Unified versus Divided Political Authority

Scott Ashworth, University of Chicago
Ethan Bueno de Mesquita, University of Chicago

Is unified or divided authority optimal for voter welfare? We study this question in a political agency model where a politician's task-specific competences are correlated. The model highlights trade-offs both within and across facets of voter welfare. Regarding incentives, unified authority yields higher total effort, but an allocation of that effort across tasks less aligned with voter preferences. Regarding the selection of good types, unified authority yields more voter information but constrains voters to use that information less flexibly. Our comparative static analysis highlights a fundamental trade-off between determinants of the optimal institution—factors that make divided authority more attractive for incentives (e.g., voters focused on one task, highly correlated competences) make unified authority more attractive for selecting good types. For some parameter values there is nonetheless an unambiguously optimal institution. For other parameter values, the overall optimal institution depends on the heterogeneity of politician competences.

Since at least the time of the American founding, how executive authority should be divided across policy domains has been a key issue in debates about the design of institutions to promote electoral accountability. The Founders chose unified executive authority for the federal government because, as Alexander Hamilton argued in *Federalist* 70, "the executive power is more easily confined when it is one: that it is far more safe there should be a single object for the jealousy and watchfulness of the people; and, in a word, that all multiplication of the executive is rather dangerous than friendly to liberty." To emphasize that the Founders were making an explicit institutional design choice, Calabresi and Terrell (2009) note that neither the majority of state governments, nor the federal government under the Articles of Confederation, had a unitary executive.

This heterogeneity in the institutional design of executive authority persists to this day. While the executive branch of any government has multiple responsibilities, the number of elected executive-branch officials among whom these responsibilities are divided varies tremendously across polities. The following facts about US state and local governments, reported by Berry and Gersen (2009), give a sense of the magnitudes. The county at the 75th percentile for number of elected officials per capita has over five times as many elected officials (1.6 per 1,000 people) as the county at the 25th percentile (0.3 per 1,000). In US state governments, there were more than 10,000 elected executive officials (not including state legislatures or elected boards) as of 1992, with enormous variation in executive unbundling from state to state. For instance, New Jersey elected only its governor, Delaware elected 80 officials, and Pennsylvanian elected 1,200. Elected executive offices range from governors (in every state) to attorneys general, treasurers, and secretaries of state (in most states) to utility regulators, education commissioners, and comptrollers (in a handful of states).

Hamilton's argument against divided authority made much of the possibility that dividing authority leads to problems of free riding and coordination. Empirical work bears this out—Berry (2009) and Berry and Gersen (2009) show that divided authority creates a fiscal common pool that results in larger government. Contemporary social scientific research also goes beyond Hamilton's arguments to identify additional welfare considerations. Gersen (2010) notes that dividing authority may promote productive forms of specialization and expertise (e.g., an educator overseeing the school district and a law enforcement professional overseeing the police) but may also entail deliberative costs by reducing desirable cross-fertilization of ideas. Dividing responsibilities across offices may also alter the perceived benefits of holding some particular office. Ferraz and Finan (2009) show that this can change

Scott Ashworth (sashwort@uchicago.edu) is professor in the Harris School of Public Policy at the University of Chicago. Ethan Bueno de Mesquita (bdm@uchicago.edu) is Sydney Stein Professor in the Harris School of Public Policy at the University of Chicago.

Data and supporting materials necessary to reproduce the numerical results in the article are available in the *JOP* Dataverse (https://dataverse.harvard.edu/dataverse/jop). An online appendix with supplementary material is available at http://dx.doi.org/10.1086/692668.

The Journal of Politics, volume 79, number 4. Published online August 4, 2017. http://dx.doi.org/10.1086/692668
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who is willing to run and thus the quality of the pool of candidates. Besley and Coate (2003) show that, relative to appointment by an elected official, separate elections for regulators tend to increase capture by interest groups by selecting more ideologically pro-consumer regulators.

Because Besley and Coate (2003) work within a citizen-candidate model, they can only address questions of selection, not how concerns over reelection affect politicians' actions. And because traditional arguments about the effect of unified versus divided authority on free riding and coordination are concerned only with politicians' actions, they do not address issues of selection.

Of course, the literature on political agency suggests that these two sets of concerns are deeply intertwined in equilibrium (Banks and Sundaram 1998; Besley 2005; Fearon 1999; Maskin and Tirole 2004; Persson and Tabellini 2000). So, to further the debate, we provide a positive and normative analysis of unified versus divided executive authority in the context of a canonical model of electoral accountability that incorporates both incentives and selection (although abstracting away from issues of coordination that are already well understood).[1]

In our model, the executive is responsible for managing two different tasks, while voters are attempting to learn about the managerial competence of the incumbent leader(s) in order to make electoral decisions. We explore three features of the environment. First, we allow for the possibility that voters differentially value the two tasks—that is, one task may be more important for voter welfare than the other. Second, we allow for the possibility of correlation in a politician's competences for managing various tasks. Third, we allow for variation in how heterogenous is managerial competence in the population of politicians.

We focus on two institutional arrangements. In the first, which (following Berry and Gersen 2008) we call *bundling*, there is one politician responsible for managing both tasks. In the second, which we call *unbundling*, there are separate politicians responsible for managing each task.

We identify a variety of trade-offs that help illuminate when bundling or unbundling is optimal for voter welfare. An important subtlety is that voter welfare is multifaceted in ways that complicate institutional comparisons. Voters care both about the incentives they create for politicians to manage governance effectively and about identifying and retaining politicians who are high-quality managers. It is useful to think about each of these facets of voter welfare separately.

For selection, the key trade-off is information versus flexibility. The more information the voters have, the better they can identify high-quality politicians. But, all else equal, voters are better off with the flexibility to keep a politician who is good at managing one task while at the same time replacing a politician who is bad at managing the other task. Under bundling, the voter decides whether to reelect a single incumbent about whom he observes two informative signals—performance on each task. Under unbundling, the voter makes two decoupled decisions, each on an incumbent about whom he has one informative signal. Thus, bundling creates more information for the voter, while unbundling allows greater flexibility.

The interplay of information and decoupling affects incentives in a more subtle way, with the following net effects. First, the voters would like the politician to have strong incentives to exert a high level of total managerial effort. Second, the voters would like the politician's allocation of managerial effort across the two tasks to be aligned with the voters' own weighting of the relative importance of the tasks. Bundling creates more total effort, but reduces alignment. Again, there is a trade-off.

In addition to these trade-offs within each facet of voter welfare, it can happen that there are trade-offs across the facets. That is, sometimes the institution that is optimal for incentives is different from the institution that is optimal for identifying and retaining high-quality incumbents.

Our main welfare results show how two comparative statics affect the trade-offs both within and across facets of voter welfare. First, we ask how making the voter increasingly concerned with only one of the tasks affects which institution is optimal with respect to each facet of voter welfare. Second, we ask how increasing the correlation between the task-specific competences affects which institution is optimal with respect to each facet of voter welfare. These comparative statics reveal a fundamental trade-off: changes that make bundling more attractive with respect to one facet of voter welfare make unbundling more attractive with respect to the other. In particular, as either the voter becomes more focused on a particular task or the task-specific competences become more highly correlated, unbundling becomes more desirable relative to bundling with respect to incentives but less desirable with respect to selecting high-quality politicians.

In light of these results, we turn to an analysis of overall voter welfare. For some configurations of parameter values there is an unambiguously optimal institutional arrangement. For other configurations of parameter values, one institution is optimal for one facet of voter welfare and the other insti-

1. We build on the literature applying Holmström's (1999) career-concerns model to electoral incentives. For other models applying career concerns to elections see, e.g., Alesina and Tabellini (2007, 2008), Ashworth (2005), Ashworth and Bueno de Mesquita (2006), Gehlbach (2007), Lohmann (1998), and Persson and Tabellini (2000).

tution is optimal for the other facet of voter welfare. We show that, as the pool of potential politicians becomes either very heterogeneous or very homogenous, overall voter welfare is entirely determined by one of the two facets of voter welfare. When the pool is very homogenous, the optimal institution for overall welfare is entirely determined by which institution is better for incentives. When the pool is very heterogeneous, the optimal institution for overall welfare is entirely determined by which institution yields better selection. As we show, in the case of extreme heterogeneity, flexibility dominates information, and so unbundling is unambiguously preferred.

