

# Bureaucratic Autonomy and the Policymaking Capacity of United States Agencies, 1998–2021

## Online Appendix

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### Contents

<b>OA1</b>	<b>Policymaking-Capacity Scores</b>	<b>1</b>
OA1.1	Data . . . . .	1
OA1.2	Bayesian Factor-Analysis Model . . . . .	3
OA1.3	Stan Model . . . . .	6
OA1.4	Alternative Specifications . . . . .	7
OA1.5	Measurement of Education Requirements . . . . .	9
OA1.6	Measurement of the Size and Focus of the Workforce . . . . .	9
OA1.7	Measurement of Salary . . . . .	10
OA1.8	Measurement of Length of Service . . . . .	14
OA1.9	Inclusion of Research Occupations as Policymaking Employees . . . . .	14
<b>OA2</b>	<b>Classification of Occupational Codes</b>	<b>15</b>
<b>OA3</b>	<b>Validation with Survey Measures</b>	<b>20</b>
<b>OA4</b>	<b>Validation with Rulemaking Data</b>	<b>24</b>
OA4.1	Robustness Check on All Rules . . . . .	27
<b>OA5</b>	<b>Structural Independence and Policymaking Capacity</b>	<b>28</b>
OA5.1	Estimates on Subsets of Agencies . . . . .	28
OA5.2	Alternative Measure of Independence . . . . .	30
<b>OA6</b>	<b>Politicization and Policymaking Capacity</b>	<b>32</b>
OA6.1	Two-Way Fixed Effects . . . . .	34

## OA1 Policymaking-Capacity Scores

This Appendix describes the development of the policymaking-capacity scores. The data comes from the Office of Personnel Management’s (OPM) Enterprise Human Resources Integration (EHRI) database. A Bayesian factor analysis uses this data to estimate policymaking capacity as a latent concept from correlated variables. This method overcomes three problems with measuring policymaking capacity. First, this method incorporates multiple variables of policymaking capacity, avoiding the reliance on a single, crude indicator as a proxy for the complex latent concept. Second, it avoids costly and infrequent survey techniques by using publicly available data from OPM to produce time-series measures for 261 agencies. Third and finally, OPM’s *Handbook of Occupational Groups and Families* makes it possible to identify which occupations engage in policymaking and tailor the measures to that specific activity (O.A.2). The result is 5,590 yearly policymaking-capacity scores for 261 agencies from 1998 to 2021.

### OA1.1 Data

Since 1998, the Office of Personnel Management—the federal government’s human-resources department—has published its EHRI database, which includes over 190 million personnel records of civilian employees working in over 750 federal agencies.<sup>1</sup> Each entry in EHRI includes information about the employee’s agency, salary, education, occupation, length of service, location, and supervisory status. The regular publication of EHRI permits the development of time-series measures of bureaucratic capacity by aggregating this data into agency–year units.

Certain occupations play a particular role in developing agency policies. I identify staff

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<sup>1</sup>OPM has published this data annually since 1998 and quarterly since 2009. I use the annual data published in September for all years, which syncs the measure with the fiscal year of the federal government. While it is possible to produce quarterly measures for some years, I do not produce these measures for this paper because it would necessitate a greater understanding of seasonal trends in agency employment.

Notable agencies excluded from EHRI include the Federal Reserve, most intelligence agencies, the U.S. Postal Service, and the White House Office. Office of Personnel Management. “Fedscope.” <https://www.fedscope.opm.gov>.

engaged in policy development by coding the descriptions of all white-collar occupations listed in OPM’s *Handbook of Occupational Groups and Families*. I code occupations described as developing regulations, programs, policies, or standards as policymaking occupations (O.A.2). In addition, I include occupations described as conducting scientific research because these researchers may assist policymakers working in highly technical issue areas.<sup>2</sup> Unless specified otherwise, I refer to these groups collectively as “policymaking occupations” or “bureaucratic policymakers.”

For each agency, I aggregate the individual-level data at the agency–year level. I also create department-level measures for certain agencies.<sup>3</sup> I exclude any agency that averaged fewer than 15 total employees from 1998 to 2021.<sup>4</sup> Additionally, I exclude any agency that averaged fewer than 5 policymaking employees during the same period and any agency–year in which the agency had no policymaking employees. EHRI reports most data at the bureau level. However, wide variation exists in bureau-level reporting.<sup>5</sup> For example, EHRI only includes department-level data for the Department of Energy but includes 96 different offices within the Air Force. Of the hundreds of agency–year entries for offices in the Air Force, over 10% have fewer than twenty employees and over 6% have fewer than five employees. Most of these offices are inconsequential for political-science research, and their inclusion

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<sup>2</sup>In alternative specifications, I exclude these researcher positions but validation suggests the broader definition of policymaking occupations produces more reliable measures.

<sup>3</sup>I estimate department-level policymaking-capacity scores for the following agencies by aggregating the employment records for all of the department’s bureaus and offices: the Air Force, the Army, the Department of Agriculture, the Department of Commerce, the Department of Defense, the Department of Education, the Department of Health and Human Services, the Department of Homeland Security, the Department of Housing and Urban Development, the Department of the Interior, the Department of Justice, the Department of Labor, the Department of Transportation, the Department of the Treasury, the Department of Veteran Affairs, the General Services Administration, the National Aeronautics and Space Administration, and the Navy. EHRI already reports employment for the Department of Energy and the Department of State at the department level. The department-level scores include employees in all subunits regardless of whether those subunits appear on the narrowed list of agencies. The department-level scores for the Department of Defense do not include the Air Force, the Army, or the Navy.

<sup>4</sup>This excludes eight agencies: the Administrative Conference of the United States, the Appalachian Regional Commission, the James Madison Memorial Fellowship Foundation, the Farm Credit System Insurance Corporation, the Barry Goldwater Scholarship Foundation, the Harry S. Truman Scholarship Foundation, the Center for Faith-Based and Community Initiatives, and the Marine Mammal Commission.

<sup>5</sup>Notable exceptions to this rule include the Department of Energy, the Department of State, and the Environmental Protection Agency.

may bias estimates for larger bureaus and departments. Accordingly, I create a narrower list of agencies.<sup>6</sup>

Table OA1: Variables of Workforce Capacity

<b>Indicator</b>	<b>Mean</b>	<b>SD</b>
Logged Number of Policymaking Employees	6.28	2.31
Proportion of Employees Involved in Policymaking	0.50	0.24
Mean Salary of Policymaking Employees (Thousands of 2020 Dollars)	115.85	21.56
Mean Length of Service of Policymaking Employees (Years)	15.56	3.31
Proportion of Policymaking Employees with a College Education	0.74	0.16

*Note:* All variables are normalized before estimation. Averages calculated before normalization.

As discussed in the main text, five variables are constructed based on their theoretical relationship to policymaking capacity. Table OA1 reports summary statistics for each of these variables.

## OA1.2 Bayesian Factor-Analysis Model

In recent decades, political scientists have turned toward Bayesian models to estimate measures from a set of variables theorized to correlate with a latent concept (Clinton and Lewis 2008; Richardson, Clinton and Lewis 2017; Selin 2015). In particular, Bayesian factor-analysis models have been used to produce unit-year measures from observable variables with continuous values (Bersch, Praça and Taylor 2017; Treier and Jackman 2008).

Let  $i = 1, \dots, n$  index agency-years and  $j = 1, \dots, m$  index the variables correlated with policymaking capacity. I assume that each observed indicator  $y_{ij}$  is a function of the agency's latent policymaking capacity  $x_i$  and that  $y_{ij} \sim \mathcal{N}(\gamma_j(\alpha_j + \beta_j x_i), \sigma_i^2)$ .<sup>7</sup> Functionally,

<sup>6</sup>I first selected all agencies cited in the *Sourcebook of United States Executives Agencies* (Selin and Lewis 2018). I added a number of bureaus abolished before the publication of the *Sourcebook*, including agencies that were merged into the Department of Homeland Security. I also added a number of bureaus that have published regulations in the last twenty years.

<sup>7</sup>I estimate the parameters by sampling from the approximate posterior distribution with a Hamiltonian Monte Carlo algorithm. I use the No-U-Turn Sampler extension to the Hamiltonian Monte Carlo algorithm (Gelman, Carlin, Stern, Dunson, Vehtari and Rubin 2021). The model is constructed in probabilistic-programming language Stan and implemented in R. As policymaking capacity may vary across time, the

the model operates as a two-parameter item-response model like those commonly used in educational testing. The  $\beta_j \geq 0$  parameter allows the relationship between  $x_i$  and  $y_{ij}$  to vary across indicators, the  $\alpha_j$  intercept estimates the value of indicator  $j$  when  $x_i = 0$ , and the  $\gamma_j \geq 0$  parameter informs how well each indicator differentiates between the latent capacity of agencies (Bürkner 2019).

