Multiple Principals, Multiple Signals: A Signaling Model of Principal-Agent Relations

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This study applies a signaling model of principal-agent relations to examine the effect of increased salience in congressional and executive venues on rule making activity of two agencies—the Bureau of Indian Affairs and the Federal Energy Regulatory Commission—between 1945 and 2000.

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Twenty years ago Barry Mitnick (1984) suggested that the “bureaucracy problem,” first enunciated by James Q, Wilson (1967), was not so much inherent in bureaucracy as it was in agency. Mitnick’s interest in agency, stretching back to 1973, has been a central preoccupation of political science ever since. Early efforts to apply insights from theories of the firm and transaction costs economics to political relationships were fraught with peril, given problems of translation, applicability, and the like (see Moe 1987, for an extended discussion). That said, after twenty years or more of tinkering, agency theorists have developed a framework that sheds light on many of the problems inherent in agency. This paper draws on these insights, combines them with the literature on punctuated equilibrium, to develop a signaling model of agency. Quite simply, I suggest that principals use a variety of venues to signal their desires to agents. As such, the paper borrows from models of agenda setting to shed light on the central preoccupation of agency theory-- information acquisition and processing.

Agency theory in brief
In its earliest incarnation, principal-agent theory was preoccupied with the ability of a principal to control the actions of an agent. After twenty years of study, there seems to be a consensus that it is more useful to focus on factors that effect political influence of agency actions, rather than control (Eisner, Worsham and Ringquist 1996; Brehm and Gates 1997; Worsham, Ringquist and Eisner 1999; Golden 2000). In addition to the switch in emphasis from control to influence, a more refined model of agency modifies earlier assumptions regarding the dyadic nature of the relationship, the locus of action, the nature of bureaucracy, as well as the effect of time on the relationship.

While the initial efforts at modeling principal-agent relationships were hampered by their assumptions of a single principal, most studies now recognize that bureaucratic actions are influenced by multiple macro-level institutions that often compete with one another for the role of principal (Wood and Waterman 1991, 1993, 1994; Brehm and Gates 1997). The tension between these macro-level actors results in mixed, and often contradictory, signals being sent to bureaucracy. The actions of multiple principals means that it is rarely the case that bureaucrats are pursuing their own selfish interest when they appear to contradict the request from a particular principal, but are instead acting under the influence of another principal (Wilson 1989; Brehm and Gates 1997; Eisner, Worsham and Ringquist 2000).

In addition to the complications produced by multiple principals, studies focusing on the meso-level of the polity have demonstrated how House and Senate committees and subcommittees, well organized interests, and issue networks of policy specialists, act to shape what it is bureaucracy does (Eisner, Worsham and Ringquist 2000; Sabatier 1999; McCool 1998; Worsham 1997; Baumgartner and Jones 1993; Sabatier and Jenkins-Smith 1993; Thurber, 1991). In this view subsystem interaction, as well as macro-level principals, determine how bureaucracy implements public policy.

Complicating efforts at influencing bureaucracy are the profusion of institutional forms that are the target of principals efforts. Bureaus and agencies can be distinguished from one another via a variety of characteristics, including: their administrative histories, the policy environment in which they operate, their organizational structures and resources, their organizational norms and standard operating procedures, their mission, and the composition of personnel (Lowi 1964; Wilson 1989; Meier 1993; Eisner 1991; Wood and Waterman 1994; Brehm and Gates 1997; Golden 2000; Ringquist, Worsham, and Eisner 2003). These factors produce several variations of the "bureaucracy problem" confronting would be principals.

Finally, policy making and influencing the implementation of public policy are reiterative games. Political-bureaucratic relationships develop over lengthy periods of time. Because of this, efforts at political influence may be effective in the short run, but lose their effectiveness or even be counterproductive in the long run (Harris and Milkis 1989; Waterman 1989; Wood and Waterman 1994). Any theory of political influence, to be generalizable, must focus on a lengthy enough time span so as to
be able to consider the effects of learning, punctuating events, and the like (Baumgartner and Jones 1993, 2002; Sabatier 2000).

