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The Effects of Punctuation Events on the Oil Policy Network: A Network Analysis of Rulemaking Outputs

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The Effects of Punctuation Events on the Oil Policy Network:

A Network Analysis of Rulemaking Outputs

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Dissertation submitted to the John D. Rockefeller IV School of Policy and Politics within the
Eberly College of Arts and Sciences at West Virginia University
in partial fulfillment of the requirements for the degree of Doctor of Philosophy in Political
Science

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2020

Keywords: Rulemaking, policy subsystem, policy network, punctuation, social network analysis,
ERGM, TERGM

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Abstract

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In this dissertation, I display the effect of punctuating events on the oil policy subsystem and network and, in turn, on the rulemaking process. Here I examine whether, and to what extent, the changes in the dynamics of the policy network and the composition of the subsystem caused by the punctuation could alter rulemaking outputs and whether these changes occur simultaneously or sequentially across the policy subsystem and network.

Building upon Punctuation-Equilibrium Theory (PET), Advocacy Coalition Framework (ACF), and the Policy Network Approach (PNA) alongside the political control literature, I provide explanations for the routines and outputs of rulemaking. Accordingly, I analyze changes in the set of oil and gas related administrative rules that are proposed and/or finalized during the period of 1996-2016. I then link these changes with the fluctuations in interactions occurring in the oil subsystem and network. For this purpose, I apply both Social Network analysis (SNA) and the exponential-family random graph models (ERGM) for statistical inferences.

Dedication

I would like to dedicate this dissertation to the memory of my father, Mohamed Nuri Mugheirbi whom I admired and looked up to as a role model. It is unfortunate that you did not live to see the day your only son graduates. Your untimely death happened while I was here in the United States of America pursuing my doctoral degree and could not travel back to Libya to pay my last respect. I will always remember you with love and admiration. I also dedicate this work to my mother, Soheir Taher Mahdi, may Allah bless you with long healthy life.

In gratitude, I dedicate this work to my lovely wife, Ibtihal Shahoumi, and my cherished children, Mohammed Fadi and Fatima Al Zahra. I would not have finished this dissertation without your support. Your patience and understanding enabled me to work and study for long hours. I am extremely grateful to have you all in my life. God bless you.

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Chapter 1: Introduction

1.1 An Overview of the Dissertation

In the field of public policy, much of the literature is concerned with the policymaking process focusing on the contributions of Congress and congressional committees, the president, federal agencies, and interest groups. Understanding the interactions among these actors is vital to explain stability and change in public policy (Adam and Kriesi 2007; Cairney 2012; Kingdon 2011; Sabatier and Jenkins-Smith 1999; True, Jones, and Baumgartner 2007; Worsham 1997, 2006). In addition, recent studies focus on the rulemaking process, given the notion that agencies play an important role in forming and implementing public policy via rulemaking (McCubbins, Noll, and Weingast 1987, 1987; McCubbins and Schwartz 1984; McKay and Yackee 2007; Nelson and Yackee 2012; Worsham and Gatrell 2005; Yackee 2006).

In this regard, I am interested in studying the rulemaking process, trying to understand how the activities of bureaucracy are shaped by punctuating events, and whether and how the bureaucracy alters its rulemaking routines and outputs following punctuations. In general, the literature of policy subsystems with such theoretical approaches as Punctuated-Equilibrium Theory (PET), the Advocacy Coalition Framework (ACF), and the Policy Network Approach (PNA) elaborate on change and stability in public policy (Baumgartner and Jones 2009; Sabatier and Weible 2007; Worsham 1998, 2006). Nevertheless, a considerable portion of that literature is devoted to explaining changes in policy at the level of political principals such as Congress and its committees. Rather, I look at public policy from the angle of agents – or the bureaucracy – examining how the interaction among the agents, principals, and interest groups who influence

policy subsystems contribute to the process of rulemaking and to what extent the activities of agencies are affected by such abrupt stimuli or punctuations.

As PET suggests, punctuations affect the context in which the policy subsystem operates. Consequently, the policy monopoly is challenged, and an opportunity opens for the involvement of other actors, which may alter the dynamics of the policy network and the composition of the policy subsystem. As a result, the policy subsystem moves toward a more competitive form and the opportunities for change increase (Baumgartner and Jones 2009; Baumgartner, Jones, and True 2007; Worsham 1997, 1998). In this context, agencies are more than participants in the policy subsystem during the stage of agenda setting. Rather, they play the most important role as implementers of law. Accordingly, agencies may promulgate regulations or rules specifying the meaning of unclear laws and the way these laws are executed. In doing so, agencies are considered an extension of Congress. In view of that extension, the rulemaking process, like legislation, is not far from politics (Kerwin 1999; Rosenbloom 2002). Here, I am trying to show the extent that the change in the dynamics of the policy network and composition of the policy subsystem, caused by the punctuation, may affect the routines and outputs of the rulemaking process. I am therefore concerned not only with the direct effects of the punctuations on the process of rulemaking, but also the indirect effects that go through the policy subsystem.

Furthermore, the rulemaking process might receive attributions from other political principals such as the president and courts. Therefore, agencies have had to deal with them alongside with congressional committees when rules are considered. Accordingly, agencies' relationships with congressional committees, the president, and courts are described as a multiple principals-agent relationship (Worsham and Gatrell 2005). Thus, the analysis goes beyond studying congressional committees and interest groups to include the involvement of the president

in the rulemaking process and to what extent the involvement of those principals could be a result of the abrupt stimuli or punctuations. Additionally, I examine the time sequences of the punctuating effect. Although the impacts of punctuations are well studied by PET at the stage of agenda setting, the punctuating impact on the rulemaking process and policy implementation needs further investigation. I attempt to ascertain whether the impact happens simultaneously across the policy subsystem and rulemaking process or if it retains some residual impact over time.

1.2 Policy Domain and Methodology

For the policy domain, I focus on the oil sector because of its importance to the U.S. economy. For example, in 2013, oil and gas formed 61% of all energy sources consumed in the United States and they are heavily used in the transportation, industrial, residential, and commercial sectors (Primary Energy Consumption by Source and Sector, 2013 n.d.). Consequently, the stability or instability of oil policy influences other sectors of the U.S. economy. Moreover, the number of administrative rules issued with regards to the oil sector is manageable comparing to the other sectors of the economy (Regulations.gov n.d.). Primarily, my attention goes to the policy areas in which the agencies have authority over issue rules such as oil production and offshore drilling, prices and consumption of oil and gasoline, and environment and safety. I identify the rules that deal with or regulate the oil industry in any of the aforementioned policy areas, and then specify the programs under which they perform; as well as including agencies responsible for carrying them out.

By tracking the rulemaking activities over time, I can display which agency is a part of the policy monopoly, if any, and over which oil policy area, there is a shift or intervention from other agencies in that policy area. More importantly, such time tracking can reveal the punctuating effect

of the focusing events on ongoing programs. It may further shed light on the origin of the rules. As West & Raso (2013) pointed out, the rules may come as a direct request from political principals or could be required by statutes, considered as non-discretionary rules. However, some rules may be authorized by statutes but not required, in which case agencies enjoy discretion to pursue rules on their own. By studying these changes over time, I may be able to demonstrate the effect of abrupt stimuli on rulemaking activities and the origin of rules. Also, I can describe political principals and interested parties involved in the agenda setting, along with their rulemaking and policy implementation actions, and which policy areas and programs they correspond to. In this regard, the analysis will involve two levels. The first is the aggregated level that includes both open and closed rules to display the involvement of political principals, agencies and interest groups as well as their roles in setting the agenda for rulemaking. The second level is an in-depth analysis of selected rules, which should shed light on the influence of political principals and interest groups on rulemaking outputs.

In order to demonstrate the effect of punctuations on the rulemaking process, I utilize Social Network Analysis (SNA), exhibiting the relationships among the political principals, agencies, and interest groups in the form of a network that governs the rulemaking process. Primarily, I seek to map the policy network of the oil sector, displaying the participants in the subsystem along with other actors that influence oil policy and rulemaking. Besides the visual and descriptive measurements of SNA, the structures and attributes of the policy network are considered as covariates for statistical inference. Particularly, I utilize the exponential-family random graph models (ERGM) and its time series version (TERGM) to explain changes in the rulemaking outputs within the policy network caused by punctuating events. Hence, tracking the changes in network structures could provide information about the shifting importance and role of

actors in the subsystem. This further informs our inferences about the causes and results of such behavior.

1.3 Significance of the Dissertation

This dissertation offers several contributions to the literature of public policy. Importantly, it links the studies that analyze agencies and the rulemaking process with studies of subsystems and policy dynamics. By looking for indicators within the policy network, it illustrates the effect of punctuations on political principals such as congressional committees and the president, in addition to interest groups, and then connects them with the changes in the rulemaking routines and outputs. Furthermore, it presents the time sequence of the punctuating impacts, describing what elements of the policy network are affected by the punctuation and at what time these effects take place. In other words, it studies policy dynamics, but from the viewpoint of bureaucracy.

In addition, this dissertation goes beyond studies of agenda setting and adoption to incorporating the bureaucratic/implementation angle of the literature on policy subsystems. By mapping the dynamics of the policy subsystem utilizing congressional hearings' data that is associated with data collected from rule comments, a comparison between the agenda setting stage and the implementation stage is demonstrated. Accordingly, it can be determined whether what happens at one stage is mirrored at the other stage. If so, does it happen simultaneously or sequentially? In view of that comparison, the central interest of this dissertation focuses on its theoretical contribution to the public policy literature more than it does on petroleum/energy policies.

Another contribution is to promote SNA and its models for statistical inference in political science in general, and public policy in particular, highlighting the utility of this method. Even

though it has been used in the social sciences for some time, only a small number of studies apply SNA and its statistical models to policy networks, and fewer still focus on the rulemaking process. Therefore, it will allow me to expose some aspects of the subsystem and policy network behavior such as the interdependencies between the political principals, agencies, and interest groups that have not previously received enough attention. In this regard, I argue that SNA could be an alternative method for explaining outputs of the rulemaking process and policy dynamics. For instance, it is able to handle the complexity of the subsystem and analyze the effect of network structures on policy dynamics and outcomes.

1.4 The Outlines of the Dissertation

This study has eight chapters. In the first chapter, an overview of the dissertation is given including a brief discussion of the argument, policy domain, methodology, and significance of the dissertation. After the introductory chapter, the second chapter presents the relevant literature regarding the subsystems, bureaucratic politics, and rulemaking. In addition, I point out some gaps in literature that the dissertation attempts to bridge. In the third chapter, I focus the arguments and the models used in the study. After articulating the research questions, I present an argument for presumed effects of the punctuation on the rulemaking routine and outputs. Then, I discuss the reasons and utility of the social network analysis illuminating how SNA can be used for statistical inferences. Specifically, I focus on the exponential-family random graph models (ERGM) and the time series version (TERGM).

The empirical analysis is presented in the next four chapters. In Chapter 4, I provide a description for the process of data collection, displaying the sources and constructions of the data sets. Given the large size of the dataset, I present the software and computer codes I developed to

automate the process of downloading and organizing the data to provide readers who might be interested in replication or conducting similar studies with information on how to do so. In the fifth chapter, I provide a discussion of the potential punctuations that affect oil policy and its network. Furthermore, the oil policy subsystem is mapped, describing and tracking the dynamics of the oil policy network over time. In addition, the main actors who may constitute the oil subsystem are distinguished from other participants in the oil policy network, identifying the relevant congressional committees, public agencies, and interest groups.

Chapter 6 provides description and analysis for the administrative agenda setting and rulemaking process in light of the actions and reactions of interest groups. The aim is to display how the punctuations and activities at the principal level influence the dynamics of rulemaking process and its lobbying behavior. In Chapter 7, which analyzes the outputs of rulemaking, I examine the responses of public agencies to the demands of interest groups, and identify the beneficiaries of rulemaking, and the variables that affect the probability of being beneficiaries are empirically examined. Finally, in Chapter 8, , I present the argument and findings of the dissertation, emphasizing its theoretical contributions to the field of public policy as well as its limitations.

Chapter 2: Literature Review

2.1 Introduction

In this chapter, I review the relevant literature of public policy and administrative rulemaking. Accordingly, this chapter is divided into five sections. The first part reviews the dynamics of policy subsystems, which includes notions of policy monopoly and policy regime. The second section introduces the policy network approach (PNA) and discusses to what extent the PNA is useful in studying public policy. The third section presents important studies regarding agencies, rulemaking, and political control. The fourth section studies the dynamics and structures of policy networks and rulemaking, showing the similarities and differences between the networks governing the policy subsystem and the rulemaking process. Finally, I point out the gap in the literature and set the research questions of this dissertation.

2.2 Policy Monopolies and Policy Regimes

Not only does the examination of the punctuating effects on the policy subsystem explain the change and stability of public policy, but it may also explain the outputs of bureaucratic policy and the rulemaking process. As agencies affect and are affected by the politics of policy subsystems, analyzing the interaction among participants within the subsystem and tracking the changes caused by punctuations may provide important clues for understanding the rulemaking outputs. Thus, the literature of Punctuated Equilibrium Theory (PET) might be a good start. Based on PET, the policy subsystem is characterized by an institutional structure that limits access for outsiders and reinforces ideas that are linked to core political beliefs, which seek to establish policy monopoly (Baumgartner and Jones 2009, 7). At the highest profile, these institutional structures

and barriers manifest in particular congressional committees or subcommittees that function as a keystone or anchor for the subsystem. At the least, the participants in any subsystem are congressmen from related congressional sub/committee(s), agency staffs, and organized interest groups (Worsham 1998, 486, 2006, 439).

As True, Jones and Baumgartner (2009) asserted, a combination of institutional tendency of stasis and abrupt stimuli coming from the environment generates a pattern of punctuated-equilibrium. The punctuation could be one of the following abrupt stimuli. First are the indicators that enlighten the change in the size of the problem and whether there is a need to take a specific action or not, such as unemployment rates, GDP, and oil prices. Second are the focusing events such as natural disaster and economic crises. Third is the feedback in which policy performance is evaluated, indicating whether there is failure in achieving the goals of the policy, so that an action should be taken (Kingdon 2011, 90–103). In this context, the subsystem is put under pressure when it receives abrupt stimuli, or punctuation, leading to an increase in media and public attention. As a result, other political principals and actors who, while often previously inactive, tend to become involved in the policy subsystem, seeking to alter powers and resources in order to influence the subsystem (Baumgartner and Jones 2009).

Simultaneously, the increase in public and media attention due to the abrupt stimuli could change the image of issues as well as the tone of coverage. Accordingly, changes in image and tone mostly are associated with the involvement of multiple policy venues such as other sub/committees and agencies that sequentially have access to the issue. Since these multiple policy venues differ in their responsibilities and their standpoints, different parties find in the image change an opportunity to advance their views and alter the subsystem. Furthermore, the tone of issue attention could be either negative or positive. Here the consequences of each case are

different. In the case of high attention with positive tone, powerful institutions may be created with broad jurisdictions. In contrast, the subsystem may be dissolved in the case of high attention with negative tone (Baumgartner and Jones 2009, 80 and 100). However, such involvement does not necessarily guarantee success for challengers. Privileged coalitions will fight back to maintain their policy monopoly. Here the advancement of the new ideas associated with the availability of multiple venues opens opportunity for policy entrepreneurs to place issues on the agenda. As a result, success in challenging the policy monopoly and changing policy depends on whether challengers of the status quo are motivated enough to find allies elsewhere and shop for other venues that are more sympathetic with their cause (Baumgartner and Jones 2009, 8–9; Cairney 2012, 189–98; Kingdon 2011, 87; True, Jones, and Baumgartner 2007, 162).

In this context, the policy subsystem is not static. It may take different forms and produce different outputs consistent with the level of monopoly it enjoys. According to Worsham, the subsystems are classified into three types according to the degree of dominance and competition among coalitions within the subsystems. The first type is the subsystem with dominant coalitions where a small and narrow number of players appear regularly and control the process of policymaking in the subsystem with a high degree of autonomy. In addition, access to the subsystem is limited, producing distributive policy that seems consensual. The second type is the subsystem with transitory coalitions characterized with moderate variety. Here the subsystem is open access to reasonable degree with high to moderate degree of autonomy in the policymaking process, producing mildly redistributive and regulatory policy that is often entrepreneurial. Third are competitive coalitions which have moderate or high variety and open access with a moderate to low degree of autonomy in the policymaking process, producing radically redistributive and regulatory policy that is often conflictual (1997, 18).

In sum, the policy outputs depend on the type of the subsystem. Therefore, the shift from one type of subsystem to another could cause changes in the produced policies. In this regard, the concept of wavering equilibrium may explain the policy change that occurs when the unstable subsystems move from the dominant-coalition to less restricted arrangements then go back to the dominant coalitions again. Accordingly, the type of the subsystem whether is dominant, transitory, or competitive along with systemic events, institutional conflict, party politics, and economic dislocation determines the nature of policy outputs whether distributive policy, mildly redistributive and regulatory policy, or radically redistributive and strongly regulatory policy (Worsham 1997, 14–17).

Moreover, the essential ideas that undergird the policy subsystem are subject to changes as well. Here, the policy change could be combined with the process of policy-oriented learning that is a “relatively enduring alteration of thought or behavioral intentions that result from experience and/or new information and that are concerned with the attainment or revision of policy objectives” (Sabatier and Jenkins-Smith 1999, 123). In this context, the belief system according to which the subsystem operates is hierarchically threefold: deep core beliefs concerning the primary norms and ontological values; policy core beliefs which determine the main policy positions and sets the essential strategies; and secondary aspects that regard the instrumental decisions and necessary information for achieving the policy core. In general, the change in secondary aspects is moderate or even easily occurring, and the activities of the administrative and legislative policymakers are most concentrated here. However, a transformation in the external non-cognitive elements of the subsystem—such as changes in socio-economic conditions, changes in systemic governing coalition, and changes caused by policy decisions and impacts from other subsystems—is required in order to alter the aspects of policy core beliefs (Sabatier and Jenkins-Smith 1999, 133).

While the dramatic transformations in the external non-cognitive elements could be a source of abrupt stimuli or external shocks, the subsystem may receive internal shocks as well, which Sabatier and Weible (2007, 204–7) emphasized as an alternative path for policy changes. For more clarification, Sabatier and Weible distinguished between the impacts of external and internal shocks on the compositions and belief system of the subsystem. Although both shocks have something in common, the internal shock has extra implications relative to the external shock. At the beginning, both external and internal shocks may lead to redistribution of critical political resources among the actors involved in the policy subsystem. Additionally, the internal shocks could put the core policy beliefs of the dominant coalition into question. Subsequently, these shocks may increase the credibility of the core policy beliefs of the minority coalition within the subsystem. As a result, doubt about the effectiveness of the dominant coalition's policy increases and the policy core beliefs of minority coalitions are confirmed. As a consequence, the dominant coalition becomes more willing to compromise and engage in negotiation with the minority coalition. In other words, such shocks or events may affect the degree of dominance and competition among coalitions within the subsystems, causing instability in the subsystem that might move from the dominant-coalition model to less restricted arrangements such as transitory or competitive coalition models. Accordingly, the movement back and forth among these types of subsystems, or what is identified as wavering equilibrium, could explain the change in subsystem outputs (Worsham 1997, 14–17, 1998).

Besides, challenges can come from cross-subsystem where the policymakers encounter messy policy problems that bridge several policy areas. Consequently, the policy communities from different policy subsystems may overlap (Grant and MacNamara 1995; Jochim and May 2010; McCool 1988). In this context, as Baumgartner and Jones explained, with the change in the

issue image in terms of attention and tone, multiple policy venues tend to be involved (Baumgartner and Jones 2009, 80). Therefore, not only does the alteration in the type of the subsystem cause changes, but also the changes may come from other venues or subsystems. As a result of that intervention, multiple subsystems might be spanned together in one regime so as to achieve a common goal, which highlights the need for establishing political institutional arrangements that characterize the relationship among economic actors, social interests, and the state. In order for the regimes to emerge, substantial institutional changes and new policies in multiple regulatory areas have to be combined (Eisner 2000, 2–3).

For more explanation, Jochim and May (2010, 307) advance the concept of a *boundary-spanning policy regime* that is “a governing arrangement” in which several subsystems are spanned and integrative policies are fostered. By putting the policymakers under pressure, these policy regimes promote integrative measures among several subsystems. Here the policymakers establish institutional frameworks supporting coordinated activities, and form forces that affect the mobilization of interests. Significantly, the boundary-spanning policy regime is concerned with the complicated problems which interact with different governmental levels and several subsystems. Also, its mechanism is based on the incorporation of subsystem components which seek similar policies. Boundary-spanning policy regimes aim to generate attention for an issue among subsystems, and a common purpose may be achieved by binding components of related subsystems. In this regard, representing interests grant the policy regimes legitimacy and political power. As a consequence, the policy regimes are institutionalized by combining authority, information flow, and attention that structure consistency. In sum, the regime overcomes the policy monopoly in order to deal with complex problems (Jochim and May 2010, 307–11; Worsham and Stores 2012, 171–72). Also, the propensity of a policy regime to evolve and increase its strength

and durability depends on the salience and complexity of policy issues targeted by the regime (Jochim and May 2010; Ringquist, Worsham, and Eisner 2003).

However, the relevant institutional force for a boundary-spanning policy regime could be provided by a dominant congressional committee. Nevertheless, the fragmentation of power and overlapping of subsystem jurisdiction open the domain for an agency to play a dominant role as the institutional force that is necessary for cooperation among several subsystems within the policy regime (Jochim and May 2010, 312).

Enhancing the attractiveness of the concept of a boundary-spanning policy regime, it is appealing when multiple subsystems cooperate with each other and are institutionally arranged to serve a common goal. In the absence of such cooperation and institutional arrangements, the policy outcomes might differ. Therefore, the analysis should include other situations where several subsystems may overlap with each other and have a different relationship other than cooperation, such as bargaining or conflict. Accordingly, there is a need to consider other frameworks that may analyze other types of relationships.

2.3 The Policy Network Approach (PNA) and its Integrative Theoretical Perspective

The fact that multiple subsystems may overlap with each other and/or receive attributions from individual actors outside the policy communities channels the analysis of the policy subsystems to consider the wider policy networks. In a critique of the standard political conceptions of power that focuses much on the dominant groups or subgovernments (subsystems), Heclo (1978, 94–103) pointed out that the growth in responsibilities of an executive's administration mobilizes a large number of interest groups. As a result, the policymaking process is opened to wide range of participants. Therefore, any study of the traditional iron triangle and

subgovernment becomes incomplete because focusing on a small number of powerful actors and interests overlooks the webs of participants who may guide and influence the exercise of power. Accordingly, these webs, or what he called *issue networks*, have different characteristics from the iron triangle or subgovernment. Instead of having small and stable circles of powerful participants who fairly control or dominate specific public policies, the issue networks are characterized with large number of participants who are mutually committed or interdependent, where no one is in complete control over a policy area. In general, it is difficult to determine the boundaries of networks. The actors constantly move in and out the network.

Heclo's concept of issue networks moves from looking for who controls the subsystem to who influences it, laying the foundation for the policy network approach (PNA). As Kenis and Schneider indicated, the perspective of policy networks reflects the decentralization of social organizations and governance where social control and intelligence are dispersed among multiple political and social entities. Accordingly, coordination among these entities is a result of the purposeful interaction and exchange of information and other resources (1991, 26). There are some developments that make PNA an appropriate approach: 1) the emergence and growth of organized society that increasingly produces resources affecting more social and political affairs by collective actions and interdependency among actors and organizations; 2) sectoralization and functional differentiation; 3) overcrowded policy making as a result of increasingly organized interests and sectoralization; 4) an increase in the scope of state policy making; 5) the decentralization and fragmentation of the state; 6) blurring of boundaries between the public and private; 7) transnationalization of domestic politics to the international affairs; and 8) the escalation in interdependency and complexity of social and political affairs (Kenis and Schneider 1991, 34–36).

As an important contribution that has broad consensus among policy network scholars, PNA emphasizes the role of interdependencies and the structure of networks in influencing the behavior of actors and in turn the policy outcomes in a manner that other public policy approaches have not sufficiently analyzed (Adam and Kriesi 2007; Dowding 1995; Galey and Youngs 2014; Hanf and Scharpf 1978; Heclo 1978, 94–105; Kenis and Schneider 1991; Marsh and Rhodes 1992; McCool 1988; Raab and Kenis 2007; Salancik 1995; Zafonte and Sabatier 1998). For more clarification, McCool explained that the American policymaking process is the swing between two tendencies, fragmentation and accommodation. On one hand, the policymaking process is fragmented to the degree that allows a variety of discrete decision-making units to have some degree of, but not complete, control over policy arenas. On the other hand, such fragmentation of power makes it difficult for any decision-making unit to achieve its causes without accommodating the needs of other units. As a result, these two tendencies promote interdependency among various power structures in a seamless web (1988, 266). Consequently, the actors and organizations within and across the subsystems are affected by the actions of each other. Therefore, the functional interdependencies becomes an important factor in explaining coordination among the variety of actors within the networks. By focusing on the type of interaction or the linkages among actors, the options for actions are constrained by the structure and the pattern of behavior embedded in the networks. In other words, this approach focuses on the structure of the networks viewing the causes and consequences of connection patterns in social and political behavior (Galey and Youngs 2014, 7; Hanf and Scharpf 1978, 12; Zafonte and Sabatier 1998, 475).

In regard to the nature of policy networks, it is problematic to portray the policy network approach as identical to Heclo's concept of issue networks that somehow is the opposite of iron triangles or subgovernments (subsystems or dominant policy communities), in which the power

within issue networks is distributed among a large number of participants rather than being concentrated among a small set of powerful actors as it is the case with subgovernments (Heclo 1978, 102). This concept is challenging. As McCool indicated, it is difficult to identify the boundaries, participants and who is in power within the networks, which reduces the practical application and theoretical utility of the issue network concept. As a result, it becomes more difficult to distinguish between the iron triangles and the more flexible and open arrangement of the subsystem, which limits the explanatory power of the issue network concept (McCool 1998, 554–55). In contrast, it may be more applicable to give emphasis to the concept of policy community that is a long-lived entity characterized by cohesiveness, exclusiveness, frequent interaction, and exchange of resources among its participants. Here policy communities seek to block the entrance of outsiders and establish a policy monopoly. Accordingly, the policy outcomes may be explained by whether the policy community succeeds in building a dominant coalition from of a subsystem or whether it faces competition within and across the subsystems (Cairney 2012, 176; Grant and MacNamara 1995, 509; Worsham 1997, 1998). In this regard, the concepts of policy community and issue networks encounter a real dilemma. On the one hand, the notion of a policy monopoly allows for the distinction between insiders and outsiders, which fits with the crux of the PET and ACF arguments. Yet, it overlooks the webs of participants who may guide and influence the exercise of power. On the other hand, abandoning the perception of policy community in favor of issue networks gives up a lot of leverage and returns us to the problem of identifying the boundaries, participants and who is in power within the networks.

Rather, it might be more appropriate to consider the policy communities and the issue networks as two different forms or configurations of policy networks. Here Marsh and Rhodes provided an adequate classification for the policy networks based on number of actors present and

their distribution of resources. Accordingly, policy communities and issues networks are treated as different kinds of policy networks that reflect relationships between government and interest groups where both forms are located on opposite sides of the same continuum (1992, 13–14 and 249). In this context, Marsh and Rhodes indicated that the membership, kind of interaction, and distribution of resources among actors in the networks are the main characteristics which distinguish policy communities from issues networks. On one side, the policy community is characterized by a limited number of participants, frequent and high-quality interactions, persistent values and outcomes, and availability and mostly equal distribution of resources. On the other side, an issue network is characterized with a large number of participants, fluctuating interaction, and bounded by unequal distribution of resources (Marsh and Rhodes 1992, 13–14 and 249–51).

However, Marsh and Rhodes found that both types of networks could coexist with each other. Specifically, they are not mutually exclusive. There are two layers that can be distinguished within the policy network. These layers are the core layer and periphery layer, where the interaction and distribution of resources vary among actors within the policy networks. Here, the core layer reflects the policy community while the periphery layer reflects the issue network (1992, 255). In other words, we may find a network where subsets of actors representing the policy community dominate the interactions and resources. Meanwhile, the rest of the participants in the network are considered as the outsiders and have similar characteristics to those in issue networks. Nonetheless, the policy network is not limited to one policy community. As Grant and MacNamara (1995, 510) mentioned, in many issues there are multiple policy communities that intersect with each other. When such an intersection happens, there are at least four potential outcomes : *mutual repulsion, absorption, subdivision, or joint venture*. Also, Zafonte and Sabatier (1998, 474) defined several types of interaction between policy subsystems that may coexist within the policy network,

which are “(a) multiple functional subsystems in a given territory, (b) nested territorial subsystems involving a given function or, most complex of all, (c) both multiple functions and nested territories”. Counting for the potential overlapping among subsystems within the policy network, Dowding concluded that the properties of the components within the networks provide explanations for the nature of policy rather than the characteristics of networks as a whole (1995, 137). As a result, the policy networks may nest more than one community as well as a number of participants who are not necessarily associated with a specific policy community. So rather than defining the policy networks as either a policy community or issue network, it is more appropriate to study the components and structures of the network, whether it has one or more policy community configurations, and to what extent the outside participants affect the inputs and outcomes of the policy networks.

However, the PNA lacks a clear and unified set of causal mechanisms that helps to develop and test empirical postulations due to the adolescent stage of that field. Therefore, it is essential to incorporate Social Network Analysis (SNA) in the analysis of policy networks (Dowding 1995, 137; Galey and Youngs 2014, 6; Kenis and Schneider 1991). What could be a promising contribution of PNA and SNA is to link the quantitative analysis of network structure to the existing theories of public policy, which adds more dynamic aspects of the established literature. While qualitative analysis illustrated in the theoretical approaches of public policy such as PET, Advocacy Coalition Framework (ACF), and Multiple Streams Theory describe the dynamics of network, the quantitative analysis of policy networks can present the structural base of these approaches. For example, it shows to what extent some elements described in policy literature such as policy images, punctuating events, belief systems, and institutions can affect and be affected by

the interaction, interdependency, and distribution of power among actors, which constitutes the structure of the network (Adam and Kriesi 2007, 131).

Moreover, Galey and Youngs argued that by integrating multiple theories, the PNA is promising in elucidating change and stability in public policy. In general, there are two areas where the PNA can show its compatibility with existing theoretical frameworks of public policy. On the one hand, postulations from ACF and the Policy Entrepreneur Model (PEM) can be incorporated to display the formation of coalitions and explain the behavior of individuals and groups within the networks, using, for example, beliefs system and informational exchange as attributes (or covariates). Here the policy networks are treated as the dependent variable. On the other hand, insights from PEM and PET may be utilized to illuminate how the dynamics of policy networks affect the policy outputs. Here the policy networks are considered as the independent variable. In sum, this approach focuses on the structure of the network viewing the causes and consequences of connection patterns in social and political behavior, which significantly and increasingly incorporates the social network analysis (2014, 6–7 and 28–30). According to Galey and Youngs, PNA goes beyond being a complementary framework to play a synthesis role where multiple theories are blended creating a comprehensive framework. It has great potential to span several policy theories and approaches such as PET, ACF, and PEM under one paradigm (2014, 2–5). For more explanation, the next chapter contains an explanation of the application of social network analysis with a representation of network structure and attribute effects relevant to the subject of this dissertation.

2.3.1 The Network Boundaries

One challenge that students of policy network encounter is the boundary specification. In general, there is agreement that the boundaries of the network should be determined by specifying

a set of actors who participate in a particular policy domain (Adam and Kriesi 2007, 135; Heclo 1978, 103; Knoke and Laumann 1982; Laumann, Marsden, and Prensky 1989) although it is not easy task. As Heclo admitted, it is difficult to determine the boundaries as issue networks consist of a large number of mutual commitment participants who constantly move in and out of the networks. However, the main incentive for participation in a network or another is their interest in common policy problems or issues (1978, 100–103). Also, in term of SNA, the problem with boundary specification is that if the relevant and/or important actors are omitted such as high degree centrality and bridges, the network analysis might become meaningless (Laumann, Marsden, and Prensky 1989, 63). Therefore, proper selection of participants is crucial for the network analysis.

For that purpose, Knoke and Laumann (1982) set two criteria for network boundary specification. First is the policy domain. Accordingly, membership in the policy network is initially similar to any social system where the “mutual relevance to one another or...common orientations to some shared reference point” (1982, 256) are the bases for mediating the interdependence among the members of that social system. Herein, the reference point that determines the relevant mutuality and orientated commonality in policy network is the policy domain where an array of consequential actors is interested in advocating, formulating, and adopting courses of actions related to a policy issue. The second criterion for network membership is the organization’s consequentiality that is determined by the ability of the organizations to affect the formation and distribution of particular domains presented in the policy subsystem. Conclusively, the consequential participants are not only those who are controlling the subsystem, but also those who are coordinating and directing it. Specifically, this organization’s consequentiality is ascertained by the degree to which the actions of some actors are being

considered by the others when the collective decisions are made (Knoke and Laumann 1982, 256–57). In other words, the network membership includes the insider actors who are part of policy monopolies in addition to the outsider actors who could influence the subsystem.

In this context, social network analysis (SNA) primarily offers two methods for defining the network boundaries. First is the *realist* method according to which the researcher depends on the actors themselves to identify the boundaries of the network, adopting their point of view for who should be included or excluded. Here the network is considered a social entity that has subjective meaning for its participants. Second is the *nominalist* method where the network boundaries are determined based on the purposes of researchers. Here the analytic framework is set to construct the network, but the network does not have ontological or social status by itself (Laumann, Marsden, and Prensky 1989, 65–66). Whether the realist or nominalist method is used, the process of assembling the network consists of at least one of three mechanisms: selecting actors based on specific attributes, engaging in relations, and/or participating in particular types of events or activities (Knoke and Yang 2008, 15–20; Laumann, Marsden, and Prensky 1989, 79). In addition, SNA advances many ways to construct the networks such as direct or indirect networks, value or non-value networks, and one-mode or two-mode networks (Knoke and Yang 2008; Wasserman 1994). However, the selection among these methods and mechanisms is an empirical question and what is important is to apply the method(s) that best reflects the community under investigation. Most importantly, when the policy networks are constructed, the SNA methods of boundary specification should be coupled with Knoke and Laumann's criteria of policy domain and consequentiality.