I constrain  $\gamma_j$  and  $\beta_j$  to positive values because policymaking capacity should be increasing in each indicator (Bürkner 2019).<sup>8</sup> The most likely violation of this assumption concerns the experience of policymaking employees and a worry that their skills dull over time. However, theoretical research suggests that individuals in these positions actually invest in their expertise and hone their procedural knowledge throughout their careers (Gailmard and Patty 2007; Miller and Whitford 2016; Potter 2019). Therefore, the assumption that policymaking capacity is monotonically increasing in expertise appears satisfied at least with respect to policymaking employees. This restriction would need to be reevaluated for other agency tasks, such as law enforcement. A set of uninformed priors completes the model.<sup>9</sup>

Table OA2: Estimates of Model Parameters

<b>Indicator</b>	$\beta_j$	$\gamma_j$
Logged Number of Policymaking Employees	2.10	0.002
Proportion of Employees Involved in Policymaking	7.52	0.03
Mean Salary of Policymaking Employees (Thousands of 2021 Dollars)	7.66	0.03
Mean Length of Service of Policymaking Employees (Years)	2.25	0.003
Proportion of Policymaking Employees with a College Education	7.80	0.03

All variables have positive and substantively meaningful coefficients. The resulting model pools all agency–years, which is the approach taken by Treier and Jackman (2008). Each run includes four chains with 10,000 iterations and a 5,000 iteration burn-in phase, consistent with the approach advocated by Gelman et al. (2021). Standard metrics of Bayesian modeling suggest that the chains converge. The model ends with zero divergences. For all parameters,  $\hat{R} \approx 1$ . Trace plots illustrate the mixing between the chains. I post-process the estimates of policymaking capacity iteration-by-iteration so that the samples are distributed according to a standard normal distribution  $\mathcal{N} \sim (0, 1)$  (Clinton and Lewis 2008).

<sup>8</sup>Another possible violation of this assumption is that a greater number of policymaking employees inhibits agency coordination. That is possible. Excluding this variable has no impact on the scores. The correlation between the chosen measure and the measure that excludes the number of policymaking employees is  $\rho \approx 1$ .

<sup>9</sup>Specifically, I assume  $\alpha_j \sim \mathcal{N}(0, 100)$ ,  $\beta_j \sim \mathcal{N}(0, 100)$ ,  $x_i \sim \mathcal{N}(0, 100)$  and  $\sigma_i^2 \sim \mathcal{U}(0, 100)$ .

policymaking-capacity scores range from  $-2.38$  (low policymaking capacity) to  $3.59$  (high policymaking capacity), with a mean of zero and a standard deviation of  $0.68$ . There are a total of  $5,590$  scores for  $261$  agencies from 1998 to 2021.

### OA1.3 Stan Model

The model was constructed in the Stan probabilistic programming language and implemented in R. The following code was used to estimate the parameters of the model:

```
data{
  int<lower=1> J; // Total Number of Agency--Years
  int<lower=1> K; // Total Number of Indicators
  int<lower=1> N; // Total Number of Observations
  int<lower=1,upper=J> jj[N]; //Agency--Year for Observation N
  int<lower=1,upper=K> kk[N]; //Indicator for Observation N
  real y[N]; //Value of indicator for Observation N
}
parameters{
  vector[J] alpha; //Capacity for Agency-Year J
  vector<lower=0>[K] beta1; //Intercept
  vector<lower=0>[K] beta2; //Difficulty for Indicator K
  vector<lower=0>[K] gamma; //Discrimination of K
  real<lower=0, upper=10> sigma; //Population SD
}
transformed parameters{
  vector[N] theta; //Agency--Year Effects
  real tau;
  theta = gamma[kk] .* (beta1[kk]+(beta2[kk] .* alpha[jj]));
  tau = pow(sigma,-2);
}
model{
  alpha ~ normal(0,10); //Priors for Capacity
  beta1 ~ normal(0,10); //Prior of Intercept
  beta2 ~ normal(0,10); //Prior of Difficulty
  gamma ~ normal(0,10); //Prior of Discrimination
  sigma ~ uniform(0,10); //Prior for Sigma
  y ~ normal(theta,tau);
}
```

Table OA3: Alternative Specifications

	Model								
	1	2	3	4	5	6	7	8	9
Number of Policymaking Employees (Logged)	✓	✓	✓		✓				✓
Proportion of Workforce in Policymaking Occupations	✓	✓		✓		✓			✓
Proportion of Policymaking Employees with College Education	✓		✓	✓			✓		✓
Proportion of Policymaking Employees with Graduate Education		✓			✓	✓		✓	
Mean Length of Service of Policymaking Employees	✓	✓	✓	✓	✓	✓	✓	✓	✓
Cumulative Length of Service of Policymaking Employees (Logged)									
Mean Salary of Policymaking Employees	✓	✓	✓	✓	✓	✓	✓	✓	
Policymaking and Research Employees	✓	✓	✓	✓	✓	✓	✓	✓	✓
Only Policymaking Employees									
Only Policymaking and Research Employees in Washington DC									

	Model							
	10	11	12	13	14	15	16	
Number of Policymaking Employees (Logged)	✓			✓	✓	✓	✓	
Proportion of Workforce in Policymaking Occupations	✓	✓	✓	✓	✓	✓	✓	
Proportion of Policymaking Employees with College Education		✓		✓		✓		
Proportion of Policymaking Employees with Graduate Education	✓		✓		✓		✓	
Mean Length of Service of Policymaking Employees	✓			✓	✓	✓	✓	
Cumulative Length of Service of Policymaking Employees (Logged)		✓	✓					
Mean Salary of Policymaking Employees		✓	✓	✓	✓	✓	✓	
Policymaking and Research Employees	✓	✓	✓					
Only Policymaking Employees				✓	✓			
Only Policymaking and Research Employees in Washington DC							✓	✓

*Note:* See OA2 for a discussion of policymaking employees versus research employees.

## OA1.4 Alternative Specifications

In order to identify the best possible measure of policymaking capacity, I run multiple specifications of the model, validate each measure, and select the model that performs best on these validation metrics. Table OA3 lists the different specifications. I select the specification that performs best on the validation exercises discussed in Online Appendix 3.

Table OA3 lists the variables included in each specification. Model (1) is the primary specification chosen after validation. Different specifications were chosen to address various concerns about the bias caused by the inclusion or exclusion of a particular variable. Although it would be onerous to test every permutation of these variables, the high correlation between all specifications mitigates concerns that any one specification significantly outperforms the others.

Correlations across specifications are reported in Table OA4. All models are highly



Table OA4: Correlations of Model Specifications

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
1	1	0.93	0.93	1	0.84	0.93	0.93	0.84	0.84	0.87	1	0.93	0.80	0.75	0.84	0.81
2	0.93	1	0.91	0.93	0.96	1	0.91	0.96	0.96	0.86	0.93	1	0.80	0.84	0.79	0.88
3	0.93	0.91	1	0.93	0.93	0.91	1	0.93	0.93	0.67	0.93	0.91	0.81	0.77	0.79	0.79
4	1	0.93	0.93	1	0.84	0.93	0.93	0.84	0.84	0.87	1	0.93	0.81	0.75	0.84	0.81
5	0.84	0.96	0.93	0.84	1	0.96	0.93	1	1	0.69	0.84	0.96	0.78	0.84	0.73	0.85
6	0.93	1	0.91	0.93	0.96	1	0.91	0.96	0.96	0.86	0.93	1	0.80	0.84	0.79	0.88
7	0.93	0.91	1	0.93	0.93	0.91	1	0.93	0.93	0.67	0.93	0.91	0.81	0.77	0.79	0.79
8	0.84	0.96	0.93	0.84	1	0.96	0.93	1	1	0.69	0.84	0.96	0.78	0.84	0.72	0.85
9	0.84	0.96	0.93	0.84	1	0.96	0.93	1	1	0.69	0.84	0.96	0.78	0.84	0.72	0.85
10	0.87	0.86	0.67	0.87	0.69	0.86	0.67	0.69	0.69	1	0.87	0.86	0.63	0.64	0.71	0.76
11	1	0.93	0.93	1	0.84	0.93	0.93	0.84	0.84	0.87	1	0.93	0.81	0.75	0.84	0.81
12	0.93	1	0.91	0.93	0.96	1	0.91	0.96	0.96	0.86	0.93	1	0.80	0.84	0.79	0.88
13	0.80	0.80	0.81	0.81	0.78	0.80	0.81	0.78	0.78	0.63	0.81	0.80	1	0.95	0.70	0.72
14	0.75	0.84	0.77	0.75	0.84	0.84	0.77	0.84	0.84	0.64	0.75	0.84	0.95	1	0.66	0.77
15	0.84	0.79	0.79	0.84	0.73	0.79	0.79	0.72	0.72	0.71	0.84	0.79	0.70	0.66	1	0.91
16	0.81	0.88	0.79	0.81	0.85	0.88	0.79	0.85	0.85	0.76	0.81	0.88	0.72	0.77	0.91	1

