Media Markets' Impact on Politics

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Abstract

In this paper we estimate the impact of newspaper coverage on citizen knowledge, politicians' actions, and policy. We find statistically significant and substantively important effects. Voters are more likely to recall the name of their U.S. House representative, and more likely to remember something their representative has done for the district, when they live in areas where newspaper coverage of the representative is high. In addition, we find evidence that politicians respond to their media enviroment. Congressmen who represent districts where newspaper coverage is high are more likely to serve on constituency-oriented committees than other representatives. Further, more federal funds are spent in these areas. We also find evidence that this behavior pays off, having a positive effect on voter opinions.

One of the main contributions of our paper is methodological. It is difficult to identify the effect the media has on voters and politicians because of the general correlation between citizens' media use and their political knowledge and interest, and because the media tend to devote more attention to well known, powerful and charismatic politicians. In order to convicingly identify an effect of media on voters and politicians, we must find some factor that causes voters' political news consumption to vary, but does not not directly affect voters' interest in politics, voters' costs of acquiring information, or the workings of politics. The factor we propose is the match, or congruence, between media markets and congressional districts.

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1. Introduction

In an ideal democracy, interested citizens inform themselves about politics and public policy with accurate news provided by an attentive and independent media. They use this information in voting, in adjusting to policy in their everyday life, and for entertainment.

The amount of information available to citizens matters for several reasons. First, information may have a direct effect on citizens' welfare simply because they dislike uncertainty and information reduces uncertainty. Bartels (1986) and Alvarez (1997) present evidence that voters dislike candidates with uncertain policy positions.[1] Increased information should also reduce the chances that voters make "mistakes" when casting their ballots.

Second, easy access to information may increase political participation, which, in the view of many observers, is beneficial per se. Numerous surveys find a strong and positive correlation between citizens' information levels and political participation.[2] While causation is more difficult to establish, several studies are suggestive. Stromberg (2004) provides evidence that decreasing the cost of acquiring information – via the expansion of radio – increases voter turnout. The strong correlation between education and turnout may also be interpreted as evidence that decreasing the cost of information increases participation.[3] Finally, numerous studies find that turnout is lower and "roll-off" is higher in non-partisan races than in partisan elections, indicating that a decrease in information decreases participation.[4]

Third, and perhaps most important, access to information may affect public policy. Stromberg (1999, 2004) and Besley and Burgess (2002) present evidence that citizens with better access to information receive more favorable public policies. Information is also necessary for voters to punish corrupt or "shirking" politicians. Cohen, Noll, and Zaller (n.d.) find evidence that the information available to voters affects the roll call voting of U.S. House representatives. A variety of models predict that policy becomes more distorted in favor of narrow interest groups when voters are less informed, and that in a pluralistic world policy outcomes favor groups with more informed members.[5]

Citizens are constrained, however, by the information that is made available by the mass media, especially newspapers, radio, and television. Other sources of information – reading specialized publications such as the *Federal Register*, the *Congressional Record* or even *Roll*

[1] Although, see Berinsky and Lewis (2004) for a critique of some of this literature.

[2] See, (*e.g.*, Verba and Nie (1972).

[3] The underlying assumption is that education reduces the costs of acquiring information. See, *e.g.*, Wolfinger and Rosenstone (1980) for evidence of the correlation.

[4] See, *e.g.*, Karnig and Walter (1977, 1983), Welch (1978), and Schaffner, Streb, and Wright (2001).

[5] See, *e.g.*, Grossman and Helpman (2001). For other evidence that mass media coverage affects public policy see Erfle and McMillan (1990).

Call magazine, or attending committee hearings, legislative debates, or political rallies to get first-hand knowledge about issues and decisions – are too costly for most citizens to use. As a result, scholars have devoted much effort to studying how the mass media behave and how voters and politicians respond to this behavior.

In this paper we estimate the impact of newspaper coverage on citizen knowledge and politicians' actions. We find that the effect is statistically significant and substantively important. Voters are more likely to recall the name of their U.S. House representative, and more likely to remember something their representative has done for the district, when they live in areas where newspaper coverage of the representative is high. In addition, we find evidence that politicians respond to their media environment. Congressmen who represent districts where newspaper coverage is high are more likely to serve on constituency-oriented committees than other representatives. We also find evidence that this behavior pays off, having a positive effect on voter opinions. Finally, we find that the effect on Congressmen's actions translates into effects on policy. More federal money is spent in areas where representatives are more covered by the newspapers.

One of the main contributions of our paper is methodological. It is difficult to identify the effect the media has on voters and politicians, because of the general correlation between citizens' media use and their political knowledge. People who are interested in politics consume more political news, from a variety of sources, causing political knowledge and news consumption to be positively correlated. It is impossible to control for all of the different sources of political information that citizens receive. A related problem is that the media tend to devote more attention to well known, powerful and charismatic politicians, producing a positive correlation between citizens' knowledge and media coverage of politicians.[6] Thus, while there are numerous studies regressing measures of political knowledge on self-reported media exposure (plus other controls), none of them convincingly identifies a causal relationship.[7]

It is equally difficult to measure how the presence of media outlets – for example, local newspapers – influences the workings of political life. The reason is that more newspapers are presumably sold where more people are interested in news and politics. If we observe

[6]Experimental studies can tackle the first issue by measuring initial levels of knowledge and then estimating the marginal impact of controlled media-exposure treatments, and also by assigning treatments randomly. The drawback of such studies is that they typically only isolate the immediate, short-term effect of "one-shot" exposures.

[7]Examples include Robinson and Levy (1986), Berkowitz and Pritchard (1989), Delli Carpini and Keeter (1989), Robinson and Davis (1990), Weaver and Drew (1993), and Arnold (2004). Mondak (1995) exploits a quasi-experiment – a newspaper strike in Pittsburgh in 1992 that closed the city's two major newspapers for eight months. Unfortuntunately, he only has a self-reported measure of respondents' knowledge of local politics.

some political phenomenon in areas with high newspaper sales, we do not know if this is caused by the newspapers, or if it reflects instead the intrinsic interest in news and politics which causes newspapers to locate and sell there.

In order to convincingly identify an effect of media on voters and politicians, we must find some factor that causes voters' political news consumption to vary, but does not directly affect voters' interest in politics, voters' costs of acquiring information, or the workings of politics. The factor we propose is the match, or congruence, between media markets and congressional districts. The measure we use is based on the share of a newspaper's readership that lives in a certain congressional district. Intuitively, newspaper coverage of a congressman should be increasing in this share; and, as we show in section 2.2, this is in fact the case. Some representatives therefore "fall through the cracks" of some or all local newspapers, and the readers of those newspapers are exposed to less news about their representative. Since more than one newspaper sells in each district, we define congruence in terms of the circulation weighted average of readership for all of the newspapers sold in a district. We explain this in more detail in section 2.1 below.

The key assumption to our empirical strategy is that the *match* between media markets and congressional district boundaries is exogenous to citizens' intrinsic interest in politics or their costs of acquiring political information. This assumption is plausible. Media markets themselves might be endogenous to voter characteristics – *e.g.*, newspapers locate where there are lots of interested citizens eager to buy and read a newspaper. Similarly, congressional district boundaries may be endogenous to various voter characteristics – *e.g.*, they may be drawn to create numerous safe districts for one or both parties. However, the factors that determine media markets – what we might loosely call "economic geography"– are generally quite different from the factors that determine congressional district boundaries. The latter are driven by the constraints that all districts in each state must have the same population, constraints imposed by courts on racial considerations, partisan considerations, the desire to protect incumbents, and so on. Crucially, learning about their local congressional representative is somewhat important, but not very important, to citizens. On the one hand, information about the local representative is not so important that newspapers tailor their markets to match congressional districts. On the other hand, such information is important enough that when newspapers can provide it at low cost and the audience is large enough, they will.

Our approach is most closely related to that of Cohen, Noll, and Zaller (n.d.), who study how the amount of information available to voters affects congressional roll call voting behavior. They explore two measures of the information environment. The first uses use Arnold's (2004) data on the number of actual newspaper headlines and citations. The second measure is a type of "fragmentation" index, calculated as the number of newspapers covering

a particular district divided by the number of districts covered by those newspapers. They find evidence that representatives in low-information districts vote in a more purely partisan manner, while those in high-information districts are more responsive to the underlying ideology of the district. Our work is also related several paper that use television media market definitions to explore the importance of mass media on the incumbency advantage and campaign finance.[8]

Before proceeding we must briefly discuss why we focus on newspapers, and ignore radio and television. The existing evidence indicates that local television stations devote much less coverage to congress than local newspapers (Hess, 1991; Vinson, 2003). Also, in surveys, respondents report that they rely more on newspapers than television for news about local elections, they rely more on television than newspapers for news about national elections (presidency), and they rely on a mix of newspapers and television for news about senate, house and gubernatorial elections (Mayer, 1993; Kahn and Kenney, 1999; Consumer Federation of America, 2004). In one analysis we compare the impact of television market structure and newspaper market structure on voter knowledge (section 2.3.4), and find that television appears to have no effect on voter knowledge about their congressmen. This is consistent with the idea that voters get little information about their congressional representatives from television. Less is known about radio, and this will require further investigation.

2. Empirics

The empirical investigation will be structured along the lines shown in Figure 1. First we define and discuss the concept of *Congruence*, or match, between media markets and congressional district (section 2.1). Second, we show that there is a strong, positive relationship between readership shares and the amount of coverage newspapers devote to representatives, a key underlying assumption in justifying our use of *Congruence* (section 2.2). In areas with high *Congruence*, therefore, voters presumably know more about their representatives. Third, we show that voters living in high-*Congruence* areas do, in fact, appear to be better informed about their representatives (section 2.3.2). Because *Congruence* affects voter information, it may also affect politicians' behavior. We explore this by examining the relationship between district *Congruence* and representatives' committee assignments (section 2.4), and the relationship between *Congruence* and the allocation of federal expenditures across counties (section 2.5).

