Do Increases in Petroleum Product Prices Put the Incumbent Party at Risk in US Presidential Elections?

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Abstract

This paper investigates the impact of petroleum product prices on the probability of an incumbent party losing a state (under the electoral college process) in a presidential election when that state had carried the candidate in the previous election. The main finding that there is credible evidence that the probability of the incumbent party losing a state previously carried increases with petroleum product price growth but only in those states that are primarily energy consuming in industrial composition. We also find that increases in the number of international conflicts, increases in real state per-capita income growth, and increases in state per capita grants-in-aid all reduce the likelihood of losing previously carried states while higher taxation growth increases this likelihood.

JEL Classification:
Key Words: petroleum prices, presidential elections

1. Introduction

A substantial literature has developed over the last thirty-five years studying the effect of economic conditions on election outcomes. Much of the early work (Kramer, 1971; Stigler, 1973) focused attention on US congressional elections and tended to find little evidence that economic conditions impacted election outcomes. Later studies, beginning in large measure with Fair's (1978) paper, and followed by Pollard (1983), focused attention on the outcomes of presidential elections, followed then by a focus on state legislative and gubernatorial elections (Peltzman, 1987, Chubb, 1988, Adams and Kenny, 1989). While modeling frameworks and empirical results vary, there is some consensus that presidential election outcomes are sensitive to economic conditions such as real per capita income growth (either state or national, depending on the nature of the study), unemployment, and, to varying degrees, inflation. Recent studies have particularly emphasized real per capita income growth as a major influence on presidential votes. A recent study by Fox and Phillips (2003), for instance, further investigated these relationships by investigating the factors influencing presidential approval ratings and found, at least for the post World War II period and largely consistent with much of the early work, that the real per capita income is the primary variable that influences on presidential elections.

It is interesting to note, however, that none of the studies that have looked at the relationship between election outcomes and economic conditions have included any measure of energy price conditions. This would on the surface seem a significant omission, particularly in the post-1972 "OPEC era" where petroleum prices have experienced significant fluctuations, certainly when compared to price patterns observed pre-1972. While many different elements (economic or otherwise) influence election outcomes, it is to the point that just prior to the 1976 and 1980 presidential elections, the world witnessed significant crude oil price spikes as a result of 1) OPEC's first embargo of the early 1970s and 2) the Iran/Iraq war that began in 1980. In both of those elections, the incumbent party lost the election. The 1992 presidential election may also have been, in part, influenced by high crude oil prices (at least when compared to the mid-to-late 1980s) as a result of the first Persian Gulf War. In the summer of 2000, the current gasoline price spike began, prompting many, including the now president George W. Bush, to heavily criticize the Clinton Administration for not pressuring OPEC to produce more or to launch policies to reduce the US's dependency on foreign source of oil. This, too, may have played a role in Vice President Al Gore's unsuccessful bid for the US Presidency in 2000. Indeed, in the 4 year period preceding the 2004 presidential election, US citizens were experiencing substantial gasoline and diesel price spikes. According to the US Department of Energy's Energy Information Administration (EIA), since reaching a low of about \$0.96 per gallon in February 1999, average national retail gasoline prices increased to about \$1.52 per gallon as of mid-May 2003 and climbed further, averaging \$2.03 per gallon as recently as October, 2004. Many commentators and journalists writing in the popular press in the months running up to the November 2004 elections espoused the potential for such price spikes to de-rail President Bush's re-election bid.[1]

The purpose this paper is to determine whether or not, and to what degree, energy price movements have on presidential outcomes, after controlling for other factors. More specifically, we investigate the impact of petroleum product prices on the probability of

[1] For example, one Newsweek issue printed a story with the title "Paying at the Pump: Record-high gas prices are putting pressure on politicians to come up with a solution, and making energy a hot topic in this year's presidential election." See http://www.msnbc.com/id/4610936/site/newsweek/.

an incumbent party losing a state (under the electoral college process) in a presidential election when that state had carried the candidate in the previous election.

It is reasonable to question whether or not the impact of crude oil or gasoline prices on presidential elections can be isolated from general economic performance and its impact on elections. Indeed, many studies have found a statistical link between macroeconomic performance and energy prices. However, in a recent critical survey of the empirical literature on this subject, Barsky and Kilian (2004) and demonstrate that the economic impact of energy prices is relatively small. For instance, they report a finding that in the United States a ten percent increase in oil prices will have less than a 0.5 percent reduction in gross output. This rather small impact was recently confirmed by Decker and Wohar (2005) at the state level. Explicitly focusing on energy consuming industrial employment, they find that, while petroleum product price changes have different employment effects on different states, these effects are relatively small. For instance, in the state of Ohio, the most "energy price sensitive" state according to data based on industrial composition, a ten percent increase in petroleum product prices will generate 3,692 jobs. When considering that Ohio employs approximately 6.7 million people, this employment effect is quite small.