correlated with one another. Some models have a correlation of  $\rho > 0.99$ . The lowest correlation between any two specifications is  $\rho = 0.63$ . Accordingly, the measures are robust to alternative specifications. Nevertheless, I take the opportunity to walk through the various specifications and the concerns addressed by each one. Correlations reported in the following discussion reflect the correlation with the primary specification: Model (1).

### **OA1.5 Measurement of Education Requirements**

One possible concern is that reliance on the proportion of policymaking employees with a college education does not adequately capture technical expertise. Overall, employees in the federal government tend to have high levels of postsecondary education. An alternative measure is the proportion of policymaking employees with a graduate education.

The specifications vary whether education is measured as the proportion of employees with a college education or the proportion of employees with a graduate education. Employees with a graduate education often have greater expertise than individuals with a college education. They may also belong to professional organizations that shape their behavior (Miller and Whitford 2016). Other research demonstrates the importance of individuals with law degrees to the policymaking process (Walker 2013). However, other occupations—especially those in the sciences—do not necessarily require a graduate-level education for employees to attain expertise. Accordingly, measuring education at the graduate level may bias the policymaking scores in favor of agencies operating in certain policy areas. There is a high correlation between the primary specification (which uses the college-education measure) and Model (2) (which uses the graduate-education measure) ( $\rho = 0.93$ ).

### **OA1.6 Measurement of the Size and Focus of the Workforce**

Another possible concern is that measures intended to capture the size or focus of the workforce may bias in favor of agencies that simply have a large number of employees. For example, the Department of Defense may appear to have greater policymaking capacity than

the Securities and Exchange Commission simply because it has more people.

The specifications vary whether the model includes the number of policymaking employees and/or the proportion of the workforce in policymaking occupations. Model (3) ( $\rho = 0.93$ ) excludes the proportion of the workforce in policymaking positions. Model (4) ( $\rho > 0.99$ ) excludes the number of policymaking employees. Model (7) ( $\rho = 0.93$ ) excludes both of these variables. In addition, Figure 1 in the main text alleviates concerns that the primary specification simply proxies the size of the agency's policymaking workforce.

### OA1.7 Measurement of Salary

The measure uses the salary of policymaking employees. One concern is that using the raw salary figure does not consider the outside employment options available to the employee. The ability of the agency to recruit and retain employees depends on whether these employees have more lucrative career options elsewhere (Gailmard and Patty 2007). By virtue of their policy domains, agencies draw from different labor markets and, therefore, employees in one agency may have more lucrative outside options.

A major difficulty in standardizing the availability of outside options is identifying those outside options. The ideal measure would examine a particular employee's occupation, education, and experience to estimate the highest possible utility they would attain in the private sector. In addition to salary, an individual's utility function may include non-economic benefits, such as their ability to influence policy and the stressors of the position (Downs 1964; Gailmard and Patty 2007). Once we have estimated the employee's expected utility from the outside option, we take the difference between the utility in the current position and the utility in the outside position to create a latent measure of job fulfillment.<sup>10</sup>

We lack sufficient data to construct this ideal measure. However, we can try to construct a measure of salary that compares the employee's current salary to the salary they would

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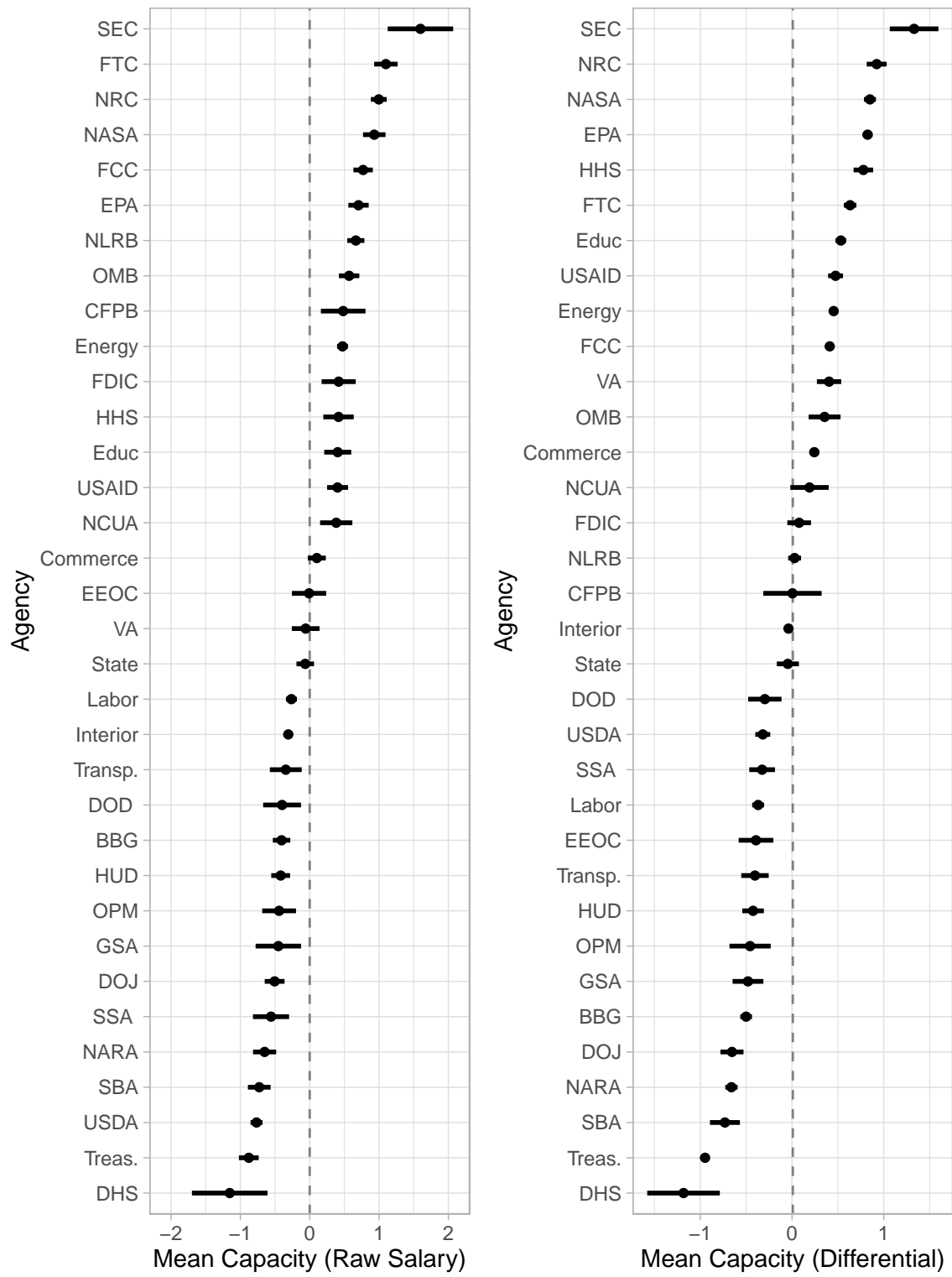
<sup>10</sup>This does not even consider the possibility of internal labor markets. Individuals who choose to move between agencies likely have different utility functions than those who choose to leave government work for the private sector (Teodoro 2011).

receive if they left their current position. I use the Occupational Employment and Wage Statistics (OEWS) from the Bureau of Labor Statistics (BLS) to measure average salaries across occupations. For each OPM occupation category, I select the OEWS occupation with the most similar description. This pairing process is easier said than done. Some occupations, like “General Attorney” or “Economist,” have clear analogs in the OEWS data. Other occupations, like “Correctional Institution Administration” or “Government Information,” require more guesswork. Even when the OEWS has a narrow category that matches the OPM occupation, OEWS may lack reliable salary data for that category. For each employee, I subtract their current salary from the OEWS salary. I create an indicator of the average salary differential within the agency and reestimate Model (1) using this indicator instead of raw salary.