[8] See Campbell, Alford and Henry (1984), Niemi, Powell and Bicknell (1986), Stewart and Reynolds (1990), Levy and Squire (2000), Ansolabehere, Snowberg and Snyder (2004).

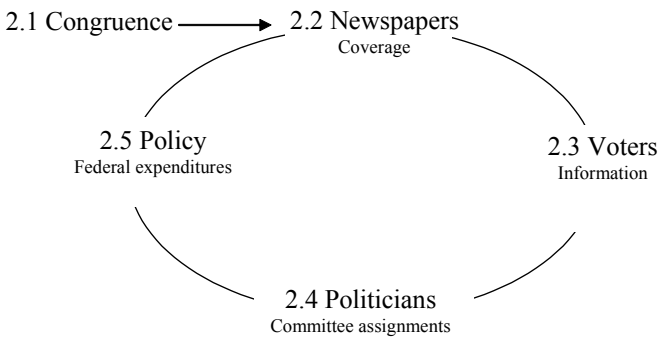

Figure 1: Structure of empirical investigation

2.1. Congruence

Let $MarketShare_{mc}$ be newspaper m's share of total newspaper sales in county c, and let $ReaderShare_{md}$ be the share of newspaper m's readers that live in congressional district d. Define the congruence between the newspaper markets and congressional districts in the part of county c that lies in district d as

$$Congruence_{cd} = \sum_{m} MarketShare_{mc}\ ReaderShare_{md}\ . \tag{1}$$

We hypothesize that *Congruence* is positively related to the amount of information voters have about their congressional representatives. This is intuitive: The amount of coverage that a newspaper devotes to a representative should be strongly related to the share of its readers that live in his or her district ($ReaderShare_{md}$), and $MarketShare_{mc}$ weighs the relative impact of each paper's coverage in the county. We derive the hypothesis formally in the Appendix.

As an example, suppose only two newspapers, A and B, sell in county c. Newspaper A sells to 40% of the households and newspaper B to 20% of the households (so, 40% of the households do not buy any newspaper). This implies that, in county c, newspaper A has a market share of $\frac{2}{3}$ and newspaper B has a market share of $\frac{1}{3}$. Suppose also that half of newspaper A's readers live in district d, and all of newspaper B's readers live in d.

	Penetration	Market share	Reader Share
Newspaper A	40%	2/3	1/2
Newspaper B	20%	1/3	1

We expect Newspaper B to cover the representative from district d closely, since all its readers live there. We expect Newspaper A to cover this representative less closely, since only half of its readers live there. The impact is on voter information is weighted by their market shares, yielding

$$Congruence_{cd} = (\frac{2}{3})(\frac{1}{2}) + (\frac{1}{3})(1) = \frac{2}{3}.$$

Congruence varies between zero and one. Note that since *Congruence* is defined using market shares, it is not dependent on the total newspaper penetration in the county.

To measure *Congruence*, we combine newspaper sales data with demographic data. Each year, the Audit Bureau of Circulation collects data on each newspaper's circulation in each county, for almost all U.S. newspapers. We have this data for period 1991-2000.[9] The U.S. Census Bureau collects data on the number of people in each congressional district, by county. We have this data for the censuses of 1980, 1990 and 2000.

We can use this data to estimate the number of people in each district that read each newspaper. (Although we estimate this separately for each year in our sample, we suppress time subscripts in what follows.) Let n_{cd} be the number of people who live in county c and congressional district d, let $n_c = \sum_d n_{cd}$ be the total number of people who live in county c, and let $n_d = \sum_c n_{cd}$ be the total number of people who live in district d. Let x_{mc} be the number of copies of newspaper m sold in county c, and let $x_m = \sum_c x_{mc}$ be the total number of copies sold of newspaper m. Assume that the number of copies per capita of newspaper m is the same in the part of county c that live in district d as for the county as a whole (we do not have data on newspaper sales for sub-county units). Then the number of copies of newspaper m sold in the part of county c that lies in district d is approximately

$$x_{mcd} = \frac{x_{mc}}{n_c} n_{cd}. \tag{2}$$

Also, the number of copies of newspaper m sold in district d is approximately $x_{md} = \sum_c x_{mcd}$. These variables can then be used to compute $MarketShare_{md}$, $ReaderShare_{md}$ and $Congruence_{cd}$ using the definitions

$$MarketShare_{mc} = \frac{x_{mc}}{\sum_{m\prime} x_{m\prime c}},$$

and

$$ReaderShare_{md} = \frac{x_{md}}{x_m}.$$

[9] On average there are about 10,900 observations each year. There are about 3,000 counties in the U.S., so the average number of observations per county in each year is about 3.6.

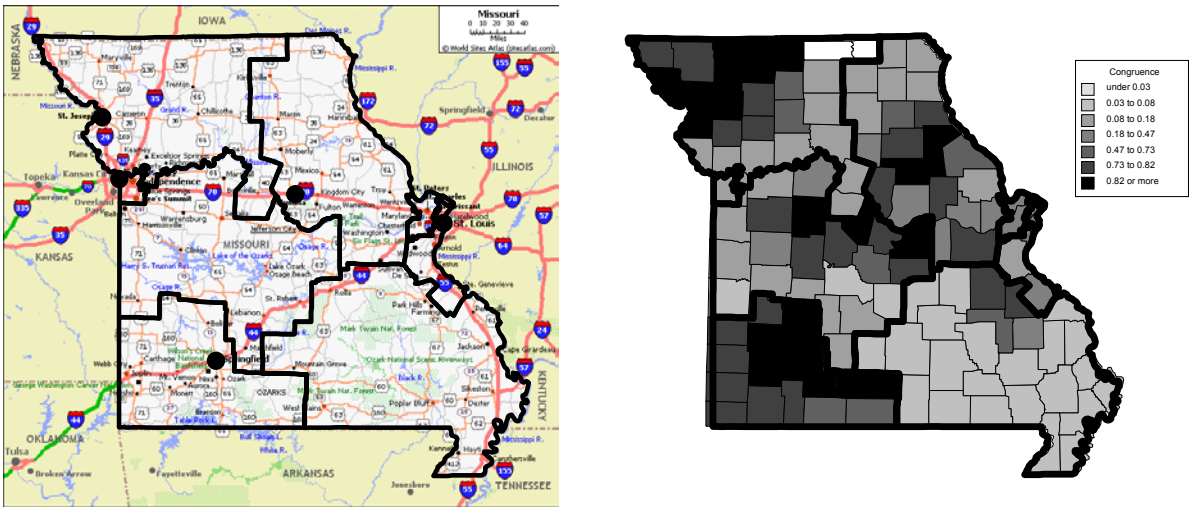

Figure 2: Congruence between newspaper markets and Congressional districts in Missouri

Combining these, we simply use equation (1) to compute $Congruence_{cd}$.

To illustrate how congruence varies, consider the case of Missouri. Newspapers are typically located in the larger cities and towns and sell to a markets around these. The two largest cities in Missouri, Kansas city and St. Louis city both lie on the state border and their markets cross the state border. The third and fourth largest cities (disregarding cities which are part of the Kansas city and St. Louis metropolitan areas) are Springfield city, and Columbia city both located in the interior of the state and a congressional district. Finally, the fifth largest city, St. Joseph city, is located at the border but the area across the state border in Nebraska and Kansas are not densely populated.

The congressional district borders of Missouri are drawn with solid lines. First take a look at the congressional district to the northwest. In the north, St.Joseph News Press is the dominant paper. We expect the St. Joseph News to cover mainly this congressional district, since 93% of its readers live in this district. Therefore, $Congruence_{cd}$ is high in that area. In the southern part of the district, people read the The Kansas City Star with 18% of readers live in district, therefore $Congruence_{cd}$ is much smaller. The Columbia Daily Tribune sell in the small appendix region to the southeast and has only 5% of its readers in this district. As a result, $Congruence_{cd}$ is low.

The district in the southwest has high congruence. It has two major papers, the Joplin Globe (with 80% of its sales in this district) and the Springfield News Leader (87%). Note how the eastern counties of this district has high $Congruence_{cd}$, whereas the adjoining county

to the east of Springfield has a very low value.

The big-city papers, the Kansas City Star and the St. Louis Post, are not expected to cover the districts in their market very much. First, a large share of their readers are in another state and do not care about the district (although a majority of the St. Louis Post's sales are in Missouri). Second, they cover many districts in Missouri so a small share of their readers will be interested in any particular district (the largest share readers in any district is around 30% for both). For this reason, the districts in the Kansas City and St. Louis metropolitan areas have low $Congruence_{cd}$.

The high $Congruence_{cd}$ counties in the central and central-northeast part are due to the string of moderately sized papers, the Sedalia Democrat, the Columbia Daily Tribune, the Post-Tribune/Capital Times, the Mexico Ledger, and the Hannibal Courier-Post.

A key identifying assumption in the empirical investigation is that $Congruence$ is not directly related to variables such as voters' intrinsic interest in politics. This seems a priori reasonable. Congressional districts boundaries are determined by state boundaries, contiguity requirements, and political concerns. Media markets are mainly determined by city location, and their location seems unrelated to the congressional districts making the interaction between these variables rather random. This creates the haphazard pattern in Figure 2. Had the southwestern congressional district in our Missouri example been extended to the east, then citizens living in these counties would most likely receive more information from about their representatives from the media because of the better match between the congressional districts and the media markets. We will now see how $Congruence_{cd}$ is related to other variables.

2.2. Newspaper Coverage and Audience Shares

In this section we examine the relationship between the estimated fraction of a newspaper's readers that live in a given congressional district, and the intensity of coverage the newspaper devotes to that district's congressional representative.