Agency theory, then, can offer important insights into why bureaucracy does what it does as long as one recognizes that the question of interest in most cases involves influence, not control. Second, the relationship in question involves the interaction of multiple potential principals operating at the macro level. Third, in addition to macro-level activity, agency involves meso-level efforts to shape policy implementation. Fourth, bureaucratic agencies are not cut from the same mold. Policy type, personnel, agency history, and a host of other internal factors distinguish one bureau from another, and complicate the effort at influence. Finally, politics, policy implementation, and efforts at influence, all unfold over lengthy time periods.

A Signaling Model of Principal-Agent Relations

This paper develops a signaling model of agency and employs it to examine the relationship between two agencies—The Bureau of Indian Affairs and the Federal Energy Regulatory Commission—and their potential principals between 1945 and 2000. The choice of the BIA is an effort to move the study of agency beyond relationships involving regulatory agencies. In addition to policy differences, the agencies can be distinguished by their organizational structure, the issue salience (and politics) associated with their primary mission, and the type of personnel they employ. The Bureau of Indian Affairs is involved in implementing a hybrid of policy that varies between redistributive and distributive, with a bit of constituent policy thrown in to complicate matters. The BIA is in the unique position of dealing with tribes that at times were treated as sovereign nations, at other times as a distinct subclass of citizens, and for the most part were forgotten in the rush to exploit the resources on the lands they occupied. In this fashion Indian policy cycles through a blend of redistributive, although the distribution goes from the have-nots to the haves, allowing mineral companies, non-Indian ranchers and farmers, and the like, access to natural resources at cut-rate costs; distributive, with the usual assortment of roads, irrigation, and other public works going to Native American communities; classical redistributive under the Great Society programs; while all the time the status of the tribes as sovereign entities is in question (Lowi’s notion of constituent policy would seem to apply). The organizational structure of the BIA is a public administration nightmare, as evident by the current Court order regarding trust-fund fraud. Never characterized as professional, the staff has seemed overwhelmed or disinterested, and sometimes both during much of the agency’s existence.

The Federal Energy Regulatory Commission, and its predecessor the Federal Power Commission, implements regulatory policy with occasional distributive overtones. Originally charged with overseeing hydroelectric power development, it now includes the regulation of natural gas and oil pipelines, the interstate sale of natural gas, and the wholesale sale of electricity in its mission, as well as the regulation of environmental matters touching on any of the preceding. The FERC is overseen by a commission of

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1 Principal-agent studies are faced with the dilemma of settling on an indicator of bureaucratic activity. No doubt this explains why the bulk of empirical studies to date focus on regulatory agencies (Moe 1982 and 1987; Weingast and Moran 1983; Weingast 1984; Wood 1988, 1990; Wood and Anderson 1993; Wood and Waterman 1991, 1993, 1994; Khademian 1993; Ringquist 1995; Carpenter 1996). Because regulatory agencies are usually procedural or production organizations, their outputs and/or outcomes are readily observable and quantifiable (see Wilson 1989, 158-164). This allows the observer to look for change in the level of regulatory activities—sanctions levied, fines imposed, citations issued—that correspond with a change in administration, party control of Congress, and the like. A central problem with such studies is the limited time period under observation due to the availability of such data, and the focus on regulatory agencies. Questions regarding the applicability of lessons gleaned from regulatory policy to other types of policy, as well as the unique characteristics of the time periods under observation cause some to doubt the generalizability of these studies.
five members who serve five-year terms. Commissioners are chosen by the president and confirmed by the Senate, with no more than three members belonging to the same political party. The organizational structure of the FERC is fairly involved with ten offices that oversee everything from tariff rates to pipeline safety, the staff are drawn from a variety of professions, and the agency is usually portrayed as composed of professionals (Breyer and MacAvoy 1974; Spence 1999).

The signaling model derives from an important feature of bureaucratic life—agencies, bureaus, and organizations draw their sustenance from the larger environment in which they operate (Rourke 1989; Meier 1993). This means agency personnel are constantly monitoring the political pulse for any signs of activity that may intrude on "business as usual." Borrowing from the latest agenda setting studies (Baumgartner and Jones 2002), I suggest that agencies monitor policy salience in any of a number of venues that correspond to the various agendas identified in the literature. In this fashion, agency personnel engaged in rulemaking are constantly taking the pulse of the players active in various venues. This involves tracking increased media attention, congressional discussions of policy areas and issues, legislative activity by the membership at large, action by oversight committees, and presidential pronouncements. The model, in brief, suggests that principals use various venues to signal their desires to agents, and that agencies regularly monitor these venues. The notion of signaling captures the effort to influence, rather than control, bureaucracy and is an offshoot of studies that examine the effects of salience in policy making in a variety of institutional settings (Baumgartner and Jones 1993; Worsham 1998; Ringquist, Worsham and Eisner 2003). The idea of multiple venues, borrowed from the work of Baumgartner and Jones (1993), captures the reality of multiple principals, as well as the subsystem context in which so much policy unfolds.

