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How Organizational Capacity Can Improve Electoral Accountability

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Keywords: organizational capacity, Electoral accountability, bureaucratic politics

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How Organizational Capacity Can Improve Electoral Accountability

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Abstract

The organizational structure of the bureaucracy is a key determinant of policy outcomes. Bureaucratic agencies exhibit wide variation in their organizational capacity, which allows politicians to strategically shape policy implementation. This paper examines what bureaucratic structure implies for the ability of voters to hold politicians electorally accountable. It explicitly models differences in organizational capacity across bureaucratic agencies and considers a problem where a politician must decide not only which policy to choose but which agency, or combination of agencies, will implement it. The choice of implementation feeds back into the choice of policy and this, in turn, affects how voters perceive the performance of the incumbent. This creates a chain of interdependence from agency structure to policy choice and political accountability. The formal model shows that the variation in organizational capacity serves the interests of voters by improving electoral control of politicians.

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1 Introduction

Policies are not only formulated, they must be implemented. A new piece of legislation must specify not only the goals and parameters of a policy, but also who will put it into effect. This leaves legislators with a choice. Should they implement policy through an independent agency or through an agency under the control of the executive branch? Should implementation be at the federal level or delegated to the states? Or, as often occurs during crises, should legislators create an entirely new entity for the policy, one that falls even more completely under the control of the executive? These choices matter for the outcomes that policies produce and, therefore, for the quality of democratic governance.

That implementation matters is, of course, not news to scholars of public bureaucracy. This rich field has shed much light on the differences in quality, capability, independence, and even speed across government agencies. In this paper, I show how differences in organizational capacity matter beyond the bureaucracy itself. I examine how these differences feed back through the political system, into the formation of policy and from there to the nature of political accountability itself. This delivers two main results. The first is that variation in bureaucratic organizational capacity can improve electoral accountability. It does so on the one hand because the political decision of *which* agency will implement policy informs voters as to the politician's true intent, and this disciplines his behavior. On the other hand, bureaucratic capacity allows agencies to develop *endogenous* policy stickiness: the politician will relinquish control over policy implementation to higher capacity agencies to help his reelection chances.

The second insight is that variation in organizational capacity within the bureaucracy persists endogenously over time as a rational response to the problem of electoral accountability. Having multiple agencies of different organizational capacity tasked with the same policy's implementation might at first glance seem inefficient. This resonates with the clas-

sic account of [Moe \(1989\)](#) that bureaucratic inefficiency and variation is deliberate, that “public bureaucracy is not designed to be effective” as it serves the interests of politicians and bureaucrats. My model goes beyond considering just the interests of politicians or of the bureaucracy. It shows that this bureaucratic structure may in fact serve the interests of voters, by facilitating electoral accountability.

Organizational Capacity and Policymaking in Practice

Two examples help illuminate the importance of organizational capacity for policy implementation. First, the FDA in the United States is the classic example of bureaucratic competence paired with independence. As documented by [Carpenter \(2014\)](#), the FDA’s handling of the Thalidomide crisis helped the FDA forge a reputation for scientific competence that, over time, provided it with a degree of independence—and permanence. This pairing of organizational capacity and independence has allowed the FDA to stand apart from political pressure and keep policy on a course that is informed by science. That path has been tested in 2020 in another crisis, the Covid pandemic, and the need for a vaccine development and approval in a remarkable 2020 presidential election year.

Another example where the importance of organizational capacity was starkly clear is the policy response in 2009 to the financial crisis, documented in [Tooze \(2018\)](#). The crisis necessitated a large scale bailout package to rescue the economy. This bailout focused on the financial sector and the automobile industry. The original spending program, known as the Troubled Asset Relief Package (TARP), was, effectively, placed at the full discretion of the president, through the U.S. Treasury. Although the TARP program proved flexible in its response, the scale of the crisis grew to the point that the task of providing funding for troubled financial institutions and related affected industries was extended simultaneously to the Federal Reserve (Fed). The Fed is not only marked by more independence from the president—to empower commitment in the running of monetary policy—but it has developed

a high organizational capacity to carry out policy related to financial markets.

A striking feature of this bifurcation was that bureaucratic differences visibly spilled over into public opinion and electoral politics. It is this spillover that motivates the present study. First, at the creation of TARP, the members of Congress facing more contested reelection bids did not support it, fearing the electoral consequences of this policy (Mian, Sufi and Trebbi, 2010). Second, the shift in policy implementation towards the independent agency (the Fed) happened as voter support for bailout programs like TARP collapsed.¹ The negative public opinion was generated in part by questions of whether these bailout packages were a necessary response to the crisis or a wasteful rescue transfer offered to lobbying banks connected to politicians. Thus, policy implementation through an agency under the president's control quickly became electorally undesirable. A shift of policy implementation to the independent Fed helped alleviate voter concerns about politically motivated programs.²

Incorporating the Bureaucracy into Theories of Accountability

Models of bureaucratic policymaking are abundant.³ So too are models of political accountability. What has heretofore been rare are models that combine the two domains. An exception is the seminal contribution of Fox and Jordan (2011). These authors focus on the decision *whether* to delegate authority to a bureaucracy, demonstrating how doing so allows a politician to avoid accountability, hurting voters. My interest is not on whether to delegate or not, but to *which* agency to assign policy implementation, and to show how this choice helps voters.

In the model, a politician must decide not only which policy to choose but which agency,

¹A proposed bailout of the Detroit automakers failed to pass a Senate vote in December 2008; in response, the President redirected funds from the TARP towards bailing out the automakers. For more details, see Stephen Labaton and David M. Herszenhorn, "White House Ready to Offer Aid to Auto Industry," The New York Times, December 12, 2008, page A1.

²See, the account by Neil Barowsky in "Where the Bailout Went Wrong," The New York Times, March 30, 2011, page A27

³A large formal theory literature has emphasized the importance of bureaucratic implementation in determining whether governments can implement their governing programs (Bendor and Meirowitz, 2004; Gailmard and Patty, 2007; Besley and Persson, 2010; Ting, 2011; Gratton et al., 2021)

or combination of agencies, will implement it. I allow for two distinct agencies. One, like the Fed, pairs high organizational capacity with independence from the politician, and is efficient at implementing large scale programs. The second agency is the reverse. It is more nimble, but closer to the politician and, thus, more controllable. As in the example of the TARP program and the Fed, the efficiency of the independent agency—like any large organization—is in large-scale programs. For smaller programs and budgets, the more nimble agency is more efficient. To use an economics analogy, this is akin to the high-capacity, independent agency having large fixed costs and smaller marginal costs, whereas the low-capacity, nimble agency has lower fixed but higher marginal costs that render it competitive for small programs but inefficient with large scale programs.

The decision over which agency implements policy is made in every term by the politician in power. The politician has full control over this budget allocation, and he is privately informed about the value created by the policy given the current economic conditions. Therefore, there is no exogenous source of policy stickiness that allows agencies to maintain control over their budgets or assigned programs.

