

Fiscal Decentralization and the Electoral Control of Politicians

Scott Gehlbach – UW Madison*

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Abstract

One of the core rationales for fiscal decentralization is the proposition that local governments are more accountable to their constituents than are national governments, with opportunities for both “exit” and “voice” deemed to be greater at the local level. Extending existing “career-concerns” models of political accountability to incorporate multidimensional effort, I show that whether voice and hence the electoral control of politicians functions best by devolving government functions to local authorities depends on the means of electing the national politicians who would otherwise be held responsible for government performance. In particular, fiscal decentralization will be relatively unattractive as a means of holding politicians accountable when votes at the national level are aggregated directly. In contrast, the aggregation of votes through intermediate institutions such as the U.S. Electoral College weakens the incentive for national politicians to act responsibly, and so strengthens the case for devolution. Introducing spillovers across localities has little effect on the basic analysis, but does raise questions about the claim that central governments are better motivated than local governments to provide public goods in the presence of externalities.

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1 Introduction

One of the most widely accepted rationales for fiscal decentralization is the idea that local governments are more accountable to their constituents than are central governments. In particular, local governments are believed to have stronger incentives to provide public goods efficiently and with minimal rent extraction both because the possibility of *exit* (of citizens or capital) increases the cost of misgovernance, and because citizens can better exercise *voice* through local than central democratic institutions.¹ This paper challenges the second of these two propositions, showing that the theoretical justification for improved electoral control of politicians at the local level is weak, with the advantages of local elections most apparent in systems where votes in *national* elections are aggregated through an intermediate institution such as the U.S. electoral college.

The notion that local democratic institutions hold politicians more accountable has been challenged empirically in recent years by both cross-country statistical evidence and case studies of particular national experiences with decentralization. Treisman (2002), for example, analyzes data from 166 countries and finds that decentralization is associated with higher perceived corruption and reduces efficiency of public-goods production, while Enikolopov and Zhuravskaya (2003) show that subordination of local authorities to higher-level governments improves the impact of fiscal decentralization on quality of governance in a sample of 95 countries. Russia's experience with decentralization (initiated under Boris Yeltsin prior to the collapse of the Soviet Union, and continued through the 1990s) has in particular led many analysts to question to degree to which decentralization of public-goods provision to locally elected authorities can improve government performance.² As documented in numerous studies, local officials in Russia have in general failed to provide the public goods necessary for the growth of new businesses, with corruption and misappropriation of public funds apparently quite prevalent in many local administrations (e.g., Lambert-Mogiliansky, Sonin and Zhuravskaya, 2000; Blanchard and Shleifer, 2001; CEFIR and Bank, 2002; Sonin, 2003; Cai and Treisman, 2004).

This paper builds on recent work by Seabright (1996) and Persson and Tabellini (2000, ch. 9), who attempt to formalize the intuition that decentralization can enhance the efficiency of public-goods production because locally elected politicians are more accountable than are their nationally elected counterparts. The key argument in these earlier works is that centralization may weaken the link between performance and political accountability, since a national politician need garner a majority in only a majority of jurisdictions to win reelection. In essence, the advantage in these models of decentralization is that locally elected politicians must please half the voters to be reelected, while nationally elected politicians need satisfy only half the voters in half the regions. Local politicians thus have

¹Rose-Ackerman (2000) applies Hirschman's (1970) exit/voice distinction to theories of local accountability. Following Tiebout (1956), the advantages of mobility in encouraging the accountability of local governments has been explored by, e.g., Rubinfeld (1987), Hoyt (1990), and Weingast (1995). In contrast, there has been relatively little formal analysis of the degree to which local rather than central elections serve to discourage self seeking by politicians; Seabright (1996) and Persson and Tabellini (2000, ch. 9) (both discussed below) are two notable exceptions.

²See Stoner-Weiss (1997) on the gradual emergence during the 1990s of elections as the mechanism by which regional governors are chosen in Russia.

stronger incentives to engage in efficient production of local public goods and refrain from rent seeking.

The model presented in Section 2 below demonstrates that this advantage of local elections is specific to the electoral mechanism implicitly assumed by Seabright (1996) and Persson and Tabellini (2000, ch. 9): in that work, national politicians need the approval of a majority of *jurisdictions* to win reelection, rather than a majority of the national population.³ In other words, votes in these models are aggregated through an institution akin to the U.S. electoral college. In contrast, as this paper shows, when national elections are majoritarian (as is more typically the case), the link between performance and accountability remains intact. In this case, the relative advantages of local vs. national elections reduce to factors such as the payoff to reelection for politicians at different levels of government.

Formally, the model in this paper falls into a class of “career-concerns” models in which an agent (here, politician) exerts effort to appear more competent in the eyes of her principals (here, voters). While such models originated in economics – the seminal contribution is Holmstrom’s (1982) analysis of managerial decision-making – in recent years they have been increasingly applied to analyze the incentives of actors in political environments. Persson and Tabellini (2000, ch. 9), upon which this paper builds, is one such example; others include Lohmann’s (1998) study of political business cycles, Alesina and Tabellini’s (2003) analysis of the delegation of tasks to politicians and bureaucrats, and Patty, Johns and Skinner’s (2004) investigation of the role of information asymmetries among the “selectorates” of different nations in determining the likelihood of war. Conceptually, career-concerns models differ from standard signaling models in that no assumption is made that the politician is *ex ante* more informed about her “competence” than are the voters. (More precisely, the politician is no more informed about which state of the world will be realized, where her competence is greater in some states than others.) This simplification avoids the multiple equilibria of signaling models, while maintaining focus on the effort provided by the politician.

The technical innovation of the model presented below is the extension of the basic career-concerns model to a setting in which politicians make decisions about the allocation of effort among competing tasks, with voters heterogeneous in the value they place on performance in different policy arenas. Thus, for example, a president who concentrates most of his effort in the foreign-policy arena in an effort to appear more competent in managing overseas affairs, does so with the understanding that she may sacrifice support among voters interested more in domestic policy. Earlier models almost universally assume unidimensional competence and effort.⁴ The distinction is important for the particular substantive concern of this paper: national majoritarian elections presuppose a conflict of interest among voters as to what tasks should be given priority by an incumbent. However, the model is general, and may be applied to a wide range of political contexts.⁵

³The assumption in these models that national governments are not constrained to provide local public goods in a way that is uniform across jurisdictions is an arguably realistic departure from much of the traditional literature on fiscal federalism; see Besley and Coate (2003) for discussion.

⁴I am aware of only one exception: Alesina and Tabellini (2003) consider delegation of tasks to politicians and bureaucrats in both unidimensional and multidimensional settings. While useful for the specific purpose to which it is put, the model of that paper is substantially less general than the model presented below.

⁵An alternative approach to modeling political accountability, originating with Barro (1973) and Ferejohn

The paper proceeds as follows. Section 2 presents the basic political-economic environment. Section 3 considers in turn political accountability under a decentralized system, a centralized system with national electoral-college elections, and a centralized system with national majoritarian elections; the third result, and its relationship to the first two, is the key substantive contribution of this paper. Section 4 extends the basic model to consider the impact on electoral accountability of spillovers across jurisdictions, a common justification for centralization of public-goods provision. Surprisingly, an increase in spillovers does not necessarily increase the incentive for national politicians to be more efficient in the production of public goods, whatever the nature of national elections. Section 5 relates the results to the broader literature on the advantages and disadvantages of decentralization, and discusses other possible applications of the multidimensional career-concerns model introduced in this paper.

2 Environment

Our political-economic environment in most respects follows Persson and Tabellini (2000, ch. 9), but differs critically in assuming that voters care not only about the competence of the politician in power, but also about other, “ideological” concerns. (Other differences are technical modifications to accommodate this feature of the model.) This alteration of the basic career-concerns model allows consideration of multidimensional as well as unidimensional effort in an explicitly electoral context.

