Radio's Impact on New Deal Spending

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Abstract

Mass media carry political information to the voter. This makes voters using mass media more likely to respond to campaign promises and to hold politicians accountable for cuts that hurt them. As a consequence, politicians should target voters using mass media. These ideas are developed in a voting model which is then used as a basis for empirical investigation.

To isolate the e¤ects of mass media on government spending empirically, this paper looks at a period of rapid change in the mass media market. It analyzes a major New Deal relief program implemented in the middle of the expansion period of the radio.

The main empirical …nding is that counties with many radio listeners received more relief funds. More funds were allocated to poor counties with high unemployment, but controlling for these and other variables, the e¤ects of the radio are large and highly signi…cant. A one standard-deviation increase in the share of households with radios raises spending by 11 percent. If other government funds were distributed in a similar fashion, then the introduction of the radio may have led to major reallocations in the government budget.

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Knowledge is power.[1]

1. Introduction and summary

Many people believe that less informed individuals are politically disadvantaged. This has caused concerns for the knowledge gap between, for example, rich and poor and African American and whites. However, to my knowledge, this belief has not been subject to any empirical test, and the alleged e¤ects have not been measured. This paper attempts to measure the e¤ects of two characteristics strongly related to political knowledge – the use of mass media and illiteracy – on political power measured as the ability to attract redistributive transfers. The results have implications for both redistribution and the growth of the government sector.

The main focus of the paper is on the e¤ects of mass media. Mass media provide the bulk of the information people use in elections. When a survey organization asked a cross section of American voters about their principal source of information in the 1940 presidential campaign, 52 percent answered "radio", and 38 percent "newspapers"[2]. However, mass media are not neutral devices, uniformly distributing information to everyone. Rather, each of the large mass media creates its speci…c distribution of informed and uninformed citizens, partly because of its speci…c costs and revenue structure. As a result, the characteristics of those informed also change when the mass media technology changes. For example, it is more costly to supply remote areas with newspapers than with radio waves. Radio can also more easily reach the part of the population with reading di¢culties than newspapers. As a result, during the late 1930s, radio became the main information provider to low-education groups and rural listeners with less ready access to daily newspapers than people living in cities[3].

That some identi…able groups became better informed due to the radio may not seem surprising in itself, but if knowledge is indeed power, it may have far reaching implications. The expansion of radio could then have paved the way for government policies favoring low-education groups and farmers during the 1930s. Similarly, the subsequent advent of television increased the share of media users

[1] Francis Bacon, Sacred Meditations, (1597).
[2] Gallup (1940).
[3] Sterling and Kitross (1978).

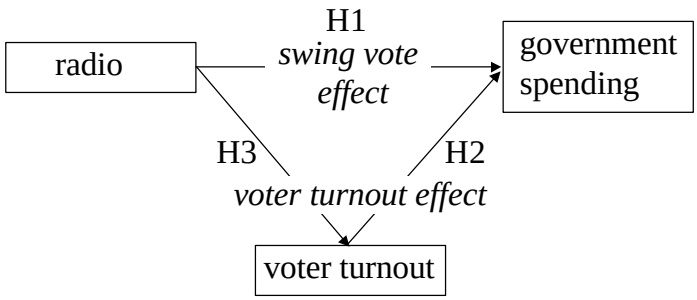

Figure 1.1:

among low-education and low-income groups[4], and among African Americans[5], perhaps making way for more favorable policies toward these groups in the 1960s. Looking forward, new innovations, like the internet and global satellite transmissions, could again change government spending in a way that is predictable given the characteristics of these media.

Before proceeding to describe the empirical work, it is important to carefully specify the ways in which information from the mass media may a¤ect government spending. This is done in section 2, which develops a model based on Strömberg (1998). In this model, information from radio is of importance both directly, through a swing vote e¤ect, and indirectly via a voter turnout e¤ect, see Figure 1.1. The swing vote e¤ect arises because politicians use mass media to convey campaign promises to the electorate. The idea can be illustrated by an example. If a politician in the early 1920s would have promised to start a farm-subsidy program, the return in the form of rural votes might have been meagre. The reason is that many of the concerned people living in rural areas did not have a daily newspaper and would not have been aware of this promise. Ten years later, this politician could go on radio and make this promise directly to an increasing number of these voters. Thus the introduction of radio could have increased the political bene…ts from making these promises considerably. In general terms, politicians have stronger incentives to promise favorable policies to groups where many use mass media since a larger share of the voters in these groups will be aware of the promises and be able to respond to them.

A swing vote e¤ect may also arise if voters judge politicians by their past

[4] Bogart (1956).
[5] McCombs (1968).

performance in office, since radio provides information about who is responsible for making cuts or increases in government programs. Continuing the previous example, a farm-subsidy program in the early 1920s might have been politically inefficient, since many of the people living in rural areas would not have known what particular politician to give credit for the program. Ten years later, a politician could go on radio and tell an increasing number of these voters directly that the credit was his or hers. This, of course increased the incentive to launch such programs. In general terms, people who use mass media are better informed about who is responsible for government policies and can better hold politicians accountable. Therefore politicians should provide more favorable policies to these voters.

The reason for the voter turnout effect is straightforward. Although a politician may increase voter sympathies by promising favorable policies to some group, this will do the vote-seeking politician no good unless these more sympathetic voters actually turn out to vote. Therefore, politicians have stronger incentives to promise favorable policies to groups with a higher voter turnout. Studies of the determinants of voter turnout typically find that political knowledge is important[6]. Studies of the determinants of political knowledge, in turn, often find that media exposure, education, income, race, age, and gender are important[7]. Putting these facts together, the vote-seeking politicians should spend more money in areas with a large number of highly educated, rich, white, elderly, males who read newspapers and listen to radio broadcasts. In these communities, people are more likely to vote, and more likely to change their votes if the politician promises higher spending.

Section 2 concludes by formulating the main hypotheses of the swing vote and voter turnout effects. These are illustrated in Figure 1.1. The first is hypothesis H1: politicians should allocate more government funds to areas where a larger share of the households have radios, everything else equal. The remaining two hy-

[6] Political knowledge is normally computed as an index based on replies to survey questions asking respondents to name political representatives and their stands on issues of the day, or questions about political institutional facts.

For example, Palfrey and Poole (1987) report a positive correlation between the amount of information a person had and her probability of voting in the 1980 presidential election. Delli Carpini and Keeter (1996, p. 224) find that in the 1988 American presidential election, "nearly nine out of ten of the most knowledgeable 10 percent of respondents voted. By comparison, among the least informed decile, only two in ten did so. In between, we observe a nearly monotonic increase in turnout as knowledge rises. "

[7] See Delli Carpini and Keeter (1996).

potheses are the building blocks of the voter turnout e¤ect. Hypothesis H2 states that politicians should allocate more funds to areas with higher voter turnout, and hypothesis H3 states that voter turnout should be higher where a larger share of the households have radios.

