

The Pork Barrel as a Stopgap Measure: A Regression Analysis of Senate Elections December 2006

There is a tendency within any democratically administered country for the issue of special interests to arise. When the budget available to the government of that country is in excess of several trillion dollars, this issue is magnified considerably. To some, especially lobbying groups and their employers, this combination of special interests and money is seen as a boon. To others, however, it is a problem when large quantities of public money (“your money,” in the language of many watchdog groups) are sent to state and local interests that may pertain very little to the average citizen. In the United States Congress, the special interest issue is manifested in what is termed “pork barrel spending,” where congressmen seek to “bring home the bacon” for their constituents. The common assumption is that a senator participates in pork barrel politics in order to gain favor with constituents and raise his chances of future political and electoral success. This gives rise to the question of exactly how effective such pork barrel spending is.

The effects of pork barrel spending on elections is the area which I will seek to investigate in this paper, using regression analysis to examine the correlation between pork barrel spending and the electoral success of incumbent senators. Due to the complexity of elections, the full model I propose is a multivariable regression combining pork barrel spending with other predicting variables. In the end, pork barrel spending is revealed to have a negative correlation with success, which I will explain through the use of pork as a stopgap measure.

The U.S. Congress: An Incurable Spender

To understand the pork barrel and its implications, it is first necessary to have a clear definition of pork barrel spending. For the purposes of this paper, data was obtained from the watchdog group Citizens Against Government Waste. CAGW catalogs and investigates pork barrel spending in Congress, defining it as any spending that meets at least two of the following seven criteria¹:

1. Requested by only one chamber of Congress
2. Not specifically authorized
3. Not competitively awarded
4. Not requested by the President
5. Greatly exceeds the President’s budget request or the previous year’s funding
6. Not the subject of congressional hearings

¹ Citizens Against Government Waste, 2004, Citizens Against Government Waste, 9 December 2006
<<http://www.cagw.org>>.

7. Serves only a local or special interest

The total pork barrel spending during a year can reach astonishingly large amounts, as congressmen slip in clauses and conditions to bring money to their constituents. Table 1 displays descriptive statistics for the pork barrel spending found in the bills passed by Congress during 2004. As can be seen, the total pork barrel spending totaled over \$8 billion, with California taking the maximum and Wyoming the minimum. The average per state was a hefty \$177 million, enough to raise the question of the motives behind the money.

Mean	\$177,667,528
Median	\$138,880,500
Maximum (CA)	\$642,854,000
Minimum (WY)	\$16,573,000
Sum	\$8,883,376,413
Observations	50

It is important to remember that pork barrel spending is not necessarily an undesirable occurrence, simply a questionable one. Many pork projects are beneficial—improving emergency services, bringing in new health care systems, or funding useful and innovative research. In the end, the question is whether the money spent on the projects is efficiently allocated or arbitrarily allotted based on where a senator believes he can gain the most favor with interest groups and constituents.

The Components of an Election

Under the assumption that pork barrel spending is at least partly related to a desire for reelection, the model used for analysis in this paper regresses an indicator of electoral success against pork barrel spending and other predicting variables. As only incumbent senators can have participated in pork barrel spending in the past and the data for congressional spending was limited at the district level, the electoral margin of an incumbent senator running for reelection was chosen. Thus, the full model regressed the electoral margin against campaign expenditures, the years of incumbency of the senator, the percent of voters in the state who identified with the opposing party, the percent who identified with the candidate's party, and pork barrel spending in the state. Natural logs were used to minimize the standard error of the regression, resulting in the equation:

$$\ln(\text{Electoral Margin}) = \beta_0 + \beta_1 \ln(\text{Campaign Expenditures}) + \beta_2 \ln(\text{Years Incumbent}) + \beta_3 \ln(\text{Opponent Voters}) + \beta_4 \ln(\text{Party Voters}) + \beta_5 \ln(\text{Pork}) + \varepsilon$$

Each variable will be covered briefly below, where I will examine the reason for its inclusion as well as the origins, preparation, and use of the data.