Consider a two-period model, where period 1 is a pre-election period, while period 2 is a post-election period. At issue is the provision of local public goods in some as-yet undefined number of localities indexed $\lambda = a, b, \dots$, with provision of the public good for locality λ in period t denoted $g_{\lambda t}$. (We defer for the moment the question of the number of localities, as for technical reasons we will need to consider different numbers in different institutional environments.) Depending on the political system, decisions about public-goods production may be made by either a local or national politician. In what follows, we will often refer to “the politician,” where unless otherwise noted this should be understood to mean the politician with control over public goods production in locality λ .

Each locality is populated by a continuum of voters of mass N_λ , who care about public-goods production in their own locality. In particular, let voters in locality λ receive policy utility from provision of public goods at time t of $\alpha_\lambda g_{\lambda t}$. Public goods are financed through a fixed tax rate $\bar{\tau}$ imposed on all citizens, who for the sake of simplicity are assumed to have a common per-capita income of y .

The question of the model is the degree to which politicians in different institutional environments provide public goods efficiently, as opposed to skimming off public funds for their own purposes or failing to exercise proper control over subordinates. Public-goods production $g_{\lambda t}$ is a function of both the “effort” exerted by the politician to reduce waste

(1986) and used by Seabright (1996) in the application discussed above, is to assume that voters can coordinate on a strategy to deny reelection to an incumbent if she fails to provide voters some “reservation” utility level. In the language of voting studies, the Barro-Ferejohn approach models “retrospective” voting, while the career-concerns approach concerns “prospective” voting (since in the latter case voters care only about future performance)

and fraud in the production of public goods, and the politician's competence in producing those goods efficiently. Key to models of this type is the assumption that neither effort nor competence, but only total public-goods production $g_{\lambda t}$, is observable by voters. The incumbent's competence persists from period 1 to period 2, so that voters have an incentive to return incumbents to office who they perceive to be more competent. This in turn implies that the incumbent has an incentive to exert effort to appear more competent and improve her chances of reelection. For simplicity, we assume that the incumbent is unaware of her competence at the time that she exerts effort, so that the timing of events is:

1. (Period 1) The incumbent politician chooses an effort level (unobserved by voters), where effort augments the production of local public goods.
2. (Period 1) The incumbent's competence is realized (but not observed by voters), which together with the incumbent's effort decision determines the level of public-goods production $g_{\lambda 1}$ in period 1 (which is observed by voters).
3. (Period 1) Voters choose whether or not to reelect the incumbent.
4. (Period 2) The politician in power in period 2 (either the incumbent or challenger) chooses an effort level, which together with that politician's competence determines the level of public-goods production $g_{\lambda 2}$ in period 2

The assumption that the incumbent knows no more about her competence than do the voters at the time she chooses her effort level is what distinguishes “career-concerns” from signaling models. This assumption simplifies the analysis by eliminating the possibility of multiple equilibria while retaining focus on the level of effort provided by the incumbent. The proper interpretation is not that the incumbent does not know whether or not she is competent in general, but that at the time she exerts effort does not know whether the political-economic environment will change in a way that favors her particular skill set.

Formally, we define effort and competence as follows:

- **Effort:** Let $r_{\lambda t}$ be the extraction of “rents” (unobservable by voters) from the budget for public goods in locality λ at time t , from which the politician derives utility $v(r_{\lambda t})$. We assume that there is an upper bound on the level of rents that may be thus extracted, so that $r_{\lambda t} \in [0, \bar{r}]$, with \bar{r} less than total revenues available for public-goods expenditures in locality λ (derived below). Then, we can define a new variable $e_{\lambda t}$ (effort) as rents forgone, i.e. $e_{\lambda t} \equiv (\bar{r} - r_{\lambda t}) \in [0, \bar{r}]$. This variable will be the focus of our attention. Effort is costly to politicians, where we assume a convex cost of effort, i.e. foregone rent extraction, given by the function $c(e_{\lambda t})$, with $c(0) = 0$. The shape of the cost function may be rationalized by assuming that either that the politician's utility from rent extraction $v(r_{\lambda t})$ is concave or that there is some convex cost of rent extraction. In all that follows, we focus on the case where $c(\cdot)$ is “sufficiently convex” to support an interior solution.
- **Competence:** The competence θ_{λ} of the politician in producing public goods in locality λ is a random variable, unobservable to voters and realized only after the

politician has made her effort choice. Note that θ_λ is not subscripted by t : the incumbent politician's competence persists from period 1 to period 2, so that voters have an interest in returning more competent politicians to power. We assume θ_λ to be independently and identically distributed across λ , with expectation zero and density $f(\cdot)$ and distribution $F(\cdot)$ functions defined over a limited support $[l, h]$, where $l < 0 < h$.⁶ If the incumbent politician is defeated, the challenger takes office, with unknown competence and $E(\theta_\lambda) = 0$.

Let the funds available for public-goods production in locality λ when the maximum possible rents \bar{r} have been extracted be $k_{\lambda t}$. (This formulation will save on notation in the discussion to follow.) In a decentralized system with no interjurisdictional transfers, $k_{\lambda t} = (N_\lambda \bar{\tau} y - \bar{r})$ in all periods t . In a centralized system, the distribution of tax revenues across localities may depend on the allocation of bargaining power among the regions or preexisting constitutional arrangements. All that we require in the latter case is that the distribution of those revenues be set according to a fixed and publicly known formula so that voters in any locality can impute the competence θ_λ of the incumbent in providing public goods for their jurisdiction. Then in either case we can define the production of public goods in locality λ as:

$$g_{\lambda t} = k_{\lambda t} + e_{\lambda t} + \theta_\lambda \quad (1)$$

Note that in contrast to Persson and Tabellini (2000, ch. 9), we assume that competence enters the public-goods production function additively. This formulation facilitates the derivation of a solution when we consider majoritarian elections below.

Equation (1) illustrates the basic logic of career-concerns models. Voters want to return incumbents to office with high competence θ_λ . However, since voters do not observe θ_λ but only public-goods production $g_{\lambda t}$, the incumbent has an incentive to exert effort $e_{\lambda t}$ to appear more competent. Of course, the equilibrium requirement that all players have correct beliefs about the others' actions implies that voters will not be fooled: knowing $e_{\lambda t}$, and observing $g_{\lambda t}$, they will be able to correctly infer θ_λ . Nonetheless, the incumbent must exert the expected level of effort, since by failing to do so voters will judge her to be less competent than she actually is.

Finally, assume that in addition to their policy concerns (which are identical for all individuals in a given locality), voters have idiosyncratic "ideological" preferences which cause them to support the incumbent politician to a greater or lesser degree. Both the assumption and the terminology are widely employed in electoral-competition models, due to the technical necessity that the politician's reelection probability be continuous in her action – here, effort. In the present context, the inclusion of ideological preferences allows consideration of multidimensional effort choice by an incumbent politician interested in reelection.

In particular, let $\delta_{i\lambda}$ refer to the ideological preference of voter i in locality λ for the *challenger*, so that this voter will support the incumbent for reelection if:

$$E(\alpha_\lambda g_{\lambda t} \mid \text{incumbent wins}) > \delta_{i\lambda} + E(\alpha_\lambda g_{\lambda t} \mid \text{challenger wins}) \quad (2)$$

⁶While not technically necessary, for substantive reasons we may constrain the lower bound on the support of θ_λ to be sufficiently large such that total provision of public goods may never be negative, even if the politician exerts no effort.

A common interpretation of this term in electoral-competition models is that $\delta_{i\lambda}$ represents preferences over policies with which politicians have little freedom of maneuver. Thus, $\delta_{i\lambda}$ might capture the degree to which voter support positions held long enough by a candidate or party that any change in policy would result in a loss of credibility. Alternatively, $\delta_{i\lambda}$ could represent voters' preferences over issues of supreme importance to party chieftains or funders, and thus over which candidates have little autonomy.

We assume that the distribution of ideological preferences in each locality is known to the incumbent *ex ante*.⁷ In particular, let $\delta_{i\lambda}$ be distributed independently across localities, and uniformly within a locality over the interval $[-\frac{1}{2\gamma_\lambda}, \frac{1}{2\gamma_\lambda}]$, where the γ_λ 's are sufficiently large (relative to the support of θ_λ and θ_λ) to insure that the incumbent's vote share always falls strictly between 0 and 1. The parameters γ_λ thus capture the degree to which voters value the production of public goods over other issues: a large γ_λ implies that voters differ little according to their "ideological" preferences, so that a politician's perceived competence in improving the efficiency of public-goods production has great relative importance in the voting decision. In what follows, we will sometimes refer to γ_λ as the "importance" or the "salience" of public-goods production relative to "ideological" concerns.

