(i, \cdot) < \alpha \) are reasonable. Note that a good type will definitely deviate from \( s(i) = \bar{i} \) to \( s(i) = i \) if doing so reveals his true type because
\[
u + \beta (\pi_\alpha V_{GW} + (1 - \pi_\alpha) V_{GL}) < U + \beta (\pi_1 V_{GW} + (1 - \pi_1) V_{GL}).\]
Also notice that a bad type will definitely deviate from \( \bar{i} \) to \( ii \) if \( \alpha(i, \cdot) = 1 \) since
\[
u + \beta (\pi_\alpha V_{BW} + (1 - \pi_\alpha) V_{BL}) < U + h + \beta (\pi_1 V_{BW} + (1 - \pi_1) V_{BL}),\]
and
\[
U + \beta (\pi_\alpha V_{BW} + (1 - \pi_\alpha) V_{BL}) < u + h + \beta (\pi_1 V_{BW} + (1 - \pi_1) V_{BL}).\]
Since both types have incentive to deviate if choosing their own district makes people believe that they are a good type, the intuitive criterion does not apply. Any off-equilibrium belief \( \alpha(i, \cdot) \) is permissible as long as it satisfies (20) and (21).

**Proposition 6** Strategy profile \((\bar{i}, \bar{i})\) constitutes an equilibrium if (20) and (21) are satisfied.

\(^{25}\)This can be shown as in footnote 15.
\(^{26}\)Also notice that (21) guarantees that Assumption 2 holds, since Assumption 2 is equivalent to
\[
\beta (\pi_1 - \pi_0) (V_{BW} - V_{BL}) \geq U - u + h,\]
and \( \pi_1 - \pi_0 > \pi_\alpha - \pi(i) \). Hence, if \((\bar{i}, \bar{i})\) constitutes an equilibrium, we do not need Assumption 2.
Note that \((ii, ii)\) is harder to sustain as an equilibrium than \((\bar{i}, \bar{i})\). For \((ii, ii)\), we need \(\pi_1\) to be significantly bigger than \(\pi_\alpha\) as shown by (17). Otherwise, a bad type will never deviate from \(ii\), and therefore the off-equilibrium belief \(\alpha (\bar{i}, \cdot) < \alpha\) becomes unreasonable. For \((\bar{i}, \bar{i})\), in contrast, we do not need any restrictions on the difference between \(\pi_1\) and \(\pi_\alpha\). As long as \(\pi (i)\) is significantly smaller than \(\pi_a\), the profile \((\bar{i}, \bar{i})\) can constitute an equilibrium.

5 Welfare Analysis

We saw that in the benchmark case in which there is no electoral uncertainty, there is a unique equilibrium in which the incumbent, good or bad, excludes his own district regardless of its productivity. As we introduce electoral uncertainty, we saw that other equilibria also arise in addition to this. For example, the strategy profile \((\bar{i}, ii)\) constitutes an equilibrium if the election outcome is almost deterministic, and the profile \((ii, ii)\) makes an equilibrium if the probability of winning when the voters absolutely believe that the incumbent is good far exceeds his winning probability when the voters’ prior belief is not updated. These equilibria are restrictive in the sense that they arise only under some strong conditions. In contrast, the profile \((\bar{i}, \bar{i})\) can constitute an equilibrium for a larger set of parameters. In this section we focus on the \((\bar{i}, \bar{i})\) - equilibrium and consider its implication about welfare.

Since the incumbent always excludes \(i\) in \(t = 1\), the expected equilibrium benefits from the projects are

\[
W^* \equiv \left( \frac{K}{N} u + \frac{N - K}{N} U \right) + \beta (\alpha U + (1 - \alpha) \bar{U}).
\]  

(22)

We first consider the effect of the increase in \(N\) on this equilibrium payoff when \(K\) is fixed. The number of ethnic groups or regions that people identify themselves with is something historically determined. Thus, by this comparative statics, we are comparing two societies of the same size but with a different number of subgroups. To make this comparison meaningful, however, we have to keep constant the sum of the district-specific benefits. If the total population and \(K\) are fixed but \(N\) increases, the ratio of districts that receive the district-specific benefits becomes smaller. Therefore, if the level of the district-specific benefits do not change accordingly, the sum of district-specific benefits will be smaller. To circumvent this problem, we assume that \(h\) is proportional to \(N\), say \(h = h'N\). Since \(\frac{K}{N}\) of the total population receives \(h\), the sum of the district specific benefits is constant at \(\frac{K}{N} \cdot h = \frac{K}{N} \cdot (h'N) = Kh'\). Since the aggregate level of district-specific benefits is the same
across countries, we can then focus on the universal benefits. We obtain the following result.

**Proposition 7** The equilibrium payoff of nationwide benefits is increasing in \( N \).

**Proof.** Plug \( \tilde{U} = \frac{K}{N} U + \frac{N-K}{N} u \) to (22) and rearrange to get

\[
W^* = \frac{K}{N} (1 - \beta (1 - \alpha)) (u - U) + U + \beta (\alpha U + (1 - \alpha) u).
\]

Hence,

\[
\frac{\partial}{\partial N} W^* = \frac{K}{N^2} (1 - \beta (1 - \alpha)) (U - u) > 0
\]

as was to be shown. ■

The intuition is simple. In the first period, the inefficiency occurs when the incumbent’s district is productive, which occurs with probability \( \frac{K}{N} \). This probability decreases as \( N \) increases. The larger the number of districts, the less likely it is that the incumbent’s district is one of the productive districts. Hence, the first period payoff is increasing in \( N \).

In the second period, if the policy maker is a good type, the payoff will be independent of \( N \), since he will always make an efficient choice. If he is a bad type, however, he will always select his district, and this will be efficient only when his district is productive, which occurs with probability \( \frac{K}{N} \). Therefore, the second period payoff is decreasing in \( N \).

Because the second period inefficiency occurs only for a bad type, the welfare enhancing effect in \( t = 1 \) dominates the welfare reducing effect in \( t = 2 \). Therefore, the overall effect of increased \( N \) on the equilibrium payoff is positive.