The article proceeds as follows. We first briefly review related theoretical literatures. The section "The Setting" describes the formal model. We then characterize equilibrium and bundling and unbundling in the next two sections. The section "Optimal Institution: First-Period Welfare" characterizes the optimal institution with respect to the facet of voter welfare that concerns incentives. The section "Optimal Institution: Second-Period Welfare" characterizes the optimal institution with respect to the facet of voter welfare that concerns retaining high-quality politicians. In each of these two sections, we show how changing the two key parameters—how much the voter cares about one task versus another and the correlation in task-specific competences—affects the optimal institution. Finally, we consider the institution that is optimal for overall voter welfare and conclude.

RELATED LITERATURE

The analyses most closely related to ours are Hatfield and Padró i Miquel (2006) and Landa and Le Bihan (2016). These articles also study electoral settings with multiple tasks where both incentives and selection matter for governance outcomes. In Hatfield and Padró i Miquel (2006) and Landa and Le Bihan (2016), a politician has only one competence (in our terms, cross-task competences are perfectly correlated), and voters care equally about both tasks. Within this setting, Hatfield and Padró i Miquel (2006) are concerned with how changes to the rewards of office affect behavior and welfare, while Landa and Le Bihan (2016) are concerned with task complexity, special interest group influence, and transparency. We abstract away from those concerns but allow for both imperfect correlation in task-specific competences and asymmetries in the voters' value for the two tasks.

Besley and Coate (2003) and Ting (2002) are also interested in whether responsibility for different tasks should be located in one or multiple offices. Besley and Coate (2003) explore this question within a citizen-candidate model of elections. In this class of models, outcomes are entirely determined by the politician's type, so they are only able to address questions of selection, not of accountability and incentives. Ting (2002) studies a legislature's design of administrative agencies when outcomes are determined entirely by the incentives created for bureaucrats, so selection concerns do not arise.

Our finding that there are trade-offs between institutions that are best for first-period welfare and those that are best for second-period welfare is reminiscent of results in models of electoral pandering (Canes-Wrone, Herron, and Shotts 2001; Fox 2007; Fox and Stephenson 2011; Fox and van Weelden 2012; Maskin and Tirole 2004; Shotts and Wiseman 2010). In a typical such model, politicians are either congruent types, who share the voters' policy preferences, or noncongruent types, who have preferences opposed to the voters'. Institutions that create strong incentives lead to pooling, which is good for first-period voter welfare, but makes it impossible for voters to select congruent types for the future. Institutions that create weak incentives allow voters to select congruent types for the future but at the cost of lower first-period welfare. In our model, the first-period actions have no direct impact on how much the voter learns.[2] Instead, the trade-off across periods results from the different ways that effort and selection are affected by information and flexibility.

Within the broader literature on political institutions, our model is related to discussions of separation of powers. On this issue, it is useful to appeal to a distinction made by Brennan and Hamlin (2000).[3] Our model addresses a pure case of what they call *separation of powers*—"the pulling apart of distinct powers and allocating them to distinct agents, rather than bundling them together in the hands of a single agent" (212). It does not address what they call *division of power*, for example, a system of checks and balances (Gailmard and Patty 2009; Persson, Roland, and Tabellini 1997).

Finally, our model is related to discussions of multitask principal-agent problems outside of elections. Unlike Holmström and Milgrom's (1991) and Dewatripont, Jewitt, and Tirole's (1999) canonical models, multitask incentives in our model do not arise because of cost complementarity. Indeed, we assume additively separable costs. Our incentive alignment problem is similar to that studied in Baker (2002), Feltham and Xie (1994), and Gibbons (2010). In these articles there are multiple tasks, but explicit contracts are restricted to condition only on lower-dimensional signals. Misalignment arises when the low-dimensional signals weight the tasks differently

2. This is because efforts and competences are additively separable in the production of governance outcomes in our model (Ashworth, Bueno de Mesquita, and Friedenberg 2017).

3. We thank an anonymous referee for pointing us toward this work.

than does the principal's welfare. In our model the voter has access to a signal for each action, but the career-concerns nature of the model endogenously creates incentives based on a lower-dimensional weighting of these signals. Hence, a similar misalignment occurs endogenously in our model. Our comparative statics then show (among other things) how this endogenous misalignment is affected by changes in the correlation across task-specific competences and the voters' weighting of the two tasks. In addition, the electoral setting of our model introduces a second dimension of welfare (namely, selection) that is not present in those models.

THE SETTING

A government undertakes two tasks, labeled 1 and 2, on behalf of a voter. Each task is carried out in each of two periods, $t = 1, 2$.

In each period, t, the politician responsible for managing task j exerts managerial effort, a_j^t. The outcome for task j in period t is

$$s_j^t = a_j^t + \theta_j^t + \epsilon_j^t,$$

where θ_j^t is the task-j-specific competence of the politician responsible for managing task j in period t, and ϵ_j^t is a random shock that is normally distributed with mean 0 and variance 1. We assume these shocks are independent of each other and of the competences.

The task-specific competences of a given politician are correlated. Specifically, any given politician has competences for managing the two tasks with prior distribution

$$\begin{pmatrix} \theta_1 \\ \theta_2 \end{pmatrix} \sim \mathcal{N}\left(\begin{pmatrix} 0 \\ 0 \end{pmatrix}, \ \sigma_\theta^2 \cdot \begin{pmatrix} 1 & \rho \\ \rho & 1 \end{pmatrix}\right).$$

Here, σ_θ^2 measures heterogeneity of the pool of politicians with respect to managerial competence, while $\rho \geq 0$ measures the individual-level correlation between the task-specific managerial competences.[4]

We consider two different institutions. Under each, there is an election at the end of the first period. Prior to the election, the voter observes the outputs, s_1^1 and s_2^1, but not the efforts or shocks. No player observes the competences.

Under bundling there is one politician in office in each period. She has responsibility for managing both tasks. At the election stage, she runs against a randomly selected challenger. The winner of the election gets a benefit of holding office $R > 0$.

Under unbundling, there are two politicians in office in each period. Each has responsibility for managing one task. At the election stage, each incumbent runs against a separate randomly selected challenger. Each election is for the relevant task-specific office. The winner of the task j election gets a benefit of holding office $R_j \geq 0$, with $R_1 + R_2 = R$.

Under either institution, in any period t, the voter's payoff from an outcome (s_1^t, s_2^t) is

$$\gamma s_1^t + (1 - \gamma) s_2^t,$$

with $\gamma \in [0, 1]$. The voter does not discount the future.

Under bundling the politician in office in period t who exerts managerial efforts (a_1^t, a_2^t) gets payoff

$$R - c(a_1^t) - c(a_2^t).$$

Under unbundling, the task-j politician in office in period t who exerts managerial effort a_j^t gets payoff

$$R_j - c(a_j^t).$$

Costs are quadratic: $c(a) = \frac{a^2}{2}$.

Throughout, we focus on pure-strategy perfect Bayesian equilibria. Such an equilibrium exists so long as the first-order conditions we derive below characterize optimal effort choices by the incumbent(s); lemma A.1 in the appendix, available online, shows that a sufficient condition for this is that R not be too large.

Two comments on the model

Before proceeding with the analysis, it is worth briefly addressing two choices we have made in our analysis of the relative merits of unified versus divided authority. First, we abstract away from delegation. One might suppose that unbundling tasks avoids delegation by assigning each task to an elected specialist, while bundling requires delegation on at least one task. This is the approach adopted by Besley and Coate (2003), but it is not the one we have taken.

For most executive tasks with which we are concerned, governance requires delegation by an elected official whether or not tasks are unbundled. For instance, whether a mayor has authority over a school district or there is a separately elected school board, running the schools is delegated to a superintendent, principals, and a whole hierarchy of career educators. In either case, the effort and competence of the elected official is, at least in large part, about managing various bureaucracies. (Of course, politicians may differ in how good they are at managing different types of bureaucracies, which might account for imperfectly correlated competences.) Thus, although

4. The assumption that the competences are nonnegatively correlated is reasonable since different managerial tasks will make use of many common capabilities, e.g., organization, interpersonal skills, trustworthiness, and so on.

we abstract away from directly modeling the agency relationship between elected officials and bureaucrats, we want to think of outcomes in our model as reflecting politicians' effort toward and skill at these managerial duties.