This paper studies the effect of signaling on FERC and BIA rule-making activity. Rule-making procedures, laid out in the Administrative Procedures Act, serve as a prime example of the congressional use of procedural requirements to influence bureaucratic routines (Wilson 1989). As such they are also a nice example of controls designed to minimize some of the problems associated with agency. Surprisingly, there has been little systematic effort to apply principal-agent theory to rule-making activity.²

The Model
I model change in the level of agency rulemaking activity as a function of signals coming from potential principals operating in any of a variety of venues—the media, the floor of each chamber of Congress, the legislative process in each chamber, committee hearings, and the White House—as well as institutional factors—the change in the number of committee staff in Congress, split party control of government, and previous rulemaking activities.

The dependent variables
Rulemaking activities and proposed rules serve as the dependent variables in models intended to test the effect of signaling on agency behavior. The List of CFR Sections Affected (LSA) from the Code of Federal Regulations (CFR) was used to track change in rulemaking activity over time. The LSA lists all amendatory actions published in the Federal Register on a yearly basis. It is arranged by Title, with both annual and monthly updates available. One can get a feel for efforts to alter any aspect of a particular Title which deals with a general policy area, e.g. Title 25-Indians, by simply noting the total number of entries listed under Title 25. The index also breaks down rulemaking activity by the sections affected under the various Titles, allowing one to determine what aspect of a policy or program is targeted for alteration. So, for example, if one were interested in efforts to alter federal policy dealing with tribal

² The most detailed treatment of rulemaking to date, Kerwin (1999), only mentions agency theory in passing.
government, one could count the number of entries under Title 25, Subchapter F of Chapter One, sections 61-91. The LSA also contains a separate section under each title that notes all proposed rules for that particular year. While I have collected data so that I can distinguish among the sections affected under both Title 18-Conservation of Power and Water Resources, and Title 25-Indians, I only report the raw number of entries in this effort.

I develop two models of agency rulemaking. In the first, Rulemaking Activity, the dependent variable is the number of entries in the LSA for a particular year. There were 2380 such entries dealing with Indian Affairs (ranging from a low of four to a high of 169 entries) and 8349 in the realm of public power (with a low of one entry and a high 645 entries). The second model, Proposed Rules, uses LSA references to proposed rules for a given year as the dependent variable. There were 866 such entries dealing with Indian Affairs (ranging from a low of one to a high of forty-eight entries) and 2857 in the realm of public power (ranging from zero to 287 entries). Since none of the series exhibit a tendency to increase or decrease with the passage of time, I settle on using the raw number of entries as the dependent variable rather than the year-to-year change in entries.

The independent variables
At the heart of the model is the idea that an important facet of the agency problem involves communication. Barry Mitnick (1984), in first outlining how agency theory might be applied to political phenomena, detailed the problems of specifying desired behavior on the part of principals, as well as the pitfalls of acquiring information regarding principal’s intent on the part of agents. While information acquisition and processing is at the heart of agency, and there are no doubt multiple and mixed signals coming from potential principals as issue salience increases, I suggest that the problems of information acquisition are not insurmountable. This is because principals operate in discrete venues that are easily monitored by agents. These venues are the focus of those who study agenda setting.

Following the lead of the agenda setting literature, and the “outside initiative model” in particular (Cobb and Elder 1983), I begin by examining the effect of issue salience on the public (media) agenda on agency rulemaking. If bureaucracy was not born a representative institution (Cook 1996; Morone 1998), one intention of the Administrative Procedures Act was to transform it into a more responsive and representative body (Rosenbloom 2000). As such, I suggest that media attention to a policy area might serve as a prod to action. The variable, Media Attention, is the number of stories in the New York Times for a particular year dealing with the policy areas under examination. I consulted the Index to the Times recording the number of stories under the terms “Indians of North America” and “electric power, hydroelectric power, power plants, natural gas, pipelines.” The search produced 4519 stories dealing with Indian Affairs, ranging from a low of five to a high of 326 and 16,045 stories in the realm of public power, ranging from a low of seventy-seven to a high of 802.