The extant literature highlighting these minor impacts seems somewhat paradoxical given the amount of media attention energy issues receive during periods of crude oil and gasoline price spikes. Residences seem to care about energy prices, yet the economy appears to be relatively insulated from them. Therefore, it seems reasonable that energy prices may then have an effect on presidential election outcomes independent of general economic conditions. This paper investigates this issue.

The remainder of this paper is organized as follows. In Section 2 we discuss the empirical model, the data and data sources used in this study. in Section 3 we present our key findings and discuss ramifications. In Section 4 we conclude and offer some avenues for future research.

2. Empirical Model and Data

There is little consensus in the extant literature as to the technique and structure of the empirical models employed in modeling factors influencing presidential elections. Many models such as Fair (1978) and Fox and Phillips (2003) construct econometric models where the dependent variable is the share of votes a particular candidate or party receives in a particular elections. Other models such as Adams and Kenny (1989) and Southwell and Waguespack (1997) estimate models where the dependent variable is binary thereby explaining the determinants that aid in predicting the probability that a particular candidate will be victorious or not. We follow this second convention and treat our dependent variable as binary.

Our primary interest in this paper is in establishing what the potential impact that petroleum product prices is likely to be on a current office holder's re-election bid (either a specific politician or a particular political party) irrespective of political party affiliation. Moreover, our time frame focuses on the post 1973 OPEC oil embargo on the United States and other western countries because this event largely caused the rather sporadic price fluctuations world oil markets have experienced over the last thirty years. Therefore, we consider US presidential elections that occurred between 1976 through

2000, which only represents seven elections.[2] However, the US system for electing a president is based on an "electoral college" system where each state is given so many electoral votes, based primarily on population, which it can cast towards a particular candidate. Hence, a presidential victory requires a certain number of total electoral (no popular) votes. Losing one or two key states can cost a candidate a victory. We use the state-focused institutional structure to enhance the number of relevant observations to address our question of interest.

Specifically, we constructed our dependent variable, PRES, to equal 1 if the party, either Democrat or Republican, that a) won election *t-4*, and b) won a particular state *i* in election *t-4*, lost that same state in election *t*, and 0 otherwise.[3] Of a total of 357 observations, there were only 89 instances where the previously winning party lost a particular state in the subsequent presidential election.[4] Hence, it seems that the

[2] We do not include the 2004 presidential elections primarily due to data limitations. As we will see, our analysis is a US state-level analysis and petroleum product price data at the state level is available only through 2002 at the time that this analysis was conducted.

[3] Our focus on modeling the probability of losing a state previously carried is reasonable and appropriate given the objective of our study. At least three other possible models could have been considered. Perhaps the most obvious would have been to consider modeling the probability of the incumbent winning a state previously lost. This is intriguing but there are two issues that arise here. First, it's not obvious as to why we should expect this to be a better modeling approach nor is it obvious why we might expect results that differ substantially from what is presented in this paper. Secondly, from a practical perspective, the number of times such an outcome occurred in our set of presidential elections is less that ten percent of the total 357 observations which calls into question the statistical reliability of such a model. That said, perhaps with a few more elections and more such observations, this may be a reasonable avenue for future research. A second alternative may have been to model the probability of retaining a state previously won. This too has a number of difficulties associated with it. There are many states, for instance, that appear to vote for a particular party's candidate, such as Rhode Island for the Democrats and Indiana for the Republicans, irrespective of economic climate. If the desire is to explain such behavior, which is not really the purpose of this paper, the political dynamics at play in such states may require a different modeling approach than the one applied here. Third, one could model the percentage of votes cast against the incumbent party in a state, irrespective of whether or not the incumbent wins the state. However, from the candidate's persective, in the United State's presidential voting system, popular votes are not nearly as important as number of electoral votes since it's the winning of states that ultimately determines the election's winner. Moreover, such data at the state level is not readily available over time it's not clear that such a model would provide substantially different results from the dichotomous modeling structure adopted here. That said, however, it may be a potentially interesting avenue for future research.

[4] It is important to note at this point that there is no indication that there is always a select few states that comprise these 89 observations. Indeed, a total of 39 states recorded at least one instance of voting against

probability of the incumbent party losing a state in the subsequent election, i.e. that a particular state is "in play" in election *t*, is about twenty-five percent. This highlights the fact that certain states will tend to vote along a particular party line. For instance, Rhode Island tends to almost always support the democratic presidential candidate while Indiana tends to almost always support the republican. However, this apparent persistence characteristic among many states is not shared by all and, as suggested above, one or two states can tip the scale in favor of one candidate versus the other. For instance, while a great deal of attention was given to Florida during the 2000 elections, had Gore carried his home state of Tennessee, a state the democrats carried in 1996, the 2000 election outcome would have changed. Hence, our focus on factors that influence states, particularly those "in-play" states, seems reasonable.