Second, we assume symmetric uncertainty about competences—politicians have no private information about how competent they are. We consider this a reasonable assumption for managerial competence. Often the best way to find out about competence is not introspection but actually doing the job. This is not to say that symmetric uncertainty is always a reasonable assumption. When uncertainty is over preferences, it is more natural to assume that politicians have private information. (See Ash, Morelli, and Van Weelden [forthcoming] for a multitask model with asymmetric information about politician policy preferences.)

EQUILIBRIUM UNDER UNBUNDLING

In this section we solve for a perfect Bayesian equilibrium under unbundling. Let the reward for the winner of the task 1 election be $R_1 = \eta R$, and the reward to the winner of the task 2 election be $R_2 = (1-\eta)R$, where $0 \leq \eta \leq 1$.

Second-period effort

In the second period there are no electoral incentives, so the politicians in office will engage in no effort.

Elections

Recall that the voter's second-period payoff is $\gamma s_1^2 + (1-\gamma)s_2^2$. Given that the second-period efforts are zero, at the time of the election, the voter's expected second-period payoff from having politician P manage task 1 and politician P' manage task 2 in the second period is

$$\mathbb{E}[\gamma s_1^2 + (1-\gamma)s_2^2 | (s_1^1, s_2^1)] = \gamma \mathbb{E}[\theta_1^P | s_1^1] + (1-\gamma)\mathbb{E}[\theta_2^{P'} | s_2^1].$$

For each office, the expected competence of the challenger is zero. We now turn to calculating these expectations for the incumbents.

Suppose the voter believes the task j incumbent will exert managerial effort a_j^u in the first period. From the voter's perspective, $s_j - a_j^u$ is normally distributed with mean θ_j and variance $\sigma_\theta^2 + 1$. Hence, standard results on updating normal priors with normal signals imply that, given an outcome s_j and a belief a_j^u, the voter's posterior beliefs about the task j incumbent's competence are normally distributed with mean $\lambda_u(s_j - a_j^u)$ and variance $(\sigma_\theta^2 + 1)\lambda_u^2$, where $\lambda_u = \sigma_\theta^2/(\sigma_\theta^2 + 1)$. The voter will reelect the task j incumbent if and only if the posterior mean is greater than 0. That is, if and only if $\lambda_u(s_j - a_j^u) \geq 0$.

First-period effort

The task j incumbent will be reelected if $\lambda_u(s_j - a_j^u) \geq 0$. The left-hand side of this condition is distributed normally with mean

$$\lambda_u(a_j - a_j^u)$$

and variance

$$\sigma_u^2 = (\sigma_\theta^2 + 1)\left(\frac{\sigma_\theta^2}{\sigma_\theta^2 + 1}\right)^2 = \frac{\sigma_\theta^4}{\sigma_\theta^2 + 1}. \quad (1)$$

Hence, the task j incumbent believes that if she chooses effort a_j, she is reelected with probability

$$1 - \Phi\left(\frac{0 - \lambda_u(a_j - a_j^u)}{\sigma_u}\right).$$

Given this, the task 1 incumbent's expected payoff if she chooses effort a_1 is

$$\eta R\left[1 - \Phi\left(\frac{0 - \lambda_u(a_1 - a_1^u)}{\sigma_u}\right)\right] - c(a_1).$$

The first-order condition for maximizing this payoff is

$$\frac{\lambda_u \eta R}{\sigma_u}\phi\left(\frac{0 - \lambda_u(a_1 - a_1^u)}{\sigma_u}\right) = c'(a_1).$$

In equilibrium the voter's conjecture (a_1^u) must be correct. Imposing this equilibrium condition, substituting for c', and noting that $(\lambda_u/\sigma_u) = 1/\sqrt{\sigma_\theta^2 + 1}$, gives the equilibrium efforts (the analysis for task 2 is analogous):

$$\frac{\eta R}{\sqrt{\sigma_\theta^2 + 1}}\phi(0) = a_1^u \text{ and } \frac{(1-\eta)R}{\sqrt{\sigma_\theta^2 + 1}}\phi(0) = a_2^u. \quad (2)$$

Equilibrium voter welfare

Unbundling creates a whole family of institutions, one for each value of η. For the purpose of comparing unbundling to bundling, we focus on the unbundled institution whose division of rewards, η, maximizes voter welfare. This allows us to compare bundling to the best possible version of unbundling.[5] To this end, we next calculate the voter's ex ante expected first-period and second-period welfare as a function of the division of rewards.

5. This assumption, while not without loss of generality, is not superconsequential. We discuss how other assumptions would affect results in the appendix.

Lemma 1.

(i) The voter's ex ante expected first-period welfare under unbundling when the division of rewards is η is

$$V_1^u(\eta,\rho,\gamma,\sigma_\theta^2) = \gamma\frac{\eta R}{\sqrt{\sigma_\theta^2+1}}\phi(0) + (1-\gamma)\frac{(1-\eta)R}{\sqrt{\sigma_\theta^2+1}}\phi(0).$$

(ii) The voter's ex ante expected second-period welfare under unbundling when the division of rewards is η is

$$V_2^u(\eta,\rho,\gamma,\sigma_\theta^2) = \frac{\sigma_\theta^2}{\sqrt{\sigma_\theta^2+1}}\phi(0).$$

(All omitted proofs are in the appendix.)

Voter welfare, $V_1^u(\eta,\ \rho,\ \gamma,\ \sigma_\theta^2) + V_2^u(\eta,\ \rho,\ \gamma,\ \sigma_\theta^2)$, is affine in $\eta \in [0,\ 1]$, so the optimal division devotes all the electoral rewards to whichever task the voter cares more about, as characterized in the next result.

Lemma 2. Under unbundling, the voter welfare maximizing η is given by

$$\eta* = \begin{cases} 1 & if\,\gamma > \frac{1}{2} \\ 0 & if\,\gamma < \frac{1}{2}. \end{cases}$$

If $\gamma = 1/2$, then any η is optimal.

Proof. Follows from the argument in the text.

EQUILIBRIUM UNDER BUNDLING

We now turn to characterizing perfect Bayesian equilibrium in the game with bundling.

Second-period effort

In the second period there are no electoral incentives, so the politician in office will choose $a_1 = a_2 = 0$.

Election

Given that second-period effort will be zero, the voter's (election-date) expected second-period payoff from politician P is

$$\gamma\mathbb{E}[\theta_1^P|(s_1,\ s_2)] + (1-\gamma)\mathbb{E}[\theta_2^P|(s_1,\ s_2)].$$

For the challenger, each of these expectations is zero. To determine the value of these expectations for the incumbent, we need to calculate the voter's posterior beliefs conditional on the first-period outcomes.

The prior and the signals are normal, so the voter's posterior beliefs are also normal. The posterior means are sufficient statistics for optimal behavior by the voter.

Suppose the voter believes the incumbent chose efforts $(a_1^b,\ a_2^b)$ in the first period. Then $(s_1 - a_1^b,\ s_2 - a_2^b)$ is an unbiased signal of the true distribution of competence. The voter combines this signal with his (mean zero) prior to form his posterior (DeGroot 1970, 175). Let (m_1,m_2) be the posterior means:

$$\begin{pmatrix} m_1 \\ m_2 \end{pmatrix} = \left(\begin{pmatrix} 1 & 0 \\ 0 & 1 \end{pmatrix}^{-1} + \begin{pmatrix} \sigma_\theta^2 & \rho\sigma_\theta^2 \\ \rho\sigma_\theta^2 & \sigma_\theta^2 \end{pmatrix}^{-1}\right)^{-1} \cdot \left[\begin{pmatrix} 1 & 0 \\ 0 & 1 \end{pmatrix}^{-1}\begin{pmatrix} s_1 - a_1^b \\ s_2 - a_2^b \end{pmatrix} + \begin{pmatrix} \sigma_\theta^2 & \rho\sigma_\theta^2 \\ \rho\sigma_\theta^2 & \sigma_\theta^2 \end{pmatrix}^{-1}\begin{pmatrix} 0 \\ 0 \end{pmatrix}\right].$$

