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Ideology, Electoral Incentives, PAC Contributions, and the Agricultural Act of 2014

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This paper examines the effects of interest group Political Action Committee (PAC) spending on the passage of the Agricultural Act of 2014. I use a mixed-process model to examine correlations between ideology, constituent characteristics, and PAC contributions by agricultural and environmental interests and the probability that a legislator voted in favor of the act. I find a positive association between agricultural and environmental PAC contributions and the probability that a legislator voted in favor of the act. Further, I find that legislators representing relatively large rural populations were more likely to vote in favor of the act.

Key words: agricultural policy, Farm Bill, political economy

Introduction

Since 1965, the U.S. Congress has regularly passed omnibus legislation generally known as the Farm Bill. Across its 12 titles, the Farm Bill serves and affects a variety of constituencies including agricultural producers, lenders, rural citizens, the energy industry, importers and exporters, recipients of nutrition assistance through the Supplemental Nutrition Assistance Program (SNAP), and environmental advocacy groups. Many of these programs constitute grants of government privilege, the costs of which, as Lusk (2015) indicates, fall primarily on taxpayers. Smith (2013) indicates that cutting Farm Bill spending by $10 billion per year would have no measurable long-run negative impact on the agricultural economy as a whole but would reduce the tax burden placed on taxpayers. Of course, producers, who currently benefit from farm programs, would likely experience short-run negative impacts.

Agricultural and environmental groups spend substantial amounts of money on Political Action Committee (PAC) contributions,[1] and it is important for the public to understand the extent of their influence. This paper measures the relative influence of environmental group PAC donations, agricultural group PAC donations, legislator ideology, and electoral incentives on the final wording of the Agricultural Act of 2014.

Recent work on the political factors affecting support for agriculture has found that several factors are important for determining whether a legislator will vote to continue federal government support for agriculture. Studies that examine legislator preferences generally find that a preference for agriculture increases legislators' propensity to vote for pro-agriculture policy (Bellemare and Carnes, 2015; Vesenka, 1989). Generally, studies which that not use instrumental variables to account for endogeneity in PAC contributions do not find statistically or economically significant

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[1] Though PAC contributions are important to electoral campaigns, individual contributions are a more direct avenue for supporting legislators.

effects of PAC contributions on agricultural support (Bellemare and Carnes, 2015; Vesenka, 1989). Studies that account for endogeneity (Abler, 1991; Stratmann, 1991; Welch, 1982) or use structural models (Gawande and Hoekman, 2006) find more support for the notion that agricultural PACs influence legislators' support for agriculture. Meta-analysis by Stratmann (2005), using papers examining a range of interest group legislation reviewed by Ansolabehere, de Figueiredo, and Snyder (2003), indicates that PAC contributions do in fact influence legislators' voting behavior.

The Agricultural Act of 2014

The most recent iteration of the Farm Bill, the Agricultural Act of 2014, cut funding (relative to the previous bill) for commodity payments to farmers, conservation, and nutrition assistance. An increase in funding for crop insurance partially offset the cuts to commodity payments.[2] These changes are discussed in more detail below. All information in the remainder of this section is taken from Chite's (2014) summary published by the Congressional Research Service. The Farm Bill is split into several titles, four of which are discussed here. The four titles of interest are i) Commodities (Title I), which provides support to farmers of specific agricultural commodities; ii) Conservation (Title II), which sets requirements regarding and provides funding to producers for conservation efforts; iii) Nutrition (Title IV), which provides financial support for low-income individuals for the purpose of purchasing healthy foods; and iv) Crop Insurance (Title XI), which provides crop insurance premium subsidies to farmers and reinsurance to private crop insurance providers.

Perhaps the most-discussed aspect of the recent Farm Bill is the replacement of direct payments to farmers with a set of programs designed to assist producers with risk management. The Agricultural Risk Coverage (ARC) and Price Loss Coverage (PLC) programs were designed to provide aid to producers when either revenue (in the case of ARC) or commodity prices (in the case of PLC) falls below legislated thresholds. Of particular interest to Southern producers is the exclusion of cotton from these programs. The existing dairy price support and income loss programs were repealed and replaced with margin protection programs that resemble insurance policies. Farmers with an adjusted gross income of $900,000 or above would no longer qualify for ARC, PLC, disaster payments, or conservation program payments. These and other changes amounted to a $14.3 billion decrease from fiscal year 2014 to fiscal year 2023 relative to the Congressional Budget Office's (CBO) projections based on the 2008 Farm Bill. Since the passage of the bill, however, ARC and PLC have been more expensive than CBO projections, mainly due to low prices.

To partially offset the reduction in spending in the commodity title, changes were made to the crop insurance title. Specifically, an area-wide "shallow loss" insurance product was created to help fill the gap in coverage left by the new commodity support program. The primary area insurance product—called the Supplemental Coverage Option (SCO)—can be purchased for any crop for which crop insurance is available. One major difference between this insurance product and the new commodity programs is that the farmer is required to pay a premium to obtain coverage. As with individual crop insurance, the premium is heavily subsidized. While SCO can be purchased for any of the major row crops, a separate area-wide insurance product called the Stacked Income Protection Plan was created specifically for cotton. There were also changes made to individual crop insurance. Farmers are now allowed to exclude low farm yields (actual yields less than 50% of the 10-year county average) from their coverage and premium calculations. The 2014 bill also requires farmers to comply with conservation and wetlands requirements in the conservation Title in order to receive crop insurance premium subsidies. These changes amounted to an increase of $5.7 billion relative to the CBO's 10-year projections of spending based on the 2008 law (Chite, 2014).