Admittedly, Knoke and Laumann's criteria are not strict. In despite of their assertion that the actors with inconsequential or trivial effect could be safely overlooked, Knoke and Laumann

indicated that inaction does not necessarily reflect peripheral actors. An inactive actor could belong to a particular policy network so far as other actors in that network anticipate and consider its reaction regardless of the need to perform an actual response. Nevertheless, they acknowledged that what distinguishes between the consequential and peripheral participants could not be strictly determined (1982, 257). Moreover, their determination that the membership of the network is only confined by organizations is not completely accurate. Individuals could be included as well. Interestingly, Knoke and Laumann's definition of an organization's consequentiality also could be applicable to some individuals as long as those individuals could exert influence over a policy domain and that their reactions are being considered by other participants in the network.

In conclusion, I believe that students of policy network should take into account two precautions. On one hand, the criteria for boundary specification should not be relaxed to the degree that the policy network include inconsequential actors and/or actors from a non-related policy domain. On the other hand, the criteria should not be restricted to the point that the network might exclude some important actors. For example, Marsh and Rhodes, and Sabatier have set several criteria that reduced the policy network to the policy community or subsystem, which excludes outsiders who may influence policy outputs (Marsh and Rhodes 1992, 476; Zafonte and Sabatier 1998, 251). In fact, Sabatier has applied SNA techniques such as blockmodeling and structural equivalence to distinguish policy subsystem and used terms of policy networks and subsystem interchangeably (Sabatier and Weible 2007; Zafonte and Sabatier 1998). In the end, the network boundaries depend on researchers' judgement to not omit or overstated relevant actors. In general, there is room for trial and error in PNA and SNA and students of the policy network have plenty of creative ways to apply SNA to the approaches and theories of public policy.

2.4 Agencies, Rulemaking, and Political Control

In general, the literature of the policy subsystem mostly studies the stage of agenda setting and adaptation. However, when it comes to the stage of policy implementation, public administration becomes the center of attention. Yet the distinction and sequence between two stages are not unambiguous as many scholars previously thought (Adolino and Blake 2010, 8–10; Cairney 2012, 41–42). In this regard, the delegation of power is one overlapping area. As they deal with the diversity of complex and salient issues, legislators tend to delegate more authority to agencies for a variety of reasons. It may be to avoid the blame and shift the responsibility of policy choices to agencies or to deal with uncertainty and collect information. In many cases, politicians seek to design a process that enables agencies to collect information about the desirable policy and its consequences in order to alleviate the problem of uncertainty on one hand, and on the other they would ensure that process serves the intended interest. In short, the agencies are required to collect information about the nature of problem, the related options and their outcomes, who receive the benefits and bear the costs, and the reactions of different parties (McCubbins, Noll, and Weingast 1987, 256–57).

In this context, agencies play an important role that goes beyond being participants in the policy subsystem during the stage of agenda setting. As implementers of laws, agencies may promulgate regulations or rules specifying the meaning of unclear laws and the ways these laws are executed. In doing so, agencies are considered an extension of Congress. In view of that extension, the rulemaking process, like legislation, is not far from politics (Kerwin 1999; Rosenbloom 2002; W. West 2005). Despite the delegation of power, agencies do not have absolute discretion. They are often overseen by political principals; the President, the Congress, and/or the courts. In this context, political principals may be involved in the rulemaking process, blocking or

facilitating specific rules (Kerwin 1999; Yackee 2005). As the President, Congress, and the courts have jurisdiction over the administration, the agencies receive multiple signals from multiple principals. Accordingly, the best description of the bureaucratic compliance problem is multiple principal-agent relationships (Worsham and Gatrell 2005).

In order to control the process and the outputs of the rulemaking, the political principals use different methods. One common method for political control is *the police-patrol* where the political principals look for agencies' wrong doing. This method includes several means associated with rewards and punishments to monitor and discipline agencies such as congressional hearings, legislative sanctions, budget review, and investigations. However, these tools are not always available for the political principals. Some of them may cause high costs or face legal and political limitations. Also, the agencies receive several signals from different political actors, which may contradict one another. Besides, the judiciary is not a better venue for the police patrol method. In many cases, courts provide limited review for administrative actions. Sometime, legal boundaries of agency decisions are vague because the legislative mandates are not clear or are too broad. Also, the judiciary depends on principles such as legitimacy and fairness and the courts cannot rule on a political basis; therefore, using the courts as means of political control is insufficient. In regard to police-patrol method, no perfect venue can be implemented for controlling administrative actions since the politicians cannot always depend on monitoring and sanction methods alone without costs; as well, they are subject to several fundamental limitations and uncertainty (McCubbins, Noll, and Weingast 1987, 244–53; McCubbins and Schwartz 1984, 166).

In addition, the rules enacted by agencies are run under a different set of procedures manifested in the Administrative Procedure Act of 1946 (APA) which provides the political principals with another mechanism for political control, depending on the *fire alarm* method. Here,

the administrative procedures facilitate the involvement of interest groups and individual citizens in the process of rulemaking in order to detect any violation to the goals of legislation so that the interest groups would have their chance to seek solutions through the administration, courts, or Congress. In this regard, the principals wait until the alarm is sounded by interest groups rather than looking for wrong doing (McCubbins and Schwartz 1984, 166; W. West 2005, 657). The APA has several features, which can alleviate the information problem for political principals and enfranchise legislators' favorable constituents. Also, it transfers the responsibility of policy outcomes from elected politicians to agencies (McCubbins, Noll, and Weingast 1987, 244–53). As McCubbins, Noll, and Weingast argued, an important consideration led to the Administrative Procedures Act (APA). Significantly, the coalition that enacts a bill or/and create an agency aim to ensure that the deal continues after the coalition dissolves. In this regard, the coalition that establishes the law creates an institutional structure and puts sanctions on agencies in order to create pressures to ensure that the process of decision making will be directed toward the interests of the coalition and reflects the political environment without attention or guidance from the political principals. Therefore, procedures are designed to respond to favorable constituents, using tools such as staff, resources, and subsidies. In other words, it stacks the deck in the agencies' process of decision making, or what is known as the “deck-stacking” argument (1987, 255).

To guarantee that the outcomes of policies are not random, political principals seek to control the details of procedures and participation process. In general, the APA has some political implications that support the “deck-stacking” argument. By announcing agencies' intention in advance, the procedure prevents secret arrangements that may work against the interests of elected officials. In addition, the public disclosure requirement, which opens the rules for notices and comments, provides agencies with valuable information about the related parties, and the benefits

and costs. Also, these notices and comments display whether agencies move toward the actions that political principals want. Significantly, it allows the relevant parties to know about the intention of agencies before constituencies are mobilized or policies are changed. It disadvantages agencies in the same manner that enables the political principals and other relevant parties to intervene early in the administrative policy-making process. Furthermore, participation in the administrative procedures can be considered as a measurement for political debate and interests regarding controversial course of actions (McCubbins, Noll, and Weingast 1987, 258–69). In this context, McCubbins, Noll, and Weingast emphasized other features for the deck stacking argument placed in APA. Interestingly, the evidentiary standard requirement indicates that agencies' decisions have to be built upon strong evidence that can stand before courts. This requirement may work in opposite direction either. For example, in the case where political principals are confident that agencies will comply, weak evidentiary standards could be preferable as it minimizes the possibility that the desirable policy may be blocked by evidence in the courts. The burden of proof is another way for deck-stacking. Agencies are required to demonstrate that cause-effect relationships in administrative decisions work in favor of intended constituents after the establishing coalition is disbanded; otherwise, it may be subject to judicial review. Besides, the APA could perform an autopilot function. As the political interests and the costs and benefits of policy outcomes change over time, the APA allows agencies to respond to challengers driven by changes in the political environment without the need for new legislation. Subsequently, the autopilot feature gives more flexibility to the politicians (1987, 259–69).

However, the “fire alarm” and “deck-stacking” arguments enlighten the importance of the interaction between the principals and interest groups in influencing the rulemaking process. Not only do the direct relationships between interest groups and agencies matter, but also, the indirect

relationships are vital. For example, when the alarm is sounded, interest groups may lobby the related congressional committee to intervene in the rulemaking so that the agency produces optimal results. Thus, the analysis of the rulemaking process should not be confined to the direct interactions between interest groups and agencies. It also should include the indirect interactions between interest groups and agencies that go through the political principals, which leads to the question *who participates in rulemaking* noted by West (2005, 663). In this context, is the rulemaking process limited to the participants in the policy subsystem or is it open to outside stakeholders? Under which conditions do political principals intervene in regulatory policy? These questions highlight how important it is to connect the studies of rulemaking with the studies of policy subsystems and boundary-spanning policy regimes. It may be that the dynamics of the subsystem and regime explains at least partially the rulemaking process and its outcomes.

In light of this connection, Ringquist, Worsham, and Eisner found that salience and complexity increase the tendency of congressmen, as political principals, to utilize legislation to interfere in regulatory policy that is typically left to agencies to deal with (2003, 160). Meanwhile, Webb Yackee found that as the attention of the President, the Congress, and the courts escalates, agencies respond to those principals. Yet if the attention of principals is low, agencies are freer to respond to interest groups (2006). Moreover, the President, Congress, and the courts as well as interest groups may play an essential role in setting the agenda for rulemaking. As West & Raso pointed out, the rules may come as a direct request from political principals or could be required by statutes, considered as non-discretionary rules. However, some rules may be authorized by statutes but not required, in which agencies enjoy discretion to pursue rules on their own (W. F. West and Raso 2013). Nonetheless, this interaction between the agencies and the political principals is not confined by the boundary of the policy subsystem. It may include multiple

subsystems or policy regimes. Given the fragmentation of power in the American political system, a dominant agency may emerge as the relevant institutional force that integrates several subsystems (Jochim and May 2010, 312). In return, the policy regimes could offer an institutional umbrella for implementation of public policy by providing legitimacy, coherence, and durability (May 2015, 20).

In sum, the significance of studying the participants in rulemaking and their connection to the subsystem and policy regime is to bring attention to the effect of the rulemaking context and political environment. However, the subsystem and policy regimes literature may explain in part the context of policy making where there is a policy monopoly or cooperation among several subsystems, but the analysis should go farther to study rulemaking process in a highly complex and conflicted environment as well. In this regard, West implied that the structures of bureaucratic policy making may differ when agencies operate in a highly fluid, conflicted, and complicated context from those who operate in stable and simple environment (2005, 664). Consequently, some inquiries are raised. For example, how do agencies deal with contradictory signals sent by the political principals such as in the case of divided government? Whose prevail? Does the dominant coalition in the policy subsystem enjoy the same level of dominance in the rulemaking process as well? To what extent is the process open for outside participants? How, if any, do the contextual factors influence patterns and the outcomes of rulemaking. These questions emphasize the importance of studying rulemaking as a part of wider network where the outcomes of the rulemaking process are determined by the interactions between agencies and other participants in the network as well as among those participants themselves.

2.5 The Dynamics of Policy Network and the Structures of Rulemaking

In this section, I review the dynamics of the policy network that may dictate the rulemaking process. Even though there is not that much literature studying rulemaking in the form of networks, the policy network assumptions are applicable to rulemaking since agencies are important actors in policy networks. As the literature has not sufficiently covered some important subjects in this regard, I expect, nevertheless, that the behavior of rulemaking networks differs from networks that studies of policy subsystems describe. Therefore, I underline such differences or expected differences at the end of this section putting these differences in form of inquiries.

On this subject, many scholars have suggested a variety of typologies characterizing the policy network as a whole, which potentially explains the inputs and outputs of the policy process. Depending on public policy theories, they were able to ascertain attributes and define structural configurations for analyzing the policy networks (Adam and Kriesi 2007; Dowding 1995; Galey and Youngs 2014, 10–11; Marsh and Rhodes 1992; McCool 1998; Zafonte and Sabatier 1998). In this context, Marsh and Rhodes indicated that the characteristics of the policy network could explain both change and stability. They found that policy networks further stability and continuity through routinizing relationships, and the networks with dominant professional and economic interests are most likely to resist the changes (1992, 257–61). The importance of Marsh and Rhodes' finding is that it brings attention to the role of power and resource distributions in analyzing the network behavior and outcomes. In general, the resources could be formal legal authority to make policy decisions, public opinion, information, troop mobilization, financial resources, and/or skillful leadership. Accordingly, the types of resources available to groups or coalition vary, depending on nature of actors within policy network (Sabatier and Weible 2007, 201–3). For example, the resources that business organizations possess differ from those the

environmental groups have, and the resources that are largely available to interest groups differ from those available to public institutions. Here demonstrating the resources that network actors possess is necessary to determine the power distribution or power structure within the policy network, which is considered as an important determinant of the behavior and outcomes of networks (Adam and Kriesi 2007, 145; Marsh and Rhodes 1992; Waarden 1992).

However, while the power of the resources is a necessary condition, it is insufficient. In term of campaign contributions as a kind of resource, Wright argued that the campaign contribution is not a sufficient explanation for voting decisions at the level of congressional committees. Instead, the number of representative lobbying contacts provides adequate explanation for committee voting whereas campaign contributions seem to have no effect on voting decisions. Rather the effect appears in lobbying efforts (1990). In other words, the effect of resources is conditioned on lobbying efforts, or the interaction between interest groups and members of committees. In this regard, interest groups vary in their lobbying behavior. They may lobby to change the status quo or to block the change. Also, they may counter-lobby in order to prevent their opponents from achieving their goals. Moreover, interest groups may engage in coalition building so that their efforts would be more effective (Baumgartner et al. 2009; McKay and Yackee 2007; Nelson and Yackee 2012). These different types of behavior highlight the important of the interaction and interdependency among actors within and across the policy subsystems and networks. Here the effect of the interaction may differ according to the kind of relationship between actors and components within policy subsystems and networks. In the case of a conflictual relationship, McCool found that the level of conflict could determine the typology of the subsystem and its strategic context of policymaking (1988). On the other hand, if the relationships among multiple subsystems are characterized by cooperation, a policy regime may

emerge spanning several subsystems so that a common goal may be achieved (Jochim and May 2010). In sum, the distribution of power and resources does not fully display the characteristics of policy network. Therefore, the nature of interaction among the network's actors has to be considered as another determinant that could explain the behavior and outcomes of networks.

In view of that, Adam and Kriesi presented a description of network structures based on the abovementioned determinants or criteria: the distribution of power, whether it is concentration or fragmentation; and the kind of interaction among actors, whether it is conflict, bargaining, or cooperation. Consequently, policy networks can be classified into six types of structures, according to which the policy outcomes can be explained. The first type of policy network are those with a concentration of power and cooperating interactions, which have a low possibility of change and maintain the status quo. Second are networks with a concentration of power and bargaining style of interactions, which have a low to moderate possibility of change with an incremental tendency. Third are networks with a concentration of power and conflictual interactions, which have a moderate possibility of change with a speedy tendency for serial modifications. Fourth are networks with a fragmentation of power and cooperating interactions, which have low to moderate possibility of change with a tendency to maintain the status quo. Fifth are the networks with fragmentation of power and bargaining style interactions, which have a moderate to high possibility of change with incremental tendency. The last type is the network with fragmentation of power and conflictual interactions, which have a high possibility of change with speedy tendency for serial modifications (2007, 144–45).

In addition, the formation of coalitions within and across subsystems is another dimension that describes the structure of policy networks. In this context, the ACF provides insight into the way coalitions are formed within the policy networks. According to ACF, the participants who

hold similar beliefs seek to translate their views to actual policy. In doing so, they pursue allies and form coalitions which enable them to share resources, and develop strategies (Sabatier and Weible 2007, 196). Because of rigid nature of normative beliefs and the tendency of viewing the world through a set of preexisting beliefs, different coalitions tend to interpret same information in a dissimilar way. In addition, people are psychologically affected by defeats more than they are with victory, which leads to what Sabatier and Weible called “the devil shift” according to which the opponents perceived each other as less trustworthy. As a result, actors within each coalition intensify their ties, leading to escalation of the level of conflict between coalitions, which puts the subsystem under pressure (Sabatier and Weible 2007, 194). In regard to which level of belief system are the most important in explaining the coordination within and across the subsystems, Zafonte and Sabatier point out that unlike deep core beliefs and secondary aspects, the policy core beliefs are most related to the policy substances that receive maximum attention from the actors and organizations within and across the subsystems. Therefore, congruence in the policy core beliefs is most likely to be the glue that drive the coordination (1998, 478–79). Commonly, there are enough policy core beliefs in any given issue to define at least two advocacy coalitions (Sabatier and Weible 2007, 195). Nonetheless, some actors within a policy network may choose to join a coalition for reasons other than their belief system. As a critique for ACF, Cairney indicated that the notion of coalitions could explain the stability, but it does not fully explain the change which may be accounted for by external shocks. Additionally, not only do alliances form based on core beliefs, but also some coalitions are temporarily founded on self-interest, which explain why some actors switch positions from one coalition to another even though they do not share the same core beliefs with the new coalition (2007, 58).

Although network typologies and characteristics might explain policy outcomes, they do not explain why and how the change in network structure occur. In this regard, many network scholars emphasized the role of contextual variables in making structural transformations (Adam and Kriesi 2007; Marsh and Rhodes 1992). In this context, Marsh and Rhodes found that the economic changes and salience of issues disrupt the policy network and stability, which cause alteration in policy outcomes (1992, 257–62). Additionally, Adam and Kriesi hypothesize that the interaction and structure network may be shaped by the merit of policies. Accordingly, the policies that motivate and provide resources for group formation might produce networks characterized with fragmented structures while the policies with high expectations, high visibility, and easy traceability may provoke conflictual interaction since public officials are put in position of defending themselves against interest groups and the public (2007, 141–42). In addition, Sabatier and Jenkins-Smith indicated that the alterations in policy core beliefs, and in turn policy outcomes, requires a transformation in the external non-cognitive elements of the policy subsystem and network such as changes in socio-economic conditions, changes in the systemic governing coalition, and changes caused by policy decisions of other subsystems (1999, 133).

The subsystem literature provides considerable insight into the effect of punctuations that might be utilized to explain the dynamics of the policy network as whole and its components such as policy communities and coalitions. Based on PET, when a punctuating or shocking event hits the policy subsystem and network, the relations among actors and coalitions within and across the subsystem may change. Simultaneously, it is associated with an increase in media and public attention, which encourages more people and interest groups to participate in the relevant subsystem. In addition, other policy venues become involved and a shift in policy venue may occur. Consequently, a wavering equilibrium occurs where the subsystem move from a dominant

coalition type to more competitive type, opening a window for change in public policy (Baumgartner and Jones 2009; Worsham 1997, 1998). Thinking of this view in terms of network changes, not only is the policy network activated, but also power and resources are redistributed, which alters the structure of the network as well. On this subject, Sabatier and Weible distinguished between the ramifications of internal shocks and external shocks, although both shocks have something in common. The first ramification is that both external and internal shocks bring attention to and put a problem on the agenda, which draws more participants to a subsystem. As a result, critical political resources are redistributed or new resources are brought into the subsystem. However, the internal shock has a second ramifications which is that the policy core beliefs of the dominant coalition are put into question due to the internal shock, increasing the credibility of policy core beliefs of minority coalitions within the subsystem. As a consequence, doubt about the effectiveness of the dominant coalition's policy is raised and the policy core beliefs of minority coalitions are confirmed. Thus, the dominant coalition become more willing to compromise and engage in negotiation with the minority coalition (2007, 204–7).

Furthermore, the resources and behavior of coalitions within the policy network are affected by another contextual factor which is *coalition opportunity structures*. According to Sabatier and Weible, the coalition opportunity structures are “relatively enduring features of a polity that affect the resources and constraints of subsystem actors (2007, 200).” Here, Sabatier and Weible indicated that coalition opportunity structures are composed of two sets of variables shaping the resources and behavior. First is the degree of consensus that is necessary for achieving important policy change. If a high degree of consensus is required for changes, then the coalition is motivated to be inclusive. This will help in making compromise, increasing information sharing, and reducing the devil shift (Sabatier and Weible 2007, 199–200). In the case of rulemaking, the

literature shows that the degree of consensus matters. As McKay and Yackee (2007) mentioned, if there are two or more sides lobbying federal agencies through comments on rules, the agencies respond to the side who dominates the lobbying effort. Nonetheless, Nelson and Yackee pointed out that the success of the dominant side in rules' comments is conditioned on whether there is consensus within the dominant coalition and the size of the coalition and its composition (2012). The second variable is the openness of the political system which is determined by the number of venues that a policy proposal could go through and the degree of accessibility of these venues. In general, the political system in United States is considered very open with the availability of multiple venues with high degree of accessibility. As a conclusion, Sabatier and Weible pointed out that pluralist coalition opportunity structures as is the case of the United States are characterized with moderate norms of compromise and open systems for decision making (Sabatier and Weible 2007, 200).

Ultimately, the aforementioned literature is applicable to the rulemaking network to the greater degree. However, some considerations should be considered, which distinguish between the structures of the policy network in general and the structures of the specific rulemaking network. First of these considerations is to what extent the politics of the subsystem affect the routines and outputs of the rulemaking process. Here the arguments of deck stacking and fire alarm suggest a link between the politics of the subsystem and the rulemaking process. According to the deck-stacking argument, the coalition who establishes a bill designs the administrative procedures in manner that ensures the agencies continue serving the intended constituents after the established coalition has disbanded. In other words, the dominant coalition and interest groups who lobbied Congress and its committees to enact a bill do not have to lobby the agencies when the agency implements that bill and issues administrative rules unless the alarm is sounded. As an implication

of the public disclosure requirement in the Administrative Procedure Act (APA), the fire alarm guarantees that when agencies deviate from serving the intended constituents, the members of the established coalition will have their chance to lobby the agencies and their political principals such as congressional committees, President, and the courts so that the intended constituencies would be served (McCubbins, Noll, and Weingast 1987; W. West 2005). Here inquiries are raised about why and under which conditions do agencies deviate from serving the intended constituencies, which motivates the members of the established coalition to lobby the agencies and their political principals? Do the punctuating events create circumstances for such behavior?

Another consideration is the effect of the autopilot function provided by the APA. Accordingly, McCubbins, Noll, and Weingast asserted that the rulemaking routine and outputs may change when the interests and preferences of political principals are altered, which gives more flexibility to politicians. As new interest groups and constituencies become more favorable, the principals may tolerate deviation from the original deal that issued the bill or reform (1987, 259–69). Thus, if, due to highly administrative flexibility or the autopilot function, the original deal that establishes the bill or reform could not survive after the establishing coalition is disbanded, then there is no deck that is stacked in administrative procedures, at least for that bill or reform. It always depends on the dominant interests and preferences at the time of decision regardless to what the original deal should serve. As a consequence, the autopilot argument implies that the opposing parties who were lobbying the subsystem at first place will have incentive to continue lobbying agencies when it comes to the implementation of policy and rulemaking. If this kind of lobbying effort from subsystem to rulemaking actually happens, the question of timing is raised. Will it happen simultaneously at both the subsystem and rulemaking levels? Or will it happen

successively moving from the subsystem to rulemaking? If so, what are the implications of such shifts in lobbying effort?

The next consideration is the relationship with the political principals. Generally, the relationship among political principals does differ from the relationship between the political principals and agencies. The President, Congress, and courts are governed by the principle of separation of powers, and the check and balance system, which sets different circumstances for lobbying the policy subsystem from those lobbying the rulemaking. Here the relations among Congress, President, and courts could be described as equal branches sharing power (Neustadt 1991). Meanwhile, the administration is not an equal branch to those principals. It is best explained by multiple-principal agent relationship where the agencies receives multiple signals from multiple principals (Worsham and Gatrell 2005). As they enjoy constitutional and legal authority over the agencies, the President, Congress, and the courts as well as public opinion could block or facilitate a specific rule (Kerwin 1999; Yackee 2005). Even in the case of delegation of authority, agencies do not have absolute discretion. They are still overseen by the political principals. In this context, Yackee found that as the attention of President, Congress, and courts increases, agencies respond to these principals. Yet if the attention of principals is low, agencies are free to response to interest groups (2006). The fact that the involvement of the political principals matters reinforces the idea that in the rulemaking process, the interactions between the interest groups and the political principals are as important as the interactions between these interest groups and agencies. So, to what extent does the involvement of political principals alter the routine and outputs of the rulemaking process? Under which conditions do the political principals become involved in rulemaking? What and how do agencies respond when receiving multiple signals from multiple principals?

The last consideration is the openness of rulemaking process. As the APA requires, the rules have to be published and opened to public comments before being finalized and agencies have to consider these comments when final decisions are made (McCubbins, Noll, and Weingast 1987; W. West 2005). However, in the pre-rule stage, the process is less transparent and the parties who have access to the pre-rule stage enjoy an advantage over others (Yackee 2012). On other hand, access to the political principals who hold jurisdiction over agencies is not available for every one, as is the case with the notices and comments stage in the rulemaking process. So to what degree could the variation in political openness affect the rulemaking process and its outputs?

Finally, these considerations highlight the differences between the policy network structures and rulemaking structures. Therefore, any network analysis for rulemaking should take these differences into account; otherwise, the analysis would be misspecified and the final results would be misleading.

2.6 Conclusion and Literature Gap.

In sum, PET & ACF describe the dynamics of the policy subsystem in which the administration is an important participant. Particularly, it studies the effect of abrupt stimuli and changes in the external non-cognitive elements on the dynamics and composition of the policy subsystem, illustrating how policy monopolies are created or terminated (Baumgartner and Jones 2009; Baumgartner, Jones, and True 2007; Sabatier and Jenkins-Smith 1999; Sabatier and Weible 2007; Worsham 1997, 1998, 2006). Moreover, the literature shows that the policy monopoly or policy subsystem may be overcome by spanning several congressional committees or subsystems in one regime where the agencies may play an important role in the cooperation among overlapping subsystems (Eisner 2000; Jochim and May 2010; Ringquist, Worsham, and Eisner 2003).

Furthermore, the policy network approach (PNA) extends the analysis to consider the influence of other actors outside the policy community. Not only are policy outputs determined by the success of the policy community in establishing the policy monopoly or subsystem, but they also determine the behavior of other entities within the policy network and the type of relationship among these entities inside and outside the policy community. In this context, the actions of actors depend on their connections with each other and the structure of these relations, demonstrating the importance of the interdependencies among network entities. Significantly, PNA brings attention to the structures of the policy network and the interdependency relations as important covariates; otherwise, the results of policy network analysis would be biased (Adam and Kriesi 2007; Cranmer and Desmarais 2011; Dowding 1995; Galey and Youngs 2014; Hanf and Scharpf 1978; Heclo 1978; Kenis and Schneider 1991; Marsh and Rhodes 1992; Raab and Kenis 2007; Salancik 1995; Zafonte and Sabatier 1998). Likewise, PNA implies that the behavior of agencies, as is the case with other network participants, is influenced by these variables. Therefore, the analysis of the rulemaking process should take into account the interdependencies among other actors and the structures of the policy networks.

On the other hand, the literature of rulemaking describes the process and conditions under which agencies operate to enact administrative rules. Accordingly, the arguments of police patrol and fire alarm exhibit the extent of involvement of political principals in the rulemaking process and various ways they utilize them for political control (Kerwin 1999; McCubbins, Noll, and Weingast 1987; McCubbins and Schwartz 1984; Rosenbloom 2002; W. West 2005; W. F. West and Raso 2013; Worsham and Gatrell 2005). The importance of these contributions is to suggest that studies of rulemaking should be linked to the literature of policy subsystems and networks. Therefore, it may be more fruitful to study the structure of the rulemaking process as part of a

wider network where the outcomes of the rulemaking process are determined by the interactions between agencies and other participants in the network as well as among those participants themselves.

However, PET, ACF, and PNA provide a comprehensive set of hypotheses that may be applied to networks of rulemaking. Specifically, these approaches explain the dynamics of the policy network and illustrate the causes and consequences of connection patterns in social and political behavior. In addition, they exhibit the forces that drive the formation of coalitions within the policy subsystems and networks as well as the effect of contextual factors (Galey and Youngs 2014). In this regard, social network analysis (SNA) offers empirical tools to study these hypotheses and build statistical models for rulemaking and policy networks. As a promising contribution, PNA and SNA link the quantitative analysis of network structure to the qualitative analysis of existing public policy theories, which contributes to more dynamic aspects of the established literature (Adam and Kriesi 2007; Galey and Youngs 2014). Nonetheless, the structure of the rulemaking process and the relations that connect the participants in rulemaking networks differ from those who govern the policy network in general. Despite the applicability of PET, ACF, and PNA's hypotheses, some considerations should be considered, unveiling the distinction between the structures of the rulemaking network and the policy networks. These considerations are related to the effect of the politics of the subsystem, the autopilot function of APA, the relations with the political principals, and political openness.

In summary, I am trying to address the gap in the public policy literature regarding the bureaucratic/implementation approach, especially when the policy process moves from the stage of agenda setting and adaption to the stage of policy implementation. Accordingly, I have reviewed the relevant literature. On the one hand, PET, ACF, and PNA mostly analyze agenda setting and

policy adoption while, on the other hand, studies of rulemaking and political control are concerned with policy implementation. However, that literature suggests a link between the two stages even though it is not explicitly articulated. Therefore, my aim is to investigate this link by mapping the dynamics of both policy networks and rulemaking, identifying the related subsystems, coalitions, and other actors who may affect the rulemaking process. In other words, I compare the two stages to see if what happens at one stage of the process, agenda setting through adoption, mirrors what occurs at the other stage — implementation. In light of that comparison, I may be able to determine to what extent the activities at one level affect the other, especially when the rulemaking and policy network receive abrupt stimuli. Additionally, I attempt to disclose how far the literature of public policy is applicable to studies of rulemaking. Although the rulemaking process is located in the implementation stage, it resembles to some degree the process of policy adaptation. Thus, it is important to present the similarities and differences between the processes of policy adaptation and the rulemaking process.

Chapter 3: The Argument for the Effects of Punctuations and Methodology of the Study

3.1 Introduction

This chapter consists of four sections. The first section contains the research questions that address gaps in the literature regarding the effect of punctuating events on the rulemaking process. In the second section, I argue whether and how the policy subsystem and policy network may affect the routines and outputs of the rulemaking process, taking into account the dynamics of the subsystem. In the third section, I state reasons why Social Network Analysis (SNA) and the Exponential-Family Random Graph Models (ERGM) are suitable for addressing these questions empirically. In addition, an explanation is given for the logic and application of ERGM and other SNA techniques that I utilize in this study. In the fourth section, I illuminate the policy domain and the time frame examined in the following chapters. In general, the purpose of this chapter is to provide the overall argument for how the punctuations affect the dynamics and outputs of the rulemaking process, in which I attempt to bridge the gaps in the literature. This argument will be empirically examined in the following chapters. If the readers are interested in the theoretical perspective of this dissertation and its contributions, reading this chapter and the conclusion is sufficient.

3.2 Research Questions

In general, the literature shows how and to what extent political principals influence agencies and their rulemaking outputs. Also, it demonstrates how punctuating events affect the policy subsystem including political principals and other actors, especially in the area of agenda

setting and policy adoption. However, the effect of punctuations on administrative activities has not been sufficiently explored. Particularly, whether and how changes in subsystem composition and belief systems caused by a punctuation could alter rulemaking outputs, and whether the punctuating impacts happen sequentially or whether they occur simultaneously across the policy subsystem, rulemaking process, and policy network. In other words, how do punctuations affect the implementation stage? These inquiries need further investigation. Therefore, I will address three general research questions in this dissertation:

Q1: How do the dynamics and composition of the policy subsystem and policy network shape the outputs of rulemaking?

Q2: How do punctuations change the dynamics and composition of the policy network and its rulemaking outputs?

Q3: What is the temporal sequence for the impacts of a punctuation on the policy subsystem and network, and in particular the rulemaking outputs?

Particularly, I am interested in tracking the impacts of punctuating events on the policy network in the oil sector and then observing how changes in dynamics and the composition of the policy subsystem alter rulemaking outputs. In addition, I intend to examine the temporal sequence of these changes. In particular, I am looking for changes in the actors involved in the policy network, the variation in lobbying effort, any shifts in power and resources, the change in the dynamics undergirding the related policy subsystem, and any alteration in consensus of different coalitions within and across the subsystem. Furthermore, my aim is to observe these changes over time so that I can demonstrate when interest groups shift their lobbying effort from congressional committees to agencies and how such movement affects the rulemaking outputs. In other words, I

am tracking the effect of punctuations over time, moving from the stage of agenda setting and policy formulation to the stage of implementation.

3.3 Arguments for the Effects of Punctuations and Rulemaking Dynamics

A primary aim in this study is to investigate who influences the rulemaking process and how agencies behave in competitive or conflicted environments. To a large extent, it is concerned with the effect of the punctuations on the policy network, within and across the subsystem, and in turn their effect on both rulemaking and its time sequence. The importance of studying abrupt stimuli is that it may provide explanations for the outputs of public policy and rulemaking through tracking the changes from the prior state of equilibrium to the state of punctuation. It presents the more dynamic aspects of public policy processes, in contrast to some static aspects that mostly remain unchanged for longer periods of time such as party affiliations, ideology, and who controls the branches of the government. Despite many studies that focus on congressional committees and other political principals, I am looking at these aspects from the angle of administration, connecting rulemaking outputs to the change in composition of the policy subsystem and network. Instead of studying the political principals as dependent variables, I consider them as independent variables that could explain rulemaking outputs. In this context, my aim is to display how abrupt stimuli might change the dynamics of the policy network and composition of the policy subsystem, which in turn, might alter rulemaking outputs. In general, the effect of punctuations on the policy subsystem, especially at the level of political principals such as congressional committees, is well articulated (Baumgartner and Jones 2009; Cairney 2012; Kingdon 2011; Sabatier and Jenkins-Smith 1999; Worsham 1997, 1998). Nevertheless, the questions of how the punctuation could affect the rulemaking process itself, and its outputs, and what the impact of the temporal sequence

of the punctuation all need further investigation. Here, I argue the effect of abrupt stimuli on principals differs from its effect on agencies.

