

Local Responses to Offshore Exploration and Development Along the Atlantic

An Analysis of
Municipal Resolution Adoptions

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Abstract

What explains local responses to offshore exploration and development along the Atlantic? This question takes on increasing importance as local governments use specific political tools to reject their subordinate status in the hierarchal governance structure that manages offshore activities. By analyzing resolutions adopted by municipalities from Florida to New York, this research seeks to define what factors shorten the timing in which local governments object to recent presidential announcements to open the Atlantic to offshore activities. Using data on municipalities that eventually adopt resolutions during 2014-2019, I examine the effect of diffusion, institutional characteristics, demographics, and at-risk industries. While I find little evidence of regional diffusion in shaping the timing of resolution adoption under recent administrations, I do find that partisanship and other factors have some effect.

Keywords: local government, offshore exploration and development, duration analysis, municipal resolutions

Introduction

Since offshore oil and gas development began to take hold in the United States over half a century ago, the nation's coastal and energy policies have been connected and the governance challenge has been to manage oil and gas exploration and development so the coasts' natural and social systems can continue to meet the needs of all its citizens (Burroughs 2011). However, the cooperative federalism that was envisioned to govern these activities has failed by leaving out lower levels of government in the decision-making process (Weaver 2001). This failure deserves attention given that local governments, in their close proximity to these activities occurring in coastal waters, are the first ones to experience the effects of offshore exploration and development. Furthermore, while there has been ample attention given to federal and state legislatures who have attempted to block federal action through legislation (Lamp 2019), little attention has been given to strategies and tactics used by localities.

Thus, this research analyzes local government responses made in objection to federal government decisions on offshore exploration and development within the past and current presidential administrations of Barack Obama and Donald Trump, given these administrations announced intentions to open certain coastal waters to these activities. In particular, there has been a sizeable response by local governments made in opposition to these administration announcements to open the Atlantic to such activities. From 2014 to 2019, over 200 municipalities of varying sizes and demographics along the East Coast have adopted resolutions opposing offshore exploration and development (figure 1).

While understanding why municipalities might choose to adopt such resolutions is important for conceptualizing the political, environmental, and economic factors of local

decision-making in relation to this topic, I argue that analyzing the relative timing in which municipalities who eventually adopt resolutions is more important. Understanding this timing may highlight certain factors that local governments feel the need to act on sooner rather than later. Furthermore, the urgency in which municipalities feel obliged to adopt a resolution is particularly interesting when considering that these resolutions do not hold the legal force to exclude them from experiencing the effects of offshore exploration and development should the federal government go through with its announcements.

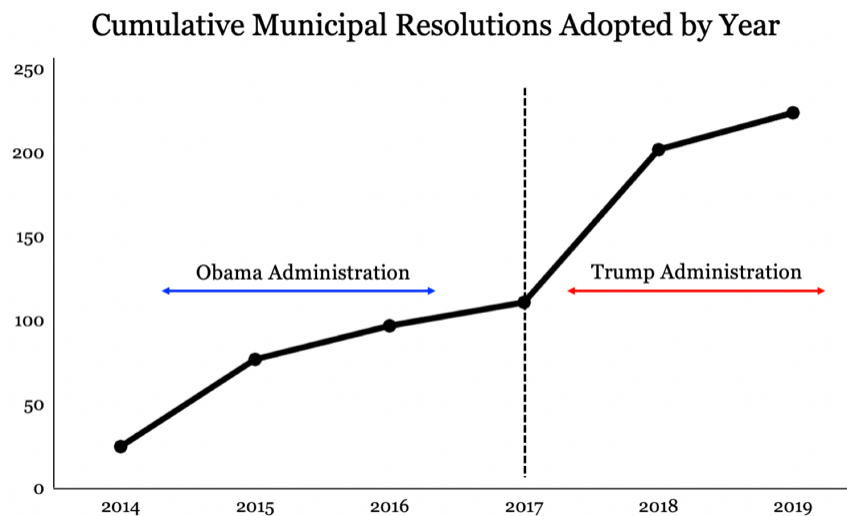


Figure 1: Cumulative number of municipalities from Florida to New York that have adopted resolutions opposing offshore exploration and development.

To test the research question of what affects the relative timing of municipal resolution adoptions along the Atlantic, I use duration analysis to look at several characteristics; namely, policy diffusion, political and institutional measures, and industry vulnerabilities. Overall, I find little evidence that municipalities will hasten their adoption when more nearby municipalities in the same county have adopted resolutions, suggesting that municipalities

may not be influenced to imitate their neighbors. Other evidence shows that the partisanship of a municipality's electorate, certain demographics, and relative proportion of certain at-risk industries does influence the time it takes a municipality to adopt a resolution. These results are important in that they can be used to fill the lack of comprehensive data existing on local action opposing federal announcements on offshore activities, as well as contribute to the larger body of research on local environmental decision-making.

Background and Literature

In the offshore exploration and development literature, empirical and theoretical research has been done on the development of the offshore industry in oil-producing geographical areas of the United States (Priest 1997, 2009; Porter 1992), on citizen attitudes following focusing events oil-producing activities induces (Grattan et al. 2011; Farrow et al. 2016), and the historical political debates occurring at both the state and federal levels (Miller 1984; Fitzgerald 2001, 2002; Sletto 2003), but outside of cases in California there has been little research done on the political tools lower levels of government have used to oppose offshore exploration and development, especially for the Atlantic region where offshore activities have not occurred in over forty years. Thus, in attempting to understand why resolutions are being utilized as a strategy for local governments to assert their opposition to offshore exploration and development as well as the relative speed in which these resolutions are passed, background for the theory proposed in this research is drawn from the overarching themes in the literature.

Contextualizing the Atlantic Opposition

Historically, the three geographical locations for offshore exploration and development in the U.S. have been the Gulf of Mexico, California, and Alaska with renewed attention being given to the Atlantic. The Department of Interior estimates that the Atlantic outer continental shelf contains 3.6% of the nation's oil reserves and 2.4% of the nation's gas reserves (Menaquale 2015). However, announcements of opening of the Atlantic have caused stakeholders to fiercely debate the commercial viability of these reserves as well as the economic, environmental, and social impacts of their potential development. Tensions among industries, environmental groups, and government agencies in some ways mirror those of California, the only one of the three geographical locations with experiences of offshore development to have exhibited such high amounts of opposition.

