Do Gas Prices Vote for the Right? Political Contributions via Price Distortions

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Abstract

I document gasoline price distortions of about 1-2 percent in swing states immediately before the last five close U.S. Presidential elections. Prices are lower in swing states in elections with Republican Presidential incumbents (1976, 2004, and 2008) and higher in elections with Democratic incumbents (1980 and 2000). The directions of these price distortions are consistent with prior evidence that voters punish incumbents for high gas prices, and with stock return evidence that suggests that oil companies benefit from Republican wins. Price distortions are present to roughly equal extents in retail and wholesale prices, but not crude oil prices, suggesting that they are introduced by refiners. I find slightly smaller price distortions before European general elections, with signs that vary with the incumbent party in a similar manner.

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Do Gas Prices Vote for the Right? Political Contributions via Price Distortions

One of the oldest ideas in politics, dating at least to the *panem et circense*s provided to ancient Romans, is that the prices of certain goods can acquire a special political significance, and that politicians can benefit from using these prices to influence voters. Subsidization of politically important goods, such as staple grains or energy, is common in developing countries. In the U.S., it is commonly argued that the political significance of gasoline prices causes excise taxes to be set at a level insufficient to address the negative externalities from consumption (e.g., Hammar, Lofgren, Sterner, 2004; Parry and Small, 2005).

If governments seek to influence politically significant prices, what about others with an interest in political outcomes? In particular, what about private firms that set the prices? This paper asks whether retail gasoline prices in the United States and Europe move in a manner consistent with their being distorted with the aim of influencing electoral outcomes.

Stock market returns surrounding elections suggest that a Republican Presidential victory raises the value of oil industry firms by about 3.5 percent. Given an industry market capitalization of $1.0-1.7 trillion at the time of the last 3 Presidential elections, this implies stakes in Presidential elections that are quite large. If voters punish incumbents for high gasoline prices, then the oil industry would benefit from low prices before elections with Republican incumbents and high prices before elections with Democratic incumbents.

This is in fact what I find for the last 5 close U.S. Presidential elections. Gas prices dropped by an average of 1-2 percent in swing states a few months before the 1976, 2004 and 2008 Presidential elections (when a Republican occupied the White House), relative to their prices in neighboring non-swing states. These price differences disappeared immediately after the election. In contrast, gasoline prices rose about 1 percent in swing states just before the 1980 and 2000 Presidential election (when a Democrat occupied the White House), with the difference again disappearing after the election.

I find smaller but similarly signed price movements before European general elections. Gas prices drop about 0.3 percent before elections when the right or center-right is in power, but increase about 1.2 percent when the left or center-left is in power.

Price distortions on this scale are more attractive to oil companies than may be immediately apparent for several reasons:

1. **Small price distortions have second-order effects on profits**. If prices begin at a long-run profit-maximizing level, the first derivative of long-run profits with respect to price is, of course, initially zero. Thus small changes away from an optimal price have very low cost in terms of foregone profits. In a calibration exercise in Section 6 below, I calculate that a 1% distortion in price away from the profit-maximizing level reduces profits by only 0.005%-0.05%, or between 1/200th and 1/20th of the most naive assumption about the cost of a price reduction (assuming a price elasticity of demand between 2 and 10).

2. **Price distortions can be targeted, both in time and geographically**. The literature on economic voting has generally concluded that when voters reward incumbents for economic outcomes, they place heavy emphasis on the very recent (see, e.g., Fair 1978 and 1996, or Lewis-Beck and Paldam, 2000, for a summary of the literature). The available evidence on economic voting and gas prices suggests that gas price changes have very transitory affects on political opinions. For example, Figure 1 plots the share of Gallup Poll respondents who call gas prices the most important problem facing the country against the CPI-adjusted national average gas price. The proportion clearly jumps when gas prices do, but also appears related more to changes over the last few months than to levels. Cho and Gimpel (2009) provide more systematic evidence, finding that the change in Democratic vote share from 2004 to 2008 is slightly more correlated with very short-term (July to October 2008) changes in gas prices than with much longer term changes (November 2004 to July 2008).

   Just as voter myopia would increase the political returns to time-targeted distortions, the electoral system in the U.S. allows efforts to influence elections to be focused geographically. In the 2000, 2004, and 2008 Presidential elections, it was apparent 2-3 months before the election that one of at most ten states would be pivotal. Even if economic voters care about national and not just personal economic outcomes, Ansolabehere, Meredith, and Snowberg (2008 and 2011) find that voters are usually only aware of local gas prices. This makes it feasible to influence perceptions of national gas prices in a targeted manner.

3. **Price competition helps overcome free rider problems**. Monetary political contributions made to influence an election result suffer from a free rider problem, but for contributions via price distortions, free rider problems are less than one might suppose for two reasons. First, pricing distortions appear to be introduced in the refining stage of the value chain, as they are present to

roughly equal extents in wholesale and retail prices, but are not present in crude oil prices. Refining is the stage of production with the greatest concentration of ownership, with the top four firms accounting of 48 percent of sales, compared with 10 percent for gas stations.[2] Second, the fact that gasoline prices are strategic complements also helps mitigate the free-rider problem. If a refiner distorts prices, up or down, to influence an election, it will be optimal for competitors to respond in kind. This increases the attractiveness of such a distortion, since any foregone profit will be offset by the political effects of both the firm's own price changes and the effect that those changes have on others' prices.

4. **The oil industry has a large stake in electoral outcomes**. In Section 2, I analyze oil stock returns around the resolution of close elections and find that a Republican Presidential election victory increases the value of the sector by 3.5 percent. U.S. Congressional elections have similarly signed, but much smaller, effects: a shift in control of one house of Congress increases the value of oil equities by 0.4 percent. [3] These market movements imply that investors expect oil companies to benefit from Republican victories, and, consistent with this belief, about 80 percent of the contributions classified by the Center for Responsive Politics as originating from the Oil & Gas industry are made to Republican candidates (see www.opensecrets.org). There are many policy differences between the parties -- on production subsidies, offshore drilling, drilling in Alaska, subsidies for alternative energy, corporate taxation -- that would lead one to expect oil company owners to prefer Republican candidates. In Europe, systematic evidence on event returns and political contributions is more difficult to generate,[4] but I do find that gasoline excise and value-added taxes rise faster under left-led coalitions. This is particularly true in the countries where the Left-led electoral alliances include Green parties, whose platforms emphasize reductions in the consumption of fossil fuels.[5]

[2] These ratios are from 2007 Economic Census data for NAICS 32411 (Petroleum Refineries) and NAICS 4471 (Gasoline Stations). Top-8-firm sales shares are 73 and 17 percent, respectively. Concentration in refining was declining slowly before the late 1990s but has increased sharply since: the top four firms accounted for 32, 30, 28, 41, and 48 percent of sales in the Economic Census years 1987, 1992, 1997, 2002, and 2007 respectively. Several major mergers occurred during the 1997-2002 period (e.g., Exxon-Mobil in 1999, Chevron-Texaco in 2001, Conoco-Philips in 2002)

[3] The analogous figures for the entire stock market are 2.0 percent for the Presidency and 0.2-0.6 percent for control of a house of Congress (Snowberg, Wolfers, and Zitzewitz, 2007a and 2007b, respectively).

[4] For reasons discussed in Section 2, it was not possible to construct analogous estimates for European elections.

[5] Green parties have governed as part of left-led coalitions in Finland, France, Germany, and Italy. "Red-Green" electoral alliances have also contested elections in Denmark, the Netherlands, and Sweden.

To summarize, several factors combine to make electorally motivated price distortions attractive to oil companies -- the large stakes oil companies face in elections, the fact that voters care about gas prices, the fact that distortions can be short-lived and targeted geographically, the small initial loss in profits from a distortion, and the self-reinforcing effect on competitors prices. At the end of the paper, I conduct a calculation of the industry-level costs and benefits from the price distortions accompanying U.S. Presidential elections and discuss the electoral impact of gas prices that would be required to rationalize the observed distortions.

This paper is related to several literatures in economics and political science: on economic voting, the political business cycle, the effects of partisan control on the economy, and campaign contributions. The early empirical work on the economic determinants of voting (Kramer, 1971; Tufte, 1975 and 1978; Fair, 1978) suggested that governments seeking reelection had an interest in creating good economic conditions before elections. This result motivated the political business cycle models of Nordhaus (1975) and MacRae (1977), in which the governing party stimulates the economy in an election year to cater to economic voters with short memories. Drazen (2001) surveys this literature and concludes there is little evidence of stronger growth prior to elections, at least in OECD countries, but that inflation does accelerate after elections.

The evidence is stronger in favor of partisan political business cycle models (Hibbs, 1977; Alesina, 1987 and 1988), in which parties differ in how they make the inflation-unemployment tradeoff. Economic growth has been stronger under left-leaning governments (Alesina, 1988; Alesina and Roubini, 1992; Faust and Irons, 1999), while inflation has slowed more during Republican administrations (Alesina, Cohen, and Roubini, 1997). One implication of these results for this paper is a need to control for macroeconomic variables (like state or country-level inflation and employment) that may be correlated with both elections and gas prices. As it turns out, including these controls has minimal effects on the results.[6]

[6] One might also wonder whether the price distortions documented here contribute to the political business cycle results. Gasoline and motor oil accounted for 4.0 percent of U.S. consumer expenditure on average from 2000-10 (based on the *Survey of Consumer Expenditure*), so the addition and removal of a 1 percent price distortion in one-quarter of the country would have a minimal direct effect on CPI inflation (of about 0.01%). Additional, "cost-push" effects are possible, but more important may be the broader point, that the political business cycle may be partly the product of politically motivated actions by private firms. Bertrand, et. al. (2006) provide an example, finding that politically connected firms in France increase employment in election years.

The fact that political parties make different policy tradeoffs, and do not converge to the tastes of the median voter as predicted by Downs (1957), provides motivation for firms to influence election outcomes. In addition to measuring realized economic outcomes, a recent literature has examined market movements around the resolution of close elections and other political events to measure expectations about the effect of partisan differences on the aggregate economy and individual firms. Snowberg, Wolfers, and Zitzewitz (2007a) find that Republican Presidential election victories raise aggregate equity valuations by 2-3 percent and also raise bond yields, oil prices and the dollar; the same authors (2007b) find similarly signed but much smaller effects of changes of Congressional control in midterm elections. Knight (2006) finds that firms and sectors expected by Wall Street analysts to benefit from a Bush victory in 2000 (including oil and gas companies) experienced higher returns when his odds of election increased. Jayachandran (2006) and Dooley (2008) conduct related analyses for the 2001 Jeffords defection (which switched control of the U.S. Senate to the Democrats in 2001) and the 2004 Presidential election, respectively, finding that equity markets expect campaign contributors to benefit from an increase in their beneficiaries' political fortunes. In Section 2 below , I use the Snowberg-Wolfers-Zitzewitz methodology to estimate the effect of Presidential and midterm elections on oil company valuations, finding, like Knight and Dooley, a positive effect of Republican victories.

The finding that contributors are expected to benefit when their beneficiaries win political control speaks to a broader debate about why political contributions are made in the first place. Monetary political contributions suffer from the same free rider problems as charitable contributions and voting, and two leading hypotheses for why they are made are consumption benefits and buying favors. Many studies have found correlations between contributions and policy outcomes. If interpreted as a causal effect of contributions on policy, the rate of return from contributions is often implausibly high, begging the question of "why there is so little money in politics?" (Tullock, 1972; Ansolabehere, de Figueiredo, and Snyder, 2003) One possibility is that the correlations are driven largely by omitted variable bias -- unobserved characteristics (ideological or informational alignment, friendship, other pecuniary and non-pecuniary contributions) that are correlated with contributions may help generate favorable policy outcomes. Obviously, our overall view of money in politics depends on the nature of the omitted variable. A relatively benign view of the process arises if the contributions-policy correlation is driven by common information or ideology (e.g., Republicans and the energy industry sharing genuine skepticism about global warming). In contrast, if other contributions are an important omitted variable, then the answer to Tullock's puzzle may be that public disclosure of

contributions is too limited in scope. This paper lends some support for the latter view by documenting a new form of political contribution, price distortions, whose cost to firms is of comparable magnitude to disclosed monetary contributions, and whose benefits to politicians might be substantially greater.

The paper is organized as follows. The next section present evidence that oil stocks rise when Republicans win U.S. elections. Section 3 discusses the methodology used to measure gas price distortions. Section 4 presents the results of the analysis of retail gas price distortions around U.S. Presidential elections. Section 5 presents the analyses of distortions around European general elections. Section 6 analyzes the economics of the observed price distortions, including the cost-benefit analysis discussed above. A discussion follows.

2. Oil stocks and electoral news

This section documents that oil stocks earn positive returns when Republicans win elections. The overall approach closely follows Snowberg, Wolfers, and Zitzewitz (2007a). Event returns for the entire oil sector are measured from the pre-election close to the post-election open are regressed on measures of electoral surprise.[7] For the Presidency, electoral surprise is measured using an indicator variable for whether the Republican candidate was elected minus the pre-election probability of a Republican win. Pre-election probabilities are measured using prediction markets or other betting markets, and are taken from the Appendix of Snowberg, Wolfers, and Zitzewitz (2007a).

For comparison, I also examine the market reaction to surprise from Congressional elections, which I measure in two different ways. The first method measures surprise in the number of chambers controlled by Republicans. The measure is analogous to the one used for the Presidency: it is the post-election number of chambers controlled less the expectation based on pre-election prediction market prices (from the Iowa Electronic Markets from 1994-2000 and Intrade from 2002-10). The second method uses the difference between the sum of the Congressional seats actually won by Republicans and the expected number of seats using election-eve race ratings from the Cook Political Report

[7] A value-weighted index for the oil sector is calculated for SIC codes 1311 and 2911 ("Crude Petroleum and National Gas" and "Petroleum Refining"). Opening prices are available in the CRSP Stock File only from 1992; in earlier years, post-election closing prices are used. Results are similar if closing prices are used for the entire period.