For each Senate race included as a data point, the electoral margin was calculated by subtracting the percentage of votes won by a candidate's nearest opponent from the percentage won by the candidate. The electoral margin should be an indicator of the magnitude of the win, or loss, of the incumbent senator. This then allows for electoral success to be regressed against the independent variables to view possible correlations. Data for this variable was obtained from CNN's coverage of the 2002 and 2004 Senate elections.²

The first independent variable chosen was the dollar amount of campaign expenditures during the election campaign of the incumbent senator. Advertising, rallies, traveling, and other necessary parts of electoral campaigns require significant amounts of cash to accomplish. This money is provided by donations from businesses, Political Action Committees, and constituents, and by general fundraising. As this money is needed to run a campaign, the amount of expenditures should provide some indication of the probable success or failure of the candidate in the election race. For congressional elections, candidates are required to report campaign financial data, from which this variable was drawn.³ Some preparation of the data for this variable was required. Because campaign expenditures are dependent upon campaign income, the electorate, and potential voters, they will vary with the size of the state. To smooth out the resulting differences between states, the final variable used was campaign expenditures per person.⁴

The second independent variable was simply the senator's number of years of incumbency at the time of the election.⁵ Previous studies have shown that incumbency is a

² *CNN.com Election 2004*, 2004, Cable News Network, 29 November 2006 <<http://www.cnn.com/ELECTION/2004/>>.

CNN.com Election 2002, 2002, Cable News Network, 29 November 2006 <<http://www.cnn.com/ELECTION/2002/>>.

Consideration was given to the potential error due to taking data from more than one election. However, as senators serve for a term of six years, two consecutive elections should not create undesirable noise unless there is an exogenous shock on the system between those years that affects the other independent variables. To my knowledge, this did not occur between 2002 and 2004, and thus the data for the independent variables remained acceptably continuous.

³ *C-SPAN: Search Campaign Finance Data*, 2006, Cable, 29 November 2006 <<http://www.c-span.org/congress/campaignfinance.asp>>.

⁴ Population data was retrieved from the U.S. Census Bureau population estimates.

United States, Census Bureau, *Annual Population Estimates 2000 to 2004*, 2004, 4 December 2006. <<http://www.census.gov/popest/states/NST-ann-est2004.html>>.

⁵ United States, Congress, *Senators of the United States*, 2006, 6 December 2006 <<http://www.senate.gov/artandhistory/history/resources/pdf/chronlist.pdf>>.

significant factor in congressional elections and indicated that the trend may be increasing.⁶ Reasons for such correlation could range from the benefit of previous experience in running a congressional election campaign to the fact that voters prefer a known candidate and are willing to accept some dissatisfaction with the current senator rather than risk switching to an entirely unknown senator. These reasons would only tend to increase over the years, making the number of years a useful variable in the model.

The third and fourth independent variables are the percentage of voters in the state who identify with the opposing party and the candidate's party, respectively. Many voters in an election will default to choosing candidates along party lines. Therefore, the percentage of voters opposing and supporting a candidate's party are relevant as both will directly affect the percentage of the vote the candidate is able to obtain. In addition, using both variables implies a third variable: the percentage of voters who are independent or moderate.⁷ The data for these variables were drawn from the Voter News Service General Election Exit Polls for both the 2002 and 2004 elections.⁸

Finally, the fifth independent variable used is the pork barrel spending data obtained from CAGW.⁹ After sorting the data by state, the total pork barrel spending in each state was calculated for the election year and two years prior; these three years were then averaged to produce a single number for each state per election. Stein and Bickers note that the simple fact that a candidate acquired money for a special interest is often more important than the

⁶ Candice J. Nelson, "The Effect of Incumbency on Voting in Congressional Elections, 1964-1974," *Political Science Quarterly* 93 (1979).

⁷ There are of course other political parties in some states, but the size of the vote they command is almost invariably small and can be safely discarded as part of the error term.

⁸ Voter News Service, *Voter News Service General Election Exit Poll, 2002*, Computer file, New York, NY: Voter News Service, 2002, distributed by Ann Arbor, MI: Inter-university Consortium for Political and Social Research, 2003.

National Election Pool, Edison Media Research, and Mitosky International, *National Election Pool General Election Exit Polls, 2004*, Computer file, Somerville, NJ: Edison Media Research/New York, NY: Mitofsky International, 2004, distributed by Ann Arbor, MI: Inter-university Consortium for Political and Social Research, 2005.