3 Decentralization vs. Centralization

In this section we consider first political accountability under a decentralized system, where public-goods production is controlled by locally elected officials. We then turn to the question of political accountability under a centralized system, where nationally elected politicians have control over public goods production. We are interested in comparing accountability under a centralized system with national "electoral-college" elections to that with national majoritarian elections, and both to accountability under a decentralized system.

Our solution concept is "weak sequential equilibrium," which combines the notion of sequential rationality with the requirement that players' beliefs on the equilibrium path be updated according to Bayes' rule (see, e.g., Osborne, 2004; Myerson, 1991). (Note that the similar solution concept "perfect Bayesian equilibrium," often employed in signaling games, is not defined for games with unobserved actions such as the model in this paper.) Throughout we restrict attention to equilibria in pure strategies.

Local Provision of Public Goods

We begin by considering what happens in period 2. Whether the incumbent or the challenger from period 1 is in power, the politician in period 2 solves the following problem:

$$\max_{e_{\lambda 2}} R_f - c(e_{\lambda 2}) \quad (3)$$

where we define $R_f \equiv v(\bar{r})$, the level of utility a local politician in a federal system gets from the maximum possible level of rent extraction. Clearly, the solution to this problem is $e_{\lambda 2}^* = 0$. Without the discipline of an upcoming election, the politician in period 2 exerts no

⁷Thus, in contrast to many models of electoral competition, electoral uncertainty in this model derives not from uncertainty about the distribution of ideological preferences, but from the fact that the incumbent does not know the realization of θ_λ when she chooses her effort level in period 1.

effort, thus extracting maximum possible rents from the budget for public goods. Following equation (1), period-2 public-goods production is therefore determined entirely by the competence of the politician in power after the election, and by the exogenous variable $k_{\lambda 2}$: $g_{\lambda 2} = k_{\lambda 2} + \theta_{\lambda}$. Consequently, voters have an interest in returning competent incumbents to power.

In particular, expression (2), which gives the condition for voter i in locality λ to vote to reelect the incumbent, reduces to:

$$E(\alpha_{\lambda}(k_{\lambda 2} + \theta_{\lambda}) \mid \text{incumbent wins}) > \delta_{i\lambda} + E(\alpha_{\lambda}(k_{\lambda 2} + \theta_{\lambda}) \mid \text{challenger wins}) \quad (4)$$

$$\Rightarrow \alpha_{\lambda} E(\theta_{\lambda} \mid \text{incumbent wins}) > \delta_{i\lambda} \quad (5)$$

where we recall that $E(\theta_{\lambda}) = 0$ for the challenger. Establish notation such that variables with tildas refer to voters' beliefs about the competence of and effort expended by the incumbent. Thus, $\tilde{\theta}_{\lambda}$ refers to the value of θ_{λ} imputed by voters based on observed public-goods production $g_{\lambda 1}$ and their beliefs about what action has been taken by the incumbent, $\tilde{e}_{\lambda 1}$, i.e. $\tilde{\theta}_{\lambda} = \tilde{\theta}_{\lambda}(g_{\lambda 1}, \tilde{e}_{\lambda 1})$ (with the specific function to be derived shortly). Then we can rewrite 5 as:

$$\delta_{i\lambda} < \alpha_{\lambda} \tilde{\theta}_{\lambda} \quad (6)$$

Given that $\delta_{i\lambda}$ is uniformly distributed on $\left[-\frac{1}{2\gamma_{\lambda}}, \frac{1}{2\gamma_{\lambda}}\right]$, this implies that the share of voters in locality λ supporting their local incumbent is:

$$\frac{1}{2} + \gamma_{\lambda} \alpha_{\lambda} \tilde{\theta}_{\lambda} \quad (7)$$

where γ_{λ} is the density of $\delta_{i\lambda}$, as discussed in the previous section.

In period 1, the incumbent politician in locality λ chooses the level of public-goods provision to solve the following problem:

$$\max_{e_{\lambda 1}} R_f - c(e_{\lambda 1}) + \Pr\left(\frac{1}{2} + \gamma_{\lambda} \alpha_{\lambda} \tilde{\theta}_{\lambda} > \frac{1}{2}\right) \cdot R_f \quad (8)$$

$$\Rightarrow \max_{e_{\lambda 1}} R_f - c(e_{\lambda 1}) + \Pr(\tilde{\theta}_{\lambda} > 0) \cdot R_f \quad (9)$$

where $\Pr\left(\frac{1}{2} + \gamma_{\lambda} \alpha_{\lambda} \tilde{\theta}_{\lambda} > \frac{1}{2}\right)$ is the probability that the incumbent secures at least a majority of votes and hence wins reelection.

Solving the incumbent's choice problem thus reduces to deriving an expression for $\Pr(\tilde{\theta}_{\lambda} > 0)$. Observe first that voters' beliefs about the competence $\tilde{\theta}_{\lambda}$ of the incumbent are based on their observation of public-goods production $g_{\lambda 1}$, their beliefs about the effort expended by the incumbent $\tilde{e}_{\lambda 1}$, and their knowledge of the exogenous parameter $k_{\lambda 1}$:

$$g_{\lambda 1} = k_{\lambda 1} + \tilde{e}_{\lambda 1} + \tilde{\theta}_{\lambda} \quad (10)$$

$$\Rightarrow \tilde{\theta}_{\lambda} = g_{\lambda 1} - k_{\lambda 1} - \tilde{e}_{\lambda 1} \quad (11)$$

Since $g_{\lambda 1} = \theta_{\lambda} + e_{\lambda 1} + k_{\lambda 1}$, this implies that for all $g_{\lambda 1}$ that with positive probability could be observed given voters' beliefs about the incumbent's action $\tilde{e}_{\lambda 1}$ (i.e. all $g_{\lambda 1}$ on the equilibrium path), voters' estimates of the incumbent's competence will be increasing in her effort:

$$\tilde{\theta}_{\lambda} = (\theta_{\lambda} + e_{\lambda 1} + k_{\lambda 1}) - k_{\lambda 1} - \tilde{e}_{\lambda 1} \quad (12)$$

$$\Rightarrow \tilde{\theta}_{\lambda} = \theta_{\lambda} + e_{\lambda 1} - \tilde{e}_{\lambda 1} \quad (13)$$

Note that any realization of $g_{\lambda 1}$ within the interval $[k_{\lambda 1} + e_{\lambda 1} + l, k_{\lambda 1} + e_{\lambda 1} + h]$ can be observed with positive probability, as θ_{λ} has a support of $[l, h]$. Since voters' beliefs about the incumbent's effort level are correct in equilibrium (as any Nash equilibrium imposes the requirement that beliefs about actions be correct), this implies that for any $g_{\lambda 1} \in [k_{\lambda 1} + \tilde{e}_{\lambda 1} + l, k_{\lambda 1} + \tilde{e}_{\lambda 1} + h]$, voters will use expression (13) to impute the value of $\tilde{\theta}_{\lambda}$.

To solve for the equilibrium, however, we must make some assumption about off-the-equilibrium-path beliefs. A realistic conjecture is that if voters observe performance "impossibly high," i.e. higher than possible given the incumbent politician's equilibrium strategy, then they will assume that competence takes its highest value, and that similarly if performance is "impossibly low" they will assume the incumbent to be of the least-competent type. The following assumption formalizes this intuition:

Assumption 1. *For observations off the equilibrium path, i.e. for $g_{\lambda 1} \notin [k_{\lambda 1} + e_{\lambda 1} + l, k_{\lambda 1} + e_{\lambda 1} + h]$, voters have the following beliefs about the type they are facing:*

$$\tilde{\theta}_{\lambda} = h \text{ if } g_{\lambda 1} > k_{\lambda 1} + \tilde{e}_{\lambda 1} + h \quad (14)$$

$$\tilde{\theta}_{\lambda} = l \text{ if } g_{\lambda 1} < k_{\lambda 1} + \tilde{e}_{\lambda 1} + l \quad (15)$$

Assumption 1 is thus a monotonicity condition, as it implies, e.g., that voters would never assume that performance of $g_{\lambda 1} = \tilde{e}_{\lambda 1} + k_{\lambda 1} + h$ implies competence of h , while performance of $g_{\lambda 1} > \tilde{e}_{\lambda 1} + k_{\lambda 1} + h$ implies competence of less than h . Without this assumption, implausible equilibria could be supported in which voters assumed that high performance implied low competence, thus robbing the incumbent of the incentive to provide more effort than expected.