Although simple, this model establishes formally an important trade-off for the politician, dating back the classic question of [Moe \(1985\)](#): Should he use the high-capacity agency and achieve a more efficient outcome even if he loses control? Or should he keep policy implementation close, even if that implies a less efficient implementation? And how does this choice depend on the private information he holds about the policy needs? Voters observe the politician's choice and decide whether to reelect him or replace him with a challenger.

The results show that the allocation of funds across bureaucratic agencies helps electoral accountability through two channels. First, the entire history of past policy implementation choices is used in deciding the politician's reelection. To this end, the institutional memory provided by bureaucratic agencies is essential. Second, voters use the allocation of funds across agencies to monitor and sanction the politician's behavior. They optimally condition

the politician's reelection on higher funding of the high-capacity agency than the politician would independently choose. Moreover, more funding for the high-capacity agency is required after periods in which the politician assigns a large budget to the low-capacity agency. That is, voters punish a politician who engages in high public spending through the politically controllable low-capacity agency. Conversely, they reward a politician who gives up more authority to the high-capacity agency, over which he has less political control.

A novel feature that emerges from the model is that this distortion has a long-term effect on the policy path. The dynamic rewards and punishments induce endogenous policy persistence. The best equilibrium for voters conditions reelection on tilting policy implementation to the high-capacity agency long into the future. The inflated grant of authority to the independent agency today carries over to tomorrow and endogenously binds policymaking going forward. This is useful for the voter in achieving better accountability. But it comes at a cost, as persistent policies result in more bloated, and thus costlier, public programs. In practice, this means that it is in the voter's interest to allow for some stickiness of government programs, as documented empirically by [Berry, Burden and Howell \(2010\)](#).⁴

The link between bureaucratic implementation choices and elections provides a new perspective on the classic [Fearon \(1999\)](#) critique on the difficulty of using elections as a means for political accountability rather than selection. At the core of the argument is the weakness of assuming that voters would be willing to follow through with electorally sanctioning a politician if the alternative to the incumbent is a candidate of worse quality. One solution, proposed in [Meirowitz \(2007\)](#), is to introduce uncertainty (mixing) in voters' electoral decision. This model proposes an additional avenue for side-stepping this critique. Inducing policy implementation choice: conditioning reelection on more funding going to the high-capacity agency instead of the low-capacity agency provides a punishment for the politician

⁴The implication of persistence resonates with recent theoretical work on legislative bargaining by [Bowen, Chen and Eraslan \(2014\)](#) and [Piguillem and Riboni \(2015\)](#).

without necessitating removal from office. This shows how the organization of the bureaucracy can offer a solution to the pure electoral accountability problem, complementing the literature on the role of the bureaucracy in elections with adverse selection (Maskin and Tirole, 2004; Shotts and Wiseman, 2010). The paper builds on models of dynamic electoral accountability under limited commitment that focus on sustainable equilibria to study the optimal incentives for politicians (Acemoglu, Golosov and Tsyvinski, 2008; Ales, Maziero and Yared, 2014).⁵

In connecting bureaucratic structure to political accountability, the model also relates to the large literature on bureaucratic function and design. The discussion about organizational capacity in the context of the bureaucracy traces back to Moe (1989) and more recently to the formal models introduced by Huber and McCarty (2004) and Ting (2011). Similar to this paper, Snowberg and Ting (2019) also explore formally the connection between organizational capacity and policy implementation, although their focus is on design of the bureaucratic hierarchy, whereas this model seeks to connect to political accountability.

In connecting the bureaucracy to policymaking, the model assumes delegated authority over policy implementation to agencies. The large literature on delegation focuses on expertise—delegation is to utilize the expertise within the bureaucracy—a motivation that is absent from my study. My interest is organizational structure and capacity, and in order to focus on the policymaking role of those characteristics, I set aside the issue of expertise.⁶

2 A Dynamic Model of Bureaucratic Capacity

Consider a model of policymaking involving a politician subject to electoral control by a median voter. The time horizon is infinite (with periods $t = 0, 1, 2, \dots$) and both the politician

⁵See Duggan and Martinelli (2017) for a review of the literature on dynamic electoral control.

⁶See Callander and Krehbiel (2014) for a model of delegation without expertise. In the Online Appendix, I show how expertise can be incorporated in this setting, and it does not change the conclusions of the model.

and the voter are long-lived. The incumbent politician decides each period t how much of a public good g_t to provide. At the end of each period, the voter decides whether to reelect the politician or to replace the incumbent with an identical politician. The problem is therefore one of dynamic electoral accountability rather than selection (as in [Ferejohn, 1986](#)). The novelty of the model is that the public good must be produced by a bureaucratic agency, and bureaucratic agencies differ in terms of organizational capacity, as further detailed below.

The Value of Public Spending. The value of the public good in period t for the voter depends on an underlying economic state, θ_t , which may be low, $\underline{\theta}$, with probability $p \in (0, 1)$, or high, $\bar{\theta}$, with probability $1-p$. The high state corresponds to a period in which government spending is very valuable, while the low state corresponds to situations when government spending is less valuable. For instance, during an economic crisis, government spending on infrastructure is more valuable if it can help stabilize unemployment, whereas in an economic boom, there is less need for large government programs. The state is known to the politician, but it is not directly observed by the voter. That is, the politician has better information about the marginal return to public spending.

Bureaucratic Agencies and Organization Capacity. Two different agencies, h and l , may produce the public good. Agency h will produce $g_t^h \geq 0$ public good in period t , whereas agency l will produce $g_t^l \geq 0$ public good. This results in a total public good $g_t = g_t^h + g_t^l$. The agencies differ in terms of their organizational capacity. Agency h has high-capacity, whereas agency l has low-capacity. Organizational capacity quantifies in one measure the processes and personnel know-how used to produce the public good. Capacity combines political and economic dimensions, as follows:

1. *Political:* Higher organizational capacity allows the agency to escape political control. At one extreme, high organizational capacity allows an agency to independently choose how

to provide the public good, without interference from the politician. At the other extreme, in a low-capacity agency, the politician influences the public good provision process. Political interference generates a benefit $\gamma \cdot g_t^l$ for the politician in period t . The parameter $\gamma > 0$ captures in reduced form the political benefit of targeting public spending to causes preferred for ideological reasons, or to politically connected firms or districts.⁷

2. *Economic*: Higher capacity allows for economies of scale. In economic terms, the marginal cost of production increases faster for the low-capacity agency. Specifically, the high-capacity agency produces the public good at a linear cost $\alpha \cdot g^h$, for $\alpha > 0$. The low-capacity agency produces it at a convex and increasing cost $c(g^l)$, with $c(0) = 0$.⁸

The ‘escape from political control’ aspect of capacity maps readily to measures of agency independence and capacity used in the empirical context (Selin, 2015; Arel-Bundock, Atkinson and Potter, 2015; Richardson, 2019). The economic cost aspect, however, requires an extra step for such a mapping. Formal models organizational capacity (Besley and Persson, 2010; Ting, 2011) generally assume an investment component to capacity, so a cost of capacity itself. The following assumption is meant to capture a similar idea here in reduced form:

Assumption 1 *The marginal cost of public good provision satisfies $\bar{\theta} \geq \alpha + c'^{-1}(\alpha) > \underline{\theta}$.*

The assumption states that, if the value of the public good is low, then it is more efficiently provided by the low-capacity agency, given the high marginal operating cost of the high-capacity agency. Conversely, when the value of the public good is high, the marginal benefit from more public good is higher than the marginal operating of cost of the high-capacity

⁷The political benefit adds to the politician’s payoff only; it does not directly subtract from the voter’s benefit, other than through the cost of providing the public good. This reflects the view of the political component of capacity as policy control rather than rent extraction.

