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AN EMPIRICAL ANALYSIS OF CONGRESSIONAL
VOTING ON FARM BILL LEGISLATION

by

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An Empirical Analysis of Congressional Voting on Farm Bill Legislation

The chasm between the public debate prior to the 1985 Food Security Act and the actual legislation which was enacted in December 1985 was perhaps the widest in recent memory. Prior to enactment, the Reagan administration had urged a more "market-oriented" farm policy, which, in the extreme, would have greatly altered or done away with many of the commodity programs which have represented the hallmark of traditional U.S. agricultural policy. From other quarters as well, the criticisms of traditional farm policies were intense and the interest in considering new policy alternatives was widespread (see Gardner, and Rausser and Farrell, for example). Yet, the legislation ultimately enacted, with relatively few exceptions, represented a large-scale continuation of farm policies in their traditional mold, a tradition that has characterized most of the last 40 years. The gulf between "agricultural policy," as practiced by economists, and the "politics of agriculture," as represented ultimately by Congressional action on the Food Security Act, appeared wide indeed.

In traditional agricultural policy research - that is, in analyzing the costs, benefits, impacts and incidence of farm programs - the process of policy formation has been frequently overlooked (notable exceptions include Rausser, de Gorter and Brady, and Guither). The experience of 1985 suggests that this is a serious oversight, and that analysts would benefit considerably from examining agricultural policy-making, in its broadest sense. A valuable point of departure for such analysis is the politico-economic research on the process of collective decision-making and the theory of regulation (Downs, Buchanan and Tullock, Olson, Stigler, etc.). The "economic" theory of politics which has emerged from this literature is grounded in large part on the optimizing principles of microeconomics and has been characterized as based on "the fundamental assumption that the 'political man', like the 'economic man' is a utility maximizer ... respond[ing] in a predictable

way to variations in total (marginal) costs and benefits" (Silberman and Durden). Since the "political man" in a democratic society does not demand "political goods" directly, but rather does so through his elected representatives, much of the resulting empirical research in this area has been concerned with explaining the voting behavior of legislators who, as the "principal agents" (Peltzman) of their constituents, are presumed to vote primarily on the basis of their constituents' best collective economic interests, as well as on the basis of ideological criteria, and other factors. The development of econometric techniques which can explain qualitative economic and political behavior - such as voting for or against a particular piece of legislation - has facilitated empirical investigations of these issues.

This paper attempts to address some of these issues by empirically examining Congressional voting (specifically in the U.S. Senate) on the Food and Agricultural Act of 1977, the Agriculture and Food Act of 1981, and the Food Security Act of 1985, hereafter referred to as the Farm Bills of 1977, 1981, and 1985. The objectives of the paper are twofold: first, to identify the significant economic and political factors influencing Congressional voting on these Bills; and second, to specifically examine the extent to which economic versus ideological factors are important in explaining voting behavior. The latter issue has represented a continuing controversy in the politico-economic literature on modeling political behavior. It assumes particular importance in agricultural policy-making because of what would appear, at first glance, to be the limited political support agricultural legislation might enjoy in many states where agriculture is of minor economic importance. The methodology used is probit analysis of the binary voting decisions of U.S. Senators for each of the three bills separately and then pooled together. The results have a variety of implications for the process of agricultural policy-making and the political support for farm programs.

Background

Downs, Buchanan and Tullock, and Olson are among the economists and political scientists who have developed the conceptual basis for the theory of collective decision-making. In its application here, this theory suggests that utility-maximizing consumers express demands for "political goods" as well as for economic goods. Silberman and Durden define a political good as a good "allocated within the context of the legislative process" (p. 318). Political goods can increase utility either through influencing consumption (transfer payments, for example) or income (tax policy). Consumers cannot consume political goods directly but, through the electoral process, vote for those legislators who will presumably best represent their interests and select their preferred political goods. As an agent of the voter, then, the legislator is presumed to vote in a pattern which will maximize the collective utility of his constituency.

