It’s the Media, Stupid – How Media Activity Shapes Public Spending

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Abstract

Politicians seeking reelection need voters to know what they have done for them. Thus, incentives may arise to spend more money where media coverage is higher. We present a simple model to explain the allocation of public spending across jurisdictions contingent on media activity. An incumbent seeking to maximize the probability of reelection will shift more money to jurisdictions where an extra dollar gains more votes because a larger share of the electorate is informed about his policy. This prediction is tested using US data on county-level public spending, Designated Market Areas (DMAs) and location of licensed television stations. Instrumenting for the possible endogeneity of media activity to public spending, 2SLS results confirm a positive effect of media coverage on county-level public spending. Spatial regression rules out the possibility of confounding media effects with spatial autocorrelation.

JEL Code: D7, D8, H7.

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1 Introduction

Every year US politics channels hundreds of billions of federal grant dollars to states and local jurisdictions. Political economics suggests that the distribution of grants is affected by incumbent politicians' behavior which in turn is driven by the aim of winning reelection. Indeed, a recent quote from Senator Clinton points out that politicians believe one of their primary tasks to be bringing money to their districts: "I'm very proud of my earmarks [grants]. It's one of the reasons I won 67 percent of the vote, because I took care of my people."[1] But will they care equally for all voters in the electorate or do incentives exist which may induce them to bias their effort in favor of certain groups of voters?

The quote from Senator Clinton indicates that politicians assume voters to follow a retrospective voting strategy asking "What have you done for me lately?" when casting their ballot, as argued by Popkin (1991). Consequently, information plays an important role because only voters who know that an incumbent is responsible for some benefit consider this when going to the polls. If politicians know that some voters are better informed, these voters may receive favorable policies. This leads to the crucial questions of how voters obtain their information and why some voters are informed whereas others are not. There are many ways in which people may obtain information. For example, information may be conveyed in daily life by talking to neighbors and friends. Today, however, the main sources of information are media like the internet, newspapers and television. As they are considered to be the primary source of information for most U.S. citizens (Napoli and Yan, 2007), this paper examines local TV news. TV stations which broadcast local news for a given market tend to cluster together in few places (media cities). As to that, Adams (1980) finds that local news coverage is biased in favor of regions close to the media cities, leaving large areas of a market with only little attention. This finding is in line with recent work by sociologists indicating that the proximity of events to media outlets makes coverage more likely (Kaniss, 1997; Oliver and Myers, 1999). In this paper, we examine whether this stylized fact of US television markets affects public policies.

In a simple model we show that news programs may be biased in favor of places close to media cities because reporting from these locations is less expensive. Thus, the model predicts that voters in counties close to media cities are better informed about public policies and receive more money. We test this prediction empirically using U.S. data on county-level grant spending, Designated Market Areas (DMAs) and location of licensed television stations. DMAs are the current industry standard for defining television markets in the United States. We show that the proposed media variables significantly affect the geographical distribution of grant spending, as predicted by the theoretical model. These results are robust to correcting for endogeneity and spatial correlation.

[1] Mike Wereschagin, David Brown and Salena Zito, "Clinton: Wright would not have been my pastor", *Pittsburgh Tribune-Review*, March 25, 2008, `http://www.pittsburghlive.com/x/pittsburghtrib/s_558930.html`.

This paper contributes to the growing field in political economics that explores the impact of mass media on political outcomes. The closest connection is to the work by Strömberg (2004a,b) which analyzes the influence of media on fiscal policy. Strömberg (2004a) examines competition between media outlets and identifies incentives leading mass media to bias programs in favor of certain groups. His theoretical model predicts media to report more on issues concerning large groups, groups that are more attractive to advertising, groups that attach a higher value to information and groups which are easier to reach in terms of distributing news. In the model these groups are better informed which results in favorable policies towards them. Strömberg (2004b) tests empirically whether better informed voters receive favorable policies. He uses U.S. data on county-level spending by FERA, a major New Deal program in the 1930s, and approximates the share of informed voters by the share of households owning a radio. He finds that counties with a larger share of these households received more funds.

Our analysis complements Strömberg's by considering the costs of producing news. News media have to gather costly information in order to create coverage. If the cost of collecting information differs among potentially newsworthy events, this may divert resources to less costly reporting and thus introduce a bias in coverage driven by the cost side. We argue that the cost of gathering information increases with distance to media cities. This introduces an effect on news coverage that counteracts Strömberg´s argument regarding distribution cost. He argues that broadcast media face significantly lower costs of distributing news to distant regions than newspapers. Thus, the rise of radio and television may result in paying more attention remote areas. Yet, whenever information from these jurisdictions comes at a higher price, this will produce an effect opposite to Strömberg's.

In a different context Besley and Burgess (2002) apply an agency model to show that better informed voters may be more successful in holding governments accountable. They analyze panel data from India and find that state governments provide more public food and calamity relief in hard times when newspaper circulation is higher. Newspaper circulation is assumed to measure the share of informed voters.

We proceed as follows. While the next section presents the theoretical model, section 3 gives a description of the data and estimation approach. Empirical results are presented in section 4. Section 5 concludes.

2 Model

In order to study equilibrium spending levels in a retrospective voting model, we explain the formation of two classes of voters, the informed and the uninformed. An incumbent politician seeking reelection decides about the allocation of public funds among different groups in the electorate. Let the politician be an incumbent US state governor and let each group comprise the residents of a county within the state. We further assume that the state area is congruent with a television market and that there are two television stations broadcasting news. These newscasts are the single source of information about politics available to the individuals. We adapt the framework presented in Strömberg (2004a) to study how the costs of producing news affect news coverage of the TV stations.

To keep the model simple, we assume that coverage of the governor's policies is ensured, implying that all voters watching the news are informed about spending levels. However, as an individual vote has virtually no influence on the electoral outcome, citizens consume news for entertainment value only and learning about the governor is a by-product, i.e. people care about what is going on in their community rather than about politics per se. In the next section, we analyze air time allocation by two competing television stations, given that on the demand side, viewers desire information on their county of residence. The resulting number of viewers spotting some news in each county will then constitute the respective groups of informed voters in the analysis of gubernatorial spending decisions.

2.1 Local TV News

In a television market, two commercial TV stations A and B compete for audience by broadcasting local news. Each station allocates total air time N across counties $c = 1, 2, ..., C$ such that $\sum_c n_c^s = N$ with n_c^s being news time devoted to a county c by station $s = A, B$. Voters care about what is going on in their community, i.e. they are interested only in news on their resident county. ϕ denotes the probability that a voter spots some news on TV which increases in news time devoted to a county $\phi'(n_c) > 0$ with decreasing marginal effect $\phi''(n_c) < 0$, moreover $\phi'(0) = \infty$. Thus, the expected utility of watching news for a voter in county c is defined as $u_c(n_c) = \phi(n_c) \cdot \bar{u}$, where $\bar{u}$ denotes the exogenous utility derived from an interesting newscast. For simplicity, we assume that all voters equally care for news on their home county implying that differences in expected utility are due only to allocated news time. Finally, a voter picks station A if

$$u_c(n_c^A) - u_c(n_c^B) \geq \xi_i \tag{1}$$

and station B otherwise. ξ_i denotes how voter i evaluates fixed characteristics of station A relative to station B, e.g. sympathy for anchormen and the style of presenting news or the ideological bias of a station. A positive value of ξ_i implies that voter i favors station B whereas negative values indicate a bias in favor of station A, leaving news levels out of consideration. This individual evaluation is given by the county-specific distribution function F_c. For simplicity, we assume that F_c is the uniform distribution with support $[-\frac{1}{2f_c}, \frac{1}{2f_c}]$ and density f_c. Consequently, a voter watches station A' s newscasts with probability $F_c[u_c(n_c^A) - u_c(n_c^B)]$.

Now we turn to the cost of news production. Broadcast media like television face high costs when it comes to producing programs for the first consumer whereas the marginal costs of the following consumers are approximately zero. Once a signal is broadcast, no additional costs are incurred when more people consume the program. The main task of journalists is gathering information to produce coverage. Being confronted with a larger number of events taking place all over the market area, TV stations face higher costs of collecting information in remote counties not only because it takes time and money to get there but journalists located in close proximity to the TV station are also usually better connected within networks generating easier access to contact persons and better information about institutions (Kaniss, 1997). Hence, with both stations being situated at the same place we presume marginal reporting costs k_c to vary across counties equally for stations A and B. Counties located far away from the media city feature high values of k_c whereas k_c is lower for counties near the two stations.

Both stations maximize expected profits. As advertisers on local television usually are less concerned with aiming at specific socio-demographic groups than advertisers in newspapers (Kaniss, 1997) both stations simply strive to maximize their audience shares regardless of audience composition. With revenues per viewer from advertising normalized to one, station A maximizes expected profit

$$E[\pi^A] = \sum_c \left[p_c \cdot F_c[u_c(n_c^A) - u_c(n_c^B)] - k_c \cdot n_c^A\right] \tag{2}$$

subject to the air time constraint. p_c denotes population in county c. Both stations decide simultaneously and non-cooperatively about allocating news time across counties. As the two stations face exactly the same optimization problem the unique Nash-Equilibrium has both stations broadcasting the same news on each county in the market. Thus, equilibrium news allocation is given by a pair of strategies $(\mathbf{n^A}, \mathbf{n^B})$ satisfying $n_c^A = n_c^B = n_c^*$, the air time constraint and

$$p_c f_c \phi_c'(n_c^*)\bar{u} - k_c = \lambda, \quad \lambda > 0, \tag{3}$$

for all counties.[2] Equation (3) summarizes the message of the model regarding news time allocation in equilibrium $n_c^* = n^*(k_c, f_c, p_c, \bar{u})$ and implies that the marginal effect of a news unit on expected profit must be equal across all counties. Assuming that the distribution function F_c is the same for all counties, the model predicts that both stations broadcast more news on counties where collecting information is less expensive and on counties with larger population. As we argue that gathering information is less expensive in places close to the location of the two stations this results in more coverage of counties close to the stations whereas more distant counties are left with only little media attention.