The 2014 Farm Bill made significant changes to environmental conservation policies. Over 20 conservation programs were consolidated into two comprehensive programs, and Conservation

[2] Since the passage of the bill, commodity prices and farm sector profits have fallen, resulting in an increase in spending on commodity programs relative to original projections.

Reserve Program (CRP) acreage was stepped down from 32 million acres in fiscal year 2015 to 24 million acres in fiscal year 2018. The CRP provides financial compensation for producers who take some of their land out of production and allow native plants and wildlife habitat to develop. The Environmental Quality Incentives Program, which assists producers in applying conservation measures to land currently in production, was reduced by $500 million relative to the CBO baseline. Conservation spending was cut $3.97 billion relative to the CBO's baseline spending projection.

The controversial cuts to the nutrition title represented a compromise between the House and Senate. The reductions in budgeted spending proposed by the House were larger than those proposed by the Senate, and the amount cut (relative to the 2008 Farm Bill) in the final bill was close to the Senate's proposed bill. The House bill would have cut nutrition spending by $39 billion over 10 years relative to the 2008 Farm Bill, while the Senate bill included only $3.94 billion in cuts. The final bill cut $8 billion from the nutrition title relative to the CBO's 10-year baseline.

Overall, the changes made to farm support, nutrition assistance, and conservation programs in the Agricultural Act of 2014 were compromises. Cuts to the commodity support program were smaller than in either the House or Senate versions proposed to the conference committee. Changes to long-standing legislation like the Farm Bill are marginal; votes on the bill do not determine whether farmers will receive support or whether nutrition programs will continue to exist. Since the interwar period, the federal government has consistently provided a program of financial support for agricultural producers. A legislator votes on relatively small changes to a significant piece of legislation that will almost certainly continue for the foreseeable future. The reality of marginal change informs the discussion in the next section. To our knowledge, this is the first paper examining attempts by agricultural interest groups to influence the passage of the Agricultural Act of 2014 and is the first to examine the effects of PAC contributions by environmental groups on agricultural policy.

Model

This paper assumes that legislators respond to three primary forces when deciding how to vote: PAC contributions, electoral incentives, and ideology.[3] The first two forces comprise the ways in which legislators interact with constituencies: Interest groups provide PAC contributions to fund legislators' election campaigns, and voters—who may vote for another candidate in a future election if the legislator does not vote for policies the constituents want—provide electoral incentives. As previous literature (e.g., Bellemare and Carnes, 2015) indicates, ideology is typically an important factor in determining a legislator's vote on a particular bill.

This paper examines the influences of four constituencies—environmentalists, the agriculture industry, rural households, and SNAP recipients—on the passage of the Farm Bill. I employ a mixed-process model with endogenous regressors to examine congressional voting behavior as a function of electoral incentives and PAC contributions associated with these constituencies as well as the legislator's ideology.

Since the direction of causality between PAC contributions and legislators' voting behavior is ambiguous (Ansolabehere, de Figueiredo, and Snyder, 2003), it is necessary to use an instrument to account for potential endogeneity. It is possible that a legislator will vote in favor of agricultural support because agricultural interests donated to his or her campaign. This is the standard case of vote buying. However, it is also possible that, during his or her campaign, a legislator signals his or her propensity to vote in favor of agricultural support to potential donors and thus secures additional campaign contributions. This potential for reverse causality implies a need for instruments to provide plausibly exogenous variation that will increase confidence about the causal effect of PAC contributions on the probability that a legislator will vote for agricultural support. Thus,

[3] Support among the general public for farm programs is quite strong (Ellison, Lusk, and Briggeman, 2010a,b). However, many policies affect voting preferences among the general public, such that voting behavior is likely to be affected only slightly by agricultural concerns.

the identification strategy employed in this paper addresses the potential reverse causality or simultaneity mentioned above.

Another potential source of endogeneity, unobserved heterogeneity, is more difficult to address. I employ cross-sectional observational data to examine the relationships of interest and, since it is possible that other variables for which I do not have data might be correlated with the right-side variables and affect legislators' voting behavior, I cannot claim that the results are causal. The relationships measured in this analysis can be characterized as estimates of correlations (rather than causal relationships) between variables that may or may not be statistically significant.

Two conditions must be met for valid instruments: i) the covariances between the instruments and endogenous variables must be nonzero and ii) the covariances between the instruments and the (unobservable) error term in the reduced-form regression must be zero (i.e., the exclusion restriction). The first condition is testable: A discussion of these tests is provided in the model identification and results section. The second condition is not testable, but the intuition behind the choice of instruments is discussed below.

Previous work on the effects of PAC contributions on the passage of agricultural legislation by Chappell (1981), Stratmann (1995), and Welch (1982) used election results and legislative seniority as instruments for PAC contributions. The logic is simple: These variables do not directly influence a legislator's vote on the Farm Bill and almost certainly do not affect the vote through another mechanism.

While these studies use the percentage of the vote received by a given legislator in the most recent election, I use the legislator's vote share in their most recent election minus 0.5[4] and a binary variable for uncontested elections as instruments for PAC contributions. I use this approach because it captures the binary nature of uncontested elections and because transforming the vote share more precisely measures election closeness. Stratmann (2005) finds that the closeness of an election is an important predictor of campaign contributions. Ansolabehere, de Figueiredo, and Snyder (2003) note that PAC contributions to a legislator's campaign are also likely to be correlated with that legislator's "power." I use "freshman" status in the legislature (i.e., the legislator is in his or her first year) as a measure of this power; specifically, a freshman legislator is expected to have less influence on the content and passage of legislation and so will receive smaller PAC contributions. Stratmann (1995) uses membership on the agriculture committee as a proxy for legislator "power," but this is problematic as it is likely correlated with the probability that a legislator will vote in favor of the Farm Bill. Thus, I use three instruments: the above-discussed transformed vote share, a binary variable for uncontested elections, and freshman status in the legislature.