A comparison of Model (1) to the scores derived from the new model reveals a strong and positive correlation ( $\rho = 0.92$ ). Yet the rank order of this alternative measure presents some concerns. Figure OA1 compares the original measure to the measure that uses the indicator of salary differential. Most agencies have similar scores under either specification. The largest increases are observed in healthcare agencies like the Department of Health and Human Services (HHS) and the Department of Veteran Affairs (VA). Yet the Department of Veteran Affairs has identified the wealth of outside options and the lack of competitive salaries at the agency as a central source of its recruiting problems (Katz 2022).

The higher scores observed by VA and HHS are likely attributable to measurement errors caused by the pairing process. OPM and OEWS use different systems to categorize healthcare occupations, and the OEWS system changes during the course of the study period. Many healthcare positions requiring an MD or other graduate degree are categorized in the general OEWS category of “Healthcare Practitioners and Technical Occupations,” which includes non-MD positions. As a result, this estimation technique makes it appear as though these educated and experienced healthcare workers would take significant pay cuts by moving to the private sector. In reality, most doctors, nurses, and medical specialists

Figure OA1: Comparison of Scores Generated from Alternative Salary Measures



would increase their pay by moving to the private sector.

Careful study of medical occupations in the federal government and the private sector could correct this error. Relative to many fields, medical occupations have clear descriptions and salary data. A cardiologist cares for hearts whether employed by the federal government or a private hospital. But the difficulty of matching employment data in an industry with such clearly delineated occupations reveals the possible sources of measurement error introduced by this exercise. If matching medical occupations proves this difficult, greater errors likely emerge in occupations where there is even less agreement between OPM and OEWS. For this reason, I avoid the salary differential measure for the primary specification.

Another concern relates to whether salaries are comparable across different locales. The salary measure includes any locality adjustment and, therefore, adjusts for this possibility. Further adjustments are made difficult by the level of the location data included in the personnel files. For most employees, the personnel files list the state where the individual is stationed but not the specific municipality. A National Oceanic and Atmospheric Administration employee stationed in Seattle, Washington, has a different cost of living than an employee stationed in Lacey, Washington. Making accurate adjustments to salary proves difficult without more granular data. In addition, some agencies exclude location information for their employees for security reasons.

Nevertheless, as an additional test, Model (15) reestimates Model (1) on just the policymaking employees located in the Washington, D.C. area and compares it to the original measure. The two measures correlate highly with one another ( $\rho = 0.84$ ).

Finally, an alternative approach to these concerns is to remove any indicator of salary from the measure. The downside of this approach is that it leaves the measure without any indicator theorized to correlate with the agency's ability to recruit and retain employees. Model (9) reestimates Model (1) without the salary measure and attains similar results ( $\rho = 0.84$ ).

## OA1.8 Measurement of Length of Service

Measuring experience as the mean length of service may penalize agencies that suddenly hire many policymaking employees. The weight given to a highly experienced employee decreases as the number of policymaking employees increases. An alternative variable measures the cumulative experience of all policymaking employees. Model (11) uses this alternative measure. We observe a high correlation between the primary specification and the specification that uses cumulative experience ( $\rho > 0.99$ ).

## OA1.9 Inclusion of Research Occupations as Policymaking Employees

The inclusion of employees working in research occupations likely overestimates the involvement of some occupations in policymaking (O.A.2). For example, the occupational descriptions for medical professionals include individuals who regularly see patients and those who conduct scientific research related to agencies' policymaking activities. Nevertheless, an agency's capacity includes its prospective ability to engage in policymaking. Although physicians in an agency like the Department of Veterans Affairs may not regularly participate in policymaking activities, these individuals could—theoretically—contribute their expertise if called upon to do so. The inclusion of individuals not actively involved in policymaking poses little concern for a measure of prospective capacity. Nevertheless, Model (13) ( $\rho = 0.80$ ) uses a more restrictive classification of policymaking occupations and excludes individuals whose occupations are described as engaged in scientific research (O.A.2). This specification has one of the lowest correlations with the primary specification. However, Table OA9 also shows that it is one of the worst-performing specifications on the validation exercises.

## OA2 Classification of Occupational Codes

This Appendix explains the classification of occupations as policymaking occupations. As described in O.A.1, the policymaking-capacity scores require identifying the portion of the agency’s workforce that performs tasks related to policymaking. To identify individuals likely involved in policymaking activities, I code all occupations listed in *The Handbook of Occupational Groups and Families*. The Office of Personnel Management publishes *The Handbook of Occupational Groups and Families*, which provides job descriptions for all occupational codes used by federal agencies. The Office of Personnel Management periodically adjusts these classifications and, therefore, it is necessary to code all of the handbooks published since 1998.<sup>11</sup>

I code each occupation in each handbook for whether the position mentions developing, advising, or researching policy. A position is coded as a policymaking position so long as it appears as a policymaking position in any one of the handbooks.<sup>12</sup> Key phrases include “developing regulations,” “planning policies,” “advising on programs,” “conducting studies related to policy,” and similar language that indicates that the individual participates in policymaking activities. Additionally, I code occupations described as conducting scientific or technical research as policymaking positions, because individuals in these occupations may also contribute to policymaking in more technical agencies. For example, the 2018 *Handbook* describes the “Fish and Wildlife Administration Series” occupation as “cover[ing] all classes of positions that involve professional and scientific work in administering, directing, or exercising administrative and technical control over programs, regulatory activities, projects, or operations that are concerned with the conservation and management of fishery resources, wildlife resources, or fish and wildlife resources.” The description does not state that the

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<sup>11</sup>OPM graciously provided me with all handbooks published since 1998. I received eight handbooks: 1998, 2001, 2002, 2004, 2008, 2009, 2010, and 2018.

<sup>12</sup>I do not allow positions to vary across time because OPM updates the handbook infrequently and only after conducting occupational studies about the tasks people in these positions are performing. Accordingly, when OPM updates the handbook to say that a position advises on policy, it is after having already observed people in that position conducting that activity.



Table OA5: Example of Occupational Category from the *Handbook***Tax Law Specialist Series (0987)**

This series covers all classes of positions, not classifiable in any other series, the principal duties of which are to administer, supervise, or perform quasi-legal technical tax work requiring analysis and application of tax principles and specialized knowledge of the Internal Revenue Code and related laws, court decisions, regulations, and precedent rulings of the Internal Revenue Service, not requiring legal training equivalent to that represented by graduation from a recognized law school; in such functions as: (1) interpreting the Internal Revenue Code, related laws, regulations, rulings, and precedents; (2) preparing regulations, rulings, and technical guides; and (3) making or reviewing determinations and decisions in such matters.

**Tax Examining Series (0592)**

This series covers all positions the paramount duties of which are to perform or supervise work in the Internal Revenue Service involving the processing of original tax returns, establishing tax account records or changing such records based on later information affecting taxes and refunds; collecting some taxes and/or obtaining tax returns; computing or verifying tax, penalty and interest; and determining proper tax liability. This work requires knowledge of standardized processing and collection procedures to record tax information and knowledge of applicable portions of tax laws and tax rulings to accept, request proof of or reject a variety of taxpayer claims, credits and deductions.

*Note:* Descriptions from the December 2018 *Handbook of Occupational Groups and Families*.

occupation develops regulations or advises on the creation of new programs. However, agencies like the National Oceanic Atmospheric Administration and the Fish and Wildlife Service enact dozens of regulations a year related to fishing limits. While lawyers may draft these regulations (Walker 2013), they must rely on the technical expertise of individuals in “Fish and Wildlife Administration” occupations to develop the substance of the policies. Exclusion of these scientific and technical positions would exclude a significant source of an agency’s technical expertise.

Table OA5 provides two examples of these occupational codes and how they map onto different tasks performed by an agency. The Tax Law Specialist Series performs tasks involving the creation and interpretation of policies. By contrast, the Tax Examining Series performs tasks related to the adjudication of tax returns. By categorizing occupational codes by whether the occupation performs a particular type of task, such as policymaking or adjudication, we can attain estimates of policymaking capacity attuned to particular tasks.