In the presence of conflicts between groups, one may think that highly diverse societies are disadvantageous. The above result shows that the opposite may be true. If the conflicts are coupled with an environment in which the incumbent faces sufficient electoral concern, it is actually better to have many subgroups in the society than to have only a few.\(^{27}\)

Another point worth noting is that the equilibrium has different welfare implications about the payoff in \( t = 1 \) for different types of incumbent. If the incumbent is a good type, he will make an efficient choice in the absence of electoral concerns. Thus, electoral concern unambiguously results in efficiency loss. If the incumbent is a bad type, however, the effect depends on the parameter values. The equilibrium payoff in \( t = 1 \) is

\[
U^1 = \frac{K}{N} u + \frac{N - K}{N} U.
\]

\(^{27}\)Collier [7] shows that highly diverse societies, typically those in Africa, are actually even safer than homogeneous societies.
Without electoral concern, the payoff that would be generated by a bad type in \( t = 1 \) is
\[
\tilde{U} = \frac{K}{N} U + \frac{N - K}{N} u.
\]
Note that
\[
U^1 - \tilde{U} = \frac{N - 2K}{N} (U - u).
\]
Thus, \( U^1 > \tilde{U} \) if \( \frac{K}{N} < \frac{1}{2} \), and \( \tilde{U} > U^1 \) if \( \frac{K}{N} > \frac{1}{2} \). If \( \frac{K}{N} \) is small, the inefficiency in equilibrium will be small whereas the inefficiency without electoral concern will be huge. Thus, when \( N \) is large relative to \( K \) and the incumbent is a bad type, electoral concern increases the first period payoff.

Finally, we compare the equilibrium payoff to the incumbent’s district with that of other districts. The expected payoff to the agent in the incumbent’s district is
\[
V_i = W^* + \beta \left( \frac{K}{N} h + (1 - \alpha) h \right), \tag{23}
\]
and the expected payoff to the agent in other districts is
\[
V_i = W^* + \frac{K}{N - 1} h + \beta \left( \alpha \frac{K}{N} h + (1 - \alpha) \frac{K - 1}{N - 1} h \right). \tag{24}
\]
We have the following result.

**Proposition 8** The voter in the incumbent’s district is worse off than the voters in other districts if and only if \( \frac{K}{N} > \frac{\beta(1-\alpha)}{1+\beta(1-\alpha)} \).

**Proof.** Obvious from
\[
V_i - V_i = \frac{h}{N - 1} \{ (1 + \beta (1 - \alpha)) K - \beta (1 - \alpha) N \}.
\]

As we can see from (23) and (24), what makes the two values different is the district-specific benefit \( h \). A voter in \( i \) never receives \( h \) in \( t = 1 \) but gets it for sure in \( t = 2 \) if the incumbent is a bad type. On the other hand, a voter in the other districts gets \( h \) with probability \( \frac{K}{N-1} \) in \( t = 1 \) but with a lower probability \( \frac{K-1}{N-1} \) in \( t = 2 \). Both get \( h \) with the same probability if the incumbent is a good type. Thus, a voter in \( i \) is worse off in \( t = 1 \) and better off in \( t = 2 \) compared to voters in other districts. As \( \frac{K}{N} \) gets large, his deficit in \( t = 1 \) increases because other districts receive \( h \) with probability \( \frac{K-1}{N-1} \), which increases as \( \frac{K}{N} \) increases. But, district \( i \) never receives \( h \). Moreover, his surplus in \( t = 2 \) becomes
less attractive, since other districts get $h$ with high probability as $\frac{K}{N}$ rises. Thus, if $\frac{K}{N}$ is above a certain level, a voter in $i$ is somewhat ironically worse off than voters in the other districts.

Also note that the cutoff value $\frac{\beta(1-\alpha)}{1+\beta(1-\alpha)}$ is decreasing in $\alpha$. Therefore, if $\alpha$ is close to 1, it is most likely that the agent in $i$ is worse off than other agents.

**Corollary 3** For any $N$ and $K$, there exists a value $\alpha_{RD}$ such that $V_i > V_i$ for any $\alpha > \alpha_{RD}$.

**Proof.** $V_i > V_i$ iff $\frac{K}{N} > \frac{\beta(1-\alpha)}{1+\beta(1-\alpha)}$, which is equivalent to $\alpha > \frac{\beta(N-K)-K}{\beta(N-K)}$. Therefore, for any $\alpha > \alpha_{RD} \equiv \max\{\frac{\beta(N-K)-K}{\beta(N-K)} , 0\}$, $V_i > V_i$. $\blacksquare$

This is because his deficit in $t = 1$ is not compensated in $t = 2$ if the incumbent is a good type. So, the higher the probability that the incumbent is good, the more likely it is that the incumbent’s district will fare worse than the other districts. See Figure 2.

## 6 Policy Implications

In this section, we consider some possible policies that may help reduce the inefficiency that we have in the presence of favoritism and electoral concern. Specifically, we will examine anti-nepotism policy and term limits.
6.1 Anti-nepotism Legislation

When favoritism is an important issue, we can think of legislating against implementation of the public project in the president’s district. Suppose choosing \( i \) is forbidden. Then, the benefits from the projects over the two periods are

\[
W_{AN} = U^1 + \beta U^1 = (1 + \beta) \left( \frac{K}{N} u + \frac{N - K}{N} U \right).
\]

We have the following result.

**Proposition 9** \( W_{AN} > W^* \) if and only if \( \frac{K}{N} < \frac{1 - \alpha}{2 - \alpha} \).

**Proof.** Obvious from

\[
W^* - W_{AN} = \beta \frac{(2 - \alpha) K - (1 - \alpha) N}{N} (U - u).
\]

The intuition is straightforward. The social welfare in \( t = 1 \) under this anti-favoritism law is the same as that in equilibrium. In the second period, the banning is harmful when \( i \) is productive, but beneficial if \( i \) is unproductive and the incumbent is a bad type. As \( \frac{K}{N} \) goes to 0, the probability that \( i \) is productive is almost 0, and so the second effect dominates the first one. Hence, the social welfare under this banning is greater than the welfare without it if \( \frac{K}{N} \) is small. Also, we can easily see that \( W^* > W_{AN} \) if \( \alpha \) is close to 1. If the incumbent is a good type, the action taken in \( t = 2 \) will be efficient and so it is harmful to put any restriction on his choice.

