EFFECTS OF NATURAL RESOURCES WEALTH OF POLITICAL

PARTICIPATION AND POLITICAL OUTCOME

An Undergraduate Research Scholars Thesis

by

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ABSTRACT

Effects of Natural Resources Wealth on Political Outcome and Political Participation

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The emergence of natural resources wealth in the United States has sparked intensive debates between the two political parties, Democratic and Republican, on their stance in support of the industry. As actions, taken by party or candidate in power, have impact on the regulations revolving the management of natural resources in the region, it is hypothesized that the significance of the industry within a county plays a role in influencing the county's voting behavior in national and local elections. Recent studies have also found respectively that (1) the energy boom and increased drilling activities drive economic growth in local counties and (2) economic conditions influence election outcomes by holding the incumbent responsible for economic performance. The two findings suggest that the wealth and management of natural resources could contribute toward incumbency advantage. In examination of the industry's influence in shaping voting behavior, the present study showed that oil and gas production in the industry are significant factors in increasing the Republican Party vote share, which aligns with the party's supportive rhetoric of the industry. In the second part of the study, relationship between the two past findings are tested and it is found that oil and gas production remain as important factors in deciding the incumbent's vote share in elections. It is also found that natural resources employment strongly contributes towards incumbency advantage.

CHAPTER I

INTRODUCTION

In the past decade, the United States has slowly emerged as a wealthy nation of natural resources. The energy boom, propelled by the shale revolution, led the United States to pursue its goal for energy independence and created significant economic growth for oil and gas producing states. According to the U.S. Energy Information Administration (EIA), imported energy as a share of total consumption in the U.S. decreased from 30.06% to 22.08% from 2005 to 2010. During the same period, it can be observed that oil and gas production grew by 24.7% and 40% respectively. Aside from the efficiency of energy extraction, an equally important aspect of the energy boom is its management. In the private sector, the energy companies dictate the efficiency of the labor market and the paying structure. On the other hand, government officials regulate production taxes and drilling activities. This interdependent relationship between the natural resources industry and government poses an interesting question: how influential are the wealth and management of natural resources in shaping election outcomes?

It is conceivable that the natural resources wealth in a county may motivate energy companies to support political parties or candidates that support the growth of the industry. These companies participate in the political arena in the form of political contributions. According to the Center for Responsive Politics (CRP), a non-profit and nonpartisan research group, the industry have contributed more than two-thirds of its campaign contributions to Republican candidates since the 1990 election cycle. In 2014, the political contributions by the oil and gas industry amounted to $144 billion .Energy is also perceived to be a polarizing topic that puts both parties to be at

odds with each other. In 2012, the NORC Center for Public Affairs conducted a poll and showed that 75% of Republicans are against government imposed drilling limits as opposed to the 34% of Democrats. Although it is hard to quantify the rhetoric of both parties, the poll and the political contribution trend suggest that the Republican Party is perceived to be more supportive of the industry.

The management of natural resources is also an important factor to consider as its management affects not only the corporations but the people living in these regions. Studies have shown natural resources, not properly managed, could have adverse effects on the country's political and economic landscape. Known as the resources curse, a collection of studies showed that natural resources, not properly managed, could produce adverse effects on the country's economy (Sachs 2001). This is proposed to be created by rent seeking behavior depending on the quality of education and the degree of political participation of the country (Wadho 2014). This rent seeking behavior could stem from incentives by private corporations to secure their interests in the political realm through political contributions (Heinberg 2015). However, in the United States, where education and political participation are high, evidence showed that natural resources wealth contributes to economic growth in local communities and counties. The growth are realized through higher employment and higher median income for the people in the community. The realized benefit may serve as a motivation for the people to vote for a candidate that is supportive of the industry. In addition, it is shown that oil and gas production also generates revenue for local governments through production taxes, land leases and property taxes.

