Bureaucrats, Judges, and Societal Welfare

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Abstract

Theories of government agencies generally conceptualize bureaucrats as either policy- or effort-oriented, while those modeling the courts typically consider judges as either ideologically-motivated or concerned with social welfare and applying legal standards. As the bureaucratic policymaking structure creates a strategic interaction between agencies and courts, these differing notions of what underlies bureaucratic and judicial utilities, along with specific institutional features, may interact to impact policy formation and outcomes profoundly in ways not previously recognized. We explore this agency-court interplay by formulating a game-theoretic model of policymaking where bureaucrats *and* judges weight both types of motivations. We produce myriad insights into what we should observe and the corresponding impacts on societal welfare. Overall, given the policymaking structure, we demonstrate that altering the policy preferences of bureaucrats or judges may have unanticipated consequences on social welfare, although misalignment of bureaucratic and judicial preferences may be welfare enhancing. However, from a societal viewpoint, reducing costs of information acquisition to agencies and courts rather than manipulating ideologically motivations is likely to be the wisest course of action.

In implementing their delegated discretion, bureaucratic agencies enjoy considerable leeway. Yet, the choices are still subject to oversight from other political institutions. Judicial review represents a particularly important constraint, especially in the United States where gridlock has been the norm for multiple decades, undercutting the ability to redefine policy and discretion statutorily. As such, agency decision-makers possess incentives to integrate expectations regarding how courts will react to bureaucratic rules and proposals. The potential importance of agency actors developing and integrating expectations about how the courts will respond to their choices implies that the motivations of both bureaucrats and the courts, and how they interact with other institutional features, are likely to be key for understanding what we observe and for making recommendations about improving societal welfare.

However, analysis of how the interplay between different incentives and institutional features might condition the nature or quality of outcomes is underdeveloped. One reason for this is how the motivations of bureaucrats and judges have been conceptualized. Studies that include a more nuanced take of bureaucratic motivations tend to exclude the judiciary (and vice versa) and models which do include both tend to simplify the motivations in one or both institutions. Here we specifically focus on the weightings the actors place on their different motivations and allow the weights in both institutions to vary.

In terms of motivations, bureaucrats are, in the broadest sense, often portrayed and modelled as effort oriented or policy motivated. The first assumption is consistent with standard economic views of organizations where, all else equal, there is incentive to minimize effort, while the second stems from the political nature of agency work and the fact that, while the ability of bureaucrats to improve their financial compensation is frequently limited (net of leaving for the private sector via the so-called revolving door), many perform tasks with policy consequences about which they have strong opinions. Indeed, compared to workers in private markets, this distinction is especially important for bureaucrats since most agency employees are insulated by civil service protection and, therefore, there may be considerable room for both effort shirking and championing policy preferences (e.g., Johnson and Libecap (1994)). As such, a key determinant of effort is likely to be the bureaucrat's intrinsic motivation relative to her responsibilities.

For the courts, there is an ongoing debate on whether judges are motivated by personal ideologies or by jurisprudence considerations. Under the former view, judges are seen as making decisions based on their preexisting ideological beliefs — with legal guidelines serving as a constraint rather than a motivation — while under the latter getting the law right is conceptualized as an end in itself. In other words, some model policy considerations as a component of judicial utility functions while others focus exclusively on judges' interpretations of law.

In our analysis, we adopt a catholic view of motivations and fill the gap in the analysis of the interplay between incentives and institutional arrangements by developing a game-theoretic framework where bureaucrats and judges put different weights on their ideological preferences versus other considerations — limiting effort for bureaucrats and improving societal welfare for judges.[1] Rather than choosing a single motivation for each institutional actor, for example that a bureaucrat cases exclusively about implementing her ideologically preferred choice and a judge is only motivated to allow policies that improve societal welfare, we consider the full gamut of possible weightings where the referenced example is a special case.

Applying our more agnostic (at least in terms of motivations) framework, we are able to study normatively and positively the hierarchical process in which bureaucrats and judges operate. Normatively, we assess whether having bureaucrats and/or judges with strong policy preferences upon which they act is desirable in the sense of improving social welfare.[2] Positively, we draw implications from the interaction of preferences and generate predic-

[1]In general making decisions consistent with legal guidelines may not always overlap with maximizing social welfare. However, this assumption serves as a useful benchmark for understanding the role of the judiciary when it comes to overseeing bureaucratic policies. Indeed, according to the hard look doctrine courts are supposed to review agency actions for arbitrariness — including ensuring that decisions do not run contrary to available evidence. As such, assuming social welfare motivations seems reasonable.

[2]However, our principle results do assume a judge whose ideological preferences are not too extreme.

tions about how ideological bias (both its left-right direction and extent) may affect policy outcomes and the tendency to sustain the status quo.

Specifically, in our model of institutional decision-making a bureaucrat decides how much effort to expend learning about the effects of two different policies on society, with higher effort generating more accurate information about the policies. The bureaucrat then decides which policy to propose, after which the policy is subject to judicial review. As part of this review process, the judge may receive information from sources other than the bureaucrat and then either upholds the policy or overturns it in favor of the status quo staying place.

In equilibrium, judicial behavior is conditioned by the ideological match with the bureaucrat, the bureaucrat's effort, and the ability to get outside information. In turn, the bureaucrat considers a variety of factors both in how much effort to exert and what policy to propose. The bureaucrat's behavior is characterized by three types of actions. The first is when the bureaucrat selects the policy to submit based on the information she gathers, i.e., she is willing to separate based on the signal received. If this occurs in equilibrium it is optimal in terms of maximizing expected social welfare. The second is ideological intransigence, where the bureaucrat always chooses her preferred policy. The final behavior is when the bureaucrat puts the cost of being overturned above all else and panders to the judiciary by always proposing the judiciary's preferred policy. Overall, our results are quite nuanced and, in some circumstances, quite surprising. Several findings from our main analysis, in particular, stand out.

First, while arguing that bureaucrats with policy preferences will work harder is commonplace, a result that partially holds in our model as well, we demonstrate that policy-motivated bureaucrats may produce inferior policy. Primarily this occurs because of a key tension in our model involving the bureaucrat's choice between separating and ideological intransigence. The stronger the bureaucrat's ideological bias, the less inclined she is to separate based on her information, as this dictates sometimes selecting the policy with which she disagrees ideologically; if she becomes too biased this choice of the alternative policy becomes unacceptable even if it means accepting a higher probability of being overturned. Additionally, the judge must believe that the bureaucrat has a chosen policy based on her signal, and for a bureaucrat with too strong of an ideological bias it is never incentive compatible to choose her non-preferred policy. These findings imply that bureaucratic zealots with overly strong policy preferences may be detrimental to social welfare. However, levels of bureaucratic bias leading to policymaking that is socially beneficial may depend on whether the bureaucrat and judge have matching ideologies. With aligned policy preferences a bureaucrat with a low bias is better. Conversely, with misaligned preferences it may be that a bureaucrat with somewhat stronger ideological preferences is preferred.

Second, we show that a judge with ideological preferences opposed to the bureaucrat's increases social welfare relative to an ideologically friendly judge. This occurs because for a greater set of biases the bureaucrat is willing to expend effort and try to implement the socially desirable policy. In an extension, we show a similar effect holds if there is ex ante uncertainty about the distribution of judicial policy preferences. In particular, if the bureaucrat's bias becomes stronger then it is optimal to increase the proportion of judges with ideologies opposed to the bureaucrat. Also intriguingly, increasing the weight that a judge places on ideology impacts social welfare non-monotonically, with moderate judicial bias, under some conditions, being better than either no bias or strong bias.

Third, the tendency for the status quo policy to remain in place depends on whether the judge has a policy preference that is aligned with the bureaucrat and the strength of the bureaucrat's preferences. If the bureaucrat places a lower weight on ideology or preferences are aligned then there is a higher probability of policy change.

Finally, our results suggest that policy interventions altering institutional factors or the non-ideological motivations of players may be both effective and superior to trying to affect the makeup of the bureaucracy or judiciary directly. While we show that we could produce superior welfare with judges with ex ante preferences opposed to the bureaucrat's by increasing the latters incentive to expend effort acquiring information, such a policy intervention is problematic. In contrast to the highly conditional relationship between ideological bias and social welfare, decreasing a bureaucrat's informational acquisition costs always improves social welfare in our model. Similarly, with some caveats, increasing a judge's access to outside information will also heighten welfare.

We include several extensions to our analysis, all of which might be more consistent with the world in some situations and none of which detract from our core findings. The first relaxes our assumption on the bureaucrat's and judge's prior belief about the state of the world and study how different priors affect bureaucratic effort. In particular, the indeterminate relationship between ideological bias and social welfare continues to hold. The second assumes extreme judicial preferences which cannot be overcome by any level of evidence. Even compared to extreme bureaucratic preferences (whose negative effects can be ameliorated by the courts), the adverse social welfare effects of such judges are considerable. The third assumes that the bureaucrat is unsure if the judge is ideologically aligned with her or not. In line with the results mentioned above, the socially optimal proportion of judges with policy preferences congruent with the bureaucrats is decreasing as the latter's bias becomes stronger. Finally, we examine a world where, in contrast to usual assumptions, learning about one policy does not provide knowledge about the alternative. In this case, stronger bureaucratic bias can lead to more effort but through a different mechanism than that of the main model, with more bias leading to greater but less efficiently utilized effort.

Literature Review

Our analysis fits broadly with the literatures on bureaucratic motivations and the judicial review of agency policies and, specifically, contributes to the study of incentives in agency-judicial interactions. As such, three streams of literature, and the models associated with them, are particularly relevant: those involving bureaucratic behavior, judicial behavior, and the interaction of the two.

Per our earlier discussion, bureaucratic behavior is often modeled as a function of a desire to limit the expenditure of costly effort to investigate policies. Hence, many formal theoretic treatments assume that bureaucrats' utilities are not directly affected by policy choices (e.g., Tirole (1986), Gailmard (2009), Gehlbach and Simpser (2015)). More recently, and in the spirit of a growing empirical work that places bureaucrats and agencies on a common ideological scale,[3] scholars have turned toward incorporating ideology or policy bias as well. For example, Besley and Ghatak (2005) shows that matching workers in like-minded organization can increase worker output; Prendergast (2007, 2008) demonstrates that effort increases when a bureaucrat or worker is biased toward one task relative to another; and Gailmard and Patty (2007) shows that policy preferences can increase effort. However, these papers do not consider court review and judicial preferences.

Judges too have been modeled as being non-ideologically and ideologically motivated. Per the former, there are two principal approaches. One, and that which we will adopt in our analysis, is that judges care about getting policy right in terms of picking policies that are objectively correct or maximizing social policy (e.g., Cameron and Kornhauser (2005), Gailmard and Patty (2013)). The other, which pertains to lower court judges, is the desire not to be overturned by a higher court (e.g., Hübert (2015)). This second approach may be thought to be subsumed by the first, as the motivations for a judge to pick the right policy can be conceptualized as a reduced form that captures the influence of higher courts.

Courts have been modeled ideologically in a variety of related ways. One, and that which we follow as it best lends itself to comparing agencies and judiciaries and is roughly in line with past empirical research showing that judges both have preferences[4] and at least sometimes are influenced by ideology in voting on agency policies,[5] is to assume that judges have ideological ideal points (e.g., Shipan (2000), Rogers (2001), and Dragu and Board

[3]For examples see: Meier and Nigro (1976), Watson (1997), Crewson (1997), Rouban (2007), Clinton et al. (2012), Bonica et al. (2012), Bertelli et al. (2015), and Chen and Johnson (2015).

[4]For examples see: Martin and Quinn (2002), Sunstein et al. (2004), Epstein et al. (2007a), Epstein et al. (2007b), Bailey (2016).

[5]These effects have been found in circuit courts as well as the Supreme Court, e.g., Revesz (1997), Cross and Tiller (1998), Miles and Sunstein (2006), Eskridge and Baer (2007), Miles and Sunstein (2008).

(2015)). Another stipulates that a judge (and an agency) has a preferred level of regulation (e.g., Stephenson (2006, 2007), while a third postulates that judges weigh the welfare of interests differently (e.g., Garvie and Lipman (2000)). Finally, in the so-called case space approach (for a review, see Lax (2011)), judges are assumed to differ on the cut-point that separates legal from illegal actions. This formulation conceptualizes differences in ideology as actually differences in standards for cases. While there are differences between the models in multiple dimensions, if the case-space has a single dimension then the set-up maps directly to the standard one-dimensional spatial model with single-peaked preferences.

As for agency-judicial interactions, two features of past analyses are particularly notable. One is the assumption that agencies are averse to having their chosen policies overturned in the courts and incur a cost if this occurs (e.g., Gailmard and Patty (2013), Turner (2015)). Another is how the hierarchical structure of decision-making is typically incorporated: the bureaucrat expends effort to learn about the state of the world, chooses a policy, and then faces judicial review (Stephenson (2007), Gailmard and Patty (2013)).

Importantly and as previously mentioned, our analysis adopts this structure but differs from much past research by remaining agnostic about the two key elements conditioning bureaucratic and judicial utility functions about which scholars have made differing assumptions. Rather, we examine how changes in the weights that bureaucrats attach to effort reduction versus ideological policy attainment and the extent to which judges care about choosing the right policy for social welfare versus pursuing their own ideological goals jointly work to produce policy outputs.