⁸Cost linearity for the high-capacity agency is not a necessary assumption for the results, but it is made for simplicity. One only needs to assume that there is single-crossing between the marginal cost curves of the two agencies, such that the high-capacity agency has a lower marginal cost for any g above some threshold. For analytical convenience, we assume $c(g^l)$ is continuous and twice differentiable.

agency. The assumption captures in a simple form the intuition that the high-capacity agency comes with a fixed investment cost for its personnel and resources. This fixed cost makes providing a small quantity of public good less efficient compared to a nimbler low-capacity agency. Therefore, as in the models with investment in capacity, it is not worth the cost of a high-capacity agency for a very small program.

While the economic component of capacity can be linked to existing models of capacity, it does differ from them in one key dimension. The cost structure ensures that it is efficient for the voter to use both types of agencies in policy implementation, depending on the size of the public program. This departure from previous models allows for the existence of both agencies to be justified on an economic basis. Therefore, inefficiencies in this model do not stem from the existence of a fully inefficient agency, but rather from the allocation of funds across agencies.⁹

Every period t , the incumbent politician chooses a budget allocation for the agencies. The high-capacity agency receives a budget $B_t^h \geq 0$, and the low-capacity agency receives a budget $B_t^l \geq 0$. Each agency provides the most public good possible given its available budget. The organization of the bureaucracy as consisting of only two agencies, and the requirement of policy implementation through bureaucratic agencies is taken as structurally given, in order to focus on the politician's decision to allocate policy implementation across agencies with different organizational capacities.

Preferences and Payoffs. The public good benefits the voter when it is provided in proportion to its economic value θ . Producing it requires public funds, ultimately paid for by the voter through taxes. Therefore, voter's net benefit for a given θ_t is

$$-\frac{1}{2} \cdot (g_t^h + g_t^l - \theta_t)^2 - \alpha \cdot g_t^h - c(g_t^l). \quad (1)$$

⁹The approach also matches more closely the motivating examples discussed in the introduction, where neither agency is wholly inferior to the other from a cost perspective.

That is, the voter receives a quadratic benefit from the public good and pays a cost in the form of the tax budget needed to produce the public good $g_t^h + g_t^l$. Notice that g^h and g^l are substitutes for the voter. The public good provides the same marginal benefit for the voter, regardless of which agency produces it, whereas the cost depends on the agency's capacity.

As the voter does not observe θ_t , she will make decisions based on her expected utility

$$v_t = \mathbb{E}_\theta \left[-\frac{1}{2} \cdot (g_t^h + g_t^l - \theta_t)^2 - \alpha \cdot g_t^h - c(g_t^l) \right] + \epsilon_t. \quad (2)$$

This consists of the expected benefit from the public good, plus an individual shock $\epsilon_t \sim \mathcal{U}[-\varepsilon, \varepsilon]$ with, $\varepsilon \geq \bar{\theta}^2$.¹⁰

While in office, the politician balances the voter's utility and the political benefit obtained through the low-capacity agency:

$$u_t = -\frac{1}{2} \cdot (g_t^h + g_t^l - \theta_t)^2 - \alpha \cdot g_t^h - c(g_t^l) + \gamma \cdot g_t^l.$$

If the politician is removed from office, then he receives a total payoff \underline{U} , which reflects an outside employment option. This payoff is assumed to be sufficiently low such that the politician would prefer to stay in office for a range of policies $(g^l(\theta), g^h(\theta))_\theta$, rather than implementing his ideal policies and being swiftly removed.

The voter discounts the future at rate $\hat{\beta}$ and the politician discounts the future at rate β , where we could, of course, have $\hat{\beta} = \beta$. This implies a total expected utility for the voter $V_0 = \sum_{t=0}^{\infty} \hat{\beta}^t \cdot v_t$ and for the politician $U_0 = \sum_{t=0}^{\infty} \beta^t \cdot u_t$. Considering the problem in the longer time horizon allows us to explore the dynamic feedback loop between the bureaucratic implementation of policy and political accountability.

¹⁰This ensures that any value of v_t observed on the equilibrium path may be obtained with either $\bar{\theta}$ or θ . It precludes the simple case in which the voter learns the value of θ_t in period $t + 1$, after observing her payoff. This approach of adding a shock to the voter's utility follows [Fearon \(1999\)](#).

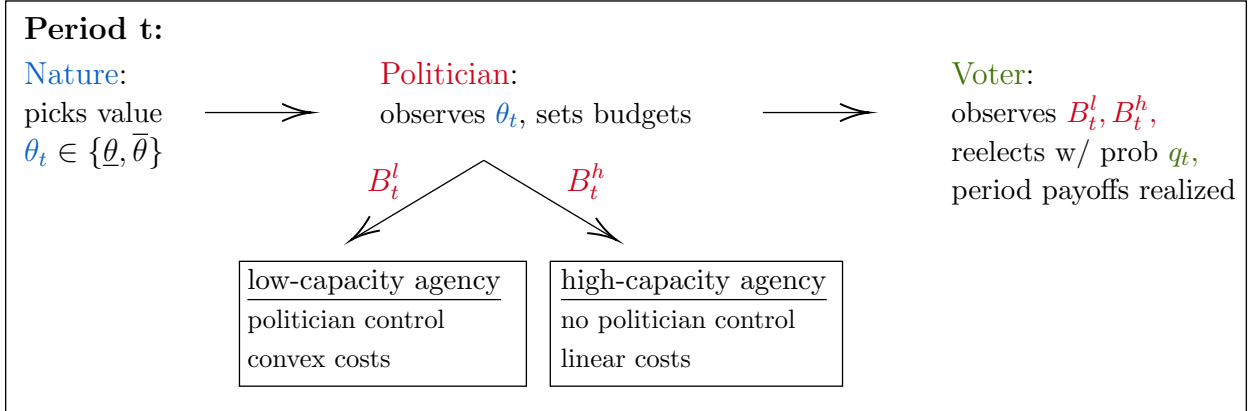


Figure 1: Summary of the game in each period t

Timing and Electoral Accountability. The policymaking and electoral accountability process proceeds as follows each period (represented graphically in Figure 1):

1. Nature chooses value $\theta_t \in \{\underline{\theta}, \bar{\theta}\}$, which is observed by the incumbent politician;
2. The voter announces a reelection probability $q_t(B_t^l, B_t^h) \in [0, 1]$ for the politician (she can commit to q_t within period);
3. The politician chooses agency budgets B_t^l and B_t^h ;
4. The voter observes B_t^l, B_t^h and makes her reelection decision given $q_t(B_t^l, B_t^h)$;
5. The public good is produced and per-period payoffs are realized.