(translating the ratings into probabilities as described in Section 3.2 below). The measures of electoral surprise are in Appendix Table A1.

Table 1 presents estimates of these regressions. Oil stocks increase approximately 3.5 percent in response to a Republican victory in a Presidential election, and about 0.5 percent in response to a shift in control of a chamber of Congress. The finding that the Presidency is several times more important control of a chamber of Congress is consistent with the findings of Snowberg, Wolfers, and Zitzewitz (2007a and 2007b) for the aggregate stock market.

Unfortunately, producing usefully precise estimates of oil stock price responses to European elections did not prove possible. The electoral surprise needed to identify the expected effects of elections only exists for close elections. Close parliamentary elections are usually not resolved on election night, and certainty about control of the ministries important to a particular industry generally awaits negotiations about coalitions. Additional complications include the fact that prediction markets that track election outcomes were available for only a few European countries and that 75 percent of the European elections are held over weekends.

3. Measuring Price Distortions Around Elections

In order to test for price distortions around elections, I need data on gas prices in different geographic areas, a method for estimating the incentive to influence an election, and a methodology for comparing prices in neighboring areas. This section briefly outlines these sources and approaches.

3.1. Gas price data

Data on historical U.S. gas prices are available from several sources, each with advantages and disadvantages. Publicly available gas price data is available from the Energy Information Administration (EIA) and from the Bureau of Labor Statistics (BLS). In its *Petroleum Marketing Monthly*, the EIA publishes monthly, state-level average self-serve retail, delivered wholesale (dealer tank wagon), and undelivered wholesale (rack) prices for a variety of petroleum products, including three grades of gasoline and diesel fuel. The EIA price data are available back to January 1983 (with a break in some series from June 1987-December 1988). Two alternative sources are weekly data published by the EIA for U.S. regions and 9 individual states, and monthly gasoline prices published by the U.S. Bureau of

Labor Statistics for the nation, regions, and 29 Metro Areas (in 20 unique states). Given that most of the political variables that will be analyzed vary at the state level, and that having coverage of all states enhances statistical power, I will work with the monthly EIA data.

From January 1975 to September 1981, retail and wholesale gasoline price data are available from *Platt's Oil Price Handbook and Oilmanac*. For 1975-77 data is available for 55 cities, including at least one city in each of the lower 48 states and the District of Columbia. For 1979-81, the data cover 48 cities in 33 unique lower-48 states and the District. The Platt's wholesale price data are quantity-weighted-averages of dealer tank wagon and rack prices. The 1975-77 data only cover leaded regular gasoline, while the 1979-81 data cover 4 grades (leaded regular, leaded premium, unleaded regular, and unleaded premium).

Most of the analysis will focus on the cheapest grade of gasoline: regular leaded gas in 1975-81 and regular unleaded gasoline more recently. The lowest cost grade typically accounts for a large share of sales,[8] and is presumably the price most important to individuals whose political views are sensitive to gas prices.

For the 2008 election, I supplement the EIA data with hand-collected data from the *AAA Fuel Gauge Report*, which reports daily gas price averages for 284 Metropolitan Statistical Areas (MSAs). The underlying source of this data is the Oil Price Information Service, which collects price data from credit card transactions. This data is available only from September 2006 to February 2009, but can be used to provide a more granular (in time and geographically) analysis of the period surrounding 2008 election. The AAA data are reported including taxes and the monthly EIA and Platt's data without taxes, but gasoline taxes change very infrequently in the United States, and analyses using the two sources yield very similar results.

European gas price data are reported weekly at the country level by the European Commission's *Oil Bulletin*. These data are available from January 1994, for European Union members only. Given that data is available for only one or two general elections for the countries admitted in 2004 and 2008, I limit the analysis to the 15 countries that were EU members as of 1995. Most European general elections are decided on national popular vote totals, so there are no swing and non-swing districts, and

[8] For instance, according to EIA sales data, regular unleaded accounts for about 80 percent of gasoline sales from 2000-10.

thus little reason to expect within-country variation in price distortions.[9] The European analysis will therefore focus on differences between countries undergoing general elections and those that are not.

3.2 Identifying swing states

Given the gasoline price data available, the analysis will include the 1976, 1980, 2000, 2004, and 2008 U.S. Presidential elections.[10] For these elections, I require a method for measuring the relative political returns to influencing voters in different geographic areas.

The problem would be simplest in a single constituency, winner-take-all contest, like a U.S. gubernatorial election. Suppose the current state of a race is captured by a variable s, and the Republican candidate will win if $s+e>0$, where e is a mean-zero future political shock. The probability of a Republican win *is* $p = 1 - \Phi(-s)$, where Φ is cumulative distribution function of e. The derivative of this probability with respect to s is $\varphi[\Phi^{-1}(1-p)]$, where φ is the probability density function of e. The effect on outcome probabilities of efforts to influence elections will be proportional to this measure, which might be regarded as the influenceability of an election. If e is normally distributed, then influenceability is maximized when $p=0.5$ and is at 90 percent or more of its maximum value for p between 0.32 and 0.68, but drops sharply outside this range. This basic shape is maintained for political shock distributions exhibiting empirically observed levels of skewness and kurtosis.[11]

For U.S. Presidential elections, the problem of allocating campaign resources across swing and non-swing states is more complicated. The problem has been well studied (e.g., Brams and Davis, 1974; Colantani, Levesque, and Ordeshook, 1975; Snyder, 1989; Strömberg, 2008). The key insight for the current purposes is that the relative incentive to influence states should depend on the probability they will be pivotal (i.e., like Florida in 2000), not on whether they are currently close. For instance, on election eve in 2008, when Obama had a 6-10 point lead in national polls, North Carolina and Missouri were projected to be the closest states. To win, however, McCain needed to win both of these states

[9] For the United Kingdom, which does have swing and non-swing districts, publicly available within-country data is available only for 7-12 regions (from the UK Automobile Association), which is insufficient for a within-country analysis.

[10] Gas price data are also available for the 1984, 1992, and 1996 Presidential elections, but none of these elections were expected to be close enough for swing states to have been targeted to the extent they were in 1976, 1980, 2000, 2004, and 2008.

[11] I NEED TO CREATE AN APPENDIX GRAPH SHOWING THIS

and several others, so the most important state to influence would have been a state closer to the political median (like Florida or Colorado, in which Obama led by 6-10 points).

Fortunately, the five Presidential elections I focus on were all close at some point between the beginning of September and election day, and so states that were close at that time were also those more likely to be pivotal. My main approach will use state-level prediction market prices (available for 2004 and 2008) and race ratings (i.e., expert opinion about which states are tossups and leaning to or likely to be won by the two candidates) to approximate electoral probabilities. I prefer to take prediction market prices from the end of August, before the two-month period in which one would expect to see the greatest efforts at influencing swing states, and can do so for 2004 and 2008.[12] For 1976, 1980, and 2000, only race ratings are and then only from immediately before the election. The three major news magazines (*Time*, *Newsweek*, and *US News and World Report*) published state-by-state race ratings in their final pre-election issues in 1976 and 1980.[13] For 2000, I use race ratings published on November 1, 2000 by the *Cook Political Report*. For each election, I obtain ratings from a time when the overall election was expected to be close, so the Tossup states were also those most likely to be pivotal.

In order to translate race ratings into probabilities, I use ex ante outcome probabilities from *Intrade* for other state-wide races that received the same rating at the same point in the election cycle. Table 2 reports ex post and ex ante (from *Intrade*) probabilities of the favored candidate wining for races rated by the *Cook Political Report* from 2000-2010. Even when a race is only "leaning" to a candidate, favored candidates have been very unlikely to lose, especially for ratings issued close to election day. In contrast, the ex ante probabilities from *Intrade* suggest more uncertainty about these races.[14] Relative to my main results, which use the ex ante probabilities either directly or to calibrate the race ratings, results that used the ex post outcomes would treat "leaning" or "likely" states as being closer to safe states.

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[12] The *Iowa Electronic Market* has never run markets on state-level Presidential election outcomes, and *Intrade* (known then as *Tradesports*) began in late 2001.

[13] I also searched for race ratings for the 1984-1996 elections in the same sources. I found only one example, in 1992, that was framed hypothetically (i.e., Perot's reentry into the race pulls voters mainly from Clinton, this is what the race would look like). The fact that these elections were not close enough for the news media to become interested in state-level analysis (despite having been interested in 1976 and 1980) probably implies that the returns to oil companies to seeking to influence the outcome through state-level targeting were minimal.

[14] Rothschild (2010) and Page and Clemen (2012) discuss the fact that political prediction markets can suffer from a overpricing of longshots, especially if arbitrage is costly.

In order to ensure that the results are not specific to this methodological choice, I conduct a couple robustness checks. First, I replace my baseline influenceability measure with a dummy variable for being rated a tossup state, which approximates what would have resulted from using ex post outcomes to measure probabilities and thus influenceability. Second, for the 2000-8 elections, I replace my baseline influenceability measure with the probabilities of being a "decisive swing state" calculated by Strömberg (2008) [reported in the paper for 2000 and 2004 and on his website for 2008], normalized by population.[15] Using these also causes results to be driven mainly by differences between tossup and non-tossup states. With the baseline approach does better explain the pricing patterns around elections, the conclusion that prices are distorted in swing states in a direction that would help Republican candidates is robust to the definition of a swing state.

For European elections, I have no within-country gas price data, so my approach will be to compare European countries that are undergoing a general election with those that are not. For U.S. Senate and Gubernatorial races, which have different timings in different states, I will also present estimates that compare states with and without elections.

3.3. Estimating price distortions

The primary issue when estimating price distortions is that gasoline prices can vary over time, and this variation can be correlated regionally (e.g., a refinery going offline can affect prices in contiguous states). In the U.S., my primary approach will be to identify pairs of contiguous states or metro areas, testing whether cross-border price differences are correlated with cross-border influenceability differences, test whether these correlations change before elections, and test whether the sign of the change is consistent with an attempt to help Republican incumbents.

Specifically, when I use paired-geographies, I estimate the model:

$$g_{jt} = \alpha + \beta\, i_j * w_t + a_j + b_{pt} + e_{jt}$$

where g_{jt} is the gas price in area j for time period t, i_j captures the influenceability of area j in the election being analyzed, w_t is one or more variables identifying the time periods in which we expect an

[15] As discussed in more detail in Section 6, Stromberg (2008) defines a decisive swing state as a state that is pivotal in the Electoral College and decided by a margin of less than 2 percent. Stromberg's website (http://people.su.se/~dstro/WH2008.html, last accessed 4/15/2012) reports ex ante estimates of these probabilities for 2008 constructed on different dates; I use the September 10 version, as it is the closest date to the end of August.

effect, α_j is an area fixed effect, and b_{pt} is a pair*time fixed effect that controls for time variation in gas prices in that particular area. An area can be consider a member of several pairs; standard errors allow for clustering at the state level, so including a given state in multiple pairs does not bias statistical inferences. Data from multiple elections can be stacked in the usual manner, with coefficients testing for either different betas in different elections or for whether beta depends on the party of the incumbent. Controls can be included, such as for state-level macro variables or state*month-of-year fixed effects to allow for different price seasonality in different states.

The average lower-40 U.S. state shares a land boundary with 4.2 other states.[16] MSAs can be paired with roughly similar numbers of nearby MSAs. Individual MSAs that span state boundaries are split in the AAA data into their MSA*state component, and I treat them as separate MSAs (and hereafter call them MSAs for brevity). If examine pairs of MSAs with geographic centers within 200 miles of one another,[17] then 233 MSAs have a least one neighboring MSA, and the average of these MSA has 5.7 neighbors. If instead I limit pairs to those within 100 miles, 153 MSAs can be paired with an average of 3.0 other MSAs.

In contrast, European countries share too few land borders to make this approach attractive. The average EU15 country shares a land border with only 2.0 other EU15 countries. More precise estimates for Europe are yielded by the more traditional approach of using the other 14 countries as controls, which involves replacing b_{pt} by b_t (a time fixed effect) in the estimating equation. The U.S. results are robust to taking this approach, but more precise estimates are yielded by the paired-geography approach outlined above.

4. Price Distortions around U.S. Presidential Elections

This section presents estimates of gasoline price distortions in swing states around U.S. Presidential Elections. It begins by presenting separate difference-in-difference estimates (election window vs. surrounding time period; swing state vs. non-swing state) of the swing state effect for each of the 1976, 1980, 2000, 2004, and 2008 U.S. Presidential elections, and then combines data from the five cycles to

[16] I exclude Alaska and Hawaii from the analysis as they do not border other states. In contrast, I do include the District of Columbia. For brevity, I will use the term "states" to mean the lower 48 states and the District.
[17] Geographic centers are determined using the equal-weighted geographic centers of the zip codes of the first-named city in an MSA.

estimate the relationship between the swing state effect and the incumbent party. This basic result is then re-estimated using more flexible approaches to help better understand its source.

Table 3 presents the separate estimates for the five U.S. Presidential elections. Columns 1-4 use the paired-states specification discussed above. The election window is defined as the months of September, October, and November in the election year, and the swing state-price correlation in this period is compared with the rest of the three-year period surrounding the election (i.e., 1999-2001 for the 2000 election). The results in the first column imply that gas prices in swing states (compared with completely safe states) were about 1.0 percent lower, 0.6 percent higher, 1.2 percent higher, 0.7 percent lower, and 2.1 percent lower in 1976, 1980, 2000, 2004, and 2008, respectively.