In section 3 hypotheses H1 and H2 are tested by examining whether the allocation of funds in a main New Deal program – the Federal Emergency Relief Act (FERA) – depended on the share of households with radios and on voter turnout. County level data comprising approximately 3000 observations is used. Hypothesis H3 about the e¤ect of radios on voter turnout is tested in a short panel consisting of county level data for the period 1920 ¡ 1940. The county level investigation of all three hypotheses is possible since the 1930 and 1940 Censuses collected county level data on the share of households with radios.

Before presenting the empirical results, there will be a short discussion of why it is reasonable to look for e¤ects from radio in the allocation of FERA funds. The FERA program was chosen because of its time of implementation, its size, and its novelty. If it is true that the expanding use of radios increased the political strength of certain groups or regions, then one should expect a new, major program to be designed to target these groups, to some extent. The program was implemented from 1933 to 1935. It distributed $3.6 billion, which can be compared with total – federal, state, and local – government expenditures which were around $12 billion at the time. The program funds were widely distributed, at their peak reaching around 16 percent of all Americans – more than 20 million people.

The FERA program was implemented in the middle of radio's expansion period, an ideal time for this type of study. At the beginning of the FERA-program in 1933, radio was established as an important mass medium. Already in 1930, NBC-Blue had started the …rst regular – …ve times a week – 15 minutes hard news broadcasting; an initiative soon followed by the other networks. In the 1932 presidential election, the two parties spent nearly $5 million on radio campaigns, with 25 percent going to national hookups. Radio covered politics both at the state and the federal level. For example, Roosevelt made radio addresses during his time as Governor of New York, and later, as President, used this medium in his series of "…reside chats" with the American public[8]. By 1937, 70 percent of the American public reportedly depended on the radio for their daily news[9]. Radio was also considered a credible media: 88 percent of the American public thought

[8] For a good discussion of the early history of radio, see Stirling and Kitross (1978).

[9] Gallup (1937).

that radio news commentators truthfully reported the news[10].

Still, in the early 1930s, radio ownership was very unevenly distributed across the United States. Receivers were concentrated in the North East, the Mid-Western cities, and in the Far West. Penetration ranged from 63 percent in New Jersey to 5 percent in Mississippi. This exceptional variation in radio use should make it easier to identify e¤ects of radio use on spending, since the variation in government spending due to radio e¤ects should also have been exceptionally large during this period.

The analysis focuses on the FERA allocations made by the governors to counties within their state. This is because the FERA was not a federal program, but a state and local program in which the federal government cooperated by making grants-in-aid. After a grant had been approved by the federal government to a state, the amount was forwarded to the Governor. The Governor, in turn, made money available to local relief administrations. The FERA provided basic rules concerning eligibility for relief, but state and local emergency relief administrations made the …nal decisions on who would receive relief and how much relief was to be given.

The empirical evidence presented in this paper suggests that governors in the 1930s allocated more FERA funds to counties where a larger share of the households had radios, controlling for income, wealth, unemployment, race, education, demographics, etcetera. The e¤ects are not only highly signi…cant statistically, but also economically important. The estimates imply that a one standard-deviation increase in the share of households with radios caused governors to increase spending to the county by 11 percent, on average. The data support both a swing vote and a voter turnout e¤ect.

Figure 1.2 summarizes the main empirical …ndings. The total e¤ect of an increase in the share of households with radios by one percentage point is an increase in state FERA-spending to the county by 0.62 percent. Of this total e¤ect, 0.55 percent is due to the swing vote e¤ect and the remaining 0.07 percent to the voter turnout e¤ect. The numbers in parenthesis are standard errors[11]. The swing vote e¤ect is substantially larger and the links of the voter turnout e¤ect have substantially larger p-values.

Another interesting …nding is that governors allocated less funds to counties

[10] Gallup (1939)

[11] The standard error on the e¤ect of voter turnout on government spending is a linear transformation of the estimated standard error of the coe¢cient estimate of the logarithm of voter turnout.

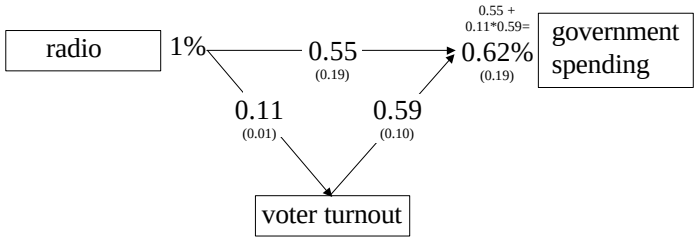

Figure 1.2:

with a large number of illiterates. For every percentage point increase in the illiteracy rate, governors appear to have cut spending by 2 percent on average. This …nding is highly statistically signi…cant, and also supports the notion that information a¤ects the incentives for vote-seeking politicians.

Finally, it should be pointed out that the above …ndings do not seem to be only a sign that FERA money went to rich counties, where many happened to have radios and few were illiterate. On the contrary, governors allocated less FERA funds to wealthy counties with high incomes, everything else equal. In fact, including income and wealth variables in the regression makes the estimate of the coe¢cient on radio more signi…cant. The reason is that radio is positively related to income and wealth, which are, in turn, negatively related to the need for relief funds. Excluding income and wealth from the regression introduces a downward bias in the estimate of the radio coe¢cient.

Section 4 discusses the federal allocation to states. Finally, section 5 discusses the results and concludes.

This paper is related to a number of empirical issues, each with its own literature. First, the examination of the political determinants of local public expenditures. For a review, see Rubinfeld (1987), and for a recent paper using a model similar to that in this paper, see Case (1998). More closely, the paper relates to a literature on the determinants of New Deal spending; see the seminal work by Wright (1974), and also Wallis (1984), Wallis (1991), and Fleck (1994). Second, the paper is related to the literature on the political e¤ects of mass media; see Lazarsfeld, Berelson and Gaudet (1948), Patterson and McClure (1976), Page, Shapiro and Dempsey (1987), and Iyengar and Kinder (1991). This literature has chie‡y been concerned with the e¤ects of mass media on the public's perception of issue salience, on their political knowledge, and on the approval ratings of politicians. Third the paper is related to the vast empirical literature on the

determinants of voter turnout; see for example Ashenfelter and Kelley (1975), Nie, Verba, and Petrocik (1976), Wol…nger and Rosenstone (1980), and Teixeira (1992).

2. Model

In this section, a model of political competition at the state level is developed. This model produces the hypotheses that will be tested in section 3.2.

In each state s, the following sequence of events takes place. First, two gubernatorial candidates simultaneously announce their election platforms. Then, some voters are informed of the candidates' platforms by mass media or other sources. The voters then choose whether to vote and, if so, for whom. Finally, the winning candidate implements his platform.