Together, equation (13) and Assumption 1 imply that voters have the following beliefs about the type they are facing:

$$\begin{aligned} \tilde{\theta}_a &= l \text{ if } g_{\lambda 1} < e_{\lambda 1} + k_{\lambda 1} + l \\ &= \theta_{\lambda} + e_{\lambda 1} - \tilde{e}_{\lambda 1} \text{ if } g_{\lambda 1} \in [k_{\lambda 1} + e_{\lambda 1} + l, k_{\lambda 1} + e_{\lambda 1} + h] \\ &= h \text{ if } g_{\lambda 1} > e_{\lambda 1} + k_{\lambda 1} + h \end{aligned} \quad (16)$$

Since $l < 0 < h$, we can write $\Pr(\tilde{\theta}_{\lambda} > 0)$ as:

$$\Pr(\tilde{\theta}_{\lambda} > 0) = \Pr(\theta_{\lambda} + e_{\lambda 1} - \tilde{e}_{\lambda 1} > 0) = \Pr(\theta_{\lambda} > \tilde{e}_{\lambda 1} - e_{\lambda 1}) \quad (17)$$

Inserting (17) into the incumbent's maximization problem (9) for period 1, differentiating with respect to $e_{\lambda 1}$, and imposing the equilibrium condition that voters' beliefs about the incumbent's action be correct, i.e. that $\tilde{e}_{\lambda 1} = e_{\lambda 1}$, we arrive at the equilibrium effort level for the incumbent in the preelection period.

Proposition 1. *In a decentralized system, the unique pure-strategy equilibrium consistent with Assumption 1 has effort in period 1 defined by:*

$$c'(e_{\lambda 1}^*) = f(0) \cdot R_f \quad (18)$$

where $R_f \equiv v(\bar{r})$, the incumbent's utility from the maximum possible rent extraction in a decentralized system.

Proof. See above. □

We are primarily interested in how the level of political accountability (rents foregone, or effort) in a decentralized system compares to that in different types of centralized systems, to be analyzed in the following subsections. However, two features of the solution deserve immediate comment: First, the level of accountability in period 1 is increasing in the degree to which the incumbent is able to extract rents in period 2, $R_f \equiv v(\bar{r})$, and the degree to which she values those rents. Second, the equilibrium level of accountability is independent of the value that voters attach to public goods provision α_λ and the salience of policy preferences captured by γ_λ . Thus, our result for a decentralized system is identical to that in Persson and Tabellini (2000, ch. 9), despite the fact that voters in our model care not only about public-goods provision but about other, “ideological,” concerns.

The latter point can be understood as follows: when an electorate cares about only one policy arena over which the politician has control, differences among voters in their inherent (“ideological”) preference for the challenger over the incumbent cancel out.⁸ Thus, while some voters will require that the incumbent display extraordinary competence to justify reelection, and others will be inclined to vote for her regardless of the efficiency she displays in public-goods production, the probability that the incumbent is reelected reduces simply to the question of whether she exhibits more competence than the challenger is expected to. As we will see, this “averaging out” does not hold when we assume true multidimensional effort in our discussion of national majoritarian elections below.

National Provision of Public Goods – National “Electoral-College” Elections

When public-goods provision is instead carried out on the national level, it is the electoral incentives of national politicians that determine the degree of political accountability. We here first model national elections as in Seabright (1996) and Persson and Tabellini (2000, ch. 9), implicitly assuming aggregation of the vote through some mechanism such as the electoral college in the U.S.

In particular, assume that there are three localities. Taxes are collected from each locality, with the distribution of those revenues for local public goods set according to a fixed and publicly known formula. Voters in locality λ can therefore impute competence θ_λ in providing local public goods as before. (Note that while this is technically a model of multidimensional competence, each *local* election involves participation by voters who care about competence along only one dimension.) The only difference from the model with local provision of public goods is then that the incumbent politician must therefore win a majority of the vote in two localities to be reelected. Given that θ_λ is independently distributed across localities, this implies a probability of winning:

$$\Pr(\text{incumbent wins} \mid e_{a1}, e_{b1}, e_{c1}) = p_a p_b + p_a p_c + p_b p_c - 2p_a p_b p_c \quad (19)$$

where $p_\lambda \equiv [1 - F(\tilde{e}_{\lambda 1} - e_{\lambda 1})]$.

⁸This is precisely true in this model, due to the assumption that $\delta_{i\lambda}$ is uniformly distributed with expectation zero: see equations (7) through (9). More generally, it will be true for any symmetric and continuous distribution of $\delta_{i\lambda}$ centered on zero, and nearly true for distributions that are approximately symmetric around zero.

Defining $R_c \equiv 3v(\bar{r})$, the maximum level of rent extraction by a national politician in a centralized system, the incumbent politician in period 1 thus solves:

$$\max_{e_{\lambda 1}} R_c - \sum_{\lambda} c(e_{\lambda 1}) + \Pr(\text{incumbent wins} \mid e_{a1}, e_{b1}, e_{c1}) \cdot R_c \quad (20)$$

giving us the following result.

Proposition 2. *In a centralized system with three localities, where votes in national elections are aggregated through an “electoral-college” mechanism, the unique pure-strategy equilibrium consistent with Assumption 1 has effort in period 1 defined by:*

$$c'(e_{\lambda 1}^*) = f(0) \cdot 2[1 - F(0)]F(0) \cdot R_c \quad (21)$$

where R_c is the incumbent’s utility from the maximum possible rent extraction in a centralized system.

Proof. See above, and note that in equilibrium (where $\tilde{e}_{\lambda 1} = e_{\lambda 1}$):

$$\begin{aligned} \frac{\partial \Pr(\text{incumbent wins} \mid e_{a1}, e_{b1}, e_{c1})}{\partial e_{\lambda 1}} &= 2f(0)[1 - F(0)] - 2f(0)[1 - F(0)]^2 \\ &= f(0) \cdot 2[1 - F(0)]F(0) \end{aligned} \quad (22)$$

giving us the result. □

Comparing Propositions 1 and 2, we see that relative to a federalist arrangement, centralization with national electoral-college elections may result in less political accountability. On the one hand, period-2 rents $R_c = 3\bar{r}$ are greater than $R_f = \bar{r}$, so the payoff from reelection is greater for a national than a local politician. On the other, the fact that the incumbent need only win in two localities weakens the link between accountability and reelection, since voter satisfaction in a locality matters only if that locality is pivotal. This happens with probability $2[1 - F(0)]F(0)$, which is less than $\frac{1}{2}$ for any distribution $F(\cdot)$.⁹ In essence, a nationally elected incumbent need win the votes of only half the voters in half the localities, thus reducing the incentive to exert effort to increase the efficiency of public-goods production. It is this latter conclusion that leads Seabright (1996) and Persson and Tabellini (2000, ch. 9) to conclude that centralization may entail a loss of political accountability. As the following subsection demonstrates, this result does not hold when we consider instead national majoritarian elections.

National Provision of Public Goods – National Majoritarian Elections

Let there now be two localities $\lambda = a, b$, with the total size of the population $(N_a + N_b) = 1$ normalized to one. The politician chooses the level of foregone rents (effort) in each locality, with voters in locality λ voting for reelection using condition (6). With the share of voters in each locality supporting reelection (7) the same as before, this implies that the total vote received by the incumbent in a national majoritarian election is:

$$\frac{1}{2} + N_a \gamma_a \alpha_a \tilde{\theta}_a + N_b \gamma_b \alpha_b \tilde{\theta}_b \quad (23)$$

⁹To see this, use the fact that $F(0) \in [0, 1]$, observing that for $x \in [0, 1]$, $\max_x 2x(1-x) = \frac{1}{2}$.