This basic economic or "capture" model (Kalt and Zupan) of political behavior is made more complex by a number of observed complications. Shirking behavior by legislators, for example, can arise when ideological factors, often unrelated to constituents' economic interests, appear to dominate economic variables in explaining voting behavior (Peltzman). Logrolling, or legislative vote trading, may result in a legislator's opposite-from-expected vote on one issue in return for a colleague's quid pro quo vote on a subsequent bill which is ultimately of greater benefit to the legislator's constituency, or a part of that constituency (Buchanan and Tullock). Coalition voting may have the some of the same effects. Other complexities abound as well.

A host of empirical studies have confirmed the explanatory ability of quantitative legislative voting models, but have yielded inconsistent results with regard to the relative importance of the specific determinants of voting behavior. In an early study, Silberman and Durden demonstrated the roles of campaign contributions, labor force variables, and regional variables in explaining

Congressional voting on minimum wage legislation. Kau and Rubin (1978) subsequently analyzed a time series of voting on minimum wage legislation and found ideological variables (party affiliation and rating by Americans for Democratic Action (ADA)) to be significant determinants of voting behavior in addition to labor market variables. Mitchell, in an extensive analysis of Congressional voting on natural gas deregulation, found an "extraordinary" correlation between ideology and voting behavior; economic determinants were also found to be important but considerably less so than ideology.

A major criticism of the inclusion of party and ideology variables in accounting for legislative voting behavior is that they tend to be significant because the economic factors are incorrectly or inadequately specified; to cite Peltzman, "when 'constituent interest' is given a more appropriate empirical characterization ... party and ideology [play] correspondingly smaller roles" (p. 183). Several empirical studies have addressed this issue, but again reach different conclusions. Kau and Rubin (1979) argue that simple ideological variables, such as a legislator's ADA ratings, may mask the extent to which log-rolling and coalition voting strategies may lie behind apparent ideological motivations. In their empirical analysis of Congressional voting on 26 key issues in 1974, they find significant evidence of coalition voting, but nonetheless find that "ideology is significant in explaining voting by Congressmen on bills with primarily economic components" (p. 384). Kau, Keenan and Rubin estimate a general equilibrium model of Congressional voting and find that constituent ideology is again a consistently significant determinant of voting behavior. On the other hand, Peltzman, using a quasi-instrumental variable approach, attempts to explain ideology itself, as a function primarily of economic and demographic variables, prior to explaining U.S. Senate voting on more than 300 bills in 1979. His results strongly confirm the basic economic model of legislative behavior in that the "vast bulk" of explanatory ability is contained in the economic-demographic variables,

and party and ideology are relegated to playing the role of "brand names," that is, as a kind of shorthand for legislators' ideological inclinations.

Methodology

This analysis attempts to explain U.S. Senate voting on the Farm Bills of 1977, 1981 and 1985 through a variety of demographic, economic and ideological variables. Four sets of preliminary empirical results are estimated and presented, for each of the three years independently and the pooled sample. For each sample, the dependent variable is a binary variable representing senators' votes (1=yes; 0=no) on the bills. Sample sizes (reflecting non-voting legislators and/or incomplete data) are 83 for 1977, 77 for 1981, 82 for 1985, and 239 for the combined data set. Probit analysis is used for the empirical analysis (for methodological details, see Maddala). The independent variables calculated and tested in the regression analyses are discussed below and summarized in table 1; data sources are also given in table 1. It is important to note that unlike purely economic applications, prior research results and an understanding of the political system are essential in specifying relevant explanatory variables and hypothesizing expected signs, since neoclassical economic theory has little to say with regard to the dynamics of the political-economic system analyzed here.

Demographic Variables

Several statewide demographic variables were introduced into the analysis under the hypothesis that cross-sectional variations in those variables are likely to in part determine voting behavior. These variables included: the percentage of unionized workers in the state labor force (UNION); the average hourly wage in manufacturing (MFGWAGE); average per capita annual income (INC); and average statewide educational levels (EDUC). Under the expectation that legislators are more likely to vote for farm legislation the higher the farm and/or rural population in their state, variables representing farm and rural population in both

absolute numbers (FARMTOT and RURTOT) and as a proportion of each state's population (FARMPOP and RURPOP) were included as regressors.