The two gubernatorial candidates are indexed by r and d. State s has a population of n_s inhabitants indexed by i. This population is lives in C_s counties, indexed by c: Each county c has n_c inhabitants, and $\sum n_c = n_s$. The gubernatorial candidates' election platforms specify how much per capita spending z_c they promise to give to every county c in the state. These promises must be consistent with the budget constraint $\sum_{c=1}^{C_s} n_c z_c \cdot I_s$; where I_s is a …xed state budget. Let z_c^d and z_c^r denote the per capita spending that candidates d and r respectively promise to give to county c. Each individual i in county c derives utility $u_i(z_c)$ from per capita spending z_c in his county. As in Lindbeck and Weibull (1987), individuals also care about other …xed policies or personal characteristics of the candidates. These preferences are captured by the individual preference parameters d_i and r_i. The utility from the platform of the Democratic candidate is $u_i\ z_c^d\ + d_i$ and the utility from the platform of the Republican candidate is $u_i(z_c^r) + r_i$. The inhabitants in the state choose whether to vote for candidate r, candidate d, or abstain from voting.

2.1. Voter turnout

The objective of this section is to discuss a set of assumptions that su¢ce to make radio use a¤ect voter turnout within a rational voter framework. In this framework, voters will turn out to vote if their net bene…ts from doing so are positive. Let the net bene…t from voting for individual i be B_i.

Assumption A1: B_i is higher for individuals who know the candidates' election platforms.

The interpretation of this assumption depends on how one interprets B_i. If one believes that the main bene…t people get from voting is the satisfaction of performing a citizen duty[12], then the interpretation is that the value of performing this duty is higher for voters who knows what the candidates' platforms are. In other words, the citizen duty of voting is the duty to make an informed choice in the election.

If one believes that the main bene…t of voting is that one may change the outcome of the election, then information about the candidates' platforms is necessary to make the right choice in case ones vote is decisive. Since the bene…ts of voting are higher the more likely it is that one makes the right choice, the bene…t from voting is higher for better informed voters; see Matsusaka (1993), and Feddersen and Pesendorfer (1997).

An implication of assumption A1 is that better informed voters would vote more frequently, since voting is more valuable to them. This implication is supported by micro-level studies by Palfrey and Poole (1987) and Delli Carpini and Keeter (1996).

Aggregated to the county level, this implies that turnout will be higher in counties where a larger share of the population are informed about candidate platforms. Let t_c be the share of citizens in county c who vote. Let $¾_c$ be the share of citizens in county c who knows the candidates' platforms. Given assumption A1, t_c is weakly increasing in $¾_c$: The next step is to connect $¾_c$ to radio use.

Assumption A2: The share, $¾_c$, of the population who are informed about the candidates' platforms is increasing in the share, r_c; of the population that has a radio:

The empirical literature supports the hypothesis that reading newspapers and listening to radio news increases the knowledge of the candidates[13]. If a larger number of people listen to radio news in areas where there are more households with radios, then this result supports Assumption A2.

Taken together, assumptions A1 and A2 lead to the conclusion that turnout is increasing in the share of households with radios. In addition, turnout depends on other variables related to the costs and bene…ts of voting which will be speci…ed in the empirical section. These variables are collected in the matrix X_2 below. The equation that is estimated in the empirical section is of the form

$$t_c = b_1 r_c + X_2 \bar{} _2 + "_2: \tag{2.1}$$

[12] Riker and Ordeshook (1968)

[13] See for example Delli Carpini and Keeter (1996, p.144)

Hypothesis H3 states that the coefficient b_1 in the above equation is positive. This hypothesis will be tested below.

2.2. The gubernatorial candidates' problem

An individual in county c casts his ballot for the Democratic gubernatorial candidate if he turns out to vote, and if

$$\phi u_i^e = E\left[u_i\left(z_c^d\right) - u_i\left(z_c^r\right)\right] > r_i - d_i:$$

Some voters are informed about what the candidates' have promised their counties: z_c^d and z_c^r. For this subset, $\phi u_i^e = \phi u_i = u_i\left(z_c^d\right) - u_i\left(z_c^r\right)$: The remainder of the electorate base their expectation on their knowledge of the equilibrium allocation. For these voters, $\phi u_i^e = \overline{\phi u_i}$; that is, a constant that is independent of any promises the candidates might make during the election campaign: The candidates assign probability distribution F_i to the difference $r_i - d_i$: They further assign a probability t_i that individual i will vote and a probability γ_i that he will learn about their campaign promises. From the candidates' points of view, turnout is fixed – it does not depend on variables they can control[14]. The probability that individual i will vote for the Democratic candidate is $t_i F_i(\phi u_i^e)$, and the expected total votes of the Democratic candidate equals $\sum_{i \in s} t_i F_i(\phi u_i^e)$:

The candidates maximize expected votes. For example, the Democratic candidate in state s solves

$$\max_{z_c^d} \sum_{i \in s} t_i \gamma_i F_i[\phi u_i] + t_i(1-\gamma_i) F_i\left[\overline{\phi u_i}\right]; \tag{2.2}$$

subject to the budget constraint

$$\sum_{c=1}^{C_s} n_c z_c = I_s:$$

The unique solution to this problem is found by evaluating the first order condition of the above maximization problem at the point where both candidates choose

[14] Turnout does depend on whether the voters hear the election promise or not, but to simplify the exposition, this is not explicit in the notation.

the same allocation, $z_c^d = z_c^r$[15]:

$$\sum_{i2c} \pi_i t_i f_i(0) u_i'\left(z_c^d\right) = n_c \lambda_s; \tag{2.3}$$

and applying the budget constraint

$$\sum_{c=1}^{C} n_c z_c = I_s:$$

Equation (2.3) contains all the model's insights about how a politician should allocate government funds. The expected gains from slightly increasing the allocation to county c are on the left hand side, while the costs; which are proportional to the number of people in the county, are on the right hand side. In equilibrium, the politicians equate the number of votes they get per dollar over all counties to λ_s. If the number of votes per dollar were not equalized in equilibrium, then the politician could gain votes by moving funds to counties where votes are cheaper.

To understand the equilibrium allocation, study the left-hand side of equation (2.3). When a candidate promises a county marginally higher spending, the probability that a voter i will change his vote in favor of this candidate is proportional to the probability that the voter will hear this election promise, π_i; that he will turn out to vote, t_i; and be sufficiently close to indifferent, $f_i(0)$; between voting for d or r to change his vote given his valuation of the extra money, $u_i'(z_c^d)$. If a politician promised the same allocation to all counties, then more votes would be gained on the margin in counties where π_i; t_i; and $f_i(0)$; on average, are high. Therefore, votes would be cheaper in these counties. Realizing this, the politicians would increase the allocation to these counties, thereby pushing up the price of votes since $u_i'(z_c)$ is decreasing in z_c: In equilibrium, counties where π_i; t_i; and $f_i(0)$; on average, are high will receive more funds.

