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# Polarization and Corruption in America*

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**Abstract**

The hypothesis that ideological polarization reduces corruption is tested using panel data from the US. To identify the causal effect of polarization, polarization is instrumented with lagged political position-taking in geographically neighboring states. Polarization is found to significantly reduce corruption. Consistent with the idea that ideological distance imposes additional electoral discipline on politicians, the beneficial effect of polarization is found to increase when political competition is high and when incumbent governors are eligible to run for office.

Keywords: Corruption, ideological polarization.

JEL: K4; H0

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# 1 Introduction

Democracy, unfortunately, does not eliminate corruption. In international data Treisman (2000) finds it to be a rather weak constraint and Persson et al (2003) note the problem persists in mature democracies. Cross-country evidence examining the determinants of corruption suggests a number of potential drivers, though as Treisman (2007) observes, causality is difficult to establish in this context. An intriguing case in point is Brown et al (2011), who hypothesize, and find evidence that, corruption falls with political polarization.[1]

This paper tests the same hypothesis using panel data from the United States. This testbed offers several advantages. Firstly, as Besley and Case (2003) observe, the common broad institutional and constitutional setting rules out many sources of unobserved heterogeneity, a major concern in the international context. Secondly, the data are considerably more extensive across time, covering the 48 contiguous states for the period 1976-2004. This permits using fixed (state) effects in the econometric analysis, hence time-invariant unobserved heterogeneity is controlled for. Third, as detailed below, the corruption data - taken from actual federal corruption convictions - are better measured than the corruption perceptions data used at the international level. Fourth the data measuring political polarization are also superior, depending on actual voting behavior within a particular institutional framework.

A further advantage is that the data also permit the development of an instrumental variable (IV) for ideological polarization observed within a state at a particular point in time. As we discuss below there is broad evidence that both in-

[1]Testa (2010) also investigates the impact of polarization on corruption using international data with congruent findings. The hypothesis is intriguing because generally polarization is bemoaned. The literature identifies adverse consequences for policy efficiency (Schultz 2008; Azzimonti and Talbert 2014), party governance (Caillaud and Tirole 2002), fiscal deficit/volatility (Woo 2003, 2005), public debt (Persson and Svensson 1989; Alesina and Tabellini 1990), private investment (Azzimonti 2011) and economic growth (Gradstein and Justman 2002).

More broadly cultural polarization in terms of language, ethnics or religion is also linked to violent conflict (Esteban and Ray 1999, 2011; Montalvo and Reynal-Querol 2005), large government sector and distortionary taxation (Ager and Brückner 2013) while preventing redistribution (Desmet, Ortuño-Ortín and Weber 2009).

dividual political attitudes and policy choices diffuse slowly across geographic space, from neighbor to neighbor and from state to state. Taking inspiration from this evidence we conjecture that leftward shifts in neighboring state average Democrat ideology, and rightward shifts in neighboring state Republican ideology, exogenously cause own-state polarization to increase with a lag. The data support this conjecture especially in the case of the Democrats. Under the plausible assumption that lagged political platforms in neighboring states are exogenous, the instrumental variable regression output can be understood to represent estimates of a causal relationship from polarization to corruption.

The consistent finding, using both OLS and IV estimation, is that polarization reduces corruption. The estimated effect is sizeable. For example if states such as Oregon, New Hampshire or Washington (with polarization levels around the mean) were as polarized as California or Wyoming (the most polarized states), corruption would totally disappear in these states. This finding is consistent with the theoretical reasoning in Brown et al (2011), and indeed independently theorized in Testa (2012), wherein the salutary effect of polarization comes from additional electoral discipline imposed on politicians who care about ideological continuity. In further support of this argument, the estimated beneficial effect of polarization is found to be stronger when political competition is sufficiently high and when the governor is eligible for re-election.

## 2 Hypothesis

Brown et al (2011) advance the hypothesis that political polarization acts as a constraint on corruption.[2] Testa (2012) also independently provides a formal analysis of how polarization raises electoral stakes and thus reduces corruption. In this analysis politicians have ideological preferences, and incumbents care about ideological

[2]Brown et al (2011) also document possible mechanisms through which polarization may increase corruption. For example office-motivated (as distinct from ideologically-motivated) politicians might be expected to reduce corruption to garner votes, assuming the corruption is to some extent visible. The extent to which voters punish corruption falls with polarization. More generally, as noted in footnote 1 polarization is often associated with adverse consequences for governance. These competing mechanisms underline the need for empirical resolution.

continuity. For incumbents, corruption brings private benefits, but harms electoral prospects. The costs of election loss increase with greater ideological distance. Ideological polarization therefore helps to keep elected politicians accountable, lowering corruption. Another possibility, advanced by Brown et al (2011), is that the capacity to collude in corruption is facilitated when candidates are ideologically proximate. Opposition politicians more readily hold incumbents to account given distinct ideological platforms.

This proposed mechanism also implies two subsidiary hypotheses. Firstly polarization should matter more under high political competition. The ideological deterrent faced by an incumbent in a 'safe seat' is reduced when their re-election is secure. Secondly the ameliorating effect of polarization is plausibly reduced when incumbents are not re-running for office. Perceived responsibility for corruption, when recognized by the electorate, is likely to be higher when the incumbent is eligible for re-election. An incumbent who is not eligible for re-election may consider that the electoral consequences of her corruption are reduced, hence the sensitivity of corruption to polarization is reduced.[3]

# 3 Data and Specification

## 3.1 The Dependent Variable: Corruption Convictions

The empirical analysis builds on Alt and Lassen (2014) who analyze corruption in the panel of US states over the period 1977-2003. The dependent variable is corruption convictions (defined as 'criminal abuses of pubic trust by government officials') normalized by state population. Corruption data are reported annually by the Public Integrity Section of the US Department of Justice. Cases are prosecuted at the federal level by this Section as well as by US Attorneys.

As noted by Glaeser and Saks (2006) these data have a number of advantageous properties for use in testing theories of corruption. First, the data correspond to

[3]Ferraz and Finan (2011) examine the hypothesis that re-election eligibility affects corruption using Brazilian data.

actual convictions. This contrasts with cross-national studies that rely on subjective surveys of experts and firms. Second, because the convictions are determined through federal prosecution, the possibility of collusion between prosecutors and officials can be ruled out. Were the prosecutions made at the state level then potentially the more corrupt states could have reduced convictions due to corruption of the judicial process itself. Thus, the convictions data are considered to be objective and comparable across states.

In the present paper the sample extends from 1976 to 2004 (as our polarization data is available until 2004) for the 48 contiguous states, covering over 21,000 corruption convictions.[4] Following Alt and Lassen (2014) the analysis uses the raw annual convictions data (normalized by population) and also a 5-year moving average. The latter has the advantage of reducing measurement problems arising from legal lags such as the time elapsed between a specific act of corruption and its conviction.

Figure 1 depicts the evolution of the average number of convictions normalized by state population across the US by year. This figure shows an upward trend with a peak of around 4.2 convictions per million inhabitants in the late 1980s. There is also considerable geographical variation, with state-averages depicted in Figure 2. Normalized convictions rates range from around 1 for Oregon and Washington to more than 6 for Mississippi and Louisiana.

***Insert Figures 1 and 2***

### 3.2 The Core Explanatory Variable: Ideological Polarization

Ideological polarization measures are constructed using the US state government ideology measures produced by Berry et al (2010), which cover the period inclusive of 1960-2004.[5] These data attribute to each party within each state-year the mean ideological position of the party's congressional delegation, hence assumes that state officials mirror their federal counterparts. The NOMINATE common space scores

[4]There are a small number of missing observations in the convictions data. For these cases linear interpolation is used in order to maximize the size of the dataset.