The opposition in California and the support in Alaska and the Gulf states for offshore exploration and development has largely been dependent on their individual historical experiences with the industry. For instance, many drilling technologies were developed in Louisiana, where the offshore oil industry took off, and therefore, residents had time to observe incremental changes as well as participate in them given that oil began dominating almost every corner of the state's economy (Freudenberg & Gramling 1993). Although the catastrophe of the BP Deepwater Horizon Macondo spill in 2010 may have tested the trust of the oil-producing gulf states, multiple studies analyzing pre-spill and post-spill attitudes of gulf states' residents found little significance in alteration of attitudes (Grattan et. al 2012; Farrow et. al 2016). On the other hand, California, which was initially supportive of drilling in the early part of the twentieth century, had a much larger alteration in public opinion after the 1969 Santa Barbara spill and the environmental movement of the 1970s (Smith & Garcia

1995). Mounting political opposition to offshore development restricted drilling along California by the mid 1980s.

The Atlantic has had a short-lived experience with offshore drilling when compared with these other areas. Brought about by Nixon administration's "Operation Independence," which sought to accelerate outer continental shelf leases, 28 exploratory wells were drilled from leases given to the Mid-Atlantic region from 1978 to 1981 (Doyle 1982). However, because the exploratory drilling did not define the area as a commercially viable oil-producing region, and the same political opposition restricting drilling in California was felt among the East Coast, the drills were closed in the mid-1980s. Since then, no concrete alteration to the Atlantic coastline has taken place from any associated stage of offshore oil activities: exploration, development, or production. Therefore, much of the current opposition being seen on the East Coast centers around the exploration stage of the offshore oil process, which includes seismic airgun surveying, the mechanism used to search for oil and gas deposits in the seabed.

However, the lengthy process of federal permitting for these surveys can cause confusion for some stakeholders. For example, these time delays may lead some stakeholders to associate surveying activities with development activities like the construction of rigs and pipelines. Thus, while there is a significant difference in the spatial and temporal timeline of exploration and development activities, citizens and elected officials can view the earliest announcements of opening the Atlantic as the potential for all activities to take place in their coastal waters. This is what Freudenberg and Gramling, in their work on the politics and perceptions of offshore drilling, call the "opportunity-threat phase" (1993).

Applying this logic to the Atlantic, where no offshore activities have occurred since the 1980s, a variety of stakeholders would perceive the impacts from the earliest announcements of plans to open the Atlantic from the President and/or relevant federal agencies. Upon these announcements are “opportunities” to those who see potential development as positive and “threats” to those who see potential risks with development. In this phase of defining opportunities and threats, stresses rise, politicians formulate their position, and interest groups form or redirect their energies.

For instance, at the time of Bureau of Ocean Energy Management’s (BOEM hereafter) announcement that seismic testing plans were being considered in 2014 under the Obama administration, U.S. Senators, Congressman, and elected state officials began making statements of approval or disapproval for the plans and began forming coalitions with other elected officials, as did coastal county and municipal officials ((South Carolina Conservation League et. al v. Wilbur Ross 2018). Environmental interest groups redirected their energies by forming “no drilling” campaigns and oil, while oil and gas groups began lobbying for development by creating platforms to attempt to counteract the environmental groups. While the oil and gas industry began releasing reports claiming that the Atlantic’s opening would lead to energy independence and generate millions of dollars in revenue for East Coast states and create thousands of jobs in the process (Hillegeist 2013), environmental groups released reports claiming that the opening would put millions of jobs at risk and be costly to state and national GDP by negatively affecting coastal industries that rely on fishing, tourism, and recreation (Menaquale 2015).

State-Federal Conflicts to Local Action

Since offshore oil exploration and development began to take hold in the U.S. over half a century ago, several jurisdictional battles have occurred between coastal state governments and the federal government on offshore governance and management decisions. Inherent in these battles has been the complex statutory and regulatory framework that has caused interest groups, political figures, government agencies, and industry to clash over the benefits and drawbacks of offshore development. Such battles, occurring up to present day, have collectively been called the “Seaweed Rebellion” (Fitzgerald 2001). Understanding the main components of this rebellion at the state-federal level is important when situating the role local governments have played within its larger framework.

The Seaweed Rebellion has occurred in three main ways; namely, litigation, moratoria, and revenue sharing (Burroughs 2011). The first relates to the statutes that arose as a way to solve the suits brought by California for state control over coastal resources and environmental safeguards. The Outer Continental Shelf Lands Act enacted by Congress in 1953 became the hallmark piece of legislation giving the Department of Interior authority to lease ocean parcels for offshore development. However, after the Santa Barbara oil spill in 1969 caused mounting pressures from coalitions across California and other coastal states, the OSCLA was amended to add environmental safeguards and the Coastal Zone Management Act was passed to allow for state involvement in federal decisions regarding the coastal zone. Yet despite the promise of inclusion within the procedural components of these statutes, state and local governments have continuously been left out of key management decisions across several presidential administrations (Weaver 2001). Specifically, the Secretary of the Interior has often done little to consult with local governments over proposed leasing programs and given minimal

justifications when they have rejected recommendations received by state and local governments under public comment periods (Christie & Hildreth 2015).

The second part of the rebellion stems from coastal states placing pressure on their congressional representatives to establish moratoria on the leasing of specific geographical areas. Since the 1980s, Congress has succeeded in using moratoria to remove certain areas of California and Florida, and since 1990, the President has also used his authority under section 12(a) of the OCSLA to also withdraw certain areas (Leske 2017). However, presidential withdrawal is highly contingent upon both the sitting administration's environmental and domestic energy policy. Additionally, Congressional moratoria cannot permanently remove the presence of the oil and gas industry from a certain area given that many of the battles for moratoriums have to be fought on a yearly basis (Weaver 2001).

Furthermore, only until recently, did the third component of the rebellion make true progress. Although several contentious battles between states and federal agencies for revenue sharing have been met with moderate successes over the past 50 years, brought about by pressure from coalitions across the Gulf states, Congress passed the Gulf of Mexico Energy Security Act in 2006. Although this increased the state share of revenue oil-producing states could receive from offshore development occurring adjacent to their state waters (Burroughs 2011), the further distribution of these revenues from states to localities is not transparent.

Ultimately, the Seaweed Rebellion has shown that the cooperative federalism that was originally envisioned to be the main governance system of offshore development has failed due to the nearly constant state-federal conflicts that have generally prevented the federal government from accessing the offshore oil and gas reserves it has pursued (Fitzgerald 2001; Weaver 2001). However, although cooperative federalism has been widely unsuccessful and

local governments have appeared to be a victim of the jurisprudence that subordinates them when considering revenue sharing, public comment periods, and information sharing across government levels, there has been some success by local governments in blocking offshore development, especially when looking at California's coastal communities from the 1980s until present.