More money will also be given to counties where people are more easily persuaded to change their votes in response to more generous campaign promises. That is, where $u_i'(z_c)$ on average is higher for any given level of z_c: This could, for example, be because that the extra FERA-money was more valuable to poor unemployed voters than to well-off voters. In the model, these differences are captured by individual-specific utility functions. The functional form $u_i(z_c) =$

[15] In the appendix, the same equations are generated as the equilbrium of a game with backward looking voters. See Lindbeck and Weibull (1987) or Strömberg (1998), for a more complete discussion of this type of equilibrium. Strömberg (1998) also contains a more detailed analysis of the underlying uncertainty for the voters.

$k - \frac{a_i}{\frac{1}{\alpha} - 1}(z_c)^{-\frac{1}{\alpha}+1}$ is used. This allows the parameter a_i to capture individual sensitivity, and the parameter α to capture a common sensitivity to spending within the program. For the utility function to be concave, a_i is assumed to be positive and α to lie in the open interval between 0 and 1. Inserting this functional form in equation (2:3) and using the budget constraint yields

$$z_c = \frac{w_c^{\alpha}}{\frac{1}{n_s}\sum_{i \in s} w_i^{\alpha}} z_s; \tag{2.4}$$

where z_s is spending per capita in the state, and w_c is de…ned as

$$w_c = \gamma_c t_c a_c f_c(0)^{\rho_c}$$

$$\rho_c = \frac{1}{n_c}\sum_{i \in c} \frac{\gamma_i}{\gamma_c}\frac{t_i}{t_c}\frac{a_i}{a_c}\frac{f_i(0)}{f_c(0)};$$

where γ_c; t_c; $f_c(0)$; and a_c denote county averages.

The variable w_c measures how successful a county is in attracting government funds. Counties with higher w_c^{α} than the state average will receive a larger than average share of the budget. Therefore spending to a county is increasing in γ_c; t_c; $f_c(0)$; and a_c, as well as in the interaction term, ρ_c. The latter implies that if two counties are identical in every other aspect, then more money should be given to counties where exactly those people within the county who are sensitive to spending also have high voter turnout, are close to being indi¤erent between the candidates, and are likely to hear the election promises.

Taking logs

$$\ln z_c = \alpha \ln \gamma_c + \alpha \ln \left(\frac{t_c}{t_s}\right) + \alpha \ln a_c + \alpha \ln f_c(0) + \tag{2.5}$$

$$\alpha \ln \rho_c - \ln \left(\sum_c \frac{n_c}{n_s}\frac{w_c^{\alpha}}{t_s^{\alpha}}\right) + \ln z_s: \tag{2.6}$$

The empirical investigation will be based on this equation and equation (2.1), determining voter turnout.

The above equation contains the two remaining central empirical hypotheses. First, the coe¢cient α on the voter turnout variable is positive. This is a more precise formulation of hypothesis H2: politicians should spend more money per capita in counties where a larger share of the population votes. Second, by assumption A2; γ_c is increasing in r_c. Therefore the share of households with radios,

r_c; has a positive e¤ect on relief spending which is independent of the e¤ect via voter turnout. This is a more precise formulation of hypothesis H1: politicians should spend more money in areas where a large share of the population has a radio.

3. Data and econometric issues

This section contains a discussion of which empirical variables should be used in the estimations, a discussion of the structure of the econometric problem and the assumptions behind it, the estimation, and a discussion of potential econometric di¢culties and some measures to avoid these.

3.1. Speci…cation

Which empirical variables will be used in the estimation of equation (2.5)? Per capita spending within the FERA-program will be used for the variables z_c and z_s, and voter turnout in the gubernatorial elections will be used for t_c and t_s.

The share of the voters who knows the candidates election platforms, $¾_c$; is potentially observable and measurable. Recent studies use survey data to investigate what share of the population is aware of di¤erent political facts. However, there are no such data from the 1930s. Instead, some variables that recent studies have found to be important determinants of political knowledge will be used to capture e¤ects through $¾_c$, namely use of radio and education (see the discussion of assumption A2 for empirical support for the e¤ect of radio on $¾_c$). The illiteracy rate among people aged above 10, and the school enrollment rate of people aged 7-18 is used to measure education. The variable $¾_c$ is assumed to be a function of the form

$$\ln ¾_c = ·_1 r_c ¡ ·_2 \text{illiteracy}_c + ·_3 \text{school enrollment}_c + "_{¾c}, \qquad (3.1)$$

where $·_1$; $·_2$ and $·_3$ are positive constants.

The average sensitivity to spending, a_c, needs to be proxied. To determine what variables the politicians of the time believed to be important for the sensitivity to program funds a_c, a recommendation of the FERA is used. In this recommendation, local relief agencies were advised to subtract the income of a family from a minimum subsistence budget to compute the transfer to which each family was eligible.[16] Therefore, a measure of a_c should include income, wealth,

[16] See 'Final Report On the WPA Program, 1935-43', p3.

and some cost of living measure. An alternative way to discuss di¤erences in sensitivity to spending would be to assume that all individuals have the same utility function, but di¤erent endowments prior to the government transfer. This would lead to similar predictions: the sensitivity to additional government transfers would be decreasing in income and wealth.

I have found no direct measures of income and wealth at the county level. Instead, variables which are arguably highly correlated with income and wealth are used. The average wage in the retail sector[17] and the per capita value of all crops harvested are used because they are assumed to be highly correlated with income in urban and rural areas respectively. Similarly, bank deposits, the median value of owner-occupied dwelling units, and the per capita value of farm buildings are used because they are assumed to be correlated with wealth, and the median monthly rent is used because of it may be correlated with the cost of living. Not only average income, but also the distribution of income may be important. Therefore, the share of the population that was unemployed in 1930 and in 1937 are included. Apart from the unemployed, special groups such as 'the aged, mothers with dependent children, youths' are enumerated in the recommendation by FERA as groups of needy persons. The share of the population under 21, and the share of the population over 65, is used for measuring the share of youths and dependents. The share of African Americans and the share of immigrants may be correlated with need aspects not captured by the other variables, and these variables are also included. Summing up, the variable a_c is assumed to be a function of the following form:

$$\begin{aligned} \ln a_c = {} & k_1 \text{unemployment}_c - k_2 \text{income}_c - k_3 \text{wealth}_c + k_3 \text{cost of living}_c \\ & - k_5 \text{age21}^+_c + k_6 \text{age65}^+_c + k_7 \text{African American}_c + k_8 \text{immigrant}_c + \varepsilon_{ac}; \end{aligned} \tag{3.2}$$

where $k_1; k_2; :::; k_8$ are positive constants.

Finally, to measure the relative number of marginal voters, $f_c(:)$, the di¤erence between the county and the state vote shares of the winning candidate is used.[18] Since there is no individual-speci…c data, the within-county interaction term, $\frac{1}{2}_c$,

[17] The simple correlation between the average wage in the retail sector and per capita personal income at the state level, where income data exist, is 0.8. The reason that the average wage in manufacturing is not used is that there are many observations missing from this series.