Previous work estimating the effects of PAC contributions on legislator voting behavior used a simultaneous probit–Tobit model developed by Chappell (1982). I employ a modified version of this model to analyze the passage of the 2014 Farm Bill.[5] The two PAC-spending-dependent equations are specified as follows:

$$y_{1p} = \alpha_{0p} + \mathbf{D}\boldsymbol{\alpha}_{\mathbf{1p}} + \mathbf{E}\boldsymbol{\alpha}_{\mathbf{2p}} + \mathbf{R}\boldsymbol{\alpha}_{\mathbf{3p}} + \mathbf{X}\boldsymbol{\alpha}_{\mathbf{4p}} + \mathbf{L}\boldsymbol{\beta}_{\mathbf{1p}} + \beta_{2p}F + \varepsilon_p, \tag{1}$$

where y_{1p} is the dollar value of PAC contributions from source p; $\mathbf{D}$ is a matrix of indicator variables measuring legislators' ideology; $\mathbf{E}$ is a matrix of electoral incentives; $\mathbf{R}$ is a matrix of binary variables indicating the agricultural region in which a legislator resides; $\mathbf{X}$ is a matrix of control variables, $\mathbf{L}$ is a matrix of election results variables used as instruments; F is a binary variable equal to 1 if the legislator has freshman status as a federal-level legislator and 0 otherwise, used as an instrument for PAC contributions; ε is a mean-zero error term; and the rest are parameters to be estimated.

[4] None of the observations of this variable are negative, indicating that all legislators won at least 50% + 1 of the vote in their district or state.

[5] It is common in applied microeconomics to start with a parsimonious model and add controls systematically to avoid Simpson's Paradox. Due to the relatively large number of variables of interest, the need to provide a detailed discussion of the instrumental variables, and space restrictions, I chose not to proceed in this manner in the manuscript. However, I employed this method and note that this method did not produce results materially different from the results presented in this paper.

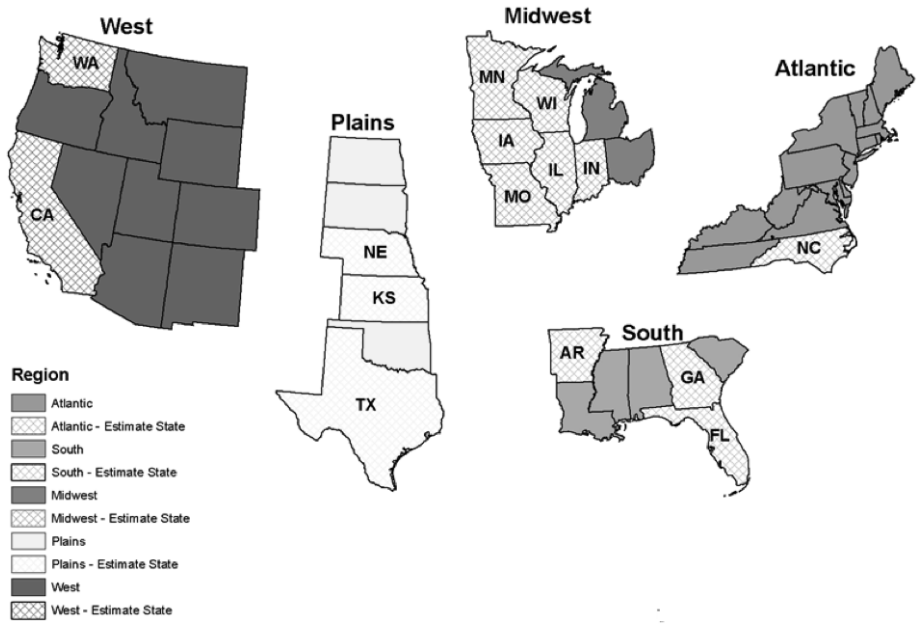

Figure 1. ARMS III Farm Production Expenditure Regions

Notes: USDA surveyors oversample in agriculturally important "Estimate States" to ensure representative state-level data. Source: of Agriculture (2017).

The vote-dependent equation is specified as follows:

$$y_2 = \gamma_0 + \mathbf{D\gamma_{1p}} + \mathbf{E\gamma_{2p}} + \mathbf{R\gamma_{3p}} + \mathbf{X\gamma_{4p}} + \delta_p y_{1p} + \varepsilon, \tag{2}$$

where y_2 is a binary variable equal to 1 if a legislator voted "Yea" for the 2014 Farm Bill and 0 if he or she voted "Nay," y_{1p} are the two PAC-contributions variables, and ε is a mean-zero error term. The rest are parameters to be estimated, unless they are defined above.

Two variables are used to measure the influence of PAC contributions on legislator voting behavior: the dollar amount of contributions by i) the agricultural sector and ii) environmental interests. Other forms of lobbying, such as face-to-face meetings, might be correlated with financial support. However, data on this type of lobbying are only available for individual lobbying groups and bills rather than for individual legislators.