These estimates do not vary meaningfully when the specification is varied. Adding macroeconomic controls (for log employment, log per capita personal income, and the unemployment rate) barely changes the coefficients, and the coefficients on the controls are jointly and individually insignificant. Adding state*era fixed effects to control for persistent differences in the states likewise has a minimal effect. Adding state*month-of-year fixed effects to control for state-specific price seasonality increases standard errors, but does not significantly change coefficient estimates, except perhaps for 1980. When the paired-states approach is replaced with the more usual panel data approach in column 5, estimates are less precise. The estimated difference becomes slightly smaller in 1976 and 2000, and slightly larger in 1980, 2004 and 2008, but Hausman tests do not reject the equivalence of the coefficients.[18]

Switching to a Tossup-state dummy variable or the Strömberg (2008) measure of the likelihood that a state is decisive likewise alters the magnitudes and standard errors of coefficients slightly, but not in a consistent direction. The overall conclusions appear robust.

Table 4 presents analogous models estimating the difference between the swing-state effect in cycles where the White House is controlled by different parties. The incumbent party variable is -1 when there was a Democratic President (1980 and 2000) and +1 when there was a Republican President (1976, 2004 and 2008). The "swing state*election window" coefficient measures whether gas prices are generally lower in swing states during elections and finds no evidence that they are. The "swing

[18] Note that column 5 (which includes year*month and state fixed effects) is a less restrictive specification than column 3 (which includes pair*year*month and state fixed effects), and so a Hausman test can be used. To keep the relative weightings of states constant, column 5, like the other columns, includes a state N times if it includes in N state pairs (i.e., if it shares a boundary with N other states).

state*incumbent party*election window" coefficient finds that this difference varies with the party controlling the White House -- relative gas prices decline in swing states in cycles with a Republican incumbent and rise when there is a Democratic incumbent. As in Table 3, coefficients do not vary meaningfully across specifications.

Table 5 presents regressions that allow for more flexibility in the gas price-race competitiveness rating relationship. The influenceability measure is replaced by dummy variables for the specific race ratings, as provided by news magazines for 1976-80 and the most recent Cook Political Report published before Labor Day for 2000-8. These dummy variables are indicated with indicator variables for the pre-election window, and these interaction coefficients are reported in the table (in regressions that also control for state and pair*time fixed effects and macroeconomic controls as in column 3 of Tables 3 and 4).

While the results for subsets of the five elections are not very precisely estimated, the specification that aggregates all races in Table 5 shows that the results in Tables 3 and 4 appear driven largely by the differences between "Safe" and more competitive states. This is perhaps surprising given that states rated "Likely" or "Lean" on Labor Day or later were only rarely won by the trailing candidate, and thus the largest difference in influenceability is between the "Tossup" and non-Tossup states, regardless of how it is measured. However it does suggest that the results are unlikely to be influenced by choices about how to measure influenceability, since while various methods may differ on which states interest groups should be the most interested in influencing, they usually agree on which states are "Safe", and thus of the least interest for influence.

Which states are driving the results? To determine this, I calculate the influenceability difference and the gas price difference-in-difference for each pair of bordering states. Figure 2 plots these differences for 2008 election, and Figures A1-A4 contain the same plots for other four elections. Each state pair appears twice (e.g., CA-AZ and AZ-CA), causing the regression line to pass through the origin by construction. The negative correlations in 1976, 2004 and 2008 and the positive correlation in 1980 and 2000 are clearly not driven by a small number of outliers, as a simple count of observations in

the first/third and second/fourth quadrants also yields evidence of a relationship.[19] Furthermore, the state pairs that contribute most to the relationship are different in different cycles.

Figure 3 examines the timing of gas price effects. In the Table 4, column 3 specification, each election window variable is replaced with 36 indicator variables for the months of the three-year period surrounding each election, and these 36 variables are interacted with the swing state variable, the incumbent party variable, and the interaction of these two. The figure plots the coefficients of the interaction of the 36 variables with swing state*incumbent party, and the coefficients capture the difference in the swing state-non-swing state price difference surrounding elections with incumbents of different parties. The results for suggest that gas price distortions begin around July and have disappeared by December. In most of the results, I use September-November as the "election window" as it seemed most reasonable a priori. If price distortions indeed begin in July, this approach may be conservative, in that it compares the immediate pre-election period with a periods that also includes some distortions.

For the 2008 election year, I can obtain more precise estimates of distortions using the daily, MSA-level data collected from the *AAA Fuel Gauge* website. I run a paired-MSA specification analogous to the paired-state specification, using pairs of MSAs within 200 miles of each other.[20] Figure 4 presents a plot of interactions of day fixed effects with the swing state variable. The timing of the price distortions matches Figure 3 -- they grow throughout 2008, peak in October-November, and then disappear by December.

The MSA-level data is also useful for examining how price distortions vary with local market structure. Using a list of gasoline stations by brand downloaded in early 2008 from *automotive.com* (which, like the AAA Fuel Gauge data, is ultimately from the Oil Price Information Service), I calculate outlet shares for each firm and MSA, aggregating brands with the same corporate owner (e.g., Exxon and Mobil). I then interact aggregations of these outlet shares with the election window variable and its interaction with the swing state variable and add these interactions to the model. This allows me to test

[19] Of the state pairs with a difference in influenceability, 59, 67, 62, 57, and 60 percent have a price difference with a sign that is consistent with the overall relationship for that year. For all five election years, the null hypothesis that this ratio is equal to 0.5 can be rejected at the 5-percent level (in a two-tailed test, allowing for clustering at the state level).

[20] Results are very similar in magnitude and precision to the analogous estimates using state-level data reported in Table 3, Column 3, and are not very sensitive to this distance cutoff (see Table A2).

whether price distortions around the 2008 Presidential election differed in MSAs with different levels of concentration, as well as different market shares for specific firms.

Table 6 reports results from these models. The first specification estimates the election window difference in the difference in prices in swing and non-swing states as about 2 percentage points. This is similar to the estimate of 2.2 percentage points for the 2008 election in Table 3, column 3. The remaining specifications test how this price distortion varies with MSA-level concentration and firm outlet shares. Price distortions are larger in MSAs with higher outlet-level Herfindahl concentration indices. The MSA-level outlet Herfindahl has a mean of 0.15 and a standard deviation of 0.04, so the coefficients in specification 2 imply that when concentration is one standard deviation higher, the election window divergence in swing-state and non-swing-state prices is 1.5 percentage points larger.

Price distortions are also larger in MSAs with more participation by the firms with the largest national outlet shares. A standard deviation increase in the outlet share of the top 4 firms (BP, Chevron, ExxonMobil, or Shell) or next 6 firms (Citgo, ConocoPhilips, Cumberland, Marathon, Sunoco, or Valero) is associated with election window*swing state price distortions that are 2.2 and 1.6 percentage points larger, respectively. The larger firms obviously internalize more of the political benefit from a desired election outcome, and so should find slightly larger price distortions profitable. Unfortunately, without station-level data, I cannot observe whether these stations are indeed disproportionately responsible for the observed price distortions. The final specification introduces separate interaction variables for each of the top 4 firms. It appears that MSAs with high market shares for 2 of these 4 firms are disproportionately responsible for the pricing distortions.[21]

Table 7 extends the analysis to more products, and examines wholesale as well as retail prices. It uses data only from the 2000-8 elections, since data on alternative products is more limited for 1976-80.[22] The specification in Table 4, Column 3 is repeated using different price series as the dependent variable, and only the coefficients on the swing state*election window*incumbent variables are reported. Price distortions are slightly smaller for midgrade and premium than for regular gasoline. Distortions are present to nearly the same extent in wholesale gasoline prices as in retail prices. Within

[21] To mask their identity, the four firms are ordered A-D based on the magnitude of the interaction coefficient.
[22] For the 1976 election, data is only available for regular leaded gasoline. For 1980, data is available for regular and premium versions of leaded and unleaded gasoline, for both self and full-service. In results omitted for space reasons, price distortions around the 1980 election were present to a roughly equal extent in regular leaded and unleaded prices, and in self and full-service prices. As in 2000-8, price distortions around the 1980 election are about 20-30 percent smaller in premium gasoline, and about 20-40 percent smaller in wholesale as in retail prices.

wholesale prices, distortions are slightly greater in dealer tank wagon (i.e., delivered) prices than in rack (i.e., terminal) prices. This is consistent with the fact that delivered pricing allows refiners to price discriminate across stations in different locations.

In contrast to the results for gasoline, there is no statistically significant evidence of price distortions in diesel fuel or No. 2 Distillate, which is used in industry and for home heating. Standard errors are larger for diesel fuel and heating oil in part because the EIA reports prices for only 24 states, focusing on those in colder climates. The pre-election period in the U.S. falls during the summer and early autumn, when one would not expect heating oil prices to be salient to voters.

Table 7 also reports results using the price of domestic crude oil purchased in the 24 states that produce it, as published by the EIA. There is no evidence that domestic sellers of crude oil distort their prices in response to electoral considerations. This also helps reassure us that the distortions we observe in the wholesale and retail prices of gasoline are not driven by localized shocks to the price of crude oil.

In addition to asking whether local prices of crude oil display electoral cycles, we might also ask whether the world price of crude oil is distorted in order to influence U.S. Presidential elections. While many in the oil industry have little power to influence the world oil price, large oil exporting countries that do not produce at capacity (e.g., Saudi Arabia) clearly do, and these countries might have an interest in affecting U.S. elections.

Table 8 reports the results from time series regressions of the oil price (the spot and future prices for West Texas Intermediate, delivered at Cushing, OK) on an election window indicator variable and its interaction with the incumbent party. The regressions included fixed effects for 4-year periods surrounding each election (year y-1 to y+2), so each three-month election window is compared with the surrounding 4 years.

Regressions in the first two columns suggest large (roughly 15 percent) distortions aimed at helping elect Republicans. Standard errors are much wider than for the earlier estimates of cross-state differences in prices. Oddly, the effects seem driven by the first three elections for which this data is available (1988-1996), not the more closely contested elections (2000-8). Furthermore, they are not very robust to specification. The results are quite sensitive to the time periods each election window is

compared with -- switching to fixed effects for years instead of 4-year periods changes results considerably (columns 4 and 5).

Furthermore, cross-country differences in crude oil prices yield no evidence of distortions motivated by U.S. elections. Adding controls for European (Brent) crude oil prices to the regressions Table 8, eliminates evidence of distortions aimed at helping Republicans (columns 6 and 7). The EIA publishes time series for the Free-on-Board cost of crude oil imported to the U.S. from 3 regions (Persian Gulf, OPEC countries, and non-OPEC countries) and seven individual countries (Angola, Colombia, Mexico, Nigeria, Saudi Arabia, the UK, and Venezuela). In regressions analogous to those in Table 8, I found no evidence that the differences in FOB prices differ in election windows or with the incumbent party (Table A3).[23]

I also test for whether futures prices anticipate distortions in prices around elections. In the last four columns of Table 8, I include prices from the nearest four months' future contracts and control for time period, so the electoral distortions are measured by, e.g., comparing prices in August for October and December delivery. This approach yields estimates that are approximately as precise as those comparing the prices of crude oil in different states. There is no evidence that futures markets anticipate crude oil price distortions around elections aimed at helping either party.[24]

Taken together, this section provides evidence that relative gas prices vary in swing states before U.S. Presidential Elections in a manner that would be consistent with a attempt to influence the election in favor of the Republican candidate, assuming that voters reaction to high gas prices by punishing the party controlling the White House. Price distortions are largest in regular unleaded gasoline, present to roughly equal extents in retail and wholesale prices, but absent in crude oil prices and in prices of products sold largely to industrial users. I now turn to tests of the periods surrounding European elections.

[23] The absence of cross-country price differences correlated with election windows is not due simply to an absence of cross-country price differences; the WTI-Brent spread has a within-year standard deviation of about 3 percent, and the difference between country-specific FOB import costs and the average FOB cost likewise has a within-year standard deviation of about 4 percent. I also conducted similar analyses using production data with election windows shifted to allow for transportation time, and again found no evidence of electorally driven distortions.

[24] I repeated this analysis using futures prices for finished products (gasoline and heating oil delivered in New York Harbor, propane delivered in Texas) and found no evidence that futures traders anticipated electoral distortions in these prices. Combined with the evidence in Table 7, this suggests that electorally motivated price distortions in gasoline are introduced when it is sold to targeted geographies at either terminals (i.e., at "Rack" prices) or, especially, dealer tank wagons.

5. Price Distortions Around European Elections

This section presents tests for price distortions around European general elections. As mentioned, I lack intra-country gasoline price data for Europe, and so will detect price distortions around elections using comparisons between countries. Figure 5 plots the coefficients from a series of election lead and lag variables that capture the relative pre-tax gasoline prices surrounding European elections. The specifications are analogous to those in column 4 of Tables 3 and 4: they include fixed effects for weeks and for the interaction of country and the nearest general election, and standard errors are clustered on country. Separate series distinguish between countries with Left and Right-led governing coalitions.[25] Gasoline prices are lower in the 20 weeks before the election, but only in countries with Right-led governments.

Figure 6 plots the series of coefficients on leads and lags of an incumbency variable (coded +1 for Right-led governments, -1 for Left-led coalitions) in regressions that also control for leads and lags of an election variable as well as the fixed effects mentioned above. These coefficients capture half of the difference between the relative prices surrounding elections with Left and Right-led governments. In this analysis, the difference emerges about 20 weeks before the election and disappears the week of the election.[26]

Table 9 reports the coefficients from a regression of prices with and without taxes on an election window indicator and an interaction of the election window variable with an incumbency variable. As in the regressions used to produced Figures 5 and 6, the figures control for fixed effects for weeks and the interaction of country and nearest election. In most European countries, elections are approximately four years apart, so each election window is compared with a period roughly two years before and after.