[18] This speci…cation is derived from a model where politiciancs maximize the probability of winning the election, see the appendix. The speci…cation was used due to a better …t with the data. $f_c(:)$ will be decreasing in this measure if $f_c(:)$ is symmetric and unimodal. This assumption is rather strong, since we have no a priori reason to believe that this distribution has any particular form.

can not be measured and is part of the county-speci…c error. Finally, a number of control variables will be included in the regression: the share of the population that is urban, population density, and population size.

The next step is to specify what variables to include in the regression on voter turnout, equation (2.1). To make a long story short: all of the variables that a¤ect relief spending should be included because they may also a¤ect voter turnout. The closeness of the election, the size of the population, and the distance in percent from equal county vote shares of the two main competitors in the election are included because they may a¤ect the bene…t of voting. The other variables are included since they may a¤ect the cost of voting. The share of the population over 21, and immigration are included because of age and residence requirements for voting. The urban share of the population, population density, and unemployment, are included due to potential di¤erences in the cost of going to the election booth. The last is included since the opportunity cost of unemployed may di¤er from that of employed. The share of African Americans is included because of disenfranchising of this group in the South.[19] Di¤erent measures of education are included since more highly educated people may have lower costs of gathering information, and the share of the population over 65 are included since older people have a stock of political knowledge. Finally, the measures of income and wealth presented above are included as control variables.

Except for voter turnout in equation (2.5), theory says nothing about which functional forms should be used. The simplest linear form is chosen. To simplify the interpretation of the coe¢cients, all variables which are not shares are in logs. Thus, one may interpret all coe¢cients as the percentage response of the dependent variable to a percentage change in the independent variable.

Summary statistics and the correlation matrix of the variables are shown in tables 1 and 2. Per capita spending within the FERA program, z_c; was obtained from the …nal statistical report of this program.[20] Per capita bene…ts from the FERA-program at the county level ranged from 12 cents to $165, with a mean of $20 and a variance of $15. The share of the households in the county with a radio receiver was collected by the 1930 Census and reported at the county level. Regionally, receivers were concentrated in the North East, the Mid-Western cities, and in the Far West. At the county level, penetration ranged from 0.6 percent to 78 percent. The mean of this variable is 26 percent and one standard deviation is

[19] See Wol…nger and Rosenstone (1980), and Ashenfelter and Kelley (1975).

[20] Source: Work Projects Administration, Final Statistical Report of the Federal Emergency Relief Administration, Washington: U.S. Government Printing O¢ce, 1942.

18 percent.[21] The simple correlation between per capita relief spending and the share of households with radios is 0.29, similar to the simple correlation between per capita relief spending and voter turnout, which is 0.31. Voter turnout in both gubernatorial is strongly correlated with the share of households with radios; the correlation is 0.64.

3.2. Results

This section contains a discussion of the structure of the econometric problem and the assumptions behind it, the estimation, and a discussion of potential econometric difficulties and some measures to avoid these.

To clarify the structure of the econometric problem, the equations determining per capita spending z_c, and the share of the population that votes in the gubernatorial election, t_c; are rewritten as follows:

$$\ln(z_c) = c_1 r_c + c_2 \ln\left(\frac{t_c}{t_s}\right) + X_{c1}\bar{}_1 + \varepsilon_{c1}; \tag{3.3}$$

$$t_c = b_1 r_c + X_{c2}\bar{}_2 + \varepsilon_{c2}: \tag{3.4}$$

The first equation is equation (2:5); where γ_c and a_c have been substituted out using equations (3.1) and (3.2). The second is equation (2:1): Matrices X_1; and X_2 contain the exogenous variables discussed above. It is implicitly assumed in the structure of the equations, that the voter turnout in 1933-36 is not directly affected by spending within the program. If the errors in the above equations are uncorrelated, then the recursive system may be consistently estimated using equation by equation OLS.

3.2.1. Spending

Let us first turn to the estimation of equation (3.3), determining voter turnout. Theory predicts that

$$c_1 > 0; c_2 \in (0; 1):$$

The coefficient c_1 is approximately the percentage increase in per capita spending due to a one-percent increase in the share of households with radios[22]. The coef-

[21] Bureau of the Census, Census of the Population, 1930.

[22] Although there is no formal limit to the size of c_1, it is reasonable to expect that it should be lower than 3:5. To see why, consider the extreme case where those and only those with radios receive money from the program. An increase from the average of 27 percent to 28 percent of

…cient c_2 corresponds to parameter ® in the utility function, which is restricted to lie in the open interval between 0 and 1.

The results are reported in Table 1. With state speci…c intercepts, the estimate of c_1 is 0:55, and the estimate of c_2 is 0:18; see regression I. Both coe¢cients are signi…cant at the one percent level.

What are the most likely sources of bias in this estimation? First, there may be a simultaneity problem in the estimation of equation (3.3). Spending within the FERA program may have increased voter turnout 1933-36. This would cause voter turnout to be positively correlated with "$_1$ and the coe¢cient estimate of c_2 to be positively biased. To avoid this potential bias, voter turnout 1933-36 is instrumented by voter turnout prior to 1932, and vote shares 1933-36 are instrumented by vote shares prior to 1932. This produces small changes; see regression II.

Another possible problem is that the model may not describe the situation very well in states with lop-sided elections. In these states, allocating the budget in order to win the election may be of small importance in comparison to other aspects not treated in this paper. If states with winning margins of more than 30 percent are excluded, namely the Southern states and Washington, the measured e¤ects become somewhat stronger. In this subsample of about 2000 observations, the estimate of c_1 is 0:72, and the estimate of c_2 is 0:43; see regression III in the same table. Both coe¢cients remain highly signi…cant. Replacing the state speci…c intercepts by the log state per capita budget, increases the estimates of c_1 and c_2; see regressions V and VI. As previously, c_2 is signi…cantly larger in the subsample where the South and Washington are excluded.

Finally, there may be problems due to measurement errors in equation (3.3). In particular, income and wealth are negatively related to the need for relief spending, but also positively related to the share of households with a radio. If income and wealth are measured with error, then the estimate of c_1 will be negatively biased, and the estimated e¤ect of radios on spending will be lower than the actual e¤ect. To minimize this bias, it is important to try to reduce the measurement error in income and wealth.

Summing up, the coe¢cient estimates of c_1 lie in the region 0:55 ¡ 0:86 within the whole sample and in the range 0:72 ¡ 0:96 when the South and Washington are excluded. The estimates of c_2 lie in the range 0:18 ¡ 0:23 for the whole sample and in the range 0:33 ¡ 0:47 when the South and Washington are excluded. The

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the households having radios implies that spending increases proportionally, that is, an increase by 1=:28 = 3:5 percent.

estimates are signi…cant at the 1 percent level in all speci…cations, except for the estimate of c_2 in column IV, which is signi…cant at the 5 percent level. Therefore, hypothesis H1 about a direct e¤ect of radios on government spending, and hypothesis H2, that politicians should spend more in areas where voter turnout is high are not rejected by the data.