**Corollary 4** For any \( N \) and \( K \), there exists a value \( \alpha_{AN} \) such that \( W^* > W_{AN} \) for any \( \alpha > \alpha_{AN} \).

**Proof.** \( W^* > W_{AN} \) iff \( \frac{K}{N} > \frac{1 - \alpha}{2 - \alpha} \), which is equivalent to \( \alpha > \frac{N - 2K}{N - K} \). Thus, for any \( \alpha > \alpha_{AN} \equiv \max\{ \frac{N - 2K}{N - K}, 0 \} \), \( W^* > W_{AN} \).

When the policy maker is a good type, it hurts to put any restriction on his choice, since he will make an efficient choice without one. Hence, if he is a good type with sufficiently high probability, imposing less restriction is more advantageous.

The content of this subsection is more relevant to the appointment of cabinet posts or public employment. In the U.S., the federal anti-nepotism statute was passed in 1967 after John F. Kennedy appointed his brother Robert F. Kennedy as Attorney General.
Currently, nearly half of all state legislature uphold laws prohibiting a legislator from hiring a relative, and more than 40 states have some form of restriction on nepotism. The rationale for anti-nepotism policies is usually two fold: first, to eliminate corruption whereby public officials make wrongful economic gains and second, to prohibit unqualified candidates from being hired. The opponents of anti-nepotism policies argue that it is unfair not to consider some potential employees just because they are relatives of someone.\textsuperscript{28} They also point out the possibility that very competent candidates may be excluded because of these anti-nepotism laws.\textsuperscript{29} The implication of the above analysis about this issue is simple. If the possibility that the incumbent’s kinsfolks are competent is high, the anti-nepotism law becomes harmful because well-qualified potential officials cannot be put to public use. If, on the other hand, that chance is small, the law is beneficial because it prevents the man in power from hiring an incompetent person. The federal anti-nepotism law may be justified in this context.

\subsection*{6.2 Term Limits}

Next, consider term limits. Suppose the president cannot serve more than one term. Then, there is no electoral concern and the incumbents would behave in \( t = 1 \) as they would in \( t = 2 \) in the model.\textsuperscript{30} Hence, the nationwide benefits over the two periods are

\[ W_{TL} = (1 + \beta)(\alpha U + (1 - \alpha) \bar{U}). \]

We get the following result.

\textbf{Proposition 10} \( W_{TL} > W^* \) if and only if \( \frac{K}{N} > \frac{1 - \alpha}{2 - \alpha} \).

\textsuperscript{28}White [20] records the following episode regarding the inefficiency of anti-nepotism law.

In April 1999, a councilwoman in Barton Rouge, Louisiana, resigned her elected position after being informed that she was violating state anti-nepotism laws. Four months earlier, her son-in-law had graduated from the city police academy and become a police officer. Under Louisiana’s strict ethics code, a governmental official cannot have an immediate relative employed in the agency that the official oversees. In this case, the “agency” supervised by the city councilwoman encompassed the entire city government, including the police department.

To avoid prosecution, either the councilwoman or the police officer would have had to resign, or the police officer and the city councilwoman’s daughter would have had to divorce.

\textsuperscript{29}See White [20] for more on this.

\textsuperscript{30}The role of term limits here is simply to get rid of any career concern so that the incumbent can act in an unconstrained manner. Hence, any other institutions that have the same effect will work for our purpose. We would get the same effect if, for example, the incumbent is guaranteed tenure in the second period without any career concern.
Proof. Obvious from

\[ W^* - W_{TL} = \frac{(1 - \alpha) N - (2 - \alpha) K}{N} (U - u). \]

Here, the intuition is the opposite of that in the previous subsection. The social welfare in \( t = 2 \) under term limits is the same as that in equilibrium. In the first period, term limits are beneficial if \( i \) is productive, but harmful if \( i \) is unproductive and the incumbent is a bad type. Since the first effect dominates the second one as \( \frac{K}{N} \) increases, the social welfare is larger under term limits than in equilibrium, when \( \frac{K}{N} \) is large enough. Also, we can see that \( W_{TL} > W^* \) if \( \alpha \) is close to 1. If the incumbent is a good type, he will always make an efficient choice in the absence of electoral concern. Hence, eliminating any restriction on his behavior is beneficial.

Corollary 5 For any \( N \) and \( K \), there exists a value \( \alpha_{TL} \) such that \( W_{TL} > W^* \) for any \( \alpha > \alpha_{TL} \).

Proof. \( W_{TL} > W^* \) iff \( \frac{K}{N} > \frac{1-\alpha}{2-\alpha} \), which is equivalent to \( \alpha > \frac{N-2K}{N-K} \). Hence, for any \( \alpha > \alpha_{TL} = \max\{\frac{N-2K}{N-K}, 0\} \), \( W_{TL} > W^* \).  

Overall, we get \( W_{TL} < W^* < W_{AN} \) if \( \frac{K}{N} < \frac{1-\alpha}{2-\alpha} \), and \( W_{AN} < W^* < W_{TL} \) if \( \frac{K}{N} > \frac{1-\alpha}{2-\alpha} \). So, if the probability that the incumbent’s district is productive is high, getting rid of any career concern yields the highest social welfare. If the probability is low, anti-nepotism policies turn out the best result. See Figures 3 and 4.

7 Concluding Remarks

 Favoritism or nepotism is widely observed across countries. Especially in societies where ethnic diversity or regional rivalry is severe, political favoritism can be an important issue that shapes the political landscape. In such societies, governments are often blamed for favoring their personal support groups. They may target federal expenditure towards specific groups or districts in order to enhance their political success at the expense of other districts. However, inefficiency may also arise for different reasons. If voters believe that politicians may be partial and only care about their core support, a socially efficient action may not be taken if it benefits his core support. In this paper, we analyzed this effect with a two-period electoral competition model. We saw that in the presence of electoral concern, there exists an equilibrium in which policy makers never choose to benefit their district even if doing so is socially desirable.
Figure 3: Welfare Comparison for a given $\alpha$

Figure 4: Welfare Comparison

$W_{TL} > W^* > W_{AN}$
Although the model we developed uses public projects as a benefit allocating device, its concepts and implications can be applied to many other situations. As already mentioned, public employment, especially the appointment of high government posts, fits our model. The allocation of awards or scholarships can also be described by this model; if outsiders are suspicious about the decision maker’s biases, he may not be able to award the best candidates if people suspect those candidates have some connections to him.