[5]Berry et al (2010) also produce a measure of US state citizens' ideology but we focus on their government ideology measure as the mechanism examined concerns the ideological polarization of state officials.

are used to identify the ideal point of each member of the party's delegation based on actual voting in the Congress on the basic issue of the role of government in the economy, and follow a unidimensional conservative-liberal axis.[6] Unidimensionality is justified by Poole and Rosenthal (1997) who find that voting in Congress has become almost purely one-dimensional since the passage of civil rights laws in the 1960s.[7]

The Berry et al (2010) measures are thus unidimensional conservative-liberal ideology scores produced for each state at the level of the party and varies over time (as the party's congressional delegation changes). The data are denoted $PARTYID\_RR_{i,t}$ and $PARTYID\_DD_{i,t}$ for the Republican and the Democrat parties respectively in state $i$ in year $t$, which in principle vary between 0 (extreme conservative) and 100 (extreme liberal).

***Insert Figure 3***

Within the sample the Republican party ranges from Idaho in 1991 ($PARTYID\_RR = 18.11$) to Massachusetts in 1976 ($PARTYID\_RR = 57.35$), whilst the Democrat party were most conservative in Virginia in 1981 ($PARTYID\_DD = 39.08$) and at their most liberal in South Dakota in 1976 ($PARTYID\_DD = 86.59$). Over time the parties have, on average, diverged. Figure 3 plots the evolution of the average ideology scores of the Democrats and Republicans over the sample period. The trend towards polarization is clear from the early 1980s onwards. While the Republicans have continuously become more conservative over time, the Democrats centrized prior to the early 1980s since when they have on average become more liberal.

[6] According to Berry et al (2010), a major advantage of this version of their government ideology measure is that the ideal points of the Congress members are comparable from one session to the next and between the House and the Senate, as opposed to their earlier measures based on interest-group ratings (Berry et al 1998).

[7] In the wake of World War II two dimensions were required to account for the roll call voting: (1) the liberal-conservative dimension related to the role of government in the economy and (2) the conflict over race and civil rights. However, with the passage of the 1964 Civil Rights Act, the 1965 Voting Rights Act, and the 1967 Open Housing Act, the second dimension declined in importance and race related issues - affirmative action, welfare, Medicaid, etc. - became questions of redistribution and thus became part of the liberal-conservative dimension (Poole and Rosenthal 1997).

Polarization ($POL$) within a particular state-year is then measured as the ideological distance between the Republican party and the Democrat party:

$$POL_{i,t} = |PARTYID\_DD_{i,t} - PARTYID\_RR_{i,t}| \quad (1)$$

This series exhibits interesting variation across time and space. Figure 1 depicts average polarization across time. In the early part of the sample both parties are measured to be moving rightwards, hence average polarization is somewhat static prior to the 1980s, since when it has markedly increased. The raw correlation of the average corruption and polarization measures in Figure 1, is 0.44. Taken at face value, this is in line with prior arguments that polarization is associated with adverse policy consequences. Note however in Figure 2 that the correlation of individual state-averages of normalized corruption against ideological polarization is negative. These basic data descriptives underline the need for a more concrete econometric analysis.

Table 1 contains summary statistics for the main variables used in the analysis. The mean value for $POL_{i,t}$ is 33.38 and its standard deviation is 8.45. The least polarized state-year in the sample was Virginia in 1981 ($POL = 3.50$), where the Republicans and Democrats had almost the same ideological score (35.58 and 39.08 respectively). The most polarized state-year was Arizona in 2004 ($POL = 56.67$) - this latter case reflects the presence of one of the most conservative Republican party in our sample ($PARTYID\_RR = 22.27$) together with one of the most liberal Democrat party ($PARTYID\_DD = 78.94$), led by the Democrat governor, Janet Napolitano.

***Insert Table 1***

A key advantage of the polarization measure used in this paper is that it varies across time as well as across states. For instance, Idaho and Mississippi were respectively the most ($POL = 55.43$) and the least ($POL = 16.57$) polarized states in 1976. By 2004, their respective polarization scores were all but equal ($POL =$

34.41 for Idaho and $POL = 33.58$ for Mississippi). This heterogenous within-state variation enables the use of fixed effects in the regression analysis.

Shor and McCarty (2011) provide an alternative polarization measure, generated from roll call voting data within state legislatures. Unfortunately this series only starts in the mid-1990s and hence would imply a significantly reduced dataset. Nonetheless, Shor and McCarty's data permit a validation test of the $POL_{i,t}$ measure used here. Following the above strategy we calculate the absolute distance between the median ideology of the Democrat party and the median ideology of the Republican party for each state-year, thus producing an alternative measure of ideological polarization available for the period 1995-2013. The correlation between the two polarization measures is 0.7, which makes us confident in the reliability of $POL_{i,t}$. Berry et al (2013) also found that the two separate measures of state government ideology converge and that both are valid measures of the underlying data.

### 3.3 Specification and Identification

The benchmark specification augments the basic model used in Alt and Lassen (2014) with the polarization measure described above. Hence we estimate:

$$Corruption_{i,t} = \beta_0 + \beta_1 POL_{i,t} + \beta_K X_{i,t} + \alpha_i + \tau_t + \epsilon_{i,t} \tag{2}$$

where $Corruption_{i,t}$ is corruption in state $i$ at time $t$, regressed on ideological polarization ($POL$) and a vector of controls ($X$). The controls include relative wages for public employees, male wage inequality, divided government (where the legislature and executive are controlled by different parties), average constant dollar income per capita, per capita constant dollar state government revenues or expenditures, the population share with high school education, state population, gubernatorial one-term limit legislation, gubernatorial two-term limit legislation, the state level of unemployment, Berry et al's (1998) measure of citizens' ideology, and the degree of urbanization on its own and interacted with state party control (measured as the

Democrat share of the state senate).[8] The vector of controls is augmented with fixed effects $\alpha_i$ and time effects $\tau_t$. In addition robust standard errors are clustered at the state level.

There are alternative mechanisms that could account for a negative empirical relationship between corruption and polarization. One possibility is that measured ideological polarization within a state increases as political competition falls. For example, an ideologically polarized state could reflect a situation where a party has a large majority and the minority party is composed of a small number of extremist representatives. In order to address this possibility the partisan composition of the state government measured as the share of democrats in the state senate is controlled for in the analysis. An alternative mechanism stems from Lindqvist and Östling (2010) who find that ideological polarization is associated with lower public spending in international data. Smaller government, in turn, arguably reduces the opportunity to divert funds. In order to address this the size of the state government is included as an additional control.

Whilst the data and specification both represent considerable improvements over cross-country studies, equation (2) still does not by itself establish watertight causality from polarization to corruption. Polarization has its own driving forces, which problematically also may independently drive corruption. The analysis goes some distance towards addressing this by controlling for the main candidate explanations for polarization in the US, in particular income inequality (McCarty, Poole and Rosenthal 2006; Garand 2010) and a broad set of socio-economic and demographic characteristics.

In order to further isolate exogenous movements in state-level polarization we also employ an instrumental variable strategy. State polarization is instrumented with past political position-taking in geographically neighboring states. The idea is that when the Democrat parties of the neighboring states (weighted by population) move left, then the state Democrat position moves to the left with a lag, and po-

[8]The source of these detailed data is described in Alt and Lassen (2014) who generously made their data available.

larization exogenously increases. Similarly, state polarization exogenously increases with a lag if the neighboring Republicans move right.

This strategy is based on an extensive literature in political science studying processes of policy and preference diffusion across the US states and internationally. This literature provides widespread empirical evidence that particular states are more likely to adopt particular laws or policies if its neighboring states have already done so. Regional diffusion of policy is documented in Berry and Berry (1990) and Mooney (2001). Seljan and Weller (2011) find that proposals to limit state tax and expenditure are strongly determined by policy in proximate states. Note that these policies typically enter the categories of 'economic' and 'social' issues congruent with the liberal-conservative axis of the NOMINATE scores.