Simplifying, this can be rewritten as

$$\begin{pmatrix} m_1 \\ m_2 \end{pmatrix} = \frac{1}{\sigma_\theta^4(1-\rho^2) + 2\sigma_\theta^2 + 1} \cdot \begin{pmatrix} \sigma_\theta^4(1-\rho^2) + \sigma_\theta^2 & \rho\sigma_\theta^2 \\ \rho\sigma_\theta^2 & \sigma_\theta^4(1-\rho^2) + \sigma_\theta^2 \end{pmatrix}\begin{pmatrix} s_1 - a_1^b \\ s_2 - a_2^b \end{pmatrix}. \tag{3}$$

Remark 1. It is worth pausing here to see an intuition captured by this updating. Multiplying the first two factors on the right-hand side of equation (3) we can see how performance on task i affects the voter's beliefs about the incumbent's task i and task j competences. In particular, as the outcome on task i improves (relative to the voter's expectation) by one unit, the voter's posterior beliefs about the incumbent's competence at managing task i improves by

$$\frac{\sigma_\theta^4(1-\rho^2) + \sigma_\theta^2}{\sigma_\theta^4(1-\rho^2) + 2\sigma_\theta^2 + 1}.$$

As the outcome on task i improves (relative to the voter's expectation) by one unit, the voter's posterior beliefs about the incumbent's competence at managing task j improves by

$$\frac{\rho\sigma_\theta^2}{\sigma_\theta^4(1-\rho^2) + 2\sigma_\theta^2 + 1}.$$

The first thing we learn from this is that because the two competences are correlated, increased performance on task i improves the voter's beliefs about the incumbent's competence at managing both tasks. The second thing we learn is a comparative static about the

correlation. The marginal effect of task i outcomes on beliefs about task i competence is decreasing in the correlation:

$$\frac{d}{d\rho}\left(\frac{\sigma_\theta^4(1-\rho^2)+\sigma_\theta^2}{\sigma_\theta^4(1-\rho^2)+2\sigma_\theta^2+1}\right)<0.$$

In contrast, the marginal effect of task i outcomes on beliefs about task j competence is increasing in the correlation:

$$\frac{d}{d\rho}\left(\frac{\rho\sigma_\theta^2}{\sigma_\theta^4(1-\rho^2)+2\sigma_\theta^2+1}\right)>0.$$

The second of these effects is straightforward. The more correlated are the two competences, the more informative is the task j outcome about the task i competence. The first effect is more subtle. The task j outcome serves essentially as a second signal about the task i competence. The more correlated are the two competences, the more informative is this second signal. Making this second signal more informative is akin to decreasing the voter's prior uncertainty about task i competence, which leads the voter to place less weight on the direct signal of task i competence.

Since the politician in office in the second period will choose minimal effort, the voter makes his reelection decision simply by comparing these posterior beliefs to his prior on the challenger's competence, weighting appropriately by how much he cares about each task. This implies that the voter reelects the incumbent if and only if

$$\begin{pmatrix}\gamma & 1-\gamma\end{pmatrix}\begin{pmatrix}m_1\\ m_2\end{pmatrix}\geq 0. \tag{4}$$

It will be useful to unpack the voter's expected payoff from reelecting the incumbent by substituting for (m_1, m_2) from equation (3). In particular, define

$$\lambda_1=\left(\frac{1}{\sigma_\theta^4(1-\rho^2)+2\sigma_\theta^2+1}\right)\cdot\left(\gamma(\sigma_\theta^4(1-\rho^2)+\sigma_\theta^2)+(1-\gamma)\rho\sigma_\theta^2\right) \tag{5}$$

and

$$\lambda_2=\left(\frac{1}{\sigma_\theta^4(1-\rho^2)+2\sigma_\theta^2+1}\right)\cdot\left(\gamma\rho\sigma_\theta^2+(1-\gamma)(\sigma_\theta^4(1-\rho^2)+\sigma_\theta^2)\right). \tag{6}$$

Then condition (4) above can be rewritten in terms of observed outcomes, rather than beliefs. In particular, condition (4) is equivalent to the voter reelecting the incumbent if and only if

$$\lambda_1(s_1-a_1^b)+\lambda_2(s_2-a_2^b)\geq 0.$$

Remark 2. The voter's equilibrium reelection rule puts weight λ_1 on task 1 and λ_2 on task 2. From the perspective of first-period voter welfare, however, it would be optimal for the incumbent to put all her effort into whichever task the voter puts greater weight on (i.e., task 1 if $\gamma>1/2$ and task 2 if $\gamma<1/2$). The fact that both λ_1 and λ_2 can be positive, and that the marginal cost of effort on each task is zero at zero effort on that task, imply that, in equilibrium, the voter's preferences and the incumbent's incentives are not perfectly aligned.

The reason for this is that the voter's reelection decision is forward looking—focused on selecting the politician who provides the highest expected payoff in the future. The λ's do take account of the preference weights, since these matter for the voter's future payoffs. However, the λ's also incorporate information about the variances of signals and the correlations across the competences. It is this latter set of considerations that drives a wedge between the incentives that maximize first-period welfare and the incentives the voter actually gives in equilibrium.

Reelection probabilities

To calculate the probabilities of reelection that enter the incumbent's optimization problem, we must consider the prior distribution of the posterior means, conditional on both the actual efforts a_1 and a_2 and the expected efforts a_1^b and a_2^b. Standard results imply that this distribution is normal (because the updating is linear) with meanz

$$\begin{pmatrix}\overline{m}_1\\ \overline{m}_2\end{pmatrix}=\frac{1}{\sigma_\theta^4(1-\rho^2)+2\sigma_\theta^2+1}\cdot\begin{pmatrix}\sigma_\theta^4(1-\rho^2)+\sigma_\theta^2 & \rho\sigma_\theta^2\\ \rho\sigma_\theta^2 & \sigma_\theta^4(1-\rho^2)+\sigma_\theta^2\end{pmatrix}\begin{pmatrix}a_1-a_1^b\\ a_2-a_2^b\end{pmatrix}$$

and variance Σ equal to the prior variance minus the posterior variance, or

$$\Sigma=\begin{pmatrix}\sigma_\theta^2 & \rho\sigma_\theta^2\\ \rho\sigma_\theta^2 & \sigma_\theta^2\end{pmatrix}-\frac{1}{\sigma_\theta^4(1-\rho^2)+2\sigma_\theta^2+1}\cdot\begin{pmatrix}\sigma_\theta^4(1-\rho^2)+\sigma_\theta^2 & \rho\sigma_\theta^2\\ \rho\sigma_\theta^2 & \sigma_\theta^4(1-\rho^2)+\sigma_\theta^2-\rho^2\sigma_\theta^4\end{pmatrix}.$$

Write

$$\sigma_m^2 = \sigma_\theta^2 - \frac{\sigma_\theta^4(1-\rho^2)+\sigma_\theta^2}{\sigma_\theta^4(1-\rho^2)+2\sigma_\theta^2+1}$$

for the diagonal elements of $\sum$ (the prior variance of a single dimension's posterior mean belief about competence) and write

$$\text{cov}_m = \rho\sigma_\theta^2\left(1 - \frac{1}{\sigma_\theta^4(1-\rho^2)+2\sigma_\theta^2+1}\right)$$

for the off-diagonal elements (the prior correlation of the posterior mean beliefs about competence).

At the time of the election, the incumbent will be reelected if $\gamma m_1 + (1-\gamma)m_2 \geq 0$. The left-hand side of this condition is distributed normally, with mean

$$\lambda_1 \cdot (a_1 - a_1^b) + \lambda_2 \cdot (a_2 - a_2^b)$$

and variance

$$\sigma_b^2 \equiv [\gamma^2 + (1-\gamma)^2]\sigma_m^2 + 2\gamma(1-\gamma)\text{cov}_m. \tag{7}$$

Hence, the incumbent believes that if she chooses efforts (a_1, a_2), she is reelected with probability:

$$1 - \Phi\left(\frac{0 - \lambda_1 \cdot (a_1 - a_1^b) - \lambda_2 \cdot (a_2 - a_2^b)}{\sigma_b}\right).$$

Remark 3. The prior variance of the voter's expected payoff from the incumbent under bundling, σ_b^2, will play an important role in the comparative statics to follow. It is a weighted average of two terms, σ_m^2 and cov_m. Two important facts follow from this observation.