The Model

There are two strategic actors, a bureaucrat (B) and judge (J). Additionally, there are two possible policies, a and b, that B can propose. It is unknown which policy is better for society (S), and denote this optimal societal policy as $\omega \in \{a, b\}$. We assume that players have a common prior and believe with probability $q = 1/2$ that policy a is better for society than the status quo and b worse and with complementary probability $1-q = 1/2$ that policy b is better. Later we discuss the substantive implications of relaxing the assumption of a flat prior on bureaucratic effort.[6]

The game begins with B choosing to exert *observable* effort, $e \in [0, 1]$, to learn about the effects of the policies on society. This generates a *private* signal, $s_B \in \{a, b\}$, for B. For $y \in \{a, b\}$ let $p(e)$ be the probability that s_B is correct, i.e., $p(e) = Pr(s_B = y|\omega = y)$. We assume this function has the form $p(e) = \frac{1+e}{2}$. Therefore, the signal becomes perfectly informative when $e = 1$ and it is uninformative if B exerts no effort.[7] Players update (whenever possible) according to Bayes' rule. Thus, as $q = 1/2$, if $s_B = y$ then the bureaucrat's updated belief that policy y maximizes social welfare is simply $\mu_y = p(e)$. After observing the signal the game enters the policymaking stage and B chooses $x \in \{a, b\}$.

Following the bureaucrat's choice of policy, the judge receives outside information. This can represent any information brought forth by outside groups (such as through legal briefs or amicus filings) or research done by the judge's office. With probability $\sigma \in (0, \overline{\sigma})$[8] the judge learns the true state of the world and with probability $1 - \sigma$ the judge gains no useful information.[9]

[6]Assuming a 50-50 prior captures the case where the judge and bureaucrat ex ante have no informational bias towards one policy or another. Thus, we are able to focus on how policy preferences and concerns for non-ideological motives affect outcomes. The case of a non-flat prior complicates the analysis, as for some levels of positive effort the precision of the signal is inferior to the prior. Additionally, while the bureaucrat continues to exhibit the three types of behaviour we describe, generalizing q creates further difficulties for finding the relevant equilibrium cut-points. For these reasons we concentrate on the simpler flat prior case and consider some of the interesting substantive changes to the analysis when it is relaxed in an extension.

[7]A similar information acquisition technology is used in Prendergast (2003, 2007). More general formulations of this technology outside the bureaucracy literature can be found in Zermeno (2011) and Chade and Kovrijnykh (2016). The benefit of this set-up is that it allows the bureaucrat to acquire more precise information without assuming that she either perfectly observes the state of the world or learns nothing.

[8]The cutoff $\overline{\sigma}$ is defined in the appendix and is always strictly greater than 0. This assumption focuses the model on the influence of the bureaucrat's information on the judge's decision-making, as opposed to it being likely that the judge will base his choice on outside sources. Given our interests this seems to be the most pertinent context.

[9]An interesting avenue for future research would be to endogenize σ. For example, Gailmard and Patty (2013) contains interest groups that can expend effort to discover the state of the world and reveal this information to the judge, while Hübert (2015) alternatively interprets σ as resulting from judicial activism. Depending on the source of the information, an endogenous σ may increase or decrease the bureaucrat's effort. For the time being, we remain agnostic about the issue and abstract from these details to isolate the

Finally, J reviews B's policy choice. He may either uphold or overturn the policy. Let $\rho = 0$ if the policy is allowed and $\rho = 1$ if it is overturned. If the policy is allowed, then the final outcome is B's policy choice. If the policy is overturned, then the final outcome is the status quo policy, Q, which yields a known payoff. Let $z \in \{x, Q\}$ denote the final policy outcome.

If the final policy outcome is $z = a$ then player $i \in \{J, B\}$ receives a payoff of θ_i. If the outcome is $z = b$ then i's payoff is $-\theta_i$. Finally, if $z = Q$ then each player gets a payoff of zero. We define the function $h(z)$ as

$$h(z) = \begin{cases} 1 \text{ if } z = a \\ 0 \text{ if } z = Q \\ -1 \text{ if } z = b. \end{cases}$$

We can now give the bureaucrat's utility for the final outcome as

$$\theta_B h(z) - \rho k - c(e),$$

where the parameter θ_B represents the weight the bureaucrat places on policy compared to other motivations. We assume, without loss of generality, that $\theta_B \geq 0$ and, thus, the bureaucrat has a weak preference for policy a over policy b. The function $c(e)$ represents the costs of investigation and we assume $c(e) = \frac{Ce}{1-e}$,[10] with $C \in (0, \frac{\sigma^2 k}{2}]$.[11] The parameter k represents the costs to the bureaucrat of having her policy choice be overturned by the judge.

Societal welfare depends on the state of the world and is denoted $W(z|\omega)$, where

effect of the interaction of bureaucratic-judicial motivations on bureaucratic policymaking.

[10]Note that, assuming suitable conditions on the derivatives, many of our results hold for more general functional forms of $p(e)$ and $c(e)$.

[11]If C is too large then the bureaucrat's optimal effort is negative.

$$W(z|\omega) = \begin{cases} 1 \text{ if } z = \omega \\ 0 \text{ if } z = Q \\ -1 \text{ else.} \end{cases}$$

The utility to the judge of the final policy outcome is given by

$$\theta_J h(z) + W(z|\omega),$$

where the parameter θ_J represents the weight the judge places on his personal policy preferences relative to societal welfare. We assume that $\theta_J \in [-1, 1]$. Therefore, a judge for whom $\theta_J = 0$ is purely motivated by social welfare. If $\theta_J > 0$ then the judge has an ideological preference for policy a and is aligned with the bureaucrat, and if $\theta_J < 0$ then the judge has an ideological preference for policy b and is opposed to the bureaucrat.

To recap, the timing of the game is as follows:

1. B exerts effort e, and generates a signal $s_B \in \{a, b\}$,
2. B chooses a policy $x \in \{a, b\}$,
3. with probability σ, J learns ω and, with probability $1 - \sigma$, J receives no additional useful information, and
4. J chooses to overturn the policy, $\rho = 1$, or not, and $\rho = 0$.

Results

As the bureaucrat attains private information about the state of the world, we employ perfect Bayesian equilibria (hence equilibrium) as a solution concept. For each type of judicial preference we characterize when there exists separating equilibrium of the policymaking subgame for which the judge is willing to uphold either policy choice. Next, we find optimal effort levels both when the bureaucrat anticipates separating at the policy stage and when she anticipates pooling on a policy at that stage. Finally, we characterize when expending positive effort and separating is better for the bureaucrat than expending no effort and pooling. Focus on this type of separating equilibrium is substantively motivated, as separation in this case[12] improves the probability that the final outcome is the socially desirable policy. The equilibrium we characterize allows for the greatest amount of separation and does not require restrictions on the judge's beliefs about the bureaucrat's type following deviations off the path of play. In fact, while multiple equilibria may exist there is a unique path of play. Note the bureaucrat cannot signal information about the state that she does not know. Specifically, because the judge observes e, even if this is followed by an action that is off the path of play, the judge knows that the bureaucrat's information is no more accurate than $p(e)$. Proofs omitted from the text can be found in the appendix.

Our first proposition characterizes the judge's behavior. We let λ_x be the judge's updated belief that $\omega = x$ after the bureaucrat chooses policy x and exerts effort e. On the path of play the judge's belief about the signal received by the bureaucrat is found using Bayes' rule. Thus, if the bureaucrat separates then $\lambda_x = \mu_x(e)$ and if the bureaucrat pools then $\lambda_x = q_x$.

Proposition 1. *Consider a judge with bias θ_J. When $x = a$, he allows the policy to pass if $\lambda_a \geq \frac{1-\theta_J}{2}$. For $x = b$, he allows the policy to pass if $\lambda_b \geq \frac{1+\theta_J}{2}$.*

Note that, as we assume $|\theta_J| \leq 1$ there always exists some level of effort that would convince the judge to rule against her ex ante ideologically preferred policy. Furthermore, this implies that if the judge learns ω through outside information then his decision to uphold x or not always is optimal in terms of social welfare.

Analysis of the judge's decision is straightforward. As the status quo results in a payoff of zero he allows policy x if $\theta_J h(x) + \lambda_x - (1 - \lambda_x) \geq 0$. The specific cut-point depends on $h(x)$, i.e., on whether policy a or policy b is chosen by the bureaucrat. Furthermore, whether

[12] It is possible that the model could support a separating equilibrium in which the judge overturns one of the policy choices. However, this type of equilibrium does not exist in the parameter space we consider and this type of separation may actually lower social welfare. Thus, it is ruled out on technical grounds and is outside our substantive focus.

the judge will allow the policy depends on λ_x and, thus, on the bureaucrat's equilibrium behavior.

If the bureaucrat chooses x according to s_B then $\lambda_x = p(e)$. Thus, for the judge to be willing to uphold either policy it must be that $p(e) \geq \max\{\frac{1-\theta_J}{2}, \frac{1+\theta_J}{2}\}$, which yields $e \geq |\theta_J|$. Define this constraint as $\overline{e}_{\theta_J} = |\theta_J|$. When the bureaucrat pools on policy a in the policymaking stage if $\theta_J > 0$ then the judge is favorable towards the bureaucrat and will allow policy a — even if the bureaucrat acquires no new information. On the other hand, if $\theta_J < 0$ then the judge is antagonistic towards the bureaucrat and does not allow a to pass without additional information; however, he would allow policy b to pass even with zero effort.

Intuitively, if the judge is sufficiently biased towards the bureaucrat's policy choice he is willing to accept this policy even if he believes it is unlikely that it maximizes society's welfare. Similarly, if the judge's personal ideology is opposed to the policy choice then he requires significantly stronger evidence to not overturn the policy. As the judge becomes more ideologically motivated, his standards of evidence to allow each policy become more divergent.

Next we analyze the bureaucrat's optimal effort. To facilitate the analysis, define the expected utility to the bureaucrat of choosing policy x given that she has observed the signal s_B and exerted effort e as $\overline{U}(x|s_B, e)$ if x is expected to be upheld and $\underline{U}(x|s_B, e)$ if x is expected to be overturned.

First, given that she has exerted effort $e \geq \overline{e}_{\theta_J}$, and so the judge is willing to accept the policy, it must also be incentive compatible for the bureaucrat to choose $x = s_B$. This imposes two constraints:

$$\overline{U}(x = a|s_B = a, e) \geq \overline{U}(x = b|s_B = a, e), \text{ and}$$

$$\overline{U}(x = b|s_B = b, e) \geq \overline{U}(x = a|s_B = b, e).$$

The first constraint is satisfied as $\theta_B \geq 0$. For the second, given the judge's equilibrium behavior, we have $\overline{U}(b|s_B = b, e) = \sigma(-\theta_B p(e) - k(1-p(e))) - (1-\sigma)\theta_B$ and $\overline{U}(a|s_B = b, e) = \sigma(-kp(e) + (1-p(e))\theta_B) + (1-\sigma)\theta_B$. Comparing terms yields that if $p(e) \geq \frac{1}{2} + \frac{\theta_B(2-\sigma)}{2\sigma k}$ then there exists a perfect Bayesian equilibrium of this subgame in which the bureaucrat chooses $x = s_B$. Define the effort level that solves this equality as $\overline{e}_{\theta_B}$, which can be written explicitly as $\overline{e}_{\theta_B} = \frac{\theta_B(2-\sigma)}{\sigma k}$.

The bureaucrat may still want to exert positive effort beyond that imposed by the judicial and bureaucratic incentive compatibility constraints if she knows she will be playing the separating strategy. Positive effort can occur because the bureaucrat wants to increase her odds of not being overturned by the judge or because it may be the only way to have a judge who has an antagonistic preference to approve her preferred policy. Thus, assuming she will play a separating strategy, the bureaucrat's expected utility for exerting effort e is

$$\frac{1}{2}\overline{U}(x = a|s_B = a, e) + \frac{1}{2}\overline{U}(x = b|s_B = b, e) - c(e), \tag{1}$$

which we define as $V^S(e)$. Maximizing yields a unique[13] optimal effort

$$\hat{e} = 1 - \sqrt{\frac{2C}{\sigma^2 k}}.$$

If, in equilibrium, the bureaucrat separates in the policymaking stage then her optimal effort must maximize (1) subject to the constraint $e \geq \max\{\overline{e}_{\theta_B}, \overline{e}_{\theta_J}\}$ and so, given our analysis, she must exert effort $e^* = \arg\max\{\hat{e}_{\theta_B}, \overline{e}_{\theta_B}, \overline{e}_{\theta_J}\}$.

The bureaucrat faces two tradeoffs when making policy. The first is minimizing her chances of being overturned versus the cost of exerting effort. The second is separating to reduce her probability of being overturned, which requires her to sometimes choose policy b, versus choosing her ideologically preferred policy a. In equilibrium, for policy to be made

[13]Her expected utility of exerting effort e and choosing the policy $x = s_B$ is given by $V^S(e) - c(e)$. This expression is twice differentiable in e and yields a second derivative $-c''(e)$ and, as c is strictly convex, this expression is < 0. Thus, the maximization problem is strictly concave in e and first order conditions are sufficient and $\hat{e}$ solves $\frac{\partial}{\partial e}[V^S(e) - c(e)] = 0$

according to better information than the prior we need that (1) given e, the effort exerted, it is incentive compatible for the bureaucrat to choose the policy that matches her signal, (2) the judge will allow either policy to pass, and (3) the bureaucrat is willing to expend the required effort over expending no effort and choosing a policy.