In 1985, during Reagan's pro-oil administration, California was threatened with new lease sales and offshore development projects. When the state was unable to seek congressional moratoriums, Santa Barbara county placed two measures on the county ballot: Measure A, lobbied for by a Santa Barbara group called "Concerned About Oil" and Measure B added by the County Board of Supervisors (Weaver 2001). Measure A advocated for three protections against offshore development by using the local government's traditional zoning power to manage conflicting land uses, while Measure B was similar but with less zoning restrictions. Although only Measure B passed, both measures were significant in that they marked the first attempt of a lower level government to remove the influence of offshore development in their community outside of the state-federal battles occurring since the beginning of the Seaweed Rebellion. Following these measures, other California cities and counties began passing measures either completely banning or requiring public approval for the construction of onshore processing facilities; twenty-six cities and counties had passed such measures by 1990 (Tostevin 1987).

Current Local Action

By and large California has set the path for successful local government action against offshore drilling in the wake uncooperative federalism by innovating ways to assert their opposition outside of federal means. However, the measures passed in coastal communities throughout the 1980s occurred as a result of impending developments where offshore drilling was already taking place. As a response to recent presidential administration actions to attempt to include the Atlantic in five-year leasing periods and to potentially allow seismic testing to occur, a new wave of innovation has occurred in the form of municipal resolutions.

However, unlike California localities that used local zoning ordinances to give measures an action-forcing mechanism, the resolutions currently being passed do not carry the same legal backing in them to make them enforceable directives. In other words, a resolution only acknowledges the municipality's opposition, but does not exclude them from any future actions the federal government may take should it choose to go through with its plans on exploration and development.

When looking at the local activism continuum proposed by Riverstone-Newell (2009) that differentiates strategic local political behaviors made in defiance to unfavorable laws and policies made by higher levels of government, these resolutions appear to fall in the first strategic behavior of "reprimand," where local governments issue formal statements of dissent. By declaring opposition to the federal government's position of opening the Atlantic to oil and gas exploration and development, municipalities passing these resolutions are rejecting their subordinate status and are demanding that government change its course. These announcements of opposition mirror that of other municipal resolutions used as reprimand against federal government decisions. For example, over 200 cities passed resolutions in

opposition to the Iraq war in the early 2000s (Dolan 2018) and approximately 900 cities passed resolutions voicing their support for the end of the arms race in the 1980s (Shuman 1992).

Given that more enforceable strategic local political behaviors exist for municipalities to object to federal decisions, the question is raised of why these resolutions are being pursued if they do not carry the force of law behind them. One answer might lie in their symbolic nature. In environmental politics, smaller scale governments may pursue symbolic policies as a tool to announce certain intentions, which higher levels of government are not willing or able to fulfil (Matten 2003). This is consistent with studies on political actions taken by local levels of government on climate change where scholars contend cities implement symbolic policies as a means to incite local action to compensate for a lack of comprehensive national legislation (Krause 2011).

While there is not necessarily a lack of legislation on offshore exploration and development, similar logic can be applied to municipalities who pass resolutions where they perceive the federal government to be unable to fulfill its protection of activities that can threaten the operations of their community. When asked about what factors into the decision for a local government to pass a resolution, Rett Newton, the mayor of Beaufort, North Carolina said that resolutions are really the only way a small coastal town can do anything to remotely challenge the federal decisions made that show serious potential to negatively affect the town, especially when there are more immediate localized public concerns that the town has more resources to address (K. Ridgway, personal communication, October 2019). Such a statement reflects the planning capacity that elected officials and other leaders are faced with within local governments structures.

Incentives and Disincentives for Local Action

Given their seemingly symbolic nature, understanding the reasons why a municipality might choose to adopt a resolution against offshore exploration and development is important before analysis can be given to the relative timing in which these resolutions are adopted. In terms of incentives and disincentives for adopting a resolution, explanations can be broken down into political, environmental, and economic considerations stemming from the literature on local decision-making and the policy process.

Municipalities may be incentivized or disincentivized to adopt a resolution from the political influence of higher-level government officials and/or organized interests. Within the literature on local policy-making, the presence of environmental groups is generally associated with the uptake of local initiatives and policy (Portney 2009) and decision-makers often construct policy from interest group competition with the groups that do the best job of delivering political resources to local officials seeing their proposed policy carried out (Lubell et. al 2009). Relating this to the topic of this research, the adoption of a resolution by a municipality might occur if environmental interest groups with anti-offshore exploration and development campaigns do a better job of delivering political resources to local officials whereas pro seismic, oil, and development groups might pose an obstacle to resolution adoption.

The literature also seems to agree that it is not a matter of whether organized interests matter in local government decision-making, but which ones matter. In the scope of this topic, Oceana, one of the environmental groups with the largest and most mobilized campaigns to oppose offshore exploration and development provides resources for citizens, government

officials, and other concerned stakeholders to learn how to pass a city or town resolution. For instance, their webpage outlines eight steps to “pass a resolution in your town and city.”

Furthermore, organized interests that can also influence local decision-making involve forms of civic capacity, such as organizations and associations that have a participatory element, like homeowners’ associations and neighborhood groups (Daley et al. 2013; Hawkins & Wang 2012; Berry 2010). Efforts made outside of environmental interest groups to publicly oppose offshore exploration and development include various leagues, clubs, and associations. For example, the Virginia Beach Garden Club in 2014 sent a letter to both BOEM and the President expressing their opposition to offshore drilling and seismic blasting and the North Carolina Association of Churches, of which has several members from municipalities that eventually adopted a resolution, released an opposition statement.

In general, the more severe an environmental problem a community faces, the more likely a local government will respond (Konisky & Meyer 2007; Potoski 2001; Daley et. al 2013). But unlike governments that choose to respond to problems such as pollution, toxic waste, or rising seas that are negatively affecting their community, the environmental impacts from offshore exploration and development have yet to be actually experienced by these municipalities in the wake of pending federal government action. Therefore, before adopting a resolution, municipalities may consider the relative threats that environmental hazards associated with exploration and development may pose to their community. In every resolution that has been adopted, two main categories of threats to the coastal environment are mentioned, as well as the perceived impacts those threats will individually cause them. Even the few municipalities geographically distant from the coastline who have opted to adopt

resolutions mention the same two categories of threats for the damage they can indirectly incur from the impact done to the state economy.

The first category of threats relates to the sound emanating from the seismic airgun surveying used to search for oil and gas deposits in the seabed. Both the intensity of the noise and frequency of these surveys, given that a typical airgun test sends out pulses every 10 seconds, 24 hours a day, multiple days on end (BOEM 2014), have been found to cause irreparable harm to marine life, including threatened and endangered species (Hildebrand 2005). For example, seismic surveying is predicted to cause the North Atlantic Right Whale, of which 400 whales remain along the Atlantic, to go extinct (Nowacek et. al 2013). Studies have also found significant reductions in fish occupations of reefs during seismic surveying and increased fish mortality (Paxton et. al 2017).