[2] Basically, the model of competition between the two television stations is analogous to models of redistributive politics as introduced by Lindbeck and Weibull (1987) and extended by Dixit and Londregan (1996). As the basic model has already attained textbook status (see, e.g., Persson and Tabellini, 2000) we abstain from extensively proving uniqueness and existence of the Nash-Equilibrium in this very simple setting. Dixit and Londregan (1996) or Strömberg (2004a) clearly characterize equilibrium strategies and give proof. With u strictly concave and assuming $F_c[\cdot]$ to be the uniform distribution, the objective functions of both stations satisfy the concavity condition for existence of equilibrium.

Equilibrium news also define the share of informed voters $\phi_c(n_c^*)$ in each county. Recalling what the model predicts on equilibrium news allocation, the share of informed voters decreases in counties' distance from the TV stations and increases in a county's population.

Note that this describes the allocation of coverage in general. In the following, we assume that there is always coverage of the activities of persons as prominent as governors, but, due to the calculus of television, the share of citizens who are aware of this differs among counties. Thus, in the next subsection, there are informed voters who know how much money was allocated to their county by the governor whereas uninformed voters do not attribute spending to the governor.

2.2 Strategic Allocation of Grants

In this section, we use a simple probabilistic voting model as in Strömberg (2004b) to show how an incumbent spreads a given budget strategically across counties to maximize the probability of reelection. The incumbent wins the election if she gets more than half of all votes cast. She allocates total grants G across the counties in her state such that

$$\sum_c p_c \cdot g_c = G, \tag{4}$$

where g_c denotes grants per capita in county c. Since each voter i in county c derives utility $W_c = W_c(g_c)$ from grants and cares about ideological features of the incumbent her total utility is

$$W_c(g_c) - \sigma_i - \delta, \tag{5}$$

where σ_i is an individual ideological component and δ is the incumbent's general popularity in the electorate as a whole; both components are random variables and may be positive or negative.

Now we can take our result on informed voters from the last subsection and put pieces together. Only an informed voter i in county c knows that the incumbent is responsible for the grant allocation and takes this into account when casting the ballot. Then, voter i votes for the incumbent if her total utility under the incumbent's regime has met some minimum standard $\overline{W_i}$:

$$\alpha_i \cdot W_c(g_c) - \sigma_i - \delta \geq \overline{W_i} \tag{6}$$

and for the challenger otherwise. The dummy variable α_i equals one if citizen i is informed and zero if she is not informed. Hence, the probability that $\alpha_i = 1$ is given by the share of informed voters ϕ_c.

We assume a special form of the utility function :

$$W_c(g) = s_c \cdot \frac{1}{1-\varepsilon} \cdot g^{1-\varepsilon}, \tag{7}$$

where $\varepsilon > 0$ captures the concavity of the utility function and the parameter s_c affects the marginal utility of an extra dollar of grants. Note that W_c is strictly concave with marginal utility falling from ∞ toward 0 when g is increased from 0 toward ∞. Evidently, since a higher s_c raises W_c' for a given g, the voters in a county with a higher s_c are more responsive to grant money regarding their voting decision. Thus, s_c measures how important grants are in relation to ideology.

To keep things simple we assume that $\sigma_i + \overline{W_i}$ has a county-specific uniform distribution with mean m_c and density ψ_c. The higher ψ_c, the larger is the number of swing voters in the county. The number of votes for the incumbent in that county c is

$$V_c = p_c \left(\frac{1}{2} + \psi_c(\phi_c \cdot W_c - m_c - \delta) \right) \tag{8}$$

Consequently, the incumbent wins the election if

$$\sum_c V_c = \sum_c p_c \left(\frac{1}{2} + \psi_c(\phi_c \cdot W_c - m_c - \delta) \right) \geq \frac{1}{2} \sum_c p_c. \tag{9}$$

Rearranging, we obtain the equivalent expression

$$\frac{1}{\sum_c p_c \psi_c} \sum_c p_c \psi_c (\phi_c \cdot W_c - m_c) \geq \delta. \tag{10}$$

Apparently, for any allocation of grants it depends on the realization of the general popularity shock, δ, whether (10) is satisfied and the incumbent wins the election. Contingent on grant allocation the probability of reelection, P, is given by

$$P = \Omega \left[\frac{1}{\sum_c p_c \psi_c} \sum_c p_c \psi_c (\phi_c \cdot W_c - m_c) \right],$$

where Ω denotes the distribution function of δ.

The incumbent strives to maximize the probability of being reelected by allocating grants strategically across counties. In equilibrium, the optimal allocation of grants $\mathbf{g}^*$ satisfies the first-order condition

$$\psi_c \cdot \phi_c \cdot W'(g_c^*) = \mu, \quad \mu > 0 \tag{11}$$

and the budget constraint. Equation (11) summarizes the central message of the model regarding the incumbent's incentives to allocate grants strategically: In equilibrium, the number of votes gained by an extra dollar is equal across counties. Assume that the governor allocates his budget equally across counties. Then, the marginal effect on expected votes is larger in counties with higher values of ψ_c and ϕ_c. The only way to satisfy the equilibrium condition is to raise spending levels in counties where the marginal effect is large. With $W(g_c)$ strictly concave, raising spending levels pushes down the marginal effect on expected votes in the respective counties. Simultaneously, raising the amount of grants in some counties implies lower spending levels in other counties due to the budget constraint. Thus, $W'(g_c)$ increases in the latter counties leading to equilibrium. Finally, larger shares of informed voters (ϕ_c) and more swing voters (ψ_c) give rise to allocating more grants to counties.

The share of informed voters, ϕ_c, results from the competition in the television market. As $\phi_c^* = \phi(n_c^*)$ and $n_c^* = n^*(k_c, f_c, p_c, \bar{u})$, the model predicts grant spending to be higher in counties where media find it less cumbersome to gather information (low k_c). This is the main message of the model. Furthermore, the model predicts that equilibrium spending is higher in counties with many swing voters (ψ_c), in counties with large populations (p_c) and where the relative importance of grants as against ideology is higher (s_c).

In the next chapter, we outline our strategy of identifying effects on county spending levels driven by television market geography. Analyzing data on U.S. television markets and the allocation of federal grants across counties, we empirically check the theoretical predictions.

3 Data and estimation approach

Having laid out the theoretical hypotheses, the remainder of the paper is concerned with the empirical analysis of media impact on public spending. First, we give an outline of the empirical specification and data sources used in the estimation. The results section then discusses our findings.

3.1 Empirical Strategy

In the estimation we will be using a cross-section of counties across the 48 contiguous states of the United States of America[3].

The dependent variable chosen is the per capita amount of federal grants awarded to the respective counties in 2000. Since we set out to discover how the intensity of media activity shapes the spending decisions of politicians, we would ideally want to use spending the geographical distribution of which is completely at the politician's discretion as our left-hand-side variable. Even though governors enjoy quite a bit of budgetary power, such monies are hardly ever available to politicians. Quite the contrary, most grants are not freely distributed across counties but are rather distributed according to formulas that

[3] Grants to New York City counties are attributed to New York County (Manhattan) because the dependent variable was not available for all five boroughs. Washington, D.C. is excluded from the estimations as are counties that cannot be unambiguously assigned to a single media market. A number of counties is omitted because of missing values, leaving us with 2934 observations (approximately 94% of US counties) for the estimations.

have been decided upon in the political process. Thus, one could easily arrive at the conclusion that funds are being distributed in some sort of 'just' manner because there is a formula that exactly determines the amount each jurisdiction is to receive. Such reasoning does not take into account that before being channeled to final recipients many formula grants typically pass through intermediary government levels or institutions. Here, political actors may put pressure on bureaucrats to divert spending according to the politician's preferences. Among these political actors are senators and governors. We assume that senators as well as governors are interested in maximizing the amount of federal dollars awarded to their state and then distribute them so as to maximize the probability of reelection. It is important, though, to realize that in addition to bureaucrats being influenced by politicians when it comes to the distribution of formula grants, not all grants are awarded via formulas and sometimes the formula merely marks the upper bound for the amount of grants that a county can receive. This leaves at least part of the federal grants at the discretion of politicians to distribute among their constituencies.

It can be argued, that aside from Governors and Senators influencing the distribution of grants, there are are many other political actors who follow their own political agenda, most notably members of Congress. From a theoretical view, it is expected that the governor will favor media cities. The same rationale goes for members of Congress who distribute monies, as their districts span more than a single county. For our purposes, however, it does not even matter whether it is the governor/congressman who distributes the money or Congress members who pull funds into their district. An explanation for the latter mechanism would be if Congressmen hailing from media counties generate more funds because they are subject to heavier media scrutiny and thus put more effort into their political actions than their counterparts from non-media places. Both mechanisms will favor media counties.