We now study the policy choice when the judge's ideology is favorable towards the bureaucrat. If a separating equilibrium does not exist in the policymaking stage then the only pooling strategy that exists is for the bureaucrat to choose policy a. Additionally, if the bureaucrat anticipates pooling on a then she expends no effort. If the bureaucrat always chooses policy a the judge will allow it (barring new outside information). However, if the bureaucrat always chooses b the judge will overturn the policy. Additionally, if the bureaucrat exerts sufficiently high effort and separates according to her signal the judge upholds the policy. The cut-point θ_B^* solves for the the bias of the bureaucrat who is indifferent between exerting effort e^* and choosing policy according to her signal versus exerting no effort and pooling on her preferred policy. Our next proposition shows how the extent of a bureaucrat's policy motivation influences how these tradeoffs play out with a sympathetic judge.

Proposition 2. *Assume $\theta_J \geq 0$. If $\theta_B \in [0, \theta_B^*)$ then the bureaucrat exerts effort $e^* > 0$. Furthermore, the bureaucrat chooses the policy $x = s_B$. If $\theta_B \geq \theta_B^*$ then the bureaucrat exerts no effort and chooses $x = a$ regardless of her signal.*

Interestingly, our analysis indicates that when the judiciary is favorably disposed toward the bureaucrat a new policy is always enacted unless the judge receives outside information to the contrary. Thus, with aligned preferences in the bureaucracy and judiciary we would expect to see few overturned policies.

This proposition also highlights the benefits of a bureaucrat with low policy motivations as, under this type of judicial review and contrary to previous studies, a neutral bureaucrat produces a better outcome than a policy zealot. This occurs for two reasons. The first is that she is willing to choose the policy that matches her signal. As such, she makes no attempt to deceive the judge and does her best to pass the policy that she believes is best for society given her signal. The second is that she exerts positive effort and generates an informative signal about the state of the world. Conversely, if the bureaucrat has overly strong policy motivations, she exerts no effort to improve the precision of her information. Furthermore, any new information that was gathered would be disregarded as she always selects her ideologically preferred policy. Thus, unless the judge receives supportive and informative outside information, the belief that the policy maximizes social welfare does not increase from the prior. However, the next result and extensions will reintroduce a role for bureaucrats who exhibit a non-trivial level of policy bias.

Our next proposition characterizes actions when the judge has policy preferences opposed to the bureaucrat's. In this case, it is possible for equilibria to exist in which the bureaucrat pools on policy a or b. If $e = 0$ then the bureaucrat always prefers to choose one of these policies over the other. Furthermore, even if $e > 0$ and multiple equilibria may exist due to off path beliefs choosing $e > 0$ and anticipating either pooling equilibrium is dominated by expending $e = 0$ and choosing the unique optimal policy. The cut-point $\underline{\theta}_B$ solves for the bias of the bureaucrat who is indifferent between pooling on policy b and expending no effort versus expending effort and separating; on the other hand, $\overline{\theta}_B$ solves for the bureaucrat indifferent between exerting no effort and pooling on b or separating.

Proposition 3. *Assume $\theta_J < 0$. If $\theta_B \in (\underline{\theta}_B, \overline{\theta}_B)$ then the bureaucrat exerts effort $e^* > 0$ and chooses the policy $x = s_A$. If $\theta_B \leq \underline{\theta}_B$ or $\theta_B \in [\overline{\theta}_B, \theta_B^\circ)$ then the bureaucrat exerts no effort and always chooses $x = b$. If $\theta_B \geq \theta_B^\circ$ then the bureaucrat exerts no effort and always chooses $x = a$.*

In this case bureaucrats with weak and strong policy motivations pool on one policy and exert no effort. The bureaucrat with a low or moderately strong policy motivation proposes a different policy than her counterpart with a high motivation. A bureaucrat with a low motivation is, in essence, captured in that she is compelled to pander to the judge. This occurs because she does not care what gets passed and places a premium on being upheld while exerting no effort. A bureaucrat with a moderately strong bias also expends no effort and pools on policy b. For this bureaucrat her bias is strong enough that it is not worth expending the effort to be able to separate in the policy stage, yet the bias is still weak enough that when expending no effort she panders to the judge. Alternatively, similar to before, a highly biased bureaucrat will pool on her ideologically preferred policy. Further, if the judge is antagonistic and the bureaucrat has strong policy preferences then the policy is overturned unless the judge receives other information. Thus, we would expect to see more policies overturned when the judge and bureaucrat have misaligned ideologies. This result is both intuitive and comports with the previously mentioned empirical work on this topic and provides a mechanism through which this occurs. Additionally, this finding holds even though all types of judges in the model place some weight on social welfare and can potentially be persuaded to rule contrary to their ideological beliefs. From a social welfare perspective, when preferences are misaligned, a bureaucrat with a moderate ideological bias is preferred as she will separate and engage in effort. Primarily due to the effects of judicial review and the interaction of motivations, and from a societal rather than from the principal's perspective, this recovers, in a new setting, the result that some policy bias for the bureaucrat is desirable. The mechanism which we identify differs from those found in other studies such as Gailmard and Patty (2007) and Prendergast (2007, 2008).

In summary, and as Figure 1 illustrates, when we juxtapose Propositions 2 and 3 we find instances of three types of bureaucratic behavior depending on the extent of bureaucratic and judicial bias and the alignment or misalignment of their preferences. Sometimes the bureaucrat pools on her preferred policy, sometimes she separates,[14] and sometimes she simply panders to what the judge prefers.

[14]It may be the set of bureaucrats who separate is empty, however, for k sufficiently large the separating region will always exist.

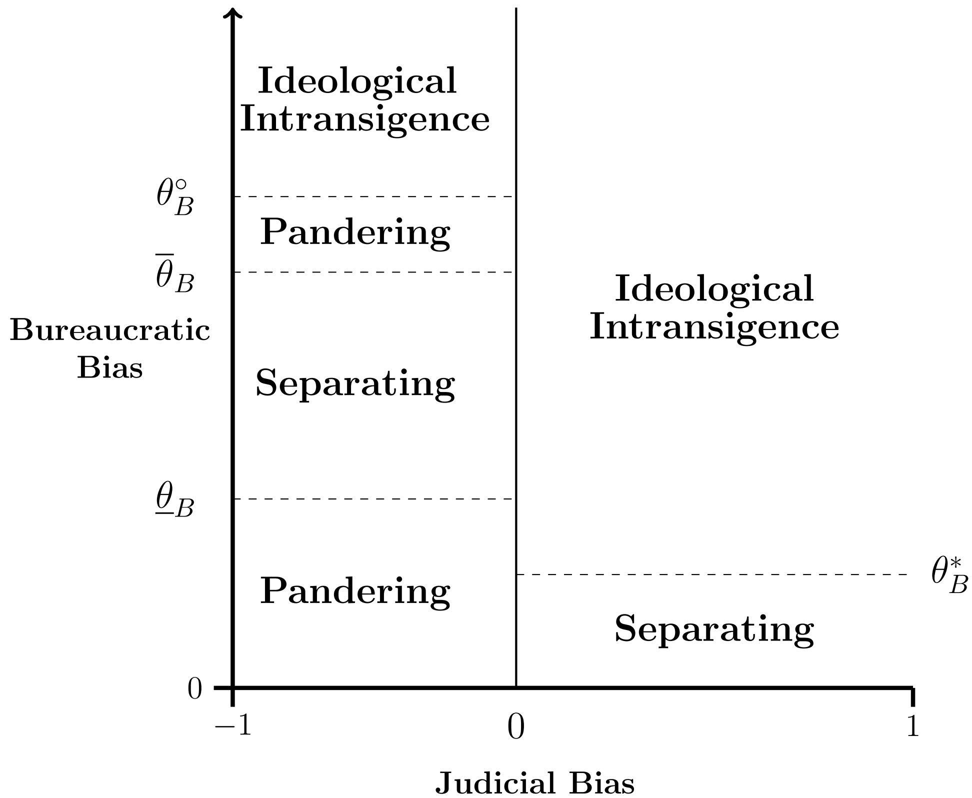


Figure 1: Bureaucratic Behavior by Different Weightings of Ideology

Welfare Effects

We now leverage the characterization of equilibria from the previous section to consider the impact of different judicial and bureaucratic motivations and institutional parameters on social welfare. Changes in the parameters of the model can impact social welfare through two channels. The first is that, given the bureaucrat expends positive effort, higher equilibrium effort levels increase welfare. Effort improves the accuracy of the bureaucrat's information and raises the probability that the correct policy is chosen. The second is the effect of a change on the set of biases for which the bureaucrat is willing to separate, as illustrated by the size of the two separating areas in Figure 1, and exert effort in the first place. Increasing these sets make it so that bureaucrats with a larger variety of policy motivations are still willing to expend effort and choose policy according to their information. This raises the ex ante probability of getting a bureaucrat that will separate, improving social welfare.

Effect of Bureaucratic Bias on Welfare. We begin by examining the effect of the bureaucrat's bias on effort. If the policy is reviewed by a friendly judge then increasing the bureaucrat's bias can only decrease social welfare. This is because among the set of bureaucrats that expend positive effort this effort is unchanging in bias, and if the bias becomes too strong then the bureaucrat expends no effort. If the judge has a policy preference opposed to the bureaucrat then bias can have a non-monotonic effect on social welfare. Since more neutral bureaucrats may expend no effort and pander by choosing the judge's preferred policy a moderate level of bias may be ideal. Overly strong policy motivations, however, still have a negative effect on social welfare. Overall, the effect of bureaucratic bias is complex, as increasing θ_B may increase or decrease social welfare.

Effect of Judicial Bias on Welfare. We now turn to examining the effect of judicial bias, when judicial motivations are strong and so $e^* = \overline{e}_{\theta_J}$. Regardless of the judge's ideological predisposition, increasing θ_J increases the amount of information the bureaucrat gathers *conditional* on being willing to expend positive effort. This is because stronger evidence is needed for the judge to uphold the policy which he ideologically dislikes. Eventually, however, judicial bias reaches the point where the amount of effort required to sway the court is too costly for the bureaucrat and she chooses to pool on a policy and exert no effort. Stronger judicial preferences force the bureaucrat to expend more effort to pass policy. Thus, increasing θ_J causes θ_B^* to shrink, resulting in fewer bureaucrats willing to expend effort and play the separating strategy. This causes the bureaucrat's effort to be non-monotonic in ideological bias and creates a tension in terms of social welfare: stronger judicial preferences lead to higher effort, conditional on non-zero effort, but a lower chance that the bureaucrat is willing to exert any effort whatsoever. The nature of this non-monotonic effect is depicted in Figure 2.

It is possible, however, to compare social welfare when the judge has preferences aligned with the bureaucrat versus when the bureaucrat and judge have opposing ideologies. For a given strength of judicial bias $|\theta_J|$, the set of bureaucrats willing to expend effort and separate in the policymaking stage when the judge is aligned with the bureaucrat is always a *subset* of the set willing to separate when the judge is opposed to the bureaucrat. Thus, ex ante drawing a bureaucrat at random when the judge is misaligned produces a higher probability of getting a bureaucrat that is willing to try and implement the socially optimal policy compared to when the judge and bureaucrat have aligned preferences. This occurs because the antagonistic judge will overturn the bureaucrat's preferred policy if she exerts no effort, and this encourages her to sometimes play the separating strategy whereas under a friendly judge she would have pooled.

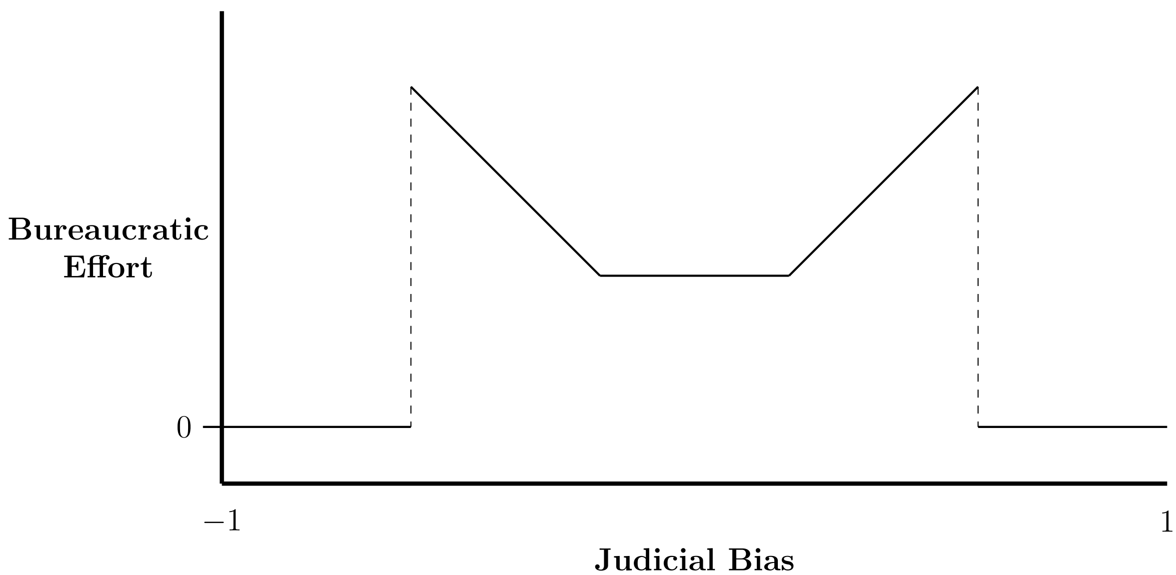


Figure 2: Bureaucratic Effort as a Function of Judicial Bias

Effects of Non-ideological Parameters on Welfare. The parameter c, the costs of agency information gathering, affect social welfare in a straightforward manner regardless of whether the judge and bureaucrat share preferences. Simply put, decreasing c improves social welfare. Social welfare enhancement occurs through both channels of influence. That is, the set of bureaucrats willing to separate and the amount of effort the bureaucrat exerts when she does separate both increase.