As PET articulates, at the time of punctuation, interest groups increase their pressure on political principals, seizing the moment to get desirable policy outcomes, which may empower a certain coalition and alter the beneficiaries of rulemaking. Here, timing matters in the rulemaking process. Accordingly, the impacts of punctuations are likely exhibited when changes over time are taken into account. Expectedly, the impact on rulemaking outputs may begin during the onset of a punctuating event as pressures are put on the agencies and the executive in general to take action. Nonetheless, agencies might be cautious in taking such actions because of the uncertainty that is associated with the effort of lobbying political principals to make a reform, especially with congressional committees. However, if some reform measures are passed, interest groups and political coalitions are expected to shift their lobbying efforts from principals to agencies so that different interest groups and political coalitions would ensure that agencies comply with the reform and produce positive outputs after the punctuation. I call this shift in lobbying effort the *lagged movement*, which represents changes in the behavior and resources of the actors within the network, upon redirecting their lobbying effort and resources from the political principals to the agencies in the post-punctuation period.

Also, I expect these lagged movements to happen even when the reform is blocked because of the autopilot function that the APA provides. As McCubbins, Noll, & Weingast asserted, agencies may change their beneficiaries when the political principals change their interests and preferences, which gives more flexibility to politicians. Subsequently, the principals may tolerate deviation from the original deal that issued the law or reform if the legislators' preferences and interests changed in favor of other interests groups (1987, 259–69). Thus, the original deal that

establishes the reform may not survive after the establishing coalition is disbanded. Then the rulemaking outputs will depend to some degree on the dominant interests and preferences at the time of the decision regardless of whom the original deal is meant to serve, due to the administrative flexibility of the autopilot function. In this case, whether the reform happens or not, there will be incentive for the winners and losers to lobby the agencies. For example, if the reform happens, the previously dominant coalitions are motivated to participate in the rulemaking process so that they can regain some of what they lost. In contrast, if the reform is blocked, the minority coalitions may attempt through the rulemaking process to achieve some of their goals that they failed to pass through Congress. Therefore, lagged movements will occur either way.

To understand the dynamics of the rulemaking process, the activities at both levels of the principals and the agents should be connected. Herein, the lagged movements offer a perspective on this connection. As a starting point, it is important to analyze the reaction of the participants in the policy network to the punctuation, which could result from one of the following abrupt stimuli: indicators which enlighten the change and the size of the problem as to whether there is a need to take a specific action or not; focusing events such as natural disasters and economic crises; and feedback where the successes and failures of the policy performance are evaluated (Kingdon 2011, 90–103). As an important catalyst for change in the routine and outputs of rulemaking over time, a punctuation generates pressure on agencies to take an action. In addition, it changes the structure of the policy network of which the agencies are a part.

To exhibit the effect of abrupt stimuli, the behavior of the network and the changes in the pattern of connections should be analyzed in three phases: the pre-punctuation equilibrium, the punctuation, and the post-punctuation phases. In this context, Figure 3.1 is a visual example of the dynamics of the policy network in the three phases. At the beginning, I expect the activities within

the policy network to be stable and steady at a certain level during equilibrium, where the agencies issue rules on a regular basis, and a dominant subsystem may well exist. Meanwhile, the involvement of other principals such as the President and courts may be less visible or entirely absent. Therefore, the policy network might appear relatively smaller since interest groups are lobbying fewer agencies by commenting on their rules and lobbying congressional committees by appearing at their hearings as shown by network 1A of Figure 3.1.

However, when a punctuation occurs, I expect the policy network to be activated as a result of public and media attention associated with the involvement of the political principals and many interest groups that were previously inactive. See the network 1B. By comparing network 1A with network 1B, the differences in the activities of the policy network between the equilibrium and punctuation times may be displayed as where at the time of the punctuation there are relatively more interest groups lobbying the principals and agencies than there were in the equilibrium phase. Yet most activities would be concentrated at the level of the principals, especially congressional committees. On the other hand, activities regarding rulemaking are expected to be less active as a result of the uncertainty associated with lobbying efforts to issue new bills or legislation that may change the beneficiaries of some policy programs.

Whether the interest groups succeed in getting new bills or legislation passed or not, the patterns of connections within the policy network are expected to change after the punctuation passes as attempts are made to influence change, whether they are successful or not. I anticipate a switch in lobbying activities from principals to agents, which creates the lagged movement that is manifested in the shift from lobbying congressional sub/committees, the President, and/or courts as the principals, to lobbying agencies as agents. See network 1C of Figure 3.1. In this third network structure, the attention of political principals gradually fades away, and they become less

active in association with decreasing public and media attention. Accordingly, the principals in the network receive fewer ties from interest groups post-punctuation, unlike the situation during the punctuation. Meanwhile, the agencies become more active moving from agenda setting to the implementation stage. As a result, there are a relatively larger number of rules with a significant number of interest group ties connecting them. In order to investigate the lagged movement and examine the argument for rulemaking dynamics, an analysis of policy networks is presented, and several empirical hypotheses are set in Chapters 5 and 6.

Figure 3.1

Note: Even though it is at this point a hypothetical example, I used real data for the oil policy network in the period 2009-2011 that encountered a focusing event: The Gulf of Mexico Deepwater Horizon oil spill in April 2010. Here, a sample of congressional hearings and administrative rules collected during period 2009-2011 and retrieved from Proquest. Sources: ProQuest Congressional Publications; Regulations.gov.

In light of this dynamics, the effect of the punctuation on the rulemaking outputs appears through the changes that it causes in the policy network at both the levels of principals and agents.

Therefore, it is important to determine which interest groups and coalitions dominate the policy network, if any, and to what extent the balance within the network is altered due to the punctuation, which in turn could explain the outputs of rulemaking. To display such effects, I determine and track the beneficiaries of rulemaking under different conditions and over time so that a better picture of the behavior and responses of agencies can be illustrated.

Accordingly, I am looking to ascertain which parties are the recipients of agencies' actions, and whether the administrative rules are advantageous to those recipients. After identifying the participants in rulemaking, I determine, in general terms, what they want from the agencies. In other words, what are the requests of the interest groups? Then I analyze the final rules to exhibit the responses of agencies to these requests, whether they are benefiting these participants or not. Specifically, the beneficiary variable depends on the analysis of request-response actions, as being a beneficiary of a rule rests on whether the related agency responds to or denies the request(s) of that participant in the rulemaking. For example, if a participant proposes a specific regulation and the relevant agency responds by issuing that regulation, then this participant is considered as a beneficiary of rulemaking. So, by analyzing the request-response actions, I can identify who the beneficiaries are and then turn to why the agencies respond to some participants while not to others. Also, by tracking these administrative actions, I can examine the conditions under which the agencies change their response from one set of participants to another.

In this regard, I argue that the participants or actors that dominate, or at least influence, the policy subsystem and network are probably the beneficiaries of rulemaking. Therefore, analyzing the composition of the policy network is important for displaying different actors and coalitions involved in rulemaking and to what extent they influence it. In view of that, the analysis is focused on two elements of influence within the policy network. The first is the lobbying effort in which I

am looking at actors and coalitions involved in the network and to whom they connect. The second element is one concerning power and resources. These resources could be formal legal authority, public opinion, information, mobilizable troops, financial resources, and/or skillful leadership (Sabatier and Weible 2007, 201–3). Accordingly, the coalition that devotes more effort in lobbying and possesses more resources is more influential and is more likely to receive a desired response from agencies.

In addition, the dominance or influence aspects of the policy network are not confined to lobbying the agencies alone. It incorporates lobbying political principals as well. Since agencies are obliged to respond to principals such as congressional sub/committees or the President, then whoever can influence these principals receives desired responses from the agencies. For example, if a specific coalition asks a particular agency for a regulation, its likelihood of obtaining that regulation is enhanced if this coalition can influence the sub/committee(s) that have authority over that particular agency. Consequently, the politics of the policy subsystem become relevant. Thus, it is important to determine whether the actors that are lobbying the agencies are also lobbying the related subsystem at the same time, and whether the related policy community enjoys a monopoly over the issue being considered by agencies, or whether the subsystem is overcome by a policy regime. Here, I consider both direct and indirect influences between interest groups and agencies. Therefore, it is central to present the relationships among the participants in the rulemaking and the related policy subsystem(s) as well as other principals. In other words, the beneficiaries are the ones that have a higher degree of influence in the entire policy network.

However, while dominating the lobbying effort and resources is a necessary condition, it is not sufficient. The success of the dominant coalition is conditioned on whether there is consensus within the lobbying coalition (Nelson and Yackee 2012; Sabatier and Weible 2007, 199–200).

Thus, an analysis of the dynamics within the network is vital to understanding and explaining the routines and outputs of rulemaking. In particular, I am trying to figure out if the actors within the same coalition have the same position toward the rules being considered; as well as having the same position when they are lobbying the principals. As the actors and coalitions hold a higher degree of consensus, the likelihood of being the beneficiaries of the rulemaking is increased. In sum, what matters is not only the size and resources of coalitions that dominate the lobbying effort, but also the degree of consensus within these coalitions. So, any analysis of the network that governs rulemaking should focus on lobbying efforts, resources, and the degree of consensus as elements of influence within the network at both levels of agencies and principals. To examine the causality between these elements of influence and rulemaking outputs, several hypotheses are put forward and an empirical analysis is presented in Chapter 7.

Herein, the timing of the punctuation can explain the changes in rulemaking outputs. If the changes in the structure of the policy network remain during and after the punctuation, then the possibility of influencing rulemaking outputs is high. If the network returns back to its structure before the punctuation, the possibility of change is low. Here, the success of minority or newly formed coalitions in obtaining favorable agency outputs depends in part on the structure of the policy network after the punctuation; whether the new coalition succeeds in keeping control through lagged movement, or if the previously dominant coalition regains control over the subsystem and policy network.

More specifically, the aim is to measure the effect of punctuations on the elements of dominance/competition within the policy network, presented in lobbying effort, resources, and the degree of consensus. In turn, I display the impact on the routine and outputs of rulemaking through measuring the changes in the beneficiaries of rulemaking. Consequently, the anticipation is that

lobbying efforts may increase during the punctuation time targeting the related subsystem(s) and other principals within policy network. Then, it shifts to the agencies as the lagged movement occurs. Meanwhile, resources may be redistributed during and after the punctuations.

In this context, relationships with the political principals are critical. Since they have political and legal obligations to follow the directives of the political principals, the agencies pay attention to the preferences of those principals. So, if a coalition succeeds in passing or blocking a reform during the punctuation period, it is probably able to do so in the rulemaking process post-punctuation. In other words, the coalition that enjoys a higher degree of influence within and across the policy subsystem during the punctuation is likely to enjoy a similar degree of dominance in lagged movement. In contrast, the policy network may be characterized with a high degree of competition where several subsystems, and many interest groups, are involved in the policy network. Consequently, the agencies receive multiple signals that may conflict with each other, and the preferences of those principals become unclear. In this case, the agencies may be more responsive to who influences the lagged movement without paying much attention to the wishes of political principals.

In total, the punctuation may directly affect the process of rulemaking by putting the agencies under pressure to take actions. Or indirectly, it may affect the politics of the subsystem and network that dictates the rulemaking. Therefore, I am applying various social network analysis (SNA) techniques to capture the impact of the punctuation on the structures and characteristics of the network. Specifically, I study the changes over time in lobbying effort, resources, and consensus within the policy networks, and then how these changes affect the beneficiaries. In other words, by focusing on abrupt stimuli, the dynamics of the policy network can be presented at both the levels of principals and agents, especially when the effect is studied over time.

3.4 The Application of Social Network Analysis and the Exponential-Family

Random Graph Models¹

In order to examine the arguments of this study, I apply Social Network Analysis (SNA) utilizing the exponential-family random graph models (ERGM)² and its time series version (TERGM) for statistical inferences. As the theories of public policy implicitly and explicitly indicate, the interdependency among participants of the policymaking process plays an important role in determining policy outcomes. Therefore, it is vital to capture the effect of such interdependency which is usually presented in the form of a network that has a set of actors or nodes linked by ties or edges. For example, if we consider the traditional iron triangle that has three main actors, a dominant congressional committee, an agency, and a powerful interest group, then we have a network with three nodes and three edges or ties expressing the relations between these nodes. In reality, many actors might be involved, with more than one committee, multiple agencies and many interest groups. If we consider the ties between those actors, a complex network emerges in which the action of any actor in the network depends on its relationship with other actors and their reactions toward it. In general, many scholars of policy networks agree that the interdependencies reflected in the structure of policy networks play an important role in explaining the behavior of participants in the policymaking process and its outputs in ways that have been overlooked by other public policy theories (Adam and Kriesi 2007; Dowding 1995; Galey and

¹ This section is not meant to discuss the detail and the mathematical computation of these models and how they run. Rather, it explains the logic behind them and their applications. For more detail, consult (Cranmer and Desmarais 2011; Handcock et al. 2003; Hunter et al. 2008a; Knoke and Yang 2008; Scott 2000; Wasserman 1994).

² ERGM is the regression version of the network. It is similar to logistic regression.

Youngs 2014; Hanf and Scharpf 1978; Heclo 1978, 94–105; Kenis and Schneider 1991; Marsh and Rhodes 1992; McCool 1988; Raab and Kenis 2007; Salancik 1995; Zafonte and Sabatier 1998).

However, the main obstacle that the scholars of policy networks and public policy have faced is the inability of baseline regressions to model the interdependency between the observations (or the actors in case of networks). These models are invariably built on the assumption that the observations are independent of each other. Within phenomena in which the interested entities behave as in a network, the observations are in fact dependent in each other. In fact, it is this very relation between the actors that is the subject of modelling rather than the characteristics of the actors themselves. This failure to model such interdependency and interactions between the observations or actors will force coefficient estimates of actor characteristics to be biased. Since they, by design, do not directly analyze interdependences among observations, baseline regressions are not appropriate models to apply to phenomena that manifest in a network fashion (Cranmer and Desmarais 2011). With the statistical and mathematical developments in graph theory in the last two decades, statistical inference in network models has become possible and has attracted many scholars. As a result of these developments and innovations, the Exponential-Family Random Graph Models (ERGM)³ and other network statistical models have been introduced, which enables researchers to model the interdependences and interactions among actors and entities within the networks (Cranmer and Desmarais 2011; Harris 2013; Hunter et al. 2008b; Knoke and Yang 2008; Lusher, Koskinen, and Robins 2012; Wasserman 1994).

³ Graph theory has had ongoing developments for some time. So, it is hard to attribute to a single piece of work or author as the inventor of ERGM. However, the most important episode is the publication of the *statnet* package for R in 2008 (<http://statnet.org/index.shtml>) when the empirical application of ERGM became available and accessible to researchers. Since then, ERGM has been incorporated in other statistical software and widely applied.

Accordingly, ERGMs offer a wide range of possibilities. Different types of network structures such as the traditional iron triangle, coalitions, and policy communities may be accounted for. Also, SNA and ERGMs can cleverly handle causality between variables. By analyzing the connections between the actors or nodes of the network as well as their attributes, the causal mechanism between dependent and independent variables can be readily specified (Cranmer and Desmarais 2011; Knoke and Yang 2008; Wasserman 1994). In this regard, ERGMs have a unique way to deal with such variables. Unlike standard regression that regards Y as a series of values conditioned on univariate distributions, ERGMs exhibit the likelihood of observing network Y by considering Y as a single realization from a multivariate probability distribution where many other realizations are possible. In other words, just like in classical statistical inference where we assume the sample mean is generated from a normal distribution, ERGMs look at networks as a set of relational ties each of which could be generated from a hypothetical sampling distribution. Essentially, this technique compares the observed network with a hypothetical population of network ties. Also, ERGMs display whether a specific edge exists or is absent, producing the probability of its existence in a similar way to logistic regression. The parameters, or their estimated coefficients, for network statistics can be node or dyad covariates that enhance the probability of observing the network Y or its edges (Cranmer and Desmarais 2011).

Simply, the logic behind ERGM depends on comparing the observed network with what would happen by random chance. By generating a large sample of random graphs⁴ or networks, the statistics of the observed network are compared with the statistics of the distributions of random graphs. If they do not significantly differ, the relations between actors could occur by coincidence. In other words, the observations are independent on each other and the relations presented in the

⁴ Mathematically, the network is expressed in the form of a matrix or graph; therefore, these terms are used interchangeably.

network have no effect on the behavior of actors. However, if the observed network does significantly differ from the distributions of random graphs, then the observations are dependent on each other and the relations do affect the behavior of actors. Next is to determine what type of interdependency or network structures make the observed network different from the random graph distributions. By repeating the simulation and trying different structural terms, an ERGM can capture the distinctive statistics of the observed network (Cranmer and Desmarais 2011; Handcock et al. 2003; Harris 2013; Hunter et al. 2008b).

Herein, ERGMs can model two types of statistics, attributes and structures. Analogous with logistic regression, the attributes are considered as the usual covariates utilized in logistic models. These attributes are coded in the network either as node or dyad level covariates. Here, the independent variables could be related to the nodes of the network such as the types of interest that actors represent; for example, whether they are business, environmental groups, or scientists. Or the independent variables could be related to edges of the network such as how many times an actor contacted a congressional committee. So, the edge is assigned a value equal to the number of communications. If that actor has several edges with multiple congressional committees, then each edge is assigned different value depending on the number of communications. For the structures as the second type of network statistics, SNA offers several configurations that can capture the interdependencies between actors or the nodes of the network such as degree

centrality⁵, betweenness centrality⁶, reciprocity⁷, two stars⁸, triangles⁹, transitive ties¹⁰, clique¹¹, and other terms. The application of these terms depends on the theoretical purpose and the form the network takes, such as whether it is a directed or non-directed network, or one mode versus two modes.

In this context, I run ERGM on a two-mode network, expressed in a bipartite matrix, that reflects the interactions between different types of nodes such as when actors participate in some events or have memberships in several organizations. So, the nodes of the network are divided into two modes. The first mode is the set of actors located in the rows of the network matrix. The second mode is the event which is located in the columns of the network matrix. Here the edges appear only between the first and second modes. No edges are allowed within the same mode (Knoke and Yang 2008; Scott 2000; Wasserman 1994). This form of network is useful in studying the interactions between the interest groups as the actor mode and public institutions, such as congressional committee hearings, as the event mode. I utilize the two-mode network to present

⁵ *Degree centrality* counts the number of connections for a given node. The actor(s) linked extensively with others is/are the most important or prominent in the network (Knoke & Yang, 2008, p.63).

⁶ *Betweenness centrality* measures the extent that a node is intermediate between other nodes. It is another measurement for the importance of actors. If the connection between two actors needs to go through an intermediate actor, then the intermediate actor has some control over the interaction between first two actors (Knoke & Yang, 2008, P.67).

⁷ In directed network, reciprocity represents mutual edges between two nodes.

⁸ Two-star is expressed when a node has two edges.

⁹ Triangles reflect the links between three nodes regardless of the direction of the edges.

¹⁰ Transitive relation or Transitivity is “a property that considers patterns of triples of actors in a network or triples of nodes in a graph. ... A relation is transitive if whenever *i* chooses *j* as a friend and *j* chooses *k* ..., then *i* chooses *k*” (Wasserman 1994, 165). For example, transitive relation could be expressed when a person establishes a friendship with another person based on common friend. So, the friend of my friend is my friend too. In other words, the relation between two actors depends on their relations with other actors in the network.

¹¹ A *clique* is a cohesive subgroup of nodes that are connected by direct relations. In general, cliques’ properties are “mutuality of ties, reachability of subgroup members, frequency of ties among members, and relative frequency of ties among subgroup members compared with non-member” (Knoke & Yang, 2008,p.72)

the relationship between the interest groups and the congressional committees in Chapter 5, and the relationship between the interest groups and agencies in Chapters 6 and 7. To calculate the Exponential Random Graph Models, I use the *ergm* package developed by Handcock et al. (2018) and Hunter et al. (2008b), which is available in the R statistical software system. Also, I use the *xergm* package developed by Leifeld, Cranmer, and Desmarais (2018a, 2018b) for Temporal Exponential Random Graph Models which is an extension of ERGM.

In summation, what the reader should know is that the parameters in ERGM are interpreted in the same way as the coefficients are interpreted in logistic regression. The main differences is that ERGM provides additional parameters for the network structures that can capture the nature of the interdependency between the observations that the baseline regression cannot (Cranmer and Desmarais 2011; Hunter et al. 2008b). The application of ERGM should be weighted in light of the nature of the data and phenomena under the study. For example, linear regression is not a good fit for survey data where the dependent variable holds values of zero or one. Here, logistic regression is an appropriate model for such data. Likewise, baseline regressions are not a good fit for a phenomenon that acts in a network fashion. The ERGMs are an appropriate model for studying these networks.

3.5 The Policy Domain and Time Frame

Because of its important to the US economy, I focus on the oil sector. Primarily, my attention goes to those policy areas in which the agencies have authority over issuing rules such as oil production and offshore drilling, pricing and consumption of oil and gasoline, and environment and safety. I identify the rules that deal with or regulate the oil industry in any of aforementioned policy areas and then specify the programs under which they perform as well as

the agencies responsible for carrying it out. By tracking pre/rulemaking activities over time, I can display which agency is a part of the policy monopoly, if any, and over which oil policy area, as well as whether there is a shift or intervention from other agencies in that policy area. More importantly, such time tracking should exhibit the disturbed effect of the punctuations on ongoing programs. It furthermore may shed light on the origin of the rules and to what extent the punctuations influence the administrative agenda setting and rulemaking process. By studying the change in pre/rulemaking activities and the origin of rules, I can demonstrate to what extent the political principals and interested parties are involved in the agenda setting and implementation of pre/rulemaking and which policy areas and programs they correspond to. Here, the analysis will be at two levels. The first is the aggregate level that includes all un/opened rules for comments and congressional hearings in order to display the involvement of political principals, agencies and interest groups, as well as their roles in setting up the agenda for pre/rulemaking. The second level is the analysis of administrative programs, which will shed light on the rulemaking's outputs in specific contexts.

For the time frame, the starting point is the year of 1996, which comes before the collapse of oil prices in 1998, when prices went under 10 dollars/bbl, so that I can compare the structure of the policy network of oil before that focusing event. On the other end, I track the routine and outputs of the rulemaking process in the oil sector until 2016, which is the end of Obama administration and after the collapse of oil prices in 2014. This period covers several important events: the collapses of oil prices, the unprecedented increases in oil prices, and the Gulf of Mexico Deepwater Horizon oil spill in 2010. These events provide an opportunity to study the rulemaking process and how its routines and outputs change in response to different types of abrupt stimuli. Also, this period witnessed a gradual increase in oil prices during the 2000s, which displays the

pressure of economic indicators on the rulemakers. Besides, there are significant political changes during this period, including three different administrations, a shift of power in Congress, and several changes from united to divided governments.

Finally, the policy network has to be constructed in a way that is appropriate for displaying the impacts of the independent variables. In this regard, I draw the policy network on a yearly basis comparing the rulemaking outputs with the change in the network for each year. According to this method, I will display how many final rules have been issued in each year and determine which ones have been changed and who the beneficiaries are. Then I measure changes in the policy network for each year, comparing these changes with the outputs of rulemaking for the same period along with its lagged values.

Chapter 4: Data Description

4.1 Introduction

The purpose of this section is to provide a description of the data collection process displaying the sources and construction of the data sets. Since the analysis has multiple dimensions, I gather information from different databases and then combine them into a number of conventional rectangular datasets, or what R and python, the software utilized here, call data frames. From one perspective, I collect information regarding the Congress in general, and selected congressional committees and their hearings in particular. From a different angle, I gather data regarding the rulemaking process. Thus, I can exhibit the oil policy network and track behavior of the different actors in this network through different stages of public policy. Giving the large size of the data sets, I present the software and computer code I developed to automate the process of downloading and organizing the data¹². This chapter helps the readers to better understand the process of network construction presented in the following chapters. The data collection problems for this research are complex, and researchers who might be interested in replicated or conducting similar studies should be able to understand the process of data collection and construction of the network in detail and be familiar with the challenges and difficulties they may face.

4.2 Data Sources Regarding the Congress

To obtain the congressional hearings concerned with oil policy, I relied on the ProQuest Congressional database (<http://congressional.proquest.com>). On May 21, 2017, I ran the following

¹² The data is exceptionally large; therefore, it was impossible to manually download and organize all of it. This approach selects and downloads the appropriate records within the larger collection.

search terms; *Petroleum and petroleum industry; Oil shales; Petroleum and natural gas in submerged lands; and Tar sands*. Then, I excluded the nonrelated subjects from these search results, which are: *Accounting and auditing; Administrative law and procedure; Arms control and disarmament; Computers; Congressional committee markup sessions; Corruption and bribery; Department of State; Federal aid to education; Food assistance; Outdoor recreation; Terrorism; and Transportation research*. As a result, I ended up with 654 hearings for the period between 1996 and 2016. However, the search terms may now produce slightly different results since ProQuest Congressional keeps updating its database. Some options that were available at the time of this collection may no longer be available. Or there might be more options than the ones were available at that time. Furthermore, ProQuest periodically adds more hearings to its database even for older years. For example, in April 2014, I ran the same search terms and the total number of congressional hearings concerned with oil policy was 21 for year 2011. Since then, the ProQuest has added more hearings for that year. On May 21, 2017, I ran the search terms again and I got 66 hearings for the year 2011. It seems there is often a significant time delay for the hearings to be classified and reported in ProQuest. Thus, I could not keep updating my data set and changing my analysis results each time ProQuest added more hearings; therefore, I had to stop at some definitive point in time, which means my last search results are from May 21, 2017. Accordingly, it is wise to take into account that the analysis of congressional hearings regarding the most recent years probably are less reliable since there may be more hearings to be reported.

Next, I read through the abstracts of these congressional hearings to determine which ones are actually related to oil policy and which ones are not. Out of the total 654 hearings that I found, 60 hearings were not related, reducing to 594 hearings. In the context of this dissertation, I am interested in collecting two types of information. First is the network of interest groups that connect

the congressional committees, which can be ascertained from lists of affiliated organizations of witnesses in the hearings they appear. To constitute the network of congressional hearings, two sets of actors must be differentiated, congressional committees and witnesses. Accordingly, I construct this network in the form of a two-mode edgelist matrix in which each set of actors is put in separate column. For more clarification, Table 4.1 is an example for the data set that identifies the edgelist matrix of congressional hearings where the committees are in one column and the witnesses before the committee is put in another column. See columns C and E. Also, there are three hearings in that table. Each hearing is given a reference number. So, hearings are distinguished by whether or not they are held by the same committees. Each actor, whether it is a committee or a witness, is given a unique abbreviation or identifier so that the computer software can identify them. See columns D and F. In this context, some witnesses may represent more than one organization. Since I am interested in their affiliated organizations more than the witnesses themselves, I code them as separate testimonies. Each testimony is presented by a different organization. Consequently, I collected over 4000 testimonies. In the end, column G expresses the ties between the congressional committees and witnesses. Since this matrix represents an unweighted network, all ties have a value of one. In doing so, computer software can count how many times a specific witness appears before a particular committee.

Table 4.1: An Example of the Edgelist Data Set of Congressional Hearings

	A	B	C	D	E	F	G
	Date	ID/CIS of Hearings	Committee	Committee Abbreviations	Witness Organization	Witness Abbreviations	Tie
First Hearing	10/02/96	97-S161-6	Agriculture, Nutrition, and Forestry. Senate	ANF.S	Ag Processing, Inc	Ag Processing	1
	10/02/96	97-S161-6	Agriculture, Nutrition, and Forestry. Senate	ANF.S	Clean Fuels Foundation	CFF	1
	10/02/96	97-S161-6	Agriculture, Nutrition, and Forestry. Senate	ANF.S	Bioclean Fuels Inc	Bioclean	1
	04/16/96	97-S261-3	Commerce, Science, and Transportation. Senate	CST.S	National Transportation Safety Board	NTSB	1
Second Hearing	04/16/96	97-S261-3	Commerce, Science, and Transportation. Senate	CST.S	Office of Congressional Affairs	OCA	1
	04/16/96	97-S261-3	Commerce, Science, and Transportation. Senate	CST.S	Department of Transportation	DOT	1
	04/16/96	97-S261-3	Commerce, Science, and Transportation. Senate	CST.S	National Association of Pipeline Safety Representatives	NAPSR	1
	05/20/96	98-H401-13	Government Reform and Oversight. House	OGR.H	Kerr-McGee Corp	KerrMcGee	1
Third Hearing	05/20/96	98-H401-13	Government Reform and Oversight. House	OGR.H	University of Oklahoma	OU3	1

The second type of information are the actor attributes or characteristics. Since I deal with two different sets of actors, congressional committees and witnesses, and each type of actors has its own attributes or characteristics, I created two separate data sets. For the congressional committees, I gathered the following information: Title of the hearing, Hearings ID/CIS number, committee(s) holding the hearing, Chamber, date of the hearings, and page length. As is manifest in Table 4.2, this information is presented in columns A, B, C, D, E, F, and G. Furthermore, I extracted additional information by reading and analyzing the abstract of the hearings. I determined the tone of the hearings, whether it is positive (1), neutral (0), or negative (-1). See column H in Table 4.2. Also, I distinguished between hearings that discussed the oil industry in general and those hearings that discussed a specific rule or regulation affecting the oil industry, assigning a code of (1) for rule-related hearings and otherwise (0). See column I. Moreover, I classified the hearings according the policy area of oil industry, whether it is discussing the

production phase, coded (1), the consumption phase, coded (2), environmental issues, coded (3), international aspects of the oil industry, coded (4), or economic growth, coded (5), with other issues coded (6) as appears in column J. However, some hearings could discuss two or more policy areas. Therefore, I created a dummy variable for each policy area to account for this overlapping. See columns K, L, M, N, O, and P. For more clarification, see rows 13 and 17. Each hearing in these rows discusses two policy area of the oil industry. In row 13, the hearing is classified as discussing the environment highlighted with orange and the economy highlighted with blue. So, both dummy variables were given a value 1. Nonetheless, this hearing is concern with the environment more does it with economy, Thus, it was classified as an environmental hearing in the nominal variable in column J. Also, the same could be said for the hearing in row 17 with economy is the dominant policy area in nominal variable.

As for the actor attributes of the witnesses, I looked at the affiliated organization of the witnesses and classified them according to the type of interests they represent or the activities they perform. In general, I found this information through looking at websites of these organizations or within their testimonies where the witnesses frequently explain nature of the organizations they represent. Some cases, I searched in external databases. Here, I identified several types of interests based on their regular appearances in the congressional hearings. These are the oil industry, coded (1); environmentalists, coded (2); scientists and experts, coded (3); federal administrations and agencies, coded (4.1); congressmen, coded (4.2); state and local governments, coded (4.3); the biofuels industry, coded (5); the auto & motor vehicle industry, coded (6); agriculture, coded (7); other energy industries, coded (8); individuals or anonymous, coded (11); and others, coded (10).

Table 4.2: An Example of the Data Set of Congressional Hearing Attributes

	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P
1	Title	ID/CIS of Hearings	Committee	committee abbreviations	Chamber	date	page length	Tone	rule related	Policy area	Production	Consumption	Environment	International	Economy	Other
2	Incentive	2000-H781-2	Ways and Means. H	WM.H	House	02/25/99	101	1	0	2	0	1	0	0	0	0
3	Energy an	2009-H181-19	Appropriations.H	App.H	House	05/01/09	1355	0	0	6	0	0	0	0	0	1
4	Interior, E	2009-H181-24	Appropriations.H	App.H	House	01/01/09	1806	0	0	6	0	0	0	0	0	1
5	Departme	2009-H181-36	Appropriations.H	App.H	House	01/01/09	1037	0	0	6	0	0	0	0	0	1
6	Offshore	2009-H581-28	Natural Resources. H	NR.H	House	02/11/09	152	-1	0	3	0	0	1	0	0	0
7	Current E	2009-S311-21	Energy and Natural Resources. S	ENR.S	Senate	01/08/09	103	1	0	5	0	0	0	0	1	0
8	Energy Se	2009-S381-48	Foreign Relations. S	FR.S	Senate	05/12/09	45	1	0	5	0	0	0	0	1	0
9	Hearing T	2010-H161-31	Agriculture. House	Agr.H	House	09/17/09	206	0	0	5	0	0	0	0	1	0
10	Hearing T	2010-H161-41	Agriculture. House	Agr.H	House	10/29/09	81	0	0	5	0	0	0	0	1	0
11	Energy an	2010-H181-29	Appropriations.H	App.H	House	01/01/10	1688	0	0	6	0	0	0	0	0	1
12	H.R. 3534,	2010-H581-21	Natural Resources. H	NR.H	House	09/16/09	271	-1	0	3	0	0	1	0	0	0
13	Unconven	2010-H581-22	Natural Resources. H	NR.H	House	06/04/09	65	0	0	3	0	0	1	0	1	0
14	Leasing ar	2010-H581-4	Natural Resources. House	NR.H	House	03/17/09	76	1	0	1	1	0	0	0	0	0
15	New Dire	2010-H701-16	Science and Technology.	ST.H	House	06/04/09	158	-1	0	3	0	0	1	0	0	0
16	Subcomm	2010-H721-18	Small Business. House	SB.H	House	08/25/09	80	1	0	5	0	0	0	0	1	0
17	Oil and th	2010-J841-7	Economic. J	Eco.J	Joint	05/20/09	118	-1	0	5	0	1	0	0	1	0
18	Offshore	2010-S311-19	Energy and Natural Resources. S	ENR.S	Senate	11/19/09	116	-1	0	3	0	0	1	0	0	0
19	Energy an	2011-H181-48	Appropriations.H	App.H	House	02/01/11	1438	0	0	6	0	0	0	0	0	1
20	Worker H	2011-H341-34	Education and Labor.H	EL.H	House	06/23/10	83	-1	0	3	0	0	1	0	0	0
21	The Deep	2011-H411-18	Homeland Security.H	HS.H	House	07/12/10	79	-1	0	3	0	0	1	0	0	0

Table 4.3: An Example of the Data Set of Actor Attributes

	A	B	C
1	Actor abbreviations	Actor full names	types of interest
2	NACCHO	National Association of County and City Health Officials	10
3	EPA	Environmental Protection Agency	4.1
4	Peter HOEKSTRA	HOEKSTRA , Peter (REPRESENTATIVE , REPUBLICAN -MI	4.2
5	CENO	Century Exploration New Orleans, Inc.	1
6	AAPA	American Association of Port Authorities	10
7	AOGCC	Alaska Oil and Gas Conservation Commission	4.3
8	FCC	Farmers Cooperative Company – Hinton FCC	7
9	Atmos	Atmos Energy Corp	8
10	P4PS	People For Puget Sound	2
11	PiedmontBio	Piedmont Biofuels	5
12	GPTC3	Georgia Piedmont Technical College	3
13	DEPI	Dominion Exploration and Production, Inc. (DEPI)	1
14	DEOG	Dominion East Ohio Gas	8
15	EVAA	Electric Vehicles Association of the Americas	6
16	Cabot	Cabot Oil and Gas Corp	1
17	BP	BP America, pb capitil, or British Petroleum	1
18	CLNG	Center for LNG / Center for Liquefied Natural Gas (CLNG	1
19	NiSource	NiSource Inc	8

To illustrate what the data set of interest groups and other organization looks like, Table 4.3 shows the names of the actors in column B and their codes in columns C. Also, each actor has given a unique abbreviation or identifier to distinguished it from other actors. However, these abbreviations have to be carefully assigned since the names of these actors are not always consistent in the text of hearings. For example, the British Petroleum Company might be written as “BP America”, “bp capital”, or “British petroleum”. So, it must have the exact abbreviation (BP) each time it is entered in data set.