An argument backing our choice of outcome measure comes from Levitt and Snyder (1997), who distinguish between low-variation and high-variation federal expenditure and state that high-variation spending is more prone to manipulations by politicians and easier to claim credit for. High-variation spending is in essence defined as federal expenditure net of direct transfers to individuals and government procurement contracts, leaving federal programs often administered by state and local governments for examination. This definition is not far from the federal grants variable we are using, yet we choose to stick with the more clear-cut definition of federal grants. Thus, in order to explain the differences in federal grants per capita across communities, we use the following OLS baseline specification where we enter all left- and right-hand side variables but those defined as shares and the population variables in natural logarithms:

$$g_c = \beta_0 + \beta_1 \cdot \alpha_c + \beta_2 \cdot \gamma_c + \beta_3 \cdot \psi_c + \beta_4 \cdot \phi_c + \beta_5 \cdot k_c + \varepsilon_c, \tag{12}$$

where g_c is the (log of) dollar amount of federal grants per capita awarded to county c.

The share of informed voters in a community is accounted for by variables included in vector ϕ_c. These are the key variables in determining whether there is a connection between the intensity of media coverage, voter information and the geographical distribution of federal grant awards. As we have shown in the theoretical model, the politician will direct grants towards counties that are closer to the media cities, as they generate more media coverage than grants awarded to farther away counties. This is due to the fact that the TV station reporting on projects financed through grant awards can do so at a lower cost if the project is realized in the proximity of the station's headquarters. Hence, the first variable proxying for voter information is the (log of) distance from the county's population centroid to the nearest media center. Our definition of media centers is based on the Designated Market Areas (DMAs) stipulated by Nielsen Media Research. The United States is split up into 210 DMAs (shown in figure 1), which are made up of those counties that tend to watch the same TV stations[4]. DMAs can cross state borders and are named after the city or cities where most TV stations are located. Whenever there are multiple cities of importance to the media market, they enter the DMA name (e.g. the San Francisco DMA is called San Francisco-Oakland-San Jose). When this is the case, our distance variable measures distance to the nearest city appearing in the DMA name. The intuition behind this is that even though they may not constitute the largest agglomeration in the DMA, these places are classified as media cities and a politician's activity in these places will probably generate more attention than it would in other places. As these distances vary a great deal across states and even DMAs, we use a relative distance measure calculated as county c's distance to media center divided by the average distance of all counties included in the same DMA to their nearest media city. This seems reasonable, as TV stations divide their news time among events occuring within their own DMA[5]. We hypothesize the coefficient on the distance variable to bear a negative sign, implying decreasing effects of distance on the amount of grants received (see the results section for further discussion).

Though not explicitly modeled as a distance measure, the second variable in ϕ_c essentially accounts for physical distance and thus transaction cost on behalf of media organizations, too. It is the (log of) the number of full-service TV stations licensed in the county under consideration. Aside from capturing zero distance to the nearest media outlet, it accounts for effects of having multiple outlets at one's disposal[6]. These full-service stations are made up in large part of affiliates of the four big networks ABC, CBS, NBC, FOX plus the PBS stations. There are a little over 700 entities which contain at least one fully licensed station, compared to a about 340 media cities (Table 11 in the appendix contains

[4] Thus changes in DMA affiliation actually do occur from time to time, whenever viewing habits in a given county change.

[5] We do not believe media coverage to be exclusive to within-DMA counties as there are outside-DMA events that warrant coverage. Yet these are of such importance that coverage is not a choice and thus the choice set is still made up of within-DMA counties only.

[6] This variable is calculated as log(number of TV stations +1) in order to avoid generating many missing values. The estimated coefficient β will therefore not represent an elasticity. β can be transformed into an elasticity ε as follows: $\varepsilon = \beta \cdot [x/(x+1)]$, where x is the number of TV stations.

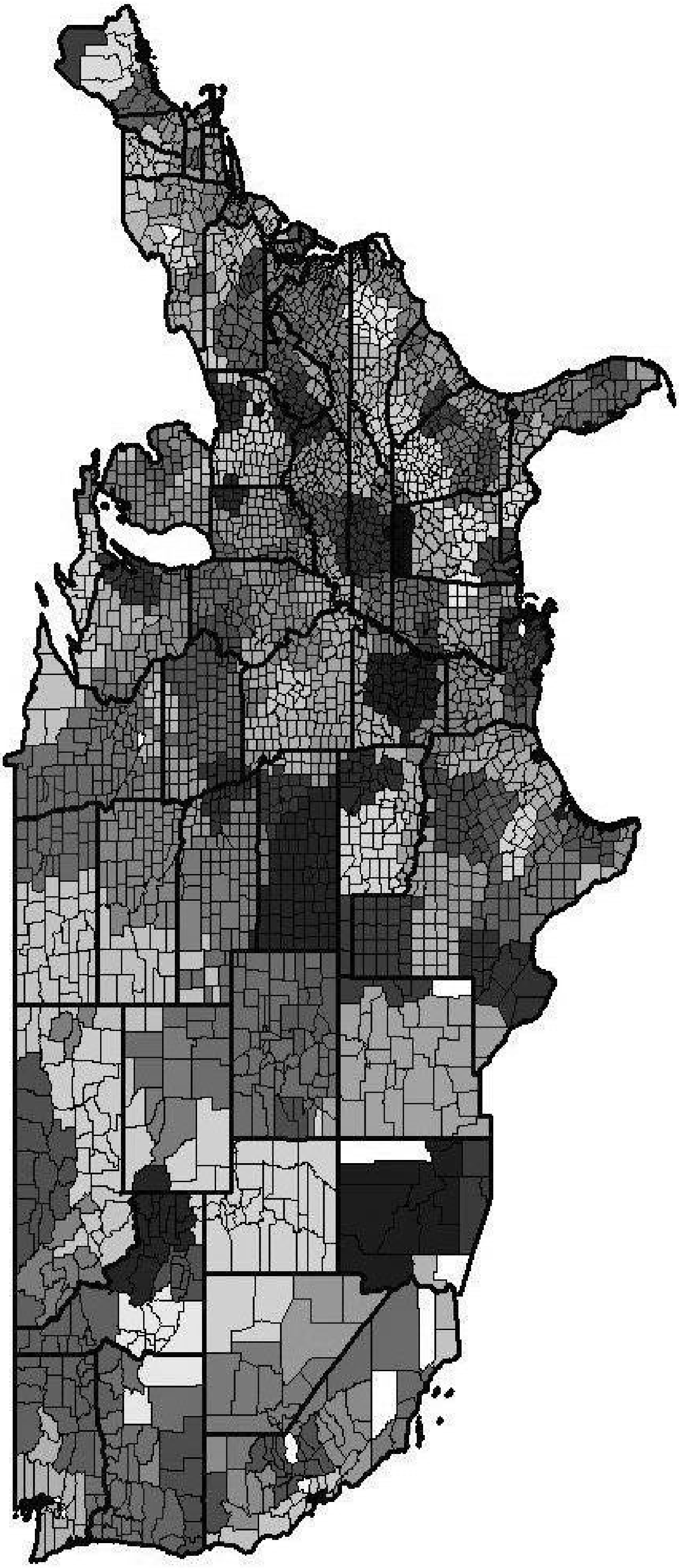

Figure 1: DMAs and state borders

detailed information on the distribution of TV stations across counties). We expect this variable to be a predictor of federal grant spending, because having at least one media outlet in the immediate vicinity will greatly increase chances of news being picked up on, even without being a Nielsen media city. Obviously, all media center counties are host to at least one TV station and so the log of distance and the log of the number of TV stations are to some extent two measures for the same concept. Accordingly, we use the two variables interchangeably as indicators of the availability of media outlets.

As quite a few DMAs cross state borders, we add the share of DMA population living in the same state that county c belongs to and a dummy variable taking on value 1 if all media cities in the DMA are located in another state than county c. The latter variable *(out-of-state)* accounts for counties possibly being marginalized within their own DMA information-wise, because they are not an important enough target group for TV stations[7]. The share of DMA population living in the same state as county c could also measure marginalization such that a smaller share means less media attention. It may, however, also be a measure for yardstick competition, as will be discussed later. In addition, if county c is not out-of-state (i.e. there is a media city that caters to county c's needs) a smaller share of DMA population living in the same state as c might lead to higher grants, as media attention may be more "on the spot". In an attempt to disentangle these effects, we add an interaction of the two variables. Finally, the percentage of residents with at least a bachelor's degree is added as a control for informed voters.

Relative voter turnout in county c is measured in α_c. As data on the number of persons registered to vote could not be obtained at county-level, we calculate turnout as the number of democratic and republican votes cast in the 1996 presidential election divided by population of that year. We then divide this number by the average turnout in the state county c is located in. The assumption inherent to this transformation is that the governor's choice set is made up of all counties in the state. A high voter density ψ_c is believed to induce higher levels of funding as well. We measure voter mobility as the number of times the majority in presidential elections in county c has shifted from 1980 to 1996[8].

Controls for financial needs of a county and its population as well as politico-economic controls are included in vector k_c. Hence, it measures the relative importance of federal grants to different groups in the population, as well as the relative success of different groups in acquiring federal grants through activities such as lobbying. The political variables we include are distance to the state capital relative to all other counties in the same state, the percentage of residents employed by the federal government and the percentage of residents employed by state and local government. While distance from the capital is believed to be negatively related to the ability to generate funds, e.g. due to higher lobbying costs (Borck and Owing 2003), a high percentage of federal and other

[7] In addition to having no media city in their state, only 16% of these counties have a TV station as opposed to 24% of the in-state-counties.