In our model, the decision making process is unilateral in the sense that the policy maker simply chooses districts. In other situations, allocation of benefits may occur by bilateral interaction, which can be modeled as matching. Think about submitting a paper to a journal. Accepting a submitted paper is a reward to the author. If, however, people suspect that the journal is biased towards a specific group of scholars, the editor may have to reject a paper submitted by a member of that group, even if the paper is very suitable. Moreover, a potential author from that group may choose to submit his paper to other journals because even if he successfully publishes his paper in that journal, people will discount it. Therefore, in this case, the reputational concern that we investigated in the model works in two directions, both of which result in inefficiency.

The main result of this paper is based on several assumptions. In particular, the role of the president is limited to undertaking public projects, and the challenger is modeled as a passive agent who plays no role in the electoral competition. We can make the model richer by incorporating such factors. We believe that the force of the paper will still remain valid with such modifications. Finally, empirical work is needed to test and verify the prediction of the model.

Appendix

A1. No Separating Equilibria in the Benchmark Case

When \( i \in D_1 \), the belief depends only on whether the benefit from \( i \) is high or low. When \( i \notin D_1 \), however, the belief depends on \( n \). For later use, define \( P(n) \) as the probability that exactly \( n \) projects yield a high benefit when \( D_1 = S_1 \). Formally,

\[
P(n) = \binom{K}{n} \lambda^n (1 - \lambda)^{K-n}.
\]
Similarly, define $Q(n)$ as the probability that exactly $n$ projects yield a high benefit when $D_1 \neq S_1$. Formally,

$$Q(n) = \begin{cases} 
\frac{\lambda^{K-1} \theta}{\binom{K-1}{n-1} \lambda^{n-1} (1 - \lambda)^{K-n} \theta + \binom{K-1}{n} \lambda^n (1 - \lambda)^{K-n-1} (1 - \theta)}, & 1 \leq n \leq K-1 \\
(1 - \lambda)^{K-1} (1 - \theta), & n = 0 
\end{cases}$$

We will show that there exist no separating equilibria by showing that under any profile, there exists a profitable deviation by at least one type. It is enough to find one profitable deviation for our purpose.

First, it is straightforward that we get $\alpha(i, \cdot) \geq \alpha$ and $\alpha(\bar{i}, \cdot) < \alpha$ for the following strategy profiles: $(\bar{i}, \bar{i}), (\bar{i}, \bar{i}, \bar{i})$, $(\bar{i}, \bar{i}, \bar{i})$, $(\bar{i}, \bar{i})$, and $(\bar{i}, \bar{i}, \bar{i})$. Hence, anyone who plays $\bar{i}$ under these profiles will deviate to $i$. Therefore, these profiles cannot be an equilibrium.

Likewise, for strategy profiles $(\bar{i}, \bar{i})$, $(\bar{i}, \bar{i}, \bar{i})$, $(\bar{i}, \bar{i}, \bar{i})$, $(\bar{i}, \bar{i})$, and $(\bar{i}, \bar{i}, \bar{i})$, we get $\alpha(i, \cdot) < \alpha$ and $\alpha(\bar{i}, \cdot) \geq \alpha$. Again, these profiles cannot constitute an equilibrium since the player choosing $i$ will deviate to $\bar{i}$.

Now, we are left with $(\bar{i}, \bar{i})$ and $(\bar{i}, \bar{i}, \bar{i})$. We show below that these profiles cannot constitute an equilibrium.

1. $(\bar{i}, \bar{i})$

Beliefs are

$$\alpha(i, M) = \frac{\alpha^K \lambda}{\alpha^K \lambda + (1 - \alpha) \frac{N-K}{N} \theta} \geq \frac{(N-K) \theta - K \lambda}{(N-K) \theta - K \lambda} \geq \alpha, \quad \text{as} \quad K \geq \frac{\theta}{\lambda + \theta} N \equiv K_1,$$

$$\alpha(i, n) = \frac{\alpha^N \frac{\lambda}{N} P(n)}{\alpha^N \frac{\lambda}{N} P(n) + (1 - \alpha) \frac{K}{N} \frac{Q(n)}{P(n)}} = \frac{\alpha^N \frac{\lambda}{N} K \lambda (1 - \lambda)}{\alpha^N \frac{\lambda}{N} K \lambda (1 - \lambda) + (1 - \alpha) \frac{K}{N} (K \lambda (1 - \lambda) - n (\lambda - \theta))} \geq \alpha, \quad \text{as} \quad n \geq \tilde{n},$$

where $\tilde{n} = \frac{\lambda}{\lambda + \theta} \{((1 - \lambda) + (1 - \theta)) K - (1 - \lambda) N\}$. Note that for fixed $K$, $\alpha(\bar{i}, n)$ is increasing in $n$. This implies that (1) if $\alpha(\bar{i}, 0) > \alpha$, then $\alpha(\bar{i}, n) > \alpha$ for all $n = 0, \ldots, K$.
(2) if \( \alpha (i, K) < \alpha \), then \( \alpha (i, n) < \alpha \) for all \( n = 0, \ldots, K \), and (3) if \( \alpha (i, 0) \leq \alpha \leq \alpha (i, K) \), then there exists a cutoff \( \hat{n} \) such that \( \alpha (i, n) \geq \alpha \) for \( n \geq \hat{n} \). Simple algebra shows that \( \alpha (i, K) < \alpha \) iff \( K > \frac{\lambda}{\lambda + \theta} N = K_3 \), and \( \alpha (i, 0) > \alpha \) iff \( K < \frac{1-\lambda}{1-\lambda + \theta} N = K_4 \). We can also show that \( K_1 < K_2 \) and \( K_3 > K_4 \) using \( \lambda > \theta \). Finally, we can show that \( K_1 > K_4 \) and \( K_2 > K_3 \) iff \( \lambda + \theta > 1 \). Now we check various values of \( K \).

Suppose first that \( \lambda + \theta > 1 \). Then we have \( K_4 < K_1 < K_3 < K_2 \).

1.1: If \( K < K_4 \), then \( \alpha (i, \cdot) < \alpha \) and \( \alpha (\hat{i}, \cdot) > \alpha \). Then both types will deviate to \( \bar{n} \).