These findings introduced questions on the relationship between the natural resources industry and election outcomes that this paper seeks to answer. Past studies have shown that the energy boom created additional benefits for local communities. At the same time, separate studies found evidence that voters utilize economic conditions as a measurement for the incumbent's performance and vote accordingly. It is tempting to infer that the natural resources industry contributes towards incumbency advantage. This study addresses this temptation by testing for transitive relations between the two findings. Based on the supportive rhetoric of the Republican Party and the high proportion of natural resources related political contributions it received, it is also hypothesized that oil and gas wealth and its management drives up republican party vote shares in national and local elections.

This study found evidence that the transitive relationship between the two findings holds. In three different elections – U.S. Presidential, Gubernatorial and U.S. House of Representative – across a ten year period between 2000 and 2010, the study found evidence that oil and gas production in the year prior to election and the percentage of natural resources employment in a county increase the incumbency vote share. As for its effects on Republican Party vote share in all the same elections, evidence showed that oil and gas production in the year prior to election and incumbency advantage is also a strong predictor.

Literature review and background

In his essay, Abramowitz elaborated on the historical predictive model for presidential election outcomes by discussing results from other studies (1988). Tufte (1978) showed that a percentage point increase in per capita income increases the incumbent's presidential party vote share by

almost two percentage points. Tufte (1978) also examined the effects of income change on House vote. In his paper, he found that income change has a statistically significant effect on the house vote. However, if the election is heled during a presidential election year, the presidential vote share has an effect on the vote share for the candidate from the president's party. Therefore, during a presidential election year, his model showed the per capita income change to be statistically significant and the presidential vote for the incumbent's party to be significant. It is therefore concluded that the candidate may ride on the president's coattails and that the effects of the per capita income change on house vote is indirectly generated through the presidential vote factor.

The second consideration in constructing a model to measure the effect of economic conditions on election outcome is the type of economic variables. This consideration has sparked extensive debate on whether a voter prioritizes the national economic condition or that of his own household. A voter is called sociotropic if he votes based on information regarding the national economy while a pocketbook voting is one where a voter decides based on his own economic conditions. While many studies have shown that sociotropic voting is more prevalent, these studies are often scrutinized for their inability to differentiate the effects of sociotropic voting from pocketbook voting (Marcus 1988).

Aside from the scope of economic voting, the perspective that voters adopt in their economic assessment of the candidate also plays a role in shaping voting behavior. Surveys conducted in past studies showed that voters tend to evaluate economic conditions in a retrospective manner (Lewis-Beck 1988). However, this is a controversial topic as there are conflicting evidence on

whether voters are generally more retrospective or prospective in their evaluation. For this paper, we assume that voters are retrospective because of the evidence by Lewis-Beck and also because evidence that candidates tend to use past achievements as a way to convince voters to vote for them or to dissuade voters to vote for their opponents.

Another consideration is that economic incentivized voting behavior is not uniform across all elections. In senate elections, voting behavior is influenced by the success of the presidency since senators serve the national legislative branch while gubernatorial elections are more driven by state economic conditions since governors are state executives (Markus 1998).

As for evidence on the economic benefits of fracking and the shale revolution, Weber concluded that gas production creates modest employment for the county (2011). Employments are not only generated within the natural resources industry but also across other related industries such as transportation and construction. A recent study by Feyner et al in 2015 confirms the finding by Weber that counties with oil and gas production generates economic benefits through an increased in employment (0.78 new jobs) and increased in income ($66,000) with every million dollars of oil and gas production. The aforementioned two papers were only investigating direct economic benefits to the population. Through production taxes and lease payments, local governments also accrued added revenues with oil and gas production from oil and gas companies (Newell and Raimi 2015). These added revenues may indirectly help the incumbent candidate by having him reinvest these revenues into his county or state. Although these evidences are strong, these papers are conducted over heavy oil and gas producing states such as

Arkansas, Colorado, Louisiana and Texas. It is unclear whether marginal oil and gas production

will create an equal proportion of economic benefits.