[8] The log of mobility is calculated as log(majority shifts +1) for the same reasons stated earlier.

government employees supposedly leads to higher grants per capita. The latter variables also account for "politician density". What we mean by that is that there are differences in how well counties are represented in the political process, leading to the well-represented jurisdictions receiving more money. As we do not have data on the number of politicians hailing from the respective counties, we assume that the percentage of residents employed by federal, state and local governments in county c is highly correlated with the number of political agents operating on behalf of county c.

We also include a number of controls to account for the distribution of grants on the basis of formulas[9]. In addition to income, poverty rate, unemployment rate, share of females, percentage of high school dropouts, county expenditure per capita, percentage of population under 24 and bank deposits per capita, we also add the Herfindahl index of ethnic fragmentation[10], the ratio of mean to median income and the white percentage of the population[11]. All OLS and 2SLS estimations allow for clustering of standard errors by state and include population density and population as well as state dummies. Full sample estimations also include an indicator for whether the county is classified as a metropolitan/micropolitan area.

3.2 Omitted Variables and Endogeneity of TV Station Location

Even though in most settings one would like to make use of panel data for empirical estimations in order to minimize omitted variable bias, there is one important reason why we do not believe we would be able to identify the effects outlined in the model using this kind of data. The problem lies in the absolute and relative stationarity of our two key variables, respectively. Whereas the number of major TV stations licensed in a given county shows at least some, however limited, variation over time, the distance a county is located from the nearest media city is fixed. The only possible reasons for this distance to actually change would be (a) if a new media city emerges or a former one is not granted that status any longer or (b) if the DMA a county belongs to changes. Although (b) sometimes happens, we believe the variation in the data will be insufficient to identify any effects[12]. We are well aware of the limitations inherent to cross-sectional data, yet try to counter these problems through the use of state effects and 2SLS.

An obvious candidate to be concerned about when it comes to endogeneity is the number of TV stations. OLS estimates may be biased due to omitted variables that affect both the

[9] For a list of variables these formulas may contain, see Randsell (2004). Most of them are highly collinear with income, so we choose not to include all of them.

[10] The index takes on values between 0 (if there were an infinite number of population groups) and 1, where 0 indicates total ethnic heterogeneity and 1 indicates a completely homogenous population. Alesina (1999) finds that fragmentation leads to higher intergovernmental spending.

[11] Differing ethnic compositions can result in the same Herfindahl index, so the white percentage accounts for the relative importance of the white population in the calculation of the index.

[12] Gentzkow (2006) assumes current DMA borders to be a valid approximation to those in the 1960s.

number of TV stations and the amount of grants a county receives per capita. This bias may go either way, depending on the direction of correlation of the omitted variable with the endogenous regressor as well as with the dependent variable. A possible omitted factor would be the presence of interest groups and lobbying activity, or to be more precise, the presence of industries or groups of people that are well represented by interest groups. One could think of the agricultural sector or heavy industry as branches that have traditionally been successful in acquiring grants. Agricultural heavy counties tend to be rural, so often they aren't home to a TV station. Counties with heavy industry are located both in rural areas as well as in urban surroundings. For rural industrial counties the same reasoning as for agriculture applies. Urban counties with a higher share of heavy industry on the other hand are probably not the kind of urban counties where TV stations tend to locate, as they would rather emerge in a more service-industry oriented county in the same metro area. Hence, the omission of lobbying activity would introduce a downward bias in the OLS estimates.

A second issue we would like to address is measurement error in the number of TV stations. Data on TV stations is obtained from the FCC and TV stations are assigned to the county where the station is licensed or where the main transmitter is located. In most cases this will be identical with the county where the actual TV studio is located but sometimes the two locations do not coincide, causing the TV stations variable to be measured with error. As is well known from the literature, measurement error biases OLS estimates towards zero.

Finally, the location of TV stations may be endogenous to government spending, as they include PBS affiliates, which are funded by the Corporation for Public Broadcasting (CPB, which in turn is funded by the US federal government), federal and state governments [13]. Because these stations may tend to emerge or be placed for political reasons where spending is high, the use of OLS might lead us to overestimate the effect of having a TV station in the home county. The same is true, if network TV stations emerge where a large amount of grants is spent. This may happen, either because there is more to report on in these places or because politicians influence the licensing process in some way[14].

Hence, we instrument the number of TV stations and the first stage equation estimated is:

$$\phi_c = \pi_0 + \pi_1 \cdot z_c + \pi_2 \cdot \alpha_c + \pi_3 \cdot \gamma_c + \pi_4 \cdot \psi_c + \pi_5 \cdot k_c + v_c, \tag{13}$$

where z_c denotes the vector of instruments and the second stage is as in equation (12).

[13] CPB grants to local jurisdictions are excluded from our dependent variable. Around 2000, PBS received about $ 250 million per year from the CPB, $ 300 million from state governments, whereas federal grants and contracts accounted for $ 70 million. See http://www.cpb.org or http://www.newenglandfilm.com/news/archives/00december/pbs.htm

[14] Prior (2006) argues that politicians have only rarely tried to influence the licensing process, though.

We instrument the log TV station variable with two exogenous variables. The first is the log of the number of TV sets in a given county in 1960. This should capture whether the audience was large enough for a station to be interested in locating there or for the FCC to grant a license to that city. The number of TV sets in 1960 is unlikely to be correlated with either grants in 2000 or some underlying variable measuring inherent political interest, as television did not serve as a major channel of distributing political information until the mid 1960s (Roper 1985). This may be especially true for local news, as film or video equipment, if at all available, was nowhere near as affordable as nowadays. The number of TV sets is also unlikely to be related to lobbying activity. The second instrument is the log of the number of low power (LP) TV stations that are not classified as Class-A (CA) and have a broadcasting power of less than 10kw[15]. We argue that many of these are local public access stations or other stations so low in reach and information content (hence they are neither classified CA nor have significant broadcasting power) that they cannot serve the governor in promoting her actions[16]. Thus, their location cannot be contingent on public spending in county c or local voters' interest in county c's current affairs. Their number is at the same time positively correlated with the number of full service TV stations. One reason is that even small stations will employ people who are trained in broadcasting and these people can be found in the media counties. In addition, these small TV stations are no more or less likely to be located in a successful lobbying county than in any other county.

3.3 Spatial Autocorrelation

There are good reasons to check for spatial dependencies in our data. Spatial autocorrelation induced by strategic interaction could be responsible for possible (dis-)similarities between grants awarded to neighboring counties. One reason for suspecting such effects is yardstick competition. We would then expect spending between neighbors to be positively correlated. As yardstick competition essentially requires two governments that strategically interact, this may not be all that relevant in our setting, where the governor decides on how to distribute grants across her state. Thus, when focusing on the governor's actions, grant spending in, say county A and B of the same state cannot be the outcome of strategic interaction. It will rather be decided upon by a single person in order to maximize the number of votes, taking into account voters' reactions to a variation in the allocation of grants. This implies that the Governor's decisions are quite likely to be driven to a large extent by measurable population characteristics rather than policy

[15] CA stations are low power TV stations which are given protected status by the FCC because they convey local information. We exclude stations above 10kw, because they might have a reach large enough to make them an attractive outlet for politicians. The log is again calculated as (log of TV stations +1).

[16] Indeed, according to the National Association of Broadcasters, the total audience of low power stations *including* Class A is 800,000 nationwide `http://www.nab.org`.

interdependence[17].

However, there may be other political agents such as the aforementioned congressmen or elected county officials that make strategic interaction seem rather conceivable. In addition, such strategic interaction can of course occur in counties bordering another state. We already try to account for this fact by including the variable *DMA home share* in our estimations. This variable measures the percentage of the population in a county's DMA living in the same state the county under consideration belongs to. The higher the share living outside the home state, the more information about what is going on in the other state we expect TV stations to convey, thus creating yardstick competition among Governors. Even though we include this control and we do not feel the spatial dependence in our setting to be an exclusively strategic one, in order to account for the above mentioned effects, we estimate a spatial lag regression model which can be displayed in matrix form as follows:

$$g = \rho W g + X\beta + \varepsilon, \tag{14}$$

where ε is a vector of i.i.d. error terms, g is a vector representing grant spending, W is a spatial weight matrix, β is a vector of coefficients to be estimated and Wg gives the measure of grant spending in neighboring counties. The interaction between own and neighbors' spending is captured in the coefficient to be estimated, ρ, which we would then expect to have a positive sign. Another reason for the choice of the spatial lag model could be spillovers which we may not be able to capture in the baseline specification. In this case, the spatial correlation, as expressed in ρ may point in either direction.

Another rationale for spatial correlation in our context would be locally correlated shocks or the existence of spatially correlated omitted variables which drive the governor's choice of local spending. In both cases the spatial interdependence is relegated to the error term, yielding the following spatial error model appropriate:

$$g = X\beta + \varepsilon \tag{15}$$

$$\varepsilon = \lambda W \varepsilon + u, \tag{16}$$

where the notation differs from above in that ε is a vector of spatially autocorrelated error terms, u is a vector of i.i.d. error terms and λ is the parameter measuring the extent of spatial autocorrelation. We also estimate a specification that allows for the simultaneous

[17] If people are envious of the amount of grants their neighboring counties receive, a sort of interdependence would be introduced in that the Governor cannot distribute her funds unequally but must rather follow up on a grant award to county A with an award to county B, thus creating positive spatial autocorrelation.

presence of spatial lag and error. Essentially this means estimating equation (14), where the error term is as in equation (16), via a three step procedure that takes into account the endogeneity of the spatially lagged variable[18].