Formal Equilibrium Definition. The contribution of this model is in exploring how the variation in organizational capacity across the bureaucracy may be useful for enhancing voters' electoral control of politicians. While the game is framed from the perspective of a long-lived voter, it is analogous to exploring the equivalent problem of a constitutional designer who wants to provide the best outcome for voters, under the constraint that voters will be less informed than politicians, and that policies will be decided period-by-period.

This requires focusing on the best outcome that can be achieved by the voter. To this end, the results will focus on the sustainable equilibria of this game, which allow for general conditioning of strategies on the public history of events (Ales, Maziero and Yared, 2014). The equilibrium of interest is then the best sustainable equilibrium for the voter, that is, the equilibrium that delivers the highest expected utility for the voter.

Let the public history of budgets observed by the voter up to and including period t be $h_t^0 \equiv \{B_1^l, B_1^h, \dots, B_t^l, B_t^h\}$. Let $h_t^1 \equiv h_t^0 \cup \{\theta_1, \dots, \theta_t\}$ be the history of outcomes observed by the politician up to period t . The voter may condition her reelection strategy on history h_t^0 , while the politician can condition his strategy on history h_t^1 . Let $\Upsilon|_{h_t^0}$ be the continuation strategy of the voter, and let $F|_{h_t^1}$ be the continuation strategy for the incumbent politician. In the sustainable equilibrium, the strategy for the voter Υ solves the voter's problem if for every h_t^0 , $\Upsilon|_{h_t^0}$ maximizes the expected voter utility given F . The strategy F solves the politician's problem if for every h_t^1 , the continuation strategy $F|_{h_t^1}$ maximizes the politician's expected utility given Υ . A sustainable equilibrium then consists of the set of strategies $\{\Upsilon, F\}$ where Υ solves the voter's problem given F , and F solves the politician's problem given Υ . The equilibrium is sustained by a punishment equilibrium in which the voter always removes the politician and any incumbent politician pursues his preferred policy.

3 Agency Structure, Political and Electoral Control

The organization of the bureaucracy determines the degree of political control over policy implementation. The distortions from political control in turn create the need for electoral accountability. To illuminate the role played by each component in this chain, it is helpful to shut down one link at a time before solving for the equilibrium of the full model.

No Electoral Accountability. Consider first shutting down the channel of electoral accountability, so that there are no elections. Taking the voter out of the game has two implications. First, without the threat of electoral control, the politician implements his preferred allocation of funds to agencies each period. Second, there is no dynamic link between periods and the same static allocation problem simply repeats itself each period. There is no reason why the public good provision should in any way depend on the history of past provision or past economic value of the public good. Each period, the politician observes θ_t . If $\theta_t = \underline{\theta}$, then the economic need for the public good is low, and the politician prefers to only fund the low capacity agency. He selects a budget $B^{h,p}(\underline{\theta}) = 0$ for the high-capacity again and $B^{l,p}(\underline{\theta}) > 0$ for the low-capacity agency. The budget $B^{l,p}$ is chosen so that this agency optimally produces public good $g^{l,p}(\underline{\theta}) = c^{-1}(B^{l,p})$, and the marginal cost of its production equals its marginal benefit for the politician: $c'(g^{l,p}(\underline{\theta})) = \underline{\theta} + \gamma - g^{l,p}$. If $\theta_t = \bar{\theta}$, then the economic need for the public good is high, and funds are allocated across both agencies in order to reduce total implementation costs. That is, $B^{h,p}(\bar{\theta}) > 0$ and $B^{l,p}(\bar{\theta}) > 0$. The politician's preferred allocation of funds yields public good $g^{l,p}(\bar{\theta})$ provided through the low-capacity agency and $g^{h,p}(\bar{\theta})$ through the high-capacity agency, such that the marginal cost of its production equals the marginal benefit for the politician: $g^{l,p}(\bar{\theta}) = c'^{-1}(\alpha + \gamma)$, and $g^{h,p}(\bar{\theta}) = \bar{\theta} - c'^{-1}(\alpha + \gamma) - \alpha$. The resulting public goods are illustrated in Figure 2, Panel (a).

No Political Component of Capacity. Next, consider shutting down the political control aspect of agency capacity. That is, assume that $\gamma = 0$, so there are no additional political benefit to be derived through the low-capacity agency. Once the conflict of interest between politician and voter is removed, so is any possible reason for history dependence in policy. Each period, the politician observes θ_t , and he acts solely in the voter's interest, funding the agencies to provide the voter's preferred amount of public good, $g^{l,v}(\theta) + g^{h,v}(\theta)$.

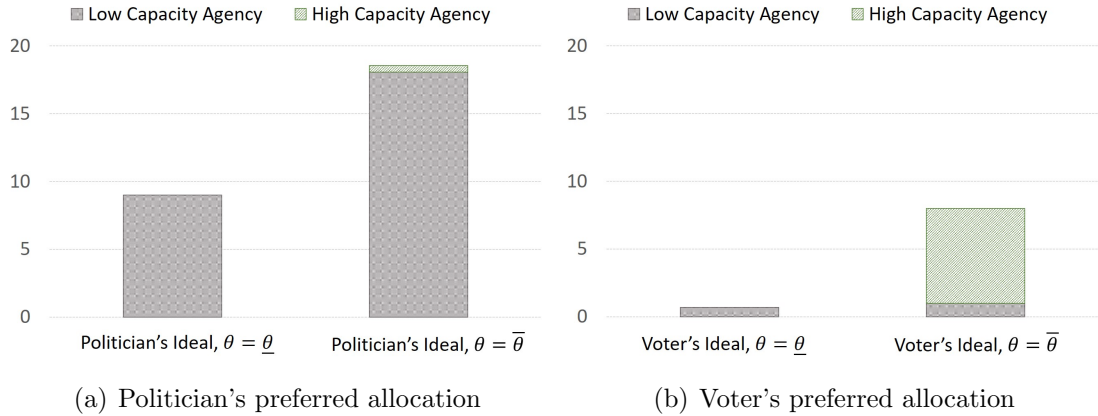


Figure 2: Illustrates the ideal agency budget allocations for the politician (Panel a) and for the voter (Panel b) for $\underline{\theta} = 0.25, \bar{\theta} = 0.65, p = 0.6, \gamma = 0.65, \alpha = 0.2, c(g) = g^2$.

The distribution of funds across agencies is chosen so that the marginal cost of provision equals the marginal benefit to the voter. This implies $g^{l,v}(\theta) < g^{l,p}(\theta)$, $g^{h,v}(\underline{\theta}) = 0$ and $g^{h,v}(\bar{\theta}) > g^{h,p}(\bar{\theta})$. The resulting public good provision is illustrated in Figure 2, Panel (b).