By contrast, the effect of σ, the probability that the judge learns the true state of the world from outside sources, on social welfare is more nuanced. While σ effects social welfare through the previously mentioned two channels, it also has the direct effect of revealing information to the judge. If either judicial bias is weak and bureaucratic bias is weak to moderate or if judicial bias is relatively strong, that is when $e^* \in \{\hat{e}_{\theta_B}, \overline{e}_{\theta_J}\}$, then an increase in σ has the anticipated effect of improving social welfare through all channels. Strikingly, if bureaucratic bias is strong (regardless of whether this bias is aligned with the judge's), and so $e^* = \overline{e}_{\theta_B}$, then increasing the probability that the judge receives outside information actually *decreases* the effort expended by the bureaucrat. This occurs because the bureaucrat's incentive to separate increases and, therefore, she does not need to be as certain that she will be upheld for separating to be incentive compatible and can exert less effort. However, in this case effort is already relatively high, and higher σ still increases θ_B^*. As such, in general we anticipate that increasing σ improves social welfare.

Discussion

The results from the analysis above have a variety of implications for policy prescriptions designed to improve social welfare. One implication is largely negative, the other principally positive. Negatively, our results show, given the complicated relationship between ideological bias and welfare, that adjusting the ideological composition of the bureaucracy or judiciary will be fraught with problems. Notably, our findings imply that calibrating how much an agency is composed of policy-motivated bureaucrats will not straightforwardly translate into improved performance given the numerous circumstances that we have identified which can undermine the potential for policy motivations to translate into superior outcomes. Indeed, when we examine the relationship between empirical measures of bureaucratic motivation and agency performance we produce, as our results would lead us to expect, a very weak, indeed statistically insignificant, relationship between the two.[15]

[15] We gauge motivations via the item response theory measure developed by Bertelli et al. (2015) using large-scale surveys of federal employees, and we measure agency performance with so-called PART scoresefforts to measure agency performance developed by the Bush administration in the first decade of the century (drawn from Lewis (2007)). While we do not suggest that the lack of a relationship between these measures

Positively, our results indicate that it is likely better to influence bureaucrats (especially) and judges through their non-ideological motivations. This can be accomplished in a variety of ways.

Perhaps most notably, our analysis indicates that policies reducing the costs to bureaucrats of information gathering are likely to have high social payoffs regardless of the preference alignments between judges and agencies. For example, it has been long maintained that establishing a semi-independent Bureau of Environmental Statistics would be a valuable means of providing needed information to the Environmental Protection Agency (e.g., Morgenstern and Portney (2004)). In our parlance, such a Bureau would effectively reduce bureaucratic information costs, what we denoted as C in our model, which we showed would unambiguously improve social welfare.

Our findings also suggest that, except in rare occasions where bureaucrats have strong policy preferences and yet still are willing to choose their least preferred policy sometimes, providing judges with analogous access to outside information would improve social welfare. Larger staffs, higher budgets, or even the development of specialized courts could all benefit society by increasing σ.

Additionally, our model indicates that bureaucratic transparency in terms of observation of agency effort may have some previously unrecognized virtues. In our analysis we assume that the judge observes e. If, instead, effort is unobservable there would be much less separation by the bureaucrat, lowering social welfare. Positive effort and separation would only occur when $\hat{e}$ is optimal as, otherwise, the bureaucrat would be incentivized to deviate in equilibrium.

We may also want to consider how allowing the bureaucrat to choose to retain the status quo could impact our results. In such a world, we would expect to see more policy change from bureaucrats with stronger policy motivations, while neutral bureaucrats would be dis-

(shown graphically in the appendix) is unambiguous proof that there is no relationship between motivation and output quality in the real world, as the validity of each measure relative to the underlying concept can be questioned, it is certainly quite striking that there is no statistically significant relationship whatsoever. Our analysis, of course, offers a potential explanation for this lack of a pattern.

incentivized from doing anything. However, even motivated bureaucrats would do nothing if they observe a signal that suggests that their less preferred policy is socially better. Overall, in our setting, allowing the bureaucrat to do nothing lowers social welfare, even aside from the issue of "policy drift" should the status quo be retained, and indicates that forcing the bureaucrat to make a choice between policies may be beneficial.

Extensions

We now consider four extensions, all of which to one degree or another try to build more realism into our model. The first incorporates the case where there are not flat priors and q is not equal to 1/2. The second, involves instances, as are sometimes maintained to occur, where the political system produces extreme justices. The next extension assumes that the bureaucrat does not know who will review her policy and, thus, is uncertain about the judge's ideology. Finally, we assume that learning about one policy's consequences will not lead to knowledge about all policy alternatives.

Prior Belief

Thus far we have assumed that, ex ante, the players believe each policy is equally likely to be the correct choice in terms of social welfare, that is $q = 1/2$. We now study how relaxing this assumption alters judicial behavior and the bureaucrat's effort by instead assuming that q can take any value between 0 and 1.[16]

Beginning with judicial behavior, now the judge's decision to overturn the policy or not is affected by q — the prior belief that $\omega = a$. If q increases, the strength of evidence that the judge requires to approve policy a decreases. As we have seen, it is important to know when the judge allows a policy to pass even if the bureaucrat exerts no effort. Using our

[16] Changing the prior in this way can also affect when the bureaucrat engages in the three types of behaviors (ideological pooling, separating, and pandering) we have described. The characterization given for our main model, however, will hold under some regions of the parameter space and the result that an overly strong bureaucratic bias will lead to no effort being expended will hold generally.

first proposition, the judge will allow policy a if $\theta_J \geq 1 - 2q$ and will overturn it otherwise. Similarly, if the bureaucrat chooses policy b the judge will allow the policy if $\theta_J \leq 1-2q$ and overturn it if $\theta_J > 1 - 2q$. Let $\theta_J^* = 1 - 2q$. Thus, if $q > 1/2$ we have $\theta_J^* < 0$; as such a judge with an ideology opposed to policy a may still allow a absent new information. Similarly, if $q < 1/2$ then $\theta_J^* > 0$ and so more types of judges are willing to allow policy b over policy a. Here we can think of the judge having an induced preference for policy a (b) if $\theta_J > \theta_J^*$ ($\theta_J < \theta_J^*$). Unlike when $q = 1/2$, the judge's induced preference depends on both the weight he places on ideology and his prior information about the policies.

The bureaucrat's incentive compatability constraint and the judge's willingness to uphold both policies are still important and may affect effort; however, our main point of interest involves how the prior changes the effect of the bureaucrat's bias on her optimal effort, call it $\hat{e}_{\theta_B}$, when the judicial and bureaucratic incentive compatibility constraints do not bind.

Proposition 4. *If $q > 1/2$ and $e^* = \hat{e}_{\theta_B}$ then, amongst the set of bureaucrats who do separate, stronger bias leads to more effort and, thus, more information acquisition. If $q < 1/2$ and $e^* = \hat{e}_{\theta_B}$ then effort is decreasing in bias among those that do expend positive effort.*

The intuition for this result is straightforward. In the first case the bureaucrat thinks it likely that she will be able to implement her preferred policy by expending effort. This again brings about a direct role for bureaucrats with stronger policy preferences — even when the judge has an induced policy preference in favor of the bureaucrat. Additionally, effort is non-monotonic in bias, as higher bias leads to higher effort until effort discontinuously drops to zero. However, in the second case the bureaucrat believes it unlikely that $\omega = a$ and this dampens her incentive to acquire information. Thus, the effect of bureaucratic bias depends on whether the bureaucrat's ideologically preferred policy is ex ante likely to be beneficial for welfare. This is illustrated in Figure 3, which shows a stylized graph of bureaucratic effort under different priors as a function of bias when the judge has an induced ideology favoring the bureaucrat's preferred policy.

Whether or not bureaucrats have preferences aligned with policies that are likely to be good for society is non-obvious, i.e., it is not clear what we should observe empirically. On the one hand, many bureaucrats are highly expert and might, therefore, tend to want to make the right choices. Conversely, bureaucrats may be unduly interested by outside interests such that they go native and develop beliefs about best policies that is inconsistent with social welfare or have professional training that leads to favoring policy options not consistent with social welfare, e.g., biologists might prefer environmental quality without weighting economic costs. In short, allowing the bureaucrat to have priors that vary from 50-50 underscores how the relationship between ideological bias and social welfare is indeterminate due to numerous complications and reinforces the importance of modifying institutional features and non-ideological motivations as means of improving outcomes.

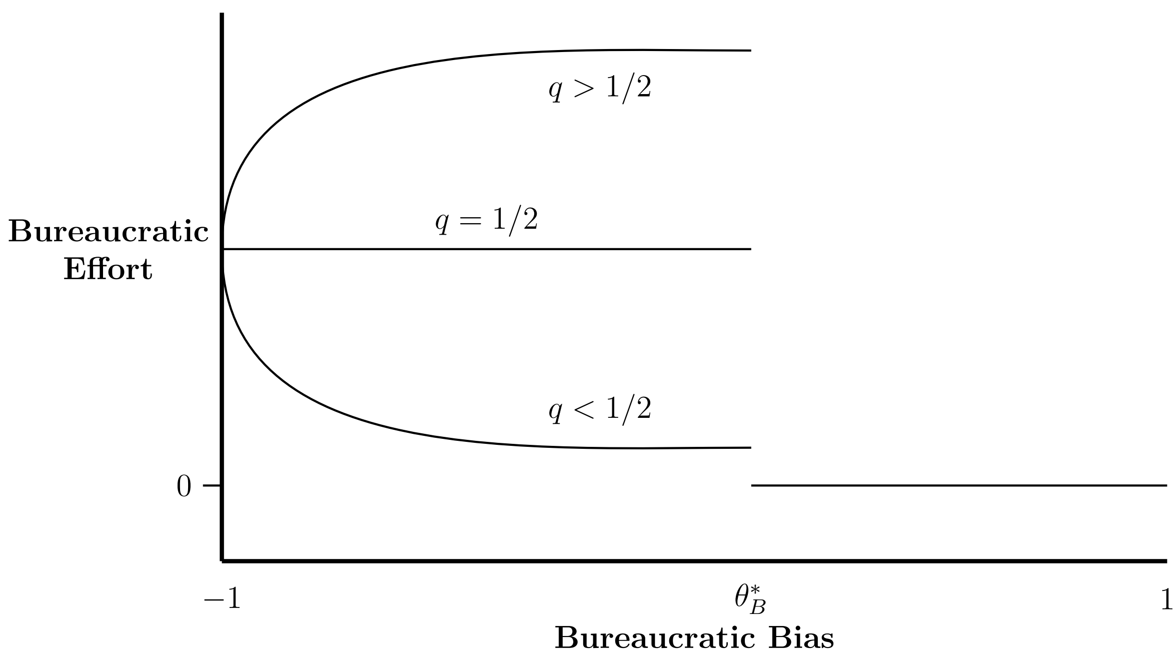


Figure 3: Bureaucratic Effort as a Function of Bureaucratic Bias

Judicial Extremists

The previous sections analyze the model assuming relatively moderate judges, i.e., where $|\theta_J| < 1$. Using Proposition 1 we see that this assumption implies that there exist strengths of evidence for which the judge is willing to allow his least preferred policy and for which he is willing to overturn his most preferred policy. It may be, as sometimes is the case according to empirical studies of ideology, that the judge has an extreme policy preference; such situations may become even more likely in the United States if the filibuster rule remains suspended for judicial appointments below the level of the Supreme Court. To capture this possibility let $|\theta_J| > 1$. In this instance, Proposition 1 implies that if $\theta_J < 0$ then μ_x would have to be greater than 1 to allow $x = a$ and $\mu_x < 0$ to overturn $x = b$ and vice versa for $\theta_J > 0$. Thus, the judge always accepts his preferred policy and always overturns his least preferred policy — even if he perfectly learns the state of the world. This intransigence yields the following result for bureaucratic behavior.

Proposition 5. *If $\theta_J > 1$ then the bureaucrat chooses $x = a$ and this policy is always allowed. If $\theta_J < -1$ and $\theta_B \leq k(1 - \sigma)$ then the bureaucrat chooses $x = b$ and this policy is always allowed; otherwise she chooses $x = a$ and the policy is always overturned. In either case she exerts zero effort.*

When the judge is ideologically extreme the bureaucrat never exerts effort and separating equilibria do not exist. With low policy motivation the bureaucrat knows she can always avoid being overturned by catering to the judge's preferred policy. As before, the bureaucrat with low policy motivation panders and the judge's ideal policy always prevails. On the other hand, the highly motivated bureaucrat wants to avoid having her non-preferred policy implemented at all costs and so always chooses $x = a$. If the judge is friendly toward the bureaucrat then this policy will always be allowed. Both the bureaucrat and judge achieve their desired policy outcome. If the judge is hostile toward the bureaucrat then this policy is always overturned and the status quo always prevails.

The resulting pooling behavior is somewhat similar to that uncovered in earlier propositions when the bureaucrat placed a strong weight on personal policy preferences and there is no separating equilibrium. The consequences for social welfare, however, are more dire when it is the judiciary that has an extreme preference. This is because there is some probability of the judge discovering the true state of the world when the bureaucrat is a policy extremist. While the bureaucrat pools on her policy choice, outside information creates the possibility for the judge to make a more informed decision about allowing or overturning the policy. In contrast to a moderate judge, where this improves the expected social welfare over pure chance, if the judge has extreme policy preferences the outside information does not influence the judge's decision at all and the judge no longer helps to improve the final outcome.