Mooney (2001) and Boehmke and Witmer (2004) find that policy diffusion is due to a social learning mechanism. A social learning process can also underpin the diffusion of ideology between states. When neighboring Democrats (Republicans) shift ideologically, the relevant social group are the own-state Democrats (Republicans). When neighboring Democrats (Republicans) shift left (right), then own-state Democrats shift left (right) and polarization increases. The credibility the IV strategy is revisited below, but there is strong evidence that ideas and ideology transmit geographically.

This reasoning yields two instruments: the 5-year lagged weighted average ideology of the Democrats ($PARTYID\_DD$) and the 5-year lagged weighted average ideology of the Republicans ($PARTYID\_RR$) of the adjoining neighboring states. Neighboring states of a particular state $i$ are defined as those that share a meaningful border. Weights are determined by population, reflecting the fact that a populous neighbor state should be much more influential than a smaller one.[9] Thus in the annual data specification, state polarization in $t$ is instrumented with the weighted party positions of neighboring states in $t-5$. In the 5-year moving average (MA) specification, the MA of state polarization from $t-4$ to $t$ is instrumented by the

[9]For example Maine polarization is instrumented by lagged New Hampshire data alone. On the other hand New Hampshire is instrumented with lagged data from Maine, Massachussets and Vermont where Massachussets is weighted more heavily due to its relatively larger population.

MA from $t-9$ to $t-5$ of the party positions in the neighboring states. Importantly, using *lagged* neighbor-state party positions captures the transmission from the neighbors to state $i$, thus reducing the risk that state $i$ itself is an 'ideology-maker' i.e. influencing the ideology of its neighbors. One issue addressed below is that the argument of geographic ideology diffusion would seem to be more readily applied in the instance of small states with large neighbors. On the other hand it is harder to believe that politics in California or New York would be so acquiescent to ideological shifts in its (relatively) small neighbors. Consequently 'large' states are excluded in some of the analysis below. Consistent with this reasoning, in the analysis below the IV is found to be much stronger for the smaller states.

Figure 4 plots 5-year average state polarization against the 5-year average of the weighted average ideology of the Democrats of neighboring states, lagged by 5 years. Similarly, Figure 5 plots 5-year average polarization within states against the 5-year average of the weighted average ideology of the Republicans of neighboring states, lagged by 5 years. These figures, albeit only suggestive, support the idea that state polarization is affected by the past position taking in neighboring states. Higher levels of state polarization are associated with more liberal lagged position-taking by neighboring Democrats and more conservative position-taking by neighboring Republicans.

***Insert Figures 4 and 5 ***

# 4 Results

## 4.1 Ordinary Least Squares Regression Results

Results from applying OLS estimation are presented in Table 2. Column (1) presents results of a specification including state fixed effects but without time effects and controls, using annual data. In this specification the estimated coefficient of ideological polarization, though not statistically significant, is positive. This echoes the raw positive correlation observed in Figure 1 and reflects the upward co-movement in the two series. However, when augmenting this specification with fixed year effects

(column (2)) or indeed just including the (time-varying) set of controls described above (column (3)), the estimated coefficient on polarization turns negative and is significant at the 5% level. Thus the positive raw correlation observed in figure 1 is an artefact of other temporal factors. Column (4) contains results including both state and year fixed effects as well as the controls, hence corresponds to the benchmark specification (2) above. The estimated coefficient is negative and significant at the 5% level and implies that a one standard deviation increase in polarization is associated with a reduction in corruption by about 0.37 normalized units - around 13% of one standard deviation.

***Insert Table 2***

Column (5) presents the results using the same specification as column (4) but uses 5-year moving averages for both the dependent and the independent variables. This specification reduces the observation period somewhat from 1976-2004 to 1980-2004 but is still our preferred specification as it accounts for lags in the judicial process. This specification again finds a negative and statistically significant coefficient estimate for ideological polarization. The estimated effect is not trivial: A one standard deviation (8.22) increase in polarization is statistically associated with a decrease in the number of corruption convictions per million inhabitants by 0.45, which is around 16% of one standard deviation. For example consider Oregon, New Hampshire or Washington (who as depicted in figure 2 have low but non-zero average corruption). If interpreted as a causal mechanism, then this result suggests that if these states, which have average polarization level at the mean (around 33) were as polarized as the most polarized states (around 47 for California or Wyoming), corruption would totally disappear in these states.

The mechanism investigated in the paper is that polarization reduces corruption because politicians are disciplined by the threat of political rivals with substantially different ideological political agendas. For the threat to be credible, incumbents should anticipate replacement by an ideologically distant opponent if caught for corruption. Thus a testable implication is that polarization reduces corruption only

if the level of political competition is sufficiently high.

To investigate whether there is conditionality in the relationship between corruption and polarization depending on political competition we make use of updated measures of the political competition data used in Besley and Case (2003), measuring the percentage of vote received by the republican candidate as a proportion of all votes cast for the republican and democratic candidates in the race for the governorship. As there is not much in the way of within-state variation in this measure, to make matters simple, the sample is split between state-years with political competition below and above the median of the sample (42.78).

***Insert Table 3***

Table 3 contains regression results for these two subsamples, using annual data in columns (1) and (2) and 5-year moving averages in columns (3) and (4). When using the annual data the coefficient on polarization reaches the 10% significance level for the high-competition subsample. When using the (preferred) moving average data, there is a marked difference in the statistical significance of the parameter estimates in the two subsamples. First the magnitude of the coefficient estimate for polarization is bigger in the high-competition subsample (-0.076 against -0.060). Second the coefficient reaches the 5% significance level in the high-competition subsample but is not significant in the low-competition subsample. There is thus some support for the conjecture that the disciplinary effect of polarization works more strongly when the threat for a politician to be replaced by the opponent party is sufficiently high.

A further implication of the mechanism investigated here is that the disciplining effect of elections on corruption may be stronger when the incumbent is eligible to run for office. Arguably voters will not punish successor politicians to the same extent as they would a particular perpetrator running for office, even if their ideological platforms are similar. This is testable due to the existence of term limit legislations preventing multiple-term incumbents from re-running for office. In order to investigate this we split the sample depending on whether or not the governor is

eligible for re-election.[10] The hypothesis is that the negative effect of polarization on corruption is more pronounced when a governor is eligible for re-election.

***Insert Table 4***

Table 4 reports the regression results for these two subsamples, again using first annual observations and then 5-year moving averages. Note there are more observations where the governor is eligible for re-election relative to those where she is not. When using annual data the coefficient on polarization is negative as expected only when the governor is eligible for re-election (column 1). Indeed when she is not eligible for re-election (column 2) the coefficient estimate becomes positive. Whilst in both instances the coefficient estimates are not individually significantly different from zero, notably they are significantly different from each other: statistically the relationship between corruption to polarization is more negative in situations where the governor is eligible for re-election. The moving average data also demonstrate a heterogenous relationship between polarization and corruption. The magnitude of the coefficient estimate for polarization is negative and significantly different from zero in the subsample with governors eligible for re-election. This further supports the hypothesis that the disciplinary effect of polarization works more strongly when officials face individual responsibility for their actions in office.

### 4.2 Instrumental Variables Regression Results

So far the empirical analysis demonstrates a clear negative association between corruption and ideological polarization. Nonetheless the results do not fully establish a causal relationship. To further address this issue Table 5 (using raw annual data) and Table 6 (using moving averages) contain results instrumenting for polarization. The upper part of these tables contain the second stage of the 2SLS estimation of the baseline specification including all controls. The tables include coefficient estimates for polarization and that for an interesting control, citizens' ideology, discussed below. The lower part of the tables contains the first stage results, reporting

[10] Again using updated data from Besley and Case (2003).

the estimated coefficients for the instruments described above.