3.2.2. Voter turnout

Let us turn now to the estimation of equation (3.4), determining voter turnout. Theory predicts that $b_1 > 0$, and it is also reasonable to expect the coe¢cient to be smaller than 1. The coe¢cient b_1 measures the percentage change in votes per capita due to an increase of one percent in the share of households with radios.

The results are shown in Table 4. The estimates of b_1 fall within the predicted interval and are signi…cant, both with and without state-speci…c intercepts. The estimates imply that an increase in the share of households with radios of one percent will increase voter turnout by 0:24 percent in the regression without state-speci…c intercepts, and 0:08 in the regression with state-speci…c intercepts; see Table 4, regressions I and III. The results are similar when the Southern states and Washington are excluded from the sample.

In this estimation, there may be an important omitted variable bias. People in counties where many are interested in politics may be both more likely to have a radio and more likely to vote. To control for this and other county speci…c e¤ects, a county dummy variable is added to the regression, and panel data is used. The panel data set is used that contains most of the important explanatory variables at the county level in 1920, 1930, and 1940, and voter turnout in gubernatorial elections around 1920, 1930, and 1940.

The results are shown in Table 5. Election-year dummy-variables are included in the last four equations, but not in the …rst two. Looking at changes between 1920 and 1930, the …xed e¤ects estimate of b_1 is 0:11, and highly signi…cant, see column II. The estimate is virtually the same with election year dummy variables, see column V. The …xed e¤ects estimates are relatively stable over time, as can be seen in the other columns of Table 5.

In this larger sample, one may also estimate b_1 based on both time-series and cross-sectional variance. The estimates of the pooled regressions on turnout in the gubernatorial elections are shown in Table 6. The estimates of b_1 are 0:11, 0:16 and 0:8, without any dummy variables, with election-year dummy-variables, and with state dummy-variables, respectively.

However, the most relevant estimates of b_1 are those based on changes from 1920 to 1930. These lie in the interval 0:10 ¡ 0:11: As the other estimates, they are highly signi…cant. The hypothesis H3 that radio use increased voter turnout is not rejected by the data.

3.2.3. Reduced form regression

Another way of looking at the data is to study a reduced-form equation constructed as follows. Make a …rst order Taylor expansion of log turnout in equation (3.3). Then substitute out voter turnout using equation (3:4). The result is an equation of the form

$$\ln(z_c) = d_{0s} + d_1 r_c + X_c^{-} + "_{c3}:$$

This formulation avoids the simultaneity problem between relief spending and voter turnout, causing correlation between errors $"_1$ and $"_2$. An estimation of the above equation also provides a measure of the total e¤ect of radios, d_1. If the equations have been correctly speci…ed, this total e¤ect should be consistent with the sum of the previously estimated swing vote and voter turnout e¤ects:

$$d_1 = \frac{d\ln(z_c)}{dr_c} = \frac{@\ln(z_c)}{@r_c} + \frac{@\ln(z_c)}{@\ln(t_c)}\frac{@\ln(t_c)}{@t_c}\frac{dt_c}{dr} = c_1 + \frac{c_2}{t_c}b_1:$$

Evaluated at the mean of t_c, the sum of the estimated swing vote and voter turnout e¤ects is $0{:}552 + \frac{0:180}{0:31} ¤ 0{:}11 = 0{:}62$: The estimated value of the total e¤ect, d_1; is 0:61; see Table 2, regression I. This is clearly consistent with the earlier estimates. The estimate of d_1 is also signi…cantly di¤erent from zero. The estimated total e¤ect of an increase in the share of households with radios by one percent is an increase in FERA spending by 0:62 percent. The earlier estimates indicate that of this total e¤ect, 0:55 percent is due to the swing vote e¤ect and the remaining 0:07 percent to the voter turnout e¤ect. Similarly, estimates of d_1 when the South is excluded and when the state speci…c intercepts are replaced by the log per capita budget are also signi…cant, and consistent with earlier estimates of c_1 and c_2.

3.3. Discussion of other results

Some other results in the regression on relief spending deserve to be mentioned, see Table 1. Of the other variables related to political knowledge, illiteracy is always signi…cantly negatively related to FERA-spending. The school enrollment rate

among people aged 7-18 is always positively, and sometimes signi…cantly, related to FERA-spending. The less convincing result for the school enrollment rate variable may be due to the fact that it does not measure the stock of knowledge very well and due to the high correlation between schooling and illiteracy.

In the introduction, it was hypothesized that radio was particularly important in improving the information to rural listeners and illiterates; and that radio improved these groups ability to get favorable policies. To test this, the share of households with radios was interacted with a dummy variable for the 1419 counties with only rural households. The results indicate that the swing vote e¤ect was signi…cantly higher in rural counties; see Table 1, column VII and VIII. Radio's impact on turnout was also signi…cantly higher in rural counties than in urban counties; see Table 4, columns V and VI, and Table 5, column VI. The estimates imply that radio increased the ability of rural America to attract government transfers. In quantitative terms, radio is estimated to have increased the funds allocated to a rural county relative to an identical urban county by 20 percent.

The evidence is mixed concerning radio's e¤ect in counties with many illiterates. The swing vote e¤ect in the subsample of counties with a higher than median share of illiterates is not signi…cantly di¤erent from that in the remaining subsample. However, radio's impact on voter turnout is signi…cantly higher in the subsample of counties with many illiterates.

Of the variables related to need, a_c, the most important variable explaining FERA-spending is the share of the population that was unemployed. Bank deposits is signi…cantly negatively related to FERA-spending, as is the value of farm buildings. The retail wage and the median rent have the expected signs when signi…cant. However, crop value per capita is positively related to FERA-spending in two speci…cations. The share of the population over 21 is negatively and signi…cantly related to FERA-spending as expected.

Moreover, some results in the regression of voter turnout are worth mentioning. The estimated size of b_1 of about 0:1 implies that, on average, one out of every ten persons who got a radio started to vote because of the radio. The aggregate e¤ects of radio on voter turnout are far from negligible. In 1920, less than one percent of the population used radios. By 1940, around 80 percent of the households had radios. The estimate suggest that this would have led to an increase in votes per capita of around 8 percent. Between 1920 and 1940, votes per capita in the US increased by about 12 percent, from 25 to 37 percent, in both Gubernatorial and Presidential elections. According to the estimates, the increase would only have been one third as large without the radio. The estimations are based on

time-series variation using year dummy variables, so they are not merely picking up the time trend in both series.