However, going through all congressional hearings is exhausting and time-consuming process. Because of the size of database and the effort need to collect the aforementioned information, I developed Python computer code to automate the process. This method depends on cracking down the HTML code in which the ProQuest website is written and extracting the information that is posted on the congressional hearing pages. This procedure is known as web scraping. For that purpose, I used several packages in the Python software version (3.6.3) to write a script for such task. Most importantly, these are the *Requests* (2.18.4) and *Beautiful Soup* (4.6.0) packages for obtaining and decodifying HTML script, and the *Regular Expression* (2.2.1) package for searching for patterns within text. Without diving into the details, anything that appears in a web page has to be put between two HTML tags such as `<p>` and `</p>` for paragraphs, `<ul>` and `</ul>` for lists, or `<div>` and `</div>` for blocks. By identifying the right pairs of tags, the desired information can be extracted and presented in spreadsheets. As an example, Figure 4.1 shows general information about a congressional hearing as it appears in the ProQuest page of that hearing. Meanwhile, Figure 4.2 shows the HTML code in which the hearing page is written in order to display Figure 4.1. Notice that the information for the hearing title is in the red box, the CIS number is in the green box, and the committee in the blue box, all located between the paired block tags, `<div class="segColR">` in the beginning and `</div>` in the end. In addition, Figures 4.3 and 4.4 display the identifying information for the witnesses for the same hearing. Nonetheless, it is located within slightly different block tags, `<div class="segColR docView FieldWidthWide">` and `</div>`. For who may be interested, the code for web scraping is provided in the end of this section with more explanation. See Appendix 2.

Figure 4.1: Example 1 of How the Information Appears in the Website

	<h2>Hearings Published</h2>
Session	<h3>Title Info</h3>
	Title: Economic and Geopolitical Implications of Low Oil and Gas Prices
otation	CIS Number: 2018-S381-184087
	Sudoc Number: Y4.F76/2:S.HRG.114-787
's	Committee: Committee on Foreign Relations. Senate
	Document Date: March 02, 2016
	Congressional Publication Number: S. Hrg.114-787

Figure 4.2: Example 1 of How the Information is Written in HTML Code

```
<div align="left" class="docSegRow">
  <div class="segColl">
    Title:
  </div>
  <div class="segColR">
    Economic and Geopolitical Implications of Low Oil and Gas Prices
  </div>
</div>
<div align="left" class="docSegRow">
  <div class="segColl">
    CIS Number:
  </div>
  <div class="segColR">
    <span class="highlight">
      2018-S381-184087
    </span>
  </div>
</div>
<div align="left" class="docSegRow">
  <div class="segColl">
    Sudoc Number:
  </div>
  <div class="segColR">
    Y4.F76/2:S.HRG.114-787
  </div>
</div>
<div align="left" class="docSegRow">
  <div class="segColl">
    Committee:
  </div>
  <div class="segColR">
    Committee on Foreign Relations. Senate
  </div>
</div>
```

Figure 4.3: Example 2 of How the Information Appears in the Website

ary	Testimony
fo	
it Notation	WITNESS PANEL: #1
ts	Date: Mar. 2, 2016
iptors	Collation: p. 3-41
ony	Witness: ADAMS , Timothy D. - President and CEO , Institute of International Finance
	Witness: KAHN , Robert - Senior Fellow, International Economics , Council on Foreign Relations

Figure 4.4: Example 2 of How the Information is Written in HTML Code

```

<div align="left" class="docSegRow">
  <div class="segColl docView_LabelWidthSmall">
    Witness:
  </div>
  <div class="segColR docView_FieldWidthWide">
    ADAMS , Timothy D. - President and CEO , Institute of International Finance
  </div>
</div>
<div align="left" class="docSegRow">
  <div class="segColl docView_LabelWidthSmall">
    Witness:
  </div>
  <div class="segColR docView_FieldWidthWide">
    KAHN , Robert - Senior Fellow, International Economics , Council on Foreign Relations
  </div>
</div>

```


4.3 Data Sources Regarding the Administrative Rules

The information regarding administrative rules and their comments is collected from several governmental sources. These websites provide the necessary data to establish the ties, or edges, between interest groups and agencies, which constitute the rulemaking network. However, the process of collecting and coding the rulemaking network and its attributes is more complicated than the network of congressional hearings. Primarily, it required working with three governmental websites. None of them had the complete data that I required. So, I had to get part of the information from one source and then complete it from another. The first source is the *Federal Register* website, www.federalregister.gov which has a comprehensive archive of rules and has a good search engine. Nevertheless, it does not have the comments on the rules, nor does it have any way to match proposed rules to their final versions. The second website is www.regulations.gov which provides an online opportunity for the public to comment on rules and publishes all comments for any rule whether they are received online or not. Importantly, it has the ability to connect the proposed rules to their final versions by using the *Docket Identification Number*. However, it has a poor search engine which is less reliable in identifying which rules are concerned with the oil sector. Moreover, it does not have comments for older rules that were issued in the 1990s and almost the first half of the 2000s. The third website is www.reginfo.gov, providing the RIN number as another way to connect the proposed rules to their final versions, especially for older rules. However, it does not provide the comments of the rules as well.

In general, I had to go through the three websites in order to fill in the missing information. I started by looking at the *Federal Register* website to identify rules regulating the oil industry since it has a comprehensive archive. I adopted a broader approach by running the following terms

through the *Federal Register* search engine: *oil and gas exploration, oil pollution, oil and gas reserves, oil imports, gasoline, petroleum, petroleum allocation, oil exports, fuel additives, and fuel economy*. I got more than 8000 rules from this search. By applying a string searching algorithm (*regular expression* package in Python), I searched the abstracts of rules for the words oil or petroleum. Assuming that an abstract that has neither of these words is probably not relevant, I was able to reduce number of rules to 1302. Then, I read carefully through the abstracts of the remaining rules to determine the policy areas and other information that needs to be analyzed in similar way to match what I have done with congressional hearings.

Next, I connected the proposed rules to their final versions by searching in *Regulations.gov*. For this purpose, I had to figure out how many out of the 1302 rules collected from the *Federal Register* exist in the *Regulations.gov* database. In general, most rules that were enacted after the online comments service was provided are available on the *Regulations.gov*. However, some older rules are updated in its database. By using the Docket number, I found each rule with its proposed and final versions along with its comments. Unfortunately, not all rules are packed in pairs of proposed/final sets based on Docket number. In some cases, there is more than one proposed and/or final rule for each Docket. In other cases, there is only one version of the rule, proposed or final. This required manually looking at each rule, identifying the proposed and final rules, and adding the missing rules that the search engine of the *Federal Register* did not identify. In the end, I was able to collect 638 out of the 1302 rules that are packed in 194 sets of proposed/final rules. Most of them are from mid 2000s to the newest years.

For the older rules that do not exist in *Regulations.gov*, the RIN number that *reginfo.gov* provides is used to pack the rules in proposed/final sets. However, since comments of these older rules are not available on *Regulations.gov* nor any other official website, the viability of collecting

and matching these rules is questionable. So, at this point I decided to restrict the analysis to these 638 rules. Nevertheless, *reginfo.gov* could be important for future research on networks that involve the President and Office of Management and Budget (OMB). It contains records for the meetings that interest groups had with OMB regarding these rules.

However, the main part of the rulemaking network are the connections between interest groups and agencies that are manifested in comments of interest groups in each set of proposed/final rules. Therefore, I needed to gather the necessary information about all rules, then convert the rules in each set to be one node in the network. As described earlier, the data for the rules is primarily collected from the website of the *Federal Register* and *Regulations.gov*. Fortunately, both websites provide an application programming interface (API) which enables the computer code to interact with the database or website by sending requests and receiving responses. So, developers or users can automate the process of data collection. In order to access the API of *Regulations.gov*, I had to sign up for the API Key and wait for authorization by *Regulations.gov* staff. On the other hand, the API for the *Federal Register* is open access. The data in these websites are presented in JSON format. Consequently, I wrote a computer program in Python using the *Requests*, *Beautiful Soup*, and *Regular Expression* packages to decodify the JSON files and collect information on the rules. For more details, see Appendix 2.

In short, the data in JSON files is stored in two formats, lists and dictionaries. In lists, the information is presented between two Square brackets such as *[value_1, value_2, value_3, ... value_i]*. The values in these lists are separated by commas (.). These values could be one of the three basic types of data: string, integer, or float¹³. Here the order of the values is important to locate the information. So, the computer code is programed to collect information in specific

¹³ String is a series of characters that could present as text. Integers are whole numbers without decimal point such 1, 2, and 3. A Float is a number with decimal point such as 2.43, 4.84, and 1.54.

location in the list. The other format is the dictionary, where each type of information is given a key and each key is followed by its value. The dictionaries are defined by curly brackets and key/value pairs are divided by comma such as {key_1: value_1, key_2: value_2, key_3: value_3, ... key_i: value_i}. Accordingly, the information needed may be found by its key regardless to its order in the dictionary. What matters here is the key of the value, not the order. So, the computer code is written to collect information that match a specific key in spite of its location in the dictionary. Usually, the lists and dictionaries are found nested within each other in JSON files.

For more clarification, Figure 4.5 is an example for a rule displayed in JSON format, retrieved from the *Federal Register* (<https://www.federalregister.gov/api/v1/documents/2015-29820.json>). It starts with an open curly bracket¹⁴, which indicates the information is presented in a dictionary. As it appears, the first key is *abstract* and its value is the string displaying the text of abstract. The next key is *action*, and its value is the string indicating it is proposed rule. However, the following key, (*agencies*), is different. The value of the *agencies* key is a list that contains two dictionaries, and each dictionary has its own keys and values. In other words, it is a dictionary nested in a list that is nested in a dictionary. For instance, to get to the name of the agency that is in the red box in Figure 4.5, the computer code has to be instructed to go to the *agencies* key which has a list. Next, it goes to the second item in the list which is a dictionary, then collecting the value of the *name* key. For more clarification, Appendix 3 contains the program I wrote to request and collect JSON files from the websites of the *Federal Register* and *Regulations.gov*, creating the data set for all rule attributes.

¹⁴ The opening curly bracket appears only in Figure 4.5 because the JSON file is too long to include all keys and their values. To view the closing curly bracket, open (<https://www.federalregister.gov/api/v1/documents/2015-29820.json>), and it can be seen in the end of the file.

Figure 4.5: An Example of a Rule Displayed in JSON Format

After manually identifying each set of rules, I ran the computer code to collect the rule attributes, creating the data set that appears in Table 4. 4, where each color presents a different set of rules. As is seen, not all sets are consistent for proposed/final pairs of rules. Some sets have multiple rules whereas others have only one rule. In general, the data collected through the *regulations.gov* API and the *Federal Register* are the titles of the rules, type of rules whether proposed or final, agency names, abstract, publication date, effective date, closing date of comments, page length, comments count, and whether the rule is significant or not. In addition, I included the reference numbers of the three databases: *document number in the Federal Register*, *RIN for Reginfo.gov*, and *Docket IDs and Rule IDs for Regulations.gov*, see the columns E, J, K, and L. Here the most important reference number is the Docket ID, which enables me to identify each set of rules. These numbers are central to ensure that data collected from two or more sources

belongs to the same rule. Finally, after reading the abstracts, I classified them according to the type of policy in the same way I did with congressional hearings, as it appears in last column of Table 4.4.

The next step is to convert each set of rules from multiple lines as in Table 4.4 to one line as in Table 4.5. This determines that each set of rules appears as one node in the rulemaking network. By tracking the same colors between Tables 4.4 and 4.5, you can see how the information for each rule set is converted to one line. Some of the information is straightforwardly collected from Table 4.4 such as docket IDs in column A, agency name in column B, comments count in column F, and the number of rules in each set in column H. The other information collected requires some type of manipulation. For the duration or time span of rule sets which is in column E, I measured the period between the start date in column C or the publication date of first rule in the set, and end date in column E, which is the later of the last rule publication date or the effective date in Table 4.4. Meanwhile, the significance variable in column G of the Table 4.5 indicates that at least one of the rules in the set is significant according to Executive Order 12866. It does not have to be that all rules in the set are significant. Just one is enough. Finally, I included the policy area in column I as a nominal variable. Nonetheless, some sets of rules could be classified in more than one policy area. For example, all the rules but one, in the first set in Table 4.4 colored yellow are classified as related to oil production policy, code (1). However, one rule is classified as other policy, code (6).

In another example, both rules in rows 11 and 12 in Table 4.4 colored by light green regulate two policy areas, production (1) and environment (3), at the same time. To account for overlapping policies, I assigned the most relevant policy to the nominal variable for policy area in column I and then created the dummy variables for each type of policy in columns J to O in Table

4.5. So, if any set of rules is classified in more than one policy, these additional policies appear in the dummy variables. This is apparent in the given examples where the yellow set assigned ones for the dummy variables for production and other policies, and the light green set was assigned ones for the dummy variables for production and environmental policies. In order to merge the cells in Table 4.4 to the ones in Table 4.5, I developed computer code to automate the process. For more information, see Appendix 4.

Table 4.4: An Example of the Data Set of the Collected Rules

				Federal Register Reference #						Reginfo.gov Reference #		Regulations.gov Docket & Rule #			
	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O
1	Title	Type	Agency names	Abstract	Document number	Publication date	Effective Date	Comments close on	page length	RIN	Docket IDs	Rule IDs	Comments count	significant	Policy Areas
2	O+A2:O28	Proposed	DEPARTM	In accorda	2013-02871	02/07/13			2	1076-AF17	BIA-2013-0003	BIA-2013-0003-0001	21	0	6
3	Leasing of	Proposed	Interior D	The Burea	2013-20764	08/28/13		10/28/13	21	1076-AF17	BIA-2013-0003	BIA-2013-0003-0002	21	0	1
4	Leasing of	Proposed	DEPARTM	In August	2013-25848	11/01/13		11/18/13	1	1076-AF17	BIA-2013-0003	BIA-2013-0003-0020	21	0	1
5	Leasing of	Rule	Interior D	The Burea	2015-11314	05/11/15	07/10/15		42	1076-AF17	BIA-2013-0003	BIA-2013-0003-0025	21	0	1
6	Leasing of	Rule	Interior D	The Burea	2016-14127	06/17/16	06/17/16		11	1076-AF17	BIA-2013-0003	BIA-2013-0003-0026	21	0	1
7	Oil Shale	Proposed	Interior D	The Burea	E8-16275	07/23/08		09/22/08	51	Not Assigne	BLM-2008-0004	BLM-2008-0004-0001	695	1	1
8	Oil Shale	Rule	Interior D	The Burea	E8-27025	11/18/08	01/17/09		75	Not Assigne	BLM-2008-0004	BLM-2008-0004-0697	695	1	1
9	Oil Shale	Proposed	Interior D	The Burea	2013-07052	03/27/13		05/28/13	12	1004-AE28	BLM-2013-0001	BLM-2013-0001-0005	53	1	1
10	Oil Shale	Proposed	DEPARTM	The Burea	2013-14028	06/13/13		07/15/13	1	1004-AE28	BLM-2013-0001	BLM-2013-0001-0040	53	1	1
11	Oil and Ga	Proposed	Interior D	On May 11	2013-12154	05/24/13		06/24/13	43	1004-AE26	BLM-2013-0002	BLM-2013-0002-0010	5722	1	3 & 1
12	Oil and Ga	Proposed	DEPARTM	On May 11	2013-13708	06/10/13		08/23/13	2	1004-AE26	BLM-2013-0002	BLM-2013-0002-0011	5722	1	3 & 1
13	Hydraulic	Rule	Interior D	On May 11	2015-06658	03/26/15	06/24/15		96	1004-AE26	BLM-2015-0001	BLM-2015-0001-0001	0	1	1
14	Onshore	Proposed	Interior D	This propo	2015-16737	07/13/15		09/11/15	70	1004-AE15	BLM-2015-0003	BLM-2015-0003-0001	91	0	1
15	Onshore	Rule	DEPARTM	This final	2016-25407	11/17/16	01/17/17		104	1004-AE15	BLM-2015-0003	BLM-2015-0003-0101	91	0	1
16	Leasing of	Rule	Interior D	This final	2016-06513	03/30/16	05/31/16		66	1010-AD06	BOEM-2016-0031	BOEM-2016-0031-0001	10	0	1
17	Leasing of	Proposed	Bureau of	The MMS	E9-12155	05/27/09		09/24/09	24	1010-AD06	BOEM-2016-0031	BOEM-2016-0031-0001	10	0	1
18	Leasing of	Proposed	Interior D	On March	2016-12097	05/24/16		06/23/16	2	1010-AD06	BOEM-2016-0031	BOEM-2016-0031-0011	10	0	1
19	Oil and Ga	Rule	DEPARTM	This final	2016-24586	10/12/16	11/14/16		2	1010-AD06	BOEM-2016-0031	BOEM-2016-0031-0011	10	0	1
20	Leasing of	Rule	DEPARTM	On March	2016-12095	05/31/16	05/31/16		2	1010-AD06	BOEM-2016-0031	BOEM-2016-0031-0011	10	0	1
21	Oil and Ga	Rule	Interior D	This rule a	2016-15607	07/01/16	08/01/16	08/30/16	4	1010-AD95	BOEM-2016-0053	BOEM-2016-0055-0001	0	0	6
22	Oil and Ga	Rule	DEPARTM	This rule a	2017-02983	02/15/17	02/15/17		3	1010-AD95	BOEM-2016-0053	BOEM-2016-0055-0001	0	0	6
23	Oil and Ga	Rule	Interior D	This inter	2010-25256	10/14/10			33	1010-AD68 /	BSEE-2012-0002	BSEE-2012-0002-0001	42	1	3
24	Oil and Ga	Rule	Interior D	BOEMRE p	2010-30990	12/09/10			1	1010-AD68 /	BSEE-2012-0002	BSEE-2012-0002-0038	42	1	3
25	Increased	Rule	Interior D	In the Fed	2010-32173	12/23/10		01/24/11	1	1010-AD68 /	BSEE-2012-0002	BSEE-2012-0002-0039	42	1	3
26	Oil and Ga	Rule	Interior D	This Final	2012-20090	08/22/12			47	1014-AA02	BSEE-2012-0002	BSEE-2012-0002-0046	42	1	3

Table 4.5: An Example of the Data set of the Aggregated Sets of Rules

	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O
1	Docket	Agency	Start date	End date	Duration	Comments count	Significant	Number of Rule	Policy area	Production	Consumption	Environment	International	Economy	Other
2	BIA-2013-0003	BIA	02/07/13	06/17/16	1226.958	21	1	5	1	1	0	0	0	0	1
3	BLM-2008-0004	BLM	07/23/08	01/17/09	179	695	1	2	1	1	0	0	0	0	0
4	BLM-2013-0001	BLM	03/27/13	07/15/13	110.8333	53	1	2	1	1	0	0	0	0	0
5	BLM-2013-0002	BLM	05/24/13	08/23/13	91.83333	5722	1	2	3	1	0	1	0	0	0
6	BLM-2015-0001	BLM	03/26/15	06/24/15	90.83333	0	0	1	1	1	0	0	0	0	0
7	BLM-2015-0003	BLM	07/13/15	01/17/17	554.8333	91	1	2	1	1	0	0	0	0	0
8	BOEM-2016-0031	BOEM	05/27/09	11/14/16	2728.833	10	1	5	1	1	0	0	0	0	0
9	BOEM-2016-0055	BOEM	07/01/16	02/15/17	230.0417	0	1	2	6	0	0	0	0	0	1
10	BSEE-2012-0002	BSEE	10/14/10	08/22/12	679	42	1	4	3	0	0	1	0	0	0
11	BSEE-2012-0003	BSEE	03/29/12	05/30/12	63	0	1	2	1	1	0	0	0	0	1
12	BSEE-2012-0005	BSEE	08/22/13	11/07/16	1173.833	65	1	4	3	1	0	1	0	0	1
13	BSEE-2012-0011	BSEE	04/05/13	06/04/13	60.83333	0	0	1	3	0	0	1	0	0	0
14	BSEE-2013-0007	BSEE	10/01/13	10/01/13	0	0	0	1	6	0	0	0	0	0	1
15	BSEE-2013-0011	BSEE	02/24/15	09/13/16	567.7917	1300	1	3	3	0	0	1	0	0	1
16	BSEE-2014-0002	BSEE	06/15/15	07/15/15	29.83333	19	0	1	3	0	0	1	0	0	0
17	BSEE-2015-0002	BSEE	04/17/15	07/28/16	468.8333	201	1	3	1	1	0	0	0	0	1
18	BSEE-2015-0012	BSEE	12/04/15	01/04/16	30.79167	0	0	1	6	0	0	0	0	0	1
19	BSEE-2016-0004	BSEE	08/12/16	12/16/16	126.8333	1	1	2	1	1	0	0	0	0	0
20	CPSC-2011-0048	CPSC	07/26/11	09/26/11	62.83333	276	0	1	3	0	0	1	0	0	0
21	DOE-2006-0001	DOE	04/24/06	11/08/06	199.0417	3	1	2	2	0	1	0	0	0	0
...	...	...	...	...	...	-	-	-	-	-	-	-	-	-	-

To build the rulemaking network, two types of nodes have to be specified. The first type is the aforementioned sets of rules. The second type is the interest group and other actors who are concerned with the rules being enacted, who can be identified by their comments on the rules. For this reason, I needed to download the comments and other related documents for each set of rules from the API database of *Regulations.gov*. In some cases, interest groups and individuals preferred to upload files rather than commenting directly on the website. I obtained these for the analysis of rules later. Therefore, I designed computer code to produce a data set for all comments and create a separate folder for each set of rules, containing its comments with their attachments and other documents. This allowed the necessary information of each set of rules to be easily located. For more details, Appendix 5 has the computer code for collection of the comments, written in Python. After downloading all comments, I was able to construct the rulemaking network in the form of an edgelist matrix, as shown in Table 4.6. The most important columns in the table are column B for dockets that define the sets of rules and column D for the interest groups and other actors who comment on the rules. Herein, the color in the table reflects each set of rules and its comments. For example, the first set in yellow received one comment whereas the second set of rules in green received seven comments.

In general, the edgelist matrix of comments on rules in Table 4.6 is similar to the edgelist matrix of witnesses in the congressional hearings in Table 4.1. Moreover, the interest groups and other actors that appear before a congressional committee may comment on the rule as well. In fact, the second mode of actors in both matrices, the commenters, are the same type, and any additional actor identified in the rulemaking network is added to Table 4.3 which contains the list of witnesses in congressional hearings. So, the only difference between these two matrixes is in the first mode where it is congressional hearings in the witness network and it is sets of rules in

the rulemaking networks. However, the rulemaking network is an open access network where anyone can comment on rules. There are no restrictions as long as the rule is open for comments. Some rules might be subject to public campaigns. As a result, thousands of comments could be received, which required a huge effort to analyzing such a magnitude of content. Therefore, I distinguished between comments submitted by interest groups, companies, and other institutions, and comments submitted by individuals (also known as the collective form comments). I focus on the interest groups' comments since they have more influence and generally provide more meaningful comments. After removing the individuals' comments, I ended up with 8435 comments submitted by interest groups and other organizations. Meanwhile, the comments submitted by individuals consist of the vast majority of the comments which reflect public opinion more than lobbying effort. My approach for these comments was to take a sample to analyze them, whether they are pro- or anti-regulation. Then I added them to the rule as an attribute for public support.

After cleaning up the edgelist matrix for rulemaking, I ensured that the actors with multiple comments and/or appearing several times in congressional hearings have consistent abbreviations or identifiers. For instance, each time British Petroleum comments on a rule or appears in a hearing it has been assigned (BP) as its abbreviation in order for the computer program to recognize it as the same actor. For this purpose, I developed search code written in Python to search the data sets of the rulemaking and congressional hearing networks simultaneously to find rules and hearings in which an actor has appeared and giving it an exact abbreviation or identifier. For more details, the Appendix 6 provides the search code.

Table 4.6: An Example of the Edgelist Matrix of the Rulemaking Network

	A	B	C	D	E	F
	Date of comments	Docket IDs	Comment IDs	Commenters	Full names of commenters	Ties
1						
2	11/4/2013	BIA-2013-0003	BIA-2013-0003-0003	OIPA	Oklahoma Independent Petroleum Association	1
3	9/23/2008	BLM-2008-0004	BLM-2008-0004-0581	APC	Anadarko Petroleum Corp / Anadarko Energy Ser	1
4	9/23/2008	BLM-2008-0004	BLM-2008-0004-0609	BP	BP America or captil	1
5	9/19/2008	BLM-2008-0004	BLM-2008-0004-0531	AGNC	Associated Governments of Northwest Colorado	1
6	12/3/2008	BLM-2008-0004	BLM-2008-0004-0676	API	American Petroleum Institute	1
7	10/2/2008	BLM-2008-0004	BLM-2008-0004-0625	COGA	Colorado Oil and Gas Association	1
8	9/22/2008	BLM-2008-0004	BLM-2008-0004-0570	OilShale	Oil Shale Exploration Co.	1
9	10/2/2008	BLM-2008-0004	BLM-2008-0004-0626	Rio Blanco,CO	Rio Blanco County, Colo	1
10	5/22/2013	BLM-2013-0001	BLM-2013-0001-0017	AGNC	Associated Governments of Northwest Colorado	1
11	5/16/2013	BLM-2013-0001	BLM-2013-0001-0012	API	American Petroleum Institute	1
12	5/29/2013	BLM-2013-0001	BLM-2013-0001-0025	Rio Blanco,CO	Rio Blanco County, Colo	1
13	8/22/2013	BLM-2013-0002	BLM-2013-0002-5418	WS	The Wilderness Society	1
14	8/26/2013	BLM-2013-0002	BLM-2013-0002-5614	UCS	Union of Concerned Scientists	1
15	8/22/2013	BLM-2013-0002	BLM-2013-0002-5410	USOGA	U.S. Oil and Gas Association	1
16	8/25/2013	BLM-2013-0002	BLM-2013-0002-5563	SUWA	Southern Utah Wilderness Alliance	1
17	8/25/2013	BLM-2013-0002	BLM-2013-0002-5543	Noble	Noble Energy	1
18	8/25/2013	BLM-2013-0002	BLM-2013-0002-5584	APC	Anadarko Petroleum Corp / Anadarko Energy Ser	1
19	8/22/2013	BLM-2013-0002	BLM-2013-0002-5425	ConocoPhillips	ConocoPhillips Alaska, Inc. or ConocoPhillips Co.	1
20	8/25/2013	BLM-2013-0002	BLM-2013-0002-5563	EDC	Environmental Defense Center	1
21	8/25/2013	BLM-2013-0002	BLM-2013-0002-5546	EDF	Environmental Defense Fund	1
22	8/25/2013	BLM-2013-0002	BLM-2013-0002-5537	Chesapeake	Chesapeake	1

4.4 Conclusion

In the end, there are several issues worth mentioning here. First, the description in this section is about the raw data of the policy network on both congressional and administrative sides. It was constructed in several data sets configured along their basic structure so that further data manipulation can be allowed. For example, I can change the node of first mode of the network of congressional hearings from hearings to committees. Or the data sets can be combined together to create a collective network such as combining the rulemaking and congressional hearing networks to observe the changes in structure from one level to another.

Second, the accuracy of the data is a notable concern. As it was explained, the sources of the data keep updating their databases. Since the research design of this study depends on mapping

all congressional hearings and administrative rules related to oil policy, I had to include newly posted hearings and rules each time these sources update their databases, which creates kind of a loop. To deal with this situation and prevent being in a constant loop of data collection, I had to stop at some point even if new data gets posted. However, such action could compromise accuracy and reliability of the data. The main concern is that the newly posted hearings and rules that have not been included in my data might be systematically different from those included. Besides, the period where the delay in posting the hearings and rules occurs is important to determine which years are more accurate than others. For the ProQuest Congressional data, there is delay between the time when hearings occur and time they are reported in its database. So, the older years are more accurate than the recent ones. Meanwhile, Regulations.gov database does not have older rules. It keeps updating them periodically. Consequently, the recent years are more accurate than the older years. As a result, the most reliable data of network is neither in the beginning nor in the end of the period of the study. It is mostly in the middle.

Third, the process of data collection is not fully automatic. It needs human involvement in some stages. It is not simply writing the computer code and running the program. To ensure accuracy and reduce the inconsistency, I had to monitor the process from the beginning to the end. Many tasks were done manually. So, it is best described as a semi-automatic process where the computer code is not the primary element. It is generally an assisting component for the process of data collection. Nevertheless, writing and running the code were not easy tasks. I faced several challenges. For example, *Regulations.gov* has a limit of 1000 requests per hour. Not only did I have to deal with large number of comments (63,000), I needed to send multiple requests for each comment. Generally, interest groups and people prefer to upload files rather than comment on the website. So, I needed to download these files as well, which significantly increase the number of

requests I had to send to the host. In addition, the problem of code errors consumed much time in order to be fixed. Sometimes, the format of JSON files are inconsistent. In other times, the host blocked me if I sent too many requests in a short period of time. So, I had to supervise the process most the time. It is an example of big data. For instance, the size of a folder that contains one rule with its comment is about 1GB. As a result, it took a lot of work, time, and effort. However, the return was very significant in that I would not have been able to finish gathering the network data if I had had to collect it all manually.

Finally, description of the process of the data collection is central to understanding the analysis of the rulemaking network. By exhibiting the sources and formats of the raw data, the structure of the network and the variables attached to it can be more readily comprehended. Importantly, this section has two purposes. The first is to present the technical issues and the challenges that faced the process of data collection. The second is to explain how and why the data sets are assembled in the aforementioned formats, which are in turn readable for network packages in R, the main software utilized in SNA. In other words, I use Python to create the data frames since it is handy in collecting data from the internet, and then I apply R to produce the network analysis. See Appendix 7 for further data preparation in R. That being said, the coding of some variables was described just to illustrate the process, but it does not go beyond that. In further detailed description, the justifications and explanations of coding the variables are presented in the chapters of the study along with their effects. In the other words, this section would be helpful for readers who are interested on achieving deep understanding for the structures of the rulemaking network.

Chapter 5: Mapping the Oil Subsystem and Policy Network (1996-2016)

5.1 Introduction

To achieve a better understanding of the process of rulemaking, it is important to study the policy subsystem as the main political principal that may exert influence over the administration and agencies. The aim of this chapter is to describe and track the dynamics of the oil subsystem and its policy network. Starting with an overview of the oil market and deliberation of the circumstances affecting the oil sector, I identify potential punctuations that may have influenced the oil policy network and its participants. I examine the extent to which these punctuations alter agenda setting within Congress and the issues being discussed in congressional hearings. Next, I analyze the composition of the policy network, developing criteria to distinguish the more permanent participants who form the oil subsystem from those best considered outsiders. I focus on the three corners of the policy subsystem triangle: congressional committees, public administrations and agencies, and interest groups. By exploring congressional hearings and bill referrals, the permanent committees are selected. As for both the interest groups and the public agencies involved in the policy network, I analyze the affiliations of witnesses appearing before the committees by constructing the network of the congressional hearings and measure the degree centralities of its participants.

In this context, the discussion here is not specifically concerned with the content of oil policy as much as with the policy dynamics and the classification of subsystem and network. I seek to describe and explain a process that is largely independent of policy specifics. I therefore provide general categories for types of issues being debated in congressional hearings without

going into the details of bills and laws. However, a considerable portion of this chapter is devoted to tracking and classifying the oil subsystem and policy network from 1996 to 2016. The goal is to offer description of policy, punctuations, and factors that might influence the subsystem and the network, and in turn, the rulemaking process. Despite the absence of conventional statistical inference in standard social network analysis, issues and factors deliberated in this chapter will be utilized as variables for the more advanced network statistical models in coming chapters that study the routines and behaviors of the rulemaking process.