The following tables list all agencies classified as policymaking positions.

Table OA6: Occupations Coded as Policymaking Positions

Correctional Institution Administration Series	Paralegal Specialist Series
Bond Sales Promotion Series	Pension Law Specialist
Safety and Occupational Health Management	Tax Law Specialist
Community Planning Series	Social Insurance Claims Examining Series
Environmental Protection Specialist Series	Public Affairs Series
Chaplain Series	Art Specialist Series
Security Administration Series	Writing and Editing Series
Fire Protection and Prevention Series	Technical Writing and Editing Series
Social Insurance Administration Series	Contracting Series
Unemployment Insurance Series	Agricultural Program Specialist Series
Health Insurance Administration Series	Industrial Specialist Series
Foreign Affairs Series	Crop Insurance Administration Series
International Relations Series	Housing Management Series
International Cooperation Series	Patent Classifying Series
Manpower Research and Analysis	Librarian Series
Manpower Development Series	Actuary Series
Civil Rights Analysis Series	Printing Management Series
Archaeology Series	Training Instruction Series
Personnel Management Series	Vocational Rehabilitation Series
Military Personnel Management Series	Education Program Series
Position Classification Series	Public Health Educator Series
Occupational Analysis Series	Education Services Series
Labor Relations Series	Instructional Systems Series
Apprenticeship and Training Series	Air Safety Investigating Series
Wage and Hour Compliance Series	Mine Safety and Health Series
Equal Employment Opportunity Series	Aviation Safety Series
Federal Retirement Benefits Series	Alcohol, Tobacco and Firearms Inspection Series
Management and Program Analysis Series	Quality Assurance Series
Management and Program Clerical and Assistance	Transportation Industry Analysis Series
Logistics Management Series	Railroad Safety Series
Telecommunications Series	Motor Carrier Safety Series
Rangeland Management Series	Highway Safety Series
Financial Management Series	Traffic Management Series
Accounting Series	Air Traffic Control Series
Auditing Series	Aircraft Operation Series
Budget Analysis Series	Human Resources Management Series
Dietitian and Nutritionist Series	Tax Specialist Series
Speech Pathology and Audiology Series	Railroad Retirement Claims Examining Service
Medical Records Administration Series	Information Technology Management Series
Prosthetic Representative Series	Printing Services Series
Hospital Housekeeping Management Series	Equipment Services Series
Public Health Program Specialist Series	Employee Benefits Law Series
Sanitarian Series	Workforce Research and Analysis Series
Consumer Safety Series	Workforce Development Series
Aerospace Engineering Series	Environmental Engineering Series
Welding Engineering Series	Mine Safety and Health Inspection Series
Industrial Engineering Technician Series	Wage and Hour Investigation
General Attorney Series	Grants Management
Government Information	Dietetics and Nutrition Series

Table OA7: Occupations Coded as Policymaking Positions for Scientific or Technical Expertise

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Safety Technician Series	Computer Engineering Series
Community Planning Technician Series	Electronics Engineering Series
Foreign Law Specialists	Biomedical Engineering Series
Social Science Series	Naval Architecture Series
Economist Series	Mining Engineering Series
Economics Assistant Series	Petroleum Engineering Series
Intelligence Series	Agricultural Engineering Series
Intelligence Aide and Clerk Series	Chemical Engineering Series
Foreign Agricultural Affairs Series	Industrial Engineering Series
Geography Series	Museum Curator Series
History Series	Trade Specialist Series
Psychology Series	Agricultural Marketing Series
Psychology Aide and Technician Series	Agricultural Market Reporting Series
Sociology Series	Financial Analysis Series
Social Work Series	Insurance Examining Series
General Anthropology Series	Loan Specialist Series
Equal Opportunity Compliance Series	General Physical Science Series
General Biological Science Series	Health Physics Series
Microbiology Series	Physics Series
Biological Science Technician Series	Geophysics Series
Pharmacology Series	Hydrology Series
Agricultural Extension Series	Hydrologic Technician Series
Ecology Series	Chemistry Series
Zoology Series	Metallurgy Series
Physiology Series	Astronomy and Space Science Series
Entomology Series	Meteorology Series
Toxicology Series	Geology Series
Plant Protection Technician Series	Oceanography Series
Botany Series	Navigational Information Series
Plant Pathology Series	Cartography Series
Plant Physiology Series	Geodesy Series
Plant Protection and Quarantine Series	Geodetic Technician Series
Horticulture Series	Forest Products Technology Series
Genetics Series	Food Technology Series
Rangeland Technician Series	Textile Technology Series
Forestry Series	Photographic Technology Series
Forestry Technician Series	Operations Research Series
Soil Science Series	Mathematics Series
Agronomy Series	Mathematics Technician Series
General Fish and Wildlife Administration Series	Mathematical Statistician Series

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Table OA8: Occupations Coded as for Scientific or Technical Expertise

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Fishery Biology Series	Statistician Series
Wildlife Refuge Management Series	Statistical Assistant Series
Wildlife Biology Series	Cryptography Series
Animal Science Series	Computer Science Series
Budget Clerical and Assistance Series	Equipment Specialist Series
General Health Science Series	Education Research Series
Medical Officer Series	Game Law Enforcement Series
Nurse Series	Consumer Safety Inspection Series
Occupational Therapist Series	General Natural Resources Management and Biological Sciences Series
Medical Technologist Series	Fish and Wildlife Administration Series
Medical Technician Series	Fish Biology Series
Pharmacist Series	Industrial Engineering Technical
Optometrist Series	General Mathematics and Statistics
Podiatrist Series	Mathematical Statistics
Medical Records Technician Series	Statistics
Dental Officer Series	Safety Engineering Series
Industrial Hygiene Series	Landscape Architecture
General Engineering Series	Architecture Series
Fire Protection Engineering Series	Bioengineering and Biomedical Engineering
Material Engineering Series	Investigative Analysis
Civil Engineering Series	General Medical and Healthcare Series
Environmental Engineering Series	Physician Series
Mechanical Engineering Series	Clinical Laboratory Science Series
Nuclear Engineering Series	Pharmacy Series
Electrical Engineering Series	Optometry Series
Dentistry Series	Podiatry Series

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## OA3 Validation with Survey Measures

This Appendix validates the different model specifications against civil-servant perceptions of agency capacity. One means of assessing validity is to compare the policymaking-capacity scores to alternative measures of policymaking capacity (Adcock and Collier 2001). I compare the measures with agency-aggregated responses to certain questions on the Federal Employee Viewpoint Survey (FEVS) that tap concepts related to bureaucratic capacity. An important caveat to this exercise: The FEVS asks questions of *all agency employees*. The survey does not include a variable that would allow scholars to subset the data to policymaking employees. While we should expect a positive correlation between perceptions of capacity and policymaking capacity, these correlations may be weaker than if FEVS surveyed just policymaking employees.<sup>13</sup>

The Office of Personnel Management has administered the FEVS annually since 2010.<sup>14</sup> Many of the questions relate to the recruitment, training, and organization of the workforce.<sup>15</sup> For each agency, I measure the proportion of respondents who “strongly agree” or “agree” with the following statements: (1) “The workforce has the job-relevant knowledge and skills necessary to accomplish organizational goals” (Mean: 0.74, SD: 0.09), (2) “Employees in my work unit share job knowledge with each other” (Mean: 0.75, SD: 0.06), (3) “Managers support collaboration across work units to accomplish work objectives” (Mean: 0.60, SD: 0.09), (4) “The people I work with cooperate to get the job done” (Mean: 0.77, SD: 0.06), (5) “My work unit is able to recruit people with the right skills” (Mean: 0.47, SD: 0.11), and (6) “Employees in my work unit produce high-quality work.” (Mean: 0.86, SD: 0.05).<sup>16</sup> The first question taps into the expertise and skills of the agency’s workforce. The next

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<sup>13</sup>Likewise, it is inappropriate to include average responses to the FEVS in estimating the policymaking-capacity scores.

<sup>14</sup>OPM administers the FEVS between April and July. The FEVS began as the Federal Human Capital Survey (FHCS) in 2002. OPM fielded the FHCS in 2002, 2004, 2006, and 2008.