As data was not available for every state from the 2002 election, the two years were averaged to produce the final data used for the variable. Thus states missing data from 2002 simply ended up with the data from 2004. This change in the data was done under the assumption that there would not be significant changes in a state's party composition between two consecutive elections. In addition, such averaging may serve to remove some of the noise inherent in survey data.

⁹ Citizens Against Government Waste, 2004, Citizens Against Government Waste, 9 December 2006 <<http://www.cagw.org>>.

amount acquired.¹⁰ Thus, averaging several years aims to reveal the propensity of a candidate to partake in pork barrel spending.

It might be noted that the amount of pork barrel spending is not divided by the population as were data the for campaign expenditures; this is due to the nature of pork barrel spending as a concentrated benefit. As noted by Tullock, Sheldon, and Brady, the United States has an abnormally large number of lobbyists seeking government money, but few groups opposing it; this is because the large benefits of pork barrel spending warrant advocating it, but the few cents lost by the average citizen do not provoke much of a reaction.¹¹ Since pork is almost always requested by interest groups rather than voters in general, the data is best used as a total spending per state rather than pork per person. It is probable that senators expect electoral assistance from these interest groups at the next election.

A quick summary of the descriptive statistics for the data is presented in Table 2. In addition, Appendix A contains the pork barrel spending data for all the states from 2000 to 2004, as it may be of interest to some readers of this paper.

	Electoral Margin	Campaign Expenditures per Person	Years Incumbent	Voters of Opposing Party	Voters of Candidate's Party	Total Pork
Mean	30	\$2.30	13	0.321	0.362	\$173,819,417
Median	28	\$1.45	11	0.322	0.369	\$132,045,520
Maximum	98	\$25.94	41	0.497	0.540	\$634,484,642
Minimum	-8	\$0.23	1	0.145	0.228	\$8,453,306
Sum	n/a	n/a	n/a	n/a	n/a	\$9,212,429,127
Observations	53	53	53	53	53	53

Of the five independent variables, all but voters of the opposing party were initially expected to have a positive correlation with an incumbent's electoral margin, for reasons covered with each variable. The variable for voters of the opposing party was, logically, expected to be negatively correlated. However, not all the coefficients came out as expected, as I present in the next section.

¹⁰ Robert M. Stein and Kenneth N. Bickers, "Congressional Elections and the Pork Barrel," *The Journal of Politics* 56 (1994) 19.

¹¹ Gordon Tullock, Arthur Seldon, and Gordon L. Brady, *Government Failure: A Primer in Public Choice*, Washington, D.C.: CATO Institute, 2002, 38-41.

Expectations and Regressions

Table 3 presents the regression results obtained from the data; each variable was regressed independently, and then all the variables were run in a multivariable regression shown at the far right. The coefficients for years of incumbency, voters of the opposing party, and voters of the candidate's party are all as expected; the t-statistics on years of incumbency and voters of the candidate's party are within the five percent level of significance and voters of the opposite party is within the ten percent level. However, campaign expenditures resulted in a highly significant negative coefficient and pork barrel spending yielded an insignificant negative result. Both of these unexpected negative coefficients will be analyzed in the following section.

Variable	Regression Coefficient (t-statistic)					
Intercept	3.35 (26.51)	2.15 (4.95)	1.89 (3.18)	4.64 (7.54)	5.36 (1.85)	5.27 (2.07)
Campaign Expenditures per Person	-0.50 (-3.39)					-0.6 (-4.37)
Years Incumbent		0.44 (2.53)				0.51 (3.62)
Voters of Opposing Party			-1.11 (-2.27)			-1.16 (-2.42)
Voters of Candidate's Party				1.40 (2.37)		-0.15 (-0.25)
Total Pork					-0.12 (-0.74)	-0.25 (-1.99)
Adjusted R ²	0.179	0.101	0.079	0.088	-0.009	0.439
S.E.R.	0.836	0.874	0.885	0.881	0.927	0.691
f-Statistic	11.48	6.41	5.13	5.64	0.55	8.50

The electoral margin was regressed against each independent variable separately and then the combined regression was run. All variables were run using natural logs to reduce standard error of the regression. Full regression results for the multivariable regression are available in Appendix B.