Our data cover the period 1991-2002 (103rd-107th Congresses). The sample consists of 161 newspapers, which cover, on average, 385 districts each congress.[10] We used the NewsLibrary.com web site, which employs a common search engine to search the on-line archives of newspapers, for 142 newspapers. We supplemented this using Lexis/Nexis for 8 newspapers. In addition, we searched 11 newspapers' web sites directly. In all, there are 4,216 observations in our sample, where each observation is a newspaper-district (newspaper-representative) pair in a given year.

We measure relative newspaper coverage as follows: Let q_{mdt} be the the number of

[10] We do not have data on every newspaper for every year in the sample.

articles appearing in newspaper m during Congress t that contain both the name of the representative from district d and the word "Congress."[11] Let $q_{mt} = \sum_d q_{mdt}$, where the sum is taken over all districts which contain at least 1% of newspaper m's readers. Then $CoverShare_{mdt} = q_{mdt}/q_{mt}$. This is the relative share of newspaper m

The main independent variable of interest is $ReaderShare_{dt}$. (Note, we now use t to denote time periods – each period is a Congress.) We include several other control variables that are likely to affect the amount of coverage, including indicator variables for the Speaker of the House, Majority Leader, Minority Leader, Majority Whip, and Minority Whip; seniority; an indicator variable for freshmen; an indicator for majority party status; an indicator for out-of-state districts; variables for members in scandals; and variables indicating whether the representative sought higher office (governor or senator) towards the end of the term. We also include some district level demographics that might affect coverage, including income and the fraction of people living in urban areas. The variable definitions and summary statistics are in appendix tables A.1 and A.2.[12]

Figure 1 shows the basic pattern: a very strong, positive, and approximately linear relationship between $CoverShare$ and $ReaderShare$. The bivariate regression line in also shown in the figure. Table 1 shows that the relationship is essentially the same after controlling for other factors that affect coverage.

Most of the controls have the effects one would expect. Party leaders tend to receive more coverage than other representatives. Members who are involved in scandals or who seek higher office also receive more coverage.

Three other findings are noteworthy. First, even controlling for $ReaderShare$, newspapers exhibit an in-state bias, covering representatives from their home state more heavily than out-of-state representatives.

Second, even controlling for $ReaderShare$, urban representatives receive less coverage than others. This could reflect the fact that urban areas have many powerful local politicians competing for scarce newspaper space – mayors, police chiefs, school superintendents, and even city council members. Local governments provide a broader array of services in urban areas than in suburban and rural areas, and citizens' preferences in urban areas are more heterogeneous, so decisions are more conflictual. As a result, citizens need to pay more attention to local politics, and, since they are busy, they have less time to monitoring their

[11] For simplicity, we use two calandar years for each Congress rather than the exact dates the Congress is in session. Thus, for the 103rd Congress we use articles appearing January 1, 1991 through December 31, for the 104th Congress we use articles appearing January 1, 1995 through December 31, 1996, and so on.

[12] We also ran specifications with the following additional variables: Share Old, Share Foreign, Share Blue Collar. These were never statistically significant.

U.S. representatives.

Finally, it does not appear that newspapers are mainly interested in providing necessary information to help voters vote in the next election. For example, freshmen do not receive more coverage than other representatives, even though they are new and relatively unknown to voters. Similarly, members who are retiring receive just as much coverage – or even slightly more – as those running for reelection.

In quantitative terms, the share of the articles devoted to a representative increases by about 45 percent when the share of the readership increases from 0 to 1. Since the typical newspaper prints approximately 100 articles about a representative each year, this translates to about 45 more articles per year. Although, as can be seen from the graph, there is a lot of variation for any given district readership share.

2.3. Voters

In this section, we investigate whether voters in areas where we expect news coverage to be high know more about their congressional representatives. We first discuss the data and empirical specification. Then, in subsection 2.3.1 we check whether people in highly congruent areas report reading about their representative more than others. This is basically exploring the same question as in the previous section, but now from the voters' point of view. We then examine whether the increased newspaper coverage impacts voter knowledge about the incumbent. In subsection we check whether voters in highly congruent areas are more likely to be able to name their representative and to identify which of the candidates is the incumbent. Finally, in subsection 2.3.3 we investigate whether voters in highly congruent areas are more likely to remember that their representative has done something for them.

To conduct these analyses, we merge the newspaper data with survey data from the National Election Studies (NES). The NES is biannual, coinciding with congressional elections, and contains an average of about 1800 respondents per year. Among the questions in the survey are items asking respondents whether they read about their representative in a newspaper, whether they can recall their representative's name, and whether they can recall anything the incumbent had done for the district. The responses are coded as dummy variables, taking the values zero or one.

Our key independent variable is $Congruence$, and we use the following specification:

$$y_i = \gamma\, Congruence_{cdt} + \mathbf{x}_{icdt}\delta + \alpha_t + \alpha_r + \varepsilon_i,$$

where $\mathbf{x}_{icdt}$ is a vector of control variables, α_t is a year-specific fixed effect, and α_r is a representative-specific fixed effect. Since the dependent variable y_i is dichotomous, the specification assumes a linear probability model. We employ this because the linear probability

model is consistent under weak assumptions, it works well with fixed effects, and its coefficient estimates are simple to interpret. All reported standard errors are heteroscedastic consistent.

Political knowledge is likely to be correlated with respondent characteristics such as education, income, and age. To distinguish the effect of the news market, we include a large set of individual specific control variables in the vector $\mathbf{x}_{icdt}$. We include dummy variables for whether the respondent's party identification matches with the incumbent's, for the respondent's education (4 categories), income (5 categories), age (7 categories), gender, race, and the number of years the respondent has lived in community. We include a number of variables characterizing the community in which the respondent lives: the degree of urbanism (3 dummy variables), population (logged), population density (logged), average education levels (share with 1-11 years, share with 12 years, and share with more than 12 years), and per capita income (logged). We include dummy variables characterizing the representative's positions in congress: whether the representative is a party leader, on a powerful committee, or a chair or ranking member of a committee. We control for the closeness of the race, using the negative absolute difference between the democratic share of the vote and 0.5. We include dummy variables for the type of congressional race: whether the incumbent was a Democrat running against a Republican challenger, some other challenger, or unopposed, and so on. Finally, we include state fixed effects and the interaction between state fixed effects and year effects. We include these last variables because growing states receive additional congressional districts after redistricting, which typically changes congruence, and these growing states may also exhibit particular patterns of political information due to the large proportion of newcomers.

2.3.1. Reading About the Incumbent

We first examine whether more people report reading about their representative in high-*Congruence* areas. The NES asked respondents whether they read about their House incumbent in a newspaper or magazine in the surveys conducted 1990, 1992 and 1994, collecting a total of 3,635 responses. We code the variable *ReadAboutRep* as one if the respondent answered yes to this question and zero if the respondent answered no (see Table A.1). In the total sample over these years, 62% report reading about the incumbent (see Table A.2).

The first column of Table 2 shows the result of a regression of *ReadAboutRep* on *Congruence*, controlling only for representative-specific and year-specific fixed effects. The second column includes the full battery of controls discussed above. In both cases, the coefficient on *Congruence* is statistically significant and positive.

The estimated effect is quite large. A shift in *Congruence* from the lowest to the highest

values in the sample increases the probability a respondent reports having read about his or her incumbent by 44 percent.[13] This is larger than the estimated impact of changing a respondent's education from grade school to college.[14]

The other correlations are unsurprising. The conditional probability of reading about the incumbent increases with age and is about 20 percent higher for respondents aged 45 or older ($age4-age7$), than for respondents aged 17-24 (omitted category). It increases monotonically with educational attainment and income. The remaining coefficients are insignificant. The incumbent specific variables, such as whether the representative is a party leader, are most likely insignificant because we include incumbent-specific fixed effects.

Note that the estimated coefficient on *Congruence* does not change much when we include the full list of controls. The reason is that *Congruence* is not highly correlated with any of these variables. We discuss this further below.

One potential problem with our results is that respondents might confuse having read about the incumbent with some other form of contact. For example, *Congruence* might be higher in areas where congressional campaigns are more intense, and some respondents might say they read about the incumbent in the newspaper when they actually read about the incumbent in campaign literature. We can check this by examining whether *Congruence* is correlated with the following survey items: Did the respondent meet the incumbent personally (16% answered yes), attend a meeting or gathering where the incumbent spoke (14%), talk to a member of the incumbent's staff (11%), or receive mail from the incumbent (64%). The results are presented in columns I-IV of Table 3. They show that *Congruence* is not significantly related to any of these other forms of contact.

2.3.2. Voter Information

We now turn to the main question of interest, whether respondents where the expected newspaper coverage of representatives is higher know more about their representatives. In the surveys conducted 1990-1998, the NES asked respondents if they could name the candidates in the U.S. House races in their district, collecting a total of 8,860 valid responses. We code the variable *NameRecall* as one if a respondent could name correctly at least one candidate and zero otherwise. In the sample, 38% of the respondents correctly named at least one of the candidates. For the same years, the NES also asked respondents if they could, when presented with the names of the candidates, identify which candidate was the incumbent.

[13] The calculation is 0.49*(0.93-0.02) = .44.

[14] Grade school is the omitted education dummy variable, and *edu*4 is the dummy variable for college education or more. The coefficient on *edu*4 is 0.29, implying that changing the respondent's education from high school to college increases the conditional probability of having read about the incumbent by 29 percent.

A total of 5,575 valid responses were collected. The variable *RecognizeIncumb* is coded as one if the respondent could recognize the incumbent or correctly answered that there was no incumbent, and zero otherwise. Most of the respondents (92%) correctly answer this question, so it less effective in discriminating between informed and uninformed.

The third column of Table 2 shows the result of a regression of *NameRecall* on *Congruence*, controlling only for representative-specific and year-specific fixed effects. The fourth column includes the full set of controls. In both cases, *Congruence* is significantly and positively correlated with knowledge about the candidates' names. The coefficient estimates vary only slightly across specifications, despite the large variation in sample size and included variables (the number of observations falls from 8,860 to 5,844, and the R-square changes from 0.16 to 0.27).