The model employs three measures of electoral incentives. The proportion of households receiving SNAP assistance in the legislator's district or state measures of the intensity of electoral incentives from these recipients. The percentage of the district (for House members) or state (senators) living in a rural area is used to measure electoral incentives from voters concerned with agricultural issues.

The ideology measure is taken from GovTrack, which uses cosponsorship patterns to develop a numerical index of the left–right political spectrum that runs from 0 to 1. If two legislators often cosponsor each other's bills, their index values will be similar. The index is evenly split into 5 binary variables to capture any nonlinearity in the ideological influence on legislators' voting.

Control variables include the legislator's party affiliation and sex as well as an indicator variable for senators and binary variables for the legislator's agricultural region using the ARMS III Farm Production Regions Map (figure 1). Party affiliation controls for the average probability that a legislator will vote for or against the bill solely because of his or her party affiliation. The Senate binary variable controls for average differences in voting behavior due strictly to membership in the House or Senate. The agricultural region variables control for average regional effects not captured by the electoral incentive variables. The major divisions in agricultural production occur at the

Table 1. Summary Statistics

	Units	Mean	Standard Deviation
"Yea" vote	Binary indicator	0.62	0.49
Agricultural PAC contributions	Thousand dollars	94.11	138.20
Environmental PAC contributions	Thousand dollars	11.62	40.70
Ideology			
Far left	Binary indicator	0.12	0.32
Left	Binary indicator	0.29	0.45
Center	Binary indicator	0.10	0.30
Right	Binary indicator	0.31	0.46
Far right	Binary indicator	0.18	0.39
Percentage of households receiving SNAP	Percentage	13.37	5.62
Share of rural households	Percentage	21.00	18.49
Vote share in recent election	Percentage	61.46	13.73
Ran unopposed in recent election	Binary indicator	0.02	0.16
Freshman status	Binary indicator	0.22	0.42
Agricultural region			
Atlantic	Binary indicator	0.30	0.46
West	Binary indicator	0.24	0.43
Plains	Binary indicator	0.12	0.32
Midwest	Binary indicator	0.19	0.39
South	Binary indicator	0.15	0.36
Senator	Binary indicator	0.19	0.39
Democrat	Binary indicator	0.48	0.50
Female	Binary indicator	0.18	0.39

regional level rather than the state level. The ARMS III Farm Production Regions Map (figure 1) divides the country into five groups: West, Plains, Midwest, Atlantic, and South. Agricultural practices are, to some extent, homogeneous within each of these five regions. Because of this intra-regional homogeneity, which guides subsidies and other policies, the politics associated with agriculture are also assumed to be homogeneous within each region.

To interpret the results discussed later in the paper, it is necessary to determine the marginal changes to policy made by the 2014 Farm Bill. Since the 2014 Farm Bill represents over 2 years of delay in passing what was originally meant to be the 2012 Farm Bill, I can be confident about what policy would have been in place had the final version not passed. Though the 1938 Agricultural Adjustment Act, 1948 Commodity Credit Corporation Charter Act, and the 1949 Agricultural Act make up the permanent agricultural policy that remains in effect until repealed, the recurring legislation known as the Farm Bill temporarily replaces said legislation and implements new policy (Novak, Pease, and Sanders, 2015, p. 81). Technically, if a Farm Bill fails to pass, this older legislation will take effect; however, due to delays in the passage of the 2014 Farm Bill, provisions from the 2008 law were continued.

Reversion to the old permanent legislation is highly unlikely, so it is reasonable to assume that, had the 2014 Farm Bill not passed in what became its final form, the provisions from the previous bill would likely have been carried forward another year. This implies that a legislator's vote to pass the 2014 Farm Bill was a vote to make the marginal changes in policy and spending described in the previous section relative to the policies and spending associated with the 2008 Farm Bill. The Farm Bill determines federal agricultural, conservation, and food policy, which implies that determining the drivers of a legislator's vote on the bill is complex. The model specified in this section accounts for many factors potentially affecting these policy goals and allows for determination of the correlations among them and the probability that a legislator voted in favor of the bill.

Data

Data on legislators' votes were taken from the GovTrack database (table 1). Of the 517 legislators who voted on the final bill, 319 voted in favor of its passage. Less than half (247) of those voting were Democrats, and 65 were members of the agricultural committee in their respective houses. Women accounted for 95 of the 517 legislators voting on the bill.

The analysis uses two measures of electoral incentives: The percentage of households in rural areas in each district or state is used to measure electoral incentives from voters who are involved in or benefit directly from agricultural production. These data are taken from the 2010 census. The share of households in each district or state receiving SNAP benefits in 2013 is used as a measure of electoral incentives for the nutrition title. These data are taken from the United States Department of Agriculture.

Data on PAC spending by agriculture and environmental interests are taken from the Center for Responsive Politics' Open Secrets (2015) database.[6] These data include spending by agricultural and environmental interest groups for the legislator's most recent re-election prior to the passage of the 2014 Farm Bill. For most House members, data from the 2012 election were used. Data for senators are from either the 2008, 2010, or 2012 elections. On average, agricultural PAC contributions are much higher per legislator ($94,110) than contributions from environmental PACs ($11,620). However, agricultural PAC contributions are also more widely dispersed, while environmental PAC contributions are more targeted. Of the 517 legislators voting on the final bill, 264 did not receive money from environmental PACs. All but two legislators received agricultural PAC money. Figure 2 diagrams the relationship between agricultural and environmental PAC contributions to representatives and senators. While lower spending overall by environmental PACs might limit their ability to influence legislation, the fact that they target their funds to specific legislators may make their spending more effective at the margin.