It must be pointed out that these models will be estimated as a robustness check rather than as a means of determining what mechanism is responsible for possible spatial dependencies. Our interest is mainly in determining whether the main media related variables *distance to media city* and *log number of TV stations* pick up some of the spatial effects and whether standard errors may be biased downwards in the OLS specification due to the neglect of spatial effects.

3.4 Data Sources

The data mentioned above is gathered from a variety of sources. While the dependent variable *federal grants per capita* is taken from the *Consolidated Federal Funds Report 2000* (CFFR), many sociodemographic controls stem from the *County Databook 2000*, published by the US Census Bureau. More sociodemographic controls are taken from the database *County Profiles* published by the US Department of Agriculture[19]. The county distances to the nearest media city are calculated based on the county population centroids provided by the Census Bureau and the geographic location of media cities obtained by using geocoding software. The names of DMAs and the media cities are those defined by Nielsen Media Research for the year 2002. Counties are assigned to DMAs based on the Nielsen definitions of the same year. The number of fully-licensed as well as low-power TV stations by county is calculated using the Federal Bureau of Communications' *Wireless Telecommunications Bureau Database* as of July 2006. Unfortunately, we were unable to obtain data for the actual time period under consideration, yet we believe that given the little variation in the data over time mentioned above, this does not hurt our results too much. The number of votes cast for Republican and Democrat party in the presidential elections from 1980 to 1996 is taken from the *USA Counties 1998* CD published by the US Census Bureau. This data was combined with the intercensal population estimates (provided by the same source) in order to calculate vote shares of the Republican and Democrat party in the presidential elections as well as voter turnout and voter mobility (density). Finally, the number of television sets by county in 1960 is taken from the *ICPSR County and City Data Book Consolidated File: County Data 1947-1977*. Micropolitan areas are as of 2003, because this classification did not yet exist in 2000. Summary statistics are displayed in table 1

[18] Lag and error specification are estimated using maximum likelihood (ML), the combined spatial lag and error model via the GS2LS estimator proposed by Kelejian and Prucha (1998). The weighting matrix W is row standardized based on rook contiguity, i.e. counties sharing a common border are treated as neighbors.

[19] available online at `http://maps.ers.usda.gov/profiles/webcensusdownload.aspx`.

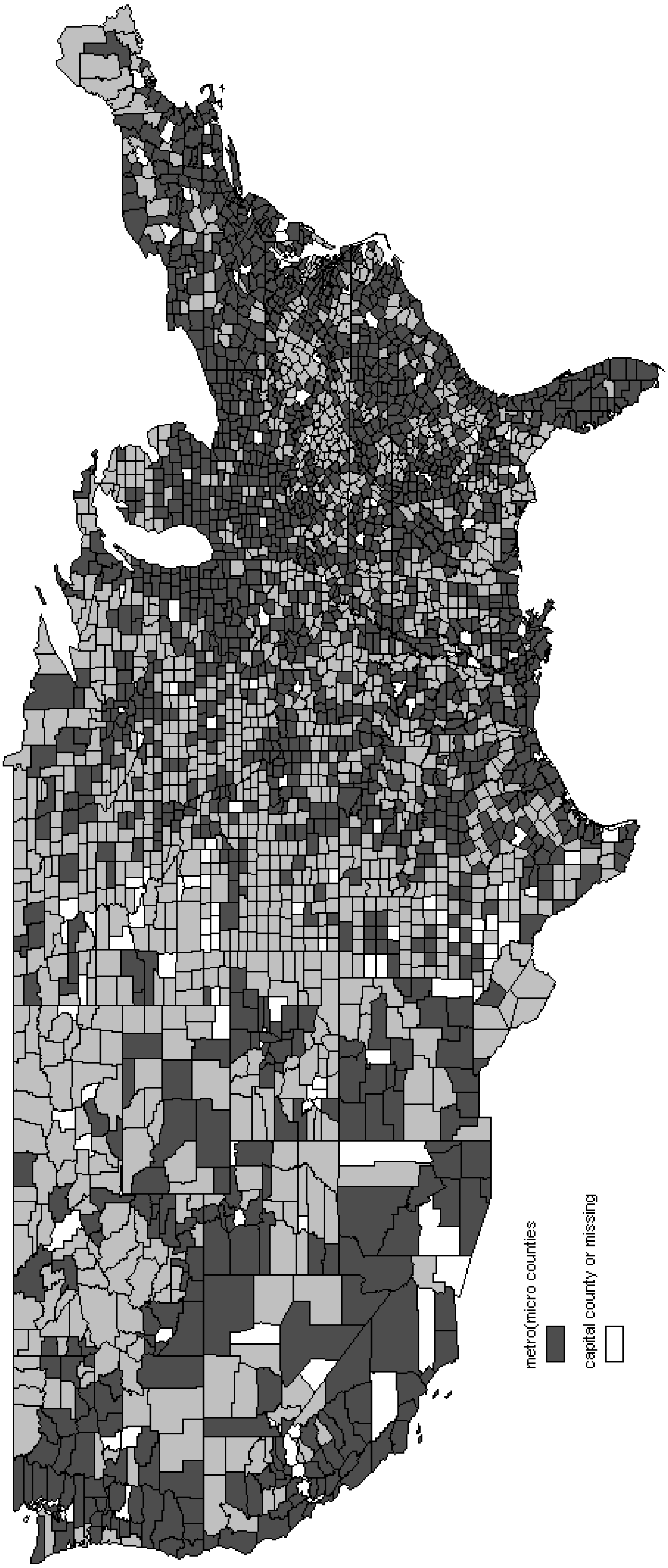

Figure 2: Counties by sample, darker shading marks metro/micro counties

Table 1: Summary statistics.

	N	Mean	Std. Dev.	Min	Max
grants per capita ($)	2934	1053	729	96	10937
grants per cap w/o Medicaid($)	2933	529	582	−224	9986
full service tv stations	2934	0.51	1.43	0	21
distance to media city ratio	2934	100.98	56.69	0.66	336
Median income 1997 ($)	2934	32461	7900	14178	77513
bachelor or higher pct	2934	13.19	6.28	3.7	53.4
out of state county	2934	0.146	0.353	0	1
DMA share in home state	2934	78.25	30.38	0.07	100
native american pct	2934	1.49	5.42	0	86
poverty pct	2934	15.00	6.22	1.9	46.7
high school dropout pct	2934	30.69	10.23	4.5	68.4
under 24 yrs pct	2934	34.33	4.28	20.2	66
unemployed pct	2934	4.75	2.52	0.7	27.6
bank deposits per cap (1000$)	2934	11.40	5.90	0.84	108.63
female pct	2934	50.47	1.85	32.74	57.43
expenditure per cap (1000$)	2934	2.24	0.864	0.017	10.47
mean to median income	2934	1.67	0.27	0.79	10.12
white pct	2934	85.16	15.59	12.60	99.50
ethnic fragmentation	2934	0.75	0.18	0.26	0.99
distance to capital ratio	2934	100.01	54.0	4	362
fed gov employed pct	2934	0.69	1.22	0.04	37.24
other gov employed pct	2934	6.56	2.83	2.24	52.52
turnout ratio 1996	2934	0.99	0.13	0.16	1.85
voter density	2934	0.72	0.83	0	3
metro/micro indicator	2934	0.56	0.49	0	1
population density (1000/sqm)	2934	0.165	0.639	0.0002	16.398
land area (1000 sqm)	2934	0.955	1.290	0.015	20.053
population (100,000s)	2934	0.838	2.819	0.005	95.193
low power tv stations	2934	1.69	5.23	0	70
tv sets 1960	2930	13618	55457	139	1816565

4 Empirical Results

4.1 The Link between media activity and spending

We employ two samples in estimating our model: a full sample of counties, containing 2934 observations and a subset containing all 1652 micropolitan and metropolitan counties in the dataset (Figure 2 shows counties by sample, where Metro/Micro counties are nested within the full sample[20]). Note that all counties containing the state capitals ($n = 48$) have been excluded from the analysis as some grants that cannot be attributed to a single county are assigned to the state capital and including these counties would likely lead us to overestimate the effect of the media on grant spending.

The main reason for splitting up our sample is that rural and nonrural counties may not be comparable because rural counties receive more grants per capita due to effects we may not be able to control for. These include scale effects, minimum grants per county leading to higher per capita grants in less populous counties, overrepresentation in the political process or flat rate grants per county. Even though we control for a number of urbanity measures such as metro/micro classification, ethnic fractionalization, population density and population, we want to rule out the possibility of measuring urban-rural differences in grant spending in our media variables. Descriptive statistics in tables 2, 3 and 4 show

[20] Metro areas are defined by the Bureau of the Census as areas containing a core urban area of 50,000 or more population. Micropolitan areas contain an urban core of at least 10,000 population. Metro or micro areas include one or more counties, specifically the core urban area, as well as many adjacent counties. Around 80% of the US population resides in metropolitan areas.

that:

(a) distance ratios are largest in the full sample, implying large distance ratios on rural counties,

(b) the raw correlation between grants and distance is higher in the full sample than in the Metro/Micro sample (this holds if we exclude Medicaid grants. We will exclude Medicaid later on as a robustness check) and

(c) rural counties indeed receive larger amounts of grants per capita. We take this as a hint, that the relationship probably differs across samples.