First, the Cauchy-Schwarz inequality implies that $\text{cov}_m \leq \sigma_m^2$, strictly so if $\rho < 1$. Thus σ_b^2 is increasing in the distance of γ from $\frac{1}{2}$, unless $\rho = 1$. Intuitively, this *variance reduction* comes from averaging two imperfectly correlated random variables. In particular, the voter's second-period welfare, which determines her electoral behavior, is the γ-weighted average of the two dimensions of politician competence. It is also important to note, then, that the magnitude of the variance reduction is decreasing in the correlation, ρ.

Second, each of σ_m^2 and cov_m are increasing in the prior correlation ρ. Since σ_b^2 is a weighted average of these two quantities, it is also increasing in ρ. This *information effect* reflects the fact that, the more correlated are the competences, the more the voter learns from the signals and, thus, the more spread out is the distribution of the mean of her posterior beliefs.

First-period effort

The incumbent's expected payoff if she chooses a_1 and a_2 is

$$R\left[1 - \Phi\left(\frac{0 - \lambda_1(a_1 - a_1^b) - \lambda_2(a_2 - a_2^b)}{\sigma_b}\right)\right] - c(a_1) - c(a_2).$$

The first-order conditions for maximizing this payoff are

$$\frac{\lambda_i R}{\sigma_b}\phi\left(\frac{0 - \lambda_1(a_1 - a_1^b) - \lambda_2(a_2 - a_2^b)}{\sigma_b}\right) = c'(a_i)$$

$$\text{for } i = 1, 2.$$

In equilibrium the voter's beliefs about effort must equal the true effort. Imposing these equilibrium expectations and substituting for c' gives the equilibrium efforts:

$$\frac{\lambda_1 R}{\sigma_b}\phi(0) = a_1^b \text{ and } \frac{\lambda_2 R}{\sigma_b}\phi(0) = a_2^b. \tag{8}$$

The marginal benefit of increased effort reflected on the left-hand side of these equilibrium conditions is the product of three terms that we will refer back to later:

(i) *The probability impact*: The change in probability of reelection resulting from a small increase in the voter's posterior beliefs about the γ-weighted average of the incumbent's competences, given by $\phi(0)/\sigma_b$.
(ii) *The belief impacts*: λ_1 (resp. λ_2) is the amount a small increase in effort on task 1 (resp. task 2) raises the voter's expected posterior beliefs about the γ-weighted average of the incumbent's competences.
(iii) *The benefit of reelection*: R.

It is worth pausing to comment on the meaning of the probability impact both because it will be important in the sequel and because it is subtle.

Remark 4. The probability impact is decreasing in σ_b. Recall that σ_b is the standard deviation of the prior distribution of the γ-weighted average of posterior mean beliefs about competences. The incumbent is reelected if that γ-weighted average ends up being greater than zero. Since the distribution of the γ-weighted average has mean zero, when σ_b is larger it is less likely that the γ-weighted average will end up close to zero. As such, it is less likely that a small change in beliefs will change the election result, and so the probability

impact is decreasing in σ_b. Notice, this also implies from our earlier remark 3 that the probability impact is decreasing in ρ and in $|\gamma - 1/2|$.

Equilibrium voter welfare

In equilibrium, the voter's expected first-period welfare is

$$\gamma \frac{\lambda_1 R}{\sigma_b}\phi(0) + (1-\gamma)\frac{\lambda_2 R}{\sigma_b}\phi(0).$$

The next result calculates ex ante expected second-period welfare.

Lemma 3. The voter's ex ante expected second-period welfare is $\sigma_b \phi(0)$.

OPTIMAL INSTITUTION: FIRST-PERIOD WELFARE

As we highlighted at the outset, it is possible for the welfare consequences of the two institutions to be different for first- and second-period voter welfare. As such, we divide our analysis of optimal institutions into three parts. In this section we focus on the voter's first-period welfare, which depends on incentives for managerial effort. In the next section we consider the voter's second-period welfare, which depends on selection of competent types. In both cases we consider how two parameters affect the optimal institutional choice: the correlation between the task-specific competences (ρ) and the relative weight the voter puts on each task (γ). Finally, we consider the optimal institution for overall voter welfare.

We will occasionally use the following notation. Let $W_t^i(\rho, \gamma, \sigma_\theta^2)$ be the voter's welfare in period t under institution i at parameter values $(\rho, \gamma, \sigma_\theta^2)$.

Under either institution, expected first-period welfare is

$$\gamma a_1 + (1-\gamma)a_2 = \frac{1}{2}(a_1 + a_2) + \frac{1}{2}(2\gamma - 1)(a_1 - a_2). \quad (9)$$

In this decomposition, first-period welfare is an average of two factors: (i) the *total effort* $(a_1 + a_2)$ and (ii) the *alignment* between the incumbent's division of effort across the tasks and the voter's weighting of the tasks' relative importance $((2\gamma - 1)(a_1 - a_2))$. Note, when $\gamma > 1/2$, the voter considers task 1 more important and the alignment term is increasing in $a_1 - a_2$. When $\gamma < 1/2$, the voter considers task 2 more important and the alignment term is decreasing in $a_1 - a_2$.

In the case of unbundling, first-period welfare is then very simple. Recall, when $\gamma > 1/2$, we have that $a_1^u = \phi(0)R\lambda_u/\sigma_u$ and $a_2^u = 0$. If $\gamma < 1/2$, these two efforts are reversed. Moreover, recall that $\lambda_u = \sigma_\theta^2/(\sigma_\theta^2 + 1)$.

In the case of bundling we have that

$$a_1^b + a_2^b = \frac{\phi(0)R}{\sigma_b}(\lambda_1 + \lambda_2)$$

and

$$a_1^b - a_2^b = \frac{\phi(0)R}{\sigma_b}(2\gamma - 1)(\lambda_1 - \lambda_2).$$

Notice, in these calculations, we again have a decomposition into three effects, as in the discussion of the first-order conditions. Total effort is the product of the probability impact, the benefit of reelection, and the sum of the belief impacts of efforts 1 and 2. Alignment is the product of the probability impact, the benefits of reelection, and the difference in the belief impacts of efforts 1 and 2.

The key to understanding the institutional trade-offs for period-1 welfare is to observe that the two institutions are ranked in opposite ways by the two components of first-period welfare. In particular, bundling induces more total effort, but unbundling better aligns effort with voter preferences.

Total effort under bundling is larger than under unbundling for two reasons. First, the probability impact is larger because of the variance reduction highlighted in remark 3. Second, the sum of the belief impacts is strictly higher under bundling when there is positive correlation because the correlation increases the total amount of information, reducing the weight the voter's posteriors put on her priors.

It is straightforward from equation (9) that for any $\gamma \neq 1/2$, alignment is maximized when all effort is devoted to the more important task. This is exactly what is attained under unbundling because, as we saw in lemma 2, all of the rewards of office are devoted to that task. However, as we saw in remark 1, for any $\rho > 0$, the voter cannot fully achieve this goal under bundling. To see why, suppose the voter cares only about task 1, but task 1 and task 2 abilities are correlated. Such a voter will vote based only on task 1 beliefs. However, this means he will vote based on the output from both tasks, which does not maximize incentives for task 1 effort. Maximizing task-1 incentives would involve the voter voting only based on the outcome from task 1, but doing so is not sequentially rational given the correlation between the two competences. These intuitions are formalized in the following result.[6]

Proposition 1. Suppose that prior correlation (ρ) and preference weight on task 1 (γ) are such that both λ_1 and λ_2 are strictly positive. Then, for any $\sigma_\theta^2 > 0$:

6. In a model of campaign finance, Daley and Snowberg (2009) show a related result. In their model, allowing fund-raising can lead to more total effort but less effort devoted to improving policy.

(i) Total effort is higher under bundling than under unbundling—that is, $a_1^u + a_2^u < a_1^b + a_2^b$.
(ii) Alignment is better under unbundling than under bundling—that is, $(2\gamma - 1)(a_1^u - a_2^u) > (2\gamma - 1)(a_1^b - a_2^b)$.

Before turning to a comparative static analysis, it is important to see that either institution can be optimal for first-period voter welfare.

An immediate implication of proposition 1 is that bundling is always better than unbundling when the voter cares equally about the two tasks (i.e., $\gamma = 1/2$)—in that case, only total effort matters, and both λ_1 and λ_2 are positive for any value of the correlation.