Farm Economic Variables

Most of the economic variables included in the analysis pertain to either the level of government farm program benefits or the average debt levels of farm operations in each state. Higher levels of either variable were hypothesized to increase the likelihood of a senator voting for income-enhancing farm legislation. Two measures of farm program benefits were calculated: the level of total farm program benefits, including CCC loans (BENEF) and farm program benefits as a proportion of gross farm income (PCTDEP). Two measures of state farm debt were also calculated: the average state farm debt-to-asset ratio (DAR), and the percentage change in state farm debt over the preceding four years (FDCHG). A final variable representing the ratio of per capita personal income to average per farm net income (RELINC) was included as a regressor based on the hypothesis that for lower relative levels of farm income (and, thus, for higher levels of RELINC), legislators would be more likely to support farm legislation.

Political Variables

The last category of variables measured a number of political and ideological variables potentially influencing voting patterns. These variables included: two dummy variables used alternatively, one representing party affiliation (PARTY: 0=Republican; 1=Democrat) and the other indicating whether the legislator was of the same party as the incumbent President (PRES: 1=yes; 0=no); and each legislator's ADA ranking (ranging from 0=conservative to 100=liberal). The role of campaign financing on legislative voting was examined for 1985 only through the use of variables measuring total PAC contributions (TOTPAC), total agricultural PAC contributions, and agricultural PAC contributions as a proportion of total PAC contributions (AGPCP). Previous

research has confirmed the influence of campaign financing on Congressional voting patterns (Peltzman).

Empirical Results

The results of probit estimation of each of the three annual models estimated separately and the pooled data set are presented in table 2. Only those variables which retained a priori expected signs and generally statistically significant estimated coefficients were retained in the analysis. For the three annual models, three alternative equations are presented, one including neither of the ideology variables, PARTY or IDEO, and two others including each separately. Four versions of the pooled model are presented, the last incorporating PRES rather than PARTY.

The estimation results show several variables to be consistently significant determinants of legislators' voting behavior and others to be important in some years only. Of the demographic/economic variables, only the variable representing rural population (RURTOT, and occasionally, RURPOP) was uniformly significant in explaining senators' voting behavior. The variables representing farm population (FARMPOP and FARMTOT) were never significant and often negatively signed. These results suggest two conclusions. First, the fact that the absolute measure of rural population rather than it's proportion of total population is consistently significant suggests that a "critical mass" of rural (including farm) population, rather than its relative importance in each state, may be important in influencing legislators' voting patterns. Second, the results suggest that the likelihood of legislators' voting for farm bills is much more closely related to issues affecting their state's entire rural population, rather than solely its farm sector. In the pooled model only, average state per capita income proved to be a significant determinant of Senatorial voting behavior, with the negative coefficient

presumably reflecting the lower likelihood of Senators from more prosperous states voting for redistributive farm legislation.

Several farm economic variables proved consistently significant in determining voting patterns. The coefficient of the variable representing the percentage of state farm income accounted for by farm program benefits (PCTDEP) was, except for 1981, consistently positive and significant, indicating that senators representing states which were relatively more dependent on farm programs in generating farm income were, as expected, more likely to vote for the continuation of those programs. Two measures of farm debt proved important in the four models. For the 1977 Bill, the farm debt-to-asset ratio was positively and significantly related to farm program voting. For the other two bills and for the pooled sample as well, the change in state farm debt over the preceding four years was positively related to votes for the farm bills. Finally, in the 1977 model only, the ratio of nonfarm to farm income was positively (though not significantly) related to Farm Bill voting.

Inclusion of solely the demographic and economic variables as regressors yielded between 61% (for 1981) and 84% (for 1977) correct predictions of legislators' discrete voting decisions. The relative weakness of the estimated economic/voting relationships for the 1981 bill is perhaps due to the relatively dynamic state of the U.S. farm economy at that time. This is indicated, for example, by the fact that government payments accounted for only 7.2 percent of net farm income in that year versus 25.3 percent in 1985.

The third group of political/ideological explanatory variables proved consistently important in determining senators' voting on agricultural legislation, although the conclusions derived therefrom are somewhat ambiguous. Inclusions of senators' ADA ratings (IDEO) as a measure of ideological persuasion, proved statistically significant in all models estimated. However, the sign of the coefficient on IDEO changed from positive in 1977 to negative in 1981 and 1985,

suggesting that pure ideology may be less important than partisan affiliation in determining voting behavior on agricultural legislation. This hypothesis was confirmed by estimating each model with PARTY rather than IDEO included as a proxy for ideology (not shown). The results were identical with PARTY proving consistently significant but shifting sign between 1977 and 1981-1985.