<sup>15</sup>Office of Personnel Management. “About.” <https://www.opm.gov/fevs/about/>

<sup>16</sup>I chose these questions because they (1) capture different characteristics of workforce organization, (2) these characteristics are those commonly described as important within the literature on bureaucratic capacity, and (3) these questions have been asked consistently across time.

three questions tap different attributes of teamwork and management. Ensuring a positive correlation with these attributes is particularly important since the policymaking-capacity scores do include a direct measure of team production. The fifth question taps workforce recruitment and retention. The final question measures the performance of employees within the agency. For all survey questions, there should be a positive correlation between the policymaking-capacity scores and the survey questions.

Table OA9: Correlations Between Scores and FEVS Questions

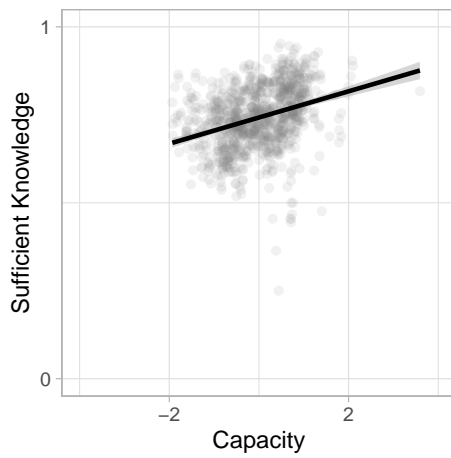
	Sufficient Knowledge	Share Knowledge	Collaboration	Cooperate	Recruit	Quality	Avg.
1	0.32	0.33	0.33	0.37	0.49	0.41	0.38
2	0.33	0.31	0.28	0.36	0.50	0.41	0.36
3	0.30	0.30	0.25	0.32	0.51	0.38	0.34
4	0.32	0.33	0.33	0.37	0.49	0.41	0.38
5	0.30	0.28	0.21	0.30	0.50	0.37	0.33
6	0.33	0.31	0.28	0.36	0.50	0.41	0.36
7	0.30	0.30	0.25	0.32	0.51	0.38	0.34
8	0.30	0.28	0.21	0.30	0.50	0.37	0.33
9	0.30	0.28	0.21	0.30	0.50	0.37	0.33
10	0.32	0.31	0.34	0.37	0.41	0.40	0.36
11	0.32	0.33	0.33	0.37	0.49	0.41	0.38
12	0.33	0.31	0.28	0.36	0.50	0.41	0.36
13	0.28	0.32	0.26	0.34	0.48	0.36	0.34
14	0.30	0.31	0.23	0.33	0.47	0.36	0.33
15	0.29	0.32	0.26	0.32	0.46	0.34	0.33
16	0.32	0.32	0.24	0.32	0.48	0.36	0.34

Table OA9 reports the correlations between the scores attained from each model specification (Table OA3) and the FEVS questions. As expected, all scores exhibit moderate, positive correlations with the FEVS questions. Again, it is unsurprising that these correlations are not stronger. The FEVS surveys all civil servants, including enforcement officers, adjudicators, and office staff. These individuals do not work in policy shops and, therefore, their aggregated responses only reflect the average level of teamwork, recruitment, and work quality across all tasks performed by the agency. The aggregated responses of agencies

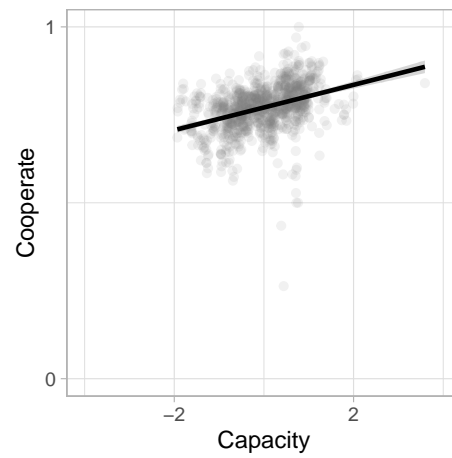
with a high-capacity policy unit may be distorted by the presence of a low-capacity enforcement unit. Nevertheless, it is equally unsurprising that agencies with higher organizational capacity overall exhibit higher levels of policymaking capacity. Model (1) has the highest correlation with the FEVS questions.

Collectively, these correlations suggest that the policymaking-capacity scores capture the key elements of policymaking capacity. According to these survey responses, agencies with higher policymaking-capacity scores exhibit greater knowledge, engage in more teamwork, and produce higher quality work.

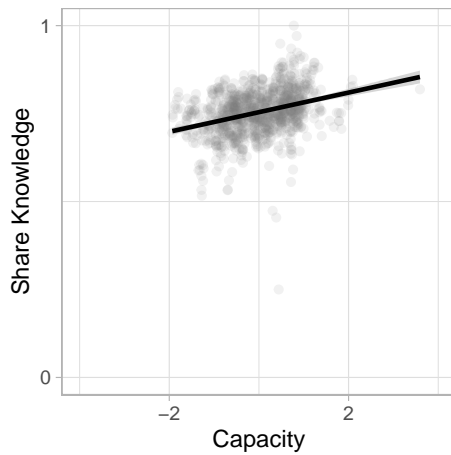
Figure OA2: Relationships between Model (1) and FEVS Questions



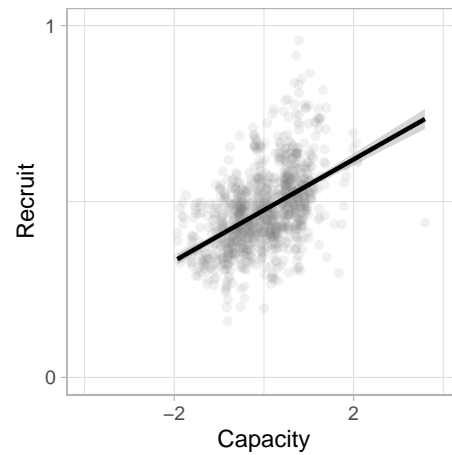
(a) Workforce Has Sufficient Knowledge



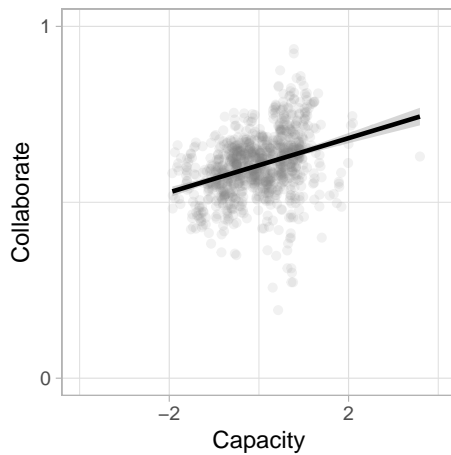
(d) Coworkers Cooperate



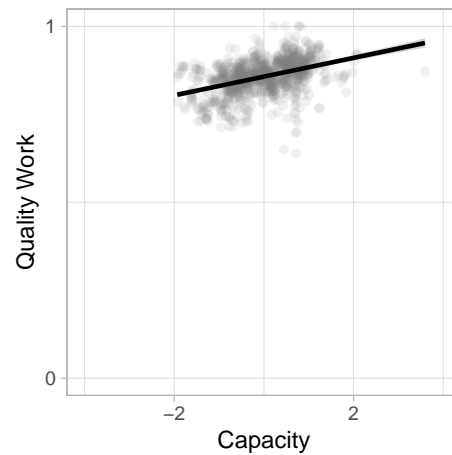
(b) Employees Share Knowledge



(e) Able to Recruit



(c) Managers Support Collaboration



(f) Produce High-Quality Work



## OA4 Validation with Rulemaking Data

This Appendix explains the research design for the rulemaking test. The research design leverages presidential transitions to test the relationship between policymaking capacity and the duration of rulemaking. The dataset consists of all rulemakings started during the first terms of the Bush, Obama, and Trump administrations. The dataset excludes any rulemaking that carried over from the previous administration. All independent variables are either (1) stable characteristics that do not change within an administration or (2) measured before the start of the current administration. This design overcomes two inferential hurdles. First, the elimination of rules begun prior to the start of the new administration ensures that the subset of rulemakings includes only those aligned with the current president’s priorities.<sup>17</sup> Second, measuring the independent variables before the start of the administration ensures that the current administration had no direct influence over measures of capacity, structure, or preferences.