I examine three congressional venues in which signaling occurs. The first indicator of congressional interest in an issue, Remarks, is when members express some interest in the policy under question by making speeches on the floor, introduce news media stories into the record, or otherwise comment on the policy in question. This does not include engaging in debate during consideration of actual legislation or comments on any pending legislation. To get a feel for chamber salience I conducted a search of the Congressional Record Index, and noted all entries under the terms “Addresses and Remarks,” “Articles and Editorials,” and “Miscellaneous” for the categories Indians/Native Americans and electricity, power, power resources, natural gas, and pipelines. During the search any “see other” reference was followed up accordingly. All told this involved 17,030 entries, 6195 in the realm of Indian Affairs (2708 in the House and 3487 in the Senate) and 10,835 dealing with public power (4646 in the House and 6189 in the Senate) for the years 1945-1998. I suggest this indicator offers a first feel for the pulse of the chamber.
The second indicator of congressional interest, Bills, tracks the introduction of legislation dealing with the two policy realms. The Index to the Congressional Record was used to identify public bills dealing with the two policy areas, record the names of sponsors, and determine the committees to which legislation was referred. This involved tracking 5150 pieces of legislation dealing with Native Americans (2742 in the House and 2088 in the Senate) and 3324 bills in the realm of public power (2307 in the House and 1017 in the Senate). Bill introduction, while a relatively low cost activity, is not entered into lightly. Members consider the consequences of going on the record as a sponsor of legislation and expend precious resources doing so (Worsham 1997; Wilkerson and Adler 2001). As such, bill introduction, and any increase in legislative activity in a particular policy realm, indicates the issue is heating up and interest is becoming more intense in the chamber.

The final indicator of congressional interest, Hearings, is an attempt to capture salience on the decision agenda. Utilizing the Congressional Information Service Index to Committee Hearings and Abstracts to Committee Hearings I identify every hearings dealing with public power and Indian Affairs between 1945 and 1998. I coded 2048 hearings, 948 dealing with Native Americans (322 in the House and 626 in the Senate) and 1100 focused on power issues (628 in the House and 472 in the Senate). I hypothesize that hearings are the most intense signal an agency receives, both because of the potential legislative outcomes that some hearings produce, but also because they are a forum in which members of the oversight committee can communicate their wishes directly, and in detail, to agency personnel.

Moving up Pennsylvania Avenue, presidential interest, President, is another candidate for the role of rulemaking stimulus. In order to get a feel for presidential interest in each of the policy areas, a subject search was conducted of the Public Papers of the President so as to note any speeches, press conferences, or presidential mention of the policy issues. Much like the signal sent by legislators when they enter comments into the Congressional Record, presidential mention of either agency or their policy responsibilities in speeches, press conferences, and the like are hypothesized as a weak signal, but a signal nonetheless. Presidential interest in the policy areas varied, with a scant 237 mentions of Indian Affairs between 1945 and 1998 (ranging from no mention in several years to a high of 13), compared to 2711 entries dealing with public power issues (ranging from four to 191 entries).

In addition to the preceding venues and principals, I examine for the effect of several institutional factors. The first, Party Government, is a dichotomous variable coded one during periods of divided party control of the executive and Congress and one during periods of unified party government. I expect rulemaking activity to increase under divided government. In this scenario, multiple and competing principals press agents to do via rulemaking what they cannot achieve legislatively.

The second institutional variable, Committee Staff, is the number of committee staff in both the House and Senate for a given year. I expect an increase in committee staff to produce an increase in rulemaking. My reasoning is that the staff-induced increase in hearing activity and legislative introductions carries over to the “legislating-by-other-means” that constitutes rulemaking.

Rulemaking Activity, the final institutional variable, counts the number of entries in the LSA for the preceding year. I expect that at least some of what agencies do is influenced by what they have been

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3 I used two sources to get at presidential interest. The Public Papers of the President were used for the presidents from Herbert Hoover through Bill Clinton, with the exception of Franklin Roosevelt. The public papers of Franklin Roosevelt are contained in Samuel L. Rosenman, ed., The Public Papers and Addresses of Franklin D. Roosevelt. There is a problem of consistency when using the Public Papers. Beginning with President Carter, references in the subject index are to page numbers as opposed to item numbers as was the case with previous presidents. This necessitates actually looking at each reference so as to avoid multiple counts of a single item.
doing. That is, rulemaking activity in the previous year, unless it is all “smoke and mirrors,” should result in an increase in proposed rules.