With this structure given, we estimate an empirical model where the dependent variable is binary. Because we have cross sectional elements to our data, we adopt a modeling procedure proposed by Chamberlain (1980). We assume that the probability of the previously winning party loses state *i* in the subsequent election is a conditional probability that follows a logistical distribution and incorporates fixed effects components. Specifically, we assume:

$$\Pr(PRES_{i,t}=1)=\exp(\alpha_i+\boldsymbol{\beta' X_{i,t}})/(1+\exp(\alpha_i+\boldsymbol{\beta' X_{i,t}})), \tag{1}$$

where the α_i represents a separate intercept (i.e. fixed effect) for each state *i* and $\boldsymbol{X_{i,t}}$, where *t* indicates a specific election year, a set of variables believed to influence the

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the incumbent party during the period covered and 16 states recorded three or more such instances. This suggests strongly that our results are not being driven by a few select states and considering the entire set of 50 states is appropriate.

electoral outcome.[5] The variables we have chosen to define $\boldsymbol{X_{i,t}}$ follow largely from the existing literature with certain additional variables and constructs to meet the objective of this paper. Their definitions and data sources are provided in Table 1 and briefly described here. Table 2 presents descriptive statistics (mean, standard deviation, minimum and maximum) for each of the variables employed.

The variable $PETPR_{i,t}$ is each state's average composite price for petroleum products as published by the EIA.[6] We used this broader price measure because we are ultimately interested in the impact that energy prices have on electoral outcomes. This price measure, which we adjusted for general inflation using the national gross domestic price deflator since state level measures of inflation with sufficient history are unavailable, is highly correlated with both other energy prices, natural gas prices for instance, as well as more specific petroleum-based fuels such as gasoline. We include the growth rate of $PETPR_{i,t}$ in equation (1) specifically as $\ln(\Delta PETPR_{i,t})$.[7] Here, the growth rate is calculated as the percent change in the level of $PETPR_{i,t}$ in election year *t* relative to $PETPR_{i,t}$'s price level as in the year following the previous presidential election.[8] If indeed energy prices hurt the incumbent's election bid, we should expect to see that greater increases in PETPR over the relevant presidential term should increase the probability of losing state *i*. Therefore, a positive outcome should obtain.

While it seems reasonable that $PETPR_{i,t}$ should impact state electoral outcomes, it is not at all clear that every state will be sensitive to changes in petroleum prices to the same degree.

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[5] In addition to the Chamberlain (1980), Greene (1993, p. 655-57) provides a detailed discussion of this technique. LIMDEP 7.0 was used to estimate this equation.

[6] This data can be obtained at http://www.eia.doe.gov/emeu/states/_price_multistate.html. This composite price is constructed by EIA as a weighted average of a number of petroleum products prices. Products include distillate fuel, jet fuel, liquefied petroleum gasses, residual fuel and motor gasoline. The weights are based largely on each fuel's share of total petroleum expenditures, the largest of which is motor gasoline. Hence, there is a very high correlation between this composite petroleum price used here and the price of motor gasoline. Indeed, for forty of the fifty states, this price correlation is in excess of 98 percent over the period 1970 to 1999. The lowest correlation is Alaska's, where the price correlation is 96 percent.

[7] As with all log-transformed variables, we multiply by 100 to put this into percentage terms.

[8] For instance, $\ln(\Delta PETPR_{i,t})$ for election t=1980 represents the growth in petroleum prices between 1977 and 1980.

Some states' economies may be relatively insulated from movements in energy prices if their primary, or base, industries are not heavy consumers of energy. Other states may have substantial manufacturing sectors that utilized large amount of petroleum-based energy for production. Still other states that are primarily energy-producing states like Alaska, Louisiana, and Oklahoma, may welcome higher energy prices. It would seem then that some attempt to capture such differences be taken into consideration.

In doing so, we adopt a procedure developed in Decker and Wohar (2005) and construct $LQ\_C\_DMY_{i,t}$.[9] This variable focuses particular attention on energy consuming states defined by the following procedure. This procedure involves a few steps briefly outlined here. First, we adopt a procedure developed by the US Bureau of Economic Analysis (BEA) (1995) to determine which industries in a given state are considered "basic" – that is, industries that are essential to the local economy in that their markets are national or international in nature.[10] Once these industries are determined, we examine each to determine which are primarily energy consuming industries using information from both US Department of Energy, and the Bureau of Economic Analysis.[11] Once these sectors were identified, for each state we calculated total employment in

[9] For additional details, interested readers are referred to Decker and Wohar (2005).