The case where the voter cares only about one task (i.e., $\gamma = 1$ or $\gamma = 0$) is less immediate. When $\gamma = 1$, first-period welfare is just a_1. Hence, when $\gamma = 1$, unbundling is strictly preferred if and only if $(\lambda_u/\sigma_u) > (\lambda_1/\sigma_b)$. The next result establishes that this is indeed the case for any strictly positive correlation.

Proposition 2. Either institution can be optimal with respect to first-period voter welfare. In particular, for any $\sigma_\theta^2 > 0$:

(i) If $\gamma \in \{0, 1\}$, then unbundling is preferred for all $\rho \neq 0$.
(ii) If $\gamma = \frac{1}{2}$, then bundling is preferred to unbundling for all ρ.

The ideas underlying proposition 2 can be extended to provide comparative statics of the optimal institution (for first-period welfare). As we show in proposition 3 below, we are able to provide clean comparative statics. Nonetheless, we first want to highlight that there are competing effects away from the limits.

Voter preferences

Consider first the comparative static on γ. Recall that bundling induces higher total effort but that unbundling better aligns the voter's preferences and the incumbent's allocation of effort between the two tasks. As the voter's preferences become more extreme, the total effort advantage of bundling shrinks and the alignment advantage of unbundling grows. Hence, the more extreme the voter, the more attractive is unbundling.

The total effort advantage of bundling depends on γ through the variance reduction described in remark 3. The variance reduction comes from the fact that the voter's reelection decision is based on a γ-weighted average of her posterior beliefs about the two dimensions of competence. Hence, as the voter becomes more extreme, the variance reduction is attenuated.

The alignment advantage of unbundling depends on γ through two competing effects. First, recall that under unbundling, for any $\gamma \neq 1/2$ there is only effort on the more important dimension, while under bundling there is effort on both dimensions. Since the voter's utility is linear in the efforts, this tends to make unbundling more attractive, and increasingly so as preferences become more extreme. Second, the extent of misalignment under bundling decreases as preferences become more extreme (whereas there is no change under unbundling), since as preferences become more extreme the incumbent's incentives are increasingly to focus on the more important task. This effect tends to make bundling more attractive as the voter becomes more extreme. Although there are competing effects, on net, it turns out that, as the voter becomes more extreme, the alignment advantage of unbundling increases.

Competence correlation

Now consider the comparative static on ρ. Welfare under unbundling is independent of the correlation. So focus on bundled welfare. A change in the correlation affects both total effort and alignment under bundling. The overall effect is that bundled welfare is decreasing in ρ.

There are two effects on total effort that cut in opposite directions. First, as correlation increases, the sum of the belief impacts increases, which tends to increase total effort. Intuitively, as correlation increases, there is more total information. When there is more total information, the posterior beliefs puts less weight on the voter's priors. And when the weight on the prior is lower the effect of a small change in outcomes, and hence the effect of a small change of effort, on posterior beliefs is larger. Second, as correlation increases, the probability impact decreases. As we have already discussed, the probability impact is determined by one over the prior variance of the γ-weighted average of the posterior means. When correlation increases, so there is more information, this prior variance is larger. The net effect of these two competing effects is to make total effort single-peaked in ρ.

A change in correlation also affects alignment under bundling in two ways (both negative), which are familiar from our discussion of the intuition underlying proposition 2. First, as before, an increase in ρ decreases the probability impact. Second, an increase in ρ decreases alignment for the reasons discussed in remark 1—an increase in ρ increases the amount of informational spillover across dimensions, thereby increasing incentives to work on the less important task under bundling.

The results of these intuitions are illustrated in figure 1 and formalized below.

Proposition 3. There is a function $\hat{\gamma}(\rho, \sigma_\theta^2)$ that is strictly decreasing in ρ with $\hat{\gamma}(\rho, \sigma_\theta^2) \geq \frac{1}{2}$ for all (ρ, σ_θ^2), such that bundling is optimal for first-period welfare if and only if

$$1 - \hat{\gamma}(\rho, \sigma_\theta^2) \leq \gamma \leq \hat{\gamma}(\rho, \sigma_\theta^2).$$

The optimality is strict if the inequalities are strict.

This result is perhaps surprising. One might have thought that, when the skills needed to manage two different tasks are highly correlated, it makes sense to give both tasks to one agent. While we will see that this intuition has some merit with respect to the quality of selection, this result shows that there is a countervailing effect. Giving tasks with highly correlated skill sets to one agent reduces first-period welfare by creating severe misalignment of managerial efforts.

OPTIMAL INSTITUTION: SECOND-PERIOD WELFARE

Lemmas 1 and 3 show that ex ante, second-period voter welfare under institution i is $\sigma_i\phi(0)$. Critically, second-period voter welfare is increasing in the prior variance of the posterior mean of the payoff from reelecting an incumbent, σ_i. The intuition is straightforward—increased dispersion of the posterior means coincides with increased voter information, and the more information the voter has, the better job she does at selecting good types.

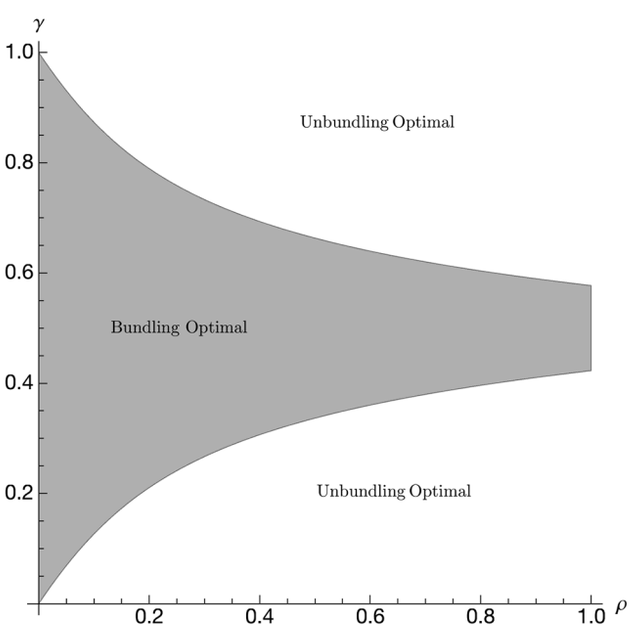

Figure 1. Optimal institution for first-period welfare as a function of ρ and γ, for $\sigma_\theta^2 = 1$.

The welfare comparisons now follow from the two effects highlighted in remark 3. First, by averaging across the incumbent's competence on two dimensions, bundling creates variance reduction, which tends to decrease ex ante, second-period voter welfare. To see how this works, consider a situation in which an incumbent is competent on one dimension and incompetent on the other. Bundling forces the voter to either stick with the incumbent, who is good at one task but bad at the other, or replace her with the challenger, who is mean zero at both. In a similar scenario under unbundling—where the incumbent on one task is competent and the incumbent on the other task is incompetent—the voter has the flexibly to stick with the competent incumbent while replacing the incompetent one.

Second, for any positive correlation across dimensions, there is an information effect associated with bundling. Because both tasks are informative about both dimensions of competence, the voter has more total information about the incumbent's competences under bundling. This allows the voter to do a better job of selecting good types.

Before turning to a comparative static analysis, it is important to see that either institution can be optimal for ex ante, second-period voter welfare. When there is no correlation, the only effect of a move from unbundling to bundling is to reduce flexibility. Hence, when there is no correlation, unbundling is preferred. When there is perfect correlation, the only effect of a move from unbundling to bundling is to increase information. There are two ways to see why this is the case. First, when correlation is perfect, there is no variance reduction associated with linking the dimensions. Second, and equivalently, when the two dimensions of competence are perfectly correlated, the voter will never face an incumbent who is competent on one dimension and incompetent on the other, so flexibility is irrelevant. Hence, when correlation is perfect, bundling is preferred.

These intuitions are summarized in the following proposition, which establishes that either institution can be optimal for ex ante, second-period voter welfare.

Proposition 4. Either institution can be optimal with respect to ex ante, expected second-period welfare. In particular, for any $\sigma_\theta^2 > 0$:

(i) If $\rho = 0$, then unbundling is strictly optimal for all $\gamma \in (0, 1)$.
(ii) If $\rho = 1$, then bundling is strictly optimal for all γ.