Unknown Judiciary

In the real world, it is common that a bureaucrat will not know who will judge the legality of an action. Only the possible judges to whom a case might be assigned, and presumably the distribution of their ideological proclivities, will be known. To capture this, we now consider a world in which there is a pool of judges from which one is drawn to review the bureaucrat's policy choice. We conceptualize the resulting uncertainty as the bureaucrat's expectation about the proportion of each type in the judiciary.

To ease the analysis and focus on the primary tradeoffs we simplify the information acquisition process. Specifically, the bureaucrat may pay a cost $\overline{C}$ to learn ω with probability 1 or incur no costs and remain uninformed. Further, we modify the model so the bureaucrat believes that the judge has bias $\theta_J = 1$ with probability γ and has bias $\theta_J = -1$ with probability $1-\gamma$. Proposition 6 characterizes when the bureaucrat is willing to pay to learn the state of the world and make policy based on this information.

Proposition 6. *Assume the bureaucrat has bias $\theta_B \leq \frac{\sigma k}{2-\sigma}$. If $\overline{C} \leq C^*_{\theta_B}$ then the bureaucrat purchases information and separates according to her signal. Furthermore, the parameter $C^*_{\theta_B}$ is maximized at $\gamma^*_{\theta_B}$ which is decreasing in θ_B.*

As $C^*_{\theta_B}$ becomes larger it becomes more likely that a bureaucrat with a given ideology separates and so increases social welfare. Additionally, as the bureaucrat becomes more biased it is optimal to decrease the proportion of judges who have an ideology opposed to the bureaucrat. This shift will decrease the bureaucrat's incentive to pool on her preferred policy as it is likely she will get overturned. Additionally, the only way the bureaucrat is able to achieve her preferred policy is by exerting effort and, as she gets stronger preferences, her incentive to try and implement this policy increases.

Conversely, as the bureaucrat becomes less biased having a greater variance of judicial ideology is optimal. Greater variance will increase the number of bureaucrats who separate by reducing the incentives for pooling to those with low policy motivations. This is because the bureaucrat is highly unsure to which type of judge she should pander. Substantively, this implies that, even if only one judge oversees a decision, overall the judiciary should be composed of a blend of ideologies when dealing with bureaucrats who are not strongly ideologically motivated.

Policy Independence

Thus far we have assumed that a single policy is ideal for society and that learning about the state of the world will reveal fully the effectiveness of all policies. This assumption of a perfect negative correlation between policies is typical in models of bureaucratic expertise (e.g., Prendergast (2007), Stephenson (2007), and Gailmard and Patty (2013)). However, in reality, there may be instances where correlations are weaker, and the effectiveness of all alternative policies cannot be inferred by learning about a single policy (see Callander (2011) for a more nuanced takes on policy learning). For example, an Environmental Protection Agency study about the effects of a cap-and-trade policy on carbon emissions (Barack Obama's initial proposal) will not necessarily be informative about the effects of the alternative of regulating power plants on such emissions (the later action in the Obama administration).

In light of the possibility that learning about one policy is not equivalent to learning about all, we alter the model as follows. There is a state of the world $\omega = (\omega_a, \omega_b)$, with

$\omega_x \in \{-1, 1\}$. The payoff to society of policy x is ω_x. Assume that for either policy $x \in \{a, b\}$ the probability that $\omega_x = 1$ (or -1) is $1/2$. Thus, with probability $1/4$ both policies are an improvement over the status quo, with probability $1/2$ one policy is an improvement and the other makes the situation worse, and with probability $1/4$ both are inferior to the status quo. The bureaucrat exerts effort $e = (e_a, e_b)$ at cost $c(e_a)$ and $c(e_b)$ and receives a signal $s_B = (s_B^a, s_B^b)$. Similar to before, the probability that $s_x = \omega_x$ is $\frac{1+e_x}{2}$. For this result we assume that the judge has neutral policy preferences, $\theta_J = 0$, and focus on the incentives of the bureaucrat to acquire information. Our proposition studies the bureaucrat's effort when it is possible to support an equilibrium where, after she has exerted effort, the bureaucrat's policy choice maximizes expected social welfare and the incentive compatibility constraint does not bind.

Proposition 7. *Assume $\theta_J = 0$.*

If θ_B is sufficiently small then the bureaucrat exerts effort $e^* = (e_a^*, \max\{0, e_b^*\})$ where e_a^* solves

$$\frac{\sigma}{8}(\theta_B + k) = c^{'}(e_a),$$

and e_b^* solves

$$\frac{\sigma}{8}(k - \theta_B) = c^{'}(e_b).$$

If $s_B = (-1, 1)$ the bureaucrat chooses $x = b$ and if $s_B \in \{(1, 1), (1, -1), (-1, -1)\}$ the bureaucrat chooses $x = a$. Following this, the judge allows the policy choice unless he receives outside information to the contrary.

This highlights another potential benefit of a bureaucrat with non-trivial policy motivations. If $\theta_B > k$ then the total amount of effort exerted is greater than if the bureaucrat has more neutral policy preferences. This result that higher bias can correspond to higher effort relates to a variety of previously mentioned findings in the literature showing that policy-motivated bureaucrats work harder. However, this benefit comes with two caveats. The first is that policy-motivated bureaucrats expend their efforts less efficiently. As such a bureaucrat becomes more zealous she spends less energy investigating the policy she dislikes, although this may not increase social welfare.

We should note that the results from this extension must be viewed with some caution in being interpolated to the real world. Whereas in the original model we assume that learning about one policy completely reveals about the other, here we assume the opposite, i.e., it reveals nothing. Obviously, while providing insight into the effect of different assumptions on how bureaucrats learn about policies may affect outcomes, the reality is likely to be imperfect learning about the alternative. While previous work on bureaucracy and complex policy learning has been conducted on issues like delegation (Callander et al. (2008)) and regulatory capture (McCarty (2013)), further investigation into agency-court interactions and policy learning constitutes an interesting avenue for future research.

Conclusion

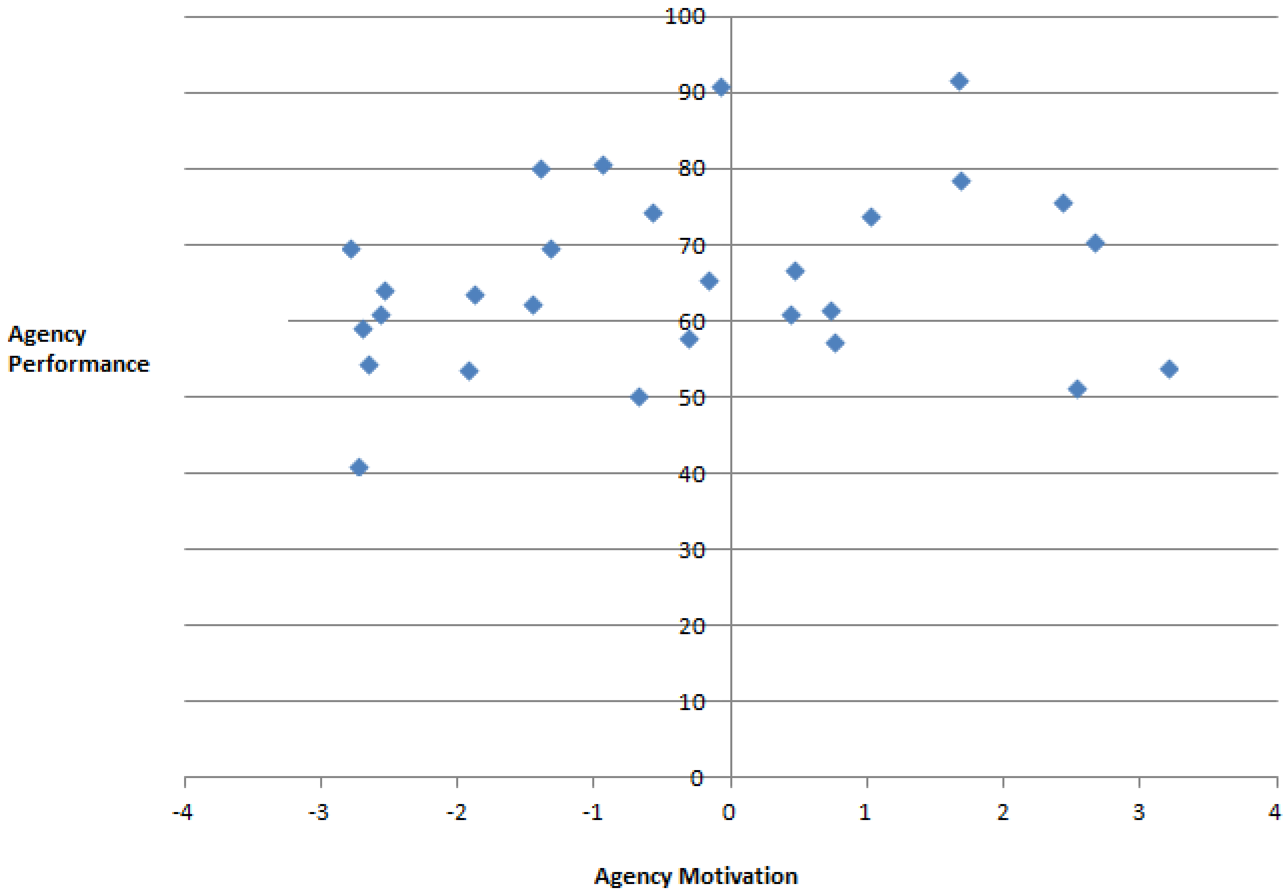
Particularly in our current era of gridlock, interactions between bureaucrats and agencies are incredibly important for understanding government policymaking and its implications for society. Our analysis, to the best of our knowledge, is considerably more inclusive than past work on different potential motivations in both the judiciary and bureaucracy and yields key insights into how these interactions affect policy outcomes. We show that there is no one simple inference that can be drawn, such as that we are better or worse off with bureaucrats or judges with strong ideological preferences.

Rather, the production of high quality policies is dependent on the interaction of both actors' preferences. We study how outcomes are affected by the motivations of bureaucrats and judges and show that ideological conflict between the two institutions improves welfare. However, overall the relationship between ideological bias and welfare is complex and, from a policy prescription perspective, successful interventions would typically need to alter the incentives of both bureaucrats and judges. Only adjusting the incentives of one may actually lead to unanticipated adverse consequences. In light of this, we analyze how altering non-ideological features of the model influences welfare and find that increasing the bureaucrat's capacity to acquire new information always improves policy outcomes and under most circumstances doing the same for a judge would be societally-improving as well.

In the future, beyond opportunities already mentioned, there are obvious areas to explore to enrich the model we have presented in this paper. One possibility is to allow judges, as is commonly the case, to remand a policy back to the bureaucrat and allow or demand an alternative be advanced creating a process in which policy is altered and refined over multiple stages. A second possibility is to consider a bureaucrat who must allocate effort and make policy over multiple issue areas. While we conjecture that, given the structure of incentives defined in our model, our main intuitions would continue to hold in some form these extensions would represent significant departures from our main model and additional substantive insights could be generated.

APPENDIX A: Data

Figure 4: Relationship between Agency Performance and Motivation



Note: Performance is measured using PART scores and motivation is assessed using the measure in Bertelli et al. (2015). Correlation between the two measures is .24, with a p-value of .216.

APPENDIX B: Proofs

Define the expected utility to the bureaucrat of exerting no effort and pooling on a policy x to be

$$\underline{V}^P_{\theta_B}(x) = \sigma(\frac{1}{2}h(x)\theta_B - \frac{1}{2}k) - (1-\sigma)k,$$

if she expects the policy to be overturned. Otherwise, let

$$\overline{V}^P_{\theta_B}(x) = \sigma(\frac{1}{2}h(x)\theta_B - \frac{1}{2}k) + (1-\sigma)h(x)\theta_B,$$

be the bureaucrat's expected utility when she expects the policy to be upheld.

Next, define $\overline{\sigma}$ as

$$\overline{\sigma} = \min\left\{\frac{1}{2}, \frac{3}{2} - \frac{1}{2}\sqrt{\frac{1+9|\theta_J|}{1+|\theta_J|}}\right\}.$$

Finally, it will be useful to define the solution to $\hat{e} = \overline{e}_{\theta_B}$ as $\tilde{\theta}_B$. Specifically,

$$\tilde{\theta}_B = \frac{k\sigma\left(1 - \sqrt{\frac{2c}{k\sigma^2}}\right)}{2-\sigma}.$$

The judge's optimal decision is analyzed in the text. Beliefs consistent with the bureaucrat's actions will be substituted into the decision rule of the judge throughout the analysis. Thus, to prove the propositions we need to analyze the bureaucrat's behavior. We separate this into two cases based on whether the judge is friendly ($\theta_J > 0$) or opposed ($\theta_J < 0$) to the bureaucrat ideologically.

Proof of Proposition 2.

First we characterize equilibria of the policymaking subgame given that the bureaucrat has expended effort e. Using this we characterize the bureaucrat's optimal effort.