To sum up, the common thread among these two benchmarks is that the resulting equilibrium policies are not history dependent. The benefit of conditioning on history is severed by removing electoral accountability or by removing the conflict of interest between voter and politician.

Proposition 1 *The best sustainable equilibrium does not feature history dependent strategies if there are no elections or if there is no political control over the low-capacity agency. Moreover, the voter's ideal policy, $(g^{l,v}(\theta), g^{h,v}(\theta))_{\theta}$, and the politician's ideal policy $(g^{l,p}(\theta), g^{h,p}(\theta))_{\theta}$ satisfy $g^{l,v}(\theta) < g^{l,p}(\theta)$ and $g^{h,v}(\theta) \geq g^{h,p}(\theta)$, for $\theta \in \{\underline{\theta}, \bar{\theta}\}$.*

No History Dependence. The concept of the best sustainable equilibrium for the voter implies the ability to condition strategies on the history of past policies. Practically, this assumes memory, and bureaucratic agencies act as the devices for keeping this memory. Without history dependence, the voter can still use reelection as a tool to discipline the

politician. Yet, this tool is limited. The voter does not observe θ , so the politician can behave as if the state is $\bar{\theta}$ when in fact it is $\underline{\theta}$, in order to allocate more funds to the low-capacity agency. The following result shows under what conditions not having history dependence precludes the implementation of the voter's preferred policy in equilibrium.

Lemma 1 *Consider the equilibrium without history dependent strategies. There exists γ^{ideal} and β^{ideal} such that for $\gamma \geq \gamma^{ideal}$ and $\beta \leq \beta^{ideal}$, the voter cannot use electoral control to enforce her preferred policy $(g^{l,v}(\theta), g^{h,v}(\theta))_{\theta}$ in any period.*

If the politician derives high private benefits from implementation through the low-capacity agency (high γ), and if staying in office is not too valuable (his discount factor is not too high), then the best the voter can do is to induce the politician to reduce his spending each period, but not up to the voter's ideal level.

In what follows, we return to the full model and show how having all three elements together allows for history dependence and for policy closer to the voter's ideal. The entire history of policies can be leveraged to improve electoral accountability, by optimally creating endogenous stickiness in policy.

4 Dynamic Bureaucratic Capacity

4.1 Formulating the Dynamic Problem.

Analyzing the full model and characterizing the best sustainable equilibrium requires three main steps. The first step is ensuring feasibility. That is, for any sequence of feasible funding allocations by the politician, $\{B_t^h(\theta), B_t^l(\theta)\}_{t=0}^{\infty}$, the voter must select a feasible sequence of reelection probabilities $\{q_t(B_t^h, B_t^l)\}_{t=0}^{\infty}$. For the politician's expected utility, this means mathematically that the expected payoff implied by actions up to period t , denoted U_t^+ , is

consistent with the payoff implied by the current period's play and any future actions, U_{t+1}^+ :

$$U_t^+ = \mathbb{E}_\theta [u(B_t^l(\theta), B_t^h(\theta)|\theta) + \beta \cdot q_t \cdot U_{t+1}^+(B_t^h(\theta), B_t^l(\theta)) + \beta \cdot (1 - q_t) \cdot \underline{U}]. \quad (3)$$

It also means that the expected payoffs are feasible given the maximum and minimum achievable payoffs:

$$U_{t+1}^+(B_t^h(\theta), B_t^l(\theta)) \geq U^{\min}, \quad (4)$$

$$U_{t+1}^+(B_t^h(\theta), B_t^l(\theta)) \leq U^{\max}. \quad (5)$$

Bound U^{\min} corresponds to the minimum payoff that the politician can receive if he is kept one more period (the ideal policy in the one period plus $\beta \cdot \underline{U}$), while U^{\max} is the maximum utility that the politician can derive when he is reelected and free to choose his preferred policy in all periods, that is, the discounted sum of his ideal policies implemented every period, $\frac{1}{1-\beta} \mathbb{E}_\theta [u(B^{l,p}(\theta), B^{h,p}(\theta)|\theta)]$.

Second, the politician makes funding allocations to maximize his utility given the voter's reelection strategy. That is, a policy that leads to reelection is chosen only if it promises a higher payoff than the politician's ideal policy followed by removal from office:

$$u(B_t^l(\theta), B_t^h(\theta)) + \beta \cdot q_t \cdot U_{t+1}^+(B_t^l, B_t^h) + \beta \cdot (1 - q_t) \cdot \underline{U} \geq u(B^{l,p}(\theta), B^{h,p}(\theta)) + \beta \cdot \underline{U}. \quad (6)$$

Moreover, the voter's reelection strategy must lead the politician to generate funding allocations that reflect the real economic need θ rather than claim a state $\hat{\theta} \neq \theta$. That is, the

funding allocations must be incentive compatible:

$$\begin{aligned}
u(B^l(\theta), B^h(\theta)|\theta) + \beta \cdot q_t(\theta) \cdot U_{t+1}^+(\theta) + \beta \cdot (1 - q_t(\theta)) \cdot \underline{U} \geq \\
u(B^l(\hat{\theta}), B^h(\hat{\theta})|\theta) + \beta \cdot q_t(\hat{\theta}) \cdot U_{t+1}^+(\hat{\theta}) + \beta \cdot (1 - q_t(\hat{\theta})) \cdot \underline{U}, \quad (7)
\end{aligned}$$

where, to simplify notation, $q_t(\theta) \equiv q_t(B^l(\theta), B^h(\theta))$ and $U_{t+1}^+(\theta) \equiv U_{t+1}^+(B^l(\theta), B^h(\theta))$.

Finally, the voter selects among the set of feasible reelection sequences the one that maximizes her expected utility. That is, in period t , she is constrained by what is feasible given the history of past policies, summarized by $U_t^+(\theta)$. She chooses the reelection probability $q_t(\theta)$ corresponding to budgets $B_t^l(\theta)$ and $B_t^h(\theta)$, and the sequence of future reelection probabilities and budgets, summarized by their implied payoff $U_{t+1}^+(\theta)$ for the politician, in order to solve the following problem:

$$\begin{aligned}
V_t(U_t^+) = \max_{\{q_t(\theta), B_t^l(\theta), B_t^h(\theta), U_{t+1}^+(\theta)\}_{\theta \in \{\underline{\theta}, \bar{\theta}\}}} \mathbb{E}_\theta \left[v(B_t^l(\theta), B_t^h(\theta)) + \hat{\beta} \cdot q_t(\theta) \cdot V_{t+1}(U_{t+1}^+(\theta)) \right. \\
\left. + \hat{\beta} \cdot (1 - q_t(\theta)) \cdot \bar{V} \right]. \quad (8)
\end{aligned}$$

subject to constraints (3)-(7). The value \bar{V} denotes the voter's expected payoff from replacing the incumbent politician and starting a new game with an identical replacement politician: $\bar{V} \equiv \max_U V(U)$. This formulation defines the dynamic problem for the voter in a form that is analyzable through standard recursive methods. The Appendix shows formally that the voter's expected utility V_t is concave and differentiable, and that the problem can be formulated recursively. The next sections present the main results and their implications for the link between bureaucratic organization and electoral accountability.