Observe that it is the assumption that voters are heterogeneous in some other (“ideological”) concern that makes it possible to talk about national majoritarian elections. When voters in a locality care only about public-goods production, then every voter in that locality uses the same rule in deciding whether or not to reelect: compare the incumbent’s perceived competence in public-goods production with the challenger’s expected competence. In such an environment, the only reasonable way to “add up” votes in a national election is to assume that the incumbent must win a majority of *localities* (since in every locality all voters vote identically). In contrast, the environment in this paper permits consideration of elections in which votes are aggregated directly and the incumbent’s vote share is *continuous* in her perceived competence, as in equation (23).

For notational simplicity, define the new variable $Z_\lambda = N_\lambda \gamma_\lambda \alpha_\lambda$, so that the number of voters supporting the incumbent is $\frac{1}{2} + Z_a \tilde{\theta}_a + Z_b \tilde{\theta}_b$. Then the probability that the incumbent wins, which is the probability that her vote share is at least $\frac{1}{2}$, is

$$\Pr\left[\frac{1}{2} + Z_a \tilde{\theta}_a + Z_b \tilde{\theta}_b \geq \frac{1}{2}\right] = \Pr(Z_a \tilde{\theta}_a + Z_b \tilde{\theta}_b \geq 0) \quad (24)$$

In national majoritarian elections, the incumbent’s reelection probability is increasing in a weighted average of her perceived competence in producing public goods in each locality. The weights $N_\lambda \gamma_\lambda \alpha_\lambda$ capture the idea that perceived competence in producing public goods for large municipalities whose residents care about public-goods production (both relative to other concerns, and in absolute terms) matters more for the incumbent’s reelection probability than perceived competence in producing public goods for small municipalities whose residents care little about public-goods production.

Before solving for the equilibrium level of effort in each locality in period 1, we introduce some notation:

$$\bar{f}(y) \equiv \int_{-\infty}^{\infty} f(y\theta_\lambda) f(\theta_\lambda) d\theta_\lambda \quad (25)$$

Note that $\bar{f}(y)$ is always greater than zero, since it is simply a sort of “average density” of a random variable.

Proposition 3. *In a centralized system where votes in national elections are aggregated directly through a majoritarian system, the unique pure-strategy equilibrium consistent with Assumption 1 has effort in period 1 defined by:*

$$\begin{aligned} c'(e_{a1}^*) &= \bar{f}\left(-\frac{Z_b}{Z_a}\right) \cdot R_c \\ c'(e_{b1}^*) &= \bar{f}\left(-\frac{Z_a}{Z_b}\right) \cdot R_c \end{aligned} \quad (26)$$

where $Z_\lambda = N_\lambda \gamma_\lambda \alpha_\lambda$, and R_c is the incumbent’s utility from the maximum possible rent extraction in a centralized system

Proof. See appendix. □

To interpret Proposition 3, begin by considering the case where localities have equal political importance, in the sense that the weights $N_a \gamma_a \alpha_a$ and $N_b \gamma_b \alpha_b$ are equal. (Clearly, a sufficient condition for this to hold is that the localities are of equal size and that $\gamma_a = \gamma_b$

and $\alpha_a = \alpha_b$.) Then Proposition 1 implies:

$$c'(e_{\lambda 1}^*) = \bar{f}(-1) \cdot R_c = \int_{-\infty}^{\infty} f(-\theta_\lambda) f(\theta_\lambda) d\theta_\lambda \cdot R_c \quad (27)$$

As noted before, $\int_{-\infty}^{\infty} f(-\theta_\lambda) f(\theta_\lambda) d\theta_\lambda$ is a type of “average density” of θ_λ . If we thus further assume that $F(\cdot)$ is symmetric, then $\int_{-\infty}^{\infty} f(-\theta_\lambda) f(\theta_\lambda) d\theta_\lambda = f(0)$, implying rents foregone of:

$$c'(e_{\lambda 1}^*) = f(0) \cdot R_c \quad (28)$$

Comparing (28) with (18), we see that under the assumption of symmetry of localities and symmetry of the distribution of θ_λ , the level of rents foregone is unambiguously higher with centralization of public-goods provision and national majoritarian elections. (Recall that $R_c > R_f$, since a politician in a centralized system benefits from rent extraction from multiple localities.¹⁰) It is the aggregation mechanism of the electoral college that breaks the link between political accountability and the probability of reelection, not national elections *per se*. While there may be other advantages to decentralization (reviewed in Section 5 below), the advantages of centralization should be less when votes for national politicians are aggregated directly, as such elections maintain the connection between political performance and political survival that is weakened with institutions such as the electoral college in the U.S.

These observations are summarized in the following proposition:

Proposition 4. *In a centralized system where votes in national elections are aggregated directly through a majoritarian system, with $N_a \gamma_a \alpha_a = N_b \gamma_b \alpha_b$ and the distribution of θ_λ symmetric around $E(\theta_\lambda) = 0$, centralization unambiguously results in greater political accountability than decentralization.*

Proof. Omitted. □

4 Spillovers

The previous section suggests a new rationale for centralization of public-goods provision: when votes in national elections are aggregated through a majoritarian system, nationally elected politicians may have a greater incentive (because of the greater rents earned from reelection) than locally elected politicians to provide public goods efficiently. This incentive is weakened when votes in national elections are aggregated through an electoral-college mechanism, as effort expended in any individual locality may be wasted if that locality proves not to be pivotal.

How do these results square with traditional justifications for centralization? Among the most common arguments for central provision of public goods is the presence of spillovers, or externalities, across jurisdictions. Nationally elected politicians, it is alleged, have greater incentive to provide public goods which affect voters in more than one locality. In essence, a bridge crossing the Mississippi at St. Louis is be more likely to be built by

¹⁰Our technical assumption that there are three localities in a centralized system with national electoral-college elections, and only two with national majoritarian elections, implies that R_c is defined differently for the two cases. This, however, is immaterial to our qualitative results, since we only need show that $R_c > R_f$.

the federal government than by either Missouri or Illinois, since neither state would fully capture the benefit of the bridge.¹¹

The present section demonstrates that, whatever the incentive of national governments to assess taxes to provide for national public goods, an increase in spillovers does not necessarily improve the accountability of nationally elected politicians in producing those goods, whatever the electoral system operating at the national level. Rather, what matters is the *relative* weight that voters across all localities put on production of one public good over another. Thus, an increase in spillovers from one public good may increase accountability in producing that good (since voters in localities other than that where the good is produced now value its production more highly), but *decrease* accountability in production of other goods.

To see this, we modify the model above to distinguish between the locality in which a voter resides, and the geographic distribution of benefits from production of a public good. In particular, let $g_{\lambda t}$ refer to the production of one of two public goods $\lambda = a, b$ at time t , where we no longer restrict public good production and consumption to any particular locality. Instead, public goods are valued to a greater or lesser degree by voters in J localities, where we index localities $j = 1, 2, \dots$. Let $\alpha_{j\lambda}$ be the marginal benefit received by voters in locality j from production of good λ . Localities are of size N_j , with $\sum_j N_j = 1$.

When public-goods provision is decentralized, then the local officials where production takes place consider only their own constituents' preferences, ignoring any spillovers to other jurisdictions. The analysis in that case follows Section 3 above. In contrast, with centralized provision, national politicians understand that voters in localities other than those where public goods are produced may value their competence in the production of those goods. Their incentives to exert effort to appear more competent are thus potentially affected by the preferences of voters in these spillover districts.