1.2: If \( K_4 < K < K_1 \), then \( \alpha (i, \cdot) < \alpha \) and \( \alpha (\hat{i}, n) \geq \alpha \) for \( n \geq \hat{n} \). Let \( q = \sum_{n \geq \hat{n}} Q(n) \) and \( p = \sum_{n \geq \hat{n}} P(n) \). For a good type not to deviate from \( s(i) = i \) to \( s(i) = \hat{i} \), we need

\[
U + \beta (\alpha U + (1 - \alpha) \bar{U}) \geq u + \beta \left\{ q (U + R) + (1 - q) (\alpha U + (1 - \alpha) \bar{U}) \right\}.
\]

Adding \( \beta \{ q + (1 - q) (\alpha k + (1 - \alpha) \frac{k-1}{N-1}) \} \bar{h} \equiv zh \) to both sides, we get

\[
U + zh + \beta (\alpha U + (1 - \alpha) \bar{U}) \geq u + \beta \left\{ q (U + h + R) + (1 - q) (\alpha v_M + (1 - \alpha) v_L) \right\}.
\]

(25)

Notice that \( z < 1 \). Now, for a bad type not to deviate from \( s(\hat{i}) = \hat{i} \) to \( s(i) = i \), we should have

\[
u + \beta \left\{ q (v_H + R) + (1 - q) (\alpha v_M + (1 - \alpha) v_L) \right\} \geq U + h + \beta \left\{ \alpha v_M + (1 - \alpha) v_H \right\}.
\]

(26)

Note that \( U + h > v_H \). Hence, combining (25) and (26) yields

\[
U + zh + \beta (\alpha U + (1 - \alpha) \bar{U}) > U + h + \beta \left\{ \alpha v_M + (1 - \alpha) v_H \right\},
\]

which is not possible since \( z < 1 \), \( U < v_M \), and \( \bar{U} < v_H \).

1.3: If \( K_1 < K < K_3 \), then \( \alpha (i, M) > \alpha \), \( \alpha (i, m) < \alpha \), and \( \alpha (\hat{i}, n) \geq \alpha \) for \( n \geq \hat{n} \). For a good type not to deviate from \( s(i) = i \) to \( s(i) = \hat{i} \), we need

\[
U + \beta \left\{ \lambda (U + R) + (1 - \lambda) (\alpha U + (1 - \alpha) \bar{U}) \right\} \geq u + \beta \left\{ q (U + R) + (1 - q) (\alpha U + (1 - \alpha) \bar{U}) \right\}.
\]

Adding \( \beta \{ q + (1 - q) (\alpha k + (1 - \alpha) \frac{k-1}{N-1}) \} \bar{h} \equiv zh \) to both sides, we get

\[
U + zh + \beta \left\{ \lambda (U + R) + (1 - \lambda) (\alpha U + (1 - \alpha) \bar{U}) \right\} \geq u + \beta \left\{ q (U + h + R) + (1 - q) (\alpha v_M + (1 - \alpha) v_L) \right\}.
\]

(27)

\[37\]
For a bad type not to deviate from $s(i) = \bar{i}$ to $s(i) = i$, we should have

\begin{align}
&u + \beta \left\{ q (v_H + R) + (1 - q) (\alpha v_M + (1 - \alpha) v_L) \right\} \\
&\geq U + h + \beta \left\{ \lambda v_H + (1 - \lambda) (\alpha v_M + (1 - \alpha) v_L) \right\}. 
\end{align} \tag{28}

Combining (27) and (28) yields

\begin{align}
&U + zh + \beta \{ \lambda (U + R) + (1 - \lambda) (\alpha U + (1 - \alpha) \bar{U}) \} \\
&\geq U + h + \beta \{ \lambda v_H + (1 - \lambda) (\alpha v_M + (1 - \alpha) v_L) \},
\end{align}

which is impossible.

1.4: If $K_3 < K < K_2$, then $\alpha(i, M) > \alpha$, $\alpha(i, m) < \alpha$ and $\alpha(\bar{i}, \cdot) < \alpha$. Then a bad type will deviate from $s(i) = \bar{i}$ to $s(i) = i$ since it increases not only his payoff in $t = 1$ but also the probability of winning.

1.5: If $K > K_2$, then $\alpha(i, \cdot) > \alpha$ and $\alpha(\bar{i}, \cdot) < \alpha$. Then both types will deviate to $ii$.

Now, suppose $\lambda + \theta < 1$. Then, we have $K_1 < K_4 < K_2 < K_3$.

1.6: If $K < K_1$, then $\alpha(i, \cdot) < \alpha$ and $\alpha(\bar{i}, \cdot) > \alpha$. Then both types will deviate to $\bar{i}$.

1.7: If $K_1 < K < K_4$, then $\alpha(i, M) > \alpha$, $\alpha(i, m) < \alpha$ and $\alpha(\bar{i}, \cdot) > \alpha$. We show that a bad type deviates. For him not to deviate from $s(i) = \bar{i}$ to $s(i) = i$, it should be that

\begin{equation}
u + \beta (v_H + R) \geq U + h + \beta (\lambda (v_H + R) + (1 - \lambda) (\alpha v_M + (1 - \alpha) v_L)). \tag{29}\end{equation}

For him not to deviate from $s(i) = i$ to $s(i) = \bar{i}$, it should be that

\begin{equation}
u + h + \beta (\theta (v_H + R) + (1 - \theta) (\alpha v_M + (1 - \alpha) v_L)) \geq U + \beta (v_H + R). \tag{30}\end{equation}

Note that the RHS of (29) is bigger than the LHS of (30). Combining the two inequalities, we get $u > U$, a contradiction.

1.8: If $K_4 < K < K_2$, then $\alpha(i, M) > \alpha$, $\alpha(i, m) < \alpha$, and $\alpha(\bar{i}, n) \gtrless \alpha$ for $n \gtrless \bar{n}$. This is the case of 1.3 above and therefore a bad type deviates.

1.9: If $K_2 < K < K_3$, then $\alpha(i, \cdot) > \alpha$ and $\alpha(\bar{i}, n) \gtrless \alpha$ for $n \gtrless \bar{n}$. Then a bad type will deviate from $s(i) = \bar{i}$ to $s(i) = i$ since it increases both his payoff in $t = 1$ and the chance of winning.