The estimated effect of *Congruence* on voter information is large. A change from the lowest to the highest values of *Congruence* increases the probability of a correct answer by about 23 percent. This is about as large as the effect of changing a respondent's education from grade school to college.

Most demographic variables correlate with voter information in the expected direction. Older, better educated, and higher-income respondents are more likely to be able to name a candidate, as are male, white, and non-suburban respondents. Also, respondents with the same party identification as the incumbent are significantly better at naming a candidate. Finally, more respondents can correctly name a candidate when the race is close.

The fifth and sixth columns contain the corresponding regressions with *RecognizeIncumb* as the dependent variable. Again, the correlation with *Congruence* is significant and positive. However, here the measured effects are smaller than in the previous two cases. This is not surprising, since 92 percent answer this question correctly. The coefficient estimates for the demographic variables show a similar pattern as in columns two and four, but are smaller.

The reason that the coefficient estimates in Table 2 do not change very much when new controls are included is that our key variable, *Congruence*, is only weakly correlated with the variables that affect individual respondent's information levels and propensity to reading about the incumbent. This is shown in Table A.3, which presents the result of an auxiliary regression with *Congruence* as the dependent variable and our battery of control variables as the independent variables. Except for *inc*4, the individual respondent characteristics (party-match, age, education, income, race, gender, etc.) are neither individually or jointly significantly correlated with *Congruence*. This is important since these are the variables that explain most of the variation in whether the respondent read about the incumbent or could name a candidate. The other variables that are correlated with *Congruence* are county population and the share of county residents with only high school education, but these variables are not related to information or reading about the incumbent. Nor is *Congruence*

significantly related to characteristics of a district's congressman that might plausibly affect media coverage, such as seniority, membership on exclusive committees, being a committee or ranking member, or being a party leader.

A possible concern is that *Congruence* for some reason is correlated with respondent knowledge about politics in general. The congruence between a newspaper's market and a congressional district influences how much the newspaper writes about a particular congressman, but it should not influence how much the newspaper writes about many other things, such as U.S. senators or the party that controls the U.S. House or U.S. Senate. We therefore ran regressions with the same specifications as in Table 2, but replaced the dependent variable with knowledge questions not related to a particular representative or district. The results are show in columns V-VII of Table 3. Column V shows a regression on whether the respondent can name at least one Senator correctly (48 percent of the respondents were able to do this). We also check two other knowledge questions: whether the respondent knows which party had a majority in the House before the election (64% correct), and which party had a majority in the Senate majority (56% correct). The results show that *Congruence* is not correlated with any of these measures of "non-district-specific" political knowledge. This increases our confidence that the positive correlations shown in Table 2, between *Congruence* and district-specific information, are not spurious.

2.3.3. Done Something for the District

A key question for accountability is whether voters can attribute policy actions to politicians. The 1990-1994 NES surveys asked respondents whether they remembered anything special that the incumbent representative did for the district, collecting 4,671 valid responses. In this sample, 19 percent answered this question affirmatively. We coded the variable $DoneForDist$ as one if the respondent answered yes to this question and zero if the respondent answered no.

Analyzing this question is a bit tricky. The probability of a positive response should be increasing in the level of information, but it should also be increasing in the number of things the incumbent has actually done for the district. In fact, we expect an interaction effect. The correlation between *Congruence* and responding yes to the question should be positive in districts where the representatives has, in fact, done many things for the district, but it should be small or even zero in districts where the incumbent has done little. Unfortunately, we do not observe whether a representative has actually done something for the district.

One possible proxy is based on committee assignments. Congressional scholars often divide the set of committees into four categories: constituency-oriented, policy-oriented,

prestige, and undesirable.[15] The presumption is that representatives serving on constituency-oriented committees are better able to engage in constituency service and pork-barrel politics. Arnold (1979) also finds that being on the appropriations committee is positively correlated with more federal resources going to the district. Consistent with these results, we find that being on Constituency committees and the Appropriations committee is positively correlated with more federal funds going to the district, see Section 2.5.

We therefore interact *Congruence* with a dummy variable *SpendComm*, which equals one if more than 50 percent of the representative's committee assignments is on constituency-oriented committees if the representative is on the appropriations committee, and zero otherwise. We add this interaction term, plus the *SpendComm* variable (the "main effect"), to the basic specification.

Following the congressional literature, we designate the following as constituency committees before the 104th Congress: Agriculture; Armed Services; Interior and Insular Affairs (Natural Resources in the 103rd Congress); Merchant Marine and Fisheries; Public Works and Transportation; Science, Space, and Technology; Small Business; and Veterans Affairs. In and after the 104th Congress, we designate the following as constituency committees: Agriculture; National Security; Resources; Science; Small Business; Transportation and Infrastructure; and Veterans Affairs. Similarly, we designate the following as policy committees before the 104th Congress: Banking, Finance and Urban Affairs; Education and Labor; Energy and Commerce; Foreign Affairs; Government Operations; and Judiciary. In and after the 104th Congress, we designate the following as policy committees: Banking and Financial Services; Commerce; Economic and Educational Opportunities; Government Reform and Oversight; International Relations; Judiciary; and Oversight.[16]

The results are shown in Table 4. In the first column, *Congruence* is not interacted with committee type. Evidently, *Congruence* is positively and significantly correlated with the *DoneForDist*. Interestingly, however, this result is mainly driven by representatives serving on constituency or the appropriations committees. This can be seen in the second column, where we have included the interaction term between *Congruence* and the *SpendComm* dummy. The coefficient on this interaction term is positive and significant, while the coefficient on *Congruence* is positive but insignificant.

One interpretation of this finding is that representatives from highly congruent districts

[15] See, *e.g.*, Deering and Smith (1997).

[16] This is essentially Deering and Smith's (1997) typology. Appropriations, Budget, Rules, and Ways and Means are designated as "prestige" committiees; all others are designated as "undesirable." See Fenno (1973) for a detailed discussion and early classification. See, *e.g.*, Baumgartner, Jones and MacLeod (1997), Thorson, Glieden, and Lina (1999), Frisch and Kelly (2002) for recent papers using similar classifications.

have stronger incentives to obtain positions on constituency committees. Membership on a constituency committee increases the conditional probability that a respondent remembers something their representative has done for the district by $-0.11 + 0.42 * Congruence$. This is increasing in $Congruence$ and positive for large values of $Congruence$. This suggests that representatives in high-$Congruence$ districts receive more credit for being on constituency committees and "bringing home the bacon." In the next section we will explore is whether representatives from high $Congruence$ districts respond to these incentives by seeking positions on constituency committees.

2.3.4. Further Robustness Checks

In addition to the regressions above, we ran the following analyses as further robustness checks. In the interests of space, we do not present tables with these results, and we keep the discussion brief.

First, we ran regressions analogous to those in Tables 2-4 but include district-times-year fixed effects rather than fixed effects for congressmen, states, and years. In this specification, the only variation used to identify the effect of $Congruence$ is the within-district variation at a given point in time. We can do this because many districts contain or overlap more the only county, so some voters (and survey respondents) in a given district live parts of the district with a high degree of $Congruence$, and others live in parts with a low level of $Congruence$. The estimates are quite similar to those in Tables 2-4. Consider for example, the dependent variable $NameRecall$. With no additional controls, the coefficient on $Congruence$ is .20 (s.e. = .09), and with the full battery of controls the coefficient on $Congruence$ is .27 (s.e. = .13); these are close to the analogous estimates in columns III and IV of Table 2. Including the district-times-year fixed effects isolates all characteristics – such as popularity, seniority, committee assignments, etc – which are likely to influence voter knowledge similarly in all parts of the district. However, the remaining variation in *Congruence* within district may be correlated with some characteristics of the people living in the counties.

Second, to isolate characteristics of people in each county we next included county fixed effects. We also applied the same newspaper sales data for 1992 to all years. This way, $Congruence$ change in a county-district only when the congressional district boundaries change due to redistricting. The question this specification asks is therefore, did voter knowledge of their representatives increase more in county-districts which became more $Congruent$ due to redistricting? Since we use the 1992 newspaper data for all years, we can extend the sample back to 1982. The estimates are again similar to those in Tables 2-4. For example, the estimated coefficient of $Congruence$ in the regression on $NameRecall$ is 0.28 (s.e. 0.06) with no additional controls, and 0.30 (s.e. 0.07) when we include all controls.

Third, we constructed a different *Congruence*measure based solely on geography rather than actual newspaper readership. Specifically, we first measured the distance between the population centroid in each county and in the county where a newspaper sold most papers (typically the newspapers home county). We then study how market coverage vary with distance. A newspaper typically has a market coverage of 32 percent in its home county, 6 percent in counties within 50 km, 1.3 percent in counties within distance 50-100 km, etc. We use this relationship to impute readership by just using distance, and compute *Congruence* based imputed readership. The correlation between the original congruence measure and the new measure is 62 percent. Analogous regressions as in Table 2-4 using this variable yields similar coefficient estimates. However, these estimates are less precise. For example, the coefficient of *Congruence* in the regression on *NameRecall* is estimated to be 0.31 (s.e. 0.11) with no additional controls and 0.37 (s.e. 0.20) with the full battery of controls.