Results are reported for four petroleum products. Price distortions average roughly 0.8 percent for gasoline, diesel, and liquid petroleum gas, and are not present for fuel oil, which is mostly used for

[25] Parties are classified as "Right" or "Left" using their alliance membership in the European Parliament. Members of the European People's Party or the European Conservatives and Reformists are coded as "Right", members of the Progressive Alliance of Socialists and Democrats or the European United Left are coded as "Left", and members of the Alliance of Liberals and Democrats for Europe are coded as "Centrist."

[26] 70 percent of the elections in the European sample are on Sundays, so for these elections, the week of the election is largely after the election.

industrial purposes. The absence of price distortions in industrial oil products is consistent with the U.S. evidence in Table 7, whereas the results for diesel fuel differ in the U.S. and Europe. Diesel is purchased by a much larger number of individual consumers in Europe than in the U.S.; since 2004, diesel-burning passenger cars have accounted for about 50 percent of new registrations (ACEA, 2011, p. 20), while during the same period they accounted for about 3 percent of the U.S. market (Buss, 2010).

6. Optimal Price Distortions

In this section, I explore how large the electoral effect of gas prices must be to make optimal the price distortions of roughly 1 percent observed in the U.S. To do so, it will be helpful to consider the incentives faced by firms in an industry that faces a common external/political motivation to set either high or low prices.

Supposed that, in addition to maximizing profits, firms face a small incentive to either increase or decrease consumers' utility. The owner of a single station i would maximize:

$$q^i(\vec{p})\left(p^i - c\right) + \gamma v(\vec{p})$$

where $q^i()$ is the demand function faced by station *i* as a function of the vector of prices, *c* is marginal cost, γ is the incentive to increase consumer utility, and *v()* is aggregate indirect utility as a function of gas prices (holding individuals' wealth and all other prices in the economy fixed). By Roy's identity, the derivative of indirect utility with respect to each station's price is the negative of quantity sold by that station. So the indirect utility term has the same first-order effect as including an incentive for firms to increase or decrease the market's quantity-weighted average price. The parameter γ can be thought of as either the share of market-wide consumer surplus that flows back to each outlet, or as the political benefit to a station from a lower market-average per gallon gas price, per gallon sold in that market.

For a single-station firm that takes other stations' prices as given, the first order condition can be written $p - c = \frac{q}{q_i}(1 - \gamma)$, or if *e* is the price elasticity faced by that station, as $\frac{p-c}{p} = \frac{1-\gamma}{-e}$. In other words, if a station affects market-average gas prices only through its own prices, and if it recoups 1 percent of the consumer surplus it creates for consumers via a political benefit, then it will cut margins by one percent, assuming the price elasticity it faces remains constant.

A multi-outlet firm will of course internalize the fact that a price cut at one outlet reduces demand at its other outlets, and thus in a Nash equilibrium without political considerations, it will charge prices that are higher than for a single-outlet firm. Likewise, it will internalize the fact that a politically-motivated price change at one of its stations creates benefits for its other stations. As political benefits depend on market-wide average prices, the share of the political benefit that is internalized by a firm will be roughly linear in its market share, and the outlet-weighted average incentive to influence prices will be roughly related to the Herfindahl index in the market.

If gasoline prices are strategic complements, then the effects of political considerations on prices can be reinforced through two channels. First, if we assume firms reach a Nash equilibrium in prices, firms' optimal prices will be affected by both their political incentives and by their best responses to politically motivated price changes by other firms (which will be in the same direction when the firms in an industry have shared political interests). Second, if firms have some commitment power, they will take into account the fact that price changes they make will influence other firms' prices, providing additional political benefits.

Therefore, we should expect the extent to which pricing behaves as if cross-outlet political benefits are internalized to depend on three factors: 1) concentration in the market, 2) the degree to which prices are strategic complements, and 3) the nature of competition in the market. If firms reach a Nash equilibrium and prices are neither strategic complements nor substitutes, then we might expect the extent to which political benefits are internalized to depend on the Herfindahl index. At the other extreme, if firms perfectly collude and behave collectively as a monopolist, then all of the benefits will be internalized. If there is no collusion, but if prices are strategic complements and if firms take other firms' reactions into account when setting prices, then we might expect behavior in between these two extremes.

For the sake of simplicity, I will calibrate a version of this model that assumes that the industry sets prices as if it was a monopolist, although, for the reasons discussed above, this behavior need not require explicit collusion. The industry-level benefit of distorting prices to influence an election should depend on the product of three factors:

1) the effect of the average gas price in the state on the expected share voting for the preferred party,

2) the effect of the expected vote share in the state in question on the probability that the preferred party will win the Presidency, and

3) the effect of the preferred party winning on the market value of the industry.

Item 3 is the most straightforward to estimate. In Section 2, I estimated that oil stocks appreciate roughly 3.5 percent in response to a Republican Presidential election victory. The aggregate market value of the (publicly traded component of) the oil industry has ranged from about 1.6 to 3.9 times annual gasoline sales at retail prices (Table 10), so this implies that a Republican victory is worth between 5-6 percent of a year's U.S. sales at retail prices for the earlier elections (1976-1980) and 11-14 percent of a year's sales for the more recent elections (2000-8).

For Item 2, one can take a couple of approaches to estimating the effect of a vote share shift in a swing state on the probability of winning a Presidential election. Strömberg (2008) calculates a probability that each state is decisive in the Electoral College and has a margin of less than 2 percent. A vote share shift from one party to another in such a state will change the election outcome about half the time. For both the 2000 and 2008 elections, Strömberg calculates using *ex ante* data that Florida was the state most likely to be decisive, and that a 1 percent vote share shift in Florida would have been expected to change the outcome probability by about 2-2.5 percent.[27]

If we assume that the cost of influencing a percentage of voters is proportional to the number of voters in a state, then Florida was one of several states offered an attractive opportunity to affect those elections. For instance, in the 2000 election, the 11 states rated as Tossup by the *Cook Political Report* in August (FL, IA, MI, MN, MO, NM, OR, PA, TN, WI, WV) were estimated by Strömberg to collectively have a 21 percent of being both the pivotal state and decided by a margin of less than 2 percent. Shifting the vote share in each of these states by one percent would therefore have a 10.5 percent chance of influencing the outcome. These states contained 27.7 million of the 101.5 total million votes (or 27.3 percent), so by focusing on these states, one could affect the outcome probability by 10 percent by influencing 277,000 voters. Voters in these 11 states in 2000 therefore had approximately a 1-in-2.7 million chance of being decisive. In 2008, the states rated as Tossups in August (CO, FL, IA, MI, MO, NC, NV, OH, VA) were estimated by Strömberg to have a 19.8 percent chance of being pivotal and decided by a margin of less than 2 percent. A one percent vote share shift in these states would have influenced

[27] Strömberg's calculations for the 2008 election are available at http://people.su.se/~dstro/WH2008.html (last accessed October 10, 2012).

the outcome probability by 9.9 percent, and these states contained 34.5 million out of 129.4 million total votes (or 26.7 percent). Voters in these states had a 1-in-3.5 million chance of being decisive.

Gelman, Katz, and Tuerlinckz (2002) and Gelman, Silver, and Edlin (2010) also provide state-by-state estimates of "voting power," the probability that a single vote would be decisive in the 2000 and 2008 Presidential elections, respectively. Their analyses found that voting power in the 2000 and 2008 elections was maximal in the same group of swing states, although they calculate that a single vote in these states had roughly a one-in-10-million chance of being decisive. In other words, if there are ten million voters a group of swing states, then shifting the vote share one percent in these states, or changing the minds of 100,000 voters, will change the election outcome probability by one percent. This calculation implies a return to influencing voters that is about 3-4 times lower than in the calculations based on Strömberg's estimates.

The Strömberg and Gelman et. al. approaches do largely agree though on the relative returns to influencing different states. A key area in which they differ is the probability that the pivotal state in the electoral college will be close. For example, in Strömberg's work, this probability (the sum of the "decisive swing state" probabilities for each state) was 39 percent for 2000 and 37 percent for 2008, but only 7 percent for 2004. This probability is higher when an election is expected to be close, and the exact date on which estimates are constructed and the method used to predict vote shares can obviously influence this. In what follows, I will use Strömberg's estimates -- switching to the Gelman, et. al. estimates would cause my estimate of the electoral impact of gas prices required to rationalize the observed price distortions to rise by a factor of 3-4. Combining the Strömberg estimates with the stock return evidence implies that the benefit from influencing vote shares by 1 percent in the swing states (and thus the election outcome probability by 10 percent) would yield a benefit equal to 1.1-1.4 percent annual U.S. gasoline sales, or about 20 percent of the sales from a three-month pre-election period in the states targeted.

Given this calculation, the voter response to gas prices needed to rationalize the observed price distortions now depends on the price elasticity of demand and the nature of competition faced by the firms. Unfortunately, price elasticity estimates for gasoline vary greatly. At the industry level, they are often estimated to be near zero in the short run and less than one even in the long run (e.g., Bohi and Zimmerman, 1984; Dahl and Sterner, 1991). In contrast, at the outlet level, own-price elasticities have

been found to be quite high (-5 to -20; see, e.g., Slade, 1986; Wang, 2009).[28] Firms with multiple outlets in an area, could of course face lower firm-level elasticities, if price rises at one outlet increase demand at other outlets.

Given the uncertainty about the relevant price elasticity, I calculate results for a wide range of possibilities (Table 11). The profit function is flattest around the optimal price when elasticities are low, and thus low elasticities make the political effects needed to justify a given percentage price discount smaller. The Cho-Gimpel estimate, that a 1% price increase shifts vote shares by about 0.02 percent against the incumbent party, would imply that 1% price distortions would be optimal at the industry level if firms faced a price elasticity of -1.4. Of course, if demand is more elastic than this, or if firms do not reach the industry-optimal-level of price distortion, then larger political effects would be required to explain the observed pricing distortions. It should be clear that this exercise is fairly speculative, but arguably still of some value.

7. Discussion

This paper has presented evidence that retail and wholesale gasoline prices in swing states appear distorted around close U.S. Presidential elections in a manner that would aide Republican candidates. The evidence of price distortions is quite robust – to variations in specification, methods for identifying swing states, election windows, the specific data source used, and the exclusion of individual outlier states. Price distortions are present to roughly equal extents in retail and delivered wholesale prices, but to a slightly lesser extent in midgrade and premium gasoline, whose prices are plausibly less politically significant, and in rack wholesale prices, which have less targeted effects on specific states than delivered prices.

In contrast, price distortions are not found in products sold primarily to industrial users (diesel fuel and No. 2 fuel), and are not found in crude oil, suggesting they are introduced at the refining stage of production. Gasoline price distortions are larger in MSAs with more concentrated gasoline markets and with higher outlets shares for the largest national firms, consistent with the fact that these larger

[28] Lerner indices calculated using dealer tank wagon prices as estimates of marginal cost also imply outlet-level elasticities of 10-20. These may be overestimates if gasoline is used as a loss leader to attract customers to a co-located store.

firms should internalize a greater share of the political benefit generated by distortions. Slightly smaller distortions in retail prices are also found around European general elections.

A natural question is whether these distortions are necessarily evidence of a conspiracy, or whether they could be the product of firms acting without coordination. While I of course have no evidence that rules out the former possibility, I argue that the latter is quite possible. Concentration in refining, the stage of production where the distortions are introduced, is fairly high. Furthermore, prices are likely strategic complements, so pricing distortions implemented by one firm will affect the optimal prices of other firms.

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Table 1. Abnormal oil stock returns accompanying electoral surprises

Dependent variable: Overnight oil stock returns (value-weighted average of firms in SIC 1311 and SIC 2911)

Dependent variable: Oil stock return - Risk-free rate					
GOP Presidency Surprise	3.59**			3.21***	3.26***
	(1.11)			(0.90)	(0.78)
GOP Congressional Control Surprise		0.43**		0.62**	
		(0.14)		(0.28)	
GOP Congressional Seats Surprise			0.05		0.09**
(House/4.35+Senate)			(0.04)		(0.04)
Dependent variable: Oil stock return - market return (CRSPVW)					
GOP Presidency Surprise	1.27**			1.22**	1.21**
	(0.51)			(0.41)	(0.41)
GOP Congressional Control Surprise		-0.06		0.03	
		(0.08)		(0.14)	
GOP Congressional Seats Surprise			0.00		0.01
(House/4.35+Senate)			(0.02)		(0.02)
Observations	9	5	5	14	14
Sample	1976-2008, Presidential years	1994-2010, Midterms		Both	

Table 2. Race ratings, probabilities and influenability measures

	Favorite win probabilities		Implied influence-ability	
	Ex-post	Ex-ante	Ex-post	Ex-ante
Rating		Intrade	State-level	Intrade
Memorial Day +/-				
Tossup	0.500	0.500	1.00	1.00
Lean	0.878	0.675	0.51	0.90
Likely	0.870	0.819	0.53	0.66
Safe	0.969	0.903	0.18	0.43
Labor Day +/-				
Tossup	0.500	0.500	1.00	1.00
Lean	0.937	0.727	0.31	0.83
Likely	0.934	0.843	0.32	0.60
Safe	0.994	0.931	0.04	0.33
Election Eve				
Tossup	0.500	0.500	1.00	1.00
Lean	0.993	0.880	0.05	0.50
Likely	0.957	0.896	0.23	0.45
Safe	0.995	0.956	0.04	0.23

Note: influenceability is $\phi[\Phi^{-1}(p)]/\phi[\Phi^{-1}(0.5)]$, where p is the probability of the favorite winning and ϕ and Φ are the standard normal p.d.f. and c.d.f., respectively.