We focus first on national majoritarian elections; below, we show how the model can also be used to analyze national electoral-college elections. Since the incumbent is responsible for both public goods, voters take into consideration the incumbent's perceived competence $\tilde{\theta}_a$ and $\tilde{\theta}_b$ in producing each good, as well as their inherent preference for the challenger over the incumbent. Let δ_{ij} refer to the ideological preference of voter i in locality j for the challenger. Then, analogously to expression 2, we can write the condition for a voter in locality j to support for incumbent for reelection as:

$$\begin{aligned} & E(\alpha_{ja}g_{a2} + \alpha_{jb}g_{b2} \mid \text{incumbent wins}) \\ & > \delta_{ij} + E(\alpha_{ja}x_{a2} + \alpha_{jb}x_{b2} \mid \text{challenger wins}) \end{aligned} \quad (29)$$

If we continue to assume that ideological preferences are distributed independently across localities, and uniformly within a locality over the interval $[-\frac{1}{2\gamma_j}, \frac{1}{2\gamma_j}]$, then analysis identical to that in Section 3 implies that the proportion of all voters supporting the incumbent given the incumbent's imputed competence $\tilde{\theta}_a$ and $\tilde{\theta}_b$ is:

$$\frac{1}{2} + \sum_j N_j \gamma_j (\alpha_{ja} \tilde{\theta}_a + \alpha_{jb} \tilde{\theta}_b) \quad (30)$$

¹¹For discussion, see Oates (1972).

Defining $z_\lambda = \sum_j N_j \gamma_j \alpha_{j\lambda}$, the probability that the incumbent wins is thus:

$$\Pr\left[\frac{1}{2} + z_a \tilde{\theta}_a + z_b \tilde{\theta}_b \geq \frac{1}{2}\right] = \Pr(z_a \tilde{\theta}_a + z_b \tilde{\theta}_b \geq 0) \quad (31)$$

Clearly, this probability is exactly analogous to (24). Thus, the equilibrium here is isomorphic to that in Proposition 3, where the terms in z_λ replace those in Z_λ .

We are interested in how changes in the parameters of the model, captured in the fraction $\frac{z_a}{z_b}$, affect the incentive of the incumbent to be accountable in the production of each public good. The following assumption allows the derivation of such comparative statics.

Assumption 2. $\frac{\partial \bar{f}(y)}{\partial y} = \int \theta_\lambda f'(y\theta_\lambda) f(\theta_\lambda) d\theta_\lambda > 0$ if $y < 0$

A sufficient (but not necessary) condition for Assumption 2 to hold is that $f(\theta_\lambda)$ is a single-peaked distribution with its peak at zero, as for θ_λ to the left of zero, $\theta_\lambda < 0$ and $f'(\theta_\lambda) \leq 0$, while to the right of zero the opposite is true. In the present context, Assumption 1 says that e_{a1} and e_{b1} are substitutes: an increase in e_{a1} decreases the marginal electoral return to e_{b1} , and vice-versa. One distribution which does not satisfy Assumption 2 is the uniform distribution: if θ_λ is distributed uniformly the marginal electoral return to effort is constant, i.e. independent of the level of effort in either sector. A U-shaped distribution would not satisfy Assumption 2, but it seems empirically unlikely that extreme competence would be more common than average competence.

Proposition 5. *In majoritarian elections where voters value competence in production of two public goods and Assumptions 1 and 2 hold, an increase in the weight $z_\lambda = \sum_j N_j \gamma_j \alpha_{j\lambda}$ that voters collectively give to production of good λ increases the incentive for the incumbent to provide effort e_λ in producing good λ , and decreases the incentive to provide effort $e_{-\lambda}$ in producing good $-\lambda$.*

Proof. The proposition is a straightforward implication of Proposition 3 and Assumption 2. □

Proposition 5 can be understood as follows. Roughly speaking, “total” electoral returns from effort are capped by the equilibrium condition that voters are not fooled by the incumbent’s attempt to appear more competent than she actually is. With *relative* electoral returns determined by the weights z_a and z_b , the incumbent chooses the allocation of effort across production of the two public goods to most efficiently achieve her equilibrium probability of reelection. A change in any of the parameters that define the collective weight z_a and z_b that voters place on production of the two public goods matters only if it changes the *relative* importance of one good vs. the other. This implies the following corollary, which is illustrated with two examples; the second of the two examples shows how national electoral-college elections can be analyzed in the present framework.

Corollary 1. *In majoritarian elections, an increase in spillovers that leaves $\frac{z_a}{z_b}$ unchanged has no impact on incentives to provide effort e_a and e_b .*

Proof. Omitted. □

Example 1. Assume national majoritarian elections with three localities of equal size, indexed $j = 1, 2, 3$. Production of public good a takes place in locality 1, and production of public good b takes place in locality 3. Let voters receive marginal utility of α from the production of “own” public goods, and marginal utility of β from production of public goods produced in other localities. If we assume that the distribution of ideological preferences δ_{ij} is identical across localities j , so that $\gamma_j = \gamma$ for all j , then we can calculate the weight that voters collectively place on production of public goods a and b as:

$$z_a = N\gamma\alpha + N\gamma\beta + N\gamma\beta = N\gamma(\alpha + 2\beta) \quad (32)$$

$$z_b = N\gamma\beta + N\gamma\beta + N\gamma\alpha = N\gamma(\alpha + 2\beta) \quad (33)$$

Then $\frac{z_a}{z_b} = \frac{N\gamma(\alpha+2\beta)}{N\gamma(\alpha+2\beta)} = 1$, so that an increase in spillovers β leaves $\frac{z_a}{z_b}$ unchanged.

Example 2. Assume an institutional environment analogous to that in Example 1, but with national elections that operate according to an electoral-college rule. The probability that the incumbent wins is given by:

$$\Pr(\text{incumbent wins} \mid e_{a1}, e_{b1}) = p_1 p_2 + p_1 p_3 + p_2 p_3 - 2p_1 p_2 p_3 \quad (34)$$

where:

$$p_1 \equiv \Pr(N\gamma\alpha\tilde{\theta}_a + N\gamma\beta\tilde{\theta}_b \geq 0) \quad (35)$$

$$p_2 \equiv \Pr(N\gamma\beta\tilde{\theta}_a + N\gamma\beta\tilde{\theta}_b \geq 0) \quad (36)$$

$$p_3 \equiv \Pr(N\gamma\alpha\tilde{\theta}_a + N\gamma\beta\tilde{\theta}_b \geq 0) \quad (37)$$

Then, following the proof to Proposition 3, the derivative of $\Pr(\text{incumbent wins} \mid e_{a1}, e_{b1})$ with respect to, e.g., e_{a1} can be calculated as:

$$\left[\bar{f}\left(-\frac{\beta}{a}\right) + \bar{f}\left(-\frac{\beta}{\beta}\right) + \bar{f}\left(-\frac{\alpha}{\beta}\right) \right] 2p(1-p) \quad (38)$$

The three terms in brackets capture the impact of an increase in spillovers β on the incentive to produce effort in producing public good a in localities 1, 2, and 3, respectively:

1. An increase in β decreases the incentive to provide public good a for the sake of voters in locality 1, since voters there now place relatively more weight on production of public good b (production of which spills over from locality 3 to locality 1);
2. An increase in β has no effect on the incentive to provide public good a for the sake of voters in locality 2, since a general increase in spillovers β also increases the value of public good b to locality 2, leaving unchanged the relative importance of the two public goods to voters in that locality.
3. An increase in β increases the incentive to provide public good a for the sake of voters in locality 3, since voters there now place relatively more weight on production of public good a (production of which spills over from locality 1 to locality 3).

In principle, additional assumptions could be placed on the distribution of θ_λ to show that $\bar{f}\left(-\frac{\beta}{a}\right) + \bar{f}\left(-\frac{\alpha}{\beta}\right) = 0$. However, the general tendency seems clear: as with national majoritarian elections, when national elections operate according to an electoral-college rule, an increase in spillovers does not necessarily result in more efficient public-goods production.

Thus, an increase in spillovers that affects the two public goods equally results in no change in incumbent behavior with national majoritarian elections, and likely minimal change with national electoral-college elections. In contrast, an asymmetric increase in spillovers results in a reallocation of effort away from one public good towards the other, as the following corollary states.