As discussed above, it is necessary to control for potential endogeneity in the relationship between PAC contributions and legislators' votes on the Farm Bill. Thus, the following data are used to construct instrumental variables: Data on the percentage of votes cast in favor of the legislator in the most recent election prior to 2013 are taken from The New York Times online database of election results. A binary variable for those legislators who ran unopposed is also included. Legislator ideology data are taken from GovTrack. The ideology index developed by Tauberer (2012) assigns a score for each legislator along the liberal–conservative spectrum based on cosponsorship behavior. Legislators who cosponsor similar bills are grouped together, while those who cosponsor different bills are further apart on the spectrum. The index is on the interval [0,1], with lower scores relating to left-wing ideology and higher scores relating to right-wing ideology. I divide the data into five groups: far left, left, center, right, and far right. The groups are defined by the intervals [0,0.2], (0.2,0.4], (0.4,0.6), [0.6,0.8), [0.8,1], respectively. Of the 517 legislators who voted on the final bill, 62 are in the far-left category, 147 in the left category, 51 in the center category, 162 in the right category, and 95 in the far-right category.

Model Identification and Results

The three equations that make up the model specified in the previous section are estimated simultaneously using a mixed-process model and limited information maximum likelihood estimation. First, though, a standard two-stage, least-squares model with White-corrected standard errors is estimated to implement a bevy of identification tests. Since this analysis employs an instrumental variables approach, it is necessary to first estimate the endogenous-variable-dependent equations separately to check for identification of the instruments. Thus, the PAC-donation-

[6] Examples of agricultural PACs include but are not limited to the Farm Credit Council, the Crop Insurance Professionals Association, and the Texas Farm Bureau. Examples of environmental PACs are the League of Conservation Voters, Sierra Club, and Ocean Champions.

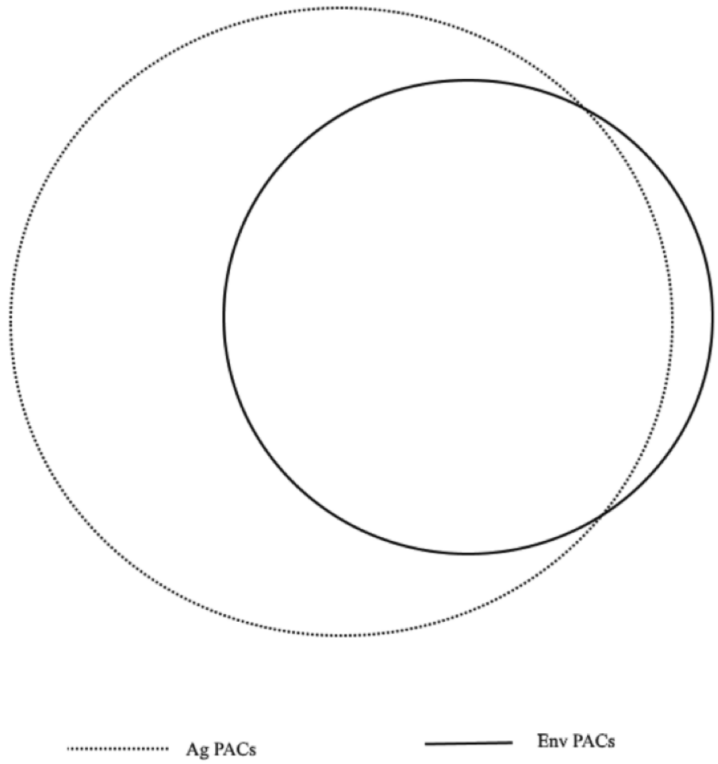

Figure 2. Venn Diagram Depicting the Number of Legislators Receiving PAC Contributions

dependent equations (specified in equation 1) are estimated separately; the results can be found in table 2. The Sanderson–Windmeijer (2016) chi-squared test of excluded instruments is employed to determine whether the three instrumental variables are jointly statistically significantly different from 0. The results of these tests, both significant at the 1% level, indicate that the model is not underidentified.

It is also necessary to determine whether the equations are weakly identified. The Sanderson–Windmeijer (2016) F-test of weak identification is employed for both PAC-spending-dependent equations, and values of 4.83 and 4.76 are found for the agricultural-PAC-spending-dependent and environmental-PAC-spending-dependent equations, respectively. Using critical values from Stock and Yogo (2005), it is clear that weak identification is a problem for both endogenous variables.

In light of this, the Anderson–Rubin (1949) joint Wald test, which is robust to the presence of weak instruments, is implemented on the estimation of equation (2). The test results in a p value of 0.003, indicating that the endogenous regressors are jointly statistically significant. While this information is important, there are functional form issues that necessitate the use of a mixed-process model, discussed below.

Finally, overidentification and endogeneity tests were performed. The value of the chi-squared-distributed Sargan (1958) test of overidentification is 0.90 with a p value of 0.3427. This failure to reject the null indicates that the model is not overidentified. The endogeneity test is defined as the difference between two Sargan test statistics: one in which the PAC contributions regressors are treated as endogenous and another in which they are treated as exogenous. The test is distributed chi-squared and the null hypothesis is that the variables can be treated as exogenous. The p value is 0.0097, indicating that the PAC contributions regressors cannot be treated as if they are exogenous.