Table 3. Gasoline price distortions before the 1976, 1980, 2000, 2004, and 2008 Presidential elections
Dependent variable: Log retail gas price (regular leaded in 1976-80; regular unleaded in 2000-8), in percent

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Swing state*1976	-0.25	-0.40	1.31	1.35	2.22	1.32		
	(0.66)	(0.70)	(1.53)	(1.56)	(1.84)	(1.20)		
Swing state*1980	-1.01	-1.10	2.40**	2.58**	2.34	2.02*		
	(0.82)	(0.78)	(1.08)	(1.11)	(1.96)	(1.08)		
Swing state*2000	-0.28	-0.17	-0.76	-0.74	-0.50	-0.93	-0.61	-1.55
	(1.52)	(1.45)	(1.10)	(1.12)	(1.47)	(0.86)	(1.13)	(1.33)
Swing state*2004	-0.06	0.15	-1.01	-1.00	-0.89	-0.61	-0.86	-3.60***
	(1.07)	(1.03)	(0.78)	(0.79)	(1.12)	(0.38)	(0.79)	(1.04)
Swing state*2008	-0.03	0.39	-1.25	-1.23	-1.38	-1.05**	-0.92	-4.13***
	(0.75)	(0.82)	(1.02)	(1.03)	(1.30)	(0.46)	(0.92)	(1.14)
Swing state*1976*Election window	-1.00*	-1.04*	-0.86	-1.16*	-1.01	-0.33		
	(0.62)	(0.63)	(0.59)	(0.65)	(0.72)	(0.43)		
Swing state*1980*Election window	0.64**	0.68**	0.70**	0.10	1.20**	0.80**		
	(0.31)	(0.32)	(0.29)	(0.42)	(0.54)	(0.33)		
Swing state*2000*Election window	1.17**	1.18**	1.20**	1.02*	0.82	0.97**	1.21**	1.40**
	(0.52)	(0.52)	(0.53)	(0.62)	(0.62)	(0.42)	(0.52)	(0.70)
Swing state*2004*Election window	-0.67**	-0.68**	-0.59**	-0.56	-0.76*	-0.39**	-0.62**	-0.25
	(0.29)	(0.29)	(0.29)	(0.42)	(0.42)	(0.17)	(0.29)	(0.40)
Swing state*2008*Election window	-2.14***	-2.17***	-2.16***	-2.00***	-2.64***	-1.09***	-2.09***	-1.52*
	(0.67)	(0.67)	(0.62)	(0.64)	(0.83)	(0.36)	(0.63)	(0.84)
Observations	66,938	66,938	66,938	66,938	66,938	66,938	43,010	43,010
	All	All	All	All	All	All	2000-8	2000-8
Swing state measure	Baseline	Baseline	Baseline	Baseline	Baseline	Tossup?	Baseline	Stromberg
State pair*Year*Month fixed effects	X	X	X	X		X	X	X
Macroeconomic controls		X	X	X	X	X	X	X
State*era fixed effects			X		X	X	X	X
State*era*month fixed effects				X				
Year*month fixed effects					X			

Note: Standard errors allow for clustering within states. Macroeconomic controls are the state-level monthly seasonally adjusted unemployment rate, log employment, and log personal income. "Swing state" is a measure of the influenceability of a state -- either the baseline measure described in the text, an indicator variable for being rated a "Tossup" state, or the Stromberg (2008) influenceability measure (the probability a state is pivotal and decided by few than 2 percentage points, divided by its population). Both are scaled to min 0, max 1. "Election window" is July-November of the election year. The sample includes one year before and one year after each election. Era means either 1975-1981 or 1999-2009.

Table 4. Gasoline price distortions around Presidential electioncs

Dependent variable: Log retail gas price (regular leaded in 1976-80; regular unleaded in 2000-8), in percent

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Swing state	-0.34	-0.26	0.20	0.24	0.75	0.42	-0.76	-2.68**
	(0.73)	(0.73)	(0.70)	(0.71)	(1.19)	(0.74)	(0.84)	(1.04)
Swing state*Incumbent party	0.20	0.23	-0.22	-0.24	-0.14	-0.24	-0.13	-1.14**
	(0.30)	(0.29)	(0.40)	(0.41)	(0.47)	(0.45)	(0.47)	(0.58)
Swing state*Election window	-0.12	-0.13	-0.06	-0.26	-0.17	0.04	-0.08	0.27
	(0.24)	(0.24)	(0.24)	(0.32)	(0.30)	(0.23)	(0.27)	(0.37)
Swing state*Incumbent party*Election window	-1.10***	-1.13***	-1.09***	-0.99***	-1.18***	-0.83***	-1.29***	-1.15**
	(0.28)	(0.29)	(0.27)	(0.30)	(0.29)	(0.26)	(0.35)	(0.46)
Observations	66,938	66,938	66,938	66,938	66,938	66,938	43,010	43,010
Elections included	All	All	All	All	All	All	2000-8	2000-8
Influenceability measure	Baseline	Baseline	Baseline	Baseline	Baseline	Tossup?	Baseline	Stromberg
State pair*Year*Month fixed effects	X	X	X	X		X	X	X
Macroeconomic controls		X	X	X	X	X	X	X
State*era fixed effects			X		X	X	X	X
State*era*month fixed effects				X				
Year*month fixed effects					X			

Note: Standard errors allow for clustering within state.

Table 5. Gas price differences by race rating

Dependent variable: Log retail gas price (regular leaded in 1976-80; regular unleaded in 2000-8), in percent

This table reports regressions that repeat the specifications in Column 3 of Tables 3 and 4 but replace the influenceability measure with dummy variables for the state's "Race Rating." In the 1976 and 1980 race ratings, "Safe" was not used as a category, so "Likely" is interpreted to mean "Safe."

	Rep incumbent	Dem incumbent	1976-80	2000-8 (Signs flipped when Dem incumbent)	All
Race ratings (Safe seats omitted category)					
Likely Dem	-0.81**	0.22		-1.05***	-0.78*
	(0.32)	(0.81)		(0.29)	(0.41)
Lean Dem	-0.80*	0.34	0.15	-1.40***	-0.55
	(0.46)	(0.78)	(0.53)	(0.53)	(0.44)
Tossup	-0.96***	0.86**	-0.79**	-1.01***	-0.93***
	(0.20)	(0.37)	(0.36)	(0.31)	(0.23)
Lean Rep	-0.72**	0.26	-0.83**	-0.45	-0.63**
	(0.33)	(0.40)	(0.40)	(0.36)	(0.30)
Likely Rep	-1.45***	-0.23		-0.58	-0.54*
	(0.46)	(0.45)		(0.32)	(0.32)

Note: Standard errors allow for clustering within state.

Table 6. Interactions of price distortions around 2008 election with market characteristics

This table reports the results of paired-MSA specifications for pairs of MSAs (or MSA*state combinations, when MSAs span multiple states) in different states with geographic centers within 200 miles. The first specification repeats the analogous regression in Table A2. Subsequent specifications include interactions of an election window indicator and a election window*swing state variable with MSA characteristics. As in Table A2, specifications include pair*date and MSA fixed effects, and standard errors cluster on state.

	Interaction with	
	Election Window	Election*Swing state
Specification 1. Baseline specification		
Constant	Absorbed by date FEs	-2.04***
		(0.67)
Specification 2. Interaction with outlet-level concentration in MSA		
Constant	Absorbed by date FEs	-2.33***
		(0.52)
Ln(Number of stations in MSA)	0.80***	-1.58***
	(0.30)	(0.41)
Outlet-level Herfindahl	29.81**	-45.63***
	(11.94)	(17.08)
Specification 3. Interaction with outlet shares in MSA		
Constant	Absorbed by date FEs	-1.75***
		(0.50)
Ln(Number of stations in MSA)	0.24	-0.87**
	(0.22)	(0.40)
Outlet share of top 4 firms (BP, Chevron, Exxon, Shell)	7.26**	-13.63**
	(3.64)	(6.12)
Outlet share of next 6 firms (Citgo, ConocoPhilips, Cumberland, Marathon, Sunoco, Valero)	2.61	-11.18*
	(4.16)	(5.73)
Outlet share of non-top-10-branded stations	-3.15	-5.02
	(4.38)	(6.90)
Specification 4. Interaction with outlet shares for top 4 firms		
Constant	Absorbed by date FEs	-1.71***
		(0.64)
Ln(Number of stations in MSA)	0.33	-0.85**
	(0.21)	(0.38)
Outlet share of Firm A	11.36**	-24.62***
	(5.45)	(7.74)
Outlet share of Firm B	16.47**	-24.45*
	(6.84)	(13.70)
Outlet share of Firm C	2.06	-13.11
	(4.85)	(8.79)
Outlet share of Firm D	15.11***	-12.12*
	(4.00)	(6.78)
Outlet share of next 6 firms (Citgo, ConocoPhilips, Cumberland, Marathon, Sunoco, Valero)	5.71	-15.04***
	(4.20)	(5.61)
Outlet share of non-top-10-branded stations	-0.51	-8.54
	(3.98)	(5.91)
Summary statistics (MSA-level)		
	Mean	SD
Swing state measure	0.513	0.308
Ln(Number of stations in MSA)		
Outlet-level Herfindahl	0.153	0.040
Outlet shares		
Top 4 firms (BP, Chevron, Exxon, Shell)	0.297	0.157
Next 6 firms (Citgo, ConocoPhilips, Cumberland, Marathon, Sunoco, Valero)	0.245	0.135
Non-top10-brands	0.300	0.163
Unbranded stations	0.158	0.089

Table 7. Retail and wholesale price distortions around U.S. Presidential elections by product, 2000-8
Dependent variable: Log fuel price, in percent

This table reports regressions that repeat the specification in Table 4, Column 3 for different fuels and distribution channels. Each coefficients reported is the coefficient on the swing state*pro-oil incumbent*election window interaction term from different regressions.

Unleaded Gasoline	Regular	Midgrade	Premium
Retail (Sales to End Users)	-1.29***	-1.04***	-0.70*
	(0.35)	(0.34)	(0.39)
Retail Outlets	-1.37***	-1.05***	-0.96**
	(0.39)	(0.36)	(0.41)
Wholesale (Sales for Resale)	-1.01***	-1.00***	-0.94**
	(0.31)	(0.34)	(0.37)
Dealer Tank Wagon	-1.04*	-1.15*	-0.71
	(0.59)	(0.59)	(0.58)
Rack Sales	-0.68**	-0.34	-0.67**
	(0.28)	(0.31)	(0.26)

Diesel/Heating Oil	No. 2 Diesel	No. 2 Distillate
Retail (Sales to End Users)	0.64	0.48
	(0.53)	(0.47)
Residential		-0.86
		(0.70)
Commercial/Institutional	1.17	0.77
	(0.84)	(0.67)
Industrial	1.13	1.03
	(0.80)	(1.30)
Through Retail Outlets	-0.37	-0.37
	(0.83)	(0.83)
Other End Users	-0.03	1.42
	(0.55)	(1.13)
Wholesale (Sales for Resale)	-0.04	0.31
	(0.36)	(0.43)

Crude oil (domestic first purchase prices)	0.56
	(0.98)

Table 8. Crude oil prices and Presidential elections

Dependent variable: Ln(West Texas Intermediate [WTI] spot/future price), in percent

The sample period is May 1987-Dec 2010. Price data is the average daily spot/futures prices for the month in question. "Election cycle" fixed effects are fixed effects for the 4-calendar-year period surrounding each election (year y-1 to y+2). The specifications include one observation per month except in the last 4 columns, where they include the nearest four monthly futures contracts for each month. Standard errors are heteroskedasticity robust and, in the last 4 columns, allow for clustering within month. The election window variables are based on the delivery dates of the contracts, so the last 4 columns are identified despite including year*month fixed effects because of the inclusion of multiple contracts.

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)
Election window (Sep-Nov of election year)	13.3***	15.8***	7.5	7.8***	5.0	0.46	-0.65	-0.15	-0.03	-0.54	-0.53
	(3.4)	(3.8)	(4.7)	(2.9)	(2.9)	(0.56)	(0.55)	(0.51)	(0.79)	(0.58)	(0.94)
Election window*Incumbent (+1 if Rep; -1 if Dem)	-17.2***	-12.3***	-16.9***	-4.4	-7.7***	1.56***	1.01*	0.49	0.57	0.49	0.57
	(3.4)	(3.8)	(4.7)	(2.9)	(2.9)	(0.57)	(0.56)	(0.51)	(0.79)	(0.53)	(0.85)
Election window*(Year >= 1999)			16.6**		5.6		2.27**		-0.24		-0.02
			(6.5)		(5.6)		(0.99)		(1.02)		(1.15)
Election window*Incumbent*(Year >= 1999)			9.3		6.5		1.05		-0.17		-0.17
			(6.5)		(5.6)		(0.98)		(1.02)		(1.06)
Ln(Brent crude spot price)						0.93***	0.93***				
						(0.01)	(0.01)				
Dep var = WTI spot, near-month future, or 4 nearest futures?	Spot	Future	Future	Future	Future	Future	Future	4 futures	4 futures	4 futures	4 futures
Election cycle fixed effects	X	X	X			X	X				
Year fixed effects				X	X						
Month*Era fixed effects										X	X
Year*month fixed effects								X	X	X	X
Observations	284	284	284	284	284	284	284	1136	1136	1136	1136

Table 9. Gas price distortions around European general elections, 1994-2010, by product

Dependent variable: Ln(Price per liter in ECU/Euros), with and without tax (VAT and excise), in percent

	Gasoline (EURO/SUPER)		Diesel		LPG		Fuel Oil	
	W/o tax	With tax	W/o tax	With tax	W/o tax	With tax	W/o tax	With tax
Election window*Incumbent	-0.77***	-0.70***	-1.20***	-0.26**	-0.72**	-0.82***	0.03	0.06
	(0.28)	(0.19)	(0.20)	(0.12)	(0.29)	(0.29)	(0.27)	(0.31)
Election window	0.48**	0.05	0.64***	-0.06	0.95***	0.60*	0.38	0.85***
	(0.23)	(0.18)	(0.14)	(0.10)	(0.37)	(0.35)	(0.26)	(0.24)
Fixed effects								
Week	X	X	X	X	X	X	X	X
Country*nearest election	X	X	X	X	X	X	X	X

Election window is 20 weeks before a general election. Incumbent = 1 when governing coalition is led by the Right and -1 when led by the Left. Standard errors cluster on week.