The results are consistent with a model where the voter calculates the probability of being pivotal in the election. The winning margin, i.e. the closeness of the election, is negative and signi…cant in all speci…cations except in the …xed e¤ects regression over the time period 1920 ¡ 1930. Furthermore, the coe¢cient on the interaction term between radio and the closeness of the election is always negative and signi…cant. It thus seems that the e¤ect of radios on turnout is higher when the margin of the election is close. One explanation for these …ndings is that people are more likely to turn out to vote if they think that it is more likely that their vote will change the outcome of the election. In areas where many people have radios, a larger share of the voters would know when the election would be close, thus causing the interaction e¤ect. An alternative explanation is the following. As is shown by micro-studies, people who know the names and platforms of political candidates' are more likely to vote. Close elections are followed more extensively in the media. Therefore more people learn about names and platforms of the candidates in close elections, and this makes a larger number of people to vote. This e¤ect would, of course, be larger in areas where more people have radios, creating the interaction e¤ect.

4. Extension: Federal level

The purpose of this section explore whether radio use also a¤ected the federal allocation of grants to states. The section builds on Strömberg (1999) which extends the model presented in this paper to include a stage where presidential candidates allocate grants to the states, before the gubernatorial candidates allocate their given budget within the states. Gubernatorial candidates in this model care about winning a majority in the election, and the presidential candidates care about winning a majority in the electoral college. The resulting equation determining FERA-spending to county c in this model is a natural extension of equation (3.3) determining spending within states:

$$\ln(z_c) = c_0' \frac{r_c}{r_s} + c_2 \ln\left(\frac{t_c}{t_s}\right) + c_{12}' \frac{r_s}{r} + c_{22}' \ln\left(\frac{v_s/n_s}{v/n}\right) + X_3 \bar{\ }_3 + \text{":} \tag{4.1}$$

The predictions of the theory are:

$$c_1^0; c_{12}^0 > 0; c_2 = c_{22}^0 \; 2 \; (0; 1):$$

Allocation within states is a¤ected by the share of households in the county with radios, r_c, relative to the state mean, r_s, and per capita votes the gubernatorial elections in the county, t_c, relative to the state mean, t_s. The new feature is that federal spending to states is a¤ected by the share of households in the state with radios, relative to the national mean r. Federal spending to counties is also a¤ected by the number of electoral votes per capita, $v_s=n_s$, relative to the national average, v=n. The results are reported in Table 3.

The swing vote e¤ect of radios on federal spending – measured by c_{12}^0 – is both large and highly statistically signi…cant. The estimate implies that an increase in the state share of households with radios by one percentage point will increase federal spending by 0:53=0:4 = 1:3 percent, evaluated at the national average share of households with radios, 0:4. The estimated total e¤ect of radios on spending implies that a one standard-deviation increase in the state share of households with radios would increase per capita spending by 22 percent. The estimated impact of radios is thus larger at the federal level than at the state level. The e¤ects of the number of electoral votes per capita on federal spending are also signi…cant, although only at the …ve percent level when the southern states and Washington are excluded. Finally, it is important to note that radio may not a¤ect the federal allocation of grants indirectly via voter turnout. The presidential candidates care about the number of electoral votes per capita, which are based on population size and not a¤ected by radio use.

5. Conclusion and discussion

Mass media a¤ects politics because it carries politically relevant information to the voter: what have the candidates promised and who is responsible for cuts in government programs? This makes voters using mass media more likely to respond to campaign promises and to hold politicians accountable for cuts that hurt them. As a consequence, politicians should target voters using mass media. A second reason for politicians to target these voters is that they are more likely to turn out to vote. All in all, the political system creates incentives to spend more government money in areas where a larger share of the population use mass media.

The empirical evidence presented in this paper suggests that this was indeed the case in the US of the 1930s: governors allocated more relief funds to areas where a larger share of the population had radios. The e¤ects are not only highly statistically signi…cant, but also economically important. The estimates of this study imply that for every percentage point increase in the share of households with radios in a certain county, the governor would increase per-capita relief-spending by 0.6 percent. A one standard-deviation increase in the share of households with radios would increase spending by 11 percent, and a change from the lowest to the highest share of households with radios in the sample would increase spending by 48 percent.

The e¤ect of illiteracy is another piece of evidence suggesting that information creates strong incentives for politicians. The governors did allocate less relief funds to areas with a large share of illiterate people. Like the radio, illiteracy may hurt voters because illiterates are less likely to be informed about campaign promises, and about who is responsible for cuts in the programs they are using. But illiteracy also indirectly hurts voters because illiterates vote less frequently than other people. The e¤ects of illiteracy are highly signi…cant and considerable. For every percentage point increase in the illiteracy rate, governors cut spending by 2 percent, on average.

The above …ndings point to the need for an information-augmented theory of the growth of government. In Meltzer and Richard's (1978, 1981, 1983) classical theory, the enlargement of the voter franchise to the poorer segments of the population leads to increased redistribution towards the poor.[23] The …ndings in this paper support the idea that groups with a high voter turnout are more successful in attracting redistributive spending. However, this paper also …nds that people without a radio, and people who were illiterate, were less successful in attracting redistributive spending, over and above the e¤ect via voter turnout. This implies that although allowing the poor the right to vote is important, it does not grant them equal political power. If politicians understand that the poor do not know who is promising them more welfare, they will promise only little. If politicians understand that the poor do not know who is responsible for the cuts in welfare, they may cut welfare without risking votes. Given the estimated e¤ects of radio use and illiteracy compared to voter turnout, the role of information in elections may be as important for explaining the growth of government as the expansion of the voting franchise.

Radio also seems to have improved the relative ability of rural America to

[23] For a recent test of this hypothesis, see Husted and Kenny (1997).

attract government transfers. It is reasonable to expect radio to have a particularly large e¤ect in rural areas. If, for example, a politician in the early 1920s had promised to start a farm subsidy program, the return in the form of rural votes might have been meagre. The reason is that many of the people concerned living in rural areas did not have a daily newspaper and would not have been aware of this promise. Ten years later, this politician could go on radio and make this promise directly to an increasing number of these rural voters. The estimated swing vote e¤ects and voter turnout e¤ects are indeed signi…cantly larger in rural areas. In total, radio is estimated to have increased the funds allocated to a rural county relative to an identical urban county by 20 percent.

Another topic deserving discussion is the apparent discrimination against African Americans in this program. In counties with a large share of African Americans, income was lower than average, and unemployment (in 1930) was higher than average. Still, the simple correlation between the share of African Americans and relief spending is negative. The reason is that these counties have characteristics that make them politically weak. First and foremost, illiteracy rates are high. In 1930, the illiteracy rate among African Americans was ten times that among white, native born, Americans: 16 percent compared to 1.6 percent. Second, the voter turnout rate is low and third, few households had radios in counties with many African Americans.

Interestingly, there is no remaining discrimination once illiteracy, voter turnout, and radio use have been accounted for. This suggests that to understand discrimination is to understand why these counties had a larger number of illiterates, fewer citizens who voted, and fewer households who used radios. It also suggests measures that would have alleviated this problem: providing people in these counties with better education, eliminating the discretionary use of eligibility rules that were allegedly used in the South[24], and giving them access to daily mass media.