The second category of threats relates to the potential of oil spills should development of rigs and wells occur if commercially viable amounts of oil and gas are found from the seismic surveying. Oil spills present a serious threat to the livelihood of local communities. For instance, the spill in most recent history caused by Deepwater Horizon explosion in 2010 spilled 19 times more oil than the Exxon Valdez in 1989 and contaminated more than 665 miles of coastline (Repanich 2010). It is also estimated to have had a \$8.7 billion impact on the economy of the Gulf of Mexico (Kroh & Conathon 2012).

Such findings on these two threat categories elicit serious conservation concerns among local communities, especially when considering the impacts they can have on fishing, tourism, and recreation industries where changes to a particular resource or industry a community is dependent on may contribute to increased vulnerability. Furthermore, when that particular resource or industry collapses, there is a substantial risk to the community's ability

to persist (Jurjonas & Seekamp 2018). This magnitude of risk has been explicitly quantified economically by local leaders in the language used in these resolutions. For instance, Beaufort, North Carolina's 2015 resolution says "estimate revenues from offshore exploration and mining of oil and natural gas fall far below the anticipated growth of revenues directly related to North Carolina's tourism industry" and Marathon, Florida's 2018 resolution states "South Atlantic support 70,000 jobs in the Florida Keys, and generate about \$4.4 billion in revenue through fisheries, tourism and related industries, which could be damaged irreparably by one oil drilling disaster."

Yet despite the economic harm from these potential environmental impacts, municipalities may also consider the economic growth offshore development can bring to their community. For example, local government leaders may prioritize the opportunity offshore development brings in spurring job creation and increasing health infrastructure in their community. Recognizing that jobs in tourism, recreation, and fishing industries can be impacted, governments may outweigh these losses with the opportunities for job growth in manufacturing and construction industries. Furthermore, during the growth of the offshore industry in Louisiana for instance, local leaders positively viewed the effect of upgrades to water and sanitation facilities and the increase in medical professionals to understaffed hospitals (Freudenberg & Gramling 1993).

Theory

Given there are various environmental, economic, and political considerations that may affect a municipality's decision to adopt a resolution opposing offshore exploration and development, what factors affect the timing of resolution adoption? Furthermore, are there differences in the timing in which municipalities adopt under the most recent administrations of Obama and Trump? By focusing analysis on municipalities that eventually adopt resolutions under these administrations, circumstances that influence why some municipalities choose to adopt resolutions sooner rather than later can be discovered. This will highlight which factors lead to a sense of urgency in municipalities to use resolutions as a tool to express opposition. My hypotheses attempt to capture various considerations for the adoption rate; namely, policy diffusion, political and institutional characteristics, demographics, and industry vulnerabilities.

The first point of inquiry examines the diffusion of municipal resolutions. In the policy diffusion literature, there are fewer studies on city-to-city level policy diffusion than on diffusion across higher levels of government. However, there has been recent work to uncover the mechanisms of diffusion within local policy adoption (Shipan & Volden 2008; Kontokosta 2011; Afonso 2016). Two such diffusion mechanisms often highlighted in the literature are learning and imitation. Learning takes place as policymakers observe the success of policy adoption in other governments and imitation takes place as policymakers copy the actions of other governments in order to appear the same. Within the context of these resolutions, municipal policymakers, council members, mayors, and other local stakeholders might desire to imitate other nearby governments who adopt resolutions in order appear the same.

A spatial component is also a common element of policy diffusion. For instance, Shipan and Volden propose that the likelihood that a city adopts a policy increases when the same policy is adopted by other cities throughout the state (2008). Berry and Berry (1990) also proposed the hypothesis that the probability of policy adoption is positively related to the number of nearby areas that border it that have already adopted. Furthermore, in an event history analysis of municipal adoptions of Bill of Rights resolutions, prior resolutions adopted within a 60-mile radius was found to quicken the speed of adoption (Vasi & Strang 2009).

Hypothesis 1: Municipalities will pass resolutions more quickly when there is a greater percentage of municipalities in the same county that have already adopted a resolution.

The second point of inquiry examines political and institutional characteristics and demographics. While research has shown that partisanship and voting behavior can influence policy outcomes on the federal and state levels of government, literature on municipal politics has argued that partisanship and voting behavior have had little impact on policy at the local level (Gerber & Hopkins 2011) due to subordination of local governments in their hierarchal relationship to state governments. However, recent research has begun uncovering impacts on local levels of government, especially relating to environmental policy. For instance, in climate policy, a study found the partisanship of a jurisdiction's electorate to significantly influence the probability of that jurisdiction adopting a policy (Gerber 2013).

Although several nonprofits with mobilized anti-exploration and development platforms have stated that the Atlantic opposition movement is bipartisan in nature (South Carolina Conservation League et al v. Wilbur Ross 2018), and both Democrat and Republicans elected officials along East Coast states have publicly expressed opposition to

offshore exploration and development, these statements do not consider the partisanship of local electorates. In other words, an electorate's partisanship may contribute to a sense of urgency among localities to object to federal government decisions by adopting a resolution in a shorter amount of time.

Hypothesis 2: Municipalities with higher proportions of Democratic voters will adopt resolutions earlier than municipalities with fewer Democratic voters.

A city's local political institutions has also been found to shape policy outcomes (Lubell et. al 2009) and support or opposition of environmental initiatives can be felt differently in different configuration of city governments (Daley et. al 2013). For instance, cities with mayor-council governments can be more politicized where organized interests have the ability to sway decision making more than council-manager forms. Perhaps organized interests advocating for resolutions do a better job of delivering resources and providing a sense of urgency for resolution adoption under different forms of municipal governments.

Hypothesis 3: Municipalities with mayor-council governments will pass resolutions quicker than municipalities with council-manager forms.

Other demographic characteristics include education, population, and income. For instance, some research has indicated that wealth is correlated with environmental preferences (Guber 2003). Other research has shown an association between education levels and demand for environmental quality (Paehlke 1990).

Hypothesis 4: Municipalities with higher education levels and higher median incomes will pass resolutions quicker than those with lower education levels and incomes.

The third point of inquiry examines the effect of vulnerable industries. Given the variance in sizes and economic compositions of the municipalities that adopt resolutions, offshore exploration and development has the possibility to greatly alter the municipality's employment and industry landscape, especially when there is dependence on a certain resource or industry. Although previous research that has looked at the effect of certain industries on local environmental policy uptake has found mixed significance (Daley et. al 2013), given the intense magnitude of the economic effect to certain industries offshore exploration and development poses (Menaquale 2015), I anticipate that municipalities who perceive a heightened sense of economic severity will pass resolutions in a shorter amount of time.