Policy Choice. Let $\theta_J > 0$ and assume that the bureaucrat has expended effort e. First, we want to know when there exists a separating equilibrium in which the bureaucrat chooses $x = s_B$ and the judge upholds either policy. From the text, we have that this occurs when $e \geq \max\{\bar{e}_{\theta_B}, \bar{e}_{\theta_J}\}$. Next, if $e < \bar{e}_{\theta_J}$ and so the judge overturns his least preferred policy, in this case b, is there a separating equilibrium? This would require that the bureaucrat's expected utility for b given $s_B = b$ is greater than her expected utility for a given $s_B = b$, where a is upheld and b overturned. This gives the inequality

$$\sigma(-p(e)\theta_B - (1-p(e))k) - (1-\sigma)k > \sigma(-p(e)k + (1-p(e))\theta_B) + (1-\sigma)\theta_B,$$

which reduces to $e > \frac{1}{\sigma} + \frac{\theta_B}{\sigma k} - 1$. However, to be in this region we must also have $|\theta_J| > e$, and combining these yields the condition $\sigma > \frac{1+\theta_B}{1+\theta_J}$. However, $\frac{1+\theta_B}{1+\theta_J} \geq \frac{1}{2}$ and so $\sigma > \frac{1+\theta_B}{1+\theta_J}$ cannot hold by assumption that $\sigma < \bar{\sigma}$. Thus, this inequality cannot hold and so there does not exist a separating equilibrium in this case.

Next, we show that if a separating equilibrium does not exist then there does exist an equilibrium in which the bureaucrat pools on policy a. Assume the bureaucrat chooses policy a regardless of her signal. In this case, if the judge observes $x = a$ as both types, $s_B \in \{a, b\}$, of bureaucrat choose the same policy $\lambda_a(e) = 1/2$. Thus, since $\theta_J \geq 0$ if the judge does not receive new information he will uphold $x = a$.

If the judge observes policy b this is off the path of play and his belief about the bureaucrat's type, s_B, is unrestricted. Thus, given the bureaucrat has expended effort e, the judge's belief that $\omega = a$ can take any value $[1-p(e), p(e)]$. Therefore, the bureaucrat's expected utility of choosing a given s_B is $\overline{U}_{\theta_B}(a|s_B, e)$ and her expected utility of choosing policy b is $\overline{U}^P_{\theta_B}(b|s_B, e)$ or $\underline{U}^P_{\theta_B}(b|s_B, e)$ depending on if off the path of play $\lambda_b > \frac{1+\theta_J}{2}$ or not. For this to be an equilibrium, we need that the bureaucrat does not want to deviate from $x = a$ following either signal $s_B \in \{a, b\}$. Clearly, $\overline{U}_{\theta_B}(a|a, e) \geq \max\{\overline{U}^P_{\theta_B}(b|a, e), \underline{U}^P_{\theta_B}(b|a, e)\}$ and so the bureaucrat will not deviate when $s_B = a$. Thus, we need to show that $x = a$ is optimal when $s_B = b$. If after $x = b$ off path beliefs are $\lambda_b < \frac{1+\theta_J}{2}$ then the judge overturns policy b and we need that $\overline{U}_{\theta_B}(a|b, e) \geq \underline{U}^P_{\theta_B}(b|b, e)$ and so the bureaucrat will not deviate if

$$\sigma(-p(e)k + (1 - p(e))\theta_B) + (1 - \sigma)\theta_B \geq \sigma(-p(e)\theta_B - (1 - p(e))k) - (1 - \sigma)k.$$

As $\overline{U}_{\theta_B}(a|b, e)$ is increasing in θ_B and $\underline{U}^P_{\theta_B}(b|b, e)$ if this holds at $\theta_B = 0$ it will hold for all θ_B. Thus, we need to show that $-p(e)\sigma k \geq -(1-p(e))\sigma k - (1-\sigma)k$. The left hand side is minimized at $p(e) = 1$ and the right hand side is maximized at $p(e) = 1$. Plugging this in yields the most stringent condition for the bureaucrat to choose policy a: $-\sigma k \geq -(1 - \sigma)k$ which is true if $\sigma < \frac{1}{2}$ which holds by $\sigma < \overline{\sigma}$.

Next, if the bureaucrat chooses policy b and off the path $\lambda_b > \frac{1+\theta_J}{2}$ then the judge will uphold the policy. Thus, we need $\overline{U}_{\theta_B}(a|b, e) \geq \overline{U}_{\theta_B}(b|b, e)$, which gives

$$\sigma(-p(e)k + (1 - p(e))\theta_B) + (1 - \sigma)\theta_B \geq \sigma(-p(e)\theta_B - (1 - p(e))k) - (1 - \sigma)\theta_B.$$

Rearranging we get that this inequality holds if and only if

$$\frac{(2 - \sigma)\theta_B}{\sigma k} \geq e. \tag{2}$$

To see that (2) holds, note we have assumed that a separating equilibrium does not exist and so $e < \max\{\overline{e}_{\theta_B}, \overline{e}_{\theta_J}\}$. If $\overline{e}_{\theta_B} = \max\{\overline{e}_{\theta_B}, \overline{e}_{\theta_J}\}$ or $e \leq \overline{e}_{\theta_B} < \overline{e}_{\theta_J}$ then that (2) holds immediately follows. Finally, it cannot be the case that $e \leq \overline{e}_{\theta_J}$ as this contradicts that the judge's off path belief is $\lambda_b > \frac{1+\theta_J}{2}$. Thus, if the judge upholds b off the path of play (2) holds and the bureaucrat will not deviate from choosing $x = a$.

We conclude our analysis of the policymaking stage by showing that there does not exist an equilibrium pooling on policy b. Assume one does exist and so for any $s_B \in \{a, b\}$ we have $x = b$. In this case, since $\theta_J > 0$ the judge overturns policy b (barring new information). If the bureaucrat deviates to policy a then the judge's belief about the bureaucrat's signal is unrestricted and, similar to before, for a given e we have that the judge's belief that $\omega = a$ can take any value in $[1 - p(e), p(e)]$. In this case, if off the path of play the judge believes $\lambda_a(e) > \frac{1-\theta_J}{2}$ and he will allow policy a; on the other hand, if $\lambda_a(e) < \frac{1-\theta_J}{2}$ then the judge rejects the policy. Clearly, in this case the bureaucrat is worse off if the judge rejects her policy. Therefore, we set the harshest off path beliefs that could be feasible for some e and assume the judge overturns a. For this to be an equilibrium we need that neither type of bureaucrat wishes to deviate from choosing b. Letting $s_B = a$, in this case $\underline{U}(b|a, e)$, then the bureaucrat's expected utility for choosing b is

$$\sigma(-p(e)k - (1 - p(e))\theta_B) - (1 - \sigma)k,$$

while her utility for deviating to policy a, $\underline{U}(a|a, e)$, is

$$\sigma(p(e)\theta_B - (1 - p(e))k) - (1 - \sigma)k.$$

Comparing, the two utilities we get that $\underline{U}(b|a, e) \geq \underline{U}(a|a, e)$ if $(1 - 2p(e))k \geq \theta_B$. We have $p(e) \geq 1/2$ and so $(1 - 2p(e)) \leq 0$, but $\theta_B \geq 0$. Thus, $\underline{U}(b|a, e) \geq \underline{U}(a|a, e)$ can never hold and so there does not exist an equilibrium in which the bureaucrat pools on policy b.

Effort Choice. Next we analyze the bureaucrat's optimal effort choice. From the previous analysis we have that if $e \geq e^*$ there exists a separating equilibrium and we assume that the bureaucrat plays this equilibrium. If $e < e^*$ then neither a separating equilibrium nor a pooling equilibrium on b exists, and so the bureaucrat anticipates in this case that she will play the equilibrium that exists in which she pools on a. As e^* results from the bureaucrat's constrained optimization problem she will never choose $e > e^*$. Alternatively, if the bureaucrat chooses $e < e^*$ then she knows that she will choose policy a following either signal. In this case, her expected utility of exerting effort e is

$$\frac{1}{2}\sigma(p(e)\theta_B - (1-p(e))k) + \frac{1}{2}(-p(e)k + (1-p(e))\theta_B) + (1-\sigma)\theta_B - c(e),$$

which reduces to $\sigma(\frac{1}{2}\theta_B - \frac{1}{2}k) + (1-\sigma)\theta_B - c(e)$ and is strictly decreasing in e. Thus, to finish analyzing the bureaucrat's optimal effort choice all that remains is to compare when she prefers $V^S_{\theta_B}(e^*) - c(e^*)$ over $\overline{V}^P_{\theta_B}(a)$ and show that this has the structure given in Proposition 2.

First, assume $\overline{e}_{\theta_J} \leq \hat{e}$. If $\theta_B \leq \tilde{\theta}_B$ then $e^* = \hat{e}$. In this case we want to find when $V^S_{\theta_B}(\hat{e}_{\theta_B}) - c(\hat{e}_{\theta_B}) \geq V^P_{\theta_B}(a)$. The left hand side of the inequality is not changing in θ_B while the right hand side is strictly increasing in θ_B. Therefore, there exists a unique bias, $\hat{\theta}^*_B$, for which if $\theta_B \leq \hat{\theta}^*_B$ then the bureaucrat prefers to expend effort and separate and if θ_B is larger then she prefers to expend no effort and choose $x = a$. Solving explicitly yields

$$\hat{\theta}^*_B = \frac{2 + k\sigma}{2-\sigma} - \sqrt{\frac{2k}{c}\left(\frac{c+\sigma}{2-\sigma}\right)}.$$

Furthermore, note that $c < \frac{k\sigma^2}{2}$ implies $\hat{\theta}^*_B < \tilde{\theta}_B$. As $\hat{e}$ is the bureaucrat's optimal effort choice if she expects to separate, it must be that when $\theta_B > \tilde{\theta}_B$ choosing $\overline{e}_{\theta_B}$ yields a lower payoff than if the bureaucrat could choose $\hat{e}$ and still separate. Thus, if $\theta_B < \hat{\theta}^*_B$ the bureaucrat separates, otherwise, she pools on policy a.

Next, assume $\overline{e}_{\theta_J} > \hat{e}$. Again, as $\hat{e}$ optimizes $V^S_{\theta_B}(e) - c(e)$ it must be that the bureaucrat's expected utility for $\overline{e}_{\theta_J}$ is less than her utility for choosing $\hat{e}$. Thus, $\hat{\theta}^*_B$ provides an upper-bound on how biased the bureaucrat may be while still separating. Next we check when $V^S(\overline{e}_{\theta_J}) - c(\overline{e}_{\theta_J}) \geq \overline{V}^P_{\theta_B}(a, 0)$. The derivative of $\overline{V}^P_{\theta_B}(a)$ with respect to θ_B is $\sigma/2 - 1$, while the derivative of $V^S_{\theta_B}(\overline{e}_J)$ with respect to θ_B is 0. Thus, $V^S_{\theta_B}$ intersects $V^P_{\theta_B}$ once. Define this intersection as $\overline{\theta}^*_B$ and for θ_B less than $\overline{\theta}^*_B$ the bureaucrat prefers to choose expend effort $e^* = \overline{e}_{\theta_J}$ and pools on a otherwise. Explicitly $\overline{\theta}^*_B$ is given by

$$\overline{\theta}_B^* = \frac{\theta_J(k\sigma(1-\theta_J)-2)}{(1-\theta_J)(2-\sigma)}.$$

Finally, let θ_B^* be

$$\theta_B^* = \begin{cases} \hat{\theta}_B^* & \text{if } |\theta_J| \leq \hat{e}, \\ \overline{\theta}_B^* & \text{else,} \end{cases}$$

and from this the characterization of bureaucratic behavior in Proposition 2 is optimal. For each region to also have strictly positive measure, i.e. $\theta^\circ > \overline{\theta}_B > \underline{\theta}_B > 0$, requires the following restrictions, beyond the assumptions noted in the set-up, on parameters: $C < \sigma$ and $k > \frac{C^2+\sigma^2}{C\sigma^2} + \frac{\sqrt{2}}{2}\sqrt{\frac{C^4-2C^2\sigma^2+\sigma^4}{C^2\sigma^4}}$ or $C \geq \sigma$.

Proof of Proposition 3.

Next we prove Proposition 3 by analyzing the bureaucrat's behavior when $\theta_J < 0$. The proof proceeds as in the previous case. First we analyze equilibria of the policymaking subgame. Second we use this analysis to determine the bureaucrat's optimal effort choice and show that it corresponds to the characterization given in the proposition.

Policy Choice. Assume the bureaucrat has expended effort e. As before, and shown in the text, if $e \geq \max\{\overline{e}_{\theta_B}, \overline{e}_{\theta_J}\}$ then there exists a separating equilibrium in which the bureaucrat chooses $x = s_B$ and the judge upholds either policy choice. Now we show that there does not exist a separating equilibrium if the bureaucrat anticipates that the judge will overturn a policy, in this case policy a, for $e < \overline{e}_{\theta_J}$. For this separating equilibrium to exist then it must be that following each signal s_B the bureaucrat prefers to choose $x = s_B$. If $s_B = a$, for the separating equilibrium to survive we need that $\underline{U}_{\theta_B}(a|a,e) \geq \overline{U}_{\theta_B}(b|a,e)$, which gives the inequality

$$\sigma(p(e)\theta_B - (1-p(e))k) - (1-\sigma)k \geq \sigma(-p(e)k - (1-p(e))\theta_B) - (1-\sigma)\theta_B,$$

which yields the constraint $\theta_B \geq k(1-\sigma(1+e))$. However, if $s_B = b$ then we have the same constraint as in the other separating case, i.e. that $\frac{\sigma ke}{2-\sigma} \geq \theta_B$. Thus, for a separating equilibrium to exist we need that

$$\frac{\sigma ke}{2-\sigma} \geq \theta_B \geq k(1-\sigma(1+e)).$$

This set of bureaucratic biases being non-empty requires that

$$e > \frac{(1-\sigma)(2-\sigma)}{\sigma(3-\sigma)}.$$

However, as $\sigma < \overline{\sigma}$ implies $\frac{(1-\sigma)(2-\sigma)}{\sigma(3-\sigma)} > |\theta_J| = \overline{e}_{\theta_J}$ the previous inequality can never hold and there is never a separating equilibrium when the judge does not uphold both policies.