Table 2: Mean distance ratio to nearest media city.

	N	Mean	Std. Dev	Min	Max
Full sample	2934	100.98	56.69	0.66	336.08
Metro/Micro	1652	79.94	53.72	0.66	336.08

Table 3: Raw correlations grants/distance, grants/tv stations.

	incl. Medicaid		**excl. Medicaid**	
	Full sample	Metro micro	Full sample	Metro micro
Grants/Distance	0.156	0.053	0.058	−0.032
Grants/TV stations	−0.024	0.074	0.021	0.112
N	2934	1652	2933	1651

Table 4: Mean grants per capita.

	N	Mean	Std. Dev	Min	Max
Full sample Medicaid	2934	1053.03	729.09	96.27	10937.44
Metro/Micro Medicaid	1652	896.28	523.34	96.27	7404.66
Full sample no Medicaid	2933	529.64	582.07	−224.37	9986.81
Metro/Micro no Medicaid	1651	470.17	386.37	−224.37	7210.87

Counties with negative values of *grants per capita without Medicaid* ($n = 5$) are excluded from the estimations. All results remain unaltered when a transformation is applied that allows logs to be taken (and the counties are included).

One reason as to why a log-log model could be in order is that the effect of distance may diminish with increasing distance (i.e. expenses are incurred whenever news happens farther away, whether the production team travels 50 or 100 miles doesn't really matter). In this specification, a negative coefficient on distance indicates a negative but leveling off relationship. In a similar vein, increases in the number of TV stations may yield decreasing gains in grants, as the effect of the first and second (i.e. introduction of competition) TV station certainly differs from the influence of the tenth station.

Full sample results of the OLS regressions using the number of TV stations as our measure of media coverage are shown in table 5. Column (1) displays coefficients using population

Table 5: Media variable is (log of) TV stations. Dependent variable is (log of) grants per capita. OLS estimates.

	(1)		(2)		(3)		(4)	
log tv stations	0.0292	(0.023)	0.0620**	(0.023)	0.0379***	(0.013)	0.0376***	(0.013)
log income			−1.6097***	(0.102)	−0.7653***	(0.130)	−0.7661***	(0.132)
bachelor or higher					0.0129***	(0.003)	0.0129***	(0.003)
out of state county					−0.0245	(0.042)	−0.1195*	(0.060)
DMA share in home state					−0.0015*	(0.001)	−0.0019**	(0.001)
out of state X DMA share							0.0035**	(0.001)
native american pct					0.0022	(0.002)	0.0021	(0.002)
poverty pct					0.0311***	(0.004)	0.0311***	(0.004)
high school dropout pct					0.0156***	(0.003)	0.0158***	(0.003)
under 24 yrs pct					−0.0221***	(0.004)	−0.0222***	(0.004)
unemployed pct					0.0035	(0.006)	0.0028	(0.006)
log bank deposits					0.0561*	(0.032)	0.0571*	(0.032)
female pct					0.0210***	(0.007)	0.0209***	(0.007)
logexpenditures pc					−0.0234	(0.037)	−0.0263	(0.037)
mean to median income					0.0760*	(0.038)	0.0726*	(0.038)
white pct					−0.0030**	(0.001)	−0.0031**	(0.001)
ethnic fragmentation					−0.4127***	(0.141)	−0.4095***	(0.139)
logdistance to capital					−0.0352	(0.029)	−0.0361	(0.028)
fed gov employed pct					0.0223***	(0.008)	0.0218**	(0.008)
other gov employed pct					0.0264***	(0.006)	0.0266***	(0.006)
log turnout ratio 1996					0.1969	(0.148)	0.1959	(0.147)
log voter density					0.0794***	(0.026)	0.0770***	(0.025)
metro/micro	−0.3227***	(0.032)	−0.1205***	(0.030)	−0.0013	(0.027)	−0.0022	(0.027)
population density (1000s)	0.0503***	(0.014)	0.0735***	(0.021)	0.0460**	(0.017)	0.0450**	(0.017)
population (100000s)	−0.0040	(0.003)	0.0111	(0.007)	−0.0018	(0.003)	−0.0015	(0.003)
intercept	7.1176	(0.034)	23.2040	(1.017)	12.4142	(1.593)	12.4551	(1.600)
state fixed effects	Yes		Yes		Yes		Yes	
N	3041		3041		2934		2934	
adj. R^2	0.209		0.389		0.578		0.579	

All state capital counties (n=48) excluded from the estimation. Standard errors in parentheses allow for clustering by state.
* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

Table 6: Media variable is (log of) distance to media city. Dependent variable is (log of) grants per capita. OLS estimates.

	(1)		(2)		(3)		(4)	
log distance	−0.0042	(0.017)	−0.0559***	(0.014)	−0.0346***	(0.009)	−0.0337***	(0.009)
log income			−1.6452***	(0.107)	−0.7662***	(0.127)	−0.7669***	(0.130)
bachelor or higher					0.0126***	(0.003)	0.0126***	(0.003)
out of state county					−0.0134	(0.041)	−0.1040*	(0.061)
DMA share in home state					−0.0014*	(0.001)	−0.0018**	(0.001)
out of state X DMA share							0.0033**	(0.001)
native american pct					0.0027	(0.002)	0.0026	(0.002)
poverty pct					0.0314***	(0.004)	0.0314***	(0.004)
high school dropout pct					0.0160***	(0.003)	0.0162***	(0.003)
under 24 yrs pct					−0.0225***	(0.004)	−0.0225***	(0.004)
unemployed pct					0.0037	(0.006)	0.0031	(0.006)
log bank deposits					0.0594*	(0.031)	0.0602*	(0.031)
female pct					0.0202***	(0.007)	0.0201***	(0.007)
logexpenditures pc					−0.0207	(0.037)	−0.0236	(0.037)
mean to median income					0.0749*	(0.039)	0.0716*	(0.039)
white pct					−0.0027*	(0.001)	−0.0028*	(0.001)
ethnic fragmentation					−0.4103***	(0.135)	−0.4076***	(0.134)
logdistance to capital					−0.0319	(0.028)	−0.0328	(0.027)
fed gov employed pct					0.0217**	(0.008)	0.0212**	(0.008)
other gov employed pct					0.0265***	(0.006)	0.0267***	(0.006)
log turnout ratio 1996					0.1948	(0.145)	0.1940	(0.144)
log voter density					0.0794***	(0.026)	0.0771***	(0.025)
metro/micro	−0.3198***	(0.030)	−0.1455***	(0.027)	−0.0116	(0.027)	−0.0121	(0.027)
population density (1000s)	0.0508***	(0.014)	0.0730***	(0.020)	0.0423**	(0.017)	0.0414**	(0.017)
population (100000s)	−0.0027	(0.003)	0.0101	(0.006)	−0.0019	(0.003)	−0.0016	(0.003)
intercept	7.1427	(0.085)	23.8747	(1.086)	12.6140	(1.546)	12.6457	(1.556)
state fixed effects	Yes		Yes		Yes		Yes	
N	3041		3041		2934		2934	
adj. R^2	0.209		0.392		0.579		0.580	

All state capital counties (n=48) excluded from the estimation. Standard errors in parentheses allow for clustering by state.
* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

controls only. Column (2) adds income, Column (3) uses the full set of controls and Column (4) adds an interaction between DMA home share and the out-of-state indicator.

Having TV stations in the county leads to higher grant awards, yet the effect decreases in the number of stations. As mentioned above, the elasticity can be calculated as $\beta \cdot [x/(x+1)]$, accordingly the loss of the only TV station in a county incurs a drop in grants per capita of approximately 1.9% whereas an increase from 10 to 11 stations only generates $[10 \cdot 10/11] \cdot 0.038 = 0.35\%$ more grants per capita. Somewhat surprising is, that a higher home state share in county i's DMA leads to lower grant awards, yet it is consistent with the idea of yardstick competition. The sign on out-of-state counties is as expected, yet insignificant. When the interaction is introduced, the effect of being out-of-state is -12%. Keep in mind, though, that this is evaluated at a DMA home share of zero. For out of state counties, an increase in the home share is associated with a gain in grants, whereas in state counties lose money when their DMA home share increases. Considering that the average DMA home share for out-of-state counties is 20% as opposed to 88% for the in-state counties, this could mean that a county that has no media city in its home state can make up for this disadvantage by its state's DMA home share being larger (i.e. being relatively more important). As for the in-state counties the negative coefficient on home share implies that given that there is a media city in your state it is best shared with as few people as possible, which would also mean a positive media effect on grants.

Finally, most of the political and socio-economic variables are significant and have the expected signs.

The results obtained when distance to the nearest media city is employed as our measure of media activity are displayed in table 6. Again, the estimation results are consistent with our theoretical predictions. The coefficient on distance is highly significant and predicts that a county located twice as far away from the nearest media city as the average county in the DMA receives 3.4% less in grants per capita. All the other variables' coefficients resemble those in table 5.

Next, we consider the Metro/Micro subsamples (Table 7 reports the coefficients on the media variables, where columns (1)-(4) indicate the same specifications as in tables 5 and 6. The full specifications can be found in the appendix, tables 12 and 13). Once more, there is a highly significant effect of number of media activity on grants received. Within this urban sample, the effects of distance and harboring a TV station roughly match the results we found before. The magnitude of the coefficients differs only by around 10% between the samples

In sum, we find the hypothesized effect of our key variables in both samples, leading us to conclude that counties less exposed to media coverage receive less attention when grants are distributed. We take this as evidence that a vote-maximizing politicians' rationale does favor counties where media activity is high.