To reprise, the relationship between rulemaking activity and proposed rules is modeled as a function of venue salience and institutional variables:

\[ Y_t = a + b_1 X_{1,t-1} + b_2 X_{2,t-1} + b_3 X_{3,t-1} + b_4 X_{4,t-1} + b_5 X_{5,t-1} + b_6 X_{6,t-1} + b_7 X_{7,t-1} + b_8 X_{8,t-1} + \epsilon_t, \]

where \( Y_t \) is the number of entries in the LSA regarding rulemaking during year \( t \) (model one) or proposed rules during year \( t \) (model 2); \( X_1 \) (Media Attention) is the number of stories in the New York Times for the previous year, \( t-1 \); \( X_2 \) (Remarks) is the number of entries under the “Remarks and Addresses” and related categories in the Congressional Record dealing with the policy in question for the previous year; \( X_3 \) (Bills) is the number of public bills dealing with the policy area introduced in the chamber during the previous year; \( X_4 \) (Hearings) is the number of hearings dealing with the policy during the previous year; \( X_5 \) (Committee Staff) is the number of House and Senate Committee staff in the previous year; \( X_6 \) (President) is the number of mentions of the policy in the index to The Public Papers of the President of the United States during the previous year; \( X_7 \) (Party Government) is a dichotomous variable that distinguishes periods of united party control from those of split control of the White House, Senate, and House; and \( X_8 \) (Rulemaking Activity) is the number of rulemaking entries in the LSA for the previous year (model 2, only).

**Results**

Tables 1 and 2 employ OLS regression to model the relationship between agency rulemaking activity or proposed rules and the various independent variables in the realms of public power (FERC) and Indian Affairs (BIA), respectively. The Durbin-Watson test and first order autocorrelation scores indicate that none of the models suffer from autocorrelation.

Review of the results in table one suggests that FERC rulemaking activity is shaped by media attention, hearing activity in both chambers, committee staff levels, and presidential interest in the issue. While media attention, Senate hearings, and staff levels all promote an increase in rulemaking activity; the effect of House hearings and presidential interest is to depress such action. Because there was no effort to code the content of signals or rulemaking activity, any speculation regarding the signs of the significant coefficients is purely speculative. For now all we can say is that increased salience appears to effect the bureaucratic routine. Similarly, the number of rules proposed by the FERC is positively correlated with media attention, Senate hearing activity, staffing levels, and divided party government. Legislative introductions in the Senate, House hearings, and the previous years rule making activity, all work to depress the number of proposed rules.

It would seem, then, that salience in various venues does effect FERC rulemaking activities and proposed rules.

When compared to the FERC case, the BIA models performance is a disappointment. Still, the BIA case is of interest precisely because of the low explanatory power of the model. Because of problems of multicollinearity between House and Senate measures dealing with legislative introductions and remarks, these were combined into a single congressional (House + Senate) measure. The alternative, running separate House and Senate models, does not alter the results reported here. In the realm of rulemaking activity, chamber-level discussion of the issue, as indicated by remarks in the Congressional Record, depresses agency activity, while House hearings increase it. No other variable even remotely approaches

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4 Due to problems of multicollinearity between the House and Senate Remarks variables, the two were combined into a single measure of chamber interest.
statistical significance, no surprise in a model suffering from such severe r-square anemia. The results of the proposed rules model are equally disappointing, with only Senate Hearings exhibiting a statistically significant effect, although media attention, committee staffing levels, and rulemaking activity (.11, .15, and .19, respectively) limp towards the realm of statistical significance. Quite simply, explanations that work relatively well in the realm of regulatory policy do not seem to apply in the case of redistributive policy.

**Conclusion**
The results of the study suggest that a signaling approach to principal-agent relations holds some promise as an explanation for the manner in which political principals interact with their bureaucratic agents in the realm of regulatory policy. The FERC does appear to alter its rulemaking activity in response to increased salience in different venues. That said, the difference in the performance of the models suggests that explanations that work well when examining the principal-agent linkage between regulatory agencies and their would-be political masters may not be as successful when applied to non-regulatory agencies.