Finally, we ran regressions analogous to those in Tables 2-4 but include, in addition to newspaper *Congruence*, a similarly constructed measure for congruence of television markets, *TVCongruence*. This measure is less precise. We do not have viewership data by county, but assume that everyone in a media market watches broadcasts only from that market. Further, we only have data on the media markets from 2000. Still, the two measures of *Congruence* are fairly highly correlated, with a correlation coefficient of .66. Interestingly, we find that *TVCongruence*is *not* significantly related to any of the variables in Tables 2-4, and including this variable has little effect on the estimated effect of newspaper *Congruence*. For example, with *NameRecall* as the dependent variable and no additional controls, the coefficient on *Congruence* is .23 (s.e. = .08), and the coefficient on *TVCongruence*is just .0.02 (s.e. = .08.) and statistically insignificant. With the full set of controls, the coefficient on *Congruence* is .22 (s.e. = .13), and the coefficient on *TVCongruence* is -.0.02 (s.e. = .20.) and remains statistically insignificant. This is consistent with the view that voters get most of the information they have about their local congressmen from newspapers rather than television. This is a plausible, since content analyses of television news suggests that local television stations devote much less news coverage to local congressmen than do local newspapers (Hess, 1991; Vinson, 2003; see also, the discussion in Arnold, 2004). Still a caveat is in place. Since *TVCongruence* is measured with significantly less precision than *Congruence*, the cards are stacked against finding TV effects.

2.4. Politicians

The results above suggest that members who represent districts with high values of *Congruence* should expect to have their behavior monitored more closely by the press, and should expect their constituents to know more about what they are doing in congress. Such representatives

might therefore have a greater incentive to engage in constituency service and pork-barrel politics. If successful, they can look forward to local newspaper stories reporting on their success – free advertising, from their point of view – and if unsuccessful they might find that reported as well. Members representing districts with low values of *Congruence* will not receive much free reporting of their activities, and even though the franking privilege reduces the costs of promoting their records, self-promotion is probably viewed more skeptically than reporting by independent journalists.

In this section we provide evidence consistent with this hypothesis. Specifically, we show that such representatives tend to serve more on constituency-oriented committees. The relationships are modest but statistically significant in the cross sections.

We use the same committee classification as in the previous subsection, and define the dummy variable *ConstituencyComm* to equal one if more than 50 percent of the representative's committee assignments is on constituency-oriented committees, and zero otherwise.[17] We control for each congressman's party and seniority status. We also control for various district characteristics, including education levels, log median income, the share of people living in urban areas, log population density, log total population, and year effects.

Table 5 presents the results. The first column shows that *Congruence* is positively and significantly related to the probability that a representative serves mostly on constituency-oriented committees. The second column shows that this correlation remains unchanged when including fixed effects for each year-state combination.

While intriguing, these estimates must be treated with some caution since they are based on a pooled cross-sectional analysis. More data – e.g., historical data on *Congruence* that allow us to exploit changes over time, such as those due to redistricting or retirements, or data on freshman committee requests such as that used by Shepsle (1978) – is needed to increase our confidence that the relationship is not spurious.

2.5. Policy

We have argued that representatives have a greater incentive to engage in constituency service and pork-barrel politics in favor of voters in highly congruent areas. If they do so successfully, then we should observe more federally allocated funds flowing in to highly congruent districts, and to more congruent counties within districts.

To test this we collected data on federal expenditure allocations across counties from the Consolidated Federal Funds Report. The expenditures we analyze include grants, procure-

[17] The results are robust to minor adjustments of the classification scheme. For example, we can treat Veterans Affairs and Science, Space, and Technology either as constituency committees or "undesirable" committees, and we can treat Government Operations (Government Reform and Oversight) either as a policy committee or an undesirable committee.

ment contracts, salaries and wages, and direct payments for retirement and disability, and other direct payments. We exclude loans, insurance and social security payments.[18] The total value of the exenditures we study is about $ 2600 per capita, or around 11 percent of GDP.

Table 7 shows the results of a regression of log per capita federal expenditures on *Congruence* and a set of other variables. Column I shows that expenditures are positively and significantly correlated with Congruence controlling for state-year fixed effects. The second column shows that this correlation is virtually unaffected by the inclusion of a large set of control variables. The community specific controls are log total population, log density the share with high school education, the share with more than high school education, log per capita income, the share black the share Hispanics, the share female, the share younger than 20, the share older than 65. The representative specific controls are whether the representative mostly on distributive committees, whether the representative was on a power committee (ways and means, rules, energy and commerce), whether the representative was a chair or a ranking member, and the representative's number of years in congress (tenure).

Columns III and IV studies the allocation of funds within each districts each year (includes fixed effects for every year-district combination). Significantly more funds were spent in more congruent counties within districts. The estimated coefficient on Congruence is again not very much affected by the inclusion of control variables.

3. Discussion and Conclusion

Our results suggest that newspaper market structure has a significant impact on the behavior of voters and politicians. A high degree of congruence between newspaper markets and congressional district boundaries leads to more press coverage of the local congressmen, a more informed electorate, and congressmen who more actively pursue positions on constituency-oriented committees. These results reinforce other recent findings that demonstrate the importance of the media on the political and economic environment.

In future work we plan to exploit our measure of *Congruence* further, by examining questions such as the following. What impact does congruence have on the relationship between partisanship, incumbency, and other factors that might determine individual voter behavior? Do voters who live in less-congruent areas tend to rely more on easy voting cues such as party affiliation? What is the relationship between media market congruence and the degree of partisanship in congressional roll call voting – the question studied in Cohen,

[18] The loans data does not report the value of the loan subsidy but only the value of the loan, the insurance data reports obligations and not payments, and the social security data is exluded because representatives are unlikely to affect its distribution.

Noll, and Zaller (n.d.)?

For the moment, we tentatively offer a few implications of our results. First, congruence should be an important factor to consider in contemplating the regulation of the press to improve voter information and political accountability. It may be even more important than, say, the degree of competition between local newspapers.

Second, trends in newspaper deaths, domestic merger activity, and the growth of international media conglomerates, could have noticeable effects on politics. To the extent that mergers create larger media markets and decrease the circulation of smaller newspapers, this activity is likely to decrease congruence at local levels. This could affect not only the congruence of congressional districts, but also that of municipalities, counties, and other local government units.

Third, as an application, the strong "personal vote" in U.S. elections might be due in part to the local nature of much newspaper coverage, and could therefore be effected by these trends. Today, relatively few voters in the U.S. read a "national" newspaper; rather, almost everyone who reads a newspaper reads a local paper. In 2003 the combined circulation of the three largest newspapers – the New York Times, the Wall Street Journal, and USA Today – was 6 million out of a total circulation in the U.S. of 50 million, or just 12 percent. In many other countries the opposite is true. Citizens in these countries are therefore unlikely to encounter much news about their local politicians. This is even the case in countries with geographically defined constituencies, such as the U.K..

4. Appendix

4.1. Model

4.1.1. Setup

This section develops a model the relationship between newspapers, voters and politicians, and discuss the specifications used in the empirical section.

First we describe the voters' behavior. Suppose there are n_{cd}voters in the part of county c that lies in legislative district d. These voters may benefit from some legislative action, which we simply model as the per capita government resources allocated by the legislature, z_{cd}. In addition to policy, each voter i also cares about other characteristics of the incumbent representative, captured by parameters $\beta_i$and η. The parameter $-\beta_i$ represents an individual's ideological preference in favor of the incumbent and $-\eta$represents the incumbent's general popularity. We assume that both these parameters are uniformly distributed on $[-\frac{1}{2}, \frac{1}{2}]$. The total utility of voter $i$in county $c$and district d, under the incumbent is

$$\ln z_c - \beta_i - \eta.$$

To evaluate if a representative has done enough for them, voters need to be informed. The required information is generally quite complex and differs across voters. However, we model information by the dummy variable ξ_i which takes the value one if the voter knows that the incumbent is responsible for the allocation z_{cd}, and zero otherwise. Voters follow the voting rule to cast their ballot for the incumbent if their utility under the incumbent has been higher than that expected under average incumbent

$$\xi_i \left(\ln z_{cd} - E \left[\ln z_{cd}^* \right] \right) - \beta_i - \eta \geq 0.$$

The key feature is that only informed voters keep the representative accountable for the funds he or she has managed to attract from Congress. Let σ_{cd} be the share of informed voters. This implies that the probability of re-electing the representative in district d is

$$P = \frac{1}{2} + \sum_{c \in d} \sigma_{cd} \frac{n_c}{n_d} \left(\ln z_{cd} - E \left[\ln z_{cd}^* \right] \right).$$

Next we model legislators. Representatives are assumed to be motivated by exogenous rents, R, of being in office and endogenous rent from being doing committee work which they find interesting. The representative chooses the type of committee $r \in (0, 1)$. This provides endogenous rents r, and an opportunity to attract funds $I(1 - r)$ to his district: Thus, there is a trade-off between the amount of funds that a representative can attract to his district and how interesting the committee work is. The representative then chooses how to allocate the funds within his district, z_{cd}, subject to the budget constraint

$$\sum n_c z_c = I(1 - r).$$

Newspapers maximize profits. Let x_{mcd} be the demand for newspaper m in the part of county c that lies in district d. Let q_{md} be the number of articles in newspaper m mentioning the congressman from district d. Although this is probably a minor factor, we assume that demand depends on coverage of representatives and is of the form

$$x_{mcd} = f_{mcd} q_{md}^{\alpha}.$$

The parameter f_{mcd} captures other characteristics of the newspaper and the county-district. To simplify, we assume that there is a constraint on the total number T of articles about Representative. The newspapers get revenue from advertisements and newspaper sales, and has distribution costs. We denote the revenue increase per reader by p. We will keep this

exogenous since we are interested in describing newspaper relative coverage, which under the assumptions of the model will be independent of p. The profits of the newspapers are

$$\pi = p \sum_{c,d} x_{mcd}\left(q_{md}\right).$$

The timing of the game is the following. An incumbent representative first chooses the type of committee and the allocation of resources within his district. Newspapers then write about the incumbent and voters vote based on this information. If re-elected, the incumbent receives the exogenous rents of being in office, R.