5.2 The Oil Market and Potential Punctuations

To understand oil policy in the United States, it is important to look at the oil market and those circumstances which affected the behavior of the actors concerned with oil policy. Herein the most influential elements of the oil market are the supply, the demand, and prices. However, I focus on oil prices since it is a function of both supply and demand. In other words, prices reflect both. It will be easier for readers to comprehend changes in the oil market by focusing on oil prices rather than discussing the details of supply and demand. In addition, prices can be considered as indicative of punctuations in the oil market and its policy subsystem.

As it appears in Figure 5.1, the nominal oil price¹⁵ in 1996 and the first half of 1997 were in the low twenties. However, prices collapsed in 1998 to reach bottom in the fourth quarter with an average of \$10.85 per barrel. Afterward, the price regained its losses in 2000 and stayed in the high twenties. Following the terrorist attack in 9/11/2001, the price went down to an average of \$16.94/bbl in the fourth quarter of 2001. Then it gradually increased through the 2000s to reach

¹⁵ The nominal price refers to the price at the moment of the transaction without adjusting for inflation (Pindyck and Rubinfeld 2013, 12).

its historic high in the second quarter of 2008 with an average of \$115.85/bbl. The financial crisis in 2009, however, caused prices to suddenly drop to \$40.48 in the first quarter of 2009. In a similar pattern with what happened after 9/11/2001, prices increased again and kept their high levels around \$100 throughout the first half of the 2010s. The prices lost about 30% of its value by the end of 2014 as a result of the price war that OPEC members waged in response to the increase in competition from the fracking industry. Consequently, prices continued dropping in the following years to reach their lowest level in the first quarter of 2016 with an average of \$28.85 per barrel.

Traditionally, a decrease in oil prices has a total positive effect on the overall United States economy since it is the biggest consumer of oil in the world and most of its consumed oil was imported during the period under study. Consequently, any reduction in oil prices means cheaper energy and more gains for the economy. Meanwhile, the negative effects of low oil prices are concentrated on the oil industry since the local production of oil in United States is relatively small compared to its oil consumption. As a result, the larger positive effects overshadow the somewhat smaller negative ones (Andrew Beattie n.d.; Barrell, Delannoy, and Holland 2011; Labonte 2007).

Figure 5.1: Nominal Oil Prices (1996-2018) on a Quarterly Basis

Source: <https://www.eia.gov/outlooks/steo/realprices/>

Nonetheless, the impacts of the price collapse on four occasions, 1998, 2001, 2009, and 2014, are not equal. In particular, the collapse in 2014 generated a different reaction from the other occasions. At first, the relative balance between supply and demand in the United States changed by 2014. For example, in 2009, U.S oil production was 5.36 million barrels per day, which constituted 29.02% of total consumption in the United States. However, in 2014, U.S oil production had risen to 7.53 million barrels per day, constituting 45.7% of total consumption (OPEC Annual Statistical Bulletin 2010/2011 2011; OPEC Annual Statistical Bulletin 2018 2018). Most of the increase in U.S production comes from unconventional oil, or the fracking industry, which is more costly than the production of conventional oil. As a result, the fracking industry was disproportionately affected, which magnified the negative effect of the price collapse to an extent that had not been experienced before (Andrew Beattie n.d.; Frondel, Horvath, and Vance 2018; Plumer 2014).

By the same logic and context as the decrease in oil prices, the increase in oil prices has a overall negative effect, where most of the economic sectors endure high energy costs while only the oil sector has much to gain (Andrew Beattie n.d.; Barrell, Delannoy, and Holland 2011; Labonte 2007). As it appears in Figure 5.1, prices were at highest levels in the year of 2008, 2011, 2012, and 2013. To comprehend the impact of oil prices in these years, the real price of oil should be considered, as it reflects the oil prices after being adjusted for inflation (Pindyck and Rubinfeld 2013, 12). In addition, real prices are a better indicator than nominal prices in evaluating economic impacts. Sometimes nominal prices can be misleading. For example, the \$30 price in 1980 is equal to $\approx$ \$100 in 2019 (CPI Inflation Calculator, U.S. BUREAU OF LABOR STATISTICS n.d.).

A comparison of nominal prices and real prices for 1968-2018 in Figure 5.2 shows that real oil prices in the years 2008, 2011, 2012, and 2013 were approximately the same as the real prices in the 1970s and beginning of the 1980s at the height of the economic crisis in western countries. However, that does not necessarily indicate that oil prices had the same impact as they did in the 1970s and 1980s. Nevertheless, they still exert considerable pressure on the U.S economy. One factor that alleviates the effect of high oil prices is the increase in the local production of oil since gains achieved by the oil industry could relatively compensate some of the losses in other sectors of the economy (Andrew Beattie n.d.; Barrell, Delannoy, and Holland 2011; Labonte 2007).

Furthermore, the oil market may react to the dramatic or precipitous changes in oil prices. Not only does the actual value of prices have an impact on the oil sector, but so too does the rate at which prices change. Overall, the oil market prefers stability. As the prices stay at high levels, or low levels, for a long time, the market adapts to that situation and supply and demand gets balanced. It is normal to have the prices fluctuated up and down in a reasonable range; however,

the focus here is on occasions where prices have drastically increased or decreased relatively quickly. Therefore, these years could be considered as potential punctuations for prices.

Figure 5.2: Comparison between Nominal and Real Prices of Oil (1968-2018) on a Yearly Basis

Source: <https://www.eia.gov/outlooks/steo/realprices/>

As appears in Figure 5.3, the nominal oil price dropped by 34.72% in 1998, and then increased by 43.08% the next year. Also, in 2001 the price of oil dropped by 20.67% in response to the 9/11 terrorist attack, and in 2008 and 2009, the prices were significantly punctuated by a 37.77% increase to a 36.22% decrease respectively. Moreover, in 2015, oil prices dropped a substantial 48.3%. To distinguish between the effects of values and change rates of oil prices, the year 2009 provides a good example. If the nominal price is looked at for that year, it could be seen that oil prices decreased from \$92.57 in 2008 to \$59.04, which is a considerable reduction. Nonetheless, \$59.04 per barrel in itself is not significantly different from price levels in the years before 2008. As a result, analyzing the change rates of oil prices yields two additional years, 1999

and 2009, that could be possible punctuations, which were not captured by observing the values of nominal and real prices alone.

Figure 5.3: Percentage Change Rates of Nominal Oil Prices (1996-2016)

Source: <https://www.eia.gov/outlooks/steo/realprices/>

Another important element that can highlight punctuations and policy dynamics is media coverage as an indicator of the public's attention regarding the oil issues. Since high oil prices negatively impact most economic sectors, the higher the prices, the more public attention is focused on oil policy. By looking at Figure 5.4 which displays the number of journals and other published materials covering oil issues during the period (1996-2016), there are two observations that can be made. First, media coverage follows the price level in general. The coverage was low when the prices were low in the 1990s and the first half of the 2000s, and it increased when prices

rose in 2008 and the first half of the 2010s. Secondly, the media/public attention regarding the collapse of oil prices does not differ significantly from the attention paid to high prices. In other words, the media seems interested in price collapses as much as in price increases. During the years 1998, 2001, 2009, and 2014 when sudden collapses in prices occurred, media coverage remained at levels similar to the years before and after. For more details, see Appendix 8 which includes the code for oil price, tables of quarterly and yearly prices, and graphs.

Figure 5.4: Media Coverage (1996-2016)

Source: <http://search.proquest.com/www.libproxy.wvu.edu/index?accountid=2837>

The Deepwater Horizon oil spill in the Gulf of Mexico in 2010 could be a potential punctuation since it is the most important single focusing event during the period between 1996-2016. On April 20, 2010, the BP sponsored drilling rig operation in the Gulf of Mexico exploded causing a deep-water well to release about 5 million barrels of oil into marine waters, the worst in the history of the oil industry. Finally, after three months of leaking, the well was sealed on September 19, 2010 (*BP leak the world's worst accidental oil spill 2010; Obama, in Gulf, pledges*

to push on stopping leak - USATODAY.com n.d.; On Scene Coordinator Report on Deepwater Horizon Oil Spill 2011; Robertson and Krauss 2010). Such an unprecedented environmental disaster attracted a significant amount of attention from the media. Even though 2010 is not one of the years where oil prices significantly increased or decreased, the level of media attention was similar to those years. It is important therefore to track the extent and effect of this focusing event on the oil subsystem and its policy dynamics in general.

The overall look at the oil sector during the period between 1996-2016 points out two types of punctuations. First are the indicator type of punctuations that manifest in oil prices. The other type of punctuations are focusing events, such as the 2010 Deepwater Horizon oil spill. However, there are reasonable degrees of overlap between the two types of the punctuations. For example, the collapse of the oil prices in 2014 could be considered as an indicator type of punctuations. At the same time, it could be a focusing event since the collapse in prices was the result of the price war between conventional oil producers and the fracking industry. Moreover, the focusing events of the terrorist attack on 9/11/2001 and the financial crisis in 2009 have influenced oil prices, causing significant decreases in prices even though they are not directly related to the oil sector. Herein, it is vital to distinguish between the effects of these focusing events. Not all punctuations generate the same dynamics. For example, the Deepwater Horizon oil spill in 2010 and the collapse of oil prices in 2014 brought more attention to the issues and attracted more outsiders to become involved in the oil subsystem. Meanwhile, the terrorist attack on 9/11/2001 and the 2009 financial crisis took attention away from the oil sector, leaving insiders with more control. Finally, these focusing events should be seen as potential punctuations and the reaction of the oil subsystem should be examined to determine which ones generate the punctuated equilibrium pattern.

5.3 Congressional Committees as the Keystone of Policy Subsystems:

As the literature on public policy indicates, congressional committees are the anchor of the policy subsystem (Worsham 1997). Therefore, identifying which committee(s) are controlling the subsystem is the first step in distinguishing the policy community from outsiders. However, before doing so, looking at congressional attention in general is important in understanding the dynamics of the policy subsystem and network. The two contextual variables which played a pivotal role in shaping the agenda of the Congress are oil prices and the media coverage. Here I counted the number of congressional hearings held by House, Joint, Select, and Senate committees in each year as an indicator for the agenda and the attention of Congress towards oil policy. Then I compared the number of congressional hearings with oil prices and media coverage as presented in Figure 5.5. More details about selection criteria and the coding process of congressional hearings are explained in Chapter 4 section 4.1.

To a great extent, the attention of Congress follows oil prices in an almost perfect manner. The number of hearings was low when the oil prices were low in the 1990s and the first half of the 2000s, and when the prices were high, the number of hearings increased, especially in 2008, 2011, and 2012. However, the one exception to this pattern is the year of 2015 where the number of hearings increased despite the fall in oil prices. Out of all occasions, the collapsed oil prices at the end of 2014 and 2015 seemed to attract the attention of Congress, which could be a response to the devastating impact that the fracking industry produced at that time. This occasion could therefore be classified as a punctuation. On the other hand, media coverage seems to have less effect on congressional attention. The number of congressional hearings appears to be less responsive to pressure coming from the media. Nevertheless, the overall impression produced by

Figure 5.5 shows that media coverage tends to increase over time as well as does congressional attention.

Figure 5.5: Congressional Hearings, Oil Prices, and Media Coverage (1996-2016)

Note: The media coverage number is adjusted to fit the graphs. It was divided by 1000, and then added 60.

The Oil prices is based on Nominal values

Sources:

<http://search.proquest.com.www.libproxy.wvu.edu/index?accountid=2837>

<https://www.eia.gov/outlooks/steo/realprices/>

<http://congressional.proquest.com.www.libproxy.wvu.edu/>

In addition, it seems that congressional attention was affected by the other focusing events discussed above. However, the effect of these punctuating events varies as they have different natures. While the 9/11 attack and financial crisis in 2009 took away congressional attention from oil policy, the Deepwater Horizon oil spill in 2010 brought the attention of Congress to oil policy. This can be observed through the drop in the number of congressional hearings in 2002 after the 9/11 attack, and in 2009, the year of the financial crisis. Meanwhile, hearings significantly increased because of the oil spill in the Gulf of Mexico. Herein, the timing of the terrorist attack on 9/11/2001 and the oil price collapse in 2014 happened at the end of these years, and some of

their effect continued over to the next year. Therefore, overlapping across the years should be considered when the impacts of these punctuations are evaluated. In the meantime, the timing of the Deepwater horizon oil spill in 2010 is more ideal from a measurement perspective. It began and ended in the middle of the year, from April 20 to September 19, 2010. As a result, the different pattern of congressional attention is more obvious in this event.

Figure 5.6: Tone of Congressional Hearings Toward the Oil Industry (1996-2016)

Source: <http://congressional.proquest.com.www.libproxy.wvu.edu/>

As for the tone of the Congressional hearings, I performed a content analysis of the summary published by the Congressional ProQuest database for all hearings held by House, Joint, Select, and Senate committees, and then classified them into three types: whether the hearings are negative toward the oil industry, neutral, or positive toward the oil industry. As appears in Figure 5.6, the hearings were mostly positive toward the oil industry in the 1990s. Specifically, in 2001 the tone was disproportionately positive. Afterwards, the congressional hearings were more negative, particularly the period between 2006-2008 associated with the increase in oil prices. The

most issues discussed in the hearings during these years were the increase in oil prices and dependence on foreign oil.

The tone became more balanced in 2009 as a result of the financial crisis and the significant drop in oil prices. In 2010, the tone dramatically shifted against the oil industry where almost all hearings were negative in response to the Deepwater Horizon oil spill in the Gulf of Mexico. Accordingly, the environment and oil production were the most discussed issues in congressional hearings during that year. However, Congress seems to become more positive towards the oil industry in the following years despite the high level of oil prices. During the period 2011-2016, Congress was mostly concerned with the increase in domestic production from oil shale and conventional oil and gas, which was seen as a way to reduce dependence on foreign oil.

When the congressional hearings are distinguished based on which house conducts them, different patterns emerge. By comparing Figures 5.7 and 5.8, it appears that the timing and composition of the hearings vary between the House of Representatives and the Senate. In the 1990s, the Senate was more active than the House in conducting hearings whereas in the first half of 2000s the case flipped; the vast majority of the hearings were conducted by the House. Moreover, in the period 2014-2016, the House held more hearings than the Senate did.

Figure 5.7: House Hearings by Committees

Figure 5.8: Senate Hearings by Committees

One reason for this difference in pattern might be the shift in the partisan control between chambers, whether one party controls both houses or not. However, providing an explanation for

this pattern is beyond the scope of this study. What is important is to analyze the composition of the congressional hearings and identify the committee(s) that could be the anchor of the oil policy subsystem. In this regard, I measure the engagement of the congressional committees based on the number of hearings each committee holds during each period of the study. A general look at the graphs show that there are three committees that have a permanent and sizable presence throughout the duration of the study; the House Committee of Natural Resources, the House Committee of Energy and Commerce, and the Senate Committee of Energy and Natural Resources. Nevertheless, the other committees occasionally participate in the oil subsystem, especially when public attention is high, as was the case with the oil spill crisis in the Gulf of Mexico in 2010. In contrast, when attention is low, fewer committees are involved. Sometimes, it is difficult to make a clear cut between the permanent committees that could reflect the policy subsystem and other committees that are part of a broader policy network. Some committees may be active at a particular time but not at others. Nonetheless, these committees could exert considerable impact on the policy subsystem and provide a venue shift for the policy changes. Therefore, they should be considered when the policy network is analyzed.

To distinguish between these committees, I measured the hearing average of the committees to see which committees significantly depart from the others. Presenting the summary of congressional hearing distribution, there are 41 committees involved in oil policy with a median of 6 hearings, a mean of 14.46 hearings, and a standard deviation of 23.03. Accordingly, congressional committees could be divided into three tiers. The first tier includes the permanent committees, which are the top 95% in holding hearings. These committees are statistically and significantly different from the means with a one-tailed test. On the House side, it appears that the most permanent committees are the Natural Resources Committee with 103 hearings and the

Energy and Commerce Committee with 71 hearings. Both committees constitute 48.6% of all hearings held by the House during the period 1996-2016. On the Senate side, the committee on Energy and Natural Resources appears to be the most permanent with 91 hearings and 40.81% of all Senate hearings that occur during the same period. Potentially these committees could establish the bulk of the oil subsystem since their activity is significantly different from the other committees. See Appendix 9 for more details about the classification of congressional committees and analysis of congressional hearings.

The second tier of congressional committees are the ones who exhibit considerable interest in oil policy but have not made the threshold of the top 95%. Even though they are not statistically different from the rest of the committees, they may exercise considerable influence over the policy subsystem and network. To identify them, I selected the committees that scored in the fourth quartile of the hearing distribution, excluding the ones that made it to the top 95%. In other words, they are between 75% and 95%. The analysis shows that eight committees could be identified within the second tier. Five of them are in the House; Transportation and Infrastructure, Oversight and Government Reform, Small Business, Science and Technology, and the Foreign Affairs committee. They held 130 hearings, constituting 36.31% of all hearings in the House. Meanwhile, two committees are in the Senate - Environment and Public Works committee, and Commerce, Science, and Transportation committee - holding 47 hearings with 21.08% of all oil policy hearings in the Senate. In addition, there is one select committee which is the Committee on Energy Independence and Global Warming, holding 14 hearings.

The last tier includes periphery committees, which are ones that did not make it into either the first or the second tiers. There are 30 committees which displayed minimum interest in oil policy and occasional involvement. Generally, they are presumed to be ineffective or at least have

marginal impact on the subsystem and the network. Usually, their involvement comes as a response to an increase in public attention. Yet the case against or for excluding these committees lies in the Heclo argument for issue networks that is discussed in the second chapter (Heclo 1978, 102). Therefore, it would be vital to empirically examine the extent to which these committees are influential, if at all.

The other indicator for committee dominance is the number of bill referrals. This indicator is usually coupled with congressional hearings showing the extent to which the committees dominate agenda setting and policy adoption. Figures 5.9 and 5.10 present the number of bills referred to the House of Representative and Senate by committees from 1997 to 2016. It appears that House and Senate committees continuously receive bill referrals even in years where they are inactive in conducting hearings at all, such as the period 1996-1998 for the House and the period 2000-2004 for the Senate. However, the main observation that can be drawn from the graphs is that bill referral is considerably influenced by the election cycle, where the number of bills significantly increases after an election and then drops in election years. Because of this fluctuation, the effect of punctuated events becomes less obvious, and it is hard to visually observe a specific pattern as well as distinguish the House from the Senate. Thus, looking to see to what extent congressional committees depart from their average is a more appropriate analysis. Following the method applied to the congressional hearings, there were 1587 bills¹⁶ referred to 37 committees during the period (1997-2016) with a median of 28 bill referrals, mean of 40.64, and Standard deviation of 44.74. For more information the classification of bill referrals, see Appendix 10.

¹⁶ The original number of bill referrals is 978. Many of them were referred to more than one committee. To make a fair comparison between committees, I counted each committee as a separate bill referral. So if, for example, a bill is referred to three committees, I count them as three bill referrals. Accordingly, the total number of bill referrals becomes 1587 with 965 bills referred to the House and 539 bills referred to the Senate.

Figure 5.9: House Bill Referrals by Committees

Figure 5.10: Senate Bill Referrals by Committees

By adopting the same criteria utilized in the congressional hearing classification, I found that the first tier of bill referrals contains three committees: the House Committee on Natural Resources with 172 bill referrals and 17.82% of bills referred to the House; the House Committee

on Appropriations with 119 bill referrals and 12.33% of bills referred to the House; and the Senate Committee on Energy and Natural Resources with 166 bill referrals and 30.8% of bills referred to the Senate. Meanwhile, the second tier consists of seven committees. On the House side, five committees appear to receive 41.14% of total house bill referrals: the Energy and Commerce committee with 108 bill referrals; Transportation and Infrastructure with 94 bill referrals; Ways and Means with 82 bill referrals; Foreign Affairs with 64 bill referrals; and the Science and Technology committee with 49 bill referrals. On the Senate side, there are two committees receiving 29.13% of total Senate bill referrals: the Appropriations committee with 104 bill referrals; and Commerce, Science, and Transportation with 53 bill referrals. Finally, the third tier is comprised of 27 peripheral committees.

There are some notable differences between the analyses of congressional hearings and bill referrals. First, the Appropriations committees in the House and Senate ranked high in the bill referral analysis whereas they did not even make it out to the third tier regarding the conduct of congressional hearings. Given that both committees have an almost constant yearly presence with little fluctuation, it is likely they receive routine bill referrals for fiscal reasons, but are not active in conducting hearings. So, it is debatable whether to consider them among the permanent committees in the oil policy network. They should be excluded from the first and second tiers. Secondly, the House committee on Energy and Commerce did not make it into the first tier regarding bill referrals; nonetheless, it came very close, just seven referrals short of joining the first tier. Given its jurisdiction and the large number of hearings it held, Energy and Commerce committee should still be considered among the first tier. Thirdly, several committees that appeared in the second tier regarding the congressional hearings could not make the cut regarding bill referrals. The missing committees are the House committees on Transportation and

Infrastructure, Oversight and Government Reform, and Small Business, the Senate committee on Environment and Public Works, and Select committee on Energy Independence and Global Warming. In the meantime, the House committee on Ways and Means was the only addition that appeared in the bill referral second tier, but not in the congressional hearings second tier.

Several issues were discussed during the period of study from the content of congressional hearings. From analyzing the summaries of the hearings published on the Congressional ProQuest database, the most frequent issues presented and argued are the increase in oil prices, dependence on foreign oil, environmental concerns such as the Keystone XL oil pipeline and the Deepwater Horizon oil spill in the Gulf of Mexico, and oil shale and oil fracking production. Additionally, the congressional committees less frequently discussed other issues depending on the events or concerns raised at the time. However, the manner in which these issues are framed differ over time and among actors. To create a constant measurement, I classified the congressional hearings according to the issues being presented into six categories or policy areas. First is policy concerned with oil production, including issues such as on/offshore drilling, offshore leasing, production for reserves, and supply in general. Second is oil prices and consumption policy which comprises issues such as the demand on oil and gasoline, reducing dependence on foreign oil, reserves in general, and the balance between demand and supply. Third is environment and safety policy that examines issues such as oil pipeline safety and oil spills. Fourth is international policy which discussed international aspects of the oil industry such as the global oil market, OPEC, and international cooperation and sanctions. Fifth is economic policy that is concerned with the impact of the oil market and other aspects of the oil industry on the growth of the economy. The final category is a general or other policy category which contains the issues that cannot be classified

within any of the previous categories. For more details about the data description collection process, see Chapter 4 section 4.1 and Appendixes 2 and 9 for data description.

Figure 5.11: House Hearings by Policy Area

Figure 5.12: Senate Hearings by Policy Area

To some degree, these policy areas may overlap, and some of the congressional hearings might be classified into more than one category. The treatment of such cases is discussed in more

detail in Chapter 4, section 4.2. By looking at the distribution of policy area in both chambers as displayed in Figures 5.11 and 5.12, the production, consumption, and environmental policies are the most deliberated policies during the period of the study, whereas the economic and international policies are debated the least. On the House side, production policy seizes the most attention with 39.02% of House hearings, especially from 2010 to 2016. It is followed by environmental policy with 21.71% and consumption policy with 16.54%, while economic and international policies have the least with 9.3% and 6.7% successively. Meanwhile, on the Senate side, consumption policy comes in first with 32.5% of the Senate hearings, followed by production and environmental policies with 24.58% and 22.5% respectively. Likewise, economic and international policies receive the least attention from the Senate with 12.5% and 4.58% respectively. Yet, one anomaly appears in the year 2010, where few environmental hearings were held at the time of the Deepwater Horizon oil spill in the Gulf of Mexico, the most devastating environmental disaster in the history of oil industry. One explanation for this inconsistency could be a result of the overlap in the issue between policies. Since the disaster was caused by a defect in the production operation in deep water that led to an environmental catastrophe, many related hearings might be summarized as production issues in the Congressional ProQuest database, and then coded as production policy. Also, it could be a result of the relative power of the committees in which the committee that oversees production policy grabs control of the hearing process, as it is probably, in general, the more influential and dominant committee.

5.4 The Oil Policy Network and the Classification of Its Actors' Affiliations

In this section, I analyze the network of congressional hearings and classify the affiliations of witnesses appearing before the congressional committees. The importance of such analysis is

that it displays the interest groups and public officials who might be a part of the policy community or dominant coalition, if any. Since access to congressional hearings is limited, preventing interest groups from participating whenever they want, interest groups have to develop or already have an existing relationship with the congressional committees that hold the hearings. Therefore, the affiliations of the witnesses and their frequent appearances could be an important indicator that can be used to identify and classify the participants in the oil subsystem and its policy networks.

Generally, the oil policy network is constructed as a bipartite, or two-mode, network that has two types of nodes, the actors and events. Accordingly, the first set of nodes, the actors, is comprised of the affiliations of the witnesses appearing in congressional hearings. Herein, I am not interested in tracking the witnesses themselves, but I am looking at their affiliations or the types of interest groups they belong to. For example, if two different witnesses represent the same company, such as British Petroleum (BP), in two different congressional hearings, they are counted as one actor appearing in two hearings. The logic of this coding is that these witnesses do not represent themselves. In fact, they represent the company or the organization that sent them. It is more accurate therefore to cite the organization itself, not its representatives. The second mode, the events, are the congressional hearings. From analyzing the summaries of hearings published in the Congressional ProQuest database during 1996-2016, I identified all hearings concerned with oil policy. I examined the individuals appearing in these hearings, representing the witnesses with the same affiliation as one actor appeared in multiple hearings. In viewing the relations within the network, the edges are drawn based on appearances in the hearings. Since the edges, or connections, in bipartite networks are only allowed between the two modes, no edge is permitted within the same mode. So, there are no links between actors themselves or between the hearings.

Relational ties, or edges, only appear between actors and hearings. For more details, see the data description section 4.1 in Chapter 4.

The actors in the network are classified according to the type of interests they reflect or the activities they perform. For oil policy, the two most important groups that we should expect to be involved in the oil subsystem and its policy network are the oil industry and environmentalists. Usually those two parties are located on opposite sides of the policy continuum. If one of them is a challenger of the status quo, the other probably is a defender of the status quo, depending on the issue(s) being deliberated at the time. However, there are other actors and groups who show considerable interest in oil policy and play an important role in the oil policymaking process. Interestingly, certain public officials have almost a permanent presence in congressional hearings. This category includes the federal agencies and administrations, members of Congress, and state and local governments. In addition, certain experts and scientists are another category. Universities, research centers, and think tanks are vital members of the policy community and the other groups usually depend on them in advocating policy positions.

The involved parties, however, cannot be limited to these categories. There is a set of other industries that might be affected by oil policy and exhibit substantial involvement in the oil network but are not necessarily allied with the oil industry or environmentalists. Their interests may overlap with one group at one time and the other at a different time. These groups that substantially and regularly participate in the network are added as separate categories. Accordingly, two additional groups were included, the biofuel industry and the energy industry in general. The biofuel industry is distinct from the oil industry. It is concerned with producing ethanol from organic materials and mixing it with refined fossil fuels. It is therefore located somewhere between the oil industry and agriculture. Meanwhile, the energy category contains the

industries that produce other sources of energy such as coal, hydroelectric energy, nuclear, and renewable energy, as well as utility companies. While this category is widespread, nevertheless, these industries are often affected by what happens in the oil sector and have displayed extensive involvement. The final category is comprised of the other groups which include the actors and organizations who do not show regular nor sizeable engagement in the policy network, or who could not be classified in any of the aforementioned categories. As a result, seven categories are identified - the oil industry, environment, officials, scientists, biofuel industry, energy, and other category.

To visualize the oil policy network, I measure the degree of centrality of the actors in the first mode which counts the number of connections for a given node. Accordingly, the actors who are linked extensively with others are the most prominent in the network (Knoke and Yang 2008, 63). I used their scores to plot the size of the actors' nodes in the network. The ones with larger nodes are the most important and permanent. To clarify the network, I did not take the degree centrality of the second mode which is the congressional hearings since it was already covered in the previous section and I do not think the results are different from what is already discussed. Additionally, I removed the isolates, or trivial actors, who only appeared once before the congressional committees. Those actors crowded the network and made it difficult to notice any pattern. By removing the trivial actors, the network size significantly dropped from 2326 nodes to 1108 nodes.

Figure 5.13: Network of Witness Affiliations Appearing before Congressional Hearings (1996-2016)

In spite of the noisy image produced by visualizing this large network, we can see some important features of the network. As seen in Figure 5.13, the actors with larger node sizes either belong to the oil industry or are public officials, followed by environmentalists and scientists to a lesser degree. To visualize the animated network, the Appendix 14 includes a video for the dynamic network of the congressional hearings on oil policy (1996-2016). In order to have a better picture, I classified the actors based on their degree centralities into three tiers, applying the same method utilized to classify the congressional committees. After removing the trivial actors, the total number of nodes in the first mode is 531 actors, and the statistical summary of their degree

centralities is 3.00 for the median, 5.33 for mean, and 8.22 for the standard deviation. The result of the compositions of each tier is displayed in Figure 5.14. I chose to provide this data visualization, as the corresponding colors and size of the chart segments corresponds to the use of node size and color in the network diagrams.

Figure 5.14: The Classification and Composition of the Actors in the Oil Network

The Second Tier

The Third Tier

The first tier shows that public officials and the oil industry are the most permanent actors with 50% and 40.9% respectively. For more details, Appendix 1 provides the names of the actors and their types of interest in each tier. There are 11 public official actors within this tier. All of them belong to federal agencies and administrations led by the U.S. Department of Energy and Energy Information Administration. There are no state and local governments nor congressmen. Meanwhile, there are 9 actors belonging to the oil industry, led by the American Petroleum Institute (API). Seven actors out of the nine oil actors are coalitions or associations that represent many oil and gas companies. On the other hand, the environmental groups and scientist institutions were presented by one organization each, the Natural Resources Defense Council and the Center for American Progress, consisting of less than 10% of total degree centrality in the first tier.

With regards to the size of the tiers, the number of actors increased significantly moving down from the first to the last tier with 22 actors for the first, 132 for the second, and 377 for the third tier. Nonetheless, the composition of the first tier differs considerably from the others. Meanwhile, the second and third tiers are very similar as can be seen in Figure 5.14. In general, public officials remain the most permanent actors with nearly 30% of second and third tiers. However, some state and local actors appear in the second tier and considerably more are present in the third tier, while federal agencies and administrations become less frequent moving down the tiers. As for the oil industry, it maintained a sizable presence in the second and third tiers as well, with 19.7% and 18.8% respectively. Also, the scientists amplified their participation to a reasonable degree in lower tiers with 18.9% for the second tier and 11.4% for the third. Meanwhile, the environmental groups show uneven appearances as their activities and are more present in the second tier, but not the others. Finally, the energy, biofuel, and other categories emerge and appear to increase their participation from the second to the third tier. Herein, the biofuel industry seems

to have a marginal appearance, which might be better to be combined with the other category. However, the decision to create a separate category for the biofuel industry was made based on its size in the policy network before removing the trivial actors. Once these actors were removed, few biofuel actors remained in the network. For more details about the construction and visualization of congressional hearing network, see Chapter 4 section 4.1 and Appendix 11.

In summation, the analysis of the witnesses' affiliation yields two important results. First, it displays to what extent the actors are permanent in the network based on their degree centrality, distinguishing between the top tier that probably forms the oil subsystem from the other participants in the policy network. Secondly, it exhibits the compositions of interest groups and public administration officials that are assumed to constitute the subsystem compared to the rest of the policy network. In general, by looking at the size of the interest group nodes, it can be observed that the oil subsystem, or the first tier, is dominated largely by the oil industry especially in comparison to its presumed rival, the environmental groups. Even when considering the lower tiers, the oil industry is disproportionately more involved in the policy network than the environmentalists. On the side of the agencies, there are nine public administrations and agencies that participated in the subsystem, which indicates the interest and widespread engagement of federal agencies in the oil subsystem.

5.5 Conclusion

A general look at the oil subsystem and policy network shows that it was influenced by several events and factors. Most importantly, oil prices seem to have a significant impact in that congressional attention almost mirrors the movement of prices. In addition, some punctuation events have shaped the public's attention and congressional agenda setting. Yet, their effects vary

in different aspects. The Deepwater Horizon oil spill in the Gulf of Mexico generated considerable attention from the Congress where the tone of congressional hearings was overwhelmingly negative toward the oil industry. Meanwhile, the collapse of oil prices in the end of 2014 appears to be the only occasion to generate congressional attention and generate a positive tone out of all the other times where prices collapsed. Congress at that time was more supportive of the oil industry. On the other hand, both the 9/11 terrorist attack and the financial crisis in 2009 took away the attention of the Congress from the oil sector even though both crises only indirectly affected the oil industry. When studying the rulemaking process, the impacts of these punctuation events should be observed, displaying if/how public administrations and agencies react to such events. As for the matters being debated, the Congress was most concerned with issues regarding oil production, consumption, and environment. The issues related to the economy and international received less attention. The discussion in this chapter did not go into the details of the bills and laws nor describe how the issues were framed. Rather, it focused on classifying the issues to more comparable categories that can be utilized in different models and over time.

Regarding lobbying of Congress, the analysis of congressional hearings can demonstrate the power structure within the policy network. Since interest groups have limited access to the congressional committees, which requires developing relationships with these committees, studying that relationship is aided by displaying the members of the oil subsystem and differentiating them from other participants in the policy network. By investigating the actors present in congressional hearings, I have been able to point out and visualize the relationships between the three corners of the policy subsystem - congressional committees, public administrations and agencies, and interest groups. The analysis sets the criteria to distinguish the most permanent actors that establish the oil subsystem as well as the composition of those

participants. Accordingly, there are three congressional committees that are the most permanent, holding a larger number of hearings and receiving a considerable number of bill referrals. On the agency side of the triangle, there are nine federal departments and agencies that are regularly present in congressional oil policy hearings. Meanwhile, the interest groups were predominantly represented by eleven organizations and companies that frequently appear before the committees. Nine of them belong to the oil industry.