[10] The focus on basic industries comes from theoretical and empirical support for Economic Base Theory, and it is reasonably employed here. This theory asserts that a regional economy consists of sectors that are exogenous (or "basic" sectors in that they define a regional economy's economic base) and sectors that are endogenous (i.e., "derivative" or "non-basic") to that economy. Exogenous sectors represent the specialized production of goods and services for a given region whose primary market lies outside regional boundaries, the sales from which inject income into the regional economy. Derivative industries are those that are dependent on the basic industries and whose purpose is to support the local economy. While challenged many times in its rather lengthy existence, Economic Base Theory remains one of the main theories of regional economic analysis for several reasons. First, empirical support for the model remains reasonably strong, second, it is the central structure employed in almost every regional forecasting model today, and third, it's easy to implement relative to other models (Polzin 2001). Moreover, the overall performance of a state's economy appears to be driven by the performance of its basic industries. For instance, Polzin (2001) finds, consistent with earlier studies, the primary determinant of a state's non-basic employment growth is growth in a state's basic industries.

[11] For manufacturing industries, we utilized The US Department of Energy's EIA's 1998 report on fuel consumption ratios by industry for the US as a whole. This ratio, calculated by EIA, measures a given industry's energy usage, measured in thousands of BTU's, per dollar of total value added generated in that given industry. The fuel consumption ratio for total US manufacturing was 9.4 BTUs per dollar of industrial value added. We classified those industries with ratios in excess of this average as "energy intensive." These industries are textiles, wood products, paper, petroleum and coal products, chemicals, nonmetallic mineral products (stone, clay, and glass) and primary metals (primary iron and steel

these sectors and divided by total state employment.[12] We then did the same for the US as a whole. We then constructed "location quotients" for each state by dividing each states' consuming energy employment share by that of the US's ($LQ\_C_{i,t}$). $LQ\_C\_DMY_{i,t}$, then, equal 1 if $LQ\_C_{i,t}$ is greater than 1 (indicating that state *i* has a larger share of energy consuming employment relative to the national share) and 0 otherwise. To see if there is a differential impact on election outcomes if voters are located in primarily energy consuming states, we interact $LQ\_C\_DMY_{i,t}$, with $\ln(\Delta PETPR_{i,t})$ in our regressions. Higher petroleum based energy prices should have a greater impact on a state's economy if that state is primarily an energy-consuming state. We expect therefore, that the estimated coefficient to be positive.

Other control variables come largely from the existing literature. For instance, we include $\ln(\Delta INC_{i,t})$, which measures the percentage increase in real state per-capita (after tax) personal income between t-3 and t.[13] If voters do indeed vote based on economic conditions as Kramer (1971), Fair (1978) and other hypothesize, then increases in per capita incomes should reduce the likelihood of the incumbent party losing a state in election *t* previously carried in an election four years earlier. Therefore a negative effect should be observed in the results. Along similar lines, changes in a state's unemployment rate should impact the electoral decision of a state. If voters hold the federal government responsible for job increases or decreases, then an increase in the unemployment rate over the incumbent party's tenure should have a tendency to increase the likelihood of losing such a state in election t and decreases in the unemployment rate should reduce this likelihood. We include $U_{i,t}$-$U_{i,t-3}$ to capture this potential effect.[14]

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manufacturing). For non-manufacturing industries, we consulted the BEA's 1998 "USE" table from their input-output matrix for the US economy. This provided us with information on the inputs to each industry's total output. If an industry realized a significant amount of its total value from oil and gas production and/or petroleum refining, we considered it an energy (consuming) intensive industry. This analysis revealed that nonmetallic mineral mining, railroad, trucking and other service transportation sectors including local and interurban transportation (buses, taxis, etc.) should be added.

[12] This employment data, as well as data on personal income, tax revenues, and population, comes from the US Bureau of Economic Analysis' Regional Economic Information Service (REIS) and can be easily obtained at http://www.bea.gov/bea/regional/data.htm.

[13] The data was adjusted for inflation using the US gross domestic price deflator.

[14] State unemployment data comes from the US Bureau of Labor Statistics, www.bls.gov.

Two policy-oriented variables, which to our knowledge have not been considered in previous studies but can be hypothesized to have an impact on electoral outcomes, are included as well. The variable $\ln(\Delta TAX_{i,t})$ measures the growth in real federal per worker income tax revenue collected in state *i* between *t-3* and election year *t*.[15] Tax policy is nearly always a substantial political campaign issue. *Ceteris paribus*, a general national aversion to higher federal income taxes (to various degrees) may suggest that increases in tax revenue collections, proxying for higher tax rates, may reduce the likelihood of the incumbent party retaining state *i* in election *t*. It may also be the case that federal injections into state *i* may improve the chances of the incumbent party retaining the state in election t. To capture this, we include $\ln(\Delta AID_{i,t})$, which measures the growth in real state per capita grants-in-aid to state *i* from the federal government between *t-3* and election year t. *Ceteris paribus*, increases in such aid should reduce the likelihood of the incumbent party losing state *i* in election *t*.[16]

Two additional control variables are included. The first is $DMYGOV_{i,t}$, which is a dummy variable indicating if the party of a state's governor is the same as the incumbent party seeking re-election in election *t*. The hypothesis here can go either way. One might expect that this might reduce the likelihood of the incumbent losing state *i* if it indicates a state's proclivity to vote for a particular party at various levels of government. However, if the governor of state *i* is not performing particularly well for state residents, this may hurt the presidential candidate's chances of retaining the state in election *t*.