***Insert Tables 5 and 6***

Column (1) contains results when both instruments are used. Columns (2) and (3) contain results respectively using only one of the two separate instruments. The first stage regressions reveal that the Neighboring Democrats instrument works as expected: the estimated coefficient is positive and statistically significant at 5% when using annual data, and at the 10% level when using moving averages. Conversely the neighboring Republican instrument is not found to be a significant determinant of state polarization. Interestingly, polarization is apparently influenced by neighboring Democrat position-taking but impervious to neighboring Republicans.[11] Because neighboring Republican ideology is clearly a weak instrument, it is excluded from the rest of the analysis.

More problematically, in all of the specifications of the first three columns (of both Tables 5 and 6) the weak instrument F statistic barely exceeds 5, much lower than the standard benchmark value of 10.

A first possible reason why the neighboring Democrat instrument is weak is that the specification controls for the citizens' ideology, which by the same logic of diffusion of ideological positioning, will also be likely affected by neighboring ideological position-taking. Thus, entering the first stage, the citizens' ideology variable is what is called a 'bad control'. This is a legitimate reason not to include citizens' ideology along with the instrumental variable and the other controls in the first stage and thus mechanically in the second stage. However a concern here is that dropping citizens' ideology from the second stage could entail an omitted variable bias if this directly affects corruption. We are confident that such is not the case because when including both variables in the regressions (columns (1)-(3)), citizens' ideology is never found to be a significant determinant of corruption. Column (4) reproduces the estimation of column (3) excluding citizens' ideology. As expected, withdrawing citizens' ideology has the effect of substantially increasing the

[11] This asymmetry is explored in more detail in the next subsection.

F statistic of the instrument (from around 4-5 to around 9) but it is still slightly below the benchmark of 10 in both Tables.

A second potential reason why our instrument is found to be weak is that some states might be relatively immune to the ideology of their neighbors. In particular the biggest states in terms of population are likely to be less susceptible to past neighboring ideology. For example position-taking in Vermont is likely to be affected, with a lag, by position-taking in New York. However politics in New York is unlikely to be symmetrically affected by lagged ideological shifts in Vermont. Therefore we investigate whether the instrument strength increases when the biggest states are excluded from the sample. We first rank states by their population in 2004 and exclude the 8 states with a population over 10 million inhabitants. Column (5) reports the 2SLS estimation with this small-state subsample. The F-test for weak instruments now reaches the value of 14 thus strongly rejecting the null hypothesis. Susceptibility to neighboring ideology is stronger in small states.

Some states might have a small population, but still be immune to neighbors who may also have small populations or even not exist. For instance in 2014, Maine is one the least populous states, ranking 40th in terms of state population. However it also has little in the way of neighbors. Defining 'relative population' as own-population divided by neighboring population (the sum of all the neighboring states), then Maine ranks 6th. Column (6) reports 2SLS estimation for a subsample excluding the 8 biggest states in terms of relative population. Again the weak instrument test is rejected.

Importantly in columns (5) and (6) of both Tables 5 and 6, when the weak instrument test is rejected, polarization is still found to be negative and statistically significant at the 5% level. The magnitude of the estimated coefficient is increased relative to the OLS estimates, varying between -0.25 and -0.38. Comparatively, when applying OLS to the same subsample (results reported in Table 7), the estimated coefficients of polarization again vary between -0.05 and -0.06 hence the subsample is not unusual in comparison to the results in Table 2.

There are two elements to increased coefficient estimate in the instance of the IV results. Firstly the OLS estimate is feasibly biased towards zero. Polarization is an outcome, and indeed one that might arise out of (omitted) adverse economic or political circumstances. If these same adverse circumstances are positively correlated with corruption then the OLS estimate is biased downwards. Second, the higher size of the coefficient in 2SLS in part arises from the fact that there is less variation in instrumented polarization than in raw polarization. The average neighboring state Democrat ideology varies less essentially because it is an average measure. Indeed 1 standard deviation in our instrument is 5.46 against 8.22 for the state polarization. However, in spite of the lower variation of instrumented polarization, the estimated quantitative effect is still sizeable. Suppose that average democrat ideology in neighboring states goes more left by 1 standard deviation (5.46), then the state polarization goes up by 2.69 with a lag, which in turn results in a reduction in the number of corruption convictions per million inhabitants by 1.04, nearly 38% of a standard deviation in the corruption data.

***Insert Table 7***

**Discussion of the IV strategy**

This subsection discusses aspects of the IV strategy based on neighboring ideological position-taking. The strategy relies on the 'diffusion hypothesis' according which ideological shifts in neighboring states are transmitted with a lag to ideological position-taking within a state. However, the first stage relationship could be accounted for by alternative mechanisms. First, although neighboring ideological position-taking is measured with a lag, the first stage relationship could reflect diffusion in the opposite direction from the state ideology to neighboring states, given enough persistence in the ideology data.[12] This is especially likely in the case of the biggest states that are more likely to be 'ideology makers' than 'ideology takers'. We call this explanation the 'ideology maker hypothesis'. Second, the first stage

[12] If $Y_t$ and $X_t$ are both correlated, and also both strongly persistent and the true Data-Generating Process is that $X_{t-1}$ causes $Y_t$, it will also be the case that $Y_{t-1}$ and $X_t$ are statistically correlated.

relationship can potentially be explained by similarity in the political views of geographically neighboring states, which vote similarly but independently on the same issues in different periods because of different agenda. We call this alternative the 'similarity hypothesis'.

The similarity hypothesis could work if common factors affecting all states (such as economic shocks) shift in the same way the ideology of neighboring states. The specification takes this possibility into account as the first stage includes time fixed effects affecting both the own state ideology as well as neighboring states' ideology. Furthermore, if it is similar cultural features that lead neighboring states to adopt similar ideologies, this is also taken into account by the inclusion of state fixed effects capturing the states' cultural features that are highly persistent over the sample period.

It is also the case that the first stage relationship found in Tables 5 and 6 was consistently stronger when excluding the (relatively) bigger states that are obvious candidates as 'ideology makers'. If the observed relationship reflected a persistent ideological diffusion from the biggest states to smaller neighboring states, the magnitude of the first stage coefficient should be lower and not higher when excluding the biggest states from the sample. Furthermore this heterogenous effect in terms of instrument strength is supportive of a diffusion process rather than the similarity hypothesis which would imply symmetrical instrument strength across subsamples.

An interesting subsidiary finding is that the diffusion process operates through the Democrat parties. To investigate this further we replicate the first stage estimations of columns (5)-(6) of Tables 5 and 6 but with state Democrat ideology and state Republican ideology as dependent variables instead of state polarization. The results reported in Table 8 reveal that the state Democrats are affected with a lag by their counterparts of neighboring states but are unaffected by the political stances of the neighboring Republicans. However, the state Republicans are totally immune to the ideological changes of both neighboring Democrats and Republicans. A full exploration of these interesting asymmetries lies beyond the scope of this paper.

***Insert Table 8***

We also provide evidence that the neighboring states' ideology Granger causes state polarization but not vice versa. Columns (1) and (2) of Table 9 contain results replicating the first stage regressions of state polarization on 5-year lagged neighboring Democrat ideology. Columns (3) and (4) reverse the relationship containing estimation results of the regression of the contemporaneous neighboring Democrat ideology on the 5-year lagged state polarization. This reveals that the past values of state polarization does not affect the current values of the instrumental variable. This is both against the similarity hypothesis that would suggest a bi-directional causality because of persistent similarities between neighboring states. This also argues against the ideological maker hypothesis that could suggest a causality from the own state to the neighboring states if the own state were ideology maker.

***Insert Table 9***

A last concern is that if neighboring states transmit their political attitudes to a state, they could also transmit their attitudes towards honesty and corruption. The exclusion restriction would be violated if ideology and tolerance of corruption were correlated (though note the civilian ideology was not found to be a significant correlate of corruption). Nonetheless we run a placebo test in which the state corruption is regressed on the 5-year lagged corruption level of neighboring states. Results presented in Table 10 show that the corruption level in a state is unaffected by the past corruption of neighboring states, which gives further support to the exclusion restriction.