Though the single variable regressions are interesting tests to run, observing the adjusted R²s across them all indicates that on their own, each holds very little explanatory power for electoral success. In addition, the standard errors of the regressions are higher for all than the standard error of the multivariable regression. Both of these observations are especially true

for pork barrel spending, the variable in question; we can conclude that without other explanatory variables, pork barrel spending has little correlation with electoral success.

As evidenced by the low adjusted R^2 s and standard errors, the electoral system is a complicated mechanism that requires multiple variables to explain. When the regression is run with all five variables included, some significant changes are noted. Campaign expenditures per person, years of incumbency, and voters of the opposing party all retain their coefficients and increase markedly in significance, with campaign expenditures and years of incumbency moving into the robust one percent level. The fourth variable, voters of the candidate's party, generates an unexpected negative coefficient, but can be safely ignored due to the very low t-statistic. Finally, pork barrel spending becomes significant at the ten percent level, still with its negative coefficient.

The improvement in the explanatory power of the regression is remarkable; with multiple variables, the equation reaches an adjusted R^2 of 0.439, much higher than that of any of the single variable regressions. This adjusted R^2 , combined with the decreased standard error of the regression and the high significance indicated by the f-statistic, indicates that the model can be accepted as having some significant explanatory power for electoral success. Therefore, the results for each individual variable in the regression must be addressed, though I will focus mostly on campaign expenditures and pork barrel spending, as these variables yielded initially unexpected results.

Analysis and Variable Explanations

Briefly, the number of years of incumbency of a senator running for reelection produced the expected positive correlation with the electoral margin of the senator and was highly significant. This correlation is likely due to the reasons covered above: experience of the candidate, desire of voters to avoid change, and so on.

The variables for voters of the opposing party and of the candidate's party yielded an interesting result: when combined in the multivariable regression, the percentage of voters identifying with the candidate's party lost its significance, while the variable for voters of the opposing party gains significance. This leads to the conclusion that in forecasting the outcome of an incumbent election, it is only the strength of the opposing party that matters. There may be several explanations for this outcome. One possibility is that once incumbent, a senator tends to hold his or her position, even if the demographics of the state change. Thus, even if the senator's party shrinks, it is not a problem unless the opposing party grows. Another possibility is that voters of the incumbent's party are more likely to defect and vote for the opponent than those opposing him or her. This could be due to an assumption by individual voters of the candidate's party that the incumbent will win and thus they can voice smaller dissatisfactions

with the incumbent that might have been overcome by a straight party vote in a non-incumbent race.

Both campaign expenditures per person and pork barrel spending resulted in statistically significant negative coefficients. At first consideration, it would seem that both variables show an opposite correlation from what would be expected, namely that the more money spent in a state, the higher the chances of election. However, the negative result for both can be explained through other interpretations, especially the idea that incumbent senators use both types of spending as stopgap measures to try and achieve electoral success in a close election race. I will look briefly at campaign expenditures and then at the results for pork barrel spending in an effort to explain this.

As noted in the previous section, campaign expenditures are used for a variety of expenses in election campaigns. Due to the nature of electoral campaigns, it is probable that the highest amount of spending would be on the close electoral races. It would be economically irrational to throw large amounts of money at an election campaign that was clearly going to win. However, in tight races the candidate would have an incentive to raise and spend more money; in addition, the party bureaucracy might be inclined to provide the candidate's campaign with more money in order to win as many congressional seats as possible. Not all close election races will be won by the incumbent senator, and if won, the margin of electoral victory will probably be low. Thus, the negative correlation of campaign expenditures with electoral success may be explained by the use of campaign money use as a stopgap measure in an attempt to win a close race.

Pork barrel spending can be treated in a similar manner. In fact, such a view is not unprecedented; in a previous study, Stein and Bickers explained pork seeking as an attempt to "shore up sagging re-election prospects."¹² Thus pork barrel spending may also be treated as a stopgap measure. A candidate may have had a close race in the previous election and feel a need to generate goodwill among interest groups, or changing demographics in the state may stimulate a desire to ensure reelection. Whatever the rational reasons behind the choice, it indicates that incumbent senators may often use their political clout to work for personal benefit in the form of reelection. This falls in line with the views of the Public Choice School, as expressed by Tullock, Seldon, and Brady.¹³

¹² Robert M. Stein and Kenneth N. Bickers, "Congressional Elections and the Pork Barrel," *The Journal of Politics* 56 (1994) 19.