4.1.2. Newspapers

To describe the equilibrium of this game, we start with the newspapers' decisions to cover representatives. Newspaper m selects the number of articles covering the Representative in district d to maximize profits, π, subject to the subject to a space constraint on the total number of articles about representatives. The first order conditions are

$$\frac{\partial \pi}{\partial q_{md}} = p\alpha \frac{x_{md}}{q_{md}} - 1 = \lambda.$$

where

$$x_{md} = \sum_{c \in d} x_{cdm}.$$

Using the space constraint, the solution to this problem is

$$q_{md} = \frac{x_{md}}{x_m} T. \tag{3}$$

This may be rewritten as:

$$CoverShare_{md} = \frac{q_{md}}{\sum_d q_{md}} = \frac{x_{md}}{x_m} = ReaderShare_{dm}, \tag{4}$$

where

$$x_m = \sum_d x_{md}.$$

We can also solve for equilibrium coverage and demand as a function of the exogenous parameters f_{mcd} to get

$$q_{dm} = \frac{\sum_{c \in d} f_{mcd}^{\frac{1}{1-\alpha}}}{\sum_{c,d} f_{mcd}^{\frac{1}{1-\alpha}}} T,$$

$$x_{cdm} = f_{mcd} q_{dm}.$$

The form of the function f_{mcd} may be quite general. Suppose for instance that potential demand for newspapers in a county depends on characteristics of the people there, such as their income, education, interest in politics and social affairs. Let this potential demand be denoted χ_{cd}. However, whether this demand is realized depends on whether there is a local newspaper published nearby. Local newspapers carry local information centered on the city where they are located, and the interest in this news, and therefore demand, declines with distance. Let δ_{mcd} be the distance between the newspaper and people in county c district d. Suppose that

$$f_{mcd} = f_{mcd}\left(\chi_{cd}, \delta_{mcd}\right).$$

The demand for a newspaper depends directly on the potential demand for newspapers in the county-district, and the distance to the newspaper. Through the newspapers content, it also depends on the potential newspaper demand and closeness of other counties surrounding the newspaper. In the empirical investigation, we will use equation (3) based on the observable statistic $\frac{x_{md}}{x_m}$ to predict newspaper coverage of representatives. Note that this statistic is a function only of the underlying characteristics χ_{cd} and δ_{mcd}.

We now discuss our assumptions about how this coverage affects voter information. Suppose that there are M newspapers that sell in county c district d. Each of these $m = 1, 2, .., M$ papers sell x_{mcd} copies in county c and carries q_{md} stories about congressman d. Let the stochastic variable

$$z_{ijm} = \begin{array}{l} 1 \text{ if respondent } i \text{ has been exposed to (seen) article } j \text{ in newspaper } m, \\ \text{and 0 otherwise.} \end{array}$$

The probability that an individual has seen an article, p_{ijm}, can be separated into the unconditional probability that the respondent bought the paper, which equals the newspaper's market penetration, $\frac{x_{mcd}}{n_{cd}}$, and the probability of seeing the article conditional on having bought a paper, h, so that

$$p_{ijm} = \frac{x_{mcd}}{n_{cd}} h.$$

To assess the impact of seeing these articles on voter information, we assume that the probability of a being informed is proportional to the number of articles the individual has seen

$$\Pr\left[\xi_i = 1\right] = \alpha_i + \beta \sum_{m=1}^{M} \sum_{j=1}^{q_{md}} z_{ijm}.$$

The expected value of ξ_i for an individual in county c and district d is

$$\begin{aligned} E[\xi_i] &= \alpha_i + \beta \sum_{m=1}^{M} p_{mcd} q_{md} = \alpha_i + \beta hT \sum_{m=1}^{M} \frac{x_{mcd}}{n_{cd}} \frac{x_{md}}{x_m} \\ &= \alpha_i + \beta hT * Exposure_{cd}. \end{aligned} \tag{5}$$

$$Exposure_{cd} = \sum_{m=1}^{M} ReaderPenetration_{mcd} * ReaderShare_{dm}$$

$E[\xi_i]$ is also the share informed voters, hence

$$\sigma_{cd} = \alpha + \gamma * Exposure_{cd}$$

voters are informed that the incumbent is responsible for the allocation.

4.1.3. Representatives

We finally analyze the incumbents Representatives' choices of committee and allocation in the first stage of the model. The incumbent chooses committee type and allocation:

$$\max_{r,z} PR + r,$$

subject to the constraints

$$\begin{aligned} r &\in (0,1), \text{ and} \\ \sum n_c z_c &= I(1-r), \qquad z_c \geq 0 \text{ for all } c. \end{aligned}$$

The first order conditions are

$$\begin{aligned} \frac{n_c}{n_d} \frac{\sigma_c}{z_c} &= n_c \lambda \\ \frac{1}{r} &= \lambda I. \end{aligned}$$

Substituting for the budget constraint we get

$$z_c^* = \sigma_c \frac{I}{n_d}, \tag{6}$$

$$(1-r) = \sum \frac{n_c}{n_d} \sigma_c. \tag{7}$$

4.1.4. Empirical implications

The model delivers a number of testable empirical implications. First equations (3) and (4) that newspaper coverage representatives is increasing in the proportion of the readership which lives the representative's district

$$q_{md} = \frac{x_{md}}{x_m} T.$$

$$CoverShare_{md} = ReaderShare_{dm}.$$

Second, that voter information is increasing in $Exposure_{cd}$ by equation (5)

$$E[\xi_i] = \alpha + \gamma_\xi * Exposure_{cd}.$$

Voters need to know who can affect the distribution of government spending – in particular, how much influence does their incumbent representative have? Empirically, we will look at simple factual questions about the representatives and hope that this is a good proxy for the more complex information needed for accountability.

We will also look at another type of question asking whether the respondent can recall anything special that the representative has done for the district. A yes to this question is more likely where incumbent has actually done something for the district and where voters are better informed. One may interpret this within the model as $z_{cd} > \overline{z}$ and $\xi_i = 1$. This means that we would expect to see a positive correlation between $Exposure_{cd}$ and responding yes to this question in districts where representatives have delivered benefits, and zero correlation in other districts. We do not observe z_{cd}, but one may hypothesize that it is higher for representatives on certain "distributive" committees. If this is the case, then there will be a positive correlation between $Exposure_{cd}$ and answering yes to the question of doing something for the district for representatives on distributive committees. We run the regression

$$E[\xi_i] = \alpha + \gamma_\xi * Exposure_{cd} + \gamma_{2\xi} * Exposure_{cd} * DistribCommittee_d + \delta * DistribCommittee_d.$$

The hypothesis is that $\gamma_{2\xi} > 0$.

Third, the model delivers the hypothesis that representatives in districts where voters on average read more about them are more likely to be on policy committees. Assume that the probability that a representative is on a constituency committee is increasing in $(1-r)$. The probability of being on a constituency committee is then

$$E[y_{it}] = \sum_c \frac{n_c}{n_d} E[\sigma_c] = \alpha + \gamma \sum_c \frac{n_c}{n_d} Exposure_{cd}.$$

4.2. Identification

To address a potential endogeneity problem, we need to rewrite the equations before estimation. The *Exposure* variables are mixtures of two concepts: (i) "congruence," *i.e.*, the extent to which a district's boundaries match the boundaries of newspaper markets; and (ii) readership, *i.e.*, overall newspaper penetration in a district or county. It is more than likely that newspaper penetration is correlated with unobserved factors which are positively correlated with knowledge about the incumbent. For this reason, estimation of equation (5) is likely to lead to inconsistent estimates.

To avoid this problem, we rewrite equation (5) as

$$E\left[y_i\right] = \alpha_i + \beta h ReaderPenetration_{cd} Congruence_{cd},$$

where

$$Congruence_{cd} = \sum_{m=1}^{M} \frac{x_{mcd}}{\sum_{m\prime=1}^{M} x_{m\prime cd}} \frac{x_{md}}{x_m} \tag{8}$$

$$= \sum_{m=1}^{M} MarketShare_{mc} * ReaderShare_{md},$$

$$MarketShare_{mc} = \frac{x_{mcd}}{\sum_{m'=1}^{M} x_{m\prime cd}},$$

$$ReaderPenetration_{cd} = \frac{1}{n_{cd}} \sum_{m'=1}^{M} x_{m\prime cd}.$$

Intuitively, $Congruence_d$ is the value $Exposure_d$ would take if everyone in district d reads exactly one newspaper – this would be the average share of newspapers' markets which lie in district d. If everyone in district d reads exactly one newspaper, then $Readership_d = 1$, that is, $\sum_m n_{md} = n_d$.

The equations we will estimate will be of the form

$$y_i = \alpha_i + \gamma Congruence_{cd} + \varepsilon_i. \tag{9}$$

The key identifying assumption is

$$E\left[Congruence_{cd}\varepsilon_i\right] = 0.$$

Equation (9) may be estimated consistently by OLS even if $ReaderPenetration_c$ is correlated with ε_i. We will measure the average effect of congruence

$$\gamma = \beta h E\left[ReaderPenetration_c\right].$$

This is a model with interaction in unobservables.