While there is evidence of a connection between signaling activity in various venues and rulemaking by the FERC, we are left with the conundrum of interpreting the meaning of the signs of the significant coefficients. The underlying assumption that increased activity in a particular venue would lead to an increase in rulemaking or proposed rules, is confounded by the negative sign of several of the significant variables. This suggests that signaling does not necessarily resemble the outside initiative model so popular in agenda setting. I am left to hazard a guess that in some instances increased salience depresses activity due to multiple, contradictory signals crowding the agenda. That is, there is a real possibility that as signals in any particular venue increase, so do the number of contradictory signals being sent to the bureaucracy. This is only a hunch right now, I have not coded any of the variables in question, although previous research has found this to be the case in Banking (Worsham 1997) and Education policy (Fisher 1999). Clearly the next step in the process is the introduction of content-related indicators that allow one to identify the nature of the signal sent and to control for mixed messages and their effect on bureaucratic activity.
Table 1
FPC/FERC Rulemaking

<table>
<thead>
<tr>
<th>Variable</th>
<th>Rulemaking Activity</th>
<th>Proposed Rules</th>
</tr>
</thead>
<tbody>
<tr>
<td>Media Attention</td>
<td>.373** (.163)</td>
<td>.166*** (.059)</td>
</tr>
<tr>
<td>Remarks</td>
<td>.088 (.105)</td>
<td>.030 (.035)</td>
</tr>
<tr>
<td>House Bills</td>
<td>-1.133 (.813)</td>
<td>.075 (.280)</td>
</tr>
<tr>
<td>House Hearings</td>
<td>-8.672** (3.831)</td>
<td>-4.590** (1.437)</td>
</tr>
<tr>
<td>Senate Bills</td>
<td>2.238 (1.956)</td>
<td>-1.469** (.664)</td>
</tr>
<tr>
<td>Senate Hearings</td>
<td>15.127*** (4.685)</td>
<td>9.634*** (1.757)</td>
</tr>
<tr>
<td>Committee Staff</td>
<td>.092*** (.031)</td>
<td>.041*** (013)</td>
</tr>
<tr>
<td>President</td>
<td>-3.267* (1.722)</td>
<td>-.623 (.605)</td>
</tr>
<tr>
<td>Rulemaking Activity</td>
<td></td>
<td>-.115** (.058)</td>
</tr>
</tbody>
</table>

Constant           -129.371 (66.136) -69.577 (24.353)
Observations       57 53
R²                   .61 .66
D-W                  1.845 1.962
1st order Autocorrelation .064 .011

***p<.01, two tailed test  **p<.05, two tailed test   *p<.10, two tailed test
Table 2  
BIA Rulemaking Activity

<table>
<thead>
<tr>
<th>Variable</th>
<th>Rulemaking Activity</th>
<th>Proposed Rules</th>
</tr>
</thead>
<tbody>
<tr>
<td>Media Attention</td>
<td>-.053 (.109)</td>
<td>.056 (.034)</td>
</tr>
<tr>
<td>Remarks</td>
<td>-.156** (.060)</td>
<td>.004 (.018)</td>
</tr>
<tr>
<td>Bills</td>
<td>.092 (.113)</td>
<td>.024 (.041)</td>
</tr>
<tr>
<td>House Hearings</td>
<td>2.636* (1.399)</td>
<td>.527 (.432)</td>
</tr>
<tr>
<td>Senate Hearings</td>
<td>.134 (.911)</td>
<td>-.473* (.278)</td>
</tr>
<tr>
<td>Committee Staff</td>
<td>-.001 (.010)</td>
<td>.005 (.003)</td>
</tr>
<tr>
<td>President</td>
<td>1.01 (1.807)</td>
<td>-.293 (.579)</td>
</tr>
<tr>
<td>Party Government</td>
<td>-2.058 (10.938)</td>
<td>-.478 (3.391)</td>
</tr>
<tr>
<td>Rulemaking Activity</td>
<td>.057 (0.043)</td>
<td></td>
</tr>
</tbody>
</table>

Constant 37.427 (19.161) 2.739 (6.755)

Observations 58 53
R² .18 .21
D-W 2.036 1.765
1st order Autocorrelation -.018 .114

**p<.01, two tailed test  *p<.10, two tailed test
References