4.2 History Dependence through Bureaucratic Implementation

The first implication of the fully dynamic problem is that history dependence is central to the the optimal solution, and it works through restrictions on the bureaucratic implementation of policy.

Proposition 2 *The voter's equilibrium reelection strategy is history dependent. For interior solutions to the voter's problem, the politician's expected payoff U_{t+1}^+ decreases after policies corresponding to a state $\bar{\theta}$. The politician's expected payoff U_{t+1}^+ increases after policies corresponding to a state $\underline{\theta}$.*

The result formally requires considering the voter's optimal choice of $U_{t+1}^+(\theta)$. For an interior solution to the voter's problem, the first-order conditions for $U_{t+1}^+(\underline{\theta})$ and $U_{t+1}^+(\bar{\theta})$ emerging from (8) lead to

$$V_t'(U_{t+1}^+(\bar{\theta})) - V_t'(U_{t+1}^+(\underline{\theta})) > 0. \quad (9)$$

Given that $V(U)$ is concave, this implies $U_{t+1}^+(\underline{\theta}) > U_{t+1}^+(\bar{\theta})$. The voter rewards the politician with higher expected future payoffs for choosing lower budgets, corresponding to $\underline{\theta}$, and she punishes him for choosing higher budgets, in order to discourage overspending. The voter benefits from higher agency budgets when the state is high ($\theta = \bar{\theta}$). Yet, she wants to ensure that the politician does not increase the budgets when $\theta = \underline{\theta}$ in order to derive political benefits through the low-capacity agency. To achieve this, the future payoff promised to the politician, $U_{t+1}^+(\bar{\theta})$, must be lower than $U_{t+1}^+(\underline{\theta})$. Practically, after $\theta = \bar{\theta}$, in order to be reelected in the future, the politician will have to provide a sequence of future budget allocations that are further away from his ideal policy. This means a mix of g^l and g^h that tilts relatively more in favor of the high-capacity agency. The reason why history matters is that it allows the voter to link current policy to the entire path of future policies. This can better incentivize the politician to set policy according to the true current economic need.

4.3 Elections versus Limits on Bureaucratic Implementation

Each period, the voter can discourage over-funding of the low-capacity agency through two levers: higher probability of removal from office and less discretion in funding this agency in the future. The dynamic problem shows that these two levers are used for electoral control.

First, if the voter wants to reduce the politician's expected payoff, she can, on the one hand, decrease the probability q_t with which she reelects the politician, holding fixed the budget allocations. Yet, removing the politician has a direct cost for the voter, as the voter's expected payoff resets every time a new politician is installed. This cost places an important limit on the voter's ability to use $q_t \in (0, 1)$ as a viable accountability mechanism. To credibly implement removal from office, the voter must be indifferent between her expected value of continuing with the current politician and resetting her payoff. Moreover, $q_t \in (0, 1)$ stops being feasible once the politician has been promised a high enough continuation payoff U_t^+ , such that the voter is forced to reelect the politician in order to deliver that payoff to him. Taken together, these insights imply a weakly decreasing $V_t(U_t)$ function, with a region of indifference where $q_t \in (0, 1)$, and a removal probability q_t that increases in U , as illustrated in Figure 3.

The second lever the voter has is to change the budgets $B^l(\theta)$ and $B^h(\theta)$ after which reelection is granted. As the voter finds it costlier to reduce q_t , she instead punishes the politician by lowering his future expected payoff through relatively higher funding requirements for the high-capacity agency. After implementing $B^l(\bar{\theta})$ and $B^h(\bar{\theta})$, the politician expects a lower future payoff. Yet, this second lever is also costly. Every time the politician is rewarded for low funding decisions, the voter must follow through with that reward. This means that, as time goes on, the voter has less flexibility to change budgets $B^l(\theta)$ and $B^h(\theta)$ towards her preferred levels, as she is bound by past promises from past rewards or punishments. This results in the classic problem of dynamic moral hazard, where the politician is

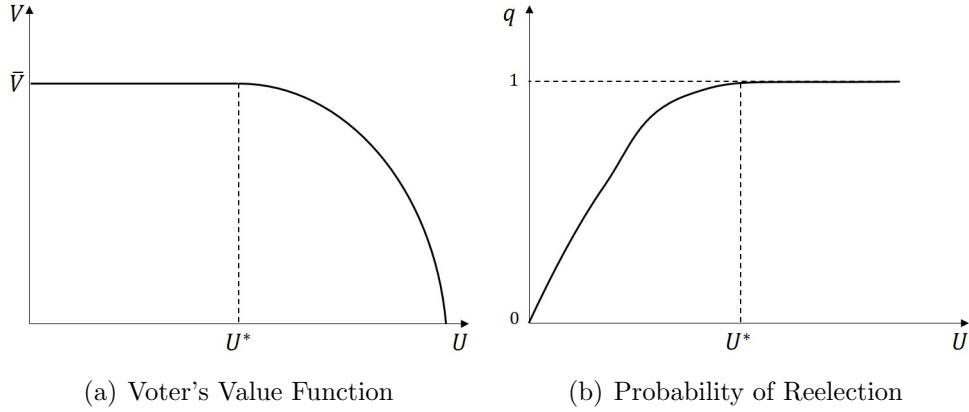


Figure 3: Panel (a) illustrates voter's value V as a function of the politician's continuation value U . The function is linear and flat from U^{\min} to some value U^* and strictly decreasing thereafter. Panel (b) illustrates the probability that the politician is reelected after implementing the recommended policy $B^l(\theta), B^h(\theta)$. The politician must be reelected after $B^l(\theta), B^h(\theta)$ whenever $U > U^*$.

less constrained as he advances in his tenure. This dynamic is illustrated in Figure 4

4.4 Policy Persistence

An immediate implication of the trade-off described above is the endogenous stickiness of policy in the high-capacity agency after periods of high economic need.

Corollary 1 *Policy persistence in the high-capacity agency emerges in the solution that maximizes voter welfare. The politician allocates a relatively higher budget to the high-capacity agency after periods when $\theta = \bar{\theta}$. The budget is decreased after $\theta = \underline{\theta}$.*

The key characteristic of the voter's optimal solution is that the entire sequence of reelection conditions can be used to incentivize politician discipline in the current period. This means that after a period when $\theta_t = \bar{\theta}$, the voter will require an increase in the high-capacity agency's budget relative to the low-capacity agency's budget, spread out over all future budgets. Thus, every allocation decision made by the politician has long-lasting policy effects through the optimal electoral incentives.