Having addressed endogeneity and instrument validity, the following discussion focuses on model selection. Chappell's (1982) probit–Tobit model addressed an important problem regarding

Table 2. First-Stage Regressions of Agricultural and Environmental PAC Contributions on Instruments and Exogenous Variables

	Agricultural PAC Contributions	Environmental PAC Contributions
Vote share in most recent election[a]	−0.53	−0.48**
	(0.51)	(0.21)
Ran unopposed in most recent election[a]	−29.48	11.12
	(29.06)	(11.43)
Freshman status[a]	−45.26***	6.21
	(13.60)	(3.97)
Far-left ideology	−58.91***	27.98***
	(21.14)	(8.19)
Left ideology	−30.06*	7.40
	(15.55)	(4.86)
Right ideology	32.76	−0.78
	(30.93)	(3.75)
Far-right ideology	13.92	−3.29
	(35.31)	(4.31)
Senate	171.28***	28.98***
	(21.55)	(7.20)
Democrat party	−15.00	10.74**
	(31.32)	(4.88)
Agricultural committee	141.11***	−7.47*
	(29.66)	(3.87)
Female	1.36	−5.49
	(9.35)	(4.11)
Agricultural regions		
West	23.44*	5.58
	(11.91)	(5.97)
Plains	35.02*	−2.27
	(18.40)	(4.42)
Midwest	28.95**	−2.97
	(13.18)	(3.84)
South	21.35	−0.60
	(16.06)	(3.57)
Percentage of SNAP recipients	2.38**	−0.46**
	(0.92)	(0.22)
Share of rural households	−0.17	0.14**
	(0.39)	(0.09)
Constant	24.55	5.95
	(28.81)	(3.95)
Sanderson–Windmeijer F-test of excluded instruments	10.00	9.87
p value	0.01	0.01

Notes: Single, double, and triple asterisks (*, **, ***) indicate statistical significance at the 10%, 5%, and 1% level. Standard errors are in parentheses. [a] Used as an instrumental variable in the full model.

analysis of PAC contributions: Interest groups often donate to relatively few candidates, such that there are many zeroes in the data. More than half (51.41%) of legislators received no campaign contributions from environmental PACs. While it is possible that these zeroes represent the true value the PAC would prefer to donate to a given candidate, it is likely that, if they could, they would donate a negative dollar value. Thus, it is necessary to use a Tobit model to account for this truncation in the data.

In contrast to the contributions made by environmental PACs, all but two legislators received agricultural PAC contributions in the 2-to-6-year period leading up to their most recent election before the 2014 Farm Bill was passed. Contributions from agricultural PACs ranged from $500 to $1.521 million. Given the range of donation amounts across nearly the entire legislature, these values almost certainly represent the true value the PACs preferred to donate. Thus, there is no justification for using a Tobit estimator to model agricultural PAC contributions.

Equations (1) and (2) are estimated as a system with limited information maximum likelihood using a mixed-process estimator. The agricultural-PAC-donation-dependent (equation 1), environmental-PAC-donation-dependent (equation 1), and vote-dependent (equation 2) equations are estimated using ordinary least squares, Tobit, and probit, respectively. As discussed above, agricultural practices are different across the country but are somewhat homogeneous within each region.[7] Thus, in addition to controlling for regional effects with dummy variables based on the ARMS III Farm Production Regions Map, I cluster the standard errors on these regions.[8] This treatment of the errors allows for independence of the errors across regions but assumes homogeneity within regions. Clustering at the state or district level is not appropriate because agricultural production and practices—and thus agricultural policy and politics—are regional phenomena.

The three-equation system defined above is estimated using limited information maximum likelihood, and the marginal effects are reported in table 3. I estimate three other regressions to determine the robustness of the results. The first robustness check consists of estimating the system of equations for both houses of Congress separately. However, due to the small size of the Senate, the estimation failed to converge. Thus, only the results of the House are reported in the second column of table 3. Two other regressions are estimated, each with only one endogenous PAC donation variable. These regressions are estimated to determine whether the measured effects of PAC contributions are biased due to the inclusion of both endogenous regressors. These results are found in columns 3 and 4 of table 3 and are discussed below.

The interpretation of the magnitude of average marginal effects is difficult due to their nonlinearity. Thus, adjusted predictions of a "Yea" vote on the 2014 Farm Bill are computed for variables of interest with statistically significant marginal effects. These results can be found in tables 4 and 5 and are discussed in detail below.

Legislator Ideology

With the exception of the far right, estimates of the marginal effect of ideology on the probability of voting in favor of the 2014 Farm Bill are not statistically significant. The adjusted predictions of voting "Yea" on the 2014 Farm Bill by ideology can be found in table 4. The 97 far-right legislators had an adjusted probability of voting for the bill of 50.45% compared with a 73.14% probability for centrists. Thus, holding all other variables at the mean, a far-right legislator was 22.69 percentage points less likely to vote in favor of the bill than a centrist.

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[7] USDA-NASS farm production regions have been regularly used to divide the country into agricultural regions (e.g., Barry, 1980; Baumgart-Getz, Prokopy, and Floress, 2012; Wu et al., 2009). Moreover, eliminating agricultural regions from the analysis did not affect the coefficients of interest or increase p values for variables of interest above the 5% threshold.

[8] All the regressions of the full system were estimated with and without clustered standard errors. In every case, the significance of the estimates was higher (i.e., p values were lower) with the clustered errors. Thus, the results of the non-clustered-error regressions are not presented.