To collect data on rulemakings, I use the *Unified Agenda*.<sup>18</sup> All agencies engaged in rulemaking, including independent agencies, must report their planned and ongoing regulatory activities in the *Unified Agenda*. Every rulemaking has a unique Regulatory Information Number (“RIN”), which makes it possible to track the progress of rulemakings over time. Machine-readable files make it possible to assemble a dataset of every reported rulemaking from January 2001 to January 2021. A rulemaking enters the dataset if (1) it first appeared in the *Unified Agenda* during the first term of the Bush, Obama, or Trump Administration, and (2) the agency published the first Notice of Proposed Rulemaking (NPRM) for the rulemak-

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<sup>17</sup>One could further subset the data to presidential priorities or include a measure of presidential priorities. For purposes of this research design, controlling for presidential priorities may introduce post-treatment bias. Presidents may prioritize certain policy areas based on the administrative state’s capacity to bring about policy change in those areas. Existing theoretical and empirical research suggests that the rulemakings begun during the president’s term in office are those that either directly implement the president’s agenda or do not conflict with that agenda (Bolton, Potter and Thrower 2015). Agencies may have begun working on some of these rulemakings during the previous administration. If the new administration decides that the rulemaking should continue, it reflects a conscious decision that the rulemaking comports with the president’s agenda. To the extent this holds, direct accounting for presidential priorities is unnecessary for this study.

<sup>18</sup>Office of Information and Regulatory Affairs. “RegInfo.gov” <https://www.reginfo.gov/public>.

ing in the same term.<sup>19</sup> I focus on rules classified as economically significant or otherwise significant by the agency because these rules reflect larger policy initiatives rather than mundane changes to regulations. Significant rules require agencies to engage in additional analyses and, therefore, expend additional resources (Bolton, Potter and Thrower 2015; Potter 2019). Therefore, the relationship between the scores and the production of significant rules provides an important test of the measures.

The dependent variable of interest is the duration of an ongoing rulemaking. I measure the duration of the rulemaking as the number of days between the publication of the first NPRM to the agency's final submission to OIRA.<sup>20</sup> I use the date of the agency's final submission to OIRA because, at that point, the agency has completed its work on the rulemaking (Bolton, Potter and Thrower 2015; O'Connell 2009; Potter 2019).

The president plays a significant role in agency rulemaking efforts (Bolton, Potter and Thrower 2015; Haeder and Yackee 2018). Whether presidents can coerce an agency into implementing their agendas depends on two stable characteristics of agency design: structural independence and agency preferences. All independent variables are normalized before estimation.

First, presidents have fewer opportunities to exercise control over agencies whose leaders are more insulated from presidential control (Lewis 2003). Structural independence is a function of design choices made at the agency's inception and, therefore, is exogenously determined prior to inauguration day (McCubbins, Noll and Weingast 1989; Moe 1989). I measure agency independence using Selin's (2015) measures of decision-maker independence. These measures model agency independence as a function of the statutory mechanisms that insulate the agency's leaders from political control.

Second, presidents have an easier time convincing civil servants to work on policies re-

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<sup>19</sup>Although the *Unified Agenda* offers the most comprehensive source of rulemaking data, it often contains typographical errors and inconsistencies (Nou and Stiglitz 2016; O'Connell 2011). Accordingly, I have checked all rulemakings against their original publications in the *Federal Register* and made corrections to dates and the type of action (e.g. NPRM or final rule) reported by the agency.

<sup>20</sup>If the final rule was exempted from OIRA review, then I use the day the final rule appeared in the *Federal Register*.

lated to their agendas if those civil servants share the president’s preferences. Civil servants with similar ideological leanings cluster in similar agencies, giving these agencies stable ideological leanings (Downs 1964; Richardson, Clinton and Lewis 2017; Wilson 1982). I measure ideological congruence between the president and the agency using measures developed by Richardson, Clinton, and Lewis (2017). The authors surveyed federal executives about agencies’ stable ideological leanings by asking, “Do the policy views of the following agencies tend to slant liberal, slant conservative, or neither consistently in both Democratic and Republican Administrations?” I code a liberal (conservative) agency as aligned with the president during Democratic (Republican) administrations. In addition, I separately control for the agency’s ideology (Potter and Shipan 2019).

Agencies have varying levels of rulemaking authority and, over time, may have increased their capacity to satisfy their obligations. Left unaccounted, estimates of the effect of capacity on rulemaking outputs may simply proxy the expected level of rulemaking within the agency. Accordingly, I control for the agency’s logged rulemaking workload to account for this possibility (Bolton, Potter and Thrower 2015). I measure workload using the logged number of rulemakings reported in the *Unified Agenda* in the fall before the inauguration. A basic Pearson correlation test reveals a strong and significant relationship between agency workloads between the Bush and Obama Administrations ( $\rho = 0.88$ ;  $p < 0.001$ ) and the Obama and Trump Administrations ( $\rho = 0.95$ ,  $p < 0.001$ ).<sup>21</sup> As anticipated, agencies do have some baseline level of rulemaking that persists regardless of changes in the White House. However, a correlation test reveals a *negative* but insignificant relationship between capacity and workload ( $\rho = -0.08$ ;  $p = 0.07$ ), suggesting that the measure of capacity does not simply capture the expected level of policymaking within an agency. This reduces concerns of an endogenous relationship between policymaking capacity and rulemaking levels.

Additionally, I stratify the results by presidential administration to control for time-varying policies within administrations that affect rulemaking procedures.<sup>22</sup>

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<sup>21</sup>The correlation is also strong between the Bush and Trump Administrations ( $\rho = 0.84$ ;  $p < 0.001$ ).

<sup>22</sup>I do not include agency fixed effects. Many of the agencies exhibit remarkable stability in their poli-

Because the data exhibits right censoring, I estimate the effect of the independent variables on rulemaking duration using a Cox proportional hazard model. The Cox model belongs to a class of survival models that estimates the time to an event (i.e., rulemaking completion). I use robust standard errors clustered at the agency level. The main results appear in the text of the paper.

### OA4.1 Robustness Check on All Rules

As a robustness check, I estimate the same models on the set of all rulemakings—not just significant rules. Table OA10 reports the results. *Capacity* is positive in all three models but does not reach the level of statistical significance.

Table OA10: Estimated Days to Final Rule, All Rulemakings: First Term of the Bush, Obama, and Trump Administrations

	Hazard Rate of Rulemaking		
	(1)	(2)	(3)
Capacity	0.08 (0.06)	0.11 (0.08)	0.16 (0.09)
Ideologically Aligned		0.11 (0.07)	0.13 (0.09)
Agency Ideology		-0.12 (0.06)	-0.11 (0.07)
Independence		0.11 (0.11)	0.17 (0.13)
Workload (Logged)		0.01 (0.07)	-0.001 (0.08)
Presidency Strata	No	Yes	Yes
First-Term Censor	No	No	Yes
Estimator	Cox	Cox	Cox
N	5,375	5,375	5,375

*Note:* Standard errors clustered at the agency level. All continuous variables normalized prior to estimation. \*p < .05; \*\*p < .01; \*\*\*p < .001

cymaking capacities across the three administrations. Therefore, there is insufficient variation to estimate within-agency effects of policymaking capacity. This is consistent with the findings of Bednar and Lewis (2023), which suggest that presidents mostly neglect the administrative state (Bednar and Lewis 2023).

## OA5 Structural Independence and Policymaking Capacity

This Appendix provides two robustness checks for the relationship between structural independence and policymaking capacity.

### OA5.1 Estimates on Subsets of Agencies

This first robustness check examines whether the results for structural independence hold for two subsets of agencies: (1) bureaus within the fifteen executive departments and (2) independent agencies. I include an agency within the department subset if it is a bureau within one of the fifteen executive departments. I include an agency within the independent subset if it is not a bureau within one of the fifteen executive departments. As with the specifications in the main article, I control for the age of the agency (in hundreds of years) because newer agencies have had less time to build capacity than older agencies. Finally, I include year fixed effects to account for time trends that influence policymaking capacity in all agencies. The model is estimated using an OLS regression with standard errors clustered at the agency level.