The ideas underlying proposition 4 can be extended to provide an intuition for comparative statics of the optimal

institution (for second-period welfare). First, consider the effect of γ. As the distance between γ and 1/2 increases, there is more variance reduction and the information effect is unchanged. Hence, as the voter cares more about one dimension relative to the other, unbundling becomes relatively more attractive. Second, consider the effect of ρ. As ρ increases, variance reduction is attenuated and the information effect increases. Both of these tend to make bundling relatively more attractive.

These intuitions are formalized in the next proposition and illustrated in figure 2.

Proposition 5. For any $(\gamma, \sigma_\theta^2)$, there is a unique $\hat{\rho}(\gamma, \sigma_\theta^2) \in [0, 1)$ such that bundling is optimal for second-period welfare if and only if:

$$\rho \geq \hat{\rho}(\gamma,\ \sigma_\theta^2).$$

The optimality is strict if the inequality is strict. Moreover, $\hat{\rho}$ is strictly increasing in γ for $\gamma < 1/2$ and strictly decreasing in γ for $\gamma > 1/2$.

These comparative statics are the opposite of those for first-period welfare, suggesting an important tension in designing optimal institutions. We return to this in the next section.

OVERALL OPTIMAL INSTITUTION

Thus far, we have studied the comparative static effects of ρ and γ on the optimal institution for first- and second-period welfare separately. Figure 3 summarizes these two analyses by combining figures 1 and 2. It highlights a fundamental tension established by propositions 3 and 5. Factors that increase the attractiveness of one institution for first-period voter welfare decrease the attractiveness of that same institution for second-period voter welfare. In particular, as γ moves away from 1/2 or ρ goes to 0, unbundling becomes more attractive for first-period welfare and bundling becomes more attractive for second-period welfare.

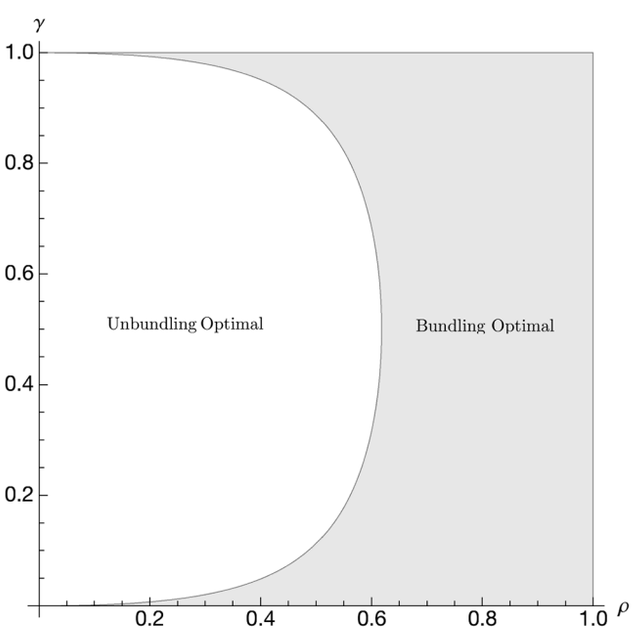

Figure 2. Optimal institution for second-period welfare as a function of ρ and γ, for $\sigma_\theta^2 = 1$.

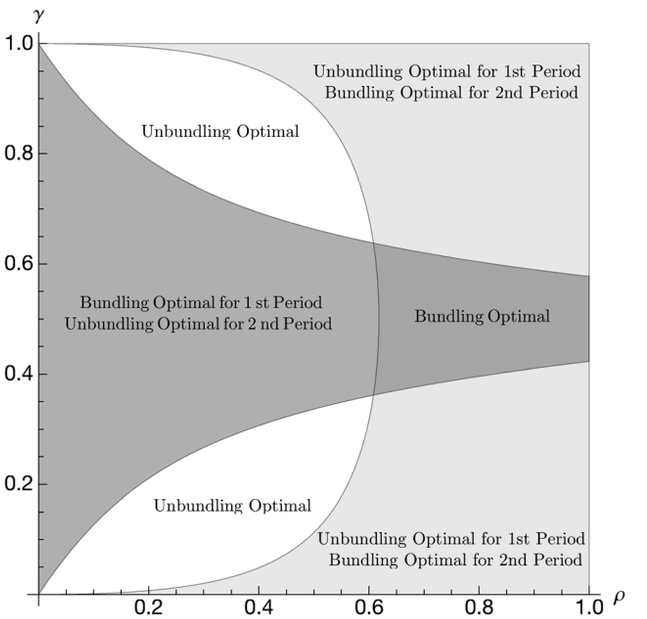

Figure 3. Optimal institution for first- and second-period welfare as a function of ρ and γ, for $\sigma_\theta^2 = 1$.

What we see in figure 3 is that for some parameter values, there is no trade-off between first- and second-period welfare optimization. If the voter cares largely about one issue (γ not too close 1/2) and the task-specific competences are not too highly correlated (ρ not too close to 1), then unbundling is the optimal institution for both periods. If the voter cares similarly about the two tasks and the task-specific competences are sufficiently correlated, then bundling is the optimal institution for both periods. However, for other configurations of parameter values, institutional choice poses a trade-off between first- and second-period welfare.

And, indeed, propositions 2 and 4, coupled with continuity of the welfares, show this qualitative conclusion is general. For any finite and positive σ_θ^2, there is a region of parameter values such that the optimal institution poses no trade-off between first- and second-period welfare and other regions for which there is such a trade-off.

Of course, the fact that there are trade-offs does not mean that an overall optimal institution does not exist. Here we study this issue by defining overall welfare as the undiscounted sum of first- and second- period welfare. Recall that

$W_t^i(\rho, \gamma, \sigma_\theta^2)$ is the voter's welfare in period t under institution i at parameter values $(\rho, \gamma, \sigma_\theta^2)$. Then, unbundling is the overall optimal institution if and only if

$$W_1^u(\rho, \gamma, \sigma_\theta^2) + W_2^u(\rho, \gamma, \sigma_\theta^2) \geq W_1^b(\rho, \gamma, \sigma_\theta^2) + W_2^b(\rho, \gamma, \sigma_\theta^2).$$

For some collections of parameter values, this overall welfare analysis depends on how trade-offs between first- and second-period welfare happen to balance out. However, when σ_θ^2 is either very small or very large we can say more.

When σ_θ^2 is very small, there is little heterogeneity in the quality of candidates. As such, electoral selection is relatively unimportant for voter welfare. Hence, overall welfare is maximized by whichever institution maximizes the voter's first-period welfare. As the next result shows, which institution maximizes first-period welfare still depends on ρ and γ, but there are no longer any trade-offs between first- and second-period welfare that matter for the overall welfare comparison.

Proposition 6. There is a decreasing function $\hat{\gamma}(\cdot)$ such that:

- For any pair (γ, ρ) with $\gamma < \hat{\gamma}(\rho)$, there exists a $\underline{\sigma}(\gamma, \rho)$ such that, for any $\sigma_\theta < \underline{\sigma}(\gamma, \rho)$ bundling is optimal for overall voter welfare.
- For any pair (γ, ρ) with $\gamma > \hat{\gamma}(\rho)$, there exists a $\underline{\sigma}(\gamma, \rho)$ such that, for any $\sigma_\theta < \underline{\sigma}(\gamma, \rho)$, unbundling is optimal for overall voter welfare.

When σ_θ^2 is very large, there is substantial heterogeneity in candidate quality. This has two implications. First, candidates themselves believe effort is unlikely to be decisive in reelection, so there is little difference across institutions in the power of incentives. Second, electoral selection is very important for the voter's welfare. Hence, overall voter welfare is maximized by whichever institution maximizes the voter's second-period welfare. Further, in this case, the same institution maximizes second-period (and thus overall) voter welfare for all values of γ and ρ. Recall that the information effect of bundling comes from the fact that, when the voter gets more informative signals, his posterior beliefs put less weight on his priors, spreading out the prior distribution of posterior means. In the limit, as σ_θ^2 gets infinitely large, the voter's updating puts no weight on his prior beliefs, for any informative signal. Hence, in the limit, the information effect disappears, leaving only the flexibility effect. This means that, for σ_θ^2 very large, not only does second-period welfare determine the overall optimal institution, but second-period welfare always favors unbundling.