In a final model, both IDEO and PARTY were included as regressors (table 2). These variables were positively correlated at the .55-.65 level. In all cases, both for the individual years and the pooled model, PARTY appeared to dominate IDEO as a determinant of voting behavior. Again, this suggests that the strictly ideological component of party affiliation in determining voting patterns may be secondary to the tendency of senators to vote for farm legislation if their party is on the White House and against this legislation if it is not. This hypothesis was further tested in the pooled sample by replacing PARTY with variable PRES. Inclusion of this variable yielded a positively signed statistically significant coefficient, as expected, and noticeable increase in percentage of correct predictions of voting outcomes.

Finally, in the only year for which data on PAC contributions' was available, 1985, the proportion of agricultural PAC contributions relative to total PAC contributions (AGPCP), is shown to be positively and significantly related to votes for the farm bill. This would appear to offer some tentative confirmation of the often-expressed view that PAC contributions do indeed influence legislation.

Conclusions

The results presented here confirm the importance of demographic, economic and ideological variables in accounting for legislative voting on recent Farm Bills. As suggested by the "economic" model of political behavior, the economic characteristics of constituents are particularly significant in determining voting patterns. The likelihood of voting for Farm Bills is shown to generally increase: the greater a state's dependence on farm program payments, the higher the debt-to-

asset ratio of a state's farms, the greater the recent change in state farm debt, and the lower farm income is relative to non-farm income.

In addition, however, contrary to the arguments of Stigler and Peltzman, ideological variables also appear to play a crucial role in helping determine voting patterns on Farm Bills, although not in the traditional sense that "ideology" is generally viewed. Ideology in the sense of a legislator's political philosophy is here shown to be secondary in importance to the political aspects of ideology, that is, the primary role of coalition or block-voting strategies by senators of similar parties. The chief implication of this result is that the legislative support for farm programs is not likely to lie in the purely ideological foundations of those programs, as sometimes argued, but rather the pragmatic strategic dimensions of voting behavior. Ideology, as suggested by Peltzman, may represent a proxy for other "non-ideological" factors. This suggests in particular that further analysis of "shirking" and "logrolling" behavior by legislators on farm legislation may yield significant additional insights into the dynamics of agricultural policy-making.

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Table 1. Variable Definitions

<u>Variable Name</u>	<u>Description</u>	<u>Units</u>
Dependent variable:		
VOTE	Vote on farm bill (1=yes; 0=no)	Dummy variable
Independent variables:		
AGPAC	Total agricultural PAC contributions	\$(1,000)
AGPCP	Agricultural PAC contributions as % of total PAC contributions	Percentage
BENEF	Total farm program benefits (incl. CCC loans)	\$(1,000)
DAR	Average farm debt to asset ratio	Percentage
EDUC	Average educational level	Years
FARMPOP	Farm proportion of state population	Percentage x 100
FARMTOT	State farm population	Thousands
FDCHG	Change in state farm debt over past 4 years	Percentage x 100
IDEO	ADA ranking (0=conservative; 100=liberal)	0 to 100
INC	Average per capita annual income	\$ per year
MFGWAGE	Average hourly manufacturing wage	\$ per hour
PARTY	Party affiliation (1=Democratic; 0=Republican)	Dummy variable
PCTDEP	BENEF/Gross farm income	Percentage
PRES	Same party as President (1=yes; 0=no)	Dummy variable
RELINC	INC/per farm average net income	Percentage
RURPOP	Rural proportion of state population	Percentage x 100
RURTOT	Rural state population	Thousands
TOTPAC	Total PAC contributions in prior election	\$(1,000)
UNION	Unionized percentage of state labor force	Percentage x 100

Note: All demographic and economic variables are defined at the state level. Data sources for the demographic and economic variables include: the Census of Agriculture, U.S.D.A. Economic Indicators of the Farm Sector, and Statistical Abstract of the U.S. for the relevant years. For the voting and political variables, sources include: Congressional Quarterly, Almanac of American Politics, and Congressional Districts in the 1980's.