***Insert Table 10***

### 4.3 Robustness

Tables 11 and 12 contain estimation results applying a number of robustness checks. Alt and Lassen (2014) showed that corruption convictions in the US states are positively affected by the level of prosecution resources and efforts, approximated by the

number of US Attorneys (per million population) prosecuting state corruption and the number of criminal investigators (per million population) from the INS (Immigration and Naturalization Service). They also provided evidence suggesting that partisan presidents target prosecutorial resources toward opponents and away from supporters by considering the congruence between the president currently appointing US Attorneys and the ideology of the state population. This congruence is equal to the share of self-declared conservative voters when the appointing president is a Republican and zero otherwise. As these three variables of prosecution efforts may also incidentally be related to the state ideological polarization, we include them as controls in our main specification estimated with OLS. Column (1) shows that the estimated coefficient on polarization is unaltered.

***Insert Tables 11 and 12***

Column (2) controls for political competition as competitive states may be less polarized and competition can also influence corruption. This has the effect to increase the magnitude of the coefficient of polarization. Furthermore as a governor who reached its term limit and is not eligible for re-election can change his ideological position while becoming also more corrupt, we control for whether the governor reached its term limit. This has virtually no effect on the impact of polarization, as shown in column (3). We also control for the share of democrats in both state chambers as the composition of the chambers can influence both polarization and corruption.[13] Indeed, polarization can be high because there are a very few extremist Democrats (Republicans) in the legislature. The partisan composition of the legislature can also foster collusion and thus corruption if most of the members are from the same party. Results in column (4) shows that this leaves our main result unchanged.

[13]Our main specification includes the interaction between urbanization and share of democrats in state senate but does not directly control for the partisan composition of the state legislature.

# 5 Conclusion

By several different metrics polarization has been increasing in the US, and in many other countries around the world. Undoubtedly this trend is a cause for concern for many reasons already noted in the literature and beyond. In mitigation, following Brown (2011) and Testa (2012), polarization potentially sharpens competition between politicians, thereby lowering corruption. Panel data from the US support this hypothesis. OLS regressions exhibit a robust negative correlation between observed corruption levels and polarization within and across states. The beneficial effect of polarization is also found to increase when political competition is high and when incumbent governors are eligible to run for office.

To identify causality, polarization is instrumented with lagged political position-taking in geographically neighboring states. The widespread idea that policy, and ideas themselves, diffuse geographically is found to strongly apply in the instance of Democratic party position-taking. Under the identifying assumption that lagged neighboring state ideological position-taking is exogenous, polarization causes lower corruption.

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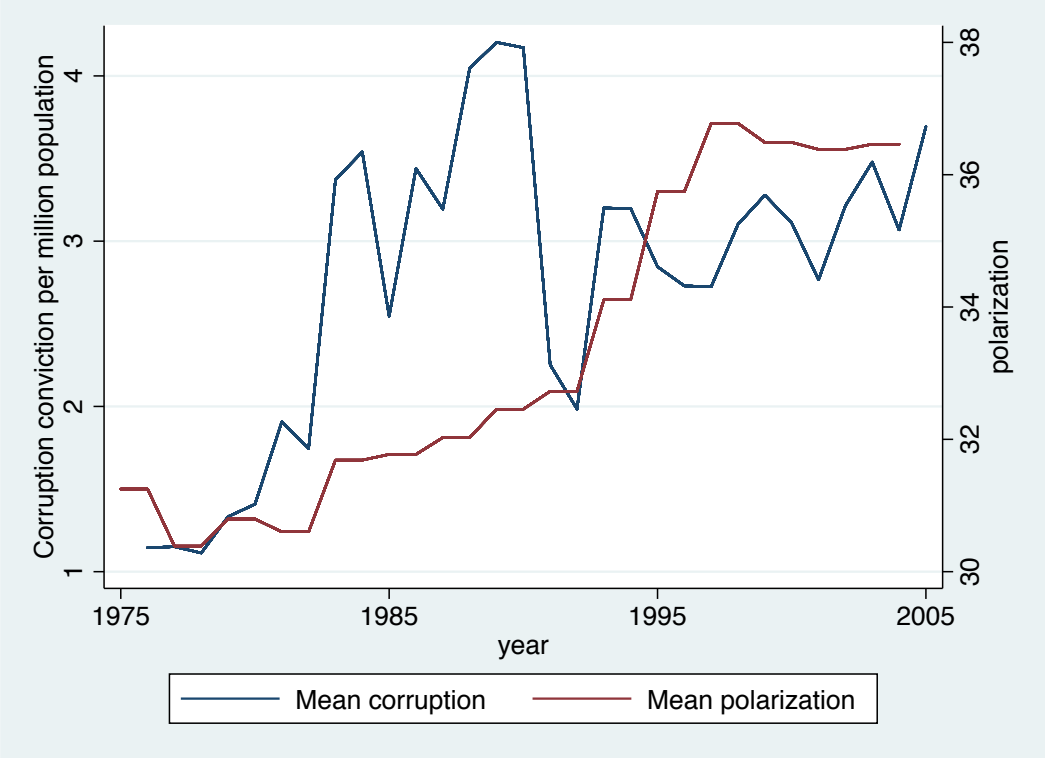


Figure 1. Evolution of average federal corruption convictions per million population and average ideological polarization, 1975-2005

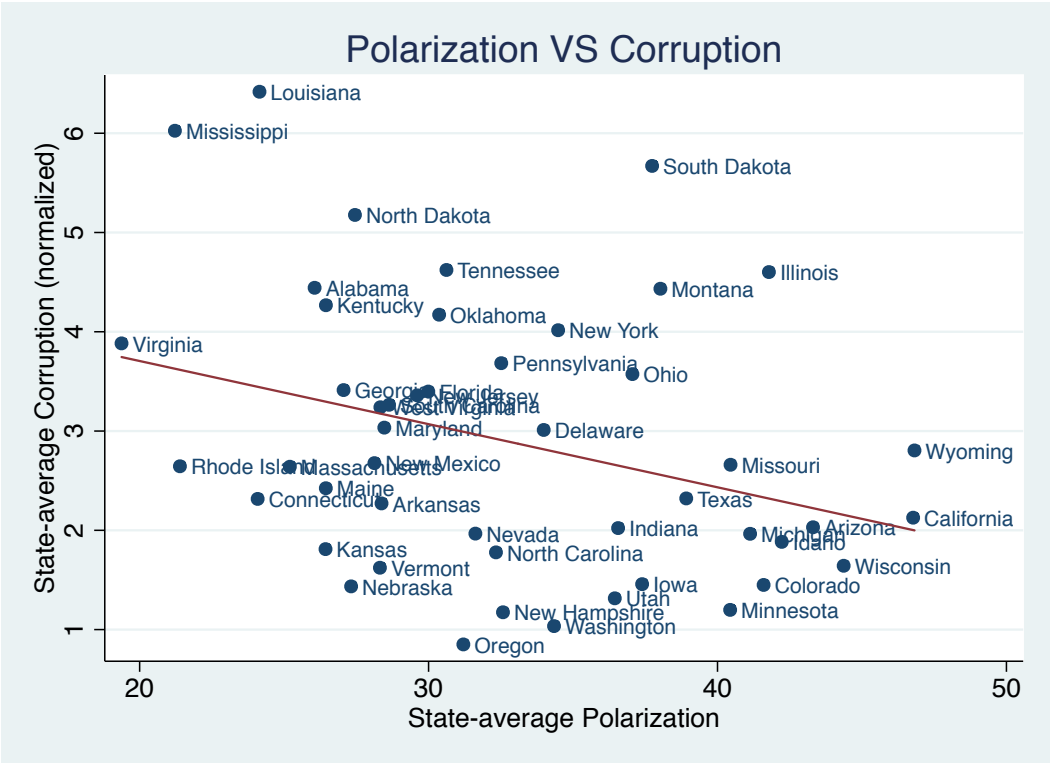


Figure 2: Scatter plot of state-averages of federal corruption convictions per million population and state-averages of ideological polarization, 1976-2004