Table 3. Average Marginal Effects of Ideology, Electoral Incentives, and PAC Contributions on the Probability of a Legislator Voting "Yea" for the 2014 Farm Bill

	Full Legislature	House Only	Ag PACs Only	Environmental PACs Only
Agricultural PAC contributions	0.0023**	0.0039***	0.0024***	
	(0.0009)	(0.0007)	(0.0008)	
Environmental PAC contributions	0.0021**	0.0176***		0.0022***
	(0.0011)	(0.0059)		(0.0006)
Far-left ideology	−0.1212	−0.2389***	−0.0626	−0.2974***
	(0.1526)	(0.0427)	(0.1254)	(0.0714)
Left ideology	−0.0990	0.0009	−0.0844	−0.1817**
	(0.0654)	(0.0673)	(0.0527)	(0.0781)
Right ideology	−0.0563	−0.0145	−0.0580	7.62E-06
	(0.0585)	(0.0567)	(0.0568)	(0.0906)
Far-right ideology	−0.1915***	−0.1302	−0.1928***	−0.2185**
	(0.0315)	(0.0988)	(0.0359)	(0.0902)
Senate	−0.3546***		−0.3196**	−0.0317
	(0.1123)		(0.1358)	(0.0397)
Democrat party	0.1205*	−0.1136	0.1506**	0.0753
	(0.0703)	(0.0991)	(0.0599)	(0.1210)
Agricultural committee	−0.0914	−0.0170	−0.1214	0.2149***
	(0.2107)	(0.1613)	(0.1780)	(0.0722)
Female	0.0391	0.0778	0.0304	0.0474
	(0.0647)	(0.0639)	(0.0585)	(0.0762)
Agricultural regions				
West	0.0819	−0.0474	0.0864*	0.1586***
	(0.0512)	(0.0403)	(0.0514)	(0.0296)
Plains	0.0480	0.0101	0.0364	0.1487***
	(0.0513)	(0.0394)	(0.0449)	(0.0129)
Midwest	0.1535*	0.1182***	0.1445*	0.2600***
	(0.0879)	(0.0448)	(0.0828)	(0.0076)
South	0.1346**	0.0810***	0.1245**	0.2162***
	(0.0620)	(0.0311)	(0.0592)	(0.0059)
Percentage of SNAP recipients	−0.0064	0.0020	−0.0081**	−0.0023
	(0.0043)	(0.0043)	(0.0037)	(0.0046)
Share of rural households	0.0067***	0.0004	0.0068***	0.0077***
	(0.0021)	(0.0023)	(0.0023)	(0.0023)

Notes: Single, double, and triple asterisks (*, **, ***) indicate significance at the 10%, 5%, and 1% level. Standard errors are in parentheses.

Table 4. Adjusted Predictions of a "Yea" Vote on the 2014 Farm Bill for Five Legislator Ideologies Holding All Other Variables at Their Means

	Adjusted Prediction	Number of Observations
Far left	59.13%	63
Left	61.80%	153
Center	73.14%	52
Right	66.80%	166
Far right	50.45%	97

Given that the relevant alternative to the passage of the bill was a continuation of the policies defined in the previous bill, I can interpret the final vote as an indication of the legislators' preferences for the specific changes the bill made relative to the 2008 Farm Bill. Barnaby and Russell (2016) note that, since the passage of the 2014 Farm Bill, attempts by right-of-center legislators have been made to cut funding from crop insurance in an effort to reduce government spending. Since the 2014 Farm Bill increased funding for crop insurance, far-right legislators most likely voted against the 2014 Farm Bill because of its increased funding for crop insurance.

The results of the House-only regression indicate that the unwillingness by far-right legislators to vote in favor of the bill was confined to the Senate. That is, the effect of far-right ideology on the Farm Bill vote is not statistically significant using only House of Representatives data, so the estimate from the full-legislature regression applies only to the Senate. In the House, far-left legislators were less likely to vote in favor of the bill than centrists, indicating the unpopularity of the cuts to SNAP.

The results indicate that ideology is only an important factor for determining the passage of agricultural legislation at the extremes of the ideological spectrum. Those near the center were statistically no more or less likely to vote in favor of the bill. The discussion of the effects of electoral incentives and PAC contributions below provides more context.

Electoral Incentives

Electoral incentives were also expected to be correlated with legislators' votes. Since the majority of the budget of the 2014 Farm Bill is dedicated to SNAP, legislators might be influenced by the use of this program in their district or state. Bellemare and Carnes (2015) use poverty as a proxy for electoral incentives from SNAP recipients. I use data on the percentage of households in a district (for representatives) or state (for senators) that receive SNAP benefits as a measure of electoral incentives to increase funding for SNAP. This is a more direct measure of the effect of SNAP on the legislative process. The estimate of the marginal effect of SNAP-participant households on the probability of voting in favor of the bill was not statistically significant and its effect is uncertain.

The share of rural households in a district or state is a proxy for the intensity of the electoral incentive associated with the public's dependence on farm programs. In addition to the general dependence of rural communities on the agricultural sector, Ifft, Kuethe, and Morehart (2015) find that direct payments to farmers of the sort found in previous bills but repealed and replaced with risk-based policy in the 2014 law were capitalized into cropland values. This increase in agricultural land values provides a financial gain to current landholders outside of agriculture as well, since higher land values increase the value of collateral for rural lenders, improving the health of the rural economy. As Ifft, Kuethe, and Morehart (2013) indicate, it is common practice for rural lenders to require farmers to purchase crop insurance, with its significant subsidies from the Farm Bill, as a form of collateral to back their annual production loans. Rural development funding and conservation subsidies also provide benefits to the agricultural community as a whole. Thus, the broader rural community has a significant stake in the provisions of the Farm Bill and is likely to pressure legislators to vote in a manner consistent with their interests. This is done either by voting for a candidate who is likely to support agriculture or threatening to vote out a candidate who does not.