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Figure 1: *CoverageShare*$_{md}$ plotted against *ReaderShare*$_{md}$

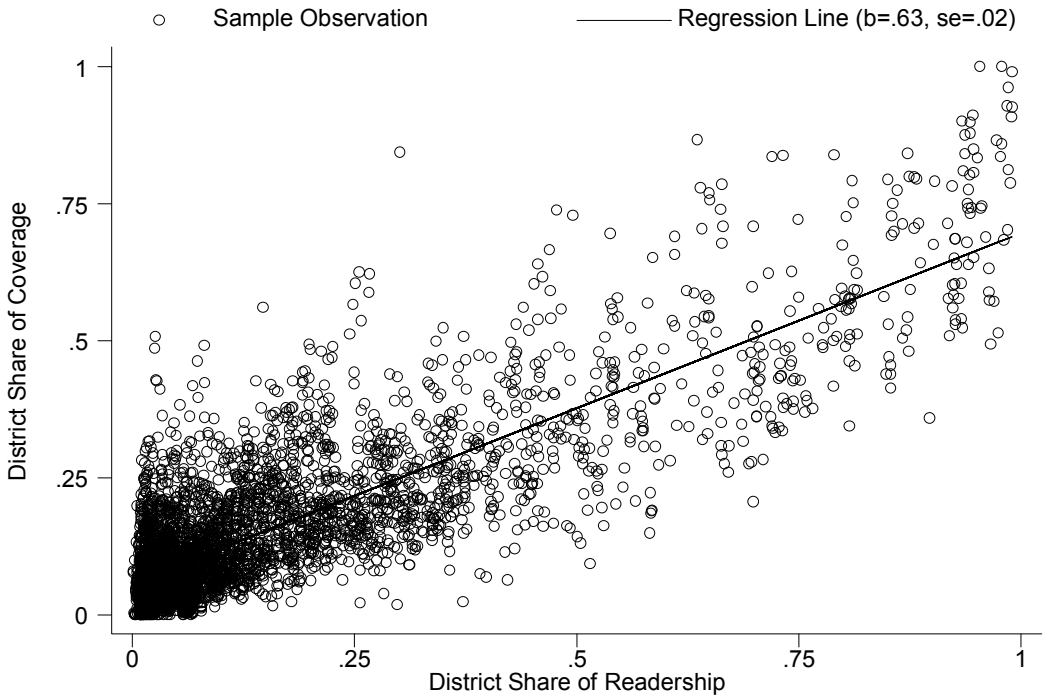

Table 1: Newspaper Coverage of U.S. House Members, 19xx-20xx

Dependent Variable: *CoverShare*$_{md}$	I	II	III
ReaderShare	.64**	.62**	.63**
	(0.02)	(0.02)	(0.02)
Speaker		.17**	
		(0.03)	
Majority Leader		.15**	
		(0.03)	
Majority Whip		0.08	
		(0.05)	
Majority Caucus Chair		.06**	
		(0.01)	
Minority Leader		.13**	
		(0.03)	
Minority Whip		0.04	
		(0.03)	
Minority Caucus Chair		.06*	
		(0.03)	
Majority Party Member		.01**	
		(0.003)	
Scandal		.04**	
		(0.01)	
Won Race for Governor		.11**	
		(0.03)	
Lost Race for Governor		.04**	
		(0.016)	
Won Race for Senate		.09**	
		(0.02)	
Lost Race for Senate		.08**	
		(0.015)	
Appointed to High Office		.08**	
		(0.02)	
Scandal		.04**	
		(0.01)	
Switched Parties		0	
		(0.02)	
Close General Election		.04**	
		(0.01)	
Lost Primary Election		-0.01	
		(0.01)	
Freshman		0	
		(0)	
Terms Served		0	
		(0)	
Retired		.02*	
		(0.01)	
Died During Term		0	
		(0.02)	
Out of State District		-.03**	
		(0.01)	
Median Income		-0.01	
		(0.03)	

Share Urban		-.09**	
		(0.01)	
R2	0.69	0.75	0.71
N	4,216	4,216	2,864

Table 2: Reported newspaper readership and recall of congressmen's names

Dependent variables	I *ReadAbout Incumbent*	II *ReadAbout Incumbent*	III *Name Recall*	IV *Name Recall*	V *Recognize Incumb*	VI *Recognize Incumb*
Explanatory variables:						
Congruence	0.362**	0.367**	0.233*	0.234*	0.179*	0.126*
	(0.134)	(0.136)	(0.097)	(0.108)	(0.074)	(0.053)
party_match		0.025		0.077**		0.011
		(0.019)		(0.014)		(0.008)
age2		0.128*		0.041*		0.04
		(0.051)		(0.021)		(0.028)
age3		0.159**		0.104**		0.047
		(0.049)		(0.024)		(0.029)
age4		0.232**		0.196**		0.064*
		(0.056)		(0.028)		(0.028)
age5		0.239		0.182**		0.075**
		(0.053)		(0.028)		(0.028)
age6		0.245**		0.259**		0.061*
		(0.051)		(0.029)		(0.029)
age7		0.199**		0.208**		0.062*
		(0.058)		(0.032)		(0.032)
edu2		0.135*		0.067**		0.021
		(0.058)		(0.024)		(0.02)
edu3		0.222**		0.178**		0.035
		(0.065)		(0.029)		(0.02)
edu4		0.29**		0.319**		0.075**
		(0.058)		(0.031)		(0.023)
inc2		0.028		0.037*		0.016
		(0.035)		(0.019)		(0.019)
inc3		0.096**		0.118**		0.024
		(0.036)		(0.021)		(0.017)
inc4		0.144**		0.156**		0.025
		(0.041)		(0.02)		(0.019)
inc5		0.171**		0.204**		0.009
		(0.052)		(0.047)		(0.024)

gender		-0.036		-0.044**		-0.006
		(0.02)		(0.014)		(0.009)
race1		0.087		0.139**		0.045
		(0.045)		(0.02)		(0.024)
urb2		-0.001		-0.051*		0.002
		(0.04)		(0.024)		(0.014)
urb3		0.107		0.008		0.042
		(0.068)		(0.042)		(0.024)
lpop		-0.072		0.03		0.028
		(0.038)		(0.038)		(0.019)
ldensity		0.062		-0.061		-0.023
		(0.039)		(0.032)		(0.017)
school2		-0.792		-2.262*		-0.735
		(0.849)		(0.903)		(0.384)
school3		0.323		-0.087		-0.519*
		(0.576)		(0.522)		(0.247)
linc		-0.45		-0.395		0.132
		(0.259)		(0.211)		(0.112)
close		-0.142		0.295		-0.16
		(0.353)		(0.194)		(0.174)
party_leader		0.232		0.082		-0.029
		(0.179)		(0.071)		(0.043)
powercom		0.031		-0.017		0.053
		(0.063)		(0.035)		(0.043)
chair		0.067		0.073		0.061
		(0.218)		(0.096)		(0.05)
rankmem		-0.01		0.071		0.074
		(0.215)		(0.097)		(0.062)
year and incumbent fixed effects	yes	yes	yes	yes	yes	yes
racetype, state, and state*year fixed effects	no	yes	no	yes	no	yes
N	3635	2863	8297	5425	5575	3806
r2	0.109	0.198	0.156	0.288	0.193	0.372

Standard errors clustered by county in parenthesis: *p<0.05, **p<0.01, *** p<0.001.

Table 3. Robustness

Dependent variables	I *meetinc*	II *gather*	III *staff*	IV *mail*	V *sen_ recall*	VI *know_c maj*	VII *know_s maj*
Explanatory variables:							
Congruence	0.062	-0.046	-0.088	0.019	-0.378	-0.075	-0.011
	(0.108)	(0.122)	(0.077)	(0.128)	(0.261)	(0.094)	(0.090)
				.			
controls	yes	yes	yes	yes	yes	yes	yes
racetype, state, year, state*year, and incumbent fixed effects	yes	yes	yes	yes	yes	yes	yes
N	2863	2863	2863	2863	2002	5557	5553
r2	0.179	0.167	0.142	0.220	0.295	0.303	0.296

Standard errors clustered by county in parenthesis: *p<0.05, **p<0.01, *** p<0.001.
The same set of controls as in Table 2 included.

Table 4: Done for district

Dependent variable:	I *DoneForDist*	II *DoneForDist*
Explanatory variables:		
Congruence	0.299*	0.044
	(0.132)	(0.216)
*Congruence*SpendComm*		0.589***
		(0.280)
SpendComm		-0.284*
		(0.133)
controls	yes	yes
racetype, state, year, state*year, and incumbent fixed effects	yes	yes
N	3625	3610
r2	0.196	0.196

Standard errors clustered by county in parenthesis: *p<0.05, **p<0.01, *** p<0.001.
The same set of controls as in Table 2 included.

Table 5: Committee Assignments of U.S. House Members, 1990-2000

Dependent variables	*Constituency Comm*	*Constituency Comm*
cov2dc	0.195*	0.225*
	(0.078)	(0.096)
pct_urban	0.022	0.014
	(0.086)	(0.096)
ldensity	-0.039**	-0.032
	(0.013)	(0.015)
pct_old	-0.522	-0.158
	(0.306)	(0.368)
lmed_income	0.001	-0.055
	(0.054)	(0.066)
tenure	-0.008**	-0.01**
	(0.003)	(0.003)
partyd	0.056	0.029
	(0.029)	(0.032)
fixed effects	year	year*state
N	2520	2520
r2	0.119	0.202

Linear regression with robust standard errors. Clustered standard errors in parentheses, where each cluster is a representative. ** statistically significant at the .01 level * statistically significant at the .05 level.

Table 7: Distribution of federal funds across counties, 1990-2000

Dependent variable, log spending per capita	I	II	V	VI
Congruence	0.095**	0.112**	0.098**	0.116**
	(0.030)	(0.028)	(0.031)	(0.029)
Log Population		-0.019		0.008
		(0.026)		(0.027)
Log Density		-0.025		-0.056*
		(0.024)		(0.027)
School2		-1.62**		-0.962**
		(0.319)		(0.324)
School3		1.075**		1.389**
		(0.245)		(0.248)
Log Income		-0.133		-0.083
		(0.092)		(0.095)
Black		1.287**		1.328**
		(0.094)		(0.121)
Hispanic		0.605**		0.82**
		(0.130)		(0.203)
Female		-1.017		-1.378
		(0.842)		(0.772)
Share aged < 20		1.18		1.749**
		(0.612)		(0.576)
Share aged > 65		2.81**		2.983**
		(0.477)		(0.463)
ConstituencyComm		0.101**		0.003
		(0.017)		(0.010)
Party Leader		-0.126*		-0.091
		(0.062)		(0.056)
AppropriationsComm		0.034		0.000
		(0.025)		(0.021)
PowerComm		-0.085**		0.013
		(0.020)		(0.015)
Chair		-0.076		-0.037
		(0.033)		(0.017)
Rankmem		-0.030		-0.013
		(0.027)		(0.015)

Tenure		0.004*		0.003
		(0.002)		(0.009)
Fixed Effects	year*state	year*state	year*district	year*district
N	18109	18109	17720	17720
r2	0.209	0.306	0.381	0.433

Clustered standard errors in parentheses, where each cluster is a representative. ** statistically significant at the .01 level * statistically significant at the .05 level.