We now study the pooling equilibria of the policy subgame to understand the bureaucrat's behavior when a separating equilibrium does not exist. As $\theta_J < 0$, if on the path of play the bureaucrat pools on policy b then the judge upholds the policy whereas the judge will overturn a on the path. First, we show that if $e = 0$ then a unique optimal choice exists. Whether the equilibrium requires pooling on policy a or b depends on the bureaucrat's bias. In this case, as $e = 0$ regardless of the judge's off path beliefs about the bureaucrat's signal he believes the probability $\omega = a$ is $1/2$. Thus, we can just check when the bureaucrat prefers to choose policy a over policy b. Her payoff for policy b is $\sigma(-\theta_B/2 - k/2) - (1-\sigma)\theta_B$ and her payoff for choosing a is $\sigma(\theta_B/2 - k/2) - (1-\sigma)k$. Comparing, she will prefer b over a if $\theta_B \leq (1-\sigma)k$ and choose a otherwise.

For any effort e a pooling equilibrium always exists and so the bureaucrat's behavior is always well defined. While for $e > 0$ multiple pooling equilibria may exist, due to off the path beliefs, as we show next it is unimportant which equilibria of the policy subgame we select on as the bureaucrat will never choose $0 < e < e^*$ for any choice.

Effort Choice. First, assume $\theta_B \leq (1-\sigma)k$ and so, if $e = 0$, the bureaucrat chooses b. Clearly, if for $e > 0$ the bureaucrat anticipates pooling on b then she will prefer to choose $e = 0$. Next, if there does exist a pooling equilibrium on policy a for some $\tilde{e} > 0$ and the bureaucrat anticipates playing it then the bureaucrat's expected utility for choosing $\tilde{e}$ is

$$\sigma(\theta_B/2 - k/2) - (1-\sigma)k - c(\tilde{e}).$$

As $\theta_B \leq (1-\sigma)k$, this must always be strictly less than choosing $e = 0$ and anticipating pooling on b in the policymaking stage. Similar arguments show that for $\theta_B > (1-\sigma)k$ if the bureaucrat anticipates playing any pooling equilibrium in the second stage then it is always optimal to choose $e = 0$ in anticipation of playing the unique equilibrium pooling on policy a. Thus, to conclude our analysis requires us to compare when the bureaucrat prefers to exert effort e^* followed by separating in the policy stage versus expending zero effort and pooling in the policy stage.

We now show that the cut-points $\overline{\theta}_B$ and $\underline{\theta}_B$ exist and act as described in Proposition 3. Again, begin by assuming $\overline{e}_{\theta_J} \leq \hat{e}$.

First note that, by $\sigma < \overline{\sigma}$, we have $\tilde{\theta}_B < (1-\sigma)k$. Thus, if $\theta_B > (1-\sigma)k$ then the bureaucrat must expend effort $\overline{e}_{\theta_B}$ to separate in the policymaking stage. Considering $\theta_B > (1-\sigma)k$ and comparing $V^S_{\theta_B}(\overline{e}_{\theta_B}) - c(\overline{e}_{\theta_B}) \geq \underline{V}^P_{\theta_B}(a)$ we get that the bureaucrat will prefer to expend effort $\overline{e}_{\theta_B}$ over no effort if

$$\begin{aligned} &\theta_B \leq \\ &\quad \frac{\sqrt{(2-\sigma)^2 + 4k(1-\sigma)^2(2+k-\sigma))}}{2(2+\sigma^2-3\sigma)} \\ &\quad -\frac{1}{2}\Big(2 + 2k(1-\sigma)^2 - \sigma\Big)\Big(1-\sigma\Big)\Big(2-\sigma\Big). \end{aligned} \tag{3}$$

However, comparing (3) to $(1-\sigma)k$ reveals that, by $c \leq \frac{k\sigma^2}{2}$, $(1-\sigma)k$ is always larger than (3). Thus, if the bureaucrat prefers policy a over policy b when $e = 0$ then the bureaucrat always prefers $e = 0$ and choosing a over exerting effort e^* and separating.

Based on this analysis, we now focus on $\theta_B < (1-\sigma)k$ and the bureaucrat's tradeoff between choosing $e = 0$ followed by policy b or choosing e^* and separating. First, if $\theta_B \leq \tilde{\theta}_B$ then $e^* = \hat{e}$. We want to find $V^S_{\theta_B}(\hat{e}) - c(\hat{e}_{\theta_B}) \geq \overline{V}^P_{\theta_B}(b)$. The derivative of $V^S_{\theta_B}(\hat{e}_{\theta_B}) - c(\hat{e}_{\theta_B})$ with respect to θ_B is 0 and the derivative of $V^P_{\theta_B}(b)$ with respect to θ_B is $\sigma/2 - 1$. Since the bureaucrat's expected utility from separating is unchanging in θ_B while her expected utility of pooling on b is decreasing and linear, we have that there exists $\underline{\theta}'_B$ such that for $\theta_B < \underline{\theta}'_B$ the bureaucrat prefers to pool on policy b and for θ_B greater than this she prefers to separate. Solving, yields

$$\underline{\theta}'_B = \sqrt{\frac{2k}{c}\left(\frac{c+\sigma}{2-\sigma}\right)} - \frac{2+k\sigma}{2-\sigma}.$$

Next, if $\theta_B \in (\tilde{\theta}_B, (1-\sigma)k)$ we need to compare the bureaucrat's expected utility of expending effort $\overline{e}_{\theta_B}$ to expending no effort and pooling on policy b. $V^S(\overline{e}_{\theta_B}) - c(\overline{e}_{\theta_B})$ intersects $\overline{V}^P(b)$ twice, at $\theta_B = 0$ and $\theta_B = \frac{k\sigma-1}{2-\sigma}$, however, the first solution is not relevant as 0 is always less $\tilde{\theta}_B$. Further, given the parameter space, $\frac{k\sigma-1}{2-\sigma} < (1-\sigma)k$, therefore, for $\theta_B \in (\frac{k\sigma-1}{2-\sigma}, (1-\sigma)k)$ the bureaucrat pools on policy b.

Finally, we also need to consider when $\hat{e} < \overline{e}_{\theta_J}$. Let $\tilde{\theta}'_B$ solve $\overline{\theta}'_B = \overline{e}_{\theta_J}$, this gives

$$\tilde{\theta}'_B = \frac{|\theta_J|k\sigma}{2-\sigma},$$

if $\theta_B \geq \tilde{\theta}'_B$ then $e^* = \overline{\theta}_B$ otherwise $e^* = \overline{\theta}_J$. As $|\theta_J| \geq \hat{e}$ we have $\tilde{\theta}'_B < (1-\sigma)k$. Therefore, as before, the bureaucrat will not choose to separate once pooling on a is preferred to pooling on b. Let $\theta_B < \tilde{\theta}'_B$ and we compare the expected utility of choosing $\overline{e}_{\theta_B}$ to choosing $e = 0$ and pooling on b The derivative of $V^S_{\theta_B}(\overline{e}_{\theta_J}) - c(\overline{e}_{\theta_J})$ with respect to θ_B is 0 while the derivative of $V^P_{\theta_B}(b)$ is negative. Thus, let $\underline{\theta}''_B$ denote the unique intersection of $V^S_{\theta_B}(\overline{e}_{\theta_J})$ with $\overline{V}^P_{\theta_B}(b)$.

Solving for θ_B'' we get

$$\theta_B'' = \frac{\theta_J(k\sigma(1+\theta_J)-2)}{2+\theta_J(2-\sigma)-\sigma},$$

and for $\theta_B > \theta_B''$ the bureaucrat prefers to expend effort e^* over zero effort.

Finally, define $\overline{\theta}_B = \frac{k\sigma-1}{2-\sigma}$, $\theta_B^\circ = (1-\sigma)k$, and

$$\underline{\theta} = \begin{cases} \underline{\theta}' \text{ if } |\theta_J| \leq \hat{e} \\ \underline{\theta}'' \text{else,} \end{cases}$$

to obtain the characterization in proposition 3. For each region to also have strictly positive measure, i.e. $\theta^\circ > \overline{\theta}_B > \underline{\theta}_B > 0$, requires the following restrictions, beyond the assumptions noted in the set-up, on parameters: $C < \frac{\sigma}{2}$ and $k > \frac{1}{2C}$ or $C > \frac{\sigma}{2}$.

Proof of Welfare Effects

First we prove that for any given θ_J the set of bureaucratic bias for which separation occurs under a friendly judge is a subset of the set of types for which separation occurs under an opposed judge. When the judge is friendly towards the bureaucrat the bureaucrat will expend effort if $\theta_B \in [0, \theta_B^*)$ and if the judge is not friendly the bureaucrat will expend effort if $\theta_B \in [\underline{\theta}_B, \overline{\theta}_B^*]$. Therefore, we want to show that $[0, \theta_B^*) \subset [\underline{\theta}_B, \overline{\theta}_B^*)$. The proof will proceed by first showing that $\theta_B^* \leq \overline{\theta}_B^*$ and second showing that if $0 < \underline{\theta}_B$ then the set is $[0, \theta_B^*)$, i.e. $\theta_B^* = 0$, proving the statement.

To show the first part, note that $V^S(e^*) - c(e^*)$ is the same under a friendly or opposed judge. Thus, the statement will be true if the payoff to the bureaucrat from pooling is always higher under a friendly judge, as this will mean that the two terms intersect later under a friendly judge. The payoff of pooling on a under an opposed judge is $\sigma(\theta_B/2 - k/2) - (1-\sigma)k$, whereas the payoff under a friendly judge is $\sigma(\theta_B/2 - k/2) + (1-\sigma)\theta_B$ which is clearly greater as $\theta_B \geq 0$. For the next part we show that if $\underline{\theta}_B > 0$ then no bureaucrats separate under a friendly judge. Specifically, we need that $V_0^S(e^*) - c(e^*) \leq V_0^P(b)$ implies $V_0^S(e^*) - c(e^*) \leq V_0^P(a)$. This is immediately clear as $V_0^P(b) = -\sigma k/2 = V_0^P(a)$.

Next we show that decreasing C at least weakly leads to more effort expended and a larger set of bureaucrats willing to expend effort. First, if $e^* \in \{\overline{e}_{\theta_B}, \overline{e}_{\theta_J}\}$ then effort is not a function of C so e^* in these cases is unchanging in C and if $e^* = \hat{e}$ then we have

$$\frac{\partial e^*}{\partial c} = -\frac{1}{\sqrt{sk\sigma^2 C}} < 0,$$

and so decreasing C yields higher effort. Finally, we need to show that decreasing C also increases the set of bureaucrat types willing to separate. As the utility from expending no effort and always choosing a or b is unchanging in C, regardless of θ_J, this will be true if the utility from expending e^* and separating is decreasing when C increases.

The derivative of $V_{\theta_B}^S(e^*) - c(e^*)$ with respect to C is

$$\frac{\sigma k}{2}\frac{e^*}{\partial C} - \frac{e^*}{1-e^*} - C\frac{(1-e^*)\frac{\partial e^*}{\partial C} + \frac{\partial e^*}{\partial C}e^*}{(1-e^*)^2},$$

which can be rewritten as

$$\frac{\partial e^*}{\partial c}[\frac{\sigma k}{2} - \frac{c}{(1-e^*)^2}] - \frac{e^*}{1-e^*}. \tag{4}$$

We need (4) to be less than zero. If $e^* \in \{\overline{e}_{\theta_J}, \overline{e}_{\theta_B}\}$ then $\frac{\partial e^*}{\partial c} = 0$ and (4) reduces to $-\frac{e^*}{1-e^*} < 0$ as needed. If $e^* = \hat{e}$ as $\frac{\partial e^*}{\partial C} < 0$ and $-\frac{e^*}{1-e^*} < 0$ then $4 < 0$ if

$$\frac{\sigma k}{2} - \frac{c}{(1-\hat{e})^2} \geq 0.$$

Substituting in $\hat{e}$ we write this inequality as

$$\frac{\sigma k}{2} \geq \frac{c}{(\frac{2c}{\sigma^2 k})}.$$

This reduces to $1 \geq \sigma$, which holds as σ is a probability.

Proof of Proposition 4

Here we modify the model by assuming q can take any value in $(0, 1)$ and study how $\hat{e}$ is changed. Thus, assuming she will play a separating strategy, the bureaucrat's expected utility for exerting effort e is

$$\pi(e)U(x = a|s_B = a, e) + (1 - \pi(e))U(x = b|s_B = b, e) - c(e),$$

where $\pi(e)$ is the probability that $s_B = a$ given that the bureaucrat has exerted effort e. Maximizing yields a unique[17] optimal effort $\hat{e}_{\theta_B}$ that solves

$$p^{'}(e)\sigma(\sigma k + (2q - 1)(2 - \sigma)\theta_B) = c^{'}(e). \tag{5}$$

Plugging in our functional forms we get that the optimal effort is

$$\hat{e}(\theta_B) = 1 - \sqrt{\frac{2c}{\sigma(k\sigma + \theta_B(2q - 1))}},$$

and the derivative of this with respect to θ_B is positive if $q > 1/2$ and negative if $q < 1/2$, demonstrating our point. A full analysis of the model would also require characterizing when the bureaucrat is willing to separate.