Moreover, it is possible that international political events influence presidential election outcomes. During periods of international instability may bode well for this incumbent party if voters perceive there to be risks associated with governmental transitions (i.e. a sense of vulnerability during periods when the federal government is transitioning and clear leadership of

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[15] This variable was calculated using REIS data.

[16] Prior to 1983, this data was reported by the US Treasury Department. Since then, this data has been reported by the US Bureau of the Census. Fortunately, the data is regularly published in issues of the *Statistical Abstract of the United States*. We compiled this data form various issues of these abstracts.

the newly elected party has not been established). Indeed, many (such as Fair, 1978) find that during periods when the US is actively at war (during the World War II and the Korean war in particular), voters are ill-inclined to vote against incumbents. However, in periods when the US is *not* heavily involved in international conflicts, it is not clear what voter behavior will be. On the one hand, increased international unrest and instability may signal a desire on the part of voters not to change current US foreign policy. However, increase international instability may signal to the electorate that the current administration's international policies are not meeting with much success, suggesting then a desire for a governmental change. To capture these dynamics, we include $\Delta CONFLICT_t$, which measure the increase in the number of international conflicts (not involving US troops in an active war) that arose during the incumbent party's term, between *t-3* and election year *t*. A positive coefficient would indicate that the electorate is dissatisfied with the current administration's foreign policy directives and thus would prefer a change. A negative coefficient would likely suggest that the electorate associates some risk associated with changing US policy.[17]

Finally, we include several election-specific dummy variables to account for recent elections that followed administrations subject to scandals. Specifically we include a dummy variable for the 1976 election since it followed Watergate, the 1980 election as it followed the Iran hostage crisis, the 1988 election as it followed the Iran-Contra affair, and the 2000 election as it followed the Clinton impeachment activities. In each case, the corresponding event may have caused substantial difficulty for the incumbent party's efforts to maintain states previously

[17] This data comes from Center for the Study of Civil War at the International Peace Research Institute, Oslo (PRIO) and the Department of Peace and Conflict Research, Uppsala University. We did not include a dummy variable indicating if the US was at war since for the elections we are considering, from 1976 through 2000, the US was not substantially engaged in what might be considered a highly active war with substantial US troops committed during the actual election year itself. Indeed the only election in close proximity to a US war was the 1992 election following the first Persian Golf War in 1990-91. In an earlier version of the model, we included a dummy variable for the 1992 election in an effort to see if this would pick up a "war" effect but the variable proved insignificant, perhaps due to the fact that the 1992 election was too far removed from the war and concerns over the general economy (which we already control for) dominated.

carried. Hence, in each case, we should see a positive impact on the probability of the incumbent party losing state *i*, *ceteris paribus*.

3. Results and Ramifications

In Table 3 we present statistical results from three versions of our empirical model, The first model, Model 1, considers all independent variables discussed above. In Models 2 and 3 we drop the change in the unemployment rate and the growth of income, respectively, since there is a fair degree of statistical correlation between these two variables.

In answering the question of whether or not energy prices impact state's proclivity to vote against the incumbent party's presidential election bid, the answer appears to be a *qualified*, "yes". The results indicate that overall there is little evidence that increases in petroleum product prices impact the probability of the incumbent party losing a state in election *t* previously carried. However, if one focuses attention on those states that are primarily energy consuming, then we do indeed find that the probability of the incumbent party losing a state previously carried increases with increases in petroleum product prices. The coefficient on $\ln(\Delta PETPR_{i,t})*LQ\_C\_DMY_{i,t}$, is consistently positive and significant at the 10 percent level across all three models estimated.

Other variables that are consistently statistically significant include $\ln(\Delta INC_{i,t})$, $\ln(\Delta TAX_{i,t})$, $\ln(\Delta AID_{i,t})$, and $\Delta CONFLICT_t$. Growth in real state per capita incomes do appear to have a (albeit weak) statistical impact. According to Model's 1 and 2, increases in real state per capita incomes bode well for incumbents in that, as expected, the probability of the incumbent party losing a state previously carried falls with increased income growth.[18] We further find that

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[18] Strictly speaking, this variable is significant at 10 percent in Model 2 but not in Model 1. However, with a *p-value* of .1034 in Model 1 and the potential for collinearity between income growth and unemployment,

increases in federal taxes collected over the three year period prior to election years *t* adversely impacts the incumbent's presidential bid. Specifically, we find that growth in federal tax collections increases the probability of the incumbent party losing a state previously carried. Moreover, this variable is strongly statistically significant in all three models investigated.