Table 10. Relative size of oil industry market cap and gasoline sales

Year	Oil industry market cap (2008$ bil)	Motor vehicle fuel sales at retail prices (2008$ bil/yr)	Ratio	3.5% of market cap/Annual sales (in percent)	Average retail price (2008 cents/gal)	Motor vehicle fuel consumption (bil gal/yr)
1976	401	244	1.64	5.7	228	107
1980	593	329	1.81	6.3	326	101
1984	419	252	1.66	5.8	245	103
1988	413	206	2.01	7.0	183	113
1992	471	209	2.26	7.9	187	111
1996	619	216	2.87	10.0	178	121
2000	981	253	3.87	13.6	195	130
2004	976	309	3.16	11.1	221	140
2008	1731	529	3.27	11.4	384	138

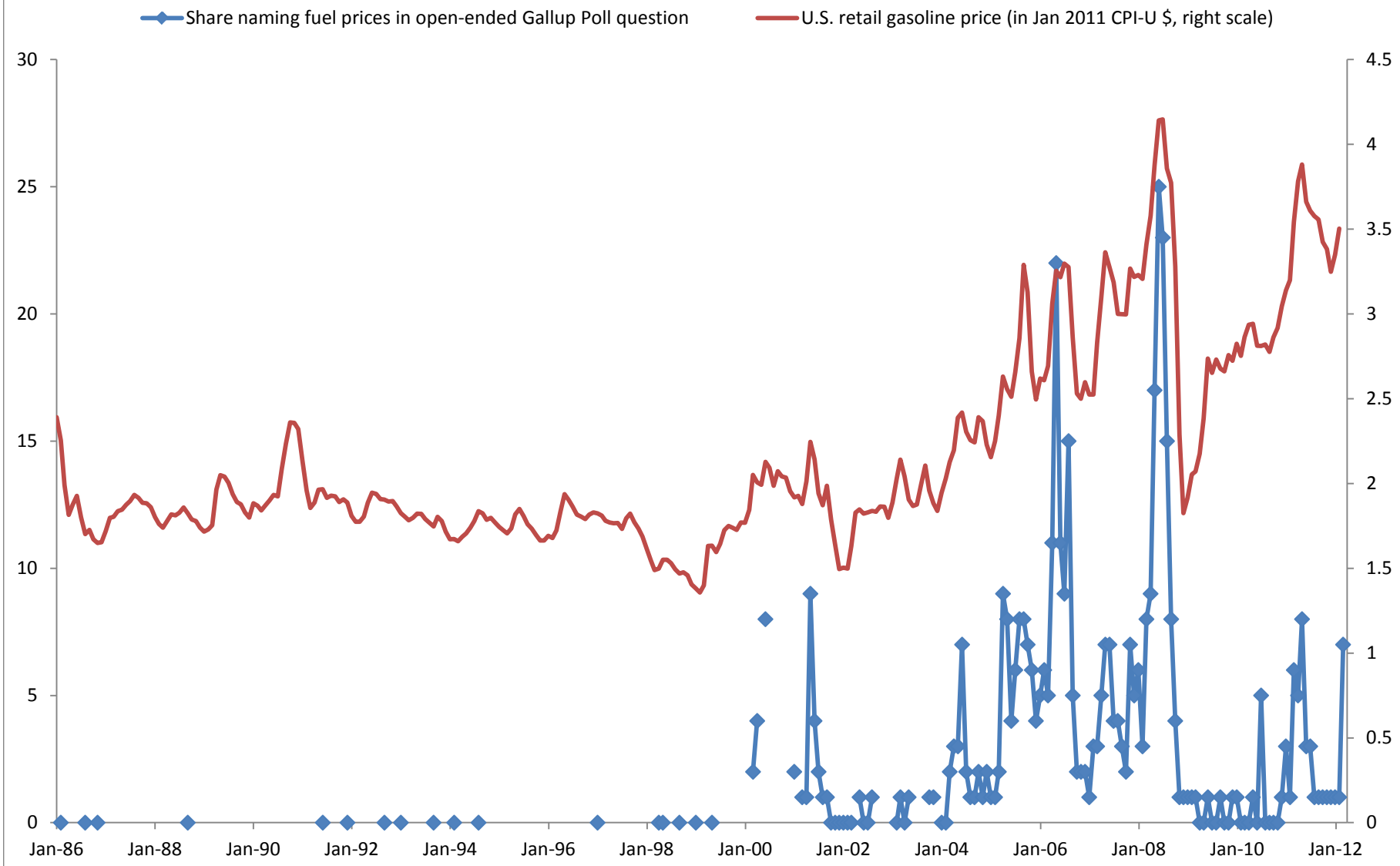
Source: Motor vehicle fuel consumption (EIA, Annual Energy Review 2009, Table 5.11); Average gas price (BLS, CPI Average Price Data, Series 7471A); Oil stock market cap (Sum of end-of-August closing market cap of SIC 1311 and SIC 2911 equities in CRSP). Values deflated to 20008$ using annual average values of the CPI-U.

Table 11. Political benefits required to justify price distortions, under different assumptions about price elasticity of demand

	Price deviation from normal optimal price						
Price elasticity of demand	-2%	-1%	-0.50%	0	0.50%	1%	2%
Panel A. Profit loss as percent of revenue							
-1.25	0.0052%	0.0013%	0.0003%	0.0000%	0.0003%	0.0012%	0.0049%
-1.4	0.0083%	0.0020%	0.0005%	0.0000%	0.0005%	0.0020%	0.0078%
-2	0.0208%	0.0051%	0.0013%	0.0000%	0.0012%	0.0049%	0.0192%
-5	0.0868%	0.0208%	0.0051%	0.0000%	0.0049%	0.0192%	0.0739%
-10	0.2090%	0.0485%	0.0117%	0.0000%	0.0108%	0.0418%	0.1558%
Panel B. Required gamma -- Required benefit from a +1% price change (as a percent of normal revenue) to make deviation optimal							
-1.25	-0.51	-0.25	-0.13	0.00	0.12	0.25	0.49
-1.4	-0.82	-0.40	-0.20	0.00	0.20	0.40	0.78
-2	-2.04	-1.01	-0.50	0.00	0.50	0.99	1.96
-5	-8.16	-4.04	-2.01	0.00	1.99	3.96	7.84
-10	-18.37	-9.09	-4.52	0.00	4.48	8.91	17.65
Panel C. Required impact of +1% price change on Republican victory probability in percent (assuming a Republican win is worth 200% of affected revenue)							
-1.25	-0.26	-0.13	-0.06	0.00	0.06	0.12	0.25
-1.4	-0.41	-0.20	-0.10	0.00	0.10	0.20	0.39
-2	-1.02	-0.51	-0.25	0.00	0.25	0.50	0.98
-5	-4.08	-2.02	-1.01	0.00	1.00	1.98	3.92
-10	-9.18	-4.55	-2.26	0.00	2.24	4.46	8.82
Panel D.Required impact of +1% price change on Republican vote share percent (assuming a one percent vote share shift in swing states affects outcome probabilities by 10 percent)							
-1.25	-0.026	-0.013	-0.006	0.000	0.006	0.012	0.025
-1.4	-0.041	***-0.020***	-0.010	0.000	0.010	***0.020***	0.039
-2	-0.102	-0.051	-0.025	0.000	0.025	0.050	0.098
-5	-0.408	-0.202	-0.101	0.000	0.100	0.198	0.392
-10	-0.918	-0.455	-0.226	0.000	0.224	0.446	0.882

The shading in Panel D indicates a political effect of gas prices approximately consistent with Cho and Gimpel's (2009) estimate.

Figure 1. Share naming fuel prices U.S.'s "Most Important Problem"



Note: Prior to 1986, fuel prices was aggregated with high general prices and/or inflation in reported results.

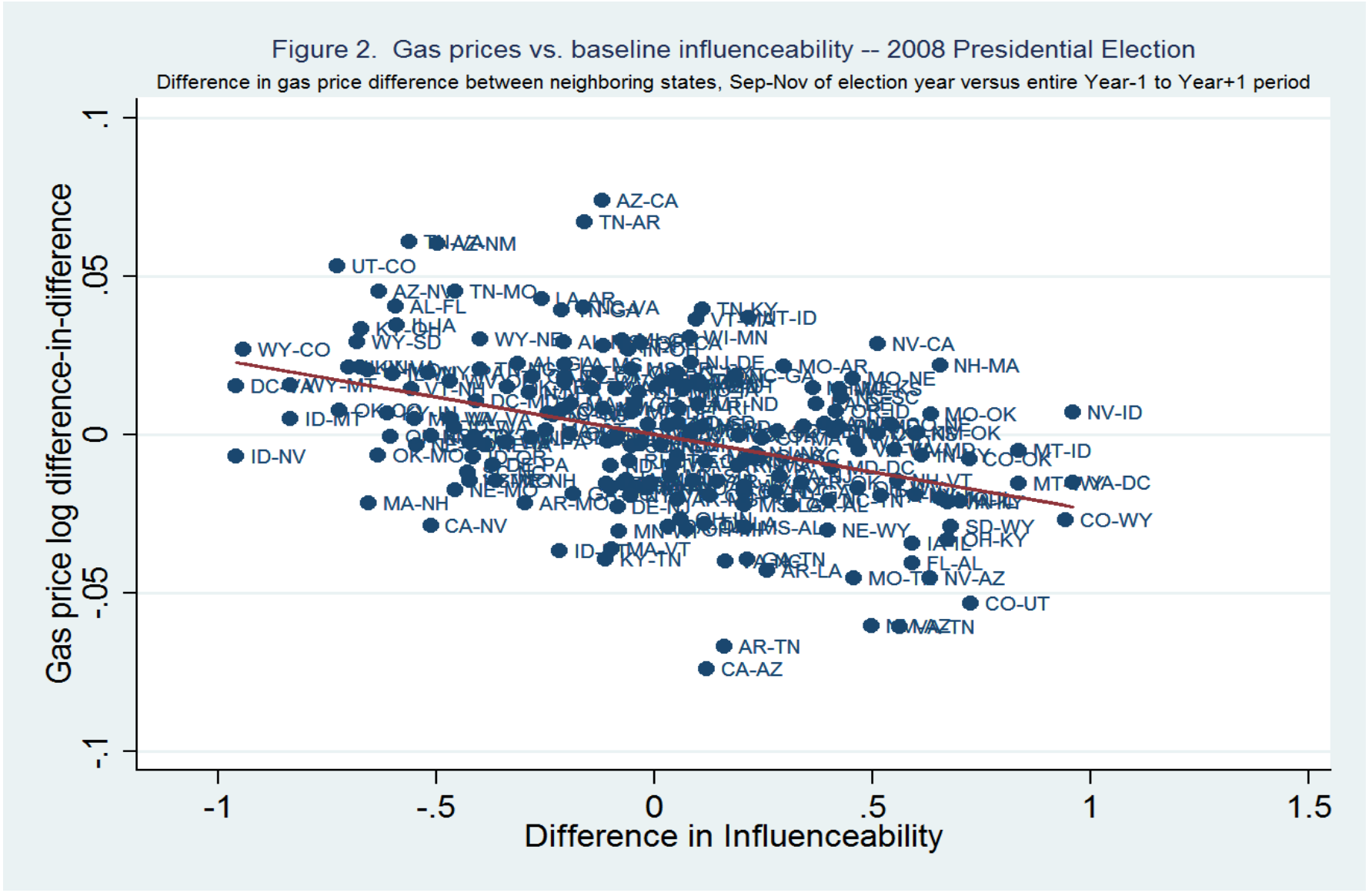


Figure 2. Gas prices vs. baseline influenceability -- 2008 Presidential Election
Difference in gas price difference between neighboring states, Sep-Nov of election year versus entire Year-1 to Year+1 period
Gas price log difference-in-difference
.1
.05
0
-.05
-.1
-1
-.5
0
.5
1
1.5
Difference in Influenceability
AZ-CA
TN-AR
UT-CO
AZ-NV
TN-MO
AL-FL
WY-CO
WY-SD
WY-NE
NV-CA
NH-MA
MO-AR
DC-WY-MT
ID-MT
MO-OK
NV-ID
ID-NV
OK-MO
MT-ID
CO-OK
MD-DC
MT-WA-DC
MA-NH
AR-MO
CA-NV
NE-WY
SD-WY
CO-WY
OH-KY
FL-AL
NV-AZ
CO-UT
AR-TN
CA-AZ