¹³ Gordon Tullock, Arthur Seldon, and Gordon L. Brady, *Government Failure: A Primer in Public Choice*, Washington, D.C.: CATO Institute, 2002.

Conclusions

The regression results indicate a definite correlation between years of incumbency and electoral success, as expected. Voter percentages by party in the state provided the interesting information that it is voters of the opposing party that make a significant difference in the election. Campaign expenditures were also demonstrated to be a stopgap measure in election races.

This leaves pork barrel spending, the primary focus of this paper. It is clear that pork barrel spending does not have the positive correlation with electoral success that the average citizen might expect. But there is significant negative correlation, again explained by a theory of stopgap spending. This does not predict the extent to which pork barrel spending actually accomplishes the goal of saving a narrow election race. Such research would be an interesting extension to the work presented in this paper.

A final result is clear: elections inherently contain a good deal of statistical noise. As stated earlier, a multivariable, fully specified model is needed for accurate interpretation of electoral races. Even with such a model there are many factors, such as candidate personalities and sudden political events, which cannot be accounted for. However, the model presented in this paper does contain significant explanatory power for electoral success. In the end, pork barrel spending should be considered a necessary component of incumbent electoral race predictions, but should be approached as a stopgap measure used by many incumbents rather than a necessary action for an electoral win.

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Appendix A: Pork Barrel Spending Data, 2000 to 2004