Table A1: Variable definitions and sources

Variable	Definition	Source
Media variables		
Congruence	See text	ABC
circ	Number of newspapers sold, divided by # of households, by county.	ABC
ReadAboutRep	Respondent read about [running House incumbent] in a newspaper or magazine. (1) yes, (0) no.	NES (VCF0915)
tv	Respondent saw [running House incumbent] on TV. (1) yes, (0) no.	NES (VCF0917)
radio	Respondent heard [running House incumbent] on radio. (1) yes, (0) no.	NES (VCF0916)
Congress variables		
NameRecall	Respondent recalls at least one House candidate's name correctly: (1) yes, (0) no.	NES (VCF0976)
Recognize Incumbent	Respondent identifies which of the [House] candidates is incumbent, or identifies non-incumbency where no incumbent is running: (1) correct, (0) incorrect.	NES (VCF0978)
DoneForDist	"Do you happen to remember anything special that [running House incumbent] has done for his/her district or for the people of his/her district while s/he has been in Congress?": (1) yes; (0) no.	NES (VCF0960)
meetinc	Respondent met [running House incumbent] personally. (1) yes; (0) no.	NES (VCF0911)
gathering	Respondent attended a meeting or gathering [running House incumbent] spoke. (1) yes; (0) no.	NES (VCF0912)
staff	Respondent talked to a member of [incumbent's] staff or someone in [incumbent's] office. (1) yes; (0) no.	NES (VCF0912)
mail	Respondent received something in mail from [running House incumbent]. (1) yes; (0) no.	NES (VCF0913)
know_cmaj	Do you happen to know which party had the most members in the House of Representatives in Washington before the lection (this/ last) month? (1) yes; (0) no.	NES (VCF0729)
Senate variables		
sen_recall	Respondent recalls at least one Senator's name correctly: (1) yes, (0) no.	NES (VCF9067)
know_smaj	"Do you happen to know which party had the most members in the U.S. Senate before the election this/last month?" (1) correct, (0) incorrect.	NES (VCF9036)
Individual characteristics		
party_match	Respondent's party ID same as House incumbent's party. (1) yes, (0) no.	NES (VCF0302)
age	Respondent's age group (7 categories): (1) 17-24; (2) 25-34; (3) 35-44; (4) 45-54; (5) 55-64; (6) 65-74; (7) 75- .	NES (VCF0102)
edu	Respondent's education: (1) 0-8 grades; (2) 8-12 grades; (3) 13-grades	NES (VCF0110)
inc	Respondent's family income (5 categories): (1) 0-16 percentile; (2) 17-33; (3) 34-67; (4) 68-95; (5) 96-100.	NES (VCF0114)
gender	Respondent's gender: (1) female; (0) male.	NES (VCF0104)
race	Respondent's race1: (1) white; (0) black	NES (VCF0105)
urban	Urbanism, respondent's sampling address: (1) central cities; (2) suburban areas; (3) Rural, small towns, outlying and adjacent areas	NES (VCF0111)
County characteristics		
pop	total county population Source: Bureau of the Census, http://eire.census.gov/popest/archives/1990.php#county	

	1990 to 1999 Annual Time Series of County Population Estimates by Age, Sex, Race and Hispanic Origin. 2000. American Factfinder. 2000-2002: U.S. Census Bureau, County Population by Age, Sex, Race, and Hispanic origin: July 1, 2002 http://eire.census.gov/popest/data/counties/coasro_detail.php	
density	population per square mile (pop/area)	Source: Census 2000 Summary File 1; 1990 Census Summary File 3
school1	Share of population 25 years or older with less than high school graduation. Linear intrapolation for non-census years years.	Source: Census 2000 Summary File 3, Table P37; and 1990 Census Summary File 4C, Table PB44
school2	Share of population 25 years or older with high school graduation, and no more. Linear intrapolation for non-census years years.	Source: see above.
school3	Share of population 25 years or older with more than high school graduation. Linear intrapolation for non-census years years.	Source: see above.
medinc	Median household income (in 1999 dollars). Linear intrapolation for non-census years years	Source: Census 2000 Summary File 3, Table P53; and 1990 Census Summary File 3A, Table P80A
Congressional race characteristics		
close	the negative absolute difference between the democratic vote share and 0.5	
racetype	Type of House race. (12) Democratic incumbent running—Republican challenger; (13) Democratic incumbent--other challenger; (14) Democratic incumbent running—unopposed; etc.).	NES (VCF0902)
House member characteristics		
Constituency Comm	Following the congressional literature, we designate the following as constituency committees before the 104th Congress: Agriculture; Armed Services; Interior and Insular Affairs (Natural Resources in the 103rd Congress); Merchant Marine and Fisheries; Public Works and Transportation; Science, Space, and Technology; Small Business; and Veterans Affairs. In and after the 104th Congress, we designate the following as constituency committees: Agriculture; National Security; Resources; Science; Small Business; Transportation and Infrastructure; and Veterans Affairs.	
PolicyComm	We designate the following as policy committees before the 104th Congress: Banking, Finance and Urban Affairs; Education and Labor; Energy and Commerce; Foreign Affairs; Government Operations; and Judiciary. In and after the 104th Congress, we designate the following as policy committees: Banking and Financial Services; Commerce; Economic and Educational Opportunities; Government Reform and Oversight; International Relations; Judiciary; and Oversight.	
PartyLeader	Party Leader	
PowerCom	Member of Ways and Means, Appropriations, or Rules Committees	
Chair	Committee Chair	

RankMem	Committee Ranking Member

NES= National Election Studies 1948-2002 Cumulative Data File.

Table A2. Summary statistics

Variable	Obs	Years	Mean	Std. Dev.	Min	Max
Media variables						
Congruence	8862	1990-1998	0.40	0.27	0.02	0.93
circ	8862	1990-1998	0.58	0.20	0.06	1.49
ReadAboutRep	3635	1990-1994	0.62	0.48	0	1
tv	3635	1990-1994	0.65	0.48	0	1
radio	3635	1990-1994	0.33	0.47	0	1
Congress variables						
NameRecall	8862	1990-1998	0.37	0.48	0	1
Recognize Incumbent	5575	1990-1998	0.92	0.28	0	1
DoneForDist	4671	1990-1994	0.19	0.39	0	1
meetinc	3635	1990-1994	0.16	0.36	0	1
gathering	3635	1990-1994	0.14	0.34	0	1
staff	3635	1990-1994	0.11	0.31	0	1
mail	3635	1990-1994	0.64	0.48	0	1
know_cmaj	8439	1990-1998	0.64	0.48	0	1
Senate variables						
sen_recall	2535	1990-1992	0.48	0.50	0	1
know_smaj	8436	1990-1998	0.56	0.496	0	1
Individual characteristics						
party_match	8862	1990-1998	0.39	0.49	0	1
age	8845	1990-1998	3.66	1.77	1	7
edu	8725	1990-1998	2.67	0.92	1	4
inc	8141	1990-1998	2.90	1.14	1	5
gender	8862	1990-1998	0.54	0.50	0	1
race1	7821	1990-1998	0.86	0.35	0	1
urban	8862	1990-1998	2.06	0.76	1	3
County characteristics						
pop	8842	1990-1998	806824	1444932	5446	9223807
density	8842	1990-1998	1614	5072	2	64224
school1	8842	1990-1998	0.23	0.09	0.03	0.53
school2	8842	1990-1998	0.30	0.07	0.13	0.50
school3	8842	1990-1998	0.47	0.12	0.22	0.82
medinc	8842	1990-1998	42454	11356	19021	82381
Congressional race characteristics						
close	8830	1990-1998	-0.19	0.15	-0.50	0.00
racetype	8860	1990-1998	22	15	12	85
House member characteristics						
party_leader	7588	1990-1996	0.01	0.11	0	1
powercom	7588	1990-1996	0.30	0.46	0	1
chair	7588	1990-1996	0.05	0.22	0	1
rankmem	7588	1990-1996	0.04	0.20	0	1

Table A3. Auxiliary regression.

Dependent variables	Congruence
Explanatory variables:	
party_match	0.0001
	(0.0013)
age2	-0.0023
	(0.0026)
age3	0.0001
	(0.0027)
age4	0.0001
	(0.0029)
age5	-0.0008
	(0.0034)
age6	-0.0003
	(0.0035)
age7	-0.0024
	(0.0035)
edu2	0.0065
	(0.0036)
edu3	0.0028
	(0.0031)
edu4	0.0022
	(0.0033)
inc2	0.0008
	(0.002)
inc3	-0.0007
	(0.0023)
inc4	-0.0067**
	(0.0025)
inc5	-0.0031
	(0.0042)
gender	0.0013
	(0.0014)
race1	-0.0003
	(0.004)

urb2	-0.0014 (0.0084)
urb3	-0.0391 (0.0395)
pop	-0.0637* (0.0301)
density	-0.0097 (0.0223)
school2	-1.303* (0.5702)
school3	0.0971 (0.3192)
medinc	-0.2186 (0.139)
close	0.0547 (0.0594)
party_leader	0.0617 (0.1097)
powercom	0.0139 (0.0094)
chair	-0.0441 (0.0291)
rankmem	-0.0496 (0.0358)
racetype, state, year, state*year, and incumbent fixed effects	yes
F-test, (party_match,age2-age7,in2-inc5, gender,race1=0) p-value:	0.32
F-test, (urb2-urb3, pop, density, school1-school3, medinc=0)	0.12
F-test, (close=0)	0.36
F-test, (party_leader, powercom, chair, rankmem=0) p-value:	0.33
N	5844
r2 (fixed effects only)	0.952
r2	0.960