Figure 3. Timing of price distortions around Presidential elections

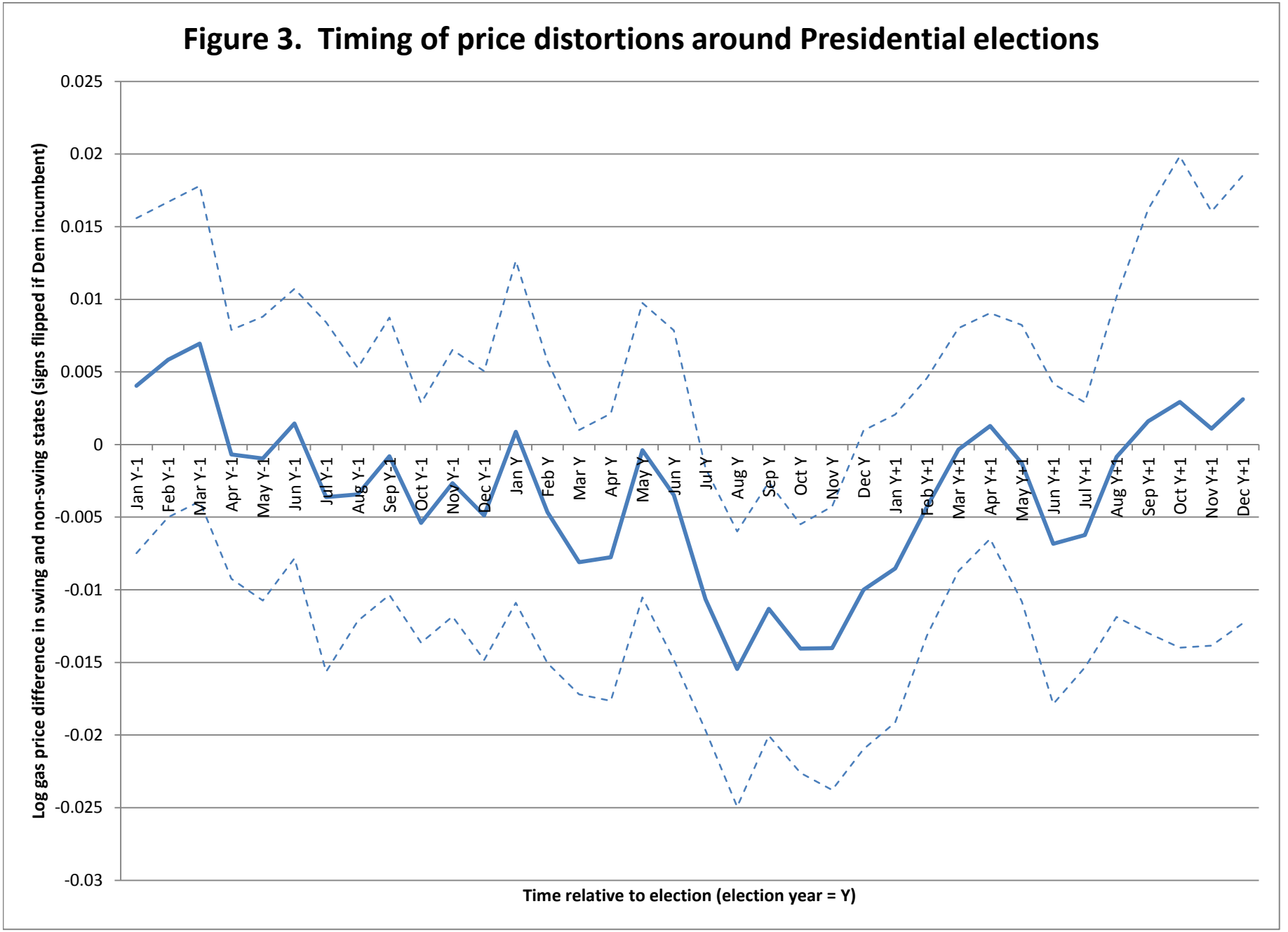


Figure 4. Gas price difference between MSAs in swing-state and non-swing-states (daily data, 2008 only)

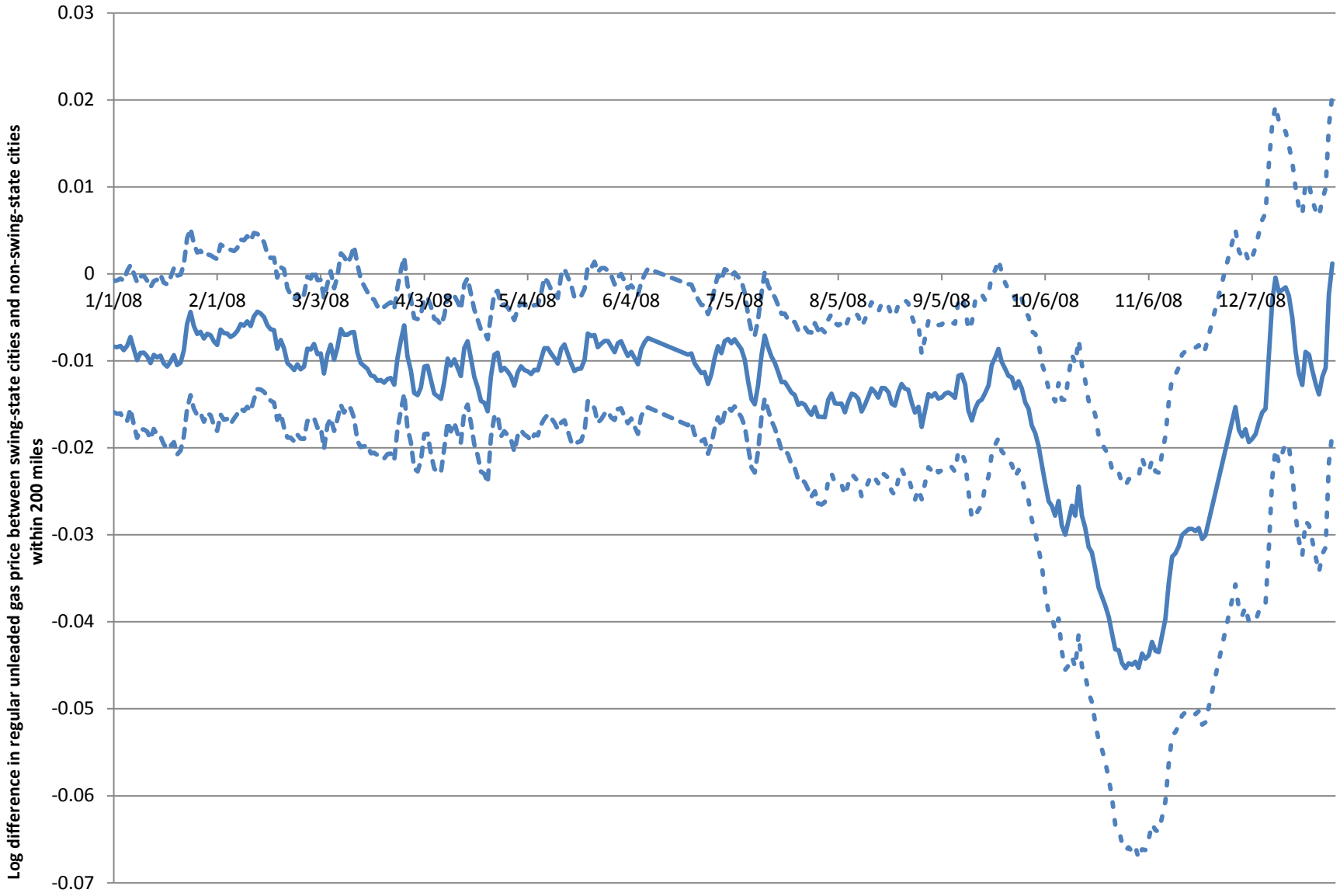


Figure 5. Relative pre-tax gasoline prices in weeks surrounding European general elections

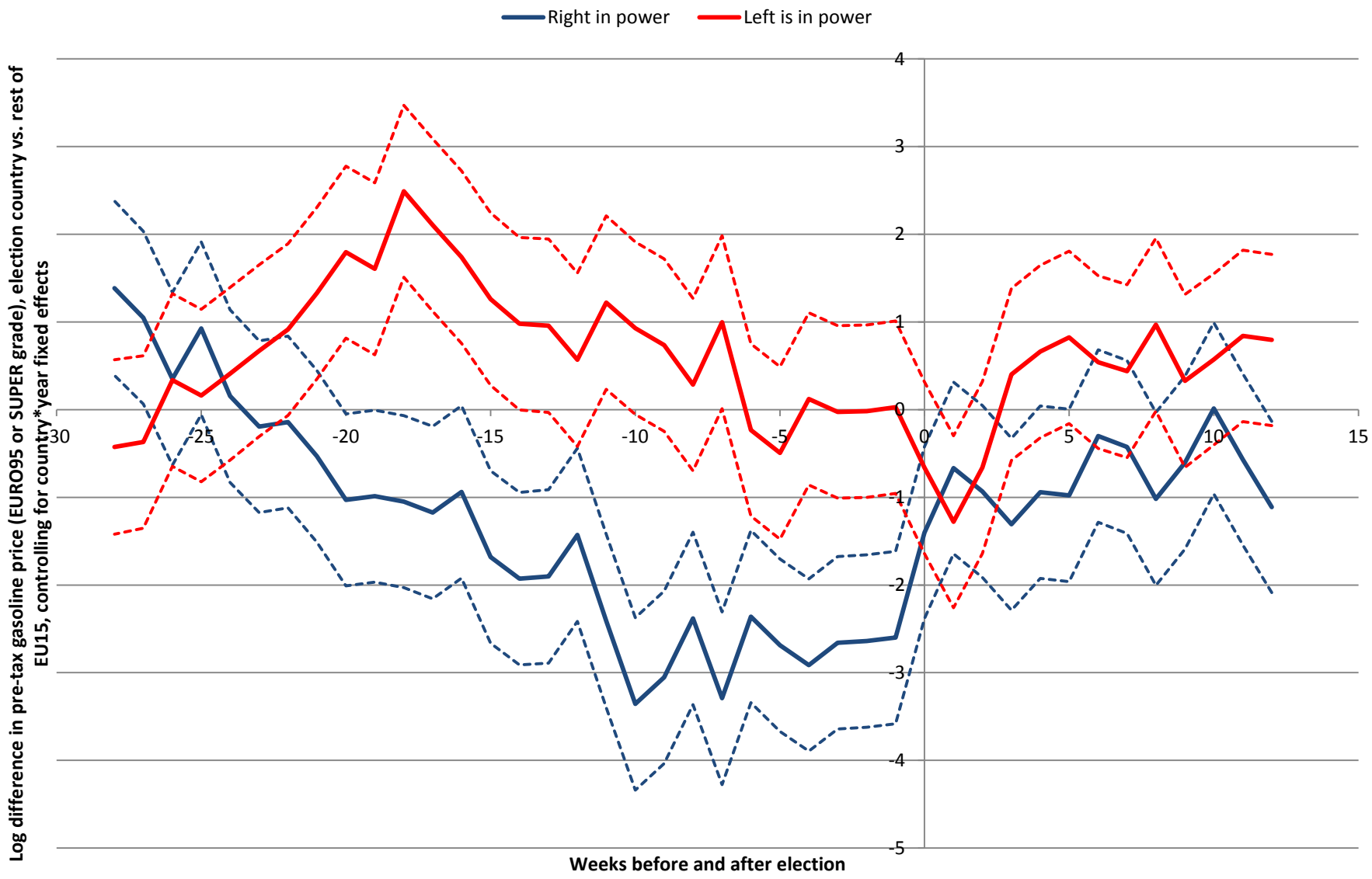


Figure 6. Difference in relative gas prices in EU15 countries in weeks surrounding general elections (Right in power - Left in power)

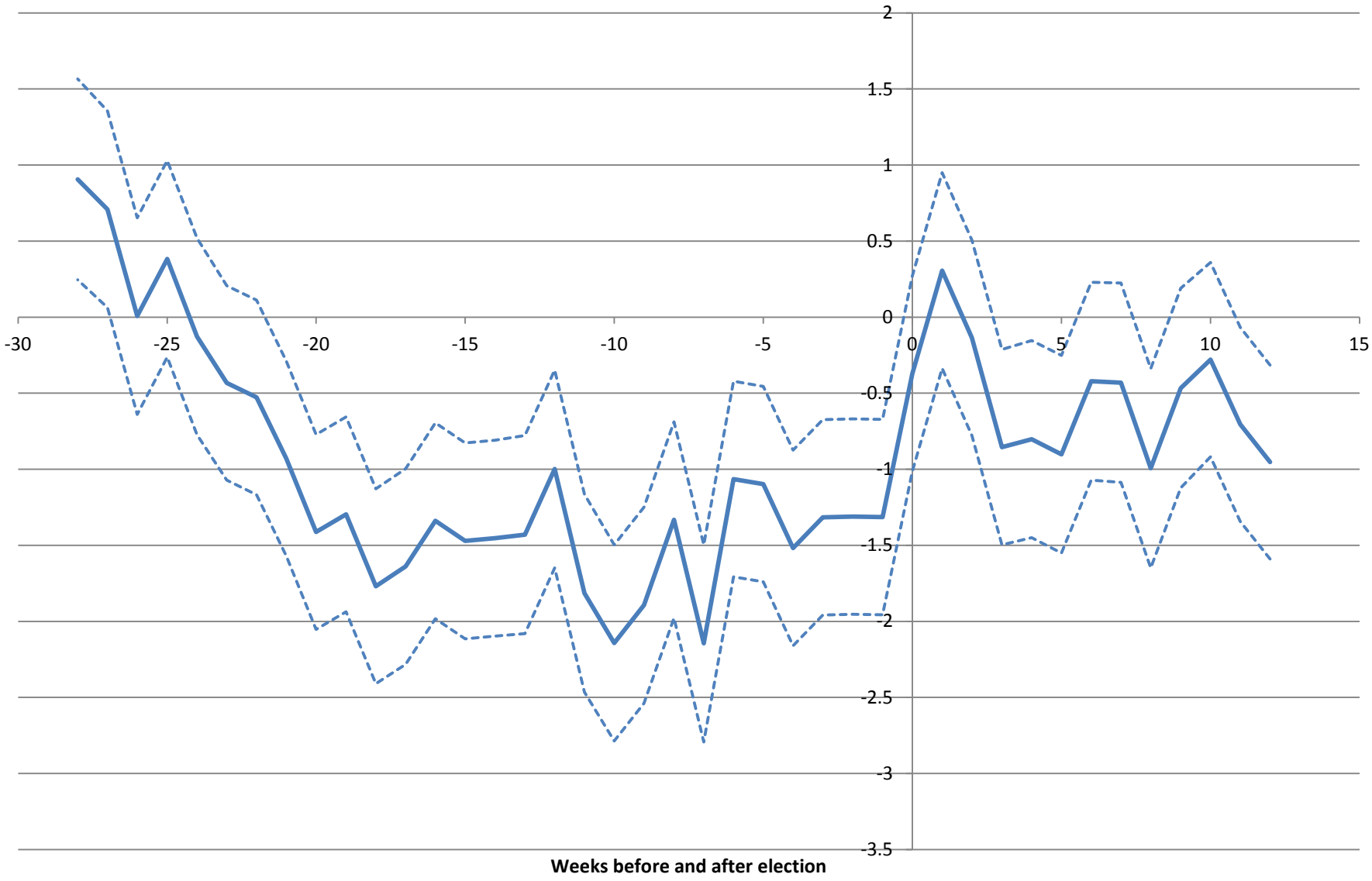


Table A1. Electoral Surprise and Oil Stock Returns

	Overnight returns in percent (pre-election close to post-election open)		GOP electoral surprise				
				Congressional control		Seats	
Year	Oil stocks (SIC 13)	CRSP VW	President	House	Senate	House	Senate
1976	-1.55	-1.10	-0.53				
1980	1.60	1.58	0.23				
1984	-0.68	-0.64	0.17				
1988	-0.20	-0.49	0.19				
1992	-0.41	-0.17	-0.08				
1994	0.51	0.77		0.90	0.30	28.2	1.0
1996	0.00	0.12	-0.07	0.20	0.07	-0.4	2.0
1998	0.62	0.88		0.10	0.10	-7.5	-1.0
2000	0.57	0.24	0.39	0.34	0.14	-0.1	-1.0
2002	0.53	0.38		0.10	0.60	9.9	3.6
2004	2.10	1.53	0.45	0.07	0.22	5.0	3.4
2006	-0.38	-0.37		-0.18	-0.74	-6.4	-3.9
2008	-2.74	-1.35	-0.10	-0.04	-0.02	5.1	-1.3
2010	0.19	0.18		0.06	-0.14	12.8	-0.7