Table 7: Dependent variable is (log of) grants (per cap). OLS estimates metro/micro sample.

	(1)	(2)	(3)	(4)
log distance	−0.0188	−0.0716***	−0.0333***	−0.0319***
	(0.017)	(0.014)	(0.011)	(0.011)
N	1691	1691	1652	1652
log tv stations	0.0514*	0.0832***	0.0405***	0.0403***
	(0.027)	(0.026)	(0.014)	(0.014)
N	1691	1691	1652	1652

Specifications (1) to (4) are as in the full sample estimations. Only counties that belong to a metropolitan or micropolitan area are included. All state capital counties (n=48) excluded from the estimation. Standard errors in parentheses allow for clustering by state. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

4.2 2SLS results

In this section we address the possibility that TV station location is a function of grant spending or that TV station location as well as grant spending are influenced by some underlying variable in the error term. The reasoning for our instruments has been laid out in 3.2, table 8 shows some first stage statistics. Both instruments are highly correlated with the number of full service TV stations, standard overidentification tests fail to reject instrument exogeneity at conventional levels.

Table 9 displays the two stage least squares (2SLS) estimation results. In the full sample (1), the coefficient of having a TV station is much higher than in the OLS estimations and thus suggests that we largely underestimated the effect of having one or more television stations at virtually zero distance. The coefficient of 0.33 means that the loss of the only TV station leads to a cut in grants by around 16% while an increase from 10 to 11 stations leads to a gain of 3% in federal funding.

Things are similar in the Metro/Micro sample (2), where the coefficient on TV stations is of the expected sign, yet smaller than in the full sample.

A few words on the magnitude of the coefficients are in order. The effect of TV stations is several times larger in 2SLS than in OLS. This in itself does not mean we cannot trust these results. After all, as the earlier examples show, the losses generated by a shutdown of a county's sole TV station would then be below twenty percent. We do not consider this to be an implausible effect. In any event, the instrumental variables corroborate the OLS results and suggest that the OLS estimates may be considered as a lower bound of the media effect.

4.3 Robustness checks

Having established a positive influence of media activity on grant spending, this section is concerned with how robust these results are to changes in specification and sample.

Table 8: First stage statistics. Dependent variable is (log of) tv stations.

	Full sample		Metro Micro sample	
log low power tv stations	0.075^{***}	(0.015)	0.138^{***}	(0.024)
log tv sets 1960	0.180^{***}	(0.015)	0.229^{***}	(0.019)
F(2,47)	80.59	($p = 0.000$)	98.61	($p = 0.000$)
adj. R^2	0.288		0.285	
partial adj. R^2	0.088		0.119	
N	2930		1650	

Estimates are for 2nd stage dependent variable *(log of) grants per capita*. Results when *(log of) grants per capita excluding Medicaid* is employed are not reported as the samples only differ by two observations and results are virtually the same. All state capital counties (n=48) excluded from the estimation. Standard errors in parentheses allow for clustering by state. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

Table 9: Dependent variable is (log of) grants per capita. 2SLS estimates.

	(1) Full sample		(2) Metro micro sample	
log tv stations	0.3388^{***}	(0.066)	0.2330^{***}	(0.057)
log income	-0.8160^{***}	(0.133)	-0.7486^{***}	(0.173)
bachelor or higher	0.0119^{***}	(0.004)	0.0090^{*}	(0.005)
out of state county	-0.1072^{*}	(0.058)	-0.1217^{*}	(0.068)
DMA share in home state	-0.0021^{**}	(0.001)	-0.0019^{***}	(0.001)
out of state X DMA share	0.0034^{**}	(0.002)	0.0050^{***}	(0.002)
native american pct	0.0032	(0.002)	0.0052	(0.003)
poverty pct	0.0286^{***}	(0.004)	0.0387^{***}	(0.006)
high school dropout pct	0.0170^{***}	(0.003)	0.0157^{***}	(0.004)
under 24 yrs pct	-0.0229^{***}	(0.004)	-0.0213^{***}	(0.006)
unemployed pct	0.0021	(0.007)	-0.0141^{*}	(0.007)
log bank deposits	0.0515	(0.033)	0.0513	(0.043)
female pct	0.0158^{**}	(0.007)	0.0239^{***}	(0.008)
logexpenditures pc	-0.0032	(0.040)	0.0140	(0.040)
mean to median income	0.0887^{**}	(0.037)	0.1154^{**}	(0.053)
white pct	-0.0034^{**}	(0.001)	-0.0031^{**}	(0.002)
ethnic fragmentation	-0.3137^{**}	(0.139)	-0.3234^{**}	(0.134)
logdistance to capital	-0.0532^{*}	(0.031)	-0.0618^{***}	(0.022)
fed gov employed pct	0.0210^{***}	(0.007)	0.0470^{***}	(0.009)
other gov employed pct	0.0268^{***}	(0.007)	0.0280^{***}	(0.009)
log turnout ratio 1996	0.1779	(0.176)	0.3345^{*}	(0.179)
log voter density	0.0799^{***}	(0.027)	0.0584^{**}	(0.028)
metro/micro	-0.0542^{**}	(0.027)		
population density (1000s)	0.0337	(0.023)	0.0258	(0.017)
population (100000s)	-0.0160^{**}	(0.006)	-0.0098	(0.006)
intercept	13.7499	(1.766)	11.8740	(1.825)
state fixed effects	Yes		Yes	
N	2930		1650	
adj. R^2	0.527		0.585	
test of overid. restr. $\chi^2(1)$	0.530	($p = 0.466$)	1.715	($p = 0.183$)

All state capital counties (n=48) excluded from the estimation. Standard errors in parentheses allow for clustering by state. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

As we have mentioned before, all estimations so far have excluded the 48 state capital counties because some grant monies are attributed to them when the actual distribution across the state is unknown. As table 14 in the Appendix shows, with capital counties included, the effects are far stronger, in some specifications even twice as large as without capital counties, thus excluding these jurisdictions seems reasonable.

In a second test, we excluded Medicaid spending from the grants variable. Medicaid accounts for roughly half the federal grant money in our data and is also considered to be rather "fixed" (Levitt and Snyder 1997). Excluding these payments is an implicit test of whether our media variables pick up health status in the population or some other characteristic we have not controlled for. In three of our four OLS specifications the estimated media effects are now at least 20% larger than before (Table 15 in the appendix), whereas the effect of TV stations is about 10% lower in the full sample when Medicaid is excluded. The larger effects are in line with what we would expect if Medicaid cannot be influenced by political agents as much as other grant schemes. The fact that the coefficient actually decreases in the TV full sample weakens this argument somewhat, yet the hypothesized effects put forward in the earlier sections of the paper are still very much present and in three out of four cases even strengthened.

4.4 Spatial regression results

Checking whether our results are contaminated by spatial effects, we find that they do not change as much as one might expect, even though we do find highly significant spatial correlation. Most importantly, both our media variables remain virtually unaltered in comparison to the OLS results. Table 10 displays the coefficients on the media variables, spatial error (λ) and spatial lag (ρ) estimates as well as test statistics. Estimations are carried out on the full sample only.

Table 10: Spatial ML and GS2SLS estimations.

	log tv stations			**log distance**		
	ML-lag	ML-error	GS2SLS	ML-lag	ML-error	GS2SLS
log tv stations	0.036**	0.036**	0.036***			
	(0.016)	(0.015)	(0.014)			
log distance				−0.034***	−0.035***	−0.034***
				(0.009)	(0.009)	(0.008)
ρ	0.157***		0.130***	0.159***		0.135***
	(0.022)		(0.031)	(0.022)		(0.032)
λ		0.205***	0.053*		0.206***	0.050*
robust LM (error)	03.81*			03.65*		
robust LM (lag)	09.53***			10.10***		
LR test	51.06***	49.09***		52.20***	49.44***	
N	2934	2934	2934	2934	2934	2934

The number of TV stations remains highly significant in both the lag and the error specification. The robust LM multipliers however favor the lag model[21]. We find highly

[21] The robust multipliers test for significance of the spatial error parameter in the presence of a spatial

significant positive spatial correlation in both models, yet the inclusion of the spatial parameters leaves the effect of TV stations unchanged in the lag and the error model. Because the presence of spatial error cannot be rejected in the lag model and vice versa (see the robust LM tests), estimation of a combined spatial lag and error model is in order. As mentioned earlier, we apply the three step spatial-IV estimator (GS2SLS) suggested by Kelejian and Prucha (1998). The results for this GS2SLS estimator once again indicate that the media effect does not pick up spatial autocorrelation[22]

Things are not very different in the case of the distance to media center variable. Again, the lag specification is preferred over the spatial error model. The robust LM multipliers indicate significant lag effects in the presence of spatially correlated error terms and vice versa, so the GS2SLS procedure again seems to be the best fit for our data. The negative effect of distance is about the same as in OLS in all three models.

As was explained earlier, the discussion as to what the factors underlying the spatial correlation are is beyond the scope of this paper, so we are content with being able to state that the significance in both media activity variables cannot be an artefact of spatial dependencies.