It also appears to be the case that federal injections into state economies, in the form of grants-in-aid, benefits the incumbent party. In all three models we find that growth in real grants-in-aid over the three year period leading up to election year *t* negatively impacts the probability of the incumbent party losing a state previously carried and the variable is significant at the 10 percent level in all cases. Finally, we find systematic evidence that increases in international conflicts during the incumbent party's tenure leading to election year *t* does not bode well for the incumbent. The result strongly suggest that voters in certain states are inclined to vote against the incumbent party if the international political climate became more unstable during the three years prior to election *t*.[19]

There is no evidence to suggest that increases in the unemployment rates impact a state's proclivity to vote against the incumbent party (as particularly evidenced by the variables insignificance in Model 3), nor does the party affiliation of state governors appear to impact the incumbent's odds of losing previously carried states. Finally, we find no evidence that there is any systematic difference in the probability of the incumbent party losing a state previously carried in any of the particular elections controlled for. While, with the peculiar exception of the 1980 election, the estimated coefficients are positive, as one would expect, the *p-values* indicate insignificance.[20]

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we can be reasonably confident that income growth does indeed have a statistical impact on these election outcomes.

[19] It is worth reminding readers that these conflicts are not conflicts involving US military personnel. Therefore, this result should not be taken to mean that voters are unlikely to vote for the incumbent when the nation is at war. Indeed, since the US was not actively at war during any of the election years considered here, our model cannot speak to the likelihood of retaining a war time president.

[20] Indeed, the DMY_{80} variable is negative in all models, and quite surprisingly statistically significant at 10 percent in Model 3. It is difficult to ascertain why this result came about and it certainly merits further

While statistical significance offers important information, the estimated coefficients do not measure marginal effects in the Logit Model. Therefore, inferences about magnitude are not possible simply by inspecting the value of the coefficients. For the Logit, in can be shown that the marginal effect of variable k on the dependent variable, in our case $PRES_{i,t}$, is $\beta_k \widehat{PRES_{i,t}}(1-\widehat{PRES_{i,t}})$, where $\widehat{PRES_{i,t}}$ is the estimated value of the probability of the incumbent party losing state *i* in election *t* conditional upon $\boldsymbol{X_{i,t}}$ where we evaluate all of our independent variables at their sample means, $\overline{\boldsymbol{X}}_{i,t}$, and the estimated coefficients from Model 2 are used.

In Table 4 we present the marginal effects of the statistically significant variables from Model 2 again when evaluated at each regressor's mean. When doing so, our model produces a conditional mean for PRES at 0.455. Increases in the number of international conflicts appears to have the largest impact on the probability of losing a state previously carried, followed by real state per capita income growth and taxation growth. Indeed, one additional international conflict appears to increase the likelihood of losing a state previously carried by 5.3 percent, relative to the calculated mean of PRES. Similarly, a one percentage point increase in real state per capita income growth reduces the likelihood of losing a state previously carried by 2.6 percent. An increase in the price of gasoline appears to have a relatively small impact on the likelihood of the incumbent losing previously carried states. However, if recent history is any guide, when energy prices increase, they tend to spike, i.e. increase substantially. If we postulate that petroleum product prices increased 10 percentage points in the three years prior to

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attention in future related research. However, it should be remembered that this election was a highly contested election (unlike the following 1984 election). Therefore, the insignificance of the dummy may be easier to accept.

election *t*, then this would translate into a 5.5 percent increase (again, relative to the mean value of predicted PRES) in the likelihood of a energy consuming state voting against the incumbent in election year *t*. Hence, substantial price spikes can be detrimental to incumbents seeking repeated electoral victories, at least in energy consuming states.

4. Conclusion

Previous research that has investigated the relationship between presidential election outcomes and economic conditions has failed to include any measure of energy price conditions. This seems strange given the amount of media attention that energy related issues receive during periods of crude oil and gasoline price spikes. Residences seem to care about energy prices, yet the research has indicated that the economy has become more insulated from these shocks over time. It seems reasonable that energy prices may then have an effect on presidential election outcomes independent of general economic conditions. This paper has investigated this issue.

In particular, this paper investigates the impact of petroleum product prices on the probability of an incumbent party losing a state (under the United States' electoral college process) in a presidential election when that state had carried the candidate in the previous election. The main finding that overall there is little evidence that increases in petroleum product prices impact the probability of the incumbent party losing a state in election *t* previously carried. However, there is evidence that the probability of the incumbent party losing a state previously carried increases with increases in petroleum product prices but only in those states that are primarily energy consuming in industrial composition. These results offer some potential policy implications. For instance, from a purely political perspective, since our findings suggest that increases in petroleum product prices have to be fairly large in order substantially effect the probability of losing a state previously carried, we should not necessarily expect the incumbent president to succumb to political pressure and adopt oil supply promoting policies such as releasing the nation's strategic petroleum reserves, even during election years.