1.10: If $K > K_3$, then $\alpha(i, \cdot) > \alpha$ and $\alpha(\bar{i}, \cdot) < \alpha$. Hence, both types deviate to $\bar{i}$. 

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2. \((\bar{i}, \bar{i})\)

Beliefs are

\[
\alpha(i, M) = \frac{\alpha \frac{N-K}{N} \theta}{\alpha \frac{N-K}{N} \theta + (1 - \alpha) \frac{K}{N} \lambda} = \frac{\alpha \frac{N-K}{N} \theta}{\alpha \frac{N-K}{N} \theta + (1 - \alpha) \frac{K \lambda - (N-K) \theta}{N}} \geq \alpha, \quad \text{as} \quad K \leq \frac{\theta}{\lambda + \theta} = K_1,
\]

\[
\alpha(i, m) = \frac{\alpha \frac{N-K}{N} (1 - \theta)}{\alpha \frac{N-K}{N} (1 - \theta) + (1 - \alpha) \frac{K}{N} (1 - \lambda)} \geq \frac{\alpha \frac{N-K}{N} (1 - \theta)}{\alpha \frac{N-K}{N} (1 - \theta) + (1 - \alpha) \frac{K (1 - \lambda) - (N-K)(1-\theta)}{N}} \geq \alpha, \quad \text{as} \quad K \leq \frac{1 - \theta}{1 - \lambda + 1 - \theta} N = K_2,
\]

\[
\alpha(\bar{i}, n) = \frac{\alpha \frac{K}{N} Q(n)}{\alpha \frac{K}{N} Q(n) + (1 - \alpha) \frac{N-K}{N} P(n)} = \frac{\alpha \frac{K}{N} Q(n)}{\alpha \frac{K}{N} Q(n) + (1 - \alpha) \frac{(N-K)P(n) - Q(n)}{N}} \geq \alpha, \quad \text{as} \quad (N - K) P(n) \leq Q(n).
\]

As before, we can show that \(\alpha(\bar{i}, n)\) is decreasing in \(n\). This implies that (1) if \(\alpha(\bar{i}, 0) < \alpha\), then \(\alpha(\bar{i}, n) < \alpha\) for all \(n = 0, \ldots, K\), (2) if \(\alpha(\bar{i}, K) > \alpha\), then \(\alpha(\bar{i}, n) > \alpha\) for all \(n = 0, \ldots, K\), and (3) if \(\alpha(\bar{i}, K) \leq \alpha \leq \alpha(\bar{i}, n)\), then there exists a cutoff \(\bar{n}\) such that \(\alpha(\bar{i}, n) \geq \alpha\) for \(n \leq \bar{n}\). We can also show that \(\alpha(\bar{i}, 0) < \alpha\) iff \(K < \frac{1 - \lambda}{1 - \lambda + 1 - \theta} N = K_4\), and \(\alpha(\bar{i}, K) > \alpha\) iff \(K > \frac{\lambda}{\lambda + \theta} N = K_3\). Now we check for various values of \(K\).

Suppose that \(\lambda + \theta > 1\). Then we have \(K_4 < K_1 < K_3 < K_2\).

2.1: If \(K < K_4\), then \(\alpha(i, \cdot) > \alpha\) and \(\alpha(\bar{i}, \cdot) < \alpha\). Then both types will deviate to \(\bar{i}\).

2.2: If \(K_4 < K < K_1\), then \(\alpha(i, \cdot) > \alpha\) and \(\alpha(\bar{i}, n) \geq \alpha\) for \(n \leq \bar{n}\). Then a good type deviates from \(s(i) = \bar{i}\) to \(s(i) = i\) and a bad type will deviate from \(s(\bar{i}) = \bar{i}\) to \(s(\bar{i}) = i\).

2.3: If \(K_1 < K < K_3\), then \(\alpha(i, M) < \alpha\), \(\alpha(i, m) > \alpha\), and \(\alpha(\bar{i}, n) \geq \alpha\) for \(n \leq \bar{n}\). For a good type not to deviate from \(s(i) = i\) to \(s(\bar{i}) = \bar{i}\), we need

\[
u + \beta\{(1 - \lambda) (U + R) + \lambda (\alpha U + (1 - \alpha) \tilde{U})\} \geq U + \beta\{(1 - q) (U + R) + q (\alpha U + (1 - \alpha) \tilde{U})\}.
\]

Adding \(\beta\{(1 - q) + q (\alpha \frac{K}{N} + (1 - \alpha) \frac{K - 1}{N - 1})\} h \equiv xh\) to both sides gives

\[
u + xh + \beta\{(1 - \lambda) (U + R) + \lambda (\alpha U + (1 - \alpha) \tilde{U})\} \geq U + \beta\{(1 - p) (U + h + R) + p (\alpha v_M + (1 - \alpha) v_L)\}.
\]

(31)
Note that $x < 1$. For a bad type not to deviate from $s(\bar{i}) = \bar{i}$ to $s(i) = i$, we need

$$U + \beta \{(1 - p)(v_H + R) + p(\alpha v_M + (1 - \alpha) v_L)\}$$

$$\geq u + h + \beta \{(1 - \lambda)(v_H + R) + \lambda(\alpha v_M + (1 - \alpha) v_L)\}.$$  \hspace{1cm} (32)

Combining (31) and (32), we get

$$u + xh + \beta \{(1 - \lambda)(U + R) + \lambda(\alpha U + (1 - \alpha) \bar{U})\}$$

$$\geq u + h + \beta \{(1 - \lambda)(v_H + R) + \lambda(\alpha v_M + (1 - \alpha) v_L)\},$$

which is impossible.

2.4: If $K_3 < K < K_2$, then $\alpha (i, M) < \alpha$, $\alpha (i, m) > \alpha$ and $\alpha (\bar{i}, \cdot) > \alpha$. Then a good type will deviate from $s(\bar{i}) = \bar{i}$ to $s(i) = i$.

2.5: If $K > K_2$, then $\alpha (i, \cdot) < \alpha$ and $\alpha (\bar{i}, \cdot) > \alpha$. Then both types will deviate to $\bar{i}$.

Now, suppose $\lambda + \theta < 1$. Then, we have $K_1 < K_4 < K_2 < K_3$.