Proof of Proposition 6

Given that the bureaucrat purchases information and separates according to her signal, both types of judge uphold this policy. If the bureaucrat does not purchase information and chooses policy a (b) then if the judge has a bias $\theta_J = 1$ he allows (overturns) it and if $\theta_J = -1$ he overturns (allows) it.

For this to be an equilibrium we need that if the bureaucrat purchases information then it is optimal for her to separate according to her signal. As before the bureaucrat would

[17] The second derivative is still $-c^{''}(e) < 0$.

never deviate when $s_B = a$ and so we just need to determine when $U(x = b|s_B = b) \geq U(x = a|s_B = b)$. This requires that $\theta_B \leq \frac{\sigma k}{2-\sigma}$.

We next need to find when purchasing information and separating is better than pooling. Define the expected utility of purchasing information and separating as $V^S_{\theta_B} = \theta_B(2q-1)-\overline{C}$, of pooling on a as $V^P(a) = \sigma(q\theta_B - (1-q)k) + (1-\sigma)(\gamma\theta_B - (1-\gamma)k)$, and finally of pooling on b as $V^P(b) = \sigma(-qk - (1-q)\theta_B) + (1-\sigma)(-\gamma k - (1-\gamma)\theta_B)$.

If $\gamma \geq \frac{k(1-2q\sigma)-\theta_B}{2k(1-\sigma)}$ then $V^P_{\theta_B}(a) \geq V^P_{\theta_B}(b)$. If $\theta_B > \frac{\sigma k}{2-\sigma}$ then this characterizes which policy the bureaucrat pools on. Assume $\theta_B \leq \frac{\sigma k}{2-\sigma}$. First, let $\gamma \geq \frac{k(1-2q\sigma)-\theta_B}{2k(1-\sigma)}$ and so we are comparing when $V^S \geq V^P(a)$. In this case the bureaucrat is willing to play the separating strategy and purchase information if $c \leq c_1^* = \theta_B(2q-1-\sigma q-(1-\sigma)\gamma) + k(\sigma(1-q) + (1-\sigma)(1-\gamma))$. A larger c_1^* increases the set of costs for which the bureaucrat is willing to separate and so increases social welfare. We see that c_1^* is always decreasing in γ and since γ is bounded below we have that c_1^* is maximized at $\gamma^*_{\theta_B} = \frac{k(1-2q\sigma)-\theta_B}{2k(1-\sigma)}$.

Next, let $\gamma < \frac{k(1-2q\sigma)-\theta_B}{2k(1-\sigma)}$, as such, we are comparing when $V^S \geq V^P(b)$. In this case the bureaucrat is willing to play the separating strategy and purchase information if $c \leq c_2^* = \theta_B(2q-1-\sigma q-(1-\sigma)\gamma) + k(\sigma(1-q)+(1-\sigma)(1-\gamma))$. The derivative of c_2^* with respect to γ is $(1-\sigma)(k-\theta_B)$. For it to be possible for us to be in this parameter space we need that $0 < \frac{k(1-2q\sigma)-\theta_B}{2k(1-\sigma)}$, which implies that $\frac{\partial c_2^*}{\partial \gamma} > 0$. Thus, an increase in γ causes c_2^* to increase. As γ is bounded above we have that c_2^* is also maximized at $\gamma^*_{\theta_B} = \frac{k(1-2q\sigma)-\theta_B}{2k(1-\sigma)}$.

Using the above analysis, given a $\theta_B < \frac{\sigma k}{2-\sigma}$, we have that social welfare is maximized for $\gamma^*_{\theta_B} = \max\{0, \frac{k(1-2q\sigma)-\theta_B}{2k(1-\sigma)}\}$. As $\frac{\partial \gamma^*_{\theta_B}}{\partial \theta_B} < 0$ we see that as the bureaucrat becomes more biased it is optimal to have fewer judges with an ideology aligned with the bureaucrat.

Proof of Proposition 7

As $\theta_J = 0$ the judge upholds policy x if his belief is that ω_x is greater than one half. His updated belief after seeing policy b is $p(e_b) \geq 1/2$, while his updated belief after seeing a is $\frac{1+p(e_a)}{3} \geq 1/2$, which holds as $p(e_a) \geq 1/2$.

For the bureaucrat to play this strategy requires

$$\begin{aligned}
&\overline{U}(b|(-1,1),e) \geq \overline{U}(a|(-1,1),e),\\
&\overline{U}(a|(1,1),e) \geq \overline{U}(b|(1,1),e),\\
&\overline{U}(a|(1,-1),e) \geq \overline{U}(b|(1,-1),e), \text{ and}\\
&\overline{U}(a|(-1,-1),e) \geq \overline{U}(b|(-1,-1),e),
\end{aligned}$$

to all hold. The second and third constraints always hold ex post as $\theta_B \geq 0$ and $e_a \geq e_b$. The first and fourth combined imply that e_a and e_b must solve

$$2\frac{(1-\sigma)}{\sigma(k+\theta_B)}\theta_B + 1 - \frac{p(e_b)(k-\theta_B)}{(k+\theta_B)} \leq p(e_a) \leq 2\frac{(1-\sigma)}{\sigma(k+\theta_B)}\theta_B + 2 + \frac{p(e_b)(k-\theta_B)}{(k+\theta_B)}. \tag{6}$$

The bureaucrat's expected utility for expending effort (e_a, e_b) is

$$\frac{1}{4}\overline{U}(a|(1,1),e) + \frac{1}{4}\overline{U}(a|(1,-1),e) + \frac{1}{4}\overline{U}(a|(-1,-1),e) + \frac{1}{4}\overline{U}(b|(-1,1),e) - c(e_a) - c(e_b),$$

and maximizing yields the equations given in Proposition 7. Denote this solution as $(\hat{e}_a, \hat{e}_b)$. As we are interested in when the bureaucrat expends efforts $(\hat{e}_a, \hat{e}_b)$ we need to check that this solution satisfies (6). If $\theta_B = 0$ then the constraint reduces to $p(e_b) \leq p(e_a) < 2 + p(e_b)$, which holds as $e_a = e_b$ for $\theta_B = 0$. As long as C is sufficiently small the neutral bureaucrat will prefer to expend effort and separate over pooling. Given the changes in the bounds and $(\hat{e_a}, \hat{e}_b)$ as a function of θ_B and continuity, then there will be some positive set of θ_B for which the bureaucrat will continue to exert effort $(\hat{e_a}, \hat{e}_b)$.

References

Bailey, M, "Measuring ideology on the courts," *Working Paper*, 2016.

Bertelli, Anthony M, Dyana P Mason, Jennifer M Connolly, and David A Gastwirth, "Measuring agency attributes with attitudes across time: A method and examples using large-scale federal surveys," *Journal of Public Administration Research and Theory*, 2015, *25* (2), 513–544.

Besley, Timothy and Maitreesh Ghatak, "Competition and incentives with motivated agents," *The American Economic Review*, 2005, *95* (3), 616–636.

Bonica, Adam, Jowei Chen, and Tim Johnson, "Automated methods for estimating the political ideology of individual public bureaucrats across time and in a common ideological space," *Unpublished Manuscript, New York University*, 2012.

Callander, Steven, "Searching for good policies," *American Political Science Review*, 2011, *105* (04), 643–662.

_ **et al.**, "A theory of policy expertise," *Quarterly Journal of Political Science*, 2008, *3* (2), 123–140.

Cameron, Charles M and Lewis A Kornhauser, "Decision rules in a judicial hierarchy," *Journal of Institutional and Theoretical Economics*, 2005, *161* (2), 264–292.

Chade, Hector and Natalia Kovrijnykh, "Delegated information acquisition with moral hazard," *Journal of Economic Theory*, 2016, *162*, 55–92.

Chen, Jowei and Tim Johnson, "Federal employee unionization and presidential control of the bureaucracy: Estimating and explaining ideological change in executive agencies," *Journal of Theoretical Politics*, 2015, *27* (1), 151–174.

Clinton, Joshua D, Anthony Bertelli, Christian R Grose, David E Lewis, and David C Nixon, "Separated powers in the United States: The ideology of agencies, presidents, and congress," *American Journal of Political Science*, 2012, *56* (2), 341–354.

Crewson, Philip E, "Public-service motivation: Building empirical evidence of incidence and effect," *Journal of Public Administration Research and Theory*, 1997, *7* (4), 499–518.

Cross, Frank B and Emerson H Tiller, "Judicial partisanship and obedience to legal doctrine: Whistleblowing on the federal courts of appeals," *The Yale Law Journal*, 1998, *107* (7), 2155–2176.

Dragu, Tiberiu and Oliver Board, "On judicial review in a separation of powers system," *Political Science Research and Methods*, 2015, *3* (3), 473–492.

Epstein, Lee, Andrew D Martin, Jeffrey A Segal, and Chad Westerland, "The judicial common space," *Journal of Law, Economics, and Organization*, 2007, *23* (2), 303–325.

_ , _ , Kevin M Quinn, and Jeffrey A Segal, "Ideological drift among Supreme Court justices: Who, when, and how important," *Northwester University Law Review*, 2007, *101*, 1483.

Eskridge, William Jr. and Lauren E Baer, "The continuum of deference: Supreme Court treatment of agency statutory interpretations from *Chevron* to *Hamdan*," *Georgetown Law Journal*, 2007, *96*, 1083.

Gailmard, Sean, "Multiple principals and oversight of bureaucratic policy-making," *Journal of Theoretical Politics*, 2009, *21* (2), 161–186.

_ and John Patty, "Participation, process, & policy: the informational value of politicized judicial review," *Washington University in St. Louis Working Paper*, 2013.

— **and John W Patty**, "Slackers and zealots: Civil service, policy discretion, and bureaucratic expertise," *American Journal of Political Science*, 2007, *51* (4), 873–889.

Garvie, Devon A and Barton L Lipman, "Regulatory rule-making with legal challenges," *Journal of Environmental Economics and Management*, 2000, *40* (2), 87–110.

Gehlbach, Scott and Alberto Simpser, "Electoral manipulation as bureaucratic control," *American Journal of Political Science*, 2015, *59* (1), 212–224.

Hübert, Ryan, "The downsides of dispassionate judges: A theory of costly law enforcement in district courts," *Working Paper*, 2015.

Johnson, Ronald N and Gary D Libecap, *The federal civil service system and the problem of bureaucracy: The economics and politics of institutional change*, University of Chicago Press, 1994.

Lax, Jeffrey R, "The new judicial politics of legal doctrine," *Annual Review of Political Science*, 2011, *14*, 131–157.

Lewis, David E, "Testing pendleton's premise: Do political appointees make worse bureaucrats?," *Journal of Politics*, 2007, *69* (4), 1073–1088.

Martin, Andrew D and Kevin M Quinn, "Dynamic ideal point estimation via Markov chain Monte Carlo for the US Supreme Court, 1953–1999," *Political Analysis*, 2002, *10* (2), 134–153.

McCarty, Nolan, "Complexity, capacity, and capture," *Preventing regulatory capture: Special interest influence and how to limit it*, 2013, pp. 99–123.

Meier, Kenneth John and Lloyd G Nigro, "Representative bureaucracy and policy preferences: A study in the attitudes of federal executives," *Public Administration Review*, 1976, *36* (4), 458–469.

Miles, Thomas J and Cass R Sunstein, "Do judges make regulatory policy? An empirical investigation of *Chevron*," *The University of Chicago Law Review*, 2006, *73* (3), 823–881.

_ **and** _ , "The real world of arbitrariness review," *The University of Chicago Law Review*, 2008, *75* (2), 761–814.

Morgenstern, Richard D and Paul R Portney, *New approaches on energy and the environment: Policy advice for the president*, Resources for the Future, 2004.

Prendergast, Canice, "The limits of bureaucratic efficiency," *Journal of Political Economy*, 2003, *111* (5), 929–958.

_ , "The motivation and bias of bureaucrats," *The American Economic Review*, 2007, pp. 180–196.

_ , "Work incentives, motivation, and identity-intrinsic motivation and incentives," *American Economic Review*, 2008, *98* (2), 201.

Revesz, Richard L, "Environmental regulation, ideology, and the DC Circuit," *Virginia Law Review*, 1997, *83* (8), 1717–1772.

Rogers, James R, "Information and judicial review: A signaling game of legislative-judicial interaction," *American Journal of Political Science*, 2001, *45* (1), 84–99.

Rouban, Luc, "Public management and politics: Senior bureaucrats in France," *Public Administration*, 2007, *85* (2), 473–501.

Shipan, Charles R, "The legislative design of judicial review: A formal analysis," *Journal of Theoretical Politics*, 2000, *12* (3), 269–304.

Stephenson, Matthew, "A costly signaling theory of hard look review," *Harvard Law and Economics Discussion Paper*, 2006, (539).

Stephenson, Matthew C, "Bureaucratic decision costs and endogenous agency expertise," *Journal of Law, Economics, and Organization*, 2007, *23* (2), 469–498.

Sunstein, Cass R, David Schkade, and Lisa Michelle Ellman, "Ideological voting on federal courts of appeals: A preliminary investigation," *Virginia Law Review*, 2004, *90* (1), 301–354.

Tirole, Jean, "Hierarchies and bureaucracies: On the role of collusion in organizations," *Journal of Law, Economics, & Organization*, 1986, *2* (2), 181–214.

Turner, Ian R, "Working smart and hard? Agency effort, judicial review, and policy precision," *Working Paper*, 2015.

Watson, Robert, "Politics and public administration a political profile of local bureaucrats in Alabama," *Administration & Society*, 1997, *29* (2), 189–200.

Zermeno, Luis, "A principal-expert model and the value of menus," *Working Paper*, 2011.