Here the analysis is pointing out to the most permanent actors in the oil policy subsystem, which does not necessarily indicate whether they are dominant. These actors appear statistically significantly more than others. However, the information produced by this analysis cannot determine the type of policy subsystem, whether it is dominant, transitory, or competitive coalitions (Worsham 1997, 18). In fact, the interest groups angle of the subsystem is the only one that is dominated by one type of interest, the oil industry, whereas the other two angles involve multiple committees and agencies, so, it is unlikely to be the dominant type of policy subsystem. Also, oil policymaking could be influenced by the other actors who are part of the policy network but not part of the subsystem. Those actors were classified to additional levels, or tiers. As a result, the analysis reveals three levels of participants in the policy network: the permanent actors who are likely to form the policy subsystem; interested actors who regularly participate in the network, but they are not part of the subsystem; and periphery actors who marginally participate in the oil network.

Nonetheless, displaying the extent of permanence in the policy network based solely on hearing participation does not convey the type of relationship among them, whether it is conflict or cooperation, nor can it exhibit which actors are in the majority coalition and which ones in the minority coalition. Also, the classification of the actors based on their kinds of interests does not

reflect the actual behavior of these actors. For example, it is possible to find an interest group that is coded as an environmentalist while it allies itself and lobbies with the oil industry. Some environmental organizations may be created by oil companies or are willing to provide consultations to the industry. To figure out the actual behavior, a deeper analysis is required. Since the focus in this study is on the rulemaking process, I am not concerned in this chapter with such analysis. Nonetheless, a more thorough analysis is performed in the upcoming chapters that study that part of the process of rulemaking. The analysis in this chapter has been intended to be descriptive in nature, presenting potential punctuations in the dynamics of oil policy, and the composition of the oil subsystem and its policy network. This provides readers with a better understanding of the policy dynamics and agenda setting at the level of political principals. As will be seen, many of the issues discussed in this chapter are used as variables in the statistical models when the rulemaking process is analyzed in the sixth and seventh chapters.

Chapter 6: The Dynamics of the Rulemaking Process and Lobbying Behavior

6.1 Introduction

The aim of this chapter is to describe and analyze the administrative agenda setting and rulemaking process, providing explanation for the actions and reactions of interest groups. To start, a general description of administrative activities is given, including the types of policies being regulated, the dominant agencies, and patterns in proposed and final rules. Then, the behavior of interest groups is analyzed in depth, exploring different scenarios of possible reactions to the involvement of political principals. Furthermore, the routines of the rulemaking process are studied taking into account the effect of abrupt stimuli, pointing out patterns that the political principals and agencies exhibit in response to these punctuations. Next, the network of rulemaking is constructed and visualized, displaying the extent of the activities and the types of interests within the network. Finally, a temporal exponential random graph model (TERGM) is applied in order to infer relationships within this policy network. By positing several hypotheses, the theory and arguments that explain the routines and dynamics of the rulemaking network can be empirically examined.

6.2 Administrative Agenda Setting in Light of the Punctuations

As the rulemaking process is governed by the Administrative Procedure Act of 1946 (APA), all public administrations and agencies are required to announce their intentions in advance before adopting any regulations. This public disclosure requirement is designed to prevent private arrangements that may work against the interests of elected officials. Accordingly, the process starts by posting proposed rules that are open for the public and interested parties to comment on,

and then the rules can be finalized after the public comment period is closed (McCubbins, Noll, and Weingast 1987, 258–69). To a great degree, proposed rules reflect the administrative agenda setting for the departments and agencies. Meanwhile, the process of finalizing the proposed rules may be subject to different considerations. Once the proposed rule is published, interest groups and concerned parties start lobbying the relevant agencies. In addition, political principals such as Congress, the President, and the courts, may become involved which can alter the timing and content of the final rules. In other words, administrative agencies may be put under pressure during the process of rule finalization that differs from the stage of proposing new rules. Therefore, the analysis should distinguish between the timing and pattern of proposed and final rules.

In regard to oil policy, Figure 6.1 shows the total number of proposed and final rules during the period (1996-2018)¹⁷. Generally, the Obama administration appears to have been more active in regulating the oil sector than the Bush and Clinton administrations. On average, the Obama administration enacted 52.13 rules each year, whereas the Bush and Clinton administrations enacted 21.13 and 3.6 rules respectively. Also, the number of significant rules enacted by the Obama administration was much higher than the Bush and Clinton administrations, as appears in Figure 6.2. On average, the Obama administration issued 17.13 significant rules while Bush and Clinton administrations enacted 6.63 and 1.2 significant rules respectively. Not only was the Obama administration active in regulating the oil sector, but it also made more profound changes in oil policy. However, there are reasons to doubt the accuracy of the electronic databases that document the rules, especially in the 1990s, and especially the *Federal Register* and *Regulations.gov*. Some rules may not have been included in these databases and the number of rules may also be a

¹⁷ For propose of producing better visualization, the graphs included two years outside time frame of the study, 2017 and 2018. So, the readers can see the different between Obama and next administrations.

little higher. The data collection, coding process, and accuracy of the database is discussed with more detail in Chapter 4 section 4.2. Yet, I believe the difference in the number of rules between the Obama and Bush administrations is higher than the error in the databases. Furthermore, the increase in rulemaking activity during the Obama administration coincided with high oil prices while the rulemaking activity decreased when the prices were lower during the Clinton and Bush administrations. Hence, the impact of oil prices on the rulemaking process should also not be ruled out.

Figure 6.1: The Proposed and Final Rules

Figure 6.2: The Significant Rules

As for the agencies and departments, the United States Environmental Protection Agency (EPA) and United States Coast Guard (USCG) are the most active agencies in rulemaking in all areas of oil policy, as demonstrated in Figure 6.3. They represent the largest contributors to rulemaking activities for the top 10 agencies. Out of all rules enacted during the period of the study, EPA, and USCG decreed 52.88% and 14.38% respectively. The rest of the agencies are within single digits. However, six out of the top 10 agencies actively participate in the oil subsystem and its policy network, appearing in the first tier. Meanwhile, three agencies appear in the second tier and one agency in the periphery tier¹⁸. In the meantime, the content and rulemaking activities were mostly concentrated on the environmental and production aspects of the oil sector with 47.6% and 32.77% respectively, while consumption, the economy, and international aspects

¹⁸ The agencies that belong to first tier are United States Environmental Protection Agency (EPA); United States Coast Guard (USCG); National Oceanic and Atmospheric Administration (NOAA); Bureau of Land Management (BLM); Bureau of Ocean Energy Management, Regulation, and Enforcement (BOEMRE), Previously known as Minerals Management Service (MMS); and Pipeline and Hazardous Materials Safety Administration (PHMSA). Meanwhile, second tier includes Bureau of Ocean Energy Management (BOEM); Bureau of Safety and Environmental Enforcement (BSEE); and Fish and Wildlife Service (FWS). Finally, the periphery tier includes Office of Natural Resources Revenue (ONRR).

were in single digits. By looking at Figure 6.4, there was constant interest in regulating environmental and production policies during the period of the study.

Figure 6.3: The Rules by Agencies

The abbreviations and names of the agencies are United States Environmental Protection Agency (EPA); United States Coast Guard (USCG); National Oceanic and Atmospheric Administration (NOAA); Bureau of Land Management (BLM); Bureau of Ocean Energy Management, Regulation, and Enforcement (BOEMRE), Previously known as Minerals Management Service (MMS); Pipeline and Hazardous Materials Safety Administration (PHMSA); Bureau of Ocean Energy Management (BOEM); Bureau of Safety and Environmental Enforcement (BSEE); Fish and Wildlife Service (FWS); and Office of Natural Resources Revenue (ONRR).

Figure 6.4: The Rules by Policy

When distinguishing between proposed and final rules, a lag period between the date of issuing the rules and the date of finalizing them may be expected. Accordingly, the curve of the final rules should follow the proposed rules with the lag time. Nevertheless, from looking at Figure 6.5, there seems to be more than just a lag period. Both the timing and patterns of proposed and final rules vary. The final rules seem to generate a pattern of “midnight rulemaking” in which the current administration tries to finalize a large number of rules in its last year before the new administration takes office (Carey 2012). In examining the last years of each administration, the number of final rules in 2000, 2008, and 2016 significantly increased compared to previous years. On the other hand, the proposed rules do not follow the same pattern. In fact, they are much lower in the last years of each administration, which indicates that these administrations are more focused on adopting and implementing the current policy than advancing new policy in the last year.

Furthermore, timing and patterns of proposed and final rules vary in response to the focusing events. As for those punctuations that divert public attention away from oil policy, the numbers of proposed and final rules decreased during the financial crisis in 2009, which was expected, given that a new administration just arrived. Meanwhile, the behavior of the administration after the terrorist attack in 9/11/2001 seems to go in the other directions where the number of rules slightly increased. Considering the issue of databases’ accuracy, I won’t draw any conclusions out of this focusing event, especially as the increase in the number of rules is relatively small. Nonetheless, the focusing event of the Deepwater Horizon oil spill in 2010 generates inverse impacts on proposed and final rules. The number of final rules significantly rose from 21 in 2009 to 40 in 2010 while the proposed rules barely changed. However, in the following year, the

proposed and final rules went in reverse directions. As the proposed rules increased from 13 in 2010 to 26 in 2011, the final rules decreased from 40 to 18 for the same years.

Figure 6.5: The Proposed and Final Rules (1996-2018)

This inversion between the initiation of proposed and final rules might be explained by considering two tendencies. First is the urge to take an action in response to the focusing event. Second, there is the uncertainty inherent variability generated by changes in the attention and possibility of political principals' involvement. On the one hand, the agencies may be reluctant to initiate new rules when there is the possibility for major policy change happening due to an increase in the activities of political principals, especially at congressional committees. Not knowing whether the changes will pass or get blocked, it is counterproductive to spend time and resources in advancing new rules that may be overturned by a new law when/if it passes. On the other hand, under the pressure of the media and public opinion, the agencies may feel the need to

take immediate and direct actions to address the consequences of the focusing event. In response to such circumstances, the administration seems to finalize current proposed rules and/or enact final rules that have an immediate effect in accordance with existing laws and policies. In other words, the approach of the administration in dealing with a punctuating event is to engage less in advancing new rules and to continue implementing the current policy.

However, the case may change post-punctuation. Importantly, situational uncertainty is alleviated. It becomes apparent whether new laws and policies have been adopted or the window for policy changes has closed. In addition, public pressure tends to be less intense after the crisis has passed. Thus, the administration enjoys more room to advance new policies, which explains the increase in the number of proposed rules in 2011, in the post Deepwater Horizon oil spill crisis period. So, the timing of proposed and final rules appears to vary between the punctuation and post-punctuation times, creating an alternating pattern between the proposed and final rules due to the changes in both uncertainty and public pressure.

The Deepwater Horizon oil spill as a focusing event type of punctuations seems to be a good case for this alternating pattern between proposed and final rules. It happened in the middle of 2010 with clear dates for the start and end of the crisis. The behavior of the administration could be clearly observed across both the punctuation and post-punctuation periods. Meanwhile, the impact of oil prices as the indicator type of punctuations may differ from the impact of focusing events. For one reason, it is difficult to point to specific dates for the start and end of the punctuation. Oil prices may gradually/rapidly increase (or decrease), which makes it more of a continuous event. The other reason is that the effect of oil prices might overlap with other punctuations since it continues for a longer period of time. Still the alternating pattern between the proposed and final rules may be observed to a lesser degree. In 2008, when the prices reached their

historical high, the number of final rules significantly increased while the proposed rules remained relatively lower. Nevertheless, the increase in oil prices in 2008 overlapped with the effects of midnight rulemaking. Herein, the administration's actions could be a result of either of the variables. For the period from 2011 to the middle of 2014 where the prices remained high, it was difficult to observe this alternating pattern because of the continuous pressure that stayed for a longer time, which could smooth out the effects of uncertainty and public attention, and overcome the lag time between the proposed and final rules.

In the meantime, the collapse of oil prices at the end of 2014 seems to partially generate this alternating pattern on the side of the proposed rules. It appears that the number of proposed rules decreased in 2014 and then increased again in 2015. Nonetheless, the final rules do not show this pattern in those years. The timing of the oil price collapse in 2014 is problematic. It started at the end of 2014 and continued throughout 2015. So, the alternating pattern may be captured if the time period is adjusted to specify the months or quarters where the punctuation and post-punctuation are appropriately pointed. In order to apply the Temporal Exponential Random Graph Models (TERGM) to test these ideas, constant time periods shall be created. However, an indicator for the punctuation is developed to capture the continuous effect of oil prices and overcome the issue of overlapping. This indicator is explained later with more details in section 6.5 of this chapter and Appendices 8 and 12.

In summation, the proposed and final rules reflect administrative agenda setting and the adaptation of executive regulations, which may be affected by the public and media pressure, and the degree of un/certainty at the level of political principals. However, tracking the number of rules by itself may not be sufficient to come up with concrete conclusions. It is possible that the agencies may enact few rules that regulate many issues related to the oil sector. In contrast, the agencies

could propose many rules that are marginal for the oil industry. What matters is the content of the rules and the public reaction. Therefore, the analysis of the rulemaking process should go beyond just tracking the rules to examine the dynamics and timing of the comments submitted by interest groups and concerned parties, which may exhibit the extent and effect of public pressure. In addition, the study of rulemaking should consider the impact of the activities at the political-principal level. Accordingly, more empirical examination is needed, which the following sections provide.

6.3 Interest Group Lobbying and the Shift from Principals to Agents.

As the APA requires, the rules should be open for notices and comments, which provides a venue for interest groups and concerned parties to lobby the agencies. Nevertheless, there are several implications that make the agencies consider these comments and notices with great attention. On one account, the public comments provide the agencies with valuable information about the related parties, and their benefits and costs. Participation in the administrative procedures can be considered a measurement for political debate and interested concern regarding controversial course of actions. On the other hand, interest groups may provide evidence that debates the rules, taking advantage of the evidentiary standard requirement that indicates that the agencies' decisions have to be built upon strong evidence that can stand before courts. Moreover, the interest groups could trigger the alarm for the political principal to become involved. The public disclosure requirement identifies whether the rules serve the intended constituents. By allowing the relevant parties to know about the intention of agencies before constituencies are mobilized or policies are changed, agencies are disadvantaged in a manner that enables the political principals

and other relevant parties to intervene early in the administrative policy-making process (McCubbins, Noll, and Weingast 1987, 244–69; McCubbins and Schwartz 1984, 166).

With regards to the lobbying behavior of interest groups toward the agencies and the rulemaking dynamics, the literature does not provide sufficient explanation. Do the activities at the level of rulemaking mirror the activities at the level of the policy subsystem? How do punctuating events affect the rulemaking process? In general, the distinct literatures of policy subsystems, Punctuated Equilibrium Theory (PET), Advocacy Coalition Framework (ACF), and Multiple Streams Theory all describe the agenda setting and policy dynamics at the level of political principals. This could explain the lobbying behavior of interest groups and other actors involved in the policy subsystem and network (Baumgartner et al. 2009; Baumgartner and Jones 2009; Baumgartner, Jones, and True 2007; Kingdon 2011; Sabatier and Jenkins-Smith 1999; Sabatier and Weible 2007). Yet, the literature does not clarify such behavior when it comes to policy implementation and adoption of executive regulations. Few studies have analyzed the rulemaking process and the accompanying lobbying dynamics toward administrations and agencies.

Despite the lack of such comprehensive studies, the literature on political control offers insights into lobbying behavior regarding rulemaking¹⁹. Generally, when a political coalition succeeds in enacting laws and entrusts an existing agency or creates a new one to implement them, the main concern is to guarantee that the deal continues, and that favorite constituents are enfranchised after that coalition is dissolved. Thus, institutional structure is therefore created, and sanctions are put in place to ensure that administrative decisions and rules are consistent with the

¹⁹ For more explanation, the literature of political control and rulemaking was discussed in more detail in the second chapter of this dissertation.

agendas and goals of the political coalition without the need for the principals to be directly involved and actively guide the agencies. To ensure that administrative outputs are not random and preclude secret arrangements, the APA places some requirements such as the public disclosure requirements, evidentiary standard requirements, and placing the burden of proof on the administrations and agencies. In other words, it stacks the deck in the agencies' process of decision making, or what is known as the "deck-stacking" argument (McCubbins, Noll, and Weingast 1987, 255).

Nonetheless, the APA provides room for flexibility. According to McCubbins, Noll, and Weingast, administrations can perform an autopilot function which allows them to react to the changes in political interests and the surrounding environment. As the preferences of political principals and their favorite constituents may alter over time, administrations may respond to new demands and interests without the need to enact new laws (1987, 269–71). In this context, Brehm and Gates provided evidence that agencies may respond directly to their clients' complaints and correct their behavior without involvement from Congress or other principals (1999). Furthermore, Balla examined the political control measures facilitated by the APA and found that the process of comments and notices does not serve as a tool for political control - in contrast to what the deck-stacking argument suggests. Despite the expectations, the program he studied did not serve the legislators' favored constituents (Balla 1998, 669–70), suggesting that the deck-stacking measures did not hold after the establishing coalition was dissolved. The alternative conjecture is that it probably worked in an autopilot manner.

Herein, the political control literature suggests two conflicting patterns. By one account, the lobbying entities in the rulemaking process do not matter because the deck is stacked, and agencies are compelled to finalize the rules in the way that laws are intended. Consequently, there

is no incentive to lobbying the agencies since the final outcomes are predetermined. Therefore, the process of commenting on the rules should not bear significant importance, and interest groups are not motivated to spend time, effort, and resources lobbying the agencies. On the other account, the autopilot function seems, at least theoretically, to work in the opposite direction to the deck-stacking assumption. As the interests and preferences of legislators change in favor of different constituents, they tolerate deviation from the original deal that established the program, which contradicts the deck-staking argument. If the original deal could not survive after the establishing coalition was disbanded due to high administrative flexibility or the autopilot function, then there is no deck that is stacked in administrative procedures. It always depends on the dominant interests and preferences at the time of making the decision regardless of what the original deal should serve. Therefore, interest groups have an incentive to lobby the agencies since there is room to achieve some gains.

To illustrate what the lobbying behavior would be under each account, Figures 6.6 and 6.7 describe the logical outcomes of reactions of interest groups toward rulemaking. For the sake of simplicity, let's assume that there are two types of interest groups. One group is comprised of the status quo defenders while the other group consists of the challengers of the status quo (or majority and minority coalitions). Also, the only factor that matters here is the decision of the interest groups whether to lobby the agencies or not. Meanwhile, all other variables remain consistent. Under the first account where the deck is stacked, the end result is already determined, and the agencies won't change their rules. Thus, from the interest groups' viewpoint, it does not matter whether to lobby or not, nothing will change. It is counterproductive to spend time and effort, knowing it cannot achieve any gains in return. The battle is already concluded at the political principals' level. Therefore, both parties, the defenders and challengers, are most likely to decide not to lobby the

agencies, as it appears in the green box in Figure 6.6. On the other hand, under the second account, the autopilot, where the agencies have a great deal of flexibility and are responsive to the lobbying effort, interest groups have an incentive to lobby the agencies. Since they may achieve some gains, it is worth it to spend time and effort. The final outcome depends on the reaction of the opposite party. If, for example, the defenders choose not to lobby and the challengers choose to lobby, the defenders are quite likely to lose. The other way around is true as well. If both parties choose to lobby, they will cancel each other out and no changes will occur. The best-case scenario therefore is to engage in lobbying, whether to achieve gains or no change in the rule, depending on the opposite party reaction. Meanwhile, if a party chooses not to lobby, the outcome is either no change in final rules or the opposite party achieves gains, as it appears in the green box in Figure 6.7. In sum, under the deck-stacking account, the most likely scenario is that the interest groups do not engage in lobbying, while under autopilot account, they probably do engage in lobbying the agencies. They are completely opposite outcomes. However, there is one circumstance when unbalanced lobbying may occur under the autopilot account, where one party does not engage in lobbying but the other does. That is if that party is severely disorganized and/or lacks the necessary resources.

Figure 6.6: Lobbying Behavior Under Deck-Stacking Scenario

		Challengers	
		Lobbying	Not Lobbying
Defenders	Lobbying	No changes in final rules	No changes in final rules
	Not Lobbying	No changes in final rules	No changes in final rules

Figure 6.7: Lobbying Behavior Under Autopilot Scenario

		Challengers	
		Lobbying	Not Lobbying
Defenders	Lobbying	No changes in final rules	Defenders achieve gains
	Not Lobbying	Challengers achieve gains	No changes in final rules

It is not likely either just one account or the other. Both scenarios are extreme theoretical cases. There are merits for each argument so that they should be neither completely accepted nor rejected. For example, despite Balla's finding that deck-stacking did not work in the health program that he studied, deck-stacking measures could work in other programs. Besides, administrative flexibility could intentionally be given by the principals to deal with complex issues, avoid the blame, or other reasons. Also, having administrative flexibility or an autopilot function is not necessarily granting absolute discretion. The political principals can still exert considerable influence. In some cases, administrative procedures are effective in disciplining the agencies (Balla 1998; McCubbins, Noll, and Weingast 1987; McCubbins and Schwartz 1984). Therefore, it could be assumed that administrative agencies enjoy some flexibility under some degree of restriction. Instead of being contradictory, both accounts could be considered as extreme ends of a spectrum. Accordingly, the degree and intensity of lobbying effort depends on the location of rules on that spectrum, as in which end is closer to the rules. Given the number of rules enacted every year, one should expect to observe a reasonable amount of variation in lobbying activities.

Nonetheless, the literature of political control does not deal with changes in rulemaking over time nor display the consequences of punctuations on that process. To have better insight into lobbying behavior toward agencies, it is important to consider the parallel activities at the level of political principals, especially the policy subsystem. As PET, ACF, Multiple Stream Theory, and the Policy Network Approach (PNA) all articulate, at the time of a punctuation, public and media attention increase, leading to the involvement of more actors who previously were not engaged in the policy subsystem and network. As a result, the balance within the policy subsystem and network may be altered and more policy venues become available, opening a window for policy

changes. However, this window will close after some time and the policy subsystem will likely return to the previous state of equilibrium or partial equilibrium (Adam and Kriesi 2007; Baumgartner et al. 2009; Baumgartner and Jones 2009; Baumgartner, Jones, and True 2007; Blanco, Lowndes, and Pratchett 2011; Kingdon 2011; Sabatier and Jenkins-Smith 1999; Sabatier and Weible 2007). At the same time, administrative agencies are pressured by media and public pressure to take action, on one hand, and by increasing uncertainty raised by the involvement of political principals, on the other. In response, the agencies may produce fewer proposed rules and more final rules, as was discussed above.

While undergoing actions by both levels of principals and agents, interest groups are expected to prioritize lobbying the political principals over the agencies. When the window for making a major policy change is opened, interest groups are expected to seize the moment and devote more time and resources to lobbying efforts directed at political principals in order to get desirable laws and policies. In the meantime, less effort and fewer resources are expected to be devoted to lobbying the agencies. It may not be productive to use valuable resources to change the content of rules that may simply be overturned by new law(s). However, if a law or reform is passed, interest groups and political coalitions are expected to shift their lobbying effort from principals to agents. As the administrations and agencies enjoy flexibility with some degree of restriction, according to deck-stacking and autopilot arguments, the winning and losing coalitions have an incentive to lobby the agencies. For the winning coalition, it is vital to ensure that agencies comply with the new reform and produce positive outputs after the punctuation has passed, whereas the losing coalition tries to gain some of what it lost at the level of political principals. I call this shift in lobbying effort *lagged movement*, which represents changes in behavior and

resources of actors within the network, as they redirect their lobbying efforts and resources from the political principals to the agencies in post-punctuation time.

Also, these lagged movements are expected to happen even when the reform is blocked because of the autopilot function. Since agencies could change their beneficiaries when the political principals change their interests and preferences, the principals may tolerate deviation from the original deal that issued the law or reform if the legislators' preferences and interests changed in favor of other interests groups (McCubbins, Noll, and Weingast 1987, 259–69). Then the rulemaking outputs will depend to some degree on the dominant interests and preferences at the time of the decision regardless of whom the original deal is meant to serve. In this case, the challengers and defenders of status quo have an incentive to lobby the agencies as well. For example, the challengers may attempt through the rulemaking process to achieve some of their goals that they failed to pass through Congress. In contrast, the status quo defenders seek to ensure that the current policy be continuously implemented. In conclusion, whether the reform happens or not, this lagged movement will occur either way.

Herein, with focusing event types of punctuations, such as the oil spill in 2010, this lagged movement or shift in lobbying from targeting political principals to targeting the agencies is expected to be more apparent since focusing events generate the patterns of punctuated equilibrium. So, the shift in the activities between the time of a punctuation and its post-punctuation period could be simply observed in the activity by visualization, as well as by other means. However, with the indicator type of punctuation, like oil prices, the lagged movement may be less apparent because of the continuous effect of such indicators. The pressure resulting from high oil prices could continue for longer time than the focusing events do. Thus, interest groups

might balance their lobbying effort between the principals and agents after a while. Thus, more advance analysis is required to capture such a shift in the interest groups' behavior.

6.4 Oil Policy and the Rulemaking Network.

Regarding oil policy, the lobbying behavior of interest groups can be manifested in the notices and comments submitted in open rules. Accordingly, the rulemaking network may be constructed. Similar to the congressional hearing network, the rulemaking network is a bipartite network where the first mode consists of the actors and second mode is comprised of the rules. As with the congressional hearing network, the actors are classified into seven categories: public officials, the oil industry, environmentalists, scientists, energy, biofuel, along with the others category. Many of those actors who comment on the rules appear before the congressional committees at one point in time or another, which offers an opportunity to compare the congressional hearing network with the rulemaking network which allows tracking of the parallel activities of those actors at both levels of the principals and the agents.

As for the second mode, the rules are gathered in sets according to the Code of Federal Regulations (CFR), which codifies the published rules into subjects or issues (Code of Federal Regulations n.d.). When a rule is published in Regulations.gov²⁰, it is given CFR citation(s) and assigned a docket number which includes other rules that regulate the CFR citation(s), if any. In some cases, a specific CFR subject has been regulated several times and over different administrations. Therefore, docket numbers are used to identify the sets of rules that may stretch

²⁰ Regulations.gov is the official government website created to facilitate processing of the electronic submission of notices and comments for the public. Also, more information about the rulemaking process can be found in the Federal Register website (www.federalregister.gov) and the website (www.reginfo.gov) administrated by the Office of Management and Budget (OMB) and the General Services Administration (GSA).

for years. The advantage of utilizing this CFR sets of rules as the nodes in the second mode is that these nodes are assumed to continue to exist during the entire period of the study, even if they are not active in some years. This is more suitable for Temporal Exponential Random Graph Models (TERGM) as both modes, the actors and the rule sets, remain extant from one period to another, and the dimensions in all the time-series networks are consistent (Leifeld, Cranmer, and Desmarais 2018a, 15–26).

The edges in the rulemaking network are constructed based on comments on the rules submitted, which links the actors in the first mode to the rule sets in the second mode. No edges or ties are allowed within the same mode. Furthermore, to reduce the size of the network and alleviate the computational burden, trivial actors were removed. They were identified as any actor that submitted only one comment during the entire period of the study. All other actors have at least two edges. Accordingly, the size of the rulemaking network is significantly reduced to less than a half, from 3751 nodes to 1581 nodes in both modes. As for the time frame of the rulemaking network, the information on comments in the years before 2001 was not completely available, and if parts of the earlier data were available, they were probably not reliable. Therefore, the time frame starts in 2001 and ends in 2016 with a caveat that some rules may be missed in the beginning of the period. The issue of data accuracy is discussed with more details in Chapter 4 section 4.2. In addition, the degree centralities of actors are measured to display who are the most active in lobbying the agencies and what types of interest they belong to. The results are plotted in Figure 6.8 which presents the aggregated rulemaking network during the period 2001-2016 and Figure 6.9 which presents the rulemaking network in each year during the same period. For the purpose of visualization, the degree centralities of the second mode, the rule sets, are not included in the graphs, giving them the same size. Moreover, the isolated nodes in Figure 6.9 are removed to

exhibit only active actors. However, they are still included in the TERGM estimates. Further information about the data collection, coding process, data manipulation, visualization, and software programing is explained in more detail in Chapter 4 section 4.2, and Appendix 12.

Figure 6.8: The Aggregated Rulemaking Network of Oil Policy (2001-2016)

The sizes of the nodes reflect to what extent they are central to the network. As it appears from the graphs, the oil industry and environmental groups are the most active actors in lobbying the agencies. Meanwhile, other interests are somewhat less engaged in the rulemaking network. However, the environmental groups were not particularly active in the first half of the 2000s as Figure 6.9 shows. Given the issue of data accuracy in these years, probably little conclusion should be drawn, but it is still important to observe such behavior. Interestingly, the environmental groups

seem relatively able to match the lobbying effort of the oil industry unlike the case in the congressional hearing network where they were disadvantaged in the first tier of actors, see Figures 5.13 and 5.14 in Chapter 5. Because of the rulemaking is an open access process, any group can submit comments and engage in lobbying the agencies so far as it has time, organization, and resources. In contrast, an appearance before a congressional committee is not an open access process. The interest groups have to develop, or already have, an existing relationship to engage in lobbying the committees. Therefore, the process of classifying the actors into tiers and distinguishing the insiders from the outsiders offers importance in understanding the congressional network more than it does with rulemaking network. The degree centrality scores demonstrate the extent of involvement in rulemaking, but not necessarily indicating whether the actors are a part of the subsystem or not. To visualize the animated network, the Appendix 15 includes a video for the dynamic network of rulemaking on oil policy (2001-2016).

Figure 6.9: The Rulemaking Networks of Oil Policy on a Yearly Basis (2001-2016)

Additionally, some actors exhibit different behaviors based on their nature. For example, the vast majority of comments submitted by public officials came either from members of Congress or state and local actors. Out of the 10,084 comments received during the period 2001-2016, there were only 68 comments submitted by federal agencies, which indicates that the comment process does not reveal the lines of communications among the federal agencies themselves. In other words, the comments are good at revealing the communications and lobbying effort between the agencies and the actors outside the administration, but not interagency communication. Also, scientists were significantly less engaged in the rulemaking network than they were in the congressional hearing network. There were only 186 out of the 10,084 comments received by actors classified as scientists in the entire period of the study. It appears that scientists are more passive actors in which they mostly respond to invitations to appear before Congress to debate the policy; nevertheless, they do not show much lobbying behavior, especially regarding the rulemaking process.

To visualize the parallel lobbying efforts of interest groups at both levels of principals and agents, a comparison between the sizes of the congressional hearing network and the rulemaking network during the period 2001-2016 is presented in Figure 6.10. It includes only the active nodes that have at least one edge. The isolated nodes are removed for the purpose of visualization. The network sizes are used here to exhibit the extent of the activities and attention in both networks. To make an appropriate comparison, a normalizing equation is applied to the data, transforming their scores to range between 1 to 100; see Appendix 12.

Generally, when the activities in Congress are high, the rulemaking networks tend to be less active. For example, when the oil prices became increasingly high from 2005 to 2008, the

congressional hearing networks were very active, whereas the activities regarding rulemaking networks were lower. However, in 2009, the situation reversed. Once attention was driven away from oil policy due to the financial crisis, the size of congressional hearing networks dropped considerably while the size of the rulemaking network significantly increased, indicating a shift in lobbying efforts from principals to agents. Also, this pattern is repeated in 2010 during and after the oil spill disaster in the Gulf of Mexico. At the time of the punctuation, the congressional hearing network was substantially more active; meanwhile, activity in the rulemaking network was low, as the interest groups prioritized lobbying Congress over agencies. In the post-punctuation period, the rulemaking network was activated again. Nevertheless, the activities in the congressional hearing network remained high due to another punctuation, which was the drastic increase in oil prices in 2011. The effects of oil prices as an indicator type of punctuation stayed for a longer time than the oil spill, which may have made the interest groups balance their lobbying efforts between the Congress and the administration. Also, it may have overlapped with other events. Accordingly, the shift in lobbying efforts from the principals to the agents, this lagged movement, might be difficult to observe by visualization alone. Therefore, models for statistical inference should be applied to assess the arguments presented in this chapter.

Figure 6.10: The Size of the Congressional Hearing and Rulemaking Networks (2001-2016)

6.5 Temporal Exponential Random Graph Models

To examine the impact of a punctuation on the rulemaking network and its dynamics, I apply a time series version of exponential random graph models (TERGM) developed by Leifeld, Cranmer, and Desmarais (2018a, 2018b), as an extension to the exponential random graph models (ERGM) developed by Handcock et al. (2018) and Hunter et al. (2008b). As an indicator for lobbying the agencies, the comments submitted by interest groups construct the edges in the rulemaking network, which are coded in a binary manner. If an interest group submitted a comment, it is coded 1. Otherwise, it is 0. Here, the TERGM is interpreted in the same fashion as logistic regression where the dependent variable, the comments, is measured by the probability of the comments' existence. If the independent variables produce positive/negative coefficients, it means that the chance of interest groups submitting a comment increases/decrease. Also, it may

be interpreted as influencing the probability of observing the whole network and its distinctive structures.

In general, TERGM and other ERGMs have two types of statistics, attributes and structures. Analogous with logistic regression, the attributes are considered as usual covariates utilized in the logistic models. These attributes are coded in the network either as node or dyad level covariates. Since the rulemaking network is a bipartite network, nodal attributes are divided into two sets of variables. Some variables are related to the first mode, the actors, while the other are related to the rule sets as the second mode. Meanwhile, the dyad level covariates are attached to the edges or the ties between the actors and the rule sets. In addition, TERGMs provide a way to model attributes related to the whole network by assigning the same value to all edges in the network. This way of coding is especially useful over time where the values of the attribute changes from one time period to another. Therefore, the network in each period has different values. On the other hand, the structural type of network statistics can capture interdependence among the observations, which is the main departure from baseline regressions that assume the observations are independent on each other. Configurations such as “two stars” and “geometrically weighted degree” can estimate the effect of the connections between actors and events in the network, correcting for bias in the model that may result from such interdependence.