CHAPTER II

METHODS

Data

The dataset is compiled using a variety of sources. To compile data on election results, I utilize

the Harvard Election Data Archive (HEDA) which compiles available data on national and local

elections through various state government sites. For this study, data is collected on the U.S.

presidential election, gubernatorial election, and the U.S. house of representative election across

a ten-year period from year 2000 to 2010. The voting data is compiled on the county-level and is

the votes are categorized as democratic votes (dv) or republican votes (rv). The total vote casted

during each election (tv) is calculated as the sum of both party votes. For the purpose of this

study, independent party votes are excluded.

To establish the incumbent candidate vote share and the incumbency advantage factor, I created

a dummy variable based on the runoff election. If the incumbent candidate is not on the ballot,

then the dummy variable is assigned the value "0". Otherwise, the republican incumbent is

assigned the value "1" and the democratic incumbent candidate is assigned the value "-1". The

incumbent vote share is equivalent to either the dv or rv based on the party identification of the

incumbent candidate.

The vote share for both the incumbent candidate and republican candidate is calculated as a

proportion of the total vote share in the ballot such as $\frac{iv}{tv}$ and $\frac{rv}{tv}$. For the U.S. House of

Representative elections, counties are assigned their respective candidates based on the

congressional districts the counties belong. Counties are assigned their respective state candidates for the gubernatorial election and candidates are the same in each county for the presidential election.

To measure the size of natural resources in each county, oil and gas production data is compiled through the United States Energy Information Administration database. The data compiled are also at the county-level. Although annual production is not an accurate representation of natural resources wealth available in the region, data on oil and gas proven reserves are often unknown or private. Therefore, production is the next best available approximation for natural resources wealth. In the data set, oil production is measured by the barrels while gas production is measured by thousand cubic feet.

Another variable compiled for the dataset is the level of political contributions in each county. Political contributions data is compiled by Sunlight Foundation and Influence Explorer and the dataset is further categorized by the political party receiving the contributions. Unfortunately, county-level data collected is not further classified by its industry sectors and therefore, the data can only serve to measure contributions from all sectors to the specific county.

Another two variables compiled to measure the management of natural resources are annual employment and annual average income. The data is compiled through the Bureau of Labor Statistics under the Quarterly Census of Employment and Wages (QCEW) program. Through the database, I extracted data on employment and annual average pay for both the entire county and only natural resources and mining industry.

Datasets compiled are formatted and merged into a longitudinal panel data set. The election outcome dataset is formatted into three variables: election type, year, state and county. It is worth noting that the election data is not uniformly available across the states. Election results from 6 states – Alaska, Delaware, Hawaii, Illinois, Indiana, and West Virginia – are not available. For the remaining states, data is available for certain years and certain elections.

The dataset compiled for this study consists of 22669 observations with an average of 1786 observations for election results of a specific election type in a specific year. It is also interesting to highlight that the number of observations are biased towards the later period of our study. This is due to states improving their data collection methodology.

Methodology

To test the relationship between oil and gas production and election outcome, I performed an ordinary least square (OLS) regression on the panel data compiled. The first regression equation constructed tests for the effects of natural resources wealth and management on Republican party vote share.

$$rv_{ratio\,county,election,year}$$

$$= \beta_0 + \beta_1 \cdot \ln(oil_{year}) + \beta_2 \cdot \ln(gas_{year}) + \beta_3 \cdot rpc_{ratio} + \beta_4 \cdot ia + \beta_5$$

$$\cdot \frac{nr_{employment}}{industry_{employment}} + \beta_6 \cdot \frac{nr_{pay}}{other_{pay}} + \epsilon$$

The Republican Party vote share (rv_{ratio}) is measured as the proportion of total votes casted in

the ballot for the two political parties. Therefore, $rv_{ratio} = \frac{rv}{dv+rv}$. For the independent variables included in the regression equation above, the variables undergo certain transformations to cater for the rv_{ratio} property as a vote share instead of an absolute number.