Proposition 7. For any pair (γ, ρ) with $\gamma \notin \{0, 1\}$ and $\rho < 1$, there exists a $\overline{\sigma}(\gamma, \rho)$ such that, for any $\sigma_\theta > \overline{\sigma}(\gamma, \rho)$ unbundling is optimal for overall voter welfare.

CONCLUSION

We started with a question of institutional design—unified versus divided executive authority. Our model highlights two key trade-offs for voter welfare.

The first trade-off concerns incentives. Under bundling total managerial effort by the incumbent politician is higher than under unbundling. However, the allocation of that managerial effort across tasks is less fully aligned with voter preferences than under unbundling.

The second trade-off concerns identifying and retaining high-quality politicians. Under bundling, the voter has more information about the incumbent politician's managerial competences than under unbundling. However, the voter is constrained to use that information less flexibly under bundling than unbundling.

We then showed how the resolution of each of these trade-offs responds to changes in voter preference weightings and the underlying information structure. This analysis highlighted a fundamental tension between the two determinants of the optimal institution—factors that push toward making bundling more attractive for managerial incentives (for instance, by making total effort more important than alignment) also push toward making unbundling more attractive for selection (e.g., by making flexibility more important than information). As such, we showed that, while sometimes the same institution is optimal for both facets of voter welfare, often the voter faces a real trade-off between choosing an institution that optimizes incentives or one that optimizes selection.

ACKNOWLEDGMENTS

We received valuable comments from Chris Berry, Steve Coate, Alex Frankel, Matt Gentzkow, Jacob Gersen, Gilat Levy, Pablo Montagnes, John Patty, Carlo Prato, Jesse Shapiro, Ken Shotts, Lars Stole, Stephane Wolton, and seminar audiences at the Priorat Workshop on Theoretical Political Science, Chicago, and Washington University.

REFERENCES

Alesina, Alberto, and Guido Tabellini. 2007. "Bureaucrats or Politicians? Part I: A Single Policy Task." *American Economic Review* 97 (1): 169–79.

Alesina, Alberto, and Guido Tabellini. 2008. "Bureaucrats or Politicians? Part II: Multiple Policy Tasks." *Journal of Public Economics* 92 (3): 426–47.

Ash, Elliott, Massimo Morelli, and Richard Van Weelden. Forthcoming. "Elections and Divisiveness: Theory and Evidence." *Journal of Politics*.

Ashworth, Scott. 2005. "Reputational Dynamics and Political Careers." *Journal of Law, Economics, and Organization* 21:441–66.

Ashworth, Scott, and Ethan Bueno de Mesquita. 2006. "Delivering the Goods: Legislative Particularism in Different Electoral and Institutional Settings." *Journal of Politics* 68 (1): 169–79.

Ashworth, Scott, Ethan Bueno de Mesquita, and Amanda Friedenberg. 2017. "Accountability and Information in Elections." *American Economic Journal: Microeconomics* 9 (2): 95–138.

Baker, George. 2002. "Distortion and Risk in Optimal Incentive Contracts." *Journal of Human Resources* 37 (4): 728–51.

Banks, Jeffrey S., and Rangarajan K. Sundaram. 1998. "Optimal Retention in Agency Problems." *Journal of Economic Theory* 82:293–323.

Berry, Christopher R. 2009. *Imperfect Union: Representation and Taxation in Multilevel Governments*. New York: Cambridge University Press.

Berry, Christopher R., and Jacob E. Gersen. 2008. "The Unbundled Executive." *University of Chicago Law Review* 75:1385.

Berry, Christopher R., and Jacob E. Gersen. 2009. "Fiscal Consequences of Electoral Institutions." *Journal of Law and Economics* 52:469–95.

Besley, Timothy. 2005. *Principled Agents: Motivation and Incentives in Politics*. Oxford: Oxford University Press.

Besley, Timothy, and Stephen Coate. 2003. "Elected versus Appointed Regulators: Theory and Evidence." *Journal of the European Economic Association* 1 (5): 1176–206.

Brennan, Geoffrey, and Alan Hamlin. 2000. *Democratic Devices and Desires*. New York: Cambridge University Press.

Calabresi, Steven G., and Nicholas Terrell. 2009. "The Fatally Flawed Theory of the Unbundled Executive." *Minnesota Law Review* 93:1696–740.

Canes-Wrone, Brandice, Michael C. Herron, and Kenneth W. Shotts. 2001. "Leadership and Pandering: A Theory of Executive Policy Making." *American Journal of Political Science* 45:532–50.

Daley, Brendan, and Erik Snowberg. 2009. "Even If It Is Not Bribery: The Case for Campaign Finance Reform." *Journal of Law, Economics, and Organization* 27:324–49.

DeGroot, Morris H. 1970. *Optimal Statistical Decisions*. New York: McGraw-Hill.

Dewatripont, Mathias, Ian Jewitt, and Jean Tirole. 1999. "The Economics of Career Concerns, Part 1: Comparing Information Structures." *Review of Economic Studies* 66:183–98.

Fearon, James D. 1999. "Electoral Accountability and the Control of Politicians: Selecting Good Types versus Sanctioning Poor Performance." In Adam Przeworski, Susan Stokes, and Bernard Manin, eds., *Democracy, Accountability, and Representation*. New York: Cambridge University Press.

Feltham, Gerald A., and Jim Xie. 1994. "Performance Measure Congruity and Diversity in Multi-Task Principal/Agent Relations." *Accounting Review* 69 (3): 429–53.

Ferraz, Claudio, and Frederico Finan. 2009. "Motivating Politicians: The Impacts of Monetary Incentives on Quality and Performance." NBER Working paper 14906.

Fox, Justin. 2007. "Government Transparency and Policy Making." *Public Choice* 131 (April): 23–44.

Fox, Justin, and Matthew C. Stephenson. 2011. "Judicial Review as a Response to Political Posturing." *American Political Science Review* 105 (2): 397–414.

Fox, Justin, and Richard van Weelden. 2012. "Costly Transparency." *Journal of Public Economics* 96 (1–2): 142–50.

Gailmard, Sean, and John W. Patty. 2009. "Separation of Powers, Information, and Bureaucratic Structure." Berkeley typescript.

Gehlbach, Scott. 2007. "Electoral Institutions and the National Provision of Local Public Goods." *Quarterly Journal of Political Science* 2:5–25.

Gersen, Jacob E. 2010. "Unbundled Powers." *Virginia Law Review* 96 (2): 301–58.

Gibbons, Robert. 2010. "Inside Organizations: Pricing, Politics, and Path Dependence." *Annual Review of Economics* 2:337–65.

Hatfield, John William, and Gerard Padró i Miquel. 2006. "Multitasking, Limited Liability, and Political Agency." Unpublished manuscript, Stanford University.

Holmström, Bengt. 1999. "Managerial Incentive Problems: A Dynamic Perspective." *Review of Economic Studies* 66 (1): 169–82.

Holmström, Bengt, and Paul Milgrom. 1991. "Multitask Principal-Agent Analyses: Incentive Contracts, Asset Ownership, and Job Design." *Journal of Law, Economics, and Organization* 7:24–52.

Landa, Dimitri, and Patrick Le Bihan. 2016. "When to Unbundle Political Authority." Unpublished manuscript, New York University.

Lohmann, Susanne. 1998. "An Information Rationale for the Power of Special Interests." *American Political Science Review* 92 (2): 809–27.

Maskin, Eric, and Jean Tirole. 2004. "The Politician and the Judge: Accountability in Government." *American Economic Review* 94 (4): 1034–54.

Persson, Torsten, Gerard Roland, and Guido Tabellini. 1997. "Separation of Powers and Political Accountability." *Quarterly Journal of Economics* 112:1163–202.

Persson, Torsten, and Guido Tabellini. 2000. *Political Economics: Explaining Economic Policy*. Cambridge, MA: MIT Press.

Shotts, Kenneth W., and Alan Wiseman. 2010. "The Politics of Investigations and Regulatory Enforcement by Independent Agents and Cabinet Appointees." *Journal of Politics* 72 (1): 209–26.

Ting, Michael M. 2002. "A Theory of Jurisdictional Assignments in Bureaucracies." *American Journal of Political Science* 46 (2): 364–78.