To empirically analyze the theory and arguments presented in this chapter, seven hypotheses are offered, illustrating the relationship between the explanatory variables and lobbying behavior as manifested in the rulemaking network. Starting with the interest groups’ decision to lobby or not to lobby the agencies, the two scenarios presented in Figures 6.6 and 6.7 indicate that the challengers to, and defenders of, the status quo would make the same decision regardless of whether the deck-staking arguments or autopilot arguments is true. Among the seven

categories of interest groups, the oil industry and environmentalists are the most involved in the rulemaking process for oil policy and are usually at odds with each other. Therefore, they can be considered the challengers and defenders of the status quo, depending on their positions toward the rules being published. Accordingly, the following hypotheses are offered:

Hypothesis 6-1: *The oil industry and environmental groups, as the challengers and defenders of status quo, make similar decisions, whether to lobby or not to lobby the agencies in rulemaking.*

Hypothesis 6-2: *Based on the autopilot argument, the oil industry and environmental groups are most likely to engage in lobbying efforts if the agencies enjoy a high degree of discretion in the rulemaking.*

Hypothesis 6-3: *Based on the deck-stacking argument, the oil industry and environmental groups are not likely to engage in lobbying efforts if the agencies have limited discretion in the rulemaking.*

The oil industry and the environmentalists are coded as categorical variables and attached to the nodes in first mode, the actors. Meanwhile, the other five categories become the base or the reference group for the comparison. Therefore, the directions of the vertex attribute coefficients estimated indicate whether Hypothesis 6-2 or 6-3 is not to be rejected. If the coefficients of both interest groups are positive, Hypothesis 6-2 is not rejected while Hypothesis 6-3 is rejected. If the coefficients are negative, then it is the other way around. However, the direction of the coefficients is not important as much as the consistency between the signs of coefficients. The oil industry and environmentalists are most likely to make the same decision about whether to lobby or not lobby

according to the scenarios in Figures 6.6 and 6.7. So, both coefficients should have the same sign, either both positive or negative. Otherwise, Hypotheses **6-1**, **6-2**, and **6-3** are rejected.

The next hypothesis addresses the shift from lobbying the political principals to lobbying the agencies, or the lagged movement. As the main political principals, the congressional hearing network is analyzed, displaying the most active actors in lobbying Congress and whether they shift their activities toward the rulemaking network. An association between the lobbying efforts of the actors in both levels of the networks is expected if the interest groups are concerned about policy implementation and want to ensure the agencies carry out the program after the coalition that established the law is disbanded. These interest groups should then appear active in the rulemaking network as well. Even so, the interest groups that failed to pass a new law or reform in Congress still have an incentive to engage in the rulemaking process so that they may gain some of what they could not achieve through lobbying Congress. Therefore, the actors who are increasingly active in the congressional hearing network are expected to be increasingly active in the rulemaking networks as well. Otherwise, the assumption of the lobbying shift or the lagged movement does not hold. Accordingly, the following hypothesis is stated:

Hypothesis 6-4: *Actors who increasingly lobby Congress are most likely to lobby the agencies in the rulemaking process more than the actors who do not lobby Congress.*

Lobbying activities toward congressional committees are measured by taking the square root of degree centrality of the actors in congressional hearing networks, then attaching these transformed degrees to the rulemaking networks as node attributes for the first mode, the actors. Thus, the actors with higher degree centralities in the congressional hearing networks are highly likely to submit comments on the rule and, in turn, increase the chance of observing the edges in the rulemaking network comparing to those who have low or no degree centrality in the

congressional network. In addition, if this relation turns out to be positive and significant, it supports the argument in Hypothesis **6-2** that the agencies enjoy a degree of flexibility according to the autopilot scenario. The shift in lobbying from political principals to agencies would not happen unless the interest groups believed the agencies have the necessary discretion to change the rule in their favor. However, this hypothesis does not address the timing and intensity of lobbying shifts. It examines whether a shift or lagged movement happens or not. To account for the timing and intensity of the lobbying effort, variables such as congressional attention, punctuations, and media coverage should be considered, which are addressed in the following hypotheses.

In this context, congressional attention is one of the variables that influences the timing and intensity of the lobbying effort regarding the rulemaking process. As activities increase at the congressional level, interest groups may prioritize the Congress over the administration since a limited window for passing a reform might be open. Therefore, they are expected to direct their time, effort, and resources toward lobbying the congressional committees. By the same logic, when congressional attention decreases, the interest groups are expected to direct more time and resources toward lobbying the agencies since there is low chance of passing a reform through Congress. Hence, they try to get what they want through the rulemaking process. It is an inverse relationship. Accordingly, the following hypothesis is offered:

Hypothesis 6-5: *When congressional attention increases, interest groups are less likely to devote time and resources to lobbying the agencies and engage in the rulemaking process.*

Congressional attention is measured in the total number of hearings regarding oil policy held in each year. Then it is attached as a network attribute. Here, all edges in the network for a particular year are given a value equivalent to the number of hearings for that year. Consequently,

we can track the effect of the change in congressional attention over time. The expectation is to have a negative correlation between the number of congressional hearings and the probability of observing edges in the rulemaking network.

Furthermore, the oil price punctuations are another variable effecting the rulemaking dynamics in a similar way. In general, there is a range where oil prices may increase or decrease without harming the economy and creating panic. Otherwise, prices could have negative impacts. Therefore, the focus is on the instances where oil prices dramatically increase or decrease. In fact, this variable is linked to congressional attention. As discussed in the previous chapter, when oil prices increase, congressional attention seems to increase as well, creating a situation of uncertainty that reforms or new laws might pass. Thus, the agencies become more reluctant to advance new policies and proposed rules. Also, interest groups are most likely to direct their time and resources toward lobbying Congress. So, activities involved in the rulemaking process decrease. Accordingly, the following hypothesis is provided:

Hypothesis 6-6: *When oil prices dramatically increase or decrease creating punctuated effects, activities in the rulemaking process are most likely to decrease.*

In order to create an indicator for the punctuations in oil prices, the degree to which the prices went up or down beyond the normal level should be measured. Therefore, this indicator is determined by counting the number of times prices went beyond the 90% confidence interval of the price distribution. It is expected that prices would have punctuated effects if located in either the lower or higher 5% of the overall distribution²¹. This indicator is built on a quarterly basis. By considering a two-tailed test, the analysis would produce a score from 0 to 4, which reflects the

²¹ Also, a range of 95% was applied with 2.5% in both sides of oil prices distribution. It produced less variation and did not perform well in TERGM.

number of quarters where the prices fall outside the 90% confidence interval in each year. Then this two-tailed test is applied on each of the nominal price, the real price, and change rates since these measurements present different aspects of oil price effects. Next, the scores of the three measurements are summed up yielding aggregating scores of the punctuated prices. These scores are attached as network attributes in the same manner as the congressional hearing attributes. For more details, see Appendix 8. According to the argument discussed above, when the punctuation happens, most of the attention goes to the Congress while the agencies receive less attention. Therefore, the expectation is that the oil price punctuations have a negative correlation with the probability of observing lobbying activity as indicated by the edges in the rulemaking network.

Moreover, this punctuated prices indicator partially captures the impact of other focusing events, specifically the financial crisis in 2009, the oil spill in 2010, and the collapse of oil prices in 2015. These events affected the oil market and oil prices changed dramatically during these years. Still, these events have their unique characteristics that should not mix with the impact of the prices. The main difference is that these focusing events have a shorter time span whereas the punctuated oil prices tend to remain for a longer time. Therefore, it is harder to observe the shift in lobbying or the lagged movement with such continuous effect, especially by visualization. Here, TERGM should produce a conclusive result that either supports or rejects the argument of this study.

The final variable that explains the dynamics of the rulemaking process is public and media attention. Based on the argument presented in this chapter, the public and media attention should have a positive effect on the lobbying effort toward the rulemaking process. As public attention increases due to the punctuations, the agencies are put under pressure and more actors tend to be involved in the rulemaking process conditioned on the activities at the congressional level.

Therefore, the chance of observing the network ties increases. Here public attention is gauged in terms of media coverage by counting the number of articles published regarding oil issues in each year divided by a thousand, and then attaching them as network attributes. Accordingly, the following hypothesis is conjectured:

Hypothesis 6-7: *An increase in public and media attention are most likely to increase activities in the rulemaking process.*

In addition to these explanatory variables, there are set of control terms that are included in the TERG model to control for alternative explanations and the effects of other variables. First is the square root of the degree centralities of actors in the first mode of the network. It controls for the effects of inactive or highly active actors in the network. It may be expected that actors with higher degree centralities increase the chance of observing an edge. A second control variable is the policy area being regulated by the rules. It is a nominal/categorical variable attached to the network as a node attribute. Two policies were included in the TERGM, production policy and environmental policy whereas the other policy areas (consumption, the economy, international, and others) were left as the reference group. A third variable is whether it is a significant rule. This is a dummy variable attached to the second mode of the network, the rule sets. It reflects whether the rule is significant and therefore it is subject to OMB review. This variable essentially counts for the effect of the president. When the OMB gets involved, interest groups are expected to lobby the agencies less than usual. It follows the same logic as the case with Congress. When the political principals get involved, the agencies receive less attention.

A fourth control factor is whether there are lagged observations (t-1). This is a memory term reflecting the lagged network. The "stability" option is applied which takes into account the existence or non-existence of the edges in (t-1). It may indicate that some subjects are being

regulated repeatedly for a long time. It is expected to be a positive correlation. If an actor is interested in a specific issue, it probably will submit a comment if that issue is being reviewed again. Also, if it is not interested, it probably will not submit a comment. As a result, the past behavior may indicate future actions.

Finally, two network structures are added to the model, the “two stars” term for the presence of the second mode and as well as “geometrically weighted degree” for second mode. They are included to capture interdependence within the network. These two terms may be considered as similar to autocorrelation in regression. Mainly, they are included in the model to control for some effect that would otherwise bias the results. These structural terms do not bear theoretical importance relevant to arguments discussed in this chapter. Yet they are necessary from a methodological point of view. For more information about the coding and models, see Appendix 12.

Table 6.1: The Two-Mode TERGM

<i>The Variables</i>	<i>Type of Statistics</i>	<i>Coefficients</i>	<i>confidence interval</i>
<i>Edges</i>	Structure term	-28.34	[-28.46; -27.33] *
<i>Oil Industry</i>	1st-mode attribute	0.22	[-0.34; 0.59]
<i>Environmentalists</i>	1st-mode attribute	0.13	[-0.24; 0.46]
<i>Lobbying Congress</i>	1st-mode attribute	0.80	[0.57; 1.20] *
<i>Congressional Attention</i>	Edge attribute	-0.11	[-0.90; 2.34]
<i>Actor Centralities</i>	1st-mode attribute	0.98	[0.80; 1.17] *
<i>Oil Price Punctuation</i>	Edge attribute	-6.07	[-13.36; -2.93] *
<i>Media Coverage</i>	Edge attribute	2.23	[0.83; 2.78] *
<i>Production Policy</i>	2nd-mode attribute	0.42	[-0.89; 0.70]
<i>Environment Policy</i>	2nd-mode attribute	0.29	[-0.52; 0.79]
<i>Significant Rules</i>	2nd-mode attribute	-0.53	[-1.37; -0.16] *
<i>t-1</i>	Structure term	0.58	[0.39; 0.88] *
<i>2-STAR OF THE RULE</i>	2nd-mode structure term	-0.02	[-0.04; 0.00]
<i>GEOMETRICALLY WEIGHTED DEGREE OF RULES</i>	2nd-mode structure term	-2.80	[-3.29; -2.07] *
<i>Num. obs.</i>		2488260	

* 0 outside the confidence interval

The results of the TERGM are presented in Table 6.1. The first term, *Edges*, is equivalent to the constant in logistic regression. For *Oil Industry* and *Environmentalists* as the challengers and defenders of status quo, the coefficients of both groups are positive but not significant. Since their coefficients are in the same direction, Hypothesis **6-1** could not be rejected. Both groups have made similar decisions, which is to lobby the agencies since the coefficients are positive, indicating that agencies enjoy at least some degree of discretion. Accordingly, Hypothesis **6-3** is rejected.

Having positive signs suggest that the deck-stacking argument does not hold, and the rulemaking process probably behaves in an autopilot manner. However, Hypothesis 6-2 cannot be accepted either because the coefficients are not significant. So, being members of the oil industry or environmentalists does not significantly affect the probability of observing a tie in the network. Also, it could be interpreted as the lobbying behavior of both groups does not differ from that of other actors nor from each other. So, the other groups engage in lobbying the agencies like oil industry and environmentalists. Therefore, they do not differ significantly from each other, which explain the inconclusive results. In addition, it could mean that because there is wide range of rules, agencies may enjoy discretion in some rules while not in others, which may contribute to inconclusive results as well. However, since the coefficients are positive, the situation seems to lean toward the autopilot argument that agencies have at least some degree of discretion that motivates interest groups to lobby.

As for lobbying the Congress, the model shows a significant and positive coefficient, indicating that the interest groups that increasingly lobby Congress are most likely to submit comments on the rulemaking process. In other word, interest groups shift their lobbying effort from the congressional committees to the agencies. Therefore, Hypothesis 6-4 is not rejected. It provides evidence for the concept of the lagged movements that actors who lobby congressional committees, whether challengers or defenders of the status quo, or majority and minority coalitions, are motivated to lobby the administration. This is to ensure that the agencies carry out the policy that the political principals adopted or else to gain some of what they failed to achieve at the principal level. Also, this finding reinforces the argument for the autopilot. The lobbying shift or lagged movement would not occur unless the interest groups believe that the agencies

possess reasonable degree of discretion. Otherwise, there is no incentive to lobby the agencies. Thus, Hypothesis **6-2** cannot be rejected as well.

For the variables that influence the routines and timing of the rulemaking process, congressional attention appears to have a negative effect on the probability of observing a tie within the network, but it is not statistically significant. Despite the coefficient being in the expected direction, Hypothesis **6-5** is rejected since the results are not conclusive. Meanwhile, oil price punctuations have a significant and negative effect, as we expected. The result supports the assumption that when punctuations happen, most of the attention goes to the Congress while the agencies receive less attention. Therefore, Hypothesis **6-6** is not rejected. On the other hand, media coverage has a positive and statistically significant effect on the probability of observing the tie in the network. As public attention increase, the agencies are put under pressure and more actors tend to become involved in rulemaking process. Thus, Hypothesis **6-7** is not rejected. Although the effect of congressional attention is not statistically significant, the impacts of oil price punctuations and media coverage reinforce the perspective that the routines of the rulemaking process and lobbying dynamics are affected by two opposite tendencies, the public and media pressure, and the degree of un/certainty at the level of political principals.

Additionally, the control variables show some interesting results. As for the degree centralities of actors, the model produced a positive and statistically significant coefficient, indicating that the actors with higher degree centralities increase their chance of observing the edge. In the meantime, the type of policy being regulated seems to have no effect on the probability of observing a tie in the network since the coefficients of oil production and environment policies are not significant. In contrast, rules considered significant generate a negative and statistically significant impact. Accordingly, the OMB review reflects the involvement of the President as a

political principal to which interest groups can direct their lobbying effort. Although this study did not specifically analyze the role of the president in rulemaking, the finding here supports the overall argument about the relations between the activities at the principal and agent levels. Finally, the lag in observations ($t-1$) shows a positive and statistically significant effect as anticipated.

6.6 The Conclusion: Premises and Limitations.

The aim in this chapter has been to shed light on administrative agenda setting and the dynamics of the rulemaking process, exhibiting selected characteristics of the lobbying behavior of interest groups in response to abrupt stimuli. The main contribution is that it establishes the link between the activities at the political principal level, especially the policy subsystem, with the activities at the level of the agencies. As a result, the rulemaking process can be understood in a broader context. Here, network analysis has provided tools to examine the relationships between actors at both the principals' and agents' levels as well as the actions and reactions of competing parties in the process of rulemaking. Although the focus has been on the activities of the congressional committees as the main principal in the rulemaking process, the analysis could be extended to include the roles of the President and the courts, displaying how multiple principals influence the routines and outcomes of the rulemaking process. That analysis is beyond the scope of this dissertation and is reserved for future research.

However, the analysis has faced several limitations. Mainly, social network analysis (SNA) and exponential-family random graph models (ERGM) currently cannot handle a network with more than two types of nodes. Meanwhile, the analysis here deals with three types of nodes: congressional hearings, rules, and interest groups. A network model with three modes or higher

has not been developed yet. Since a network with only two modes can currently be constructed, the analysis has to be divided into two networks; one includes the congressional hearings and interest groups as discussed in Chapter 5, and the other includes the rule sets and interest groups as presented in this chapter. Consequently, the information has to be extracted from the congressional hearing network and then attached to the rulemaking networks. This may not be the best solution, but it is the only one available. There are several structural configurations that could produce theoretical importance if congressional hearings and rulemaking networks could be combined into a three-mode network. Until then, the approach used here remains the best way to handle such complexity. For TERGM diagnoses and the goodness of fit, see Appendix 12.

Moreover, the TERGM was not able to model three important events/punctuations, the financial crisis in 2009, the Deepwater horizon oil spill in 2010, and the price war of OPEC leading to bankruptcy within the fracking industry in 2014. When dummy variables for these events are added to the model, TERGM produces errors that the model suffers from collinearity. A simple linear regression model with 16 time points and 3 dummy variables would suffer the same problem. Fortunately, the effects of these focusing events have been partially captured through the oil price punctuations. Also, these focusing events were visually presented and discussed; therefore, the viewers can observe the change in rulemaking dynamics at the time of punctuations and post-punctuations even if empirical estimation is currently beyond the limitations of the modeling tools.

Finally, the TERGM depends on simulating random networks and comparing the observed network with the distribution of these randomly generated networks, displaying whether the observed network and its statistics differ significantly from what would happen by random chance. Therefore, the results of TERGM are confined to the networks being studied. Other networks concerning different policies may exhibit distinctive structures, which limit the ability to make

broad generalizations based on the case being studied here. Thus, a comparative method may be more suitable. By comparing the behavior of several networks in different policy sectors, generalizations about the rulemaking process and role of political principals might be offered.

Chapter 7: Rulemaking Outputs and the Beneficiaries of Administrative Actions

7.1 Introduction

In the previous chapter the dynamics of the rulemaking process was studied, providing explanations for the initiation and finalization of rules, and examining lobbying patterns toward agencies. Yet, it does not explain the outputs of rulemaking. Who are the beneficiaries of agencies' actions? Why do agencies respond to some interest groups over others? How does the relationship between interest groups and political principals influence the agencies' decisions? In an attempt to answer these questions, I discuss the determinants of rulemaking outputs, providing an argument for how these determinants work. Then, as the dependent variable, an explanation is provided for how the beneficiaries of rulemaking are ascertained, alongside a description of the coding process used to reveal this explanation. Next, I describe the method for constructing the network that presents the interactions between the interest groups and the agencies. In order to exhibit the responses of agencies as to what interest groups demand, a two-mode network with a structural zeros format is constructed, providing examples and allowing visualization of such networks. Subsequently, I conjecture several hypotheses in order to examine the argument in this chapter, emphasizing the causal relationship between the agencies' responses and rulemaking determinants. Having done that, I then run a two-mode ERGM with structural zeros and ascertain the validity, or lack thereof, of the argument presented in here. Finally, a conclusion and discussion with interpretations and limitations of the model are given.

7.2 The Elements of Influence as a Determinant of Rulemaking Outputs.

To display the outputs of the rulemaking process and the factors that dictate administrative actions, the analysis of the beneficiaries of rulemaking bears importance. By tracking who the beneficiaries are and under which conditions interest groups succeed in changing the content of rules, a better picture of the behavior and the responses of agencies may be portrayed. Therefore, I am looking to ascertain which parties are the recipients of agencies' actions, and whether the administrative rules are advantageous to those recipients. After identifying the participants in rulemaking, I determine what they want from the agencies. In other words, what are the requests of the interest groups? Then I analyze the final rules to exhibit the responses of the agencies to these requests, whether they benefit from these participants or not. Specifically, the beneficiary variable depends on the analysis of request-response actions, as being a beneficiary of a rule rests on whether the related agency responds to or denies the request(s) of that participant in rulemaking. For example, if a participant proposes a specific regulation and the relevant agency responds by issuing that regulation, then this participant is considered as a beneficiary of rulemaking. So, by analyzing the request-response actions, the beneficiaries may be identified and then it is possible to turn to why the agencies respond to some participants while not to others. Also, by tracking the administrative actions, the conditions under which the agencies change their response from one set of participants to another can be measured.

In this regard, I argue that the participants or actors that influence the policy subsystem and network are probably the beneficiaries of rulemaking. Therefore, analyzing the composition of the policy network is important for displaying different actors and coalitions involved in rulemaking and to what extent they influence it. In view of that, three elements of influence within the policy network are offered that need to be considered; the lobbying effort, power and resources, and

degree of consensus. For lobbying effort, I am looking at actors and coalitions involved in the network and to whom they connect. Power and resources, as another element of influence, is manifest in formal legal authority, public opinion, information, mobilizable troops, financial resources, and/or skillful leadership (Sabatier and Weible 2007, 201–3). Accordingly, the coalition that devotes more effort to lobbying and possesses more resources is more influential and is more likely to receive an optimal response from agencies.

In addition, influence in the policy network is not confined to lobbying the agencies alone. It incorporates lobbying political principals as well. Since agencies are somehow obliged to respond to principals such as congressional sub/committees or the President, then we expect that whoever can influence these principals will receive desired responses from the agencies. For example, if a specific coalition asks a particular agency for a regulation, its likelihood of obtaining that regulation is enhanced if this coalition can influence the sub/committee(s) that have authority over that particular agency. Thus, it is important to determine whether the actors that are lobbying the agencies are also lobbying the related congressional committees at the same time.

As a way to influence administrative policy and the outputs of rulemaking, interest groups engage in coalition building and lobbying where the interest groups in fact lobby each other, forming coalitions that can affect agencies' policy decisions. Coalition lobbying is perceived to be among the influential tactics that interest groups rely on (Baumgartner et al. 2009; Baumgartner and Leech 1998; Heinz, Laumann, and Nelson 1993; Hula 1999; Loomis 1986). By building a coalition, the uniformity of the message sent to policymakers is increased. The larger the coalitions, the more effective they are (Nelson and Yackee 2012). Here, both direct and indirect influence between interest groups and agencies is considered. Therefore, it is central to be able to present the relationships among the participants in the rulemaking network and the congressional

network as well as other principals. In other words, the beneficiaries are the ones that have a higher degree of influence or connection in both levels of policy networks.

However, while both influencing the lobbying effort and possession of resources are necessary conditions, they are not sufficient. As Nelson and Yackee (2012) and Sabatier and Weible (2007, 199–200) have pointed out, the success of the dominant coalition is conditioned on whether there is consensus within the lobbying coalition (Nelson and Yackee 2012; Sabatier and Weible 2007, 199–200). Thus, the analysis of the content of the rules along with the comments of interest groups is vital to understanding and explaining the outputs of the rulemaking process. Particularly, I seek to determine if the actors within the same coalition have the same position toward the rules being considered. As the actors and their coalitions hold a higher degree of consensus, the likelihood of being the beneficiaries of rulemaking is increased. In sum, what matters is not only the size and resources of the coalitions that influence the lobbying effort, but also the degree of consensus within these coalitions. So, any analysis of the network that governs rulemaking should focus on lobbying efforts, resources, and the degree of consensus as three key elements of influence within the network at the levels of both agencies and principals. These elements can determine the outputs of the rulemaking process.

7.3 The Beneficiaries of the Agencies' Responses as the Dependent Variable

To determine the agencies' actions, the administrative rules are studied as the main units of analysis. Since the dependent variable is the output of the rulemaking process as manifested by the beneficiaries, the content of the administrative rules is analyzed, comparing the proposed versions of the rules with their final versions. In particular, the aim is to demonstrate whether the agencies finalize their rules as they were originally proposed or if there are changes; and if the

change occurs, determining in which direction (more or less regulation). Additionally, pre-rulemaking activities in the analysis are included if they were published. As some students of rulemaking indicate, pre-rulemaking activities play an important role in the agenda setting of the rulemaking process, and the parties that participate early in the pre-rulemaking activities influence the content of the proposed rules and are well-positioned during the rulemaking process (Naughton et al. 2009; Yackee 2012). In this case, the pre-rule (the Advance Notice of Proposed Rules) is considered as the initial version and the proposed rule as the final version, and then the same proposed rule once again is analyzed as the initial version and its final version as the final rule.

Specifically, the focus is on rules that were open for public comments so that the influence of interest groups' lobbying can be observed. Nonetheless, not all rules are open for public comments, in which case it was not possible to identify the requests of interest groups and whether they succeeded in influencing the content of those rules. In contrast, there are some instances where a final rule that was open for public comments is issued without a prior notice or a proposed version, only to have another final rule be issued modifying the content of the previous rule in response to the demands received from commenters on the first rule. In this case, the first final rule is treated as the proposed version of the rule and the second as the final version of the rule. As for the data, the rules are primarily collected from the official website of regulations (www.regulation.gov) and the federal register website (<https://www.federalregister.gov/>) where rules and their comments are published. For more details, see Chapter 4 section 4.2.

The aim here is to exhibit the agencies' responses to interest group lobbying, as to who gets the desired response. Therefore, the two-mode network or bipartite matrix is applied where the interest groups or actors are in one set while the agencies are in the other. Like the network of rulemaking lobbying dynamics discussed in the previous chapter, the only ties allowed in the two-

mode network are from one set of nodes to the other, but no tie exists within the same set of nodes. So, the interest groups can contact the agencies requesting a specific action, and the agencies may respond back to the requests of these groups. Because of data limitations, this model of the network structure doesn't allow for interest groups contacting each other, and likewise for the agencies.

Generally, the method of the tie building and coding process is similar to what Yackee has described in several articles (McKay and Yackee 2007; Nelson and Yackee 2012; Yackee 2006). Subsequently, the interest groups are classified according to their positions: anti-regulation or pro-regulation. In order to accomplish this, the comments on the rules are analyzed, determining who requests less regulation at one end of the continuum and who requests more regulation at the other end. In the middle of the continuum are the comments that agree with the content of the rule and request no changes. In view of that determination, the code for these requests is (-1) for less regulation, (0) for no change, and (1) for more regulation. The direction of these requests is important in determining the responses of agencies.

In this context, the interest groups may request more than one action regarding the same rule depending on how many issues are being regulated, and these requests do not necessarily have the same directions. They may ask for more regulation regarding one issue, and less regulation on another issue within the same rule. In this situation, each regulated issue and its related requests is treated as a separate unit of analysis regardless of being in the same rule. These requests hypothetically construct direct ties between interest groups and agencies in the network, where the interest groups are the senders and the agencies are the receivers. So, a binary two-mode network is constructed based on whether the interest groups requested an action or not. In any given rule, an interest group has no more than one tie for each regulated issue, but it may have several edges/ties in the same rule according to the number of issues being addressed in the rule.

To construct the ties or the edges sent back from agencies to interest groups, I analyze agencies' responses regarding each regulated issue. By tracking the changes in the content of the rules from the proposed to the final versions, I can examine whether the agencies respond with less regulation, more regulation, or no change, giving them similar coding (-1 = a less regulatory response, 0 = no change, or 1 = more regulation). Then codes of the interest groups' requests are compared with the coding of the agencies' responses in each regulated issue. If there is a match between what interest groups requested in the proposed rule and how the agencies responded in the final rule, a tie exists; otherwise, the tie is absent. For example, if an interest group requested more regulation in its comment on a proposed rule and the related agency responded with more regulation in the final rule, then there is a match, and the tie sent back from the agency to that interest group would be coded. If there is no matching between requests and responses, then there is no tie. Hence, there are three cases where request-response match would occur:

- If an interest group demands less regulation (-1) and the agencies respond with less regulation (-1), the reciprocated tie exists.
- If an interest group demands no change (0) and the agencies respond with no change (0), the reciprocated tie exists.
- If an interest group demands more regulation (1) and the agencies respond with more regulation (1), the reciprocated tie exists.
- Otherwise, the tie does not exist.

However, the tie that expresses "no change" may appear controversial, especially when the request for "no change" met with the "no change" action. It may be argued that since there is nothing happened, then why this tie exists. In order to achieve a better understanding of this, a distinction should be made between lobbying to change the status quo, in general, and lobbying to

change a specific section within a rule from the proposed to the final version. Interest groups may put pressure on an agency to change the status quo and issue a rule. Once the proposed rule is issued, it indicates that an attempt to change the status quo is made. In this case, the reaction of interest groups will differ according to their positions. The defenders of the status quo will ask for repealing the proposed changes or at least they will ask for less regulation, which I code as (-1). In contrast, the challengers of the status quo will support the proposed changes and ask to finalize the rule as it is proposed without further changes, which is coded (0) since “no changes” were requested to be made in the final version of the rule. So, the application of “no changes” ties is limited to this phase of rulemaking. In this case, nevertheless, the code (0) for “no change,” is in fact a code for supporting the change of status quo originally proposed by the agency as it satisfies the causes of the challengers to the status quo. On another case, the challengers may not be happy with what is being proposed and ask for further changes, which I code as (1) as more regulations were requested. In sum, this code is applied specifically to the changes that occur between the proposed and final version of the rules, and the existence of the tie depends on the action of the related agency, to which requests it responds. So, I treated “no change” requests as any other request that is delivered by interest groups and may receive a desired response. Thus, the interpretation of the “no change” tie should not extend outside that phase of rulemaking.

In view of the ties created by complementary requests and responses, the beneficiaries of the rules are displayed by who gets reciprocal ties from the agencies. In other words, this reciprocity represents the requests from interest groups and the responses back from agencies in final rules. For a visual illustration, Figure 7.1 demonstrates a hypothetical example for how the beneficiary network looks. In this network, there are three interest groups (IG1, IG2, and IG3) lobbying an agency (AG). Two of them, IG1 and IG2, requested more regulation (1) while the

third group, IG3, asked for less regulation (-1). Accordingly, the blue lines or ties represent the requests sent from the interest groups to the agency, and the numbers on these ties reflect the directions of requests for more or less regulation. On the other hand, the agency responded with more regulation (1). Since there was a match between the requests of IG1 and IG2, and the response of the agency AG, the red lines show the reciprocal ties from AG to IG1 and IG2, and the numbers on these ties reflect the direction of the responses. Meanwhile, the request of IG3 was denied; therefore, the reciprocal tie does not appear. In sum, the reciprocity exhibits the beneficiaries of rules.

Figure 7.1: An Example for the Beneficiaries of Rulemaking

7.4 The Construction of the Request-Response (RR) Network with Structural Zeros.

However, portraying the request-response (RR) network in the way the Figure 7.1 depicted is not possible under the current software packages that run exponential random graph models (ERGM) with two-mode networks, especially the “ergm” package developed by Handcock et al. (2018) and Hunter et al. (2008b). For one reason, the RR network is a directed two-mode network

where the requests are sent from interest groups to agencies, and the responses are sent back from the agencies to interest groups. Meanwhile, the existing packages can only run ERGM on non-directed two-mode networks which do not recognize this reciprocity. The other reason is that ERGM, like the other types of regressions, is designed to model one dependent variable or dependent relation in the network; whereas the RR network embodies two types of relations, request relations and response relations. Therefore, the RR network should be divided to two networks. One represents the request ties while the other represents the response ties, and then run the request network as an independent network with the response network as the dependent. Fortunately, ERGM can run a matrix with a structural zeros format that can be utilized to combine the two relations of requests and responses in one network. Accordingly, the dependent network is constrained by the independent network where the possible ties in the dependent network do not exceed the actual count of ties in the independent network. For more details about ERGM with structural zeros, see Heaney and Leifeld (2018). Since the agencies have only two choices about whether to respond to a request, so the tie exists, or to deny a request, so the tie is absent, the total number of responses cannot surpass the actual number of requests; otherwise, the agencies would respond to non-existing requests.

To illustrate the application of ERGM with structural zeros, Figures 7.2 and 7.3 present a hypothetical example for how the structural-zeros matrix is constructed. Here we have two-mode network reflecting a rule that regulated four issues (Issue 1, Issue 2, Issue 3, and Issue 4) and received requests from six interest groups (IG1, IG2, IG3, IG4, IG5, and IG6). So, the green cells represent the requests submitted by the interest groups regarding each regulated issue as it appears in Figure 7.2. For example, Issue 1 received requests from four interest groups IG1, IG2, IG3, and

IG4. Meanwhile, interest groups IG5 and IG6 submitted nothing regarding Issue 1; therefore, they are given zeros as it appears in the gray cells.

When it comes to responses, the sponsored agency has two choices whether to respond to or deny the demands of the four interest groups, IG1, IG2, IG3, and IG4, who submitted requests. Meanwhile, interest groups, IG5 and IG6, are not relevant since they have not submitted any requests as they appear in the gray cells with NA (not applicable) in Figure 7.3. Herein, the interest groups that received the desired responses are given a code of (1) while the ones who did not are given a code of (0). In other words, the network and in turn an ERGM is instructed to exclude the gray cells with NA from the computation so that we ensure that total number of responses does not exceed the number of requests when simulation is run. Otherwise, the sponsored agency would be allowed to respond to non-existing requests.