Both oil and gas production are fairly large in producing counties. The means of both production variables for each county are approximately 440,000 barrels and 6,650,000 tcbf. Therefore the effects of production on the vote share may be hard to interpret if the regression is performed with the original variable. To simplify the model, both variables undergo a logarithm transformation which allows us to better interpret the coefficients as the percentage change in vote share due to a one percent change in the variables.

For natural resources employment variable, it is more useful to study the effects of the natural resources employment as a percentage of the total employment in the county instead of the number of employment in the industry. It is also more interesting to level of natural resources industry pay relative to the other industries in the county instead of the absolute level of the industry pay itself. The annual average pay variable is then transformed by the function $\frac{nr_{pay}}{other_{pay}}$

where $other_{pay} = \frac{total_{employment} \times total_{pay} - nr_{employment} \times nr_{pay}}{total_{employment} \times total_{pay}}$.

ia is the incumbency advantage dummy variable which consists of three different values as described in the Data section. In addition, we also included a rpc_{ratio} variable that measures that proportion of political contributions to the Republican Party in the county.

The second hypothesis test for the transitive relationship between two findings: (1) natural resources wealth and management creates economic benefits to local communities and (2) economic conditions affect voting behavior towards incumbent candidate.

$$\text{iv}_{\text{ratio}_{county,election,year}} = \beta_0 + \beta_1 \cdot \ln(oil_{year}) + \beta_2 \cdot \ln(gas_{year}) + \beta_3 \cdot ia + \beta_4 \cdot$$

$$ria + \beta_5 \cdot \frac{\text{nr}_{employment}}{industry_{employment}} + \beta_6 \cdot \frac{\text{nr}_{pay}}{other_{pay}} + \beta_7 \cdot \ln(oil_{year}) \cdot ia + \beta_8 \cdot$$

$$\ln(gas_{year}) \cdot ia + \beta_9 \cdot \frac{\text{nr}_{employment}}{industry_{employment}} + \beta_{10} \cdot \frac{\text{nr}_{pay}}{other_{pay}} + \epsilon$$

The regression model constructed is fairly similar to the first regression model. However, to test the effects of natural resources variable after holding the incumbency effects constant, the model included interaction terms which are the multiplication of the incumbency factors with the original variables. It is important to note that iv represents the incumbent party's vote share and not the incumbent candidate vote share. Therefore, if the incumbent candidate is not running, the interaction terms will automatically be zero and the vote share will only depend on the remaining main effects.

CHAPTER III

RESULTS

By applying the fixed effect regression model described in the methodology section to the panel data, the results obtained are displayed in Table 1 below. In the table, the dependent variable is the Republican Party vote share.

The table showed the importance of controlling for multiple fixed effects when running regressions. When the model controlled for the year, county and election type fixed effects, it is found that oil and gas production in the year prior to the election are statistically significant at the one percent level in predicting the vote share. However, oil and gas production in the current year are shown to be insignificant in the model. When the model only controlled for year fixed effects, the rpc_{ratio} and $nr_{employment}$ ratio are statistically significant variables in the model. However, the addition of county and election fixed effects immediately rendered the $nr_{employment}$ to be insignificant. It can also be argued that political contribution is a response variable to the state of natural resources industry in a county and therefore, the variable may dilute the effects of the other variables. In model (7), the variable was removed and the $nr_{employment}$ ratio was calculated to be weakly significant. In all the different variation of regression models, nr_{pay} ratio is insignificant.