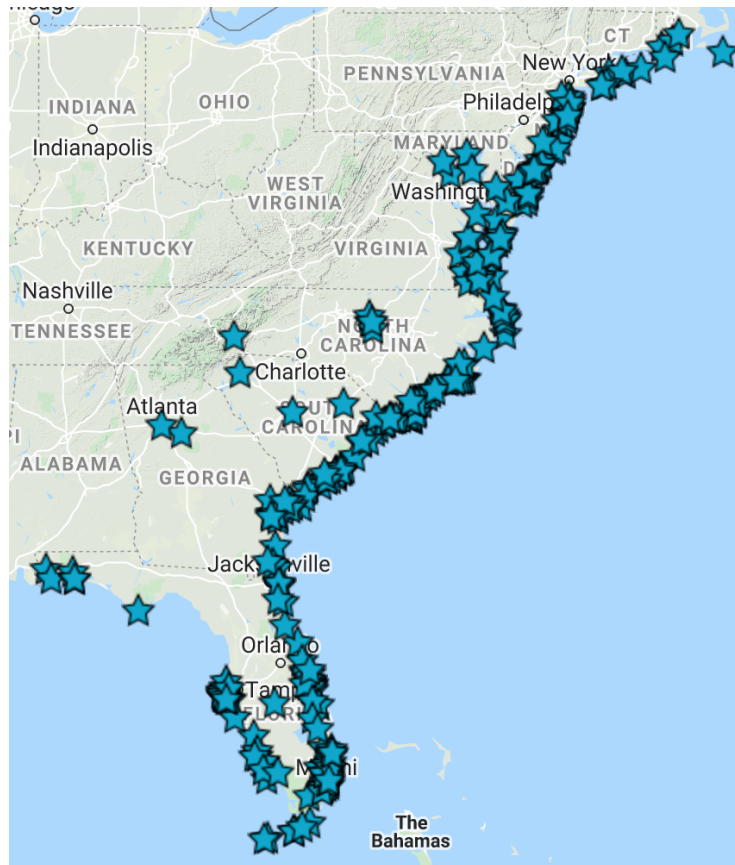
Hypothesis 5: Municipalities with a higher percentage of their employed population working in an industry that would be negatively affected or collapse due to offshore exploration and development will adopt resolutions quicker. Conversely, municipalities with higher amounts of the employed population working in industries that might benefit and grow from offshore exploration and development will take longer to adopt resolutions.

Data and Model

A list of all municipalities residing in coastal states boarding the Atlantic that have adopted resolutions opposing offshore exploration and development was acquired from Oceana, an environmental NGO with a large and mobilized anti-drilling platform. From 2005 to the time of writing in present day, 285 municipalities and counties along the Atlantic have adopted resolutions. Three restrictions were placed on this list.

First, only municipal adopters from Florida to New York were included in the dataset to most accurately reflect the regions that would be affected by the areas included in the announced seismic testing and development leasing plans under the Obama and Trump administrations. Second, because this research is interested in the timing of resolutions following announcements made under the Obama and Trump administrations, the dataset was restricted to adopters from the beginning of 2014, two years into the second term of the Obama administration. Third, fewer than ten municipalities have opted to adopt more than one resolution; of the ones that have, a resolution adoption in 2009 or 2010 is often followed by a re-adoption in the time period relevant to this research. No municipalities with adoptions prior to 2014 were included in this analysis. Usable data yielded 96 municipal adopters from 2014-2016 under the Obama administration and 119 municipal adopters from 2017-2019 under the Trump administration, for a grand total of 215 adopters across both administrations from 2014-2019.

Figure 2: Distribution of all Municipal Resolution Adoptions along the Atlantic from 2014-2019



Retrieved from <https://www.google.com/maps/d/u/0/viewer?mid=1hS12-13i63fE628Rs7GRlsqG3TI&ll=48.02533585454453%2C-109.79656215&z=4>

Before statistical analysis, an overview of the spatial and temporal distribution of the municipal resolutions opposing offshore exploration and development adopted along the Atlantic highlights some observations and patterns deserving of attention. Looking first at the earliest adopters under each administration, there is a difference in timing. The 10 earliest adopters under the first year of the Obama administration all occurred within the first two months, whereas the 10 earliest adopters under the first year of the Trump administration occurred within the first five months. However, both administrations are similar in that the

second year of observation in each has the highest amount of adopters; the amount of adopters doubles from the 2014 to 2015 under Obama and quintuples from 2016 to 2017 under Trump.

Second, the earliest adopters under the period of observation under Obama were geographically dispersed, occurring in different counties across Florida, North Carolina, and New Jersey. The earliest adopters under Trump were also geographically dispersed, occurring across Florida, Virginia, and New York, but on the county level were more close, with several occurring in the same counties.

In attempting to understand the relative timing of adoption among municipalities that eventually do adopt resolutions opposing offshore exploration and development, a cox proportional hazard model was selected for analysis. Under cox hazard models, the relationship between the hazard rate and the explanatory variables is estimated without any assumptions made about the baseline hazard function, although it is assumed that covariates have a constant effect on the hazard rate over time. Within the context of this research, the hazard rate is the likelihood that a municipality will adopt a resolution at a particular point in time. The dependent variable is the number of days it takes a municipality from the beginning of the observation period to adopt a resolution.

Three regressions were ran: two on municipal adoptions occurring in each presidential administration, and one on all adoptions by aggregating the administrations. The later regression was done in order to compare the effect of certain factors on the timing of adoption across administrations to within administrations. A number of covariates were selected for analysis; all are stable in their measurement and do not vary with time.

To test diffusion theory, the variable *Neighbors* measures the percentage of municipalities in a county that have adopted a resolution prior to the one in question. In the

event that a municipality lies within two counties, the municipality is counted as part of the county that holds the largest portion of the municipality's geographic area. *Prior Administration Adopters* is a binary categorical "yes" or "no" variable that is only used in the Trump administration model. It captures whether a municipality that adopts a resolution during the Trump administration lies within a county that had previous municipal adopters under the Obama administration.

Two variables were selected to test political and institutional theories. *Government Form* is a dichotomous variable coded as 1 when the municipality has a mayor-council form of government and coded as 2 when the municipality has a council-manager form. This information was collected from each municipality's government website. If the municipality's website did not specify their form of government, this information was collected from the municipality's most recent published town or city charter. Although there are several forms of municipal governments, all municipalities in my data set had government forms that fit the description of mayor-council or council-manager.

Democratic Vote is the municipality's percent share of the two-party vote for the Democratic Party candidate in the presidential election; for municipal adopters in the Obama administration, vote returns from the 2012 presidential election were used and for the Trump administration, vote returns from the 2016 presidential election were used. Precinct-level vote returns were aggregated to municipalities' geographic boundaries.