Corollary 2. *In majoritarian elections, an increase in spillovers from production of one public good increases effort in production of that good, while decreasing effort in production of the other.*

Proof. An increase in spillovers from production of public good λ implies an increase in $\alpha_{j\lambda}$ for some j , increasing $z_\lambda = \sum_j N_j \gamma_j \alpha_{j\lambda}$ while leaving $z_{-\lambda} = \sum_j N_j \gamma_j \alpha_{j-\lambda}$ unchanged. The result then follows from Proposition 5. \square

Examination of Example 2 shows that this logic carries over to electoral-college elections. Thus, rather than improving political accountability overall, an increase in spillovers from one public good increases accountability in production of that good, while reducing it in production of the other.

Overall, the analysis of this section give little reason to suspect that the presence of spillovers affects the basic results of Section 3. It does, however, raise questions about the claim that central governments are better motivated to deal with spillovers than are local governments.

5 Discussion

The literature on federalism stresses many possible advantages to decentralization, among which the purportedly greater accountability of local politicians is only one. In particular, scholars and observers have stressed the role that decentralization can play in facilitating better matching between citizen preferences and the level and type of public-goods provision (Tiebout, 1956; Musgrave, 1959; Oates, 1972), in encouraging experimentation by local jurisdiction (producing what Justice Louis Brandeis famously called “laboratories of democracy”) (Osborne, 1988; Morehouse and Jewell, 2004), and in encouraging political participation (Inman and Rubinfeld, 1997).

Sustained analysis over many years has led to a better understanding of the conditions under which these advantages are most apparent. For example, while Tiebout-like mobility is not essential for decentralization to lead to better matching of citizen preferences with public goods provision, mobility will normally enhance this effect. The fact that for various reasons the U.S. labor force is more geographically mobile than that in many other countries suggests that the positive impact of decentralization is likely to unusually large in the United States (see Oates (1999) for discussion).

The results in this paper can be read in the same light. Whether decentralized provision of public goods encourages greater political accountability depends on the benchmark level of political accountability under centralization, which in turn depends on the means of electing national politicians. By weakening the link between performance and reelection probability, the U.S. electoral college provides a rationale for decentralization absent

when national elections instead operate according to a majoritarian principle. Again, decentralization seems to be particularly suited to the institutional environment present in the U.S.

Earlier we discussed the disappointing results of decentralization in Russia. It is perhaps instructive to note that Russia not only has large barriers to geographic mobility (Andrienko and Guriev, 2002), but also elects its president in majoritarian elections.

Beyond any substantive contribution to the literature on the merits and demerits of decentralization, this paper provides a framework for analysis of the allocation of effort among competing tasks by an incumbent politician running for reelection. As noted in Section 1, existing models of politicians' "career concerns" focus almost exclusively on the provision of effort to one task.

The model presented above can be easily incorporated to accommodate any political-economic environment in which government performance in policy arena λ at time t takes the form:

$$g_{\lambda t} = k_{\lambda t} + e_{\lambda t} + \theta_{\lambda}$$

where $k_{\lambda t}$ is some exogenous parameter, $e_{\lambda t}$ is effort provided by the politician in power, and θ_{λ} is that politician's competence in providing the good or service in question. The details of the institutional environment are captured in the weights z_{λ} that in equilibrium determine the allocation of effort across competing tasks. In principle, these weights can be any function of the parameters of the model so long as they are derived in the process of "adding up" the incumbent's total vote across voter groups. As in Section 4, the impact of changes in the institutional environment on effort in each policy arena can then be determined.

One question that seems especially ripe for analysis using the tools in this paper is the dependence of political business cycles on the broader institutional context. The theory of rational political business cycles explains election-year inflation (effort, in the context of this paper) as an attempt by the politician to increase output (government performance) and thus voters' evaluation of her competence in economic policy.¹² As suggested by Tufte (1978) in work that predates the literature on rational political business cycles, one might expect the amplitude of particular waves of the political business cycle to depend on the prevailing political environment. While this insight has formed the foundation for emerging research on "context-conditional electoral and partisan cycles" (Franzese, Jr., 2002), the theoretical foundations of those cycles are not yet firmly established. The model presented here may provide a framework for thinking about the incentive to inflate when voters care not only about output but about other facets of government performance which depend on an elected politician's actions and competence.

Appendix: Proof of Proposition 3

Focus on e_{a1} ; the proof for e_{b1} is analogous. Assumption 1 says that voters have beliefs as in (16) about the type they are facing, given observed performance g_{a1} and beliefs about

¹²The seminal work is Rogoff and Sibert (1988), Rogoff (1990), and Persson and Tabellini (1990), all signaling models. Lohmann (1998) adapts the basic story to a career-concerns context.

the action taken by the incumbent \tilde{e}_{a1} . Anticipating this, the incumbent can formulate her probability of winning, i.e. $\Pr(Z_a\tilde{\theta}_a + Z_b\tilde{\theta}_b \geq 0)$. Taking beliefs about the incumbent's choice of effort \tilde{e}_{a1} in arena a and competence $\tilde{\theta}_b$ in arena b for the moment as given, $\Pr(Z_a\tilde{\theta}_a + Z_b\tilde{\theta}_b \geq 0)$ can be expressed for $e_{a1} \leq \tilde{e}_{a1}$ as:

$$\int_l^{l+\tilde{e}_{a1}-e_{a1}} \mathbf{1}(l \geq -\frac{Z_b}{Z_a}\tilde{\theta}_b) f(\theta_a) d\theta_a + \int_{l+\tilde{e}_{a1}-e_{a1}}^h \mathbf{1}(\theta_a + e_{a1} - \tilde{e}_{a1} \geq -\frac{Z_b}{Z_a}\tilde{\theta}_b) f(\theta_a) d\theta_a \quad (39)$$

where $\mathbf{1}(\cdot)$ is the indicator function, which takes a value of one if the statement is true, and zero otherwise. The first term of this expression represents observations of g_{a1} off the equilibrium path, i.e. $g_{a1} < \tilde{e}_{a1} + k_{a1} + l$, the second observations on the equilibrium path. Since $\tilde{\theta}_a = l$ if $g_{a1} < \tilde{e}_{a1} + k_{a1} + l$, it will be true that $Z_a\tilde{\theta}_a + Z_b\tilde{\theta}_b \geq 0$ for all observations off the equilibrium path iff $l \geq -\frac{Z_b}{Z_a}\tilde{\theta}_b$. In contrast, for observations on the equilibrium path, $\tilde{\theta}_a = \theta_a + e_{a1} - \tilde{e}_{a1}$, implying that the incumbent politician will win iff $\theta_a + e_{a1} - \tilde{e}_{a1} \geq -\frac{Z_b}{Z_a}\tilde{\theta}_b$.

Thus, we can express (39) in terms of realizations of the random variable $\tilde{\theta}_b$. (Recall that perceived competence $\tilde{\theta}_b$ is a function of actual competence θ_b , which is a random variable, and that θ_a and θ_b are distributed independently.) For $\tilde{\theta}_b \geq -\frac{Z_a}{Z_b}l$, the indicator function takes on a value of one for all realizations of θ_a in both the first and second terms in (39), implying that for $\tilde{\theta}_b \geq -\frac{Z_a}{Z_b}l$ the incumbent wins with probability equal to one. In contrast, if $\tilde{\theta}_b < -\frac{Z_a}{Z_b}l$, then the indicator function in the first term equals zero, and the statement in the second term will be true only for $\theta_a \geq \tilde{e}_{a1} - e_{a1} - \frac{Z_b}{Z_a}\tilde{\theta}_b$. No longer holding $\tilde{\theta}_b$ constant, we can thus write (39) as:

$$\int_{\tilde{\theta}_b < -\frac{Z_a}{Z_b}l} [1 - F_a(\tilde{e}_{a1} - e_{a1} - \frac{Z_b}{Z_a}\tilde{\theta}_b)] f(\theta_b) d\theta_b + \int_{\tilde{\theta}_b \geq -\frac{Z_a}{Z_b}l} 1 \cdot f(\theta_b) d\theta_b \quad (40)$$

where for the sake of clarity we denote the cdf of θ_a as F_a . For realizations of $\tilde{\theta}_b$ sufficiently low, the probability of winning is strictly less than one. However, for high realizations of $\tilde{\theta}_b$, even very low competence θ_a will not keep the incumbent from winning.