The effects of oil and gas production on republican vote share is quite significant. On average, oil producing counties produces 1400,000 barrels of oil a year. The model showed that an average or above average oil producing county has republican votes of at least 2.4% more than a

non-oil producing state assuming all other things are equal. However, the variation in republican vote share between different producing states is extremely low. The coefficient showed that a 1% increase in oil production only contributes to a 0.0017 increase in the republican vote share. Similarly, a gas producing county extracts 6 billion cubic feet of gas annually on average. Compare to a non gas producing county, the county yields a 1.87% increase in republican vote share. This means that oil and gas production contributes an average of 4.2% towards the vote share. Incumbency advantage, on the other hand, contributes 7% towards the vote share. Another highlight from the model is the effect of the year variable on republican vote share. The year 2006 and 2008 has 5% less republican votes than the other years studied.

Table 2 below display the results of the 2nd fixed effect regression model described in the methodology section. The dependent variable is the incumbent party's candidate's vote share, iv_{ratio}. The table showed that oil and gas production remains a huge predictor of incumbent party's success. The plausible explanation is that a candidate, regardless of his party identification, will support the natural resources industry if his county is a producing region. This is further supported by the smaller party identified incumbency advantage in the model relative to that of

One of the highlights in the table is the natural resources employment ratio. In the model, if the incumbent candidate is not running, the incumbent party losses 0.18% of vote share for every 10% of oil and gas employment. However, the employment ratio contributes around 2.2% towards the vote share if the candidate is an incumbent. This represents a strong evidence that the transitive relations betfaween the aforementioned two findings hold.

Response: Incumbent Party Vote Share	
$Oil_{previousyear}$	0.0055***
	(4.59)
$Gas_{previousyear}$	0.0026***
	(2.66)
$Incumbency\ Advantage$	0.0230***
	(7.28)
$Nat.Res.Employment\ Ratio$	-0.0179
	(-0.25)
$Nat.Res\ Pay\ Ratio$	-0.0587***
	(-9.90)
Interaction Term with Incumbent	
$Oil_{previousyear} \cdot I$	0.0015**
	(2.13)
$Gas_{previousyear} \cdot I$	-0.0016***
	(-2.75)
$Nat.Res\ Employment\ Ratio \cdot I$	0.2173***
	(3.76)
$Nat.Res\ Pay\ Ratio * I$	0.0721***
	(20.3)
$Constant$	0.5536***
Fixed Effect	
Year	Yes
County	Yes
Election	Yes
R-squared	0.1204
N	20255

Note:
* Statistical significance at the ten percent level
** Statistical significance at the five percent level
*** Statistical significance at the one percent level

Table 2

CHAPTER IV

CONCLUSION

Discussion

Although the results found in the study verifies the hypotheses regarding the effects of natural resources on election outcomes, there are many other factors that should be studied and taken into consideration in future studies. A huge obstacle to this study is the lack of availability of data on the county-level. It may be advisable to construct the research on a state level to see if such micro analysis is needed.

As mentioned in the introduction of the paper, government regulations and rent seeking behavior remain could be huge factors in enabling the industry to affect elections. The level of production taxes and land lease payments may influence the government's decision in regulating drilling activities.

Oil and gas prices are also important factors in deciding the level of production activities and its management in terms of pay ratio and employment ratio. To study the effects of oil and gas prices, future study could consider gas basis prices which prices are pertaining to specific regions. A highly flooded gas supply region may have high gas production despite its huge gas reserves.

Many election related studies have also noted the importance of perception over reality. A county that has a strong economic outlook may not work in favor of the incumbent if the voters

perceive otherwise. In addition, it is also important to study the spillover effect of the natural resources industry to the rest of the economy.

Conclusion

The paper strongly showed that the Republican Party is benefiting from the natural resources industry in elections. Although it is not established if their actions warrant the support, it certainly tied voting behavior to the public perception that republican party is supportive of the industry. In regards to the effect of the industry to the incumbency effect, the study found evidence that the transitive relationship holds for oil production. This study is a preliminary approach to the examination of the political effects of the natural resources industry. It is worth considering whether the effect of the industry will disappear once the industry starts to plateau.

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