Although the empirical results clearly show that radio and literacy are positively related to relief spending, the interpretation of the results are not obvious. The information received from radio could also have motivated people to take other political actions than voting, for example lobbying activities as in Lohmann (1994). It could also be the case that radio made people aware of government programs from which they were entitled to receive funds. Further research may make it possible to distinguish between these di¤erent ways of in‡uence.

[24] See Ashenfelter and Kelley, (1975).

6. References

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7. Appendix 1: A simple model of retrospective voting

This model illustrates how information via mass media might matter if voters judge politicians on basis of past performance. The idea is that mass media inform the public about which politician is responsible for making a cut or increasing spending in government programs. Therefore voters who use mass media are more likely to connect a program they care about with a political office, and to hold politicians accountable for making cuts or increases in these programs. This increases the politicians' incentives to target these voters. The importance of voters making the connection between programs and offices has been discussed at length by Popkin (1991). This model draws out the implications of the reasoning of Popkin (1991) with regard to the allocation of government funds and mass media.

Without loss of generality, assume that the incumbent governor is a Democrat, indexed by d, competing for votes with an unknown Republican challenger, indexed by r in state s by deciding how large a share of the state budget, I_s, will be allocated to each county in the state. There are C_s counties, indexed by c. Let z_c be per capita relief spending, and n_c denote the number of inhabitants of county c, with $\sum n_c = n_s$; the number of inhabitants in the state. The budget constraint is $\sum n_c z_c = I_s$:

The incumbent allocates the budget and the voters learn the allocation from experience. Some voters learn that the allocation of z_c is the responsibility of the governor, from mass media or from other sources. The voters choose whether to vote and, if so, for whom.

Each voter i in county c derives utility $u_i(z_c)$ from per capita spending z_c in his county: Individuals also care about other policies where Democrats and Republicans have fixed positions. These preferences are captured by the individual preference parameters d_i and r_i. The utility from the platform of the incumbent governor is $u_i(z_c^d) + d_i$. Some voters know that the governor is responsible for the allocation of z_c^d, others do not. Let the variable $\mu_i = 1$ if the voter knows that the governor is responsible for this allocation and $\mu_i = 0$ otherwise. Voter i follows the voting rule to cast his ballot for the incumbent, if his utility was higher under incumbent d than some exogenous reservation utility $\bar{u}_i$:

$$\mu_i \cdot u_i = \mu_i \left[u_i(z_c^d) - \bar{u}_i \right] \geq r_i - d_i:$$

and for candidate r otherwise.

For individual i; the governor assigns a probability distribution F_i to the difference $r_i - d_i$; a probability t_i that the voter will vote, and a probability γ_i that the voter knows that the governor is responsible for the spending level z_c. From the governor's points of view, turnout is …xed – it does not depend on variables that he can control[25]. The probability that individual i will vote for the incumbent is $t_i F_i(\alpha_i \cdot u_i)$, and the expected total votes of the incumbent equals $\sum_{i2s} t_i \gamma_i F_i(\cdot u_i) + t_i (1 - \gamma_i) F_i(0)$:

The candidates maximize expected votes

$$\max_{z_c^d} \sum_{i2s} t_i \gamma_i F_i(\cdot u_i) + t_i (1 - \gamma_i) F_i(0); \tag{7.1}$$

subject to the budget constraint

$$\sum n_c z_c = I_s:$$

If the governor increases spending marginally, only those informed about the fact that the governor is responsible for this increase will change their votes in response. The allocation is determined by the …rst-order condition to the governors' problem:

$$\sum_{i2c} \gamma_i t_i f_i(\cdot u_i) u_i' \left(z_c^{d\alpha}\right)' = n_c \lambda_s \tag{7.2}$$

and the budget constraint

$$\sum n_c z_c = I_s:$$

The equilibrium has the same form as equation (2.3), the only di¤erence is that f_i is evaluated at $\cdot u_i$ instead of at zero. This has the empirical implication that $f_i(\cdot u_i)$ will depend on the dependent variable z_c and should be instrumented. Apart from this, the empirical speci…cation is the same. Relief spending will be increasing in the share of voters who knows that the governor is responsible for relief spending, γ_c, in the share who turns out to vote t_c; and in the likelihood that the voter is close to indi¤erent between the candidates, $f_i(\cdot u_i)$, and in the marginal sensitivity to more funds, $u_i'\left(z_c^{d\alpha}\right)$.

Unlike the model in section 2, equilibrium spending may now a¤ect vote shares. Whether equilibrium spending a¤ect vote share depends on the speci…cation of u_i: First, assume that voter i follows the voting rule to cast his ballot for the incumbent, if his utility was higher under incumbent d than the utility the voter expected, had r been in o¢ce: The only rational expectations equilibrium in

[25] This is a more problematic assumption in this formulation of the model.

this case is that both candidates choose the same allocation when in o¢ce, and that ¢u_i = 0: The equilibrium equation is then exactly the same as equation (2:3); characterizing allocation in the model of section 2. In this formulation, spending has no equilibrium e¤ect on votes. The reason is that politically powerful counties expect to receive high transfers. They do not particularly award an incumbent for high levels of bene…ts, since they realize that the political incentives would force any incumbent to be equally generous to the county. Any other speci…cation π_i yields equilibrium e¤ects on aggregate vote shares. For example, suppose that the voter uses the simple rule $\pi_i = u_i(z_{c;t\,i\,1})$: That is, the voter's performance benchmark is spending during the previous election period. In this case, an increase in the level of spending will have a positive e¤ect on votes. This formulation is consistent with the …ndings of Levitt and Snyder (1997), that incumbents spending more than the time-series average in an electoral district will gain votes.

8. Appendix 2: Data description

The sources of data are the following. County data on families with radios was collected from the 1930 and 1940 US Censuses. County data on spending within the FERA program was collected from the Work Projects Administration, Final Statistical Report of the Federal Emergency Relief Administration, Washington: US. Government Printing O¢ce, 1942). County data on voter turnout in gubernatorial[26] and presidential[27] elections was collected from the ICPSR archives. Other variables have been collected from di¤erent US Censuses.

In some areas, voter turnout was higher than 100 percent of the population. This was true for St. Louis, Missouri, in gubernatorial elections, and for St. Louis, Missouri; Loving, Texas; and Baltimore, Maryland, in presidential elections. A plot suggested that these observations are outliers and they have been omitted. None of the results presented change when these observations are included in the regressions.

[26] Source: UNITED STATES HISTORICAL ELECTION RETURNS, 1824-1968, ICPSR #1.

[27] Clubb, Jerome M., William H. Flanigan, and Nancy H. Zingale. ELECTORAL DATA FOR COUNTIES IN THE UNITED STATES: PRESIDENTIAL AND CONGRESSIONAL RACES, 1840-1972 [Computer …le]. Compiled by Jerome M. Clubb, University of Michigan, William H. Flanigan, University of Minnesota, and Nancy H. Zingale, College of St. Thomas. ICPSR ed. Ann Arbor, MI: Inter-university Consortium for Political and Social Research [producer and distributor], 1986.