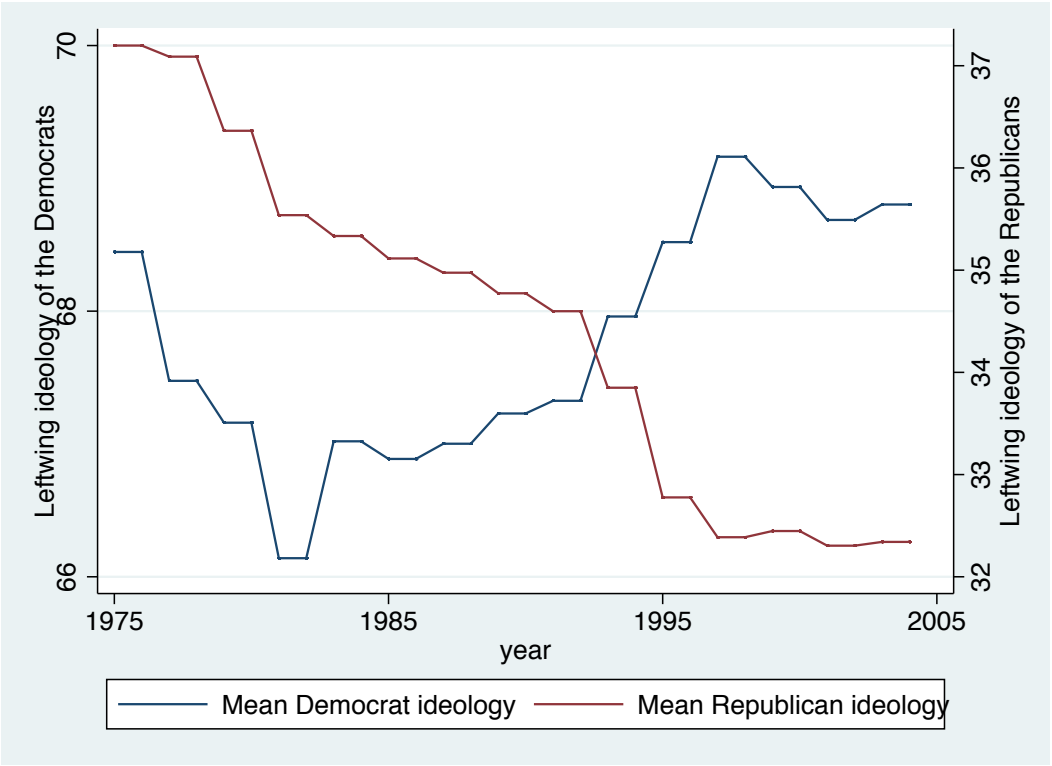


Figure 3. Evolution of average political ideology of the Democrats and the Republicans by year, 1975-2004

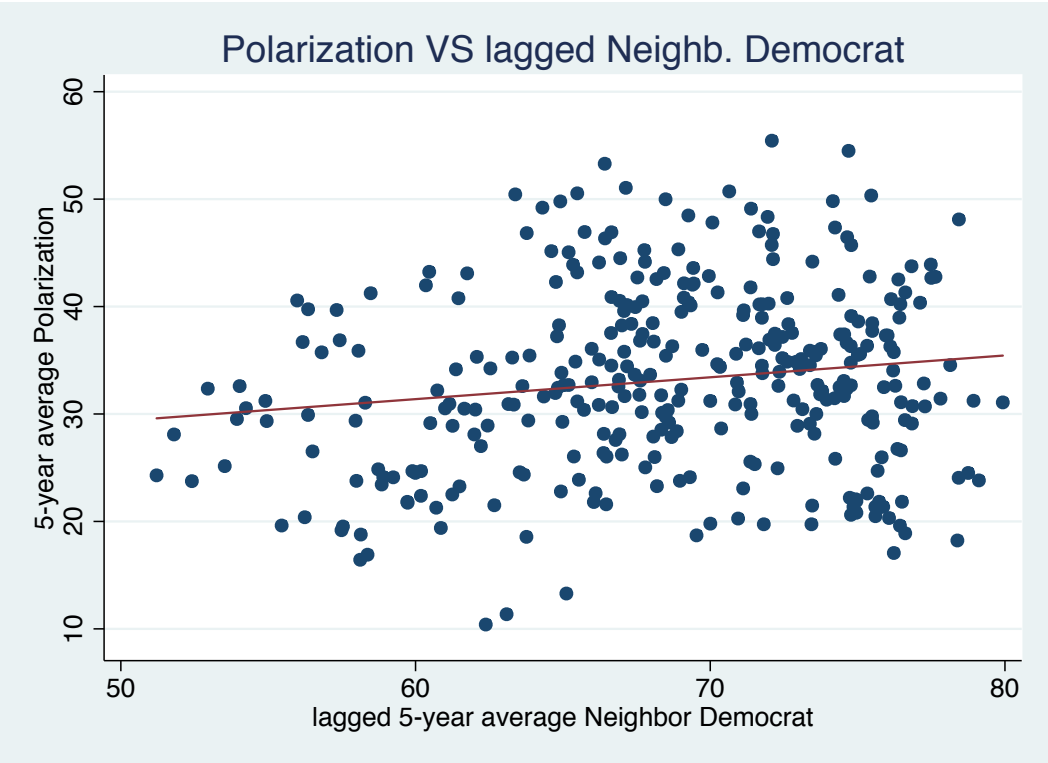


Figure 4: Scatter plot of lagged 5-year averages of neighboring states' Democrat ideology (weighted by states population) and 5-year averages of political polarization, 1976-2004

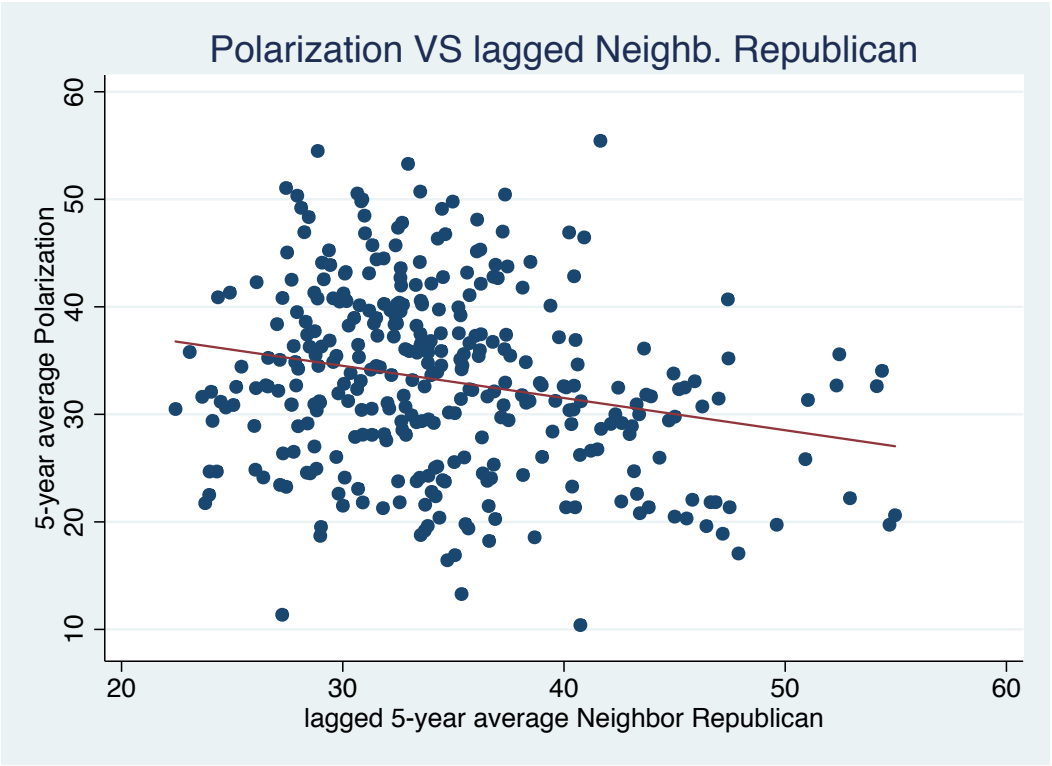


Figure 5: Scatter plot of lagged 5-year averages of neighboring states' Republican ideology (weighted by states population) and 5-year averages of political polarization, 1976-2004