Table OA11 reports the results. Recall from the main analysis that a one-unit increase in *Decision-maker Independence* increases an agency's *Policymaking Capacity* by 0.24. The result is substantively the same for both agency subsets. However, we observe significant differences in the effect of *Political-Review Independence* between the department agencies and the independent agencies. Recall from the main analysis that a one-unit increase in *Political-Review Independence* increases an agency's *Policymaking Capacity* by 0.19. For independent-agency subsets, the estimated effect remains statistically significant and positive. However, the effect is substantively smaller and near-zero for the department-agency subset. This difference is attributable to the relative lack of variation in *Political-Review Independence* for the department-agency subset (SD: 0.48) compared to the independent-

Table OA11: Model Estimates of Effect of Independence on Capacity, Agency Subsets

	Policymaking Capacity			
	(1)	(2)	(3)	(4)
Decision-Maker Independence	0.18 (0.19)		0.36** (0.14)	
Political-Review Independence		-0.00 (0.09)		0.32*** (0.08)
Agency Ideology	-0.15* (0.07)	-0.15* (0.07)	0.24 (0.13)	0.48*** (0.09)
Age (Hundreds of Years)	-0.18* (0.08)	-0.15* (0.07)	-1.12** (0.38)	-1.17*** (0.29)
Constant	-0.20 (0.22)	-0.34 (0.19)	-0.13 (0.30)	0.58*** (0.15)
Subset	Executive	Executive	Independent	Independent
Agency Fixed Effects	No	Yes	No	Yes
Topic Fixed Effects	No	Yes	No	Yes
Estimator	OLS	OLS	OLS	OLS
Observations	3,328	3,328	994	994
R <sup>2</sup>	0.27	0.27	0.58	0.69

*Note:* Standard errors clustered at agency level. \*p<0.05; \*\*p<0.01; \*\*\*p<0.001

agency subset (SD: 1.31). Overall, the results suggest that structural independence is important for the capacities of both independent agencies and agencies within the executive departments.

## OA5.2 Alternative Measure of Independence

Table OA12: Model Estimates of Effect of Independence Commissions on Capacity

	Policymaking Capacity	
	(1)	(2)
Independent Commission	0.55*** (0.10)	0.62*** (0.11)
Agency Ideology		-0.13* (0.06)
Age (Hundreds of Years)		-0.08 (0.08)
Constant	-0.06 (0.04)	-0.38* (0.18)
Topic Fixed Effects	No	Yes
Estimator	OLS	OLS
Observations	5,589	5,104
R <sup>2</sup>	0.07	0.28

*Note:* Standard errors clustered at agency level.

\*p<0.05; \*\*p<0.01; \*\*\*p<0.001

As an alternative to Selin's (2015) measures, I estimate the model using an indicator for whether the agency is classified as an independent regulatory commission or board in the *Sourcebook of United States Executive Agencies* (Selin and Lewis 2018).<sup>23</sup> Scholars gener-

<sup>23</sup>The following agencies within the data set are classified as independent commissions: Consumer Financial Protection Bureau, Chemical Safety and Hazard Investigation Board, Commodity Futures Trading Commission, Consumer Product Safety Commission, the Defense Nuclear Facilities Safety Board, Election Assistance Commission, Equal Employment Opportunity Commission, Farm Credit Administration, Federal Communications Commission, Federal Deposit Insurance Corporation, Federal Election Commission,

ally describe this class of independent agencies as possessing greater autonomy than other agencies (Devins and Lewis 2008; Hickman 2018; Selin 2015). Therefore, if the theory holds true, then we should expect that these agencies have higher levels of policymaking capacity relative to other agencies.

Table OA12 reports the results. As anticipated, independent commissions have far higher levels of policymaking capacity than other agencies. On average, independent commissions are almost a standard deviation higher in policymaking capacity than other agencies. The estimated effect is far greater than the effects of either decision-maker independence or political-review independence, demonstrating the robustness of these findings to alternative measures of structural independence.

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Federal Labor Relations Authority, Federal Maritime Commission, Federal Mine Safety and Health Review Commission, Federal Retirement Thrift Investment Board, Federal Trade Commission, Inter-American Foundation, Merit Systems Protection Board, National Credit Union Administration, National Mediation Board, National Labor Relations Board, Nuclear Regulatory Commission, Occupational Safety and Health Review Commission, Privacy and Civil Liberties Oversight Board, Railroad Retirement Board, Securities and Exchange Commission, Surface Transportation Board, and United States International Trade Commission.



## OA6 Politicization and Policymaking Capacity

While agency structure may protect policymaking capacity by preserving bureaucratic autonomy, presidential control threatens to erode autonomy by shifting control over administrative policymaking from bureaucratic policymakers to presidential appointees (Richardson 2019). In this Appendix, I briefly consider whether there is a correlation between bureaucratic capacity and politicization.

Using agency fixed effects and year fixed effects, this analysis looks at overtime variation within agencies.<sup>24</sup> The dependent variable is an agency's policymaking capacity. I measure politicization as the ratio between agency appointees and supervisors (Mean: 0.11, SD: 0.27) (Lewis 2008).<sup>25</sup> I classify any executive pay, non-career SES, or Schedule C position as an appointee. When the ratio exceeds one, the number of appointees exceeds the number of career supervisors. A liberal (conservative) agency is coded as opposed to the current administration in any year where a Republican (Democratic) president is in office. Using Richardson et al.'s measures of agency ideology, I classify an agency as liberal (conservative) if its score is more than one standard deviation below (above) the mean (Richardson, Clinton and Lewis 2017). As before, I control for the agency's age and estimate the model using an OLS regression with clustered standard errors (O.A.9)

The literature suggests that politicization encourages workforce attrition and, therefore, a decline in capacity (Richardson 2019). One concern with measuring politicization as the ratio of agency appointees and supervisors is that the causal arrow may point in the opposite direction. In other words, presidents may have an easier time politicizing low-capacity agencies. In this narrative, presidents may increase politicization by reducing the number of

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<sup>24</sup>A two-way fixed effects approach cannot be used due to multicollinearity.

<sup>25</sup>This data is extracted from EHRI. I classify any executive pay, non-career SES, or Schedule C position as an appointee. I divide this by the number of supervisors in the agency. This method has been adopted by a number of scholars (Dahlström, Fazekas and Lewis 2021; Lowande 2019; Potter 2020; Wood and Lewis 2017). However, poor data on political appointees make any measure of politicization prone to error. Government Accountability Office. 2019. *Government-Wide Political Appointee Data and Some Ethics Oversight Procedures at Interior and BA Could Be Improved*. <https://www.gao.gov/assets/gao-19-249.pdf>. Scholars employing this method attain similar results when using alternative (but still imperfect) measures (Dahlström, Fazekas and Lewis 2021; Potter 2020).

supervisors within an agency—either by converting them to political appointees or encouraging them to exit government service through more bullish means. If this narrative is true, then we should expect that low-capacity agencies have a lower number of supervisors. Yet we observe a negative correlation between an agency’s policymaking score and the number of supervisors within the agency ( $\rho = -0.25$ ). In other words, as agency capacity increases, the number of supervisors within the agency decreases. Given this, presidents should not necessarily have an easier time politicizing low-capacity agencies.

Table OA13: Model Estimates of Effect of Politicization on Capacity

	Policymaking Capacity	
	(1)	(2)
Politicization	-0.18** (0.06)	-0.17* (0.08)
Opposed		0.02* (0.01)
Politicization $\times$ Opposed		-0.15 (0.09)
Age (Hundreds of Years)	2.48*** (0.14)	2.51*** (0.14)
Estimator	OLS	OLS
Observations	5,574	5,104
R <sup>2</sup>	0.29	0.30

*Note:* Standard errors clustered at agency level.

\* $p < 0.05$ ; \*\* $p < 0.01$ ; \*\*\* $p < 0.001$

Table OA13 reports the results. As hypothesized, an increase in politicization within an agency reduces policymaking capacity. A one standard deviation increase in *Politicization* reduces *Policymaking Capacity* by about a tenth of a standard deviation. The effect of politicization is greatest in agencies that are ideologically opposed to the current administration—nearly doubling the loss of policymaking capacity. The results suggest that

increases in politicization reduce policymaking capacity and that politicization has the greatest effect on ideologically distant agencies.

### OA6.1 Two-Way Fixed Effects

The second robustness check uses a two-way fixed effects estimator to estimate the effect of politicization within agencies over time. This specification cannot include any measure for ideological alignment between the president and agency due to collinearity. Table OA14 demonstrates that the effect of politicization is robust to this estimator.

Table OA14: Model Estimates of Effect of Politicization on Capacity, Two-Way Fixed Effects

Policymaking Capacity	
Politicization	-0.18** (0.06)
Opposed	2.48*** (0.14)
Observations	5,574
R <sup>2</sup>	0.02

*Note:* Standard errors clustered at agency level. \*p<0.05; \*\*p<0.01; \*\*\*p<0.001

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