5 Conclusion

This paper set out to analyze the effects of geographical distance from media outlets on federal grant spending. We found strong support for our theoretical predictions in the measure of distance to media outlets and media density combined, the number of TV stations. The effect of distance to the nearest media city is in the hypothesized direction in both samples as well. Neither of these effects is confounded with spatial dependencies. Endogeneity on the other hand seems to be a problem when it comes to estimating the effect of the number of TV stations on grants received. We massively underestimate the coefficient in the OLS specifications. Even if one were to doubt the validity of our instruments, the direction of the effect is in the hypothesized direction in OLS, albeit of smaller magnitude. Still, at a rate of approximately $1,000 per capita even a gain or loss of around 2% in grants per capita amounts to a large sum for a county harboring, say, 100,000 inhabitants, not to speak of the effects estimated via 2SLS. Being located far away from the media center leads to lower grants as well, yet the effect seems to be somewhat smaller, considering that most counties aren't located farther than twice the average distance from the nearest media center. It doesn't matter, however, which effect is stronger, as both measure distance to media outlets (with the number of TV stations measuring an additional effect of media density). In terms of robustness and magnitude our results strongly suggest that the intensity of media activity matters to politicians and

lag parameter (Robust LM (error)) and vice versa (Robust LM (lag)).

22 As suggested by Kelejian and Prucha (1998), we use the full set of spatially-first-lagged exogenous variables as instruments to account for the endogeneity of the spatial lag.

influences the geographical distribution of federal grants.

We did not try to uncover the reasons for the highly significant spatial effects. As stated earlier, apart from spatially correlated shocks or omitted variables that take on similar values in neighboring counties, the rationale for suspecting such effects could be either yardstick competition or spillovers in the provision of public goods.

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6 Appendix

Table 11: Counties by number of full power TV stations (including Class A).

	Full sample		**Metro micro sample**	
number of TV stations	Frequency	pct	Frequency	pct
0	2,284	77.85	1,123	67.98
1	359	12.24	258	15.62
2	115	3.92	102	6.17
3	51	1.74	46	2.78
4	45	1.53	43	2.60
5	31	1.06	31	1.88
6	13	0.44	13	0.79
7	12	0.41	12	0.73
8	5	0.17	5	0.30
9	6	0.20	6	0.36
10	4	0.14	4	0.24
11	2	0.07	2	0.12
12	1	0.03	1	0.06
13	4	0.14	4	0.24
16	1	0.03	1	0.06
21	1	0.03	1	0.06
Total	2,934	100.00	1652	100.00

Table 12: Media variable is (log of) TV stations. Dependent variable is (log of) grants per capita. OLS estimates.

	(1)		(2)		(3)		(4)	
log tv stations	0.0514*	(0.027)	0.0832***	(0.026)	0.0405***	(0.014)	0.0403***	(0.014)
log income			−1.5188***	(0.131)	−0.7019***	(0.181)	−0.7015***	(0.182)
bachelor or higher					0.0091**	(0.004)	0.0090**	(0.004)
out of state county					0.0040	(0.043)	−0.1407**	(0.068)
DMA share in home state					−0.0014*	(0.001)	−0.0019**	(0.001)
out of state X DMA share							0.0051***	(0.002)
native american pct					0.0050	(0.004)	0.0048	(0.004)
poverty pct					0.0418***	(0.006)	0.0415***	(0.006)
high school dropout pct					0.0137***	(0.004)	0.0141***	(0.004)
under 24 yrs pct					−0.0220***	(0.006)	−0.0218***	(0.006)
unemployed pct					−0.0118*	(0.007)	−0.0125*	(0.007)
log bank deposits					0.0527	(0.044)	0.0540	(0.044)
female pct					0.0331***	(0.007)	0.0328***	(0.007)
logexpenditures pc					0.0012	(0.040)	−0.0061	(0.040)
mean to median income					0.0984*	(0.051)	0.0977*	(0.052)
white pct					−0.0024	(0.002)	−0.0026	(0.002)
ethnic fragmentation					−0.4278***	(0.139)	−0.4236***	(0.139)
logdistance to capital					−0.0496**	(0.024)	−0.0506**	(0.023)
fed gov employed pct					0.0503***	(0.010)	0.0502***	(0.010)
other gov employed pct					0.0283***	(0.008)	0.0288***	(0.008)
log turnout ratio 1996					0.3535**	(0.149)	0.3528**	(0.148)
log voter density					0.0515*	(0.026)	0.0509*	(0.026)
population density (1000s)	0.0495***	(0.015)	0.0710***	(0.021)	0.0322**	(0.014)	0.0309**	(0.014)
population (100000s)	−0.0052	(0.003)	0.0092	(0.006)	−0.0007	(0.004)	−0.0006	(0.004)
intercept	6.7894	(0.015)	22.1584	(1.329)	10.4778	(1.779)	10.5161	(1.791)
state fixed effects	Yes		Yes		Yes		Yes	
N	1691		1691		1652		1652	
adj. R^2	0.146		0.358		0.619		0.620	

Specifications (1) to (4) are as the full sample. Only counties that belong to a metropolitan or micropolitan area are included. All state capital counties (n=48) excluded from the estimation. Standard errors in parentheses allow for clustering by state. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

Table 13: Media variable is (log of) distance to media city. Dependent variable is (log of) grants per capita. OLS estimates.

	(1)		(2)		(3)		(4)	
log distance	−0.0188	(0.017)	−0.0716***	(0.014)	−0.0333***	(0.011)	−0.0319***	(0.011)
log income			−1.5834***	(0.143)	−0.7242***	(0.178)	−0.7225***	(0.179)
bachelor or higher					0.0093**	(0.004)	0.0092**	(0.004)
out of state county					0.0197	(0.042)	−0.1169*	(0.068)
DMA share in home state					−0.0012*	(0.001)	−0.0017**	(0.001)
out of state X DMA share							0.0048***	(0.002)
native american pct					0.0056	(0.004)	0.0054	(0.004)
poverty pct					0.0418***	(0.006)	0.0415***	(0.006)
high school dropout pct					0.0142***	(0.004)	0.0146***	(0.004)
under 24 yrs pct					−0.0227***	(0.006)	−0.0225***	(0.006)
unemployed pct					−0.0112	(0.007)	−0.0119*	(0.007)
log bank deposits					0.0554	(0.042)	0.0566	(0.043)
female pct					0.0313***	(0.007)	0.0312***	(0.007)
logexpenditures pc					0.0026	(0.039)	−0.0043	(0.040)
mean to median income					0.0913*	(0.051)	0.0908*	(0.052)
white pct					−0.0022	(0.002)	−0.0024	(0.002)
ethnic fragmentation					−0.4277***	(0.136)	−0.4244***	(0.136)
logdistance to capital					−0.0469**	(0.023)	−0.0479**	(0.022)
fed gov employed pct					0.0483***	(0.010)	0.0483***	(0.010)
other gov employed pct					0.0283***	(0.008)	0.0288***	(0.008)
log turnout ratio 1996					0.3501**	(0.145)	0.3498**	(0.144)
log voter density					0.0501*	(0.026)	0.0495*	(0.026)
population density (1000s)	0.0500***	(0.014)	0.0709***	(0.019)	0.0293**	(0.014)	0.0282**	(0.014)
population (100000s)	−0.0041	(0.003)	0.0081	(0.006)	−0.0004	(0.004)	−0.0002	(0.004)
intercept	6.8934	(0.080)	23.1802	(1.470)	10.9423	(1.780)	10.9534	(1.791)
state fixed effects	Yes		Yes		Yes		Yes	
N	1691		1691		1652		1652	
adj. R^2	0.145		0.367		0.620		0.622	

Specifications (1) to (4) are as in the full sample. Only counties that belong to a metropolitan or micropolitan area are included. All state capital counties (n=48) excluded from the estimation. Standard errors in parentheses allow for clustering by state. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

Table 14: Sample including state capitals. Dependent variable is (log of) grants (per capita).

	Medicaid included		**Medicaid excluded**	
	Distance	TV	Distance	TV
OLS full sample	-0.044^{***}	0.067^{***}	-0.058^{***}	0.075^{***}
	(0.009)	(0.012)	(0.011)	(0.018)
2SLS full sample		0.389^{***}		0.451^{***}
		(0.058)		(0.087)
OLS metro/micro	-0.040^{***}	0.061^{***}	-0.053^{***}	0.084^{***}
	(0.010)	(0.013)	(0.012)	(0.017)
2SLS metro/micro		0.275^{***}		0.376^{***}
		(0.050)		(0.071)

All state capital counties (n=48) *included* in the estimation. Standard errors in parentheses allow for clustering by state. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

Table 15: Dependent variable is (log of) grants (per capita) excluding Medicaid.

	(1) Distance	(2) TV	(3) Overid	(4) First F(2,47)
OLS full sample	-0.043^{***}	0.034^{*}		
	(0.010)	(0.017)		
2SLS full sample		0.369^{***}	0.096	78.01
		(0.097)	($p = 0.755$)	($p = 0.000$)
OLS metro/micro	-0.041^{***}	0.054^{**}		
	(0.013)	(0.017)		
2SLS metro/micro		0.312^{***}	1.550	95.35
		(0.080)	($p = 0.213$)	($p = 0.000$)

Column (1) displays coefficients on media variable *(log of) distance*, column (2) for media variable *(log of) tv stations*. Columns (3) and (4) show tests of overidentifying restrictions and first stage F values. All state capital counties (n=48) excluded from the estimation. Standard errors in parentheses allow for clustering by state. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

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