| Variable | Obs | Mean | Std. dev. | Min | Max |
|---|---|---|---|---|---|
| Corruption (normalized) | 1384 | 2.74 | 2.77 | 0.00 | 25.28 |
| Polarization | 1392 | 33.38 | 8.45 | 3.51 | 56.67 |
| Neighbor Democrat ideology | 1392 | 68.67 | 5.46 | 50.77 | 79.96 |
| Neighbor Republican ideology | 1392 | 33.25 | 6.22 | 21.64 | 55.56 |

**Table 1: Summary Statistics**

| | (1) | (2) | (3) | (4) | (5) |
|---|---|---|---|---|---|
| Polarization | 0.000932 | -0.0478** | -0.0538** | -0.0442** | -0.0543** |
| | (0.0230) | (0.0222) | (0.0205) | (0.0199) | (0.0253) |
| Obs | 1,384 | 1,384 | 1,355 | 1,355 | 1,163 |
| Data | Annual | Annual | Annual | Annual | 5-yr mov. aves. |
| Estimation method | OLS | OLS | OLS | OLS | OLS |
| country FE | YES | YES | YES | YES | YES |
| year FE | NO | YES | NO | YES | YES |
| Controls | NO | NO | YES | YES | YES |
| $R^2$ | 0.210 | 0.317 | 0.260 | 0.330 | 0.601 |

**Table 2: Corruption and Polarization. OLS Estimations**

Notes: The dependent variable is federal corruption convictions per million population. The regressions include state and year fixed effects and a set of unreported controls used in Alt and Lassen (2014), including relative government wages, wages inequality, divided government, real per capita income, real per capita government revenues, percent of high school graduates, log of population, binding one-term limit, binding two-term limit, unemployment, citizen ideology, percent living in urban areas, an interaction term between urbanization and share of democrats in state senate. Estimations with annual observations in columns (1) to (4) and with 5-year moving averages in column (5). Robust standard errors clustered at the state level in parentheses. *** p<0.01, ** p<0.05, * p<0.1

| | (1) Low Competition | (2) High Competition | (3) Low Competition | (4) High Competition |
|---|---|---|---|---|
| Polarization | -0.045 | -0.047* | -0.060 | -0.076** |
| | (0.0316) | (0.0246) | (0.0411) | (0.0353) |
| Obs | 654 | 657 | 490 | 581 |
| Data | Annual | Annual | 5-yr mov. aves. | 5-yr mov. aves. |
| Estimation method | OLS | OLS | OLS | OLS |
| $R^2$ | 0.444 | 0.339 | 0.690 | 0.694 |

**Table 3: Conditionality on Electoral Competition. OLS Estimations**

Notes: The dependent variable is federal corruption convictions per million population. Columns (1) and (3) correspond to state-years with electoral competition below the median of the sample (42.78). Columns (2) and (4) correspond to state-years with electoral competition above the median of the sample. Our measure of political competition is based on data from Besley and Case (2003) providing the percentage of MAJOR vote received by the republican candidate. The MAJOR vote is the sum of all votes cast for the republican and democratic candidate in the race for the governorship. See Notes of Table 2 for additional information.

| | (1) Re-eligible Governor | (2) Not re-eligible | (3) Re-eligible Governor | (4) Not re-eligible |
|---|---|---|---|---|
| Polarization | -0.030 | 0.066 | -0.058** | -0.021 |
| | (0.0207) | (0.0493) | (0.0239) | (0.0392) |
| Obs | 1,008 | 347 | 907 | 303 |
| Data | Annual | Annual | 5-yr mov. aves. | 5-yr mov. aves. |
| Estimation method | OLS | OLS | OLS | OLS |
| $R^2$ | 0.379 | 0.345 | 0.679 | 0.757 |

**Table 4: Conditionality on the Eligibility of the Governor. OLS Estimations**

Notes: The dependent variable is federal corruption convictions per million population. Columns (1) and (3) correspond to state-years for which the governor is eligible for re-election and columns (2) and (4) correspond to state-years for which the governor is not eligible for re-election. See Notes of Table 2 for additional information.

| | (1) Full sample | (2) Full sample | (3) Full sample | (4) Full sample | (5) Small states | (6) Small states (2) |
|---|---|---|---|---|---|---|
| Polarization | -0.327* | -0.064 | -0.379* | -0.298* | -0.343** | -0.386*** |
| | (0.195) | (0.250) | (0.214) | (0.166) | (0.138) | (0.143) |
| Citizens Ideology | 0.486 | -0.0198 | 0.568 | | | |
| | (0.325) | (0.433) | (0.388) | | | |
| Obs | 1,355 | 1,355 | 1,355 | 1,355 | 1,125 | 1,125 |
| Data | Annual | Annual | Annual | Annual | Annual | Annual |
| Estimation method | 2LS | 2SLS | 2SLS | 2SLS | 2SLS | 2SLS |
| $R^2$ | 0.171 | 0.328 | 0.107 | 0.195 | 0.128 | 0.081 |
| First stage | | | | | | |
| Neighboring Democrat (5 yr. lag.) | 0.272** | | 0.279** | 0.346*** | 0.489*** | 0.493*** |
| | (0.125) | | (0.126) | (0.121) | (0.127) | (0.136) |
| Neighboring Republican (5 yr. lag.) | 0.133 | 0.158 | | | | |
| | (0.153) | (0.156) | | | | |
| $F$ | 2.953 | 1.121 | 5.285 | 8.950 | 16.487 | 14.700 |

**Table 5: Corruption and Polarization. 2SLS Estimations with Annual Observations**

Notes: The dependent variable is federal corruption convictions per million population (annual observations). IV is estimated by two-stage-least squares. The upper part of the Table provides the second stage of the 2SLS estimation and the lower part provides the first stage. The instruments are the 5-year lag of the neighboring states' Democrat and the Republican ideologies (weighted by the states population). $F$ is an F-statistic for the statistical significance of the instruments in the first stage regression. Column (5) excludes the 8 states above 10 million inhabitants in 2004: California, Texas, New York, Florida, Illinois, Pennsylvania, Ohio and Michigan. Column (6) excludes the 8 biggest states in terms of the ratio of own-population divided by neighboring population (sum of all neighboring states) in 2004: California, Texas, Florida, Washington, Michigan, Maine, New York, Illinois. See also notes of Table 2 for other details.