The marginal effect of the share of rural households on the probability of a vote in favor of the 2014 Farm Bill is 0.0067 (table 3) and is statistically significant at the 1% level. The adjusted predictions of a "Yea" vote on the 2014 Farm Bill at the minimum, 25th percentile, median, 75th percentile, and maximum of the share of rural households are found in table 5. Holding all other variables at their means, the adjusted predictions range from 45.06% to 93.13% for minimum (0%) and maximum (76.49%) values of the share of rural households, respectively.

The magnitude of the effect of rural household share is large; the difference in the probability of voting in favor of the 2014 Farm Bill of otherwise-average legislators living in the least rural and

Table 5. Adjusted Predictions of a "Yea" Vote on the 2014 Farm Bill across the Distributions of Key Variables, Holding All Other Variables at Their Means

	Share of Rural Households	Agricultural PAC Contributions	Environmental PAC Contributions[a]
Minimum	45.06%	36.32%	59.29%
	(0.00%)	($0.00)	($0.00)
25th percentile	47.84%	41.28%	59.82%
	(3.33%)	($18,100)	($2,000)
Median	58.25%	48.26%	60.97%
	(15.79%)	($42,750)	($6,418)
75th percentile	73.10%	67.35%	63.95%
	(35.17%)	($111,501)	($18,059)
Maximum	93.13%	100%	100%
	(76.49%)	($1,521,020)	($569,471)

Notes: Numbers in parentheses are the values of the independent variables at the indicated points on the distribution. [a] Since more than half the Environmental PAC contributions are $0, the 25th, 50th, and 75th percentiles were calculated using only observations greater than 0.

most rural areas is 48.07 percentage points. The probability that legislators in the least-rural districts would vote in favor of the bill was less than 50%, but it is virtually certain that they would vote for the bill in the most rural areas. Comparing two otherwise-identical legislators with rural household shares at the 25th and 75th percentiles, I find a difference in probability of voting in favor of the bill of 25.26 percentage points, from 47.84% at the 25th percentile to 73.1% at the 75th percentile. This is an economically significant difference, since the probability is less than 50% at the 25th percentile and nearly 75% at the 75th percentile.

At the median (15.79% rural household share), there is a 58.25% probability that a legislator voted in favor of the bill. This result indicates that even legislators in areas with a small minority of rural households are more likely than not to vote in favor of pro-agriculture legislation. As noted above, the approach used in this paper does not allow for causal effects to be determined. However, there is a statistically significant, positive, and politically significant association between electoral incentives and the Farm Bill vote. There is a substantially higher probability a legislator will vote in favor of the bill if his or her constituency is above the median rural household share.

Results of the House-only regression indicate that electoral incentives are different for the two houses of Congress. For legislators in the House, the percentage of rural households at the district level did not have a statistically significant effect on the probability that the legislator would vote for the bill. This indicates that the statistically significant effect measured in the full legislature is only relevant in the Senate. However, this does not significantly alter the implications of the effects measured in the full-legislature regression, as the distribution of rural household shares in the Senate-only data is similar to the distribution of the data used in the full-legislature regression.

The positive association between the share of rural households and the probability of a "Yea" vote on the 2014 Farm Bill is difficult to reconcile with the reduction in farm program spending relative to the baseline. It is unlikely that the percentage of rural households is picking up the effect of relatively modest cuts to the nutrition program since the percentage of SNAP households is also controlled for in the model. It is possible that this effect is a result of the relatively modest cuts to farm support programs in general relative to the House and Senate bills. Additionally, Congress (2014) indicates that the roll call vote record during 2013 leading up to final passage gave no clear indication that the bill would pass in early February 2014. Legislators may have been apt to vote in favor of the bill so that future iterations of the bill did not further erode agricultural support.

PAC Contributions

Agricultural and environmental PACs spent a combined $55 million on the campaigns of senators and House members leading up to their most recent elections before the final vote on the 2014 Farm Bill. These contributions are rational given that legislators are in a position to vote for legislation that benefits these interest groups. Thus, even if—due to data restrictions—I cannot prove the existence of a causal relationship that amounts to "vote-buying" behavior by PACs, it is unlikely that rational PAC donors would donate to these campaigns if they did not expect some benefit in return (Bellemare and Carnes, 2015). The data and techniques used in this paper to minimize unobserved heterogeneity imply that the results below are at least suggestive of a causal relationship.

Both agricultural and environmental PAC contributions are positively associated with the probability of voting in favor of the bill. Coefficients of 0.0023 (agricultural PACs) and 0.0021 (environmental PACs) are estimated and are statistically significant at the 1% level. A *t*-test indicates that the two coefficients are statistically different from one another (*p* value 0.001) but the magnitudes are similar from an economic perspective. Given that there is a statistically significant relationship between PAC contributions and vote probability, a discussion of the adjusted predictions across the distributions of PAC donation sources follows.

Robustness checks for the estimates of the effects of PAC contributions on the 2014 Farm Bill vote generally support the results of the full model. The House-only regression (table 3) yields a higher-magnitude effect for both agricultural and environmental PAC contributions than in the full legislature. The effects are statistically significant and, given the results in the full legislature model, indicate that the effects of both agricultural and environmental PAC contributions are lower in the Senate. However, the direction and significance of the estimates is still the same as in the full-legislature regression.

Since the primary model in this paper includes two endogenous variables, it is important to determine whether the results are dependent on the inclusion of both variables. Thus, table 3 reports the results of two regressions in which one of the PAC