There are three demographic measures. *Population* is the municipality's total population, logged; 2010 Census data was used for municipal populations under both presidential administrations. *Education* captures the percent of the municipality's population that holds a bachelor's degree or higher. This information was difficult to obtain from the

2010 Census given that a sizeable portion of the municipalities in this analysis have a very small population. Therefore, for the Obama Administration, this information was collected from the 2014 American Community Survey and for the Trump Administration, this information was collected from the 2016 American Community Survey. *Income* is a measure of the municipality's median household income, logged. This data was also collected from the 2010 Census.

To test my industry vulnerability theories, two measures were selected. Ideally, tourism, recreation, and fishing industry measures would be beneficial to test my theories, however given the size and data available on the municipalities in this analysis, *Accommodation and Recreation* captures the percentage of the civilian employed population working in arts, entertainment, recreation, accommodation and food service industries. *Manufacturing* captures the percentage of the civilian employed population working in the manufacturing industry. Information for these variables was collected from the 2012 Economic Census. Descriptions and summary statistics for all variables used in the analysis are presented in table 1.

Table 1: Explanatory Variables and Summary Statistics

Variable	Description	Obama		Trump	
		<i>Mean</i>	<i>SD</i>	<i>Mean</i>	<i>SD</i>
Neighbors	Percentage of all municipalities within a county that have adopted a resolution prior to the one in question.	0.1413	0.1491	0.1745	0.1839
Prior Administration Adopters	Yes or no variable for adopters under the Trump period if the municipality in question lies within a county that had previous adopters under the Obama period.	-	-	-	-
Government Form	Dichotomous variable coded as 1 if the municipality has a mayor-council form of government and 2 if it has a council-manager form of government	-	-	-	-
Democratic Vote	Percent share of the two-party vote for the Democratic candidate.	0.4230	0.1284	0.4778	0.1438
Population	Total population within the municipal limits, logged.	3.7178	0.7856	3.91	0.89
Education	Percentage of population with a bachelor's degree or higher.	0.4170	0.1617	0.3669	0.1545
Income	Median household income, logged.	4.7759	0.1453	4.7600	0.15
Manufacturing	Percentage of civilian employed population working in the manufacturing industry.	0.064	0.044	0.0635	0.0465
Accommodation and Recreation	Percentage of civilian employed population working in arts, entertainment, recreation, accommodation and food service industries.	0.142	0.077	0.1207	0.0528

Results

Tables 2 and 3 below present the results of the cox hazard analysis. Not every variable that was expected to be significant in the analysis was found to be significant in all of the regressions ran. However, among variables hypothesized to be related to the timing of resolution adoption, some predict timing only within one presidential administration. Cox-snell residuals indicated good model fit, and the null hypothesis that model coefficients are simultaneously equal to 0 was rejected under the Wald test.

Table 2: Results from Cox Models A and B

Variable	Model A: Obama (2014-2016)		Model B: Trump (2017-2019)	
	Hazard Ratio	Standard Error	Hazard Ratio	Standard Error
Neighbors	0.982*	0.008	0.976***	0.006
Prior Administration Adaptors: Yes	-	-	4.025***	0.292
Government Form: Mayor-Council	0.904	0.230	1.141	0.246
Democratic Vote	0.994	0.009	0.996	0.007
Population	1.335	0.158	1.388*	0.150
Education	1.032*	0.013	1.003	0.009
Income	0.069	1.614	3.361	1.015
Manufacturing	0.962	0.026	0.949	0.027
Accommodation and Recreation	1.010	0.018	1.002	0.018
N	96		120	
Wald χ^2	17.69 (p < .02)		36.93 (p < 3e ⁻⁰⁵)	

***p<0.01, **p<.01, *p<0.05

Table 3: Results from Cox Model C

Model C: Combined Periods (2014-2019)		
Variable	Hazard Ratio	Standard Error
Neighbors	0.989**	0.004
Government Form: Mayor-Council	0.890	0.169
Democratic Vote	0.987*	0.006
Population	1.074	0.103
Education	2.839	0.007
Income	0.069	0.751
Manufacturing	1.001	0.018
Accommodation and Rec	1.038**	0.012
N	120	
Wald χ^2	31.17 ($p < 1e^{-04}$)	

*** $p < 0.01$, ** $p < .01$, * $p < 0.05$

Looking first at possible diffusion characteristics, *neighbors* has both a significant and small hazard ratio in every regression model. For all models, a 1% increase in the number of prior adopters within the municipality in question's county is associated with approximately a 2% reduction of hazard meaning that municipalities take longer to adopt when they are located near more prior adopters. To better grasp the results of the diffusion characteristics within the observed presidential administrations, survival functions are graphed below by manipulating this variable, while holding all other variables at their mean value.

Figure 3: Survival Function for Relative Percentages of Neighboring Prior Adopters under the Obama Administration

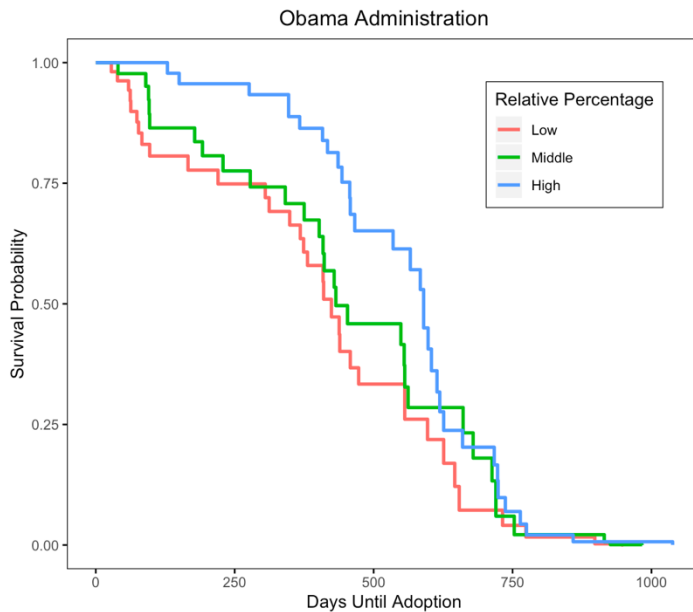
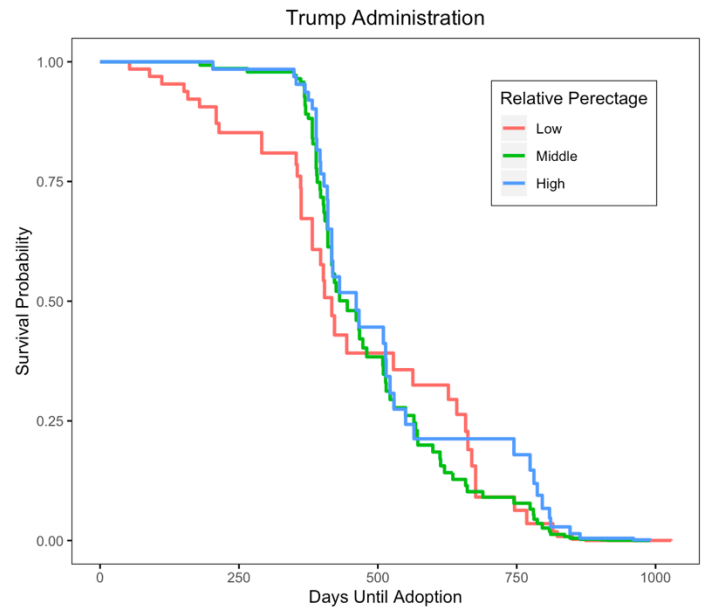