| | (1) Full sample | (2) Full sample | (3) Full sample | (4) Full sample | (5) Small states | (6) Small states (2) |
|---|---|---|---|---|---|---|
| Polarization | -0.239 | 0.348 | -0.264 | -0.178 | -0.250** | -0.273** |
| | (0.199) | (0.780) | (0.207) | (0.150) | (0.124) | (0.123) |
| Citizens Ideology | 0.501 | -0.646 | 0.550 | | | |
| | (0.402) | (1.430) | (0.424) | | | |
| Obs | 1,339 | 1,339 | 1,339 | 1,339 | 1,113 | 1,113 |
| Data | 5-yr MA | 5-yr MA | 5-yr MA | 5-yr MA | 5-yr MA | 5-yr MA |
| Estimation method | 2LS | 2LS | 2LS | 2LS | 2LS | 2LS |
| $R^2$ | 0.486 | 0.156 | 0.457 | 0.534 | 0.448 | 0.417 |
| First stage | | | | | | |
| Neighboring Democrat (5 yr. lag.) | 0.264* | | 0.300* | 0.398*** | 0.546*** | 0.583*** |
| | (0.152) | | (0.157) | (0.133) | (0.157) | (0.161) |
| Neighboring Republican (5 yr. lag.) | 0.094 | 0.101 | | | | |
| | (0.191) | (0.185) | | | | |
| $F$ | 1.867 | 0.329 | 3.987 | 9.678 | 13.602 | 14.691 |

**Table 6: Corruption and Polarization. 2SLS estimations with 5-year Moving Averages**

Notes: The dependent variable is federal corruption convictions per million population (5-year moving averages). See also notes of Table 5 for other details.

| | (1) | (2) | (3) | (4) |
|---|---|---|---|---|
| | Small states | Small states | Small states (2) | Small states (2) |
| Polarization | -0.049** | -0.060** | -0.052** | -0.066** |
| | (0.020) | (0.025) | (0.019) | (0.024) |
| Obs | 1,125 | 965 | 1,125 | 965 |
| Data | Annual | 5-yr mov. aves. | Annual | 5-yr mov. aves. |
| Estimation method | OLS | OLS | OLS | OLS |
| $R^2$ | 0.316 | 0.588 | 0.320 | 0.588 |

**Table 7: Corruption and Polarization. OLS Estimations for Subsamples**

Notes: The dependent variable is federal corruption convictions per million population. See also notes of Table 2 for other details.

| | (1) | (2) | (3) | (4) |
|---|---|---|---|---|
| | Democrat ideology | | Republican ideology | |
| Neighboring Democrat (5 yr. lag.) | 0.329*** | 0.439*** | -0.0122 | 0.0424 |
| | (0.108) | (0.127) | (0.0627) | (0.0645) |
| Neighboring Republican (5 yr. lag.) | 0.0485 | -0.0343 | -0.0655 | -0.0619 |
| | (0.0902) | (0.120) | (0.0907) | (0.115) |
| Obs | 1,355 | 1,339 | 1,355 | 1,339 |
| Data | Annual | 5-yr mov. aves. | Annual | 5-yr mov. aves. |
| Estimation method | OLS | OLS | OLS | OLS |
| $R^2$ | 0.800 | 0.856 | 0.919 | 0.936 |

**Table 8: First stage of Democrat and Republican Ideology**

Notes: The dependent variable is the state's Democrat ideology in columns (1) and (2) and the state's Republican ideology in columns (3) and (4). The main independent variables are the 5-year lag of the neighboring states' Democrat ideology (weighted by the state population) and the 5-year lag of the neighboring states' Republican ideology. Regressions also include state and year fixed effects and a set of unreported controls. See also notes of Table 2 for other details.

| | (1) | (2) | (3) | (4) |
|---|---|---|---|---|
| | Polarization | | Neighboring Democrats | |
| Neighboring Democrats (5 yr. lag.) | 0.346*** | 0.398*** | | |
| | (0.121) | (0.133) | | |
| Polarization (5 yr. lag.) | | | 0.0363 | 0.0590 |
| | | | (0.0311) | (0.0410) |
| Obs | 1,355 | 1,339 | 1,355 | 1,339 |
| Data | Annual | 5-yr mov. aves. | Annual | 5-yr mov. aves. |
| Estimation method | OLS | OLS | OLS | OLS |
| $R^2$ | 0.780 | 0.834 | 0.869 | 0.890 |

**Table 9: Granger causality**

Notes: In columns (1) and (2), ideological polarization is regressed on the 5-year lag of the neighboring states' Democrat ideology (weighted by the states population). In columns (3) and (4), the neighboring states' Democrat ideology (weighted by the states population) is regressed on the 5-year lag of ideological polarization. Regressions also include state and year fixed effects and a set of unreported controls. See also notes of Table 2 for other details.

| | (1) | (2) |
|---|---|---|
| Neighboring corruption (5 yr. lag.) | 0.0913 | 0.155 |
| | (0.089) | (0.163) |
| Obs | 1,099 | 1,053 |
| Data | Annual | 5-yr mov. aves. |
| Estimation method | OLS | OLS |
| $R^2$ | 0.315 | 0.623 |

**Table 10: Placebo Test – State Corruption and Neighboring Corruption**

Notes: The dependent variable is the state's federal corruption convictions per million population. The main independent variable is the 5-year lag of the neighboring states' corruption level (weighted by the states population). Regressions also include state and year fixed effects and a set of unreported controls. See also notes of Table 2 for other details.

| | (1) | (2) | (3) | (4) |
|---|---|---|---|---|
| Polarization | -0.041** | -0.050** | -0.042** | -0.044** |
| | (0.020) | (0.021) | (0.020) | (0.020) |
| US Attorneys per million pop. | 0.446 | | | |
| | (0.551) | | | |
| Criminal investigators per million pop. | -0.00603 | | | |
| | (0.00964) | | | |
| US Attorneys ideological bias | -0.199 | | | |
| | (0.195) | | | |
| Political competition | | 0.00827 | | |
| | | (0.112) | | |
| Not re-eligible Governor | | | 0.634 | |
| | | | (1.922) | |
| Democrats share in both chambers | | | | -4.291 |
| | | | | (21.65) |
| Obs | 1,355 | 1,311 | 1,355 | 1,355 |
| Data | Annual | Annual | Annual | Annual |
| Estimation method | OLS | OLS | OLS | OLS |
| $R^2$ | 0.332 | 0.331 | 0.329 | 0.330 |

**Table 11: Robustness with Annual Observations**

Notes: The dependent variable is federal corruption convictions per million population (annual observations). Along with the unreported controls used in Alt and Lassen (2014), additional sets of controls are included in the estimations. In column (1), we use Alt and Lassen (2014)'s measures of prosecution resources and efforts with the number of US Attorneys (per million population) prosecuting state corruption, the number of criminal investigators (per million population) from the US INS (Immigration and Naturalization Service) and the US Attorneys' ideological bias measured as the congruence between the president currently appointing US Attorneys and the ideology of the state population. In column (2), we control from political competition based on data from Besley and Case (2003). In

column (3), we control for whether the governor reached its term limit. In column (4), we control for the share of democrats seats in both chambers of the state legislature. See Notes of Table 2 for additional information.

| | (1) | (2) | (3) | (4) |
|---|---|---|---|---|
| Polarization | -0.0568** | -0.0660** | -0.0535** | -0.0532** |
| | (0.0277) | (0.0311) | (0.0254) | (0.0252) |
| US Attorneys per million pop. | -0.0303 | | | |
| | (0.0647) | | | |
| Criminal investigators per million pop. | 0.00136 | | | |
| | (0.00139) | | | |
| US Attorneys ideological bias | -0.0538 | | | |
| | (0.0367) | | | |
| Political competition | | -0.00211 | | |
| | | (0.0151) | | |
| Not re-eligible Governor | | | -0.0257 | |
| | | | (0.228) | |
| Democrats share in both chambers | | | | 1.274 |
| | | | | (2.628) |
| Obs | 1,163 | 1,060 | 1,163 | 1,163 |
| Data | 5-yr MA | 5-yr MA | 5-yr MA | 5-yr MA |
| Estimation method | OLS | OLS | OLS | OLS |
| $R^2$ | 0.605 | 0.605 | 0.600 | 0.601 |

**Table 12: Robustness with 5-year Moving Averages**

Notes: The dependent variable is federal corruption convictions per million population (5-year moving average). See Notes of Table 11 for additional information.