2.6: If $K < K_1$, then $\alpha (i, \cdot) > \alpha$ and $\alpha (\bar{i}, \cdot) < \alpha$. Then both types will deviate to $\bar{i}$.

2.7: If $K_1 < K < K_4$, then $\alpha (i, M) < \alpha$, $\alpha (i, m) > \alpha$ and $\alpha (\bar{i}, \cdot) < \alpha$. Then, a good type will deviate from $s(i) = \bar{i}$ to $s(i) = i$ and a bad type will deviate from $s(\bar{i}) = \bar{i}$ to $s(i) = i$.

2.8: If $K_4 < K < K_2$, then $\alpha (i, M) < \alpha$, $\alpha (i, m) > \alpha$, and $\alpha (\bar{i}, n) \geq \alpha$ for $n \leq \bar{n}$. This is the case of 12.3 above and therefore a good type deviates.

2.9: If $K_2 < K < K_3$, then $\alpha (i, \cdot) < \alpha$ and $\alpha (\bar{i}, n) \geq \alpha$ for $n \leq \bar{n}$. Then, a good type will deviate from $s(\bar{i}) = i$ to $s(\bar{i}) = \bar{i}$.

2.10: If $K > K_3$, then $\alpha (i, \cdot) < \alpha$ and $\alpha (\bar{i}, \cdot) > \alpha$. Thus, both types deviate to $\bar{i}$.

A2. Other Equilibrium Beliefs in the Benchmark Case

In the pooling equilibrium in Proposition 1, the off-equilibrium belief was $\alpha (i, q) < \alpha$, $q = M, m$. But depending on $\lambda$ and $\theta$, other beliefs are also possible. We will investigate when $\{\alpha (i, M) \geq \alpha, \alpha (i, m) < \alpha\}$ or $\{\alpha (i, M) < \alpha, \alpha (i, m) \geq \alpha\}$ is possible.
1. \( \{ \alpha (i, M) \geq \alpha, \alpha (i, m) < \alpha \} \)

Under this belief, the incumbent who chooses his own district wins (loses) if the realized benefit is high (low).

First consider a good type. A good type will never deviate from \( s (\tilde{i}) = \tilde{i} \) to \( s (\tilde{i}) = i \) since the former maximizes his utility and at the same time guarantees reelection. So, consider \( s (\tilde{i}) = \tilde{i} \). If he sticks to this, his expected utility is

\[
u + \beta (U + R)
\]

(33)

If he deviates to \( s (\tilde{i}) = i \), his expected utility is

\[
U + \beta \{ \lambda (U + R) + (1 - \lambda) (\alpha U + (1 - \alpha) \tilde{U}) \}.
\]

(34)

Note that (34) > (33) for \( \lambda = 1 \) and (33) > (34) for \( \lambda = 0 \). Also note that (34) is increasing in \( \lambda \). Hence, there exists \( \lambda_1 \) such that (33) > (34) for all \( \lambda < \lambda_1 \).

Now consider a bad type. Under \( s (\tilde{i}) = \tilde{i} \), the expected utility is

\[
u + \beta (\tilde{U} + h + R).
\]

(35)

If he deviates to \( s (\tilde{i}) = i \), he gets

\[
U + h + \beta \{ \lambda (\tilde{U} + h + R) + (1 - \lambda) (\alpha (U + \frac{K}{N} h) + (1 - \alpha) (\tilde{U} + \frac{K}{N - 1} h)) \}.
\]

(36)

As above, it is straightforward that there exists \( \lambda_2 \) such that (35) > (36) for all \( \lambda < \lambda_2 \).

Next, under \( s (\tilde{i}) = \tilde{i} \), his expected utility is

\[
U + \beta (\tilde{U} + h + R).
\]

(37)

If he deviates to \( s (\tilde{i}) = i \), he gets

\[
u + h + \beta \{ \theta (\tilde{U} + h + R) + (1 - \theta) (\alpha (U + \frac{K}{N} h) + (1 - \alpha) (\tilde{U} + \frac{N - 1}{K - 1} h)) \}.
\]

(38)

We can see that there exists \( \theta_1 \) such that (37) > (38) for all \( \theta < \theta_1 \).

Overall, \( \{ \alpha (i, M) \geq \alpha, \alpha (i, m) < \alpha \} \) is admissible for \( \lambda \leq \min \{ \lambda_1, \lambda_2 \} \) and \( \theta < \theta_1 \).

2. \( \{ \alpha (i, M) < \alpha, \alpha (i, m) \geq \alpha \} \)

Under this belief, the incumbent who chooses his own district wins (loses) if the realized benefit is low (high).
First consider a good type. A good type will never deviate from \( s(i) = i \) to \( s(i) = \bar{i} \) since the former maximizes his utility and at the same time guarantees reelection. So, consider \( s(i) = \bar{i} \). If he sticks to this, his expected utility is

\[
u + \beta(U + R). \tag{39}\]

If he deviates to \( s(i) = i \), his expected utility is

\[
U + \beta\{(1 - \lambda)(U + R) + \lambda(\alpha U + (1 - \alpha)\bar{U})\}. \tag{40}
\]

Note that (40) > (39) for \( \lambda = 0 \) and (39) > (40) for \( \lambda = 1 \). Also, note that (40) is decreasing in \( \lambda \). Hence, there exists \( \lambda_3 \) such that (39) > (40) for all \( \lambda > \lambda_3 \).

Now consider a bad type. Under \( s(i) = \bar{i} \), the expected utility is

\[
u + \beta(\bar{U} + h + R). \tag{41}\]

If he deviates to \( s(i) = i \), he gets

\[
U + h + \beta\{(1 - \lambda)(\bar{U} + h + R) + \lambda(\alpha(U + \frac{K}{N}h) + (1 - \alpha)(\bar{U} + \frac{K-1}{N-1}h))\}. \tag{42}
\]

As above, it is straightforward that there exists \( \lambda_4 \) such that (41) > (42) for all \( \lambda > \lambda_4 \).