Figure 4: Survival Function for Relative Percentages of Neighboring Prior Adopters under the Trump Administration



Figures 3 and 4 above show the survival functions for relative low, middle, and high percentages of neighboring prior adopters. Under both the Obama and Trump periods, these graphs illustrate that municipalities that eventually adopt a resolution do so in a shorter amount of time when there is a relatively lower percentage of neighboring municipalities in their county that have adopted a resolution. Although this result is the opposite of what I expected to see, when comparing among municipalities that eventually do adopt resolutions, the presence of other resolutions in the county does not seem to hasten adoption.

However, there does appear to be evidence that under the Trump administration, municipalities adopt a resolution in a shorter amount of time when they lie in a county that had at least one prior adopter in the previous period under the Obama administration. Figure 4 shows the difference in survival functions for municipal adopters in the Trump administration that lie in a county that had prior adopters or no prior adopters under the preceding Obama administration.

Figure 5: Survival Function for Municipal Adopters under the Trump Administration located in a county with or without prior adopters under the Obama Administration

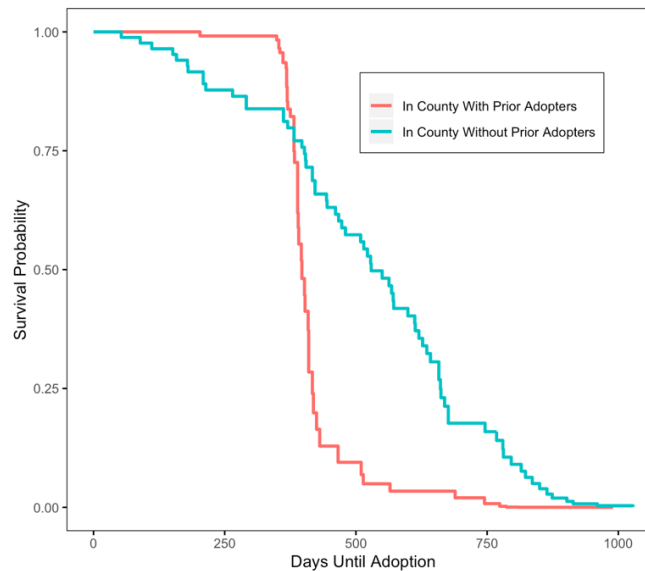


Figure 5 above illustrates a sharp quickening of resolution adoption from approximately day 400 to 500 of the analysis period for municipalities located in a county with at least one prior adopter under the preceding administration. This heightened period of adoption translates to 2018, a year into Trump administration. Although the reason for this spike a year into the administration cannot be determined from the regression results, it is worth noting that 2018 experienced a high volume of state-federal conflicts over federal announcement plans on offshore exploration and development.

It is interesting that in the individual administration periods the data shows no quickening in the speed of resolution adoption when there is a higher proportion of neighboring municipal adopters, but does show a quickening in adoption under the second administration when at least one nearby municipality has done so in the previous administration. While this points to mixed evidence of geographic diffusion of resolutions on the county level, there might be other factors not accounted for in these regression models, such as the interaction between diffusion and partisan responses.

Looking next at political and institutional variables, although Democratic Vote was not found to be individually significant under the Obama and Trump administrations, there is some evidence that the partisanship of a municipality's electorate affects the timing of resolution adoption. Figures 6, 7, and 8 below present the survival functions for the two-party presidential vote.

Figure 6: Survival Function for Majority Share of the Two-Party Vote under the Obama Administration

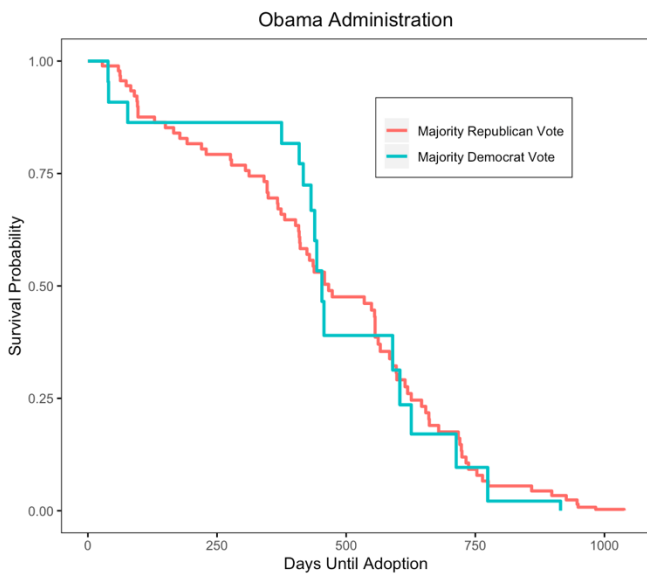


Figure 7: Survival Function for Majority Share of the Two-Party Vote under the Trump Administration