Table A2. Paired-MSA specifications for the 2008 election

This table examines the sensitivity of MSA-level estimates of price distortions to the distance between the MSA pairs. Distances are calculated between the geographic centers of an MSA (or an MSA*state combination, when an MSA spans multiple states), which is in turn calculated as the equal-weighted average of the geographic center of the Zip Codes in the largest city. Specifications are analogous to column 3 of Tables 3 and 4, and include fixed effects for MSAs and pair*date. The sample period is January 2007 to February 2009 -- the election window is defined as September to November 2008.

Distance criteria in miles	All	0-49	50-99	100-199	200-299	300+	<100	<200	<300
Swing state*2008*Election window	-2.01***	-1.84**	-2.63***	-1.80**	-1.95	-1.60	-2.51***	-2.04***	-2.03***
	(0.65)	(0.86)	(0.91)	(0.79)	(1.53)	(3.28)	(0.83)	(0.67)	(0.66)
Fixed effects									
MSA pair*date	X	X	X	X	X	X	X	X	X
MSA	X	X	X	X	X	X	X	X	X
Observations	2,492,775	114,996	526,922	1,212,594	468,710	169,553	641,918	1,854,512	2,323,222
MSA pairs included	1856	82	374	874	374	152	456	1330	1704
Unique MSAs included	259	62	145	221	140	56	153	233	257
Unique states included	49	24	40	47	32	12	40	49	49

Table A3. Differences in electoral price distortions in crude oil imported from different locations

The free-on-board (FOB) cost of crude oil imported from a specific country or region is regressed on indicator variables for an Presidential election window and an interaction of that variable with an indicator for the incumbent party (+1 = Rep, -1 = Dem). Regressions are analogous to those in Table 8, columns 1 and 2, and include fixed effects for the surrounding four year period (Y-1 to Y+2) and standard errors are heteroskedasticity robust. Angola joined OPEC in 2007, but is listed with non-OPEC countries in this table as it was not a member for the majority of the sample period.

	Specification 1		Specification 2	
	Dep var: Ln(Crude oil price)*100		Dep var: [Ln(Crude oil price) - Ln(Average)]*100	
	Election window	Incumbent	Election window	Incumbent
All countries	12.9***	-14.9***		
(1975-2010)	(3.2)	(3.2)		
OPEC members	12.5***	-14.9***	-0.4	0.0
(1975-2010)	(3.2)	(3.2)	(0.5)	(0.5)
Persian Gulf	10.6*	-21.3***	-4.8	-1.9
(1996-2010)	(5.4)	(5.4)	(2.9)	(2.9)
Saudi Arabia	7.2	-14.6***	-3.2	0.6
(1975-2010)	(5.0)	(5.0)	(2.1)	(2.1)
Nigeria	12.4***	-14.6***	-0.9	0.5
(1975-2010)	(2.9)	(2.9)	(0.6)	(0.6)
Venezuela	14.1***	-13.3***	1.2	1.6
(1975-2010)	(3.7)	(3.7)	(1.4)	(1.4)
Non-OPEC	13.2***	-14.8***	0.3	0.1
(1975-2010)	(3.2)	(3.2)	(0.4)	(0.4)
Angola	12.8***	-18.9***	-2.0**	1.4
(1996-2010)	(4.9)	(4.9)	(1.0)	(1.0)
Colombia	14.4**	-20.1***	-0.2	0.6
(1996-2010)	(6.5)	(6.5)	(1.3)	(1.3)
Mexico	13.9***	-15.5***	0.9	-0.6
(1975-2010)	(3.5)	(3.5)	(0.6)	(0.6)
UK	14.2***	-7.1	-0.9	-1.1
(1977-2010)	(4.4)	(4.4)	(1.1)	(1.1)

Figure A1. Gas prices vs. baseline influenceability -- 2004 Presidential Election

Difference in gas price difference between neighboring states, Sep-Nov of election year versus entire Year-1 to Year+1 period

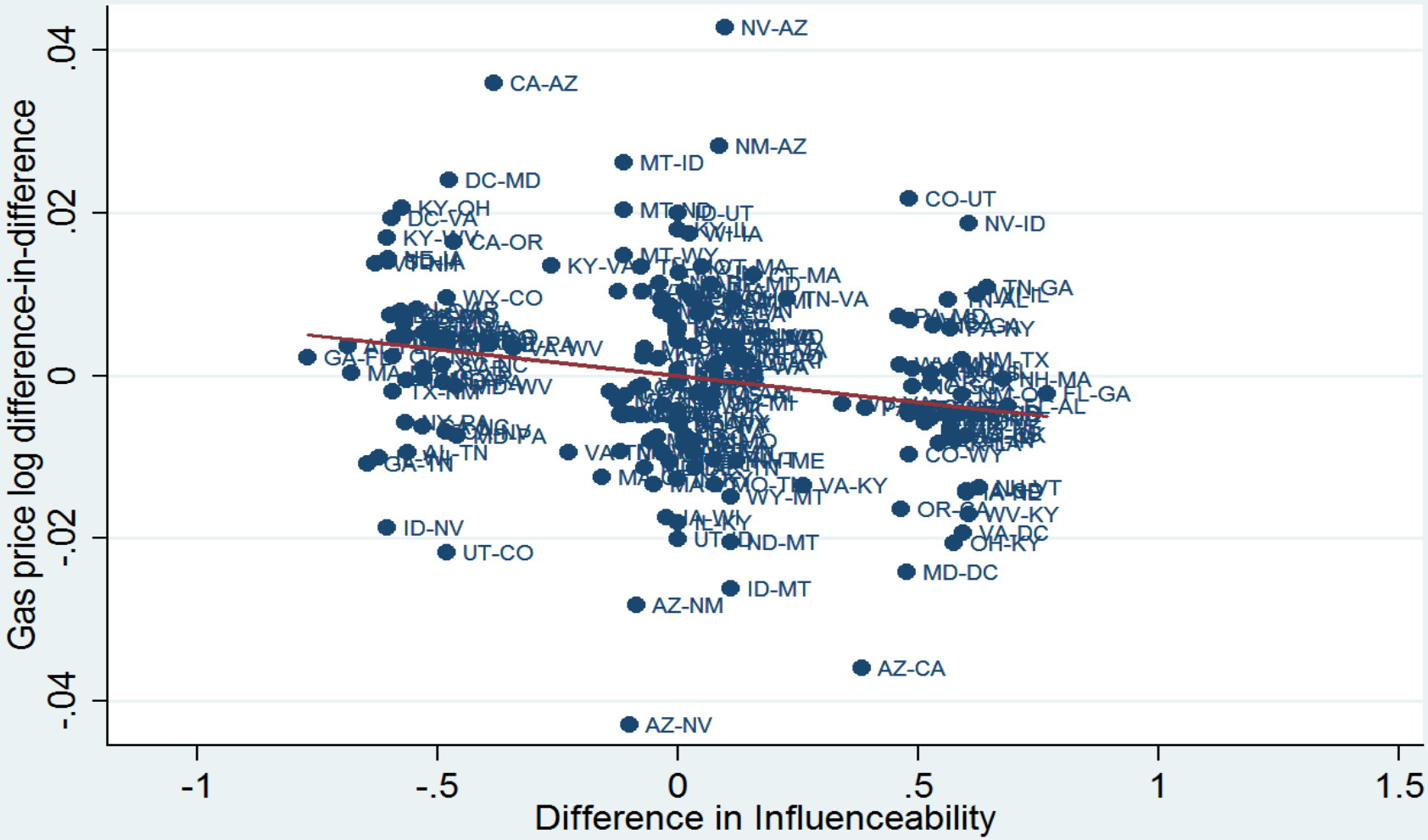


Figure A2. Gas prices vs. baseline influenceability -- 2000 Presidential Election

Difference in gas price difference between neighboring states, Sep-Nov of election year versus entire Year-1 to Year+1 period

Figure A3. Gas prices vs. baseline influenceability -- 1980 Presidential Election

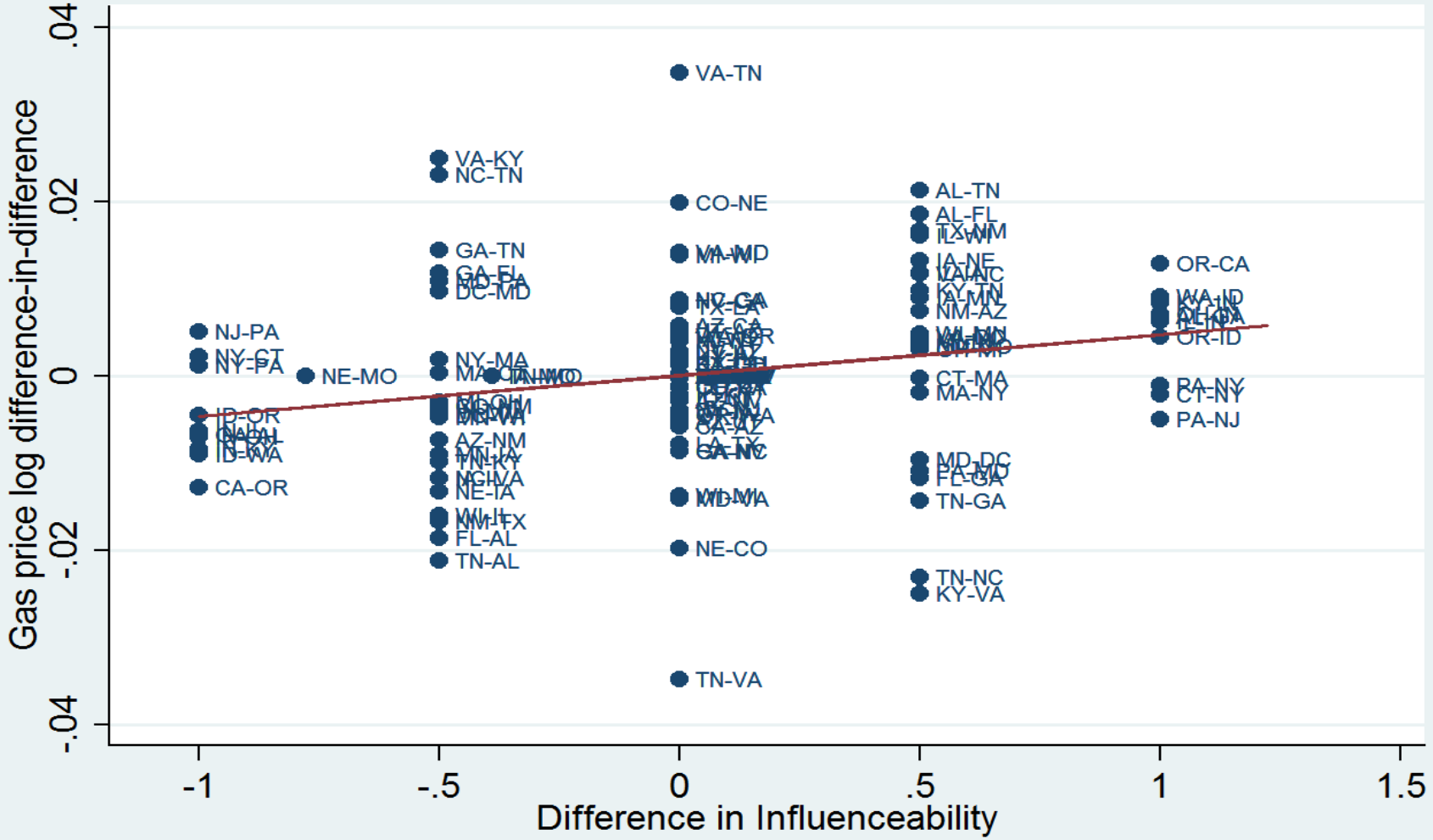


Figure A4. Gas prices vs. baseline influenceability -- 1976 Presidential Election

Difference in gas price difference between neighboring states, Sep-Nov of election year versus entire Year-1 to Year+1 period