In examining the effect of petroleum prices we control for other factors including the growth in real state per-capita income, growth in federal tax collection, inflows of federal grants and aid into state economies, party affiliation of state governors, and the number of international conflicts that arose during the incumbent party's term. We find that increases in the number of international conflicts has the largest impact on the probability of losing a state previously carried followed by real state per-capita income growth and taxation growth. Growth in real per capita grants-in-aid to states appears to have the smallest impact of the (statistically significant) variables investigated. That said, the incumbent party would be well-advised to seriously consider the ramifications of higher energy prices on the electorate.

There are a number of avenues of future research to consider. It would be beneficial to consider state governor as well as US House of Representatives and US Senate election outcomes and energy price growth to see if energy prices impact other elections at differing levels of government. It may too be useful the energy price effect prior too the first OPEC crisis of 1973. Finally, it would be very interesting to conduct a similar analysis for European and other non-US countries with democratic governmental systems to see if the effects persist elsewhere and what the relative magnitude of the effects are. We leave these efforts for future consideration.

References

Adams, J.D., and L.W. Kenny, "The Retention of State Governors," Public Choice, 62 (1989): 1-13.

Barsky, R. and Kilian, L. "Oil and the Macroeconomy since the 1970s" The Journal of Economic Perspectives, 18, (Fall 2004): 115-134.

Chamberlain, G., "Analysis of Covariance with Qualitative Data," Review of Economic Studies, 47, (1980): 225-238.

Chubb, J.E., Institutions, the Economy, and the Dynamics of State Elections," American Political Science Review, 82 (March, 1988): 133-154.

Decker, C.S., and M.E. Wohar, "The Impact of Petroleum Product Prices On State Economic Condition: An Analysis of the Economic Base," The Review of Regional Studies (2005) Forthcoming

Fair, R., "The Effects of Economic Events on Votes For the President," Review of Economics and Statistics, 60 (May, 1978): 159-173.

Fox, G., and E.N. Phillips, "Interrelationship Between Presidential Approval, Presidential Votes and Macroeconomic Performance, 1948-2000," Journal of Macroeconomics, 25 (2003): 411-424.

Greene, W., Econometric Analysis, 2nd Edition (New York, Macmillan Publishing Company, 1993)

Kramer, G.H., "Short-term Fluctuations in U.S. Voting Behavior, 1896-1964," American Political Science Review, 65 (March, 1971): 131-143.

Peltzman, S., "Economic Conditions Gubernatorial Elections," American Economic Review: Papers and Proceedings, 77 (May 1987): 293-297.

Pollard, W.A., "Presidential Elections: Cyclical and Distributional Economic Effects," Public Finance Quarterly, 11 (April 1983): 217-236.

Polzin, P.E., "Why Some States Grow Faster than Others: New Growth Models for State Economic Policy," Growth and Change, 32 (2001), 413-425.

Southwell, P. and D. Waguespack, "Support For Term Limits and Voting Behavior in Congressional Elections," The Social Science Journal, 34, n1, (1997): 81-89.

Stigler, G.J., "General Economic Conditions and National Elections," The American Economic Review, (May 1973): 160-167.

U.S. Department of Commerce. Bureau of Economic Analysis, 1995. BEA Regional Projections to 2045: Vol. 1, States. U.S. Government Printing Office: Washington DC.

TABLE 1. VARIABLE NAMES, DEFINITIONS, AND DATA SOURCES

NAME	DEFINITION	SOURCE
$PRES_{i,t}$	Binary variable: 1 if the winning party carried state i in election t-4 lost state i in election t, 0 otherwise	Statistical Abstract of the United States, Various issues
$\ln(\Delta PETPR_{i,t})$	Growth in (inflation adjusted) petroleum product prices in state i between year t-3 and election year t.	Energy Information Administration, US Department of Energy
$\ln(\Delta INC_{i,t})$	Growth in real per capita personal income in state i between year t-3 and election year t.	Regional Economic Information Service (REIS), Bureau of Economic Analysis, US Department of Commerce
$\ln(\Delta TAX_{i,t})$	Growth in real tax revenues collected per worker in state i between year t-3 and election year t.	Regional Economic Information Service (REIS), Bureau of Economic Analysis, US Department of Commerce
$\ln(\Delta AID_{i,t})$	Growth in real per capita grant-in-aid to state i from the federal government between year t-3 and election year t.	Statistical Abstract of the United States, Various issues
$U_{i,t}-U_{i,t-3}$	Change in state i's unemployment rate between year t-3 and election year t.	US Bureau of Labor Statistics
$DMYGOV_{i,t}$	Dummy variable: 1 if the governor of state i is of the same political party as the winning party of election t-4 during election t, 0 otherwise.	Statistical Abstract of the United States, Various issues
$\Delta CONFLICT_t$	Change in the number of international violent conflicts between year t-3 and election year t.	Center for the Study of Civil War at the International Peace Research Institute, Oslo (PRIO) & the Department of Peace and Conflict Research, Uppsala University
$LQ\_C\_DMY_t$	Dummy variable: 1 if state i was "energy consuming intensive" relative to the US as a whole during election t, 0 otherwise	Authors' calculation using REIS data, Bureau of Economic Analysis, US Department of Commerce