State	2000	2001	2002	2003	2004
AK	\$394,514,000	\$480,297,000	\$451,334,278	\$393,346,750	\$524,329,000
AL	\$205,315,000	\$300,361,990	\$320,552,359	\$279,868,200	\$360,619,000
AR	\$63,777,000	\$75,459,000	\$122,203,853	\$75,868,500	\$56,540,000
AZ	\$99,151,000	\$76,826,000	\$129,461,561	\$162,017,000	\$104,658,000
CA	\$675,723,000	\$520,266,500	\$671,764,426	\$588,835,500	\$642,854,000
CO	\$126,219,000	\$66,219,000	\$66,055,242	\$177,363,781	\$196,304,000
CT	\$35,775,000	\$26,191,000	\$69,582,723	\$83,314,500	\$67,655,000
DE	\$17,674,000	\$21,938,000	\$30,349,529	\$33,435,000	\$25,325,000
FL	\$272,483,000	\$257,883,000	\$387,516,121	\$323,318,000	\$300,131,000
GA	\$147,085,000	\$71,125,000	\$144,366,115	\$137,026,500	\$161,361,413
HI	\$313,241,000	\$474,567,000	\$432,631,474	\$352,842,000	\$494,136,000
IA	\$47,443,000	\$73,350,000	\$200,163,642	\$169,959,400	\$168,124,000
ID	\$40,819,000	\$54,344,000	\$88,983,151	\$180,729,476	\$77,943,000
IL	\$151,419,000	\$153,229,000	\$190,298,834	\$256,090,500	\$230,439,000
IN	\$61,924,000	\$85,688,000	\$125,762,259	\$155,330,000	\$117,461,000
KS	\$79,361,000	\$75,140,000	\$65,709,065	\$64,898,000	\$108,439,000
KY	\$173,372,000	\$177,238,000	\$282,029,967	\$267,238,150	\$226,121,000
LA	\$78,347,000	\$130,452,800	\$213,043,548	\$273,517,250	\$110,047,000
MA	\$70,395,500	\$71,355,000	\$99,248,130	\$107,051,500	\$120,756,000
MD	\$135,683,000	\$88,744,000	\$158,621,585	\$153,427,350	\$155,194,000
ME	\$22,898,000	\$40,226,000	\$66,332,377	\$63,184,500	\$53,902,000
MI	\$56,625,000	\$129,605,000	\$175,644,272	\$139,534,000	\$148,350,000
MN	\$27,923,000	\$80,106,000	\$139,705,627	\$170,631,500	\$70,569,000
MO	\$427,545,000	\$163,036,000	\$188,842,602	\$273,438,500	\$170,101,000
MS	\$565,759,000	\$672,731,100	\$297,038,952	\$212,827,500	\$218,188,000
MT	\$97,968,000	\$98,002,000	\$110,835,276	\$87,707,500	\$116,444,000
NC	\$181,129,000	\$96,294,000	\$138,417,817	\$81,596,000	\$108,710,000
ND	\$34,795,000	\$42,587,000	\$59,651,391	\$53,593,500	\$46,330,000
NE	\$32,892,000	\$24,673,000	\$29,837,382	\$33,820,000	\$32,902,000
NH	\$68,195,000	\$64,520,000	\$99,373,280	\$62,003,000	\$278,578,000
NJ	\$127,451,000	\$116,251,000	\$157,300,609	\$176,664,000	\$101,029,000
NM	\$129,955,000	\$175,246,000	\$157,965,345	\$311,475,977	\$99,153,000
NV	\$76,444,000	\$77,240,000	\$152,413,907	\$171,484,500	\$148,327,000
NY	\$185,690,000	\$226,751,000	\$356,293,560	\$331,672,650	\$324,620,000
OH	\$132,401,000	\$154,209,000	\$230,835,273	\$253,947,500	\$268,615,500
OK	\$115,125,000	\$108,211,000	\$114,804,999	\$96,645,500	\$159,811,000
OR	\$46,303,000	\$32,571,000	\$85,847,280	\$133,929,500	\$47,979,000
PA	\$174,842,000	\$254,834,500	\$259,134,803	\$308,140,500	\$368,922,000
RI	\$8,800,000	\$51,995,000	\$67,252,137	\$74,291,500	\$49,489,000
SC	\$134,427,000	\$112,677,000	\$216,057,246	\$422,504,000	\$179,609,000
SD	\$46,768,000	\$58,340,000	\$125,530,539	\$90,608,000	\$85,264,000
TN	\$37,319,000	\$50,175,000	\$153,629,308	\$200,105,650	\$127,870,000
TX	\$277,561,000	\$240,092,000	\$383,486,294	\$502,945,000	\$380,596,000
UT	\$130,527,000	\$142,931,700	\$93,665,363	\$77,398,000	\$82,510,000
VA	\$283,300,000	\$196,157,000	\$218,375,558	\$176,599,500	\$290,812,000
VT	\$53,722,000	\$69,470,000	\$51,484,887	\$61,481,000	\$40,716,000
WA	\$255,782,000	\$139,912,100	\$289,223,693	\$485,617,500	\$250,942,000
WI	\$61,831,000	\$57,442,000	\$172,776,184	\$145,849,500	\$129,434,000
WV	\$140,237,000	\$232,314,000	\$388,628,560	\$298,085,000	\$238,594,500
WY	\$1,000,000	\$8,200,000	\$16,159,918	\$16,575,000	\$16,573,000
Total	\$7,124,934,500	\$7,197,473,690	\$9,246,222,301	\$9,749,833,134	\$8,883,376,413

Appendix B: Full Regression Results

Dependent Variable: Ln(Electoral Margin)				
Method: Least Squares				
Sample: 1 53				
Included observations: 49				
Excluded observations: 4				
Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	5.267854	2.550471	2.065443	0.0449
Ln(Campaign Expenditures Per Person)	-0.614238	0.140588	-4.36905	0.0001
Ln(Years Incumbent)	0.514394	0.142215	3.617006	0.0008
Ln(Voters of Opposing Party)	-1.157796	0.478415	-2.420066	0.0198
Ln(Voters of Candidate's Party)	-0.153643	0.604384	-0.254215	0.8005
Ln(Total Pork)	-0.248242	0.124588	-1.99251	0.0527
R-squared	0.497186	Mean dependent var	3.209189	
Adjusted R-squared	0.438719	S.D. dependent var	0.922416	
S.E. of regression	0.691062	Akaike info criterion	2.213102	
Sum squared resid	20.53534	Schwarz criterion	2.444754	
Log likelihood	-48.221	F-statistic	8.503738	
Durbin-Watson stat	1.337331	Prob(F-statistic)	0.000012	