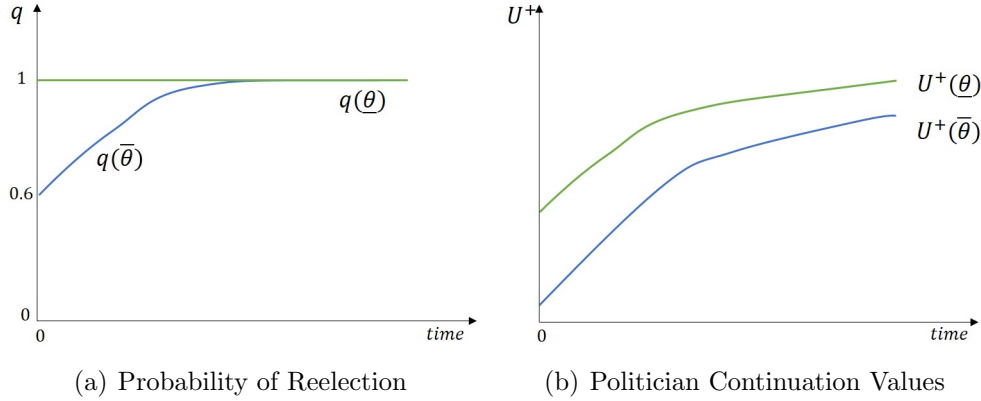


Figure 4: Panel (a) illustrates the probabilities that the politician is reelected after implementing the recommended policy, for $\bar{\theta}$ and $\underline{\theta}$, assuming repeated realizations of $\underline{\theta}$ over time. Panel (b) illustrates the continuation values $U_{t+1}^+(\bar{\theta})$ and $U_{t+1}^+(\underline{\theta})$, assuming repeated realizations of $\underline{\theta}$ over time.

In terms of institutional design, the implication of this result is that the voter benefits if there is persistence of policy implementation over time. To summarize the above analysis, implementation of the voter's optimal history-dependent strategy requires both memory of past policies and persistence of public programs in bureaucratic agencies.

4.5 Current Incentives versus Future Spending

Offering dynamic rewards and punishments is more costly for the voter when she values the future more, that is, when $\hat{\beta}$ increases. Offering the politician rewards and punishments through persistence of programs is costly, as the voter must also bear the cost of overspending through the high-capacity agency in periods when this spending not necessary. If $\hat{\beta}$ is higher, this makes the voter less willing to implement large rewards or punishments long into the future, in order to discourage overspending in the short-run. Conversely, if the voter does not value the future as much, she is willing to implement strong rewards or punishments to obtain her desired policy in the short-run. The cost, however, is that in the long-run, policies will tilt more strongly in favor of the politician's preferences, as the voter is bound by her rewards promises, and thus loses leverage in the future.

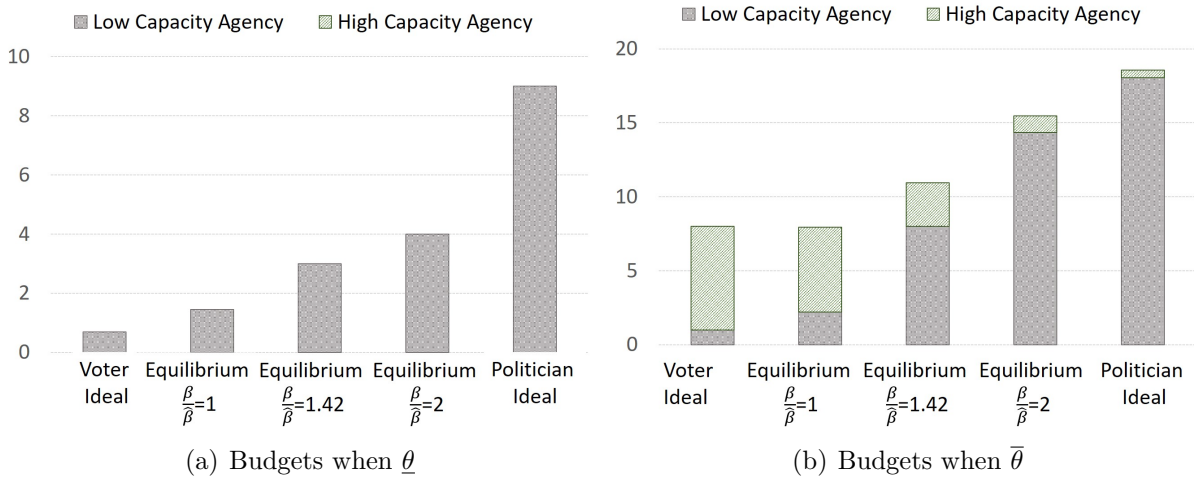


Figure 5: The figure shows the long-run equilibrium results of simulating the model over 25 periods with alternating realizations of $\underline{\theta}$ and $\bar{\theta}$, with parameters $\underline{\theta} = 0.25, \bar{\theta} = 0.65, p = 0.6, \gamma = 0.65, \alpha = 0.2, c(g) = g^2, \beta = 0.5$, and $\hat{\beta} \in \{0.5, 0.35, 0.25\}$. It illustrates the long-run per-period budget allocations when $\theta_t = \underline{\theta}$ (Panel a) and when $\theta_t = \bar{\theta}$ (Panel b), with the voter and politician ideal allocations added for comparison.

Proposition 3 *As the voter's discount factor $\hat{\beta}$ decreases, long-run funding to agencies is closer to the politician's ideal.*

Formally, the first-order conditions to the voter's problem imply

$$\mathbb{E} \left[\frac{dV_{t+1}(U_{t+1}^+(\theta))}{dU_{t+1}^+} \right] = \frac{\beta}{\hat{\beta}} \cdot \frac{dV_t(U_t^+)}{dU_t^+}. \quad (10)$$

As $\hat{\beta}$ decreases, equation (10) means that $U_{t+1}^+(\theta)$ increases. A higher expected payoff for the politician requires a sequence of future policies closer to his ideal. The result is a reflection of the classic trade-off in dynamic moral hazard problems: in order to obtain the desired spending in the short-run, the voter must promise rewards that lower her ability to control the politician in the long-run. The effect is stronger the more the voter values current policy outcomes relative to future policy outcomes. This effect is illustrated in Figure 5 for a simulation of the model for different values of $\hat{\beta}$.

4.6 Higher Expected Value of Public Spending

Achieving electoral accountability is costlier for the voter when periods of high public spending are more likely (that is, if p is lower).

Corollary 2 *Higher probability of periods of valuable public spending (lower p) leads to higher rewards relative to punishments for the politician: $U_{t+1}^+(\underline{\theta}) - U_{t+1}^+(\bar{\theta})$ increases.*

Lower p implies a lower likelihood that $\theta = \underline{\theta}$. If the probability of $\underline{\theta}$ is lower, then the voter expects fewer future periods in which the budget limits will constrain the politician. Therefore, she must make the constraint each period more onerous, in order give the politician a sufficiently high expected punishment in case of overspending. She does this by increasing the gap between the reward — the promised payoff in case of low spending — and the punishment — the promised payoff in case of high spending.