Next, under \( s(\bar{i}) = \bar{i} \), his expected utility is

\[
U + \beta(\bar{U} + h + R). \tag{43}\]

If he deviates to \( s(\bar{i}) = i \), he gets

\[
u + h + \beta\{(1 - \theta)(\bar{U} + h + R) + \theta(\alpha(U + \frac{K}{N}h) + (1 - \alpha)(\bar{U} + \frac{K-1}{N-1}h))\}. \tag{44}
\]

We can see that there exists \( \theta_2 \) such that (43) > (44) for all \( \theta > \theta_2 \).

Overall, \( \{\alpha(i, M) < \alpha, \alpha(i, m) \geq \alpha\} \) is admissible for \( \lambda \geq \max \{\lambda_3, \lambda_4\} \) and \( \theta > \theta_2 \).

**A3. No Other Separating Equilibria under Uncertainty**

We show that the following strategy profiles cannot constitute an equilibrium. It is enough to show one profitable deviation for each profile.

1. \((i\bar{i}, \bar{i}i)\)

Under this profile, \( \alpha(\bar{i}, \cdot) = 0 < \alpha(i, \cdot) \). Hence, \( \pi(\bar{i}) < \pi(i) \). But then a bad type will deviate from \( s(\bar{i}) = \bar{i} \) since

\[
u + V_B(i) < U + h + V_B(i). \tag{42}
\]
2. \((ii, \bar{u})\)

Again, \(\alpha (\bar{i}, \cdot) = 0 < \alpha (i, \cdot)\) and hence \(\pi (\bar{i}) < \pi (i)\). Therefore, a bad type will deviate from \(s (i) = \bar{i}\) since

\[
U + V_B (\bar{i}) < u + h + V_B (i) .
\]

3. \((\bar{u}, ii)\)

Under this profile, \(\alpha (\bar{i}, \cdot) = 1 > \alpha (i, \cdot)\). Then a good type will deviate from \(s (\bar{i}) = i\) since

\[
u + V_G (i) < U + V_G (\bar{i}) .
\]

4. \((ii, \bar{u})\)

Under this profile, \(\alpha (i, \cdot) = 0 < \alpha (i, \cdot) = 1\). Then, a bad type will deviate from \(s (i) = \bar{i}\) since

\[
u + V_B (\bar{i}) < U + h + V_B (i) .
\]

5. \((\bar{u}, ii)\)

Under this profile, \(\alpha (i, \cdot) = 1 > \alpha (i, \cdot) = 0\) and so \(\pi (\bar{i}) = \pi_1 > \pi (i) = \pi_0\). Then, a bad type will deviate to \(\bar{u}\) since by Assumption 2,

\[
U + h + \beta \{\pi_0 V_{BW} + (1 - \pi_0) V_{BL}\} < u + \beta \{\pi_1 V_{BW} + (1 - \pi_1) V_{BL}\},
\]

and hence

\[
u + h + \beta \{\pi_0 V_{BW} + (1 - \pi_0) V_{BL}\} < U + \beta \{\pi_1 V_{BW} + (1 - \pi_1) V_{BL}\} .
\]

6. \((ii, \bar{u})\)

Under this profile, \(\alpha (i, \cdot) = 1 > \alpha (i, \cdot)\). Then a bad type will deviate from \(s (i) = \bar{i}\) since

\[
u + V_B (\bar{i}) < U + h + V_B (i) .
\]

7. \((\bar{u}, \bar{u})\)

Under this profile, \(\alpha (i, \cdot) = 1 > \alpha (i, \cdot)\). Then, a bad type will deviate from \(s (i) = \bar{i}\) since

\[
u + V_B (\bar{i}) < U + h + V_B (i) .
\]
8. \((\bar{i}, \bar{i})\)

For a good type not to deviate from \(s(i) = i\) to \(s(i) = \bar{i}\), we need

\[
U + \beta \{ \pi(i) V_{GW} + (1 - \pi(i)) V_{GL} \} \geq u + \beta \{ \bar{\pi}(\bar{i}) V_{GW} + (1 - \bar{\pi}(\bar{i})) V_{GL} \}.
\]

Adding \(\beta\{ \bar{\pi}(\bar{i}) + (1 - \bar{\pi}(\bar{i})) (\alpha \frac{K}{N} + (1 - \alpha) \frac{K-1}{N-1})\}h \equiv z'h\) to both sides, we get

\[
U + z'h + \beta\{ \pi(i) V_{GW} + (1 - \pi(i)) V_{GL} \} \geq u + \beta \{ \bar{\pi}(\bar{i}) (V_{GW} + h) + (1 - \bar{\pi}(\bar{i})) V_{BL} \}.
\]

Notice that \(z' < 1\).

9. \((\bar{i}, \bar{i})\)

For a good type not to deviate from \(s(\bar{i}) = \bar{i}\) to \(s(\bar{i}) = \bar{i}\), we need

\[
U + \beta \{ \bar{\pi}(\bar{i}) V_{GW} + (1 - \bar{\pi}(\bar{i})) V_{GL} \} \geq U + \beta \{ \pi(i) V_{GW} + (1 - \pi(i)) V_{GL} \}.
\]

Adding \(\beta\{ \pi(i) + (1 - \pi(i)) (\alpha \frac{K}{N} + (1 - \alpha) \frac{K-1}{N-1})\}h \equiv x'h\) to both sides gives

\[
u + x'h + \beta \{ \bar{\pi}(\bar{i}) V_{GW} + (1 - \bar{\pi}(\bar{i})) V_{GL} \} \geq U + \beta \{ \pi(i) V_{GW} + h) + (1 - \bar{\pi}(\bar{i})) V_{BL} \}.
\]

Note that \(x' < 1\).  For a bad type not to deviate from \(s(\bar{i}) = \bar{i}\) to \(s(\bar{i}) = i\), we need

\[
U + \beta \{ \pi(\bar{i}) V_{BW} + (1 - \pi(\bar{i})) V_{BL} \} \geq u + h + \beta \{ \bar{\pi}(\bar{i}) V_{BW} + (1 - \bar{\pi}(\bar{i})) V_{BL} \}.
\]

Combining (47) and (48), we get

\[
u + x'h + \beta \{ \bar{\pi}(\bar{i}) V_{GW} + (1 - \bar{\pi}(\bar{i})) V_{GL} \} \geq u + h + \beta \{ \bar{\pi}(\bar{i}) V_{BW} + (1 - \bar{\pi}(\bar{i})) V_{BL} \},
\]

which is impossible.
References