Table 2. Coefficient Estimates for Voting Models

Year/Equation	Coefficient Estimates							
	INT	PARTY	IDEO	PCTDEP	RURTOT	DAR	RELINC	FDCHG
1977: (1)	-1.711			22.040	0.326	12.406	0.003	
	(-2.137)**			(1.991)**	(1.611)*	(2.431)**	(0.442)	
	LR = 22.915		n = 83					% Correct Predictions=84%
(2)	-2.913		0.014	31.481	0.362	15.258	0.003	
	(-2.804)**		(2.137)**	(2.286)**	(1.746)**	(2.636)**	(0.378)	
	LR = 20.348		n = 83					% Correct Predictions=82%
(3)	-2.691	0.834	0.006	29.034	0.372	13.461	0.006	
	(-2.605)**	(1.702)**	(0.685)	(2.007)**	(1.745)**	(2.329)**	(0.829)	
	LR = 23.389		n = 83					% Correct Predictions=83%
1981: (1)	-0.377			5.424	0.162			0.003
	(-0.722)			(0.447)	(0.929)			(0.772)
	LR = 30.802		n = 77					% Correct Predictions=61%
(2)	0.522		-0.019	6.156	0.238			0.002
	(0.937)		(-3.910)**	(0.464)	(1.240)			(0.603)
	LR = 19.261		n = 77					% Correct Predictions=77%
(3)	-1.119	-1.519	-0.005	10.338	0.372			0.002
	(-1.427)*	(3.319)**	(-0.719)	(0.714)	(1.762)**			(0.517)
	LR = 31.315		n = 77					% Correct Predictions=78%

**Coefficient significant at 0.05 level for a one-tailed test based on asymptotic t-values.

*Significant at 0.10 level (one-tailed test).

Table 2 (Cont.)

<u>Year/Equation</u>	<u>Coefficient Estimates</u>							
	<u>INT</u>	<u>PARTY</u>	<u>IDEO</u>	<u>PCTDEP</u>	<u>RURTOT</u>	<u>AGPCP</u>	<u>FDCHG</u>	<u>INC</u>
<u>1985:</u>								
(1)	-0.596 (-1.810)**			8.220 (1.662)*	0.245 (1.552)*	4.035 (1.261)	0.010 (0.615)	
	LR = 16.989		n = 82	% Correct Predictions=74%				
(2)	-0.256 (-0.641)	-0.688 (-1.479)*		6.855 (1.414)*	0.248 (1.563)*	4.227 (1.431)*	0.015 (0.969)	
	LR = 11.601		n = 82	% Correct Predictions=71%				
(3)	-1.584 (-2.263)**	-1.095 (2.372)**	-0.005 (0.771)	10.188 (1.922)**	0.299 (1.817)**	4.384 (1.400)*	0.014 (0.849)	
	LR = 17.591		n = 82	% Correct Predictions=74%				
<u>Total</u>								
<u>Sample:</u>								
(1)	1.241 (3.114)**			9.905 (2.568)**	0.243 (2.494)**		0.002 (1.138)	-0.0001 (-4.237)**
	LR = 29.741		n = 239	% Correct Predictions=68%				
(2)	1.466 (3.514)**	-0.005 (-2.020)**		8.831 (2.351)**	0.243 (2.469)**		0.002 (1.047)	-0.0001 (-4.038)**
	LR = 33.844		n = 239	% Correct Predictions=68%				
(3)	1.671 (3.936)**	-0.648 (-2.822)**	-0.001 (-0.334)**	10.071 (2.606)**	0.273 (2.723)**		0.002 (1.021)	-0.0002 (-4.548)**
	LR = 17.358		n = 239	% Correct Predictions=73%				
(4)+	0.542 (1.157)	1.120 (5.541)**	0.0005 (0.170)	11.251 (2.866)**	0.310 (2.972)**		0.002 (1.085)	-0.0002 (-3.973)**
	LR = 66.504		n = 239	% Correct Predictions=79%				

+In equation (4) only, PARTY is replaced by PRES.