An implication of this result is that persistent crises, where high economic need is likely to persist into the future (cases when p is low), lead to more funding of the high-capacity agency than crises that are expected to be short (when p is high). That is because the politician lowers $U_{t+1}^+(\bar{\theta})$ by requiring relatively higher spending through the high-capacity agency. Moreover, persistent crises also make electoral accountability more difficult, as they increase the cost to the voter of providing incentives to the politician.

5 Discussion

The examples of the FDA and TARP mentioned in the introduction illustrate how the main elements of the model map to empirical policymaking settings. These examples show how the structure of bureaucratic implementation feeds into policy choice and into voters' electoral control of politicians. In the following paragraphs, I expand on that discussion to show how the dynamic policymaking implications of the model are reflected in empirical cases.

The two examples from the introduction referred to policies forged in time of crisis. In the case of the FDA, the crisis was limited to one episode. The fallout from the side effects of Thalidomide did not cascade into a string of multiple such crises. In the case of the 2008 financial crises, the crisis consisted of several subsequent episodes of bank failures, private company and individual defaults, followed by a government debt crisis in the European Union. All these subsequent crises came with a high need for government spending. The results of Proposition 2 prescribe an increase in the high-capacity (more politically independent) agency's role following a crisis, as it was the case for the FDA. The dynamics additionally imply that, in the case of several subsequent periods of crisis, funding to the politically independent agency gradually increases. This dynamic indeed matches the experience of the financial crisis. As described in the introduction, in the United States, the shift of policy implementation towards the Federal Reserve increased gradually, as voter support for executive controlled programs like TARP weakened. A similar dynamic was observed also outside the United States. Germany, for example, first responded to the crisis by directly rescuing its struggling banks using executive authority.¹¹ Yet, as the crisis persisted, the government spending programs were diversified towards avenues under less executive control. The parliament adopted broader support programs in November 2008 and February 2009, which included, for instance, tax breaks and general rules for companies accessing funding and loan guarantees.¹²

The model's implications are not limited to policymaking in crisis times. To illustrate this point, I consider an example from the renewable energy sector. In the United States, the Energy Policy Act of 2005 and subsequent legislation specified government funding and purchasing programs for renewable energy. The programs came in two main forms. First,

¹¹Starting with Hypo Real Estate and BayernLB in October 2008, followed by Commerzbank, Germany's second largest bank in January 2009 (source: the New York Fed's International Responses to the Crisis Timeline).

¹²The Library of Congress Research Reports: Financial Stimulus Plans: Recent Developments in Selected Countries (http://www.loc.gov/law/help/financial_stimulus_plan.php).

there was the policy implementation through an agency under the control of the president, namely the Department of Energy (DOE). The DOE was tasked with providing direct funding through grants and low cost debt for companies employing innovative technologies. Second, energy policy implementation was also assigned to an agency whose rules and procedures allowed for less discretion by the president, namely the Internal Revenue Service (IRS). Firms running renewable energy projects received investment tax credits and accelerated depreciation accounting, used to lower tax liabilities. The public good provided by the government through these programs was substantial, accounting for 48% of solar power production costs and 35% of wind power production costs.¹³ The model predicts that electorally accountable politicians would provide more public funding in periods when it is needed more. Indeed, both categories of programs increased following the 2008 financial crisis, when the sources of private funding for renewable energy projects dried up. Yet, in line with the logic of policy persistence in the high-capacity agency, as the economic need decreased post-2008, the direct grants and loans were reduced, while the tax credits remained.¹⁴ Moreover, the link between the policy implementation decision and electoral incentives features preeminently in the public domain. For example, the Solyndra scandal of 2012 aimed to relate policy implementation through direct grants to politically connected transfers, leading to a campaign of political attacks against the president.¹⁵ Following this scandal, the use of tax credits increased and the grant program was diminished.

The above examples show how the model may be used to shed light on the relationship between policy implementation and electoral accountability. Changes in funding to agencies and in the structure of bureaucratic implementation are driven in part by the concerns of politicians facing voter evaluation. Electoral motivations not only drive the decision whether

¹³“Examination of Federal Financial Assistance in the Renewable Energy Market”, report by Scully Capital and Kutak Rock LLP, October 2018.

¹⁴ibid., Exhibit 4-3.

¹⁵A summary is provided at <https://www.washingtonpost.com/politics/specialreports/solyndra-scandal/>

to delegate policy implementation, but as this model shows, they also crucially affect which agency to fund, and how to sequence the allocation of funds.

6 Concluding Remarks

A fundamental feature of policymaking is the bureaucracy's policy implementation capability. In order to produce results, policies must not only be formulated, but they must also be implemented by a capable bureaucracy. The variation in organizational capacity among bureaucratic agencies can lead to different implementations of the same policy goals. This paper provides a model to unpack how differences in organizational capacity inside the bureaucracy affect policy implementation, and in turn how this influences policy choice by politicians, and the voters' ability to hold elected politicians accountable. Taking the organizational structure of the bureaucracy as given, the formal model focuses on the politician's choice of which agency to assign policy implementation to. The politician's choice is observed by voters, and it is guided by electoral concerns. The optimal policy path for electoral accountability leads to endogenous persistence of policy in bureaucratic agencies.

The formal model also speaks to the evolution of bureaucratic organization implied by its role in electoral accountability. Dynamically, there is no convergence towards one agency gaining monopoly over policymaking. Instead, electoral incentives ensure the persistence of policy implementation through both high-capacity and low-capacity agencies. Complementing [Moe \(1989\)](#), this paper highlights that the design of the bureaucracy may in fact serve the interests of voters: bureaucratic organization where multiple agencies have complementary policy roles may be effectively used to enhance electoral accountability.

A natural extension of this model is to ask whether the results may be extended to understand the dynamics of structuring policy implementation in international or supranational organizations, like the institutions of the European Union (EU), as opposed to domestic

agencies. The model captures several aspects of this problem. Supranational agencies that form the EU level bureaucracy are regarded as more technocratic and hence less responsive to politician biases compared to local domestic agencies. Also, supranational organizations are set up in order to address large scale projects compared to domestic agencies. Nevertheless, analyzing the link between electoral accountability and supranational delegation decisions would require extending the model to address two additional concerns. First, the funding of supranational organizations is derived from multiple countries and spending may reflect redistribution between the participating countries. Second, the objective of the supranational organization may not always align with that of voters in one particular country, as the organization must balance preferences of voters from multiple countries.¹⁶ A fruitful direction for future research is to incorporate these two features into the model in order to understand how a multi-layered bureaucratic structure that involves supranational agencies may facilitate or impede domestic electoral accountability.

The Proofs and an extension to agency expertise are included in the Online Appendix.

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¹⁶The implications of these differences for voter welfare are explored in Foarta (2018), in a model in which public spending is achieved through both domestic spending and inter-governmental transfers, and where domestic politicians are biased in their spending preferences.

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