TABLE 2. DESCRIPTIVE STATISTICS

	Mean	*Standard Deviation*	*Minimum*	*Maximum*
PRES	0.25	0.43	0	1
$\ln(\Delta PETPR_{i,t})$	5.94	27.25	-42.49	55.75
$\ln(\Delta PETPR_{i,t})$ *$LQ\_C\_DMY_{i,t}$	3.04	21.66	-40.16	52.66
$\ln(\Delta INC_{i,t})$	6.29	5.06	-23.38	34.22
$\ln(\Delta TAX_{i,t})$	2.46	12.17	-31.03	36.40
$\ln(\Delta AID_{i,t})$	14.61	143.40	-707.46	696.83
$U_{i,t}-U_{i,t-3}$	0.11	1.88	-3.70	7.30
$DMYGOV_{i,t}$	0.39	0.49	0	1
DMY_{76}	0.14	0.35	0	1
DMY_{80}	0.14	0.35	0	1
DMY_{88}	0.14	0.35	0	1
DMY_{00}	0.14	0.35	0	1
$\Delta CONFLICT_t$	1.43	6.35	-10	9
Number of Observations	357			
PRES = 0	268			
PRES = 1	89			

TABLE 3. FIXED EFFECTS LOGIT MODEL RESULTS

n = 357, Dep. var. = $PRES_{i,t}$

	Model 1		Model 2		Model 3	
	coef.		*Coef.*		*coef.*	
$\ln(\Delta PETPR_{i,t})$	-0.0076		-0.0084		0.0048	
	(0.7370)		(0.7080)		(0.8169)	
$\ln(\Delta PETPR_{i,t})$ *$LQ\_C\_DMY_{i,t}$	0.0222	*	0.0214	*	0.0206	*
	(0.0531)		(0.0565)		(0.0672)	
$\ln(\Delta INC_{i,t})$	-0.1062		-0.0976	*	---------	
	(0.1034)		(0.0995)		---------	
$\ln(\Delta TAX_{i,t})$	0.0753	***	0.0760	***	0.0593	**
	(0.0073)		(0.0066)		(0.0206)	
$\ln(\Delta AID_{i,t})$	-0.0022	*	-0.0022	*	-0.0022	*
	(0.0636)		(0.0658)		(0.0694)	
$U_{i,t}-U_{i,t-3}$	-0.0463		---------		0.0530	
	(0.7510)		---------		(0.6841)	
$DMYGOV_{i,t}$	-0.2967		-0.2713		-0.1641	
	(0.4401)		(0.4696)		(0.6586)	
DMY_{76}	0.8596		0.8290		0.5210	
	(0.3209)		(0.3346)		(0.5324)	
DMY_{80}	-1.6411		-1.5498		-2.2539	*
	(0.2007)		(0.2143)		(0.0647)	
DMY_{88}	0.5748		0.5959		0.8180	
	(0.4700)		(0.4521)		(0.2875)	
DMY_{00}	0.6447		0.6450		0.1684	
	(0.3877)		(0.3871)		(0.8077)	
$\Delta CONFLICT_t$	0.2135	***	0.2067	***	0.2077	***
	(0.0000)		(0.0000)		(0.0000)	
Log Likelihood	-83.676		-83.727		-85.032	
McFadden R^2	0.583		0.582		0.576	

p-values are reported in parentheses.
* - Significant at the 10 percent level.
** - Significant at the 5 percent level.
*** - Significant at the 1 percent level.

Table 4. MARGINAL EFFECTS OF SIGNIFICANT VARIABLES[1]

	coef.	*marginal effect (1 point increase)[2]*	*marginal effect (10 point increase)*
$\ln(\Delta PETPR_{i,t}) * LQ\_C\_DMY_{i,t}$	0.0222	0.0055	0.0551
$\ln(\Delta INC_{i,t})$	-0.1062	-0.0263	-0.2634
$\ln(\Delta TAX_{i,t})$	0.0753	0.0187	0.1866
$\ln(\Delta AID_{i,t})$	-0.0022	-0.0006	-0.0055
$\Delta CONFLICT_t$	0.2135	0.0529	0.5295

[1]These marginal effects were based on our Model 2 results.
[2]For all variables except $\Delta CONFLICT_t$, the effect measures a 1 percentage point increase. For $\Delta CONFLICT_t$ the effect measures a one unit increase.