Similarly, we can derive $\Pr(Z_a\tilde{\theta}_a + Z_b\tilde{\theta}_b \geq 0)$ for $e_{a1} \geq \tilde{e}_{a1}$ as:

$$\int_{\tilde{\theta}_b < -\frac{Z_a}{Z_b}h} 0 \cdot f(\theta_b) d\theta_b + \int_{\tilde{\theta}_b \geq -\frac{Z_a}{Z_b}h} [1 - F_a(\tilde{e}_{a1} - e_{a1} - \frac{Z_b}{Z_a}\tilde{\theta}_b)] f(\theta_b) d\theta_b \quad (41)$$

Taken together, (40) and (41) define a continuous, differentiable function of e_{L1} . Taking the derivative of this function and applying the equilibrium condition that $\tilde{e}_{a1} = e_{a1}$, as well as the equilibrium condition that $\tilde{\theta}_b = \theta_b$ (since $\tilde{\theta}_b = \theta_b + e_{b1} - \tilde{e}_{b1}$, and in equilibrium $\tilde{e}_{b1} = e_{b1}$), we have:

$$\begin{aligned} \frac{\partial \Pr(Z_a\tilde{\theta}_a + Z_b\tilde{\theta}_b \geq 0)}{\partial e_{a1}} &= \int_{\theta_b \in [-\frac{Z_a}{Z_b}h, \frac{Z_a}{Z_b}l]} f(-\frac{Z_b}{Z_a}\theta_b) f(\theta_b) d\theta_b \\ &= \int f(-\frac{Z_b}{Z_a}\theta_b) f(\theta_b) d\theta_b \\ &= \bar{f}(-\frac{Z_b}{Z_a}\theta_b) \end{aligned} \quad (42)$$

where we recall that θ_a and θ_b are identically distributed. The second equality follows from the fact that θ_b is defined over a support of $[l, h]$, so that integrating over $\theta_b \in [-\frac{Z_a}{Z_b}h, \frac{Z_a}{Z_b}l]$ does not in any way limit the realizations of θ_b for which $f(-\frac{Z_b}{Z_a}\theta_b) > 0$, and the third equality makes use of the definition of \bar{f} . Multiplying by R_c and setting this equal to the derivative of the cost function defines the unique equilibrium level of effort e_{a1}^* . \square

References

- Alesina, Alberto and Guido Tabellini. 2003. "Bureaucrats or Politicians?" Unpublished manuscript.
- Andrienko, Yuri and Sergei Guriev. 2002. "Determinants of Interregional Mobility in Russia: Evidence From Panel Data." CEFIR Working Paper.
- Barro, Robert. 1973. "The Control of Politicians: An Economic Model." *Public Choice* 14:19–42.
- Besley, Timothy and Stephen Coate. 2003. "Centralized versus Decentralized Provision of Local Public Goods: A Political Economy Approach." *Journal of Public Economics* 87:2611–2637.
- Blanchard, Olivier and Andrei Shleifer. 2001. Federalism With and Without Political Centralization: China versus Russia. In *IMF Staff Paper: Transition Economies: How Much Progress?*
- Cai, Hongbin and Daniel Treisman. 2004. "State Corroding Federalism." *Journal of Public Economics* Forthcoming.
- CEFIR and World Bank. 2002. "Monitoring of Administrative Barriers to Small Business Development in Russia." CEFIR manuscript.
- Enikolopov, Ruben and Ekaterina Zhuravskaya. 2003. "Decentralization and Political Institutions." CEPR Discussion Paper 3857.
- Ferejohn, John. 1986. "Incumbent Performance and Electoral Control." *Public Choice* 50:5–26.
- Franzese, Jr., Robert J. 2002. "Electoral and Partisan Cycles in Economic Policies and Outcomes." *Annual Review of Political Science* 5:369–421.
- Hirschman, Albert O. 1970. *Exit, Voice, and Loyalty: Responses to Declines in Firms, Organizations, and States*. Cambridge, MA: Harvard University Press.
- Holmstrom, Bengt. 1982. Managerial Incentive Problems - A Dynamic Perspective. In *Essays in Economics and Management in Honor of Lars Wahlbeck*. Helsinki: Swedish School of Economics.
- Hoyt, William H. 1990. "Local Government Inefficiency and the Tiebout Hypothesis: Does Competition Among Municipalities Limit Local Government Inefficiency?" *Southern Economic Journal* 57(2):481–496.
- Inman, Robert P. and Daniel L. Rubinfeld. 1997. "Making Sense of the Antitrust State Action Doctrine: Resolving the Tension Between Political Participation and Economic Efficiency." *Texas Law Review* 75:1203–1299.

- Lambert-Mogiliansky, Ariane, Konstantin Sonin and Ekatherina Zhuravskaya. 2000. "Capture of Bankruptcy: Theory and Evidence from Russia." CEPR Discussion Paper 2488.
- Lohmann, Susanne. 1998. "Rationalizing the Political Business Cycle: A Workhorse Model." *Economics and Politics* 10(1):1–17.
- Morehouse, Sarah M. and Malcolm E. Jewell. 2004. "States as Laboratories: A Reprise." *Annual Review of Political Science* 7:177–203.
- Musgrave, Richard M. 1959. *The Theory of Public Finance*. New York: McGraw-Hill.
- Myerson, Roger B. 1991. *Game Theory*. Cambridge, MA: Harvard University Press.
- Oates, Wallace E. 1972. *Fiscal Federalism*. New York: Harcourt Brace Jovanovich.
- Oates, Wallace E. 1999. "An Essay on Fiscal Federalism." *Journal of Economic Literature* 37(3):1120–1149.
- Osborne, D. 1988. *Laboratories of Democracy*. Boston: Harvard Business School Press.
- Osborne, Martin J. 2004. *An Introduction to Game Theory*. Oxford: Oxford University Press.
- Patty, John W., Leslie Johns and Kiron K. Skinner. 2004. "Information Asymmetries, Political Leadership, and the Incentives for Warfare." Unpublished manuscript.
- Persson, Torsten and Guido Tabellini. 1990. *Macroeconomic Policy, Credibility, and Politics*. Chur, Switzerland: Harwood Academic Publishers.
- Persson, Torsten and Guido Tabellini. 2000. *Political Economics: Explaining Economic Policy*. Cambridge, MA: MIT Press.
- Rogoff, Kenneth. 1990. "Equilibrium Political Budget Cycles." *American Economic Review* 80:21–36.
- Rogoff, Kenneth and A. Sibert. 1988. "Elections and Macroeconomic Policy Cycles." *Review of Economic Studies* 55:1–16.
- Rose-Ackerman, Susan. 2000. "The Economics and Politics of Federalism: Tensions and Complementarities." *APSA-CP* 11(1):16–19.
- Rubinfeld, Daniel. 1987. Economics of the Local Public Sector. In *Handbook of Public Economics*, ed. Alan J. Auerbach and Martin Feldstein. Amsterdam: North Holland.
- Seabright, Paul. 1996. "Accountability and Decentralisation in Government: An Incomplete Contracts Model." *European Economic Review* 40:61–89.
- Sonin, Konstantin. 2003. "Provincial Protectionism." CEFIR Working Paper.

- Stoner-Weiss, Kathryn. 1997. Russian Federalism and Regionalism. In *Developments in Russian Politics*, ed. Stephen White, Alex Pravda and Zvi Gitelman. Durham, NC: Duke University Press.
- Tiebout, Charles M. 1956. "A Pure Theory of Local Expenditures." *Journal of Political Economy* 64(5):416–424.
- Treisman, Daniel. 2002. "Decentralization and the Quality of Government." Unpublished manuscript.
- Tufte, Edward R. 1978. *Political Control of the Economy*. Princeton, NJ: Princeton University Press.
- Weingast, Barry R. 1995. "The Economic Role of Political Institutions: Market-Preserving Federalism and Economic Development." *Journal of Law Economics and Organization* 11(1):1–31.