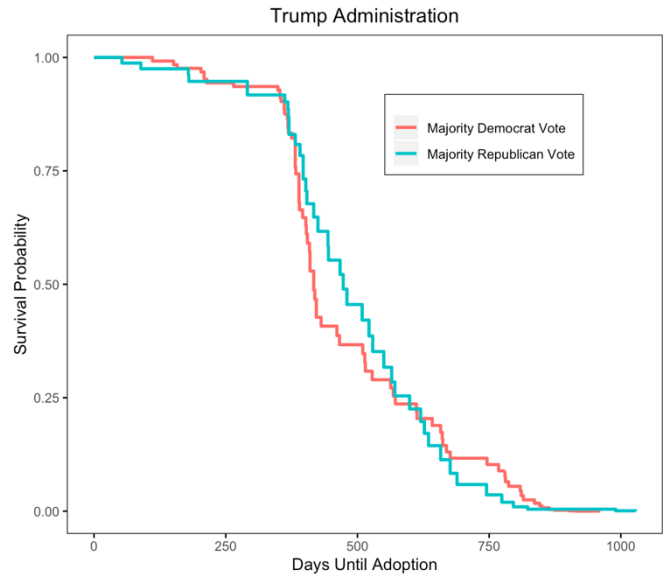
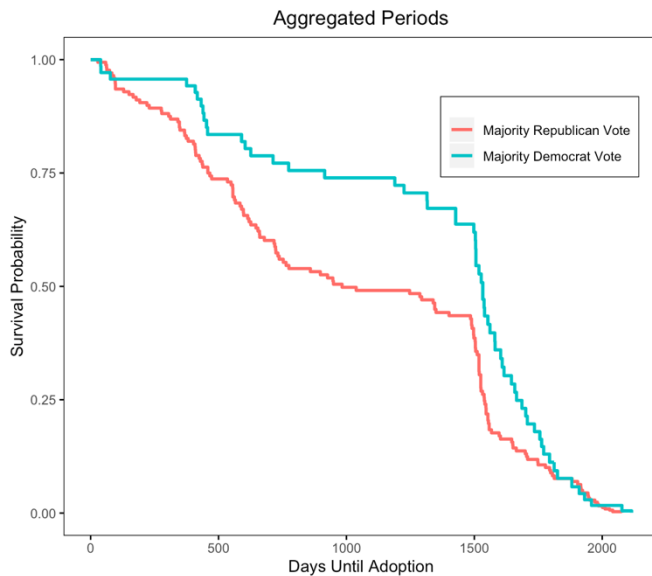


Figure 8: Survival Function for Majority Share of the Two-Party Vote under Aggregated periods



While the individual administration periods modeled in figures 6 and 7 exhibit fairly similar patterns between the majority Republican and Democrat vote, aggregating the Obama and Trump periods illuminates an interesting trend. Figure 8 shows two trends; namely, that municipalities with a majority vote for the Republican candidate adopt resolutions quicker and that there is a time delay in adoption by more Democratic municipalities, where their hazard of resolution adoption greatly increases after Trump's election (sometime approximately after day 1400). The results and graphs seem to suggest that if a municipality eventually adopts a resolution in one administration, partisanship does not make a difference for when they adopt one. However, more Republican municipalities adopt under Obama and more Democratic municipalities do under Trump.

Government form was also expected to have an effect on the resolution adoption rate. I expected that municipalities with more politicized mayor-council governments would be swayed more by environmental organized interests which would in turn quicken the decision-making surrounding resolutions, and thus adopt resolutions in a shorter amount of time. As indicated by the negative coefficients in each model, the data does suggest that having a mayor-council form increases the hazard of adoption, thus indicating a shorter time to adoption. However, the hazard ratio is not found to be significant in any of the models, and thus no association can be drawn on the effect of either mayor-council or council-manager municipalities.

Looking next at the demographic variables, some of my hypotheses were supported by the results. I expected municipalities with larger populations, higher median household incomes, and higher education levels to adopt resolutions quicker under the assumption that these characteristics would act as proxies for civic capacity in environmental protection.

While median household income did not have a significant effect on the speed of resolution adoption in any of the models, population and education did. Under the Obama administration, municipalities with higher percentages of their population having a college degree or higher passed resolutions quicker, showing that education might be an indicator of civic capacity in environmental protection for early adopters. Furthermore, under the Trump administration, more populous municipalities adopted resolutions quicker.

With respect to industry vulnerability measures, I find little evidence that support my hypothesis that municipalities with higher percentages of the employed population working in certain industries effects the speed of resolution adoption in individual administration models. However, I do find that under the aggregated administrations model, municipalities with higher percentages of the employed population working in the accommodation and recreation industries adopt resolutions quicker. This finding supports my logic that municipalities who perceive heightened economic problem severity from potential offshore exploration and development in their community will pass resolutions quicker from the sense of urgency that this perceived threat brings.

Discussion

What affects the timing in which municipalities along the Atlantic adopt resolutions opposing offshore exploration and development? My findings suggest that there are different explanations for timing of adoption under Obama and Trump's presidential administrations.

In sum, there is mixed evidence of resolution diffusion. Within each presidential administration, regional diffusion does not seem to drive adoption patterns, but there may be learning across time, such that when White House leadership changes, Democratic municipalities learn from Republican neighbors that adopted under the prior presidential administration. While certain demographic measures are significant in effecting timing of resolution adoption in individual administrations, political and institutional measures and industry vulnerability measures are not. However, when the administrations are aggregated, voting behavior and at-risk industries become significant in affecting the timing of resolution adoption. Although the duration analysis used in this research did not consistently illuminate one specific measure that affects the speed in which municipalities adopt resolutions, it has offered a good starting point to contribute to the lack of existing data on local action opposing federal plans to open the Atlantic to offshore activities.

It is important to note that there are some factors not accounted for in these regression models. One example is the effect of interest group presence on the diffusion of these resolutions. Given data availability limitations, I was unable to measure the presence of environmental NGO's "say no to drilling" or seismic testing opposition campaigns within these municipalities. It could be that once there has been an early innovator within the county, the NGO's campaign might redirect their resources to other counties without any adopters, leaving the municipalities without an incubator to follow the early innovator within the

county. Future studies should focus on the ways interest group presence and campaigns are related to geographic diffusion.

Furthermore, although my results do not point to geographic resolution diffusion on the county level, this does not negate the possibility that there might be evidence of diffusion on another regional level. It could be that municipal learning and imitation are occurring on a larger scale where connections a municipality has to another municipality in another county, part of the state, or to another state they share a border with speeds up resolution adoption rate. In a policy diffusion metareview, Gilardi finds that geographic proximity and clustering indicators can often be too blunt (2015), and therefore, future studies might consider looking for learning and imitation across other jurisdictional levels. Perhaps local resolutions prompt state legislation or state legislation prompts local resolutions.

Additionally, while this study focuses on municipalities that eventually adopt resolutions from Florida to New York along the East Coast, it would be interesting to compare the results of this study to a similar one analyzing the timing of municipal adopters along the Pacific Coast. Although no such similar study on this region has been published at the time of writing, regional comparisons of the timing of municipal resolution adoptions may highlight different political and economic factors that affect local government action.

To date, more municipalities along the Atlantic have passed resolutions and given local governments have been subordinated or entirely left-out of the decision-making process that factors into presidential administration plans on offshore exploration and development, this trend is deserving of more attention. Because the federal government is tasked with managing oil and gas exploration and development in a way that allows the coasts' natural and social systems to meet the demands of its citizens, analyzing the rapid response of local

governments in objecting to federal government decisions must be considered if the cooperative federalism envisioned for this management is to be restored.

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