Figure 7.2: A Hypothetical Example for a Structural-Zeros Request Matrix

	Issue 1	Issue 2	Issue 3	Issue 4
IG1	1	1	0	0
IG2	1	1	0	1
IG3	1	0	0	1
IG4	1	0	1	0
IG5	0	0	1	0
IG6	0	0	1	0

Figure 7.3: A Hypothetical Example for a Structural-Zeros Response Matrix

	Issue 1	Issue 2	Issue 3	Issue 4
IG1	1	1	NA	NA
IG2	1	0	NA	0
IG3	1	NA	NA	0
IG4	0	NA	1	NA
IG5	NA	NA	1	NA
IG6	NA	NA	0	NA

Since we have a two-mode independent network with 4 nodes of regulated issues ($V = 4$) and 6 nodes of interest groups ($U = 6$), then the total number of possible ties are ($V \times U$) = $4 \times 6 = 24$, which in this example represents the maximum possible number of request ties from the interest groups to the agencies. Since agencies received 11 request ties ($E=11$) reflected by the total number of green cells in Figure 7.2, the request network yields a density of $\frac{E}{V \times U} = \frac{11}{24} = 0.46$. Meanwhile, the agency has responded to 6 requests out of 11. Hence, the response network in Figure 7.3 has 6 ties ($E' = 6$) with a density of $\frac{E'}{E} = \frac{6}{11} = 0.55$. Despite both networks having the same number of nodes, the possible response ties in the dependent network cannot exceed the count of the actual request ties in the independent network. In other words, the agencies respond to 6 requests out of 11; therefore, the denominator in the density equation of responses network is

11, not the maximum number of request ties 24. Here, the ERGM simulation is not about how many possible request ties there are. It is about the number of possible response ties.

This coding process is applied on the selected rules. It would be ideal if the 638 rules that regulate the oil sector could be included. However, such inclusion requires performing content analysis of thousands of pages of the rules and tens of thousands of comments submitted by interest groups so that the requests and responses could be matched. Given that interest groups usually submit several requests for each rule, the number of regulated issues to be analyzed increases exponentially. Consequently, coding this by hand is beyond the ability of any single individual to accomplish. It would require a research team to analyze the content of the huge number of rules and their comments and/or utilizing text analysis software. Therefore, a limited number of rules were selected considering the time and resources available for this work.

As a starting point, the rules initiated in period 2009-2012 are identified because this period encompasses the Deepwater Horizon oil spill in the Gulf of Mexico in 2010 as one of the focusing events that significantly affects the oil sector. This allows the changes in the RR network in the equilibrium, punctuation, and post-punctuation periods to be observed. Then the focus shifts to rules promulgated within administrative programs that were consistently present during the 2009-2012 period. Thus, the agencies' responses regarding the same type of issues or policy could be tracked. Accordingly, two EPA programs are identified: The Renewable Fuel Program (RFP) that attracts interest groups from all over the country, and the National Oil and Hazardous Substances Pollution Contingency Plan (NCP) that targets different geographic sites to be designated as Superfund sites. Subsequently, the NCP attracts local interest groups from the targeted areas.

After excluding the EPA rules that do not belong to the two selected programs and the rules enacted by other agencies as well, 13 rules and their comments are identified. Five of them

promulgated under the RFP while the others are under the NCP. Next, the content of selected rules and their comments is analyzed, specifying 72 regulated issues and 280 actors submitted 422 requests. Those actors include a wide range of interests from the oil industry and environmentalists to the biofuels industry. Also, trivial actors such as individuals and anonymous commenters were not excluded since the network size is manageable. Meanwhile, the EPA responded to 274 requests out of 422.

Figure 7.4: The Request-Response (RR) Network with Structural Zeros

However, there is a time overlap where the rules were open for comments in one year and finalized in the next years. Therefore, all requests and responses are combined or collapsed into one network. This is more suitable for running a two-mode ERGM with structural zeros.

Nonetheless, the changes over time will be modeled by attaching the values of the variables that change over time as edge attributes. The details of how to code these variables is explained later in section 7.5 of this chapter. Consequently, the RR network is constructed as bipartite network where the first mode has 280 actors and the second mode has 72 regulated issues, with a density equals to $\frac{Responses}{Requets} = \frac{274}{422} = 0.65$. For the purpose of visualization, the RR network is plotted in Figure 7.4. For more details the coding process and visualization, see the Appendix 13.

7.5 The Examination of the Elements of Influence as the Independent Variables.

As was discussed above, the beneficiaries are ascertained by who receives the desired responses and there are three determinants that presumably increase the probability of receiving response ties. The first determinant is lobbying effort, which considers the activities that go beyond just sending requests to the agencies. The aim is to gauge two aspects of lobbying effort, lobbying the principals and coalition lobbying. For lobbying the principals, I am looking at whether the interest groups have appeared before the congressional hearings at the time the requests were submitted to the agencies. This assumes that groups that have access to Congress would use their relationships to influence the agencies' decisions. The second aspect of lobbying effort is coalition lobbying in which the interest groups lobby each other to build coalitions that could put pressure on the agencies and influence the rulemaking outputs. Accordingly, two hypotheses are stated:

Hypothesis 7-1: *Actors who increasingly lobby Congress are more likely to receive their desired responses from agencies than actors who do not lobby Congress.*

Hypothesis 7-2: *Actors who engage in coalition lobbying are more likely to receive their desired responses from agencies than actors who do not lobby with coalitions.*

To measure lobbying effort toward Congress, I focus on the activities of actors in a congressional hearing network previously presented in Chapter 5, gauging the normalized degree centralities of actors in the years they submitted requests. Since the RR network covers four years from 2009 to 2012, each actor has four different degree centrality scores, and it is not feasible to attach them as the actors' attributes because all requests and responses of any actor are collapsed on one network regardless of the years they were submitted. Therefore, it is appropriate to assign the normalized degree centralities of the actors as edge/ties attributes. So, we could have one node with four scores that are distributed over its ties based on the years when the requests happened. In this way, changes over time is taken into account even though they are present in a single network.

As for coalition lobbying, I look at whether the actor or interest group submitted joint comment(s) with other organizations as an indicator of coalition lobbying. It is not the only indicator as several interest groups may also form a coalition and each one submits separate a comment that has the same request as the other members in the coalition. To capture that behavior, other studies have run surveys asking the interest groups to identify their coalition members (Heaney and Leifeld 2018; Nelson and Yackee 2012). Such surveys are more reliable when the information about coalitions is collected at, or near, the time of the actions. However, doing so retrospectively for coalitions that formed in the past is less reliable. However, the joint comments do provide a chronological record of coalition lobbying. Since the actors may engage in coalition lobbying regarding one rule, but not in another, joint comments are attached as edge attributes to the requests of all participants of these joint comments. If the actor submits a joint comment, it is coded (1). Otherwise, it is zero.

The second determinant is the element of power. One of the important elements of power available for interest groups in the rulemaking process is information. The APA sets its evidentiary standard to require agencies to establish cause-effect relationships and build administrative decisions upon strong evidence that could stand before the courts. Interest groups can take advantage of such requirements and provide information that either supports or challenges the cause-effect relationship, depending on their position regarding the status quo. Therefore, agencies are expected to look with great consideration at the information provided in comments before finalizing the rules. Accordingly, I analyze the content of these comments regarding each regulated issue in order to see whether the interest groups provided information such as new facts, articles or research, analytic and scientific explanation, and/or surveys. In other word, the information variable is concerned with any materials that could establish or challenge the cause-effect relationship. So, if a comment is associated with information, it is coded (1) and attached as an edge attribute to the tie between the interest groups and agencies. Otherwise, a zero is attached to the tie. Thus, the following hypothesis is stated:

Hypothesis 7-3: *Actors who provide information in their comments have a higher probability of receiving desired responses from agencies than actors who do not provide information.*

The third determinant is the degree of consensus. As Nelson & Yackee (2012) and Sabatier & Weible (2007, 199–200) indicated, the success of dominant actors or coalitions is conditional upon their degree of consensus. If a coalition or a specific type of interest group can dominate the comment process, they are most likely to receive an desired response from the agency that regulates the issue concerned. It is common to face counter-lobbying, which may reduce the effectiveness of actors and coalitions in influencing administrative decisions. Agencies would be

under more pressure if the interest groups are united than if they compete with each other. Also, the size of the coalitions matters. If a large number of interest groups take the same position in lobbying the agencies, they are expected to be more effective than if there were a smaller number lobbying the agencies. Accordingly, I state the following hypotheses:

Hypothesis 7-4: *Agencies are more likely to respond to actors and coalitions who exhibit a higher degree of consensus than the actors and coalitions who do not.*

Hypothesis 7-5: *The larger the size of the consensus, the more effective the lobbyists are in influencing the agencies' decisions.*

To measure the degree of consensus among different types of actors in the network as well as among actors within the same type of interest groups, the positions of actors should be determined. As a start, I gauge how many actors requested less regulation, no change, and more regulation regarding each regulated issue. Then I look at the percentage of each type of requests to total number of requests, and then attached these percentages to their corresponding edges. For example, if there are 10 actors, and seven of them submit requests for more regulation, two for no change and one for less regulation, then their percentages are 70%, 20%, and 10% respectively. Next, I assign the proportions of each type of request as edge attributes. Accordingly, a score of 0.7 is attached to the request ties of the seven actors who requested more regulation, 0.2 is attached to the request ties of the two actors who request no change, and 0.1 attached to the actor who requested less regulation. Consequently, the probability of the seven actors receiving their desired response is expected to be higher than the others. However, if we have 100 actors instead of 10 in the same example, more pressure is put on the agencies. So, it is expected that the probability of 70 actors requesting more regulation to receive their desired responses is higher than the probability of 7 actors doing so. In sum, the effectiveness of the consensus variable is conditioned

on the number of total requests. To capture this effect, I create a multiplicative term between the proportions of consensus and number of requests regarding each regulated issued, and its coefficient is expected to be positive.

In addition, several control and contextual variables are added to the analysis to account for alternative explanations and improve the specification of the model. I included the two types of interest groups that are generally considered to be the defenders and challengers of the status quo, the oil industry and environmentalists. They are included as a nominal variable in the first mode, the actors, while all other groups are set to be the base for comparison. Also, a dummy variable for whether the rule is significant or not is assigned to the second mode to account for the involvement of the President through the OMB review process. To consider the effects of the punctuation and post-punctuation, I add a dummy variable for the ties of requests that occurred during the 2010 oil spill disaster in Gulf of Mexico and another dummy variable for ties that happened after the disaster. Furthermore, the two stars term for the first mode and the geometrically weighted degree coefficient for the second mode are added to the model to capture the interdependence within the network and produce a better model specification. Like the model in Chapter 6, those structural terms do not bear theoretical importance relevant to arguments here. Nevertheless, they are necessary from a methodological point of view. For more information about the coding procedures, visualization, model and goodness of fit, see Appendix 13.

Table 7.1: The Two-mode ERGM with Structural Zeros for the RR Network

THE VARIABLES	TYPE OF STATISTICS	COEFFICIENTS	STD. ERROR
Edges	Structure term	0.62	(0.91)
Lobbying Congress	Edge attribute	11.04	(0.34) ***
Coalition lobbying	Edge attribute	-0.95	(0.47) *
Information	Edge attribute	-1.25	(0.28) ***
Consensus	Edge attribute	4.42	(0.83) ***
Consensus x number of requests	Edge attribute	-0.00	(0.01)
Oil industry	1st-mode attribute	-2.29	(0.60) ***
Environmentalists	1st-mode attribute	-0.01	(0.56)
Significant rules	2nd-mode attribute	1.26	(0.39) **
Punctuation	Edge attribute	-2.54	(0.68) ***
Post-punctuation	Edge attribute	-1.56	(0.74) *
2-star of the actors	1st-mode structure term	0.16	(0.08) *
Geometrically weighted degree of the issues/rules	2nd-mode structure term	-4.06	(0.55) ***

*** $p < 0.001$, ** $p < 0.01$, * $p < 0.05$

7.6 The Results of the Two-mode ERGM with Structural Zeros

Table 7.1 shows the results of the two-mode ERGM with structural zeros. As for the effect of lobbying efforts, the model demonstrates that the interest groups that have access to Congress and actively lobbying the congressional committees are most likely to receive their desired responses as the coefficient is positive and significant. Therefore, Hypothesis 7-1 is supported. This finding displays how the involvement of political principals can influence agencies decisions. On the other hand, the coefficient of coalition lobbying is significant and negative, which is in the opposite direction to what is expected. Thus, the Hypothesis 7-2 is rejected. This is puzzling. Other empirical studies, as well, found negative causal relations between coalition lobbying and policy changes. At best, they failed to establish such causal relation, indicating there are no tangible benefits from coalition lobbying (Gray and Lowery 1998; Haider-Markel 2006; Heinz, Laumann,

and Nelson 1993). In contrast, Nelson and Yackee (2012) were notably able to specify some conditions under which coalition lobbying affect rulemaking outputs. Yet, they failed to account for the interdependencies among the actors, which return us to the reason for applying social network analysis and ERGM in the first place. In general, there is still debate about the effect of coalition lobbying, and more study is needed to sort out this issue.

As for information as an element of power, the coefficient turns out to be significant and negative in contrast to what is expected. Interest groups that associate data and information with their comments seems to reduce their chances of receiving the response they desire. Accordingly, Hypothesis **7-3** is rejected. Like coalition lobbying, the effect of information might be conditioned on other variables. At this point, I do not have a plausible explanation for this unexpected result. In the meantime, the degree of consensus appears to have a positive and significant effect that if the actors agree on a unified position in their requests regarding a regulated issue, the agencies are more likely to grant them their desired responses. Hence, Hypothesis **7-4** is supported. Nonetheless, the multiplicative term between the degree of consensus and the number of requests seems to be insignificant. Therefore, Hypothesis **7-5** is rejected suggesting that the size of the group consensus does not additionally influence the agencies' decisions.

In summation, the analysis of the three determinants of rulemaking outputs - lobbying effort, the element of power, and consensus - shows mix results in that some aspects of these arguments are supported while other are not. Importantly, lobbying Congress as one aspect of lobbying effort displays the role of political principals in shaping the rulemaking outputs and to what extent activities at both the principal and agent levels are connected. Meanwhile, coalition lobbying as the other aspect of lobbying effort, and information content as an element of power appear to be counterproductive in reducing the chances of interest groups receiving desired

responses. As for the third determinant, the results of the analysis illustrate the degree to which the consensus is influential. However, when it comes to the size of consensus, the result is not conclusive. Even though not all determinants of the rulemaking were confirmed as expected, two important elements, lobbying Congress and degree of consensus, appeared to be significant and in the right direction. Therefore, the overall argument of the study is at least partially supported.

Not only are actors who have higher degree of influence in rulemaking process likely to be the beneficiaries of agencies' actions, but also are actors who enjoy higher degree of influence at principal level, especially congressional committees. Thus, separating the activities at the congressional level, as they are only related to the stage of agenda setting, from the activities at the rulemaking process, as they are only related to the stage of policy implementation, is not accurate anymore. The rulemaking outputs could be explained by considering the parallel activities at levels of both principals and agents. This finding is the main contribution of this dissertation to the literature of policy subsystem and public policy in general.

Furthermore, the control variables uncover some additional aspects of agencies' behavior. For the type of interests, agencies seem to be systematically denying the requests of the oil industry compared to other types of interest groups as the significant negative coefficient demonstrates. Meanwhile, the responses of agencies toward the environmental groups do not statistically differ from the responses toward other types of interests as that coefficient is insignificant. Here the context of where and when the administrative decisions were made should be considered. The agencies made their decisions under the Obama administration, which may be seen as less friendly toward the oil industry. Also, both programs, the RFP and the NCP, are sponsored by EPA. So, this behavior might be related to the nature of the agency itself. EPA may well be more hostile toward the oil industry as one of the industries causing pollution. Other agencies may exhibit

different behavior. Moreover, timing may play role here since most of agencies' decisions were made during and after the oil spill in 2010 where the pressure and tone of public opinion and media coverage were against the oil industry. It could well be the mix of all of the above factors, which explains the negative reactions toward the oil industry, while not necessarily favoring the environmental groups.

Also, the coefficient for significant rules that are subject to OMB review is positive and statistically significant, indicating that the actors have a higher probability of receiving their desired responses for rules under OMB review in general, but it does not explain who has more influence over others. One way to answer this is to analyze the meetings that OMB holds with interest groups regulating the proposed rules reported in *reginfo.gov*. Unfortunately, for the years before 2014, the *reginfo.gov* database just reports the parties who were involved in the meetings without specifying which rules are the subject of discussion. Thus, any connection between interest groups lobbying OMB and their influence over the agencies' decisions cannot be established in the period 2009-2012 since these meetings could be for any rules, even ones that are not related to oil policy. For the effects of the punctuation and the post-punctuation period, the model shows that the agencies are less responsive to actors' requests during and after the 2010 Deepwater Horizon oil spill as the coefficients of both regressors are negative and significant. Finally, the model's structural terms, two stars and geometrically weighted degree, appears to be significant, which is important to account for the interdependency within the network. Failing to account for network interdependency when it exists may be seen as analogous to failing to correct for a statistical problem in a regression model, such as autocorrelation.

7.7 Conclusion and Discussion.

Herein, several considerations should be taking into account in interpreting the model results. Most importantly, demonstrating the effect of the punctuations on the rulemaking outputs is problematic to some extent. Because of the relatively long period between the initiation and finalization of the rules, the causal relationship between punctuations and changes in agencies' decisions is difficult to display. On average, the agencies took 231.6 days, about seven and half months, to finalize the 13 rules that were analyzed in this chapter. Hypothetically, that is enough time to absorb the pressure generated by such a punctuation. As was discussed in Chapter 6, the initiation of proposed rules and the lobbying dynamics of interest groups are to great extent influenced by such punctuations and post-punctuation periods. Meanwhile, the finalization of rules exhibits a different pattern that is affected by other factors such the change in structures and balance within the oil policy network at the level of political principals.

Herein, Yackee (2006) provides an explanation for how the activities at the principal level could affect the rulemaking outputs and in turn how the effects of punctuations could be inferred. When the attention of Congress and President increases, agencies are obliged to respond to their wishes over those of the interest groups. Therefore, agencies were less responsive to the interest groups' requests during the punctuation of oil spill in 2010 as the attention of principals was high at that time. Also, the principals' attention continues be high in 2011 and 2012 as a result of dramatic increases in oil prices, which explains the negative coefficient of the post-punctuation period of the oil spill. Here, the advantageous interest groups are the ones who have access to political principals since they can use their access to congressional committees to influence the agencies' decisions which was empirically demonstrated as the coefficient for lobbying Congress was positive and significant. Since the punctuation disturbs the balance and redistributes power

and resources within the policy subsystem and networks, determining the direction of the effect and the type of interests that benefit from such disturbance is not easy task. Despite being the dominant groups in the congressional network, requests submitted by the oil industry were systematically denied by the EPA, which implies that the oil industry lost their control during and after the oil spill punctuation. However, environmentalists are not necessarily the beneficiaries of such change. The agencies' responses toward environmental groups were not significantly different from other groups as Table 7.1 shows.

In addition, lagged movement offers another mechanism for how the effect of the punctuation manifests. Whether or not the interest groups succeed in passing a reform through Congress at the time of the punctuation, the competing groups shift their lobbying effort toward agencies; therefore, the degree of consensus is expected to be low. As Table 7.1 shows, agencies are less responsive to interest groups' requests when there is a low degree of consensus. Hence, both the direct and indirect effects of the punctuation should be considered. However, a punctuation by itself does not guarantee changes in rulemaking outputs. It is similar to the case with policy subsystems when a punctuation alters the distribution of power and resources opening an opportunity for change, but such change is not certain. The reform efforts could be blocked. So, the effect of a punctuation should be understood through the alterations in the relationships among political principals, agencies, and interest groups, on one hand, and the changes in degree of consensus among interest groups who lobbying the agencies, on the other hand. Eventually, it depends on the structure of the network at both levels of principals and agents, whether the previously dominant coalition can regain control over the network in punctuation and post-punctuation periods, which will determine the beneficiary of rulemaking outputs.

Furthermore, the interpretation of ERGM differs from a baseline regression. By depending on simulation, ERGM creates a distribution of generated random graphs or networks, and then compares the statistics of the observed network with that distribution. So, if the network statistics, attributes, or structures appear significant in the model, it means that these statistics differ significantly from what randomly would happen. This is the means by which social networks may be examined with inferential statistics. In other words, if an association appears between ties of responses as the dependent variable and any of the independent variables, it is highly probably that it is not coincidental. Unlike standard regression, ERGM does not consider a network as a series of values conditioned on univariate distributions. It treats the network as a single realization from a multivariate probability distribution where many other realizations are possible (Cranmer and Desmarais 2011). In sum, it is not a comparison between a series of networks. It is whether the observed network is significantly different from what would happen by random chance.

Therefore, these ERGM results are not necessarily applicable to other types of policy networks. It is mainly applicable on the Request-Response network for oil policy that includes two specific EPA programs from 2009 to 2012. If other networks are constructed to include additional agencies and different time periods, the ERGM may produce different results as these networks could exhibit various alternative behavior. To make generalizations about the determinants of rulemaking outputs, more studies are needed. This RR network should be considered a case study for the behavior of agencies in specific programs and for specific time periods. Applying network analysis to other policy sectors and comparing the results may be a better approach for making generalizations about routines and the outputs of rulemaking.

Since ERGM depends on generating and sampling random graphs or networks, the model coefficients slightly change each time ERGM is rerun or a variable is added or removed²². However, some coefficients consistently remained significant and in the same direction even when the model has been rerun several times, which increases confidence in the results. The variables and terms that exhibit consistent coefficients are the following: lobbying Congress, consensus, information, oil industry, significant rules, 2-star for the actors, and geometrically weighted degree of the issues/rules. The coefficients of the other variables keep flipping between being significant and insignificant; therefore, providing less confidence in their results. Critically, among the explanatory variables, lobbying Congress, consensus, and information produced consistent results, which reinforces the argument and central findings of this study.

Also, several alternative ways of constructing the RR network, such as distinguishing between the network of the Renewable Fuel Program (RFP) that attracts interest groups from all over the country, and the network of National Oil and Hazardous Substances Pollution Contingency Plan (NCP) that targets different geographic sites to be designated as Superfund sites, were tried. Additionally, limiting participants of the RR network to organizations only by removing the trivial actors such as individuals was examined. In doing so, variations in network behavior and structures emerged. Nonetheless, these ERGMs ran poorly, with these networks degenerating²³ or not converging. As a result, constructing the RR network in the way presented in this chapter proved to be best from a technical and methodological point of view, but not necessarily from a theoretical perspective.

²² In order to produce replicable results, the seed option in the R statistical software should be set to a fix number.

²³ Degeneracy is a situation when the ERGM simulation produces either an empty or a full graph. For more information see Cranmer and Desmarais (2011, 73–74) and Hunter et al. (2008b, 9–15).

Chapter 8: Conclusion and Discussion

The main objective of this dissertation has been to answer three fundamental questions: How do the dynamics and composition of the policy subsystem and policy network shape the outputs of rulemaking? How do punctuations change the dynamics and composition of the policy network and its rulemaking outputs? What is the temporal sequence for the impacts of a punctuation on the policy subsystem and network, and in particular the rulemaking outputs? The key to answering these questions is to track the punctuation effect and study the policy dynamics at both levels of the principals and the agents. Here, the routines and outputs of the rulemaking process cannot be fully understood without considering the activities at the congressional level. Therefore, with a focus on the oil sector, I analyzed the policy subsystem, pointing out the punctuated events that occurred, and how the oil subsystem reacted to such punctuations. In addition, the dominant actors that constitute the oil subsystem are distinguished from other participants in the policy network, displaying the type of interests involved in lobbying the congressional committees. Then, I examined the rulemaking process, specifically the initiation and finalization of rules, and the interest groups engaged in such activities.

Not only does a punctuation shape the congressional agenda, but it also affects the administrative agenda setting as well. However, punctuations appear to generate different behaviors and reactions at the administrative level from what happens at the congressional level. While a punctuation increases attention and attracts more actors who previously were unengaged to become involved in the subsystem, it produces conflicting effects on the rulemaking process. On one hand, the agencies fall under public and media pressure to take an action addressing the

concerned crisis or problem. On the other hand, the increase in activities at the principal level, especially congressional committees, creates a situation of uncertainty in which a major policy change may or may not occur, and in turn the agencies become reluctant to adopt new policies that might be overturned by potential reform. In response to such conflicted pressures, the agencies tend to finalize already existing proposed rules and/or enact final rules that have immediate effects, and refrain from proposing new rules, which indicates that the administration prefers to continue implementing existing policy over adopting new ones at the time of the punctuation. In contrast, in the post-punctuation period, the agencies endure less media and public pressure and the situation of uncertainty is alleviated, knowing that a major reform has passed or been blocked. Thus, the agencies tend to adopt new regulations and policies, which appears as an increase in the number of proposed rules post-punctuation.

Furthermore, the behavior of interest groups and their lobbying patterns vary between political principals and agencies, and from punctuation to post-punctuation. When a punctuation happens, the interest groups prioritize lobbying the principals over the agencies since a window for a major policy change is open. Therefore, the activities in the congressional network increase while the rulemaking network experiences fewer activities. After the punctuation passes, the interest groups shift their lobbying efforts toward the agencies, creating lagged movement. As Congress becomes less active and the opportunity for policy change fades away, interest groups turn their lobbying efforts toward agencies so that they may achieve some gain through the rulemaking process. It does not matter whether the interest groups succeed in passing the reform or not, there will be an incentive for the winners and losers to lobby the agencies. Since the agencies enjoy some degree of discretion in rulemaking according to the autopilot argument, there is always a possibility of deviation from the enacted reforms and laws. Therefore, the interest

groups shift their attention to the rulemaking process either to ensure the agencies will comply with current reforms or to achieve some gains they were not able to attain through Congress.

By tracking the lobbying behavior of the oil industry and environmental groups as majority and minority coalitions, this pattern of lagged movement was observed. As the oil industry was the dominant coalition in the oil subsystem while the environmentalists were proportionally disadvantaged in the congressional hearing network, both groups were actively lobbying the agencies on almost an equal basis, which indicates that the oil industry as the majority coalition most likely shifts their lobbying effort to rulemaking to ensure the compliance of agencies whereas the environmental groups as a minority coalition seek to achieve some gains or alleviate their losses at the congressional level. In addition, the analysis shows that the timing and intensity of lobbying efforts regarding rulemaking are negatively correlated with punctuations confirming the sequences of the lagged movement. When the punctuation occurs, the rulemaking process receives less attention as the interest groups prioritize lobbying Congress over agencies, while in the post-punctuation, interest groups redirect their lobbying effort toward agencies. Furthermore, the type of punctuations plays a role in exhibiting the lagged movement. For focusing event punctuations such as the Deepwater Horizon oil spill, the shift from lobbying political principals to agencies in the post-punctuation period is sharp and easily observed. Meanwhile, the indicator type of punctuation, such as the oil price increases, tend to generate pressure that remains for a longer time than a focusing event. Therefore, interest groups seem to balance their lobbying efforts between the principal and agent levels as time passes.

In general, a punctuation appears to have immediate effects on the dynamics of the rulemaking network. However, when it comes to the outputs of rulemaking, the situation is more complicated. To a considerable extent, the punctuation changes and redistributes power and

resources within the policy network that governs the rulemaking process, which in turn influences the rulemaking outputs. By examining the administrative responses to the requests and demands of interest groups, the analysis hypothesizes that the agencies are most likely to respond to actors who enjoy a higher degree of influence within the policy network at both levels of principals and agents. Initially, I examined the lobbying effort, power and resources, and degree of consensus as the three main elements of influence in the policy network and found evidence that partially supports the central argument of the study. Among the elements of influence, lobbying the principals, especially Congress, as one aspect of the lobbying effort, and the degree of consensus have significant effects on the rulemaking outputs and appear to be significant determinants for the beneficiaries of agencies' actions. Accordingly, punctuations seem to have substantial impacts on both elements of influence.

As the public policy literature indicates, the punctuation alters the power and resources of the policy subsystem. Consequently, the actors who enjoy a higher degree of dominance in the congressional network in the punctuation and post-punctuation phases are most likely to be the beneficiaries of rulemaking outputs. For example, the analysis shows that the agencies were systematically denying the demands and requests of the oil industry during and after the Deepwater Horizon crisis despite being the dominant interest at subsystem level in general, which indicates that the oil industry lost their dominance status specifically in the punctuation and post-punctuation periods. In the meantime, other groups which gained access to Congress during that time were successful in influencing the agencies' decisions. Also, the punctuation could affect the degree of consensus by generating lagged movement. As opposing parties such as challengers and defenders of the status quo shift their lobbying effort from political principals to agencies, the degree of consensus among the actors who engage in the rulemaking process is considerably decreased,

especially at the time of the post-punctuation. By tracking the dynamics of the rulemaking network, the oil industry and environmental groups, as opposing parties, were actively engaged in lobbying the agencies at similar levels, which support the conclusion of this study.

In summation, the impact of a punctuation is not confined to the policy subsystem or the stage of agenda setting. It goes beyond providing an opportunity for reform or policy change. It continues to affect the rulemaking process through the stage of policy implementation. Even if a reform is blocked in the subsystem, there is still chance for the competing parties to achieve policy changes through the rulemaking process. Interestingly, the punctuation generates simultaneous impacts on the policy network at both levels of political principals and agencies. However, the direction and the intensity of the impact differ between the two levels. By tracking sequences of changes from equilibrium to punctuation and then post-punctuation, a better understanding of the routine and outputs of rulemaking may be achieved.

This dissertation offers several contributions to the literature of public policy. Interestingly, it connects the studies that analyzes agencies and the rulemaking process with studies of subsystems and policy dynamics. It demonstrates the effect of punctuations on political principals such as congressional committees in addition to interest groups, and then connects them with the changes in the rulemaking routines and outputs. Furthermore, it exhibits the time sequences of the punctuating impacts such as describing what aspects of the policy network are affected by the punctuation and in what time sequence these effects take place. In other words, this dissertation examines policy dynamics, but from the administrative perspective.

In addition, it goes beyond studying agenda setting and policy adoption to incorporate the bureaucratic and implementation angle into the policy subsystem literature. By mapping and analyzing policy networks at levels of congressional hearings and rulemakings, both stages of

public policy are linked, illustrating the simultaneous and various effects of a punctuation on agenda setting and policy implementation. It is no longer accurate to study public policy in a stage-wise fashion. It is important to consider the mutual impacts of the parallel activities at the distinctly different levels of political principals and administration which provides a different perspective from the customary approaches that separate the stages of public policy. That perspective is the main theoretical contribution of this dissertation to the literature of public policy.

From a methodological viewpoint, this dissertation highlights the role of interdependencies between different types of actors in shaping the routine and outputs of rulemaking in particular, and public policy in general. Even though it has been used in the social sciences for some time, only a small number of studies apply SNA and its statistical models to policy networks, and fewer still focus on the rulemaking process. By promoting the use of SNA and ERGMs for statistical inference, some aspects of the subsystem and policy network behavior can be examined which have not previously received enough attention. In this dissertation, the importance of considering the interdependencies between actors in the network of principal and agents has been demonstrated in a way that baseline regressions such as linear or logistic models could not.

On the other hand, there are several limitations. Most importantly, the extent to which generalizations can be drawn from this study is limited. This dissertation studied the rulemaking process in a specific context related to oil policy and in a particular period of time. I identified systematic patterns of behavior of the participants of the rulemaking process, provided explanations for such patterns, and empirically examined the arguments of the study. Even though statistically significant results were produced, the findings of the dissertation cannot yet be generalized to other cases and policy sectors without further examination. These results could be confined to the particular policy and specific time period. Some of the results may be uniquely

related to the oil policy in that period. Others may be more universal. To make such generalizations, the process of rulemaking in other policies and in different time periods should be studied. Comparing the routines and outputs of rulemaking under various circumstances is a better way to draw generalizations than focusing on a single case study. Still, this case study provides a perspective for the causal mechanism that could be used for following comparative studies.

Moreover, this dissertation mainly focuses on the study of the relationship between the congressional committees and administrations. Little attention is paid to the other principals, specifically the President and the courts. These principals, I acknowledge, play important roles in shaping the routines and outputs of the rulemaking process. Nonetheless, there are practical and technical reasons for excluding them from this analysis. The availability of the data throughout the period of the study was one of the main obstacles. For example, the OMB meetings could form the network of interest groups lobbying President. Unfortunately, the official OMB website (www.reginfo.gov) does not provide sufficient information about these for the most period of the study. At best, it provides only an incomplete network in which tracking changes in lobbying behavior over time would not be feasible. Another reason is the limited resources and time available for collecting and analyzing extra data and information. For instance, the *amicus curiae* or friend of the court brief could be one of the means that interest groups utilize to influence the courts and in turn influence agencies' decisions. Displaying such influence requires deep analysis of the contents of the *amicus curiae* to determine the position of the interest groups and compare them with the actions of the courts and in turn the agencies. Such efforts may need a research team and/or apply advance software to analyze huge volumes of data and information. Given the limited time and resources available for this study, I had to choose what to focus my time and effort on.

Hence, I prioritized studying congressional committees over the President and courts as the most important and relevant subject of this study.

Last but not least, the complexity of the phenomenon studied here put additional limitations on what could be analyzed. I studied a network phenomenon where interdependencies between the entities within the network affect the behavior and actions of each other. Moreover, these entities hold different status, are connected through several relations, and evolve over time. In some cases, the set of data I analyzed is more complicated than the current research techniques and models can handle. For example, it would have been preferable to analyze a network that contains three sets of actors; congressional hearings, administrative rules, and interest groups. Each set of these actors has its unique characteristics; however, models that can analyze a network with three modes or sets of actors have not yet been developed. Existing models can readily analyze a network with one or two modes. I therefore had to divide the network to two separate two-mode networks. The first includes the interest groups and congressional hearings while the second network includes the interest groups and the administrative rules. I then extracted the information from the first network and attached it to the second network. This is a feasible solution, but it is not a perfect one. Some important effects have not been captured this way such as the effect of a specific network structure between two modes on the third or a structure within one mode on the other two. Hopefully, more network analysis software development will come in the future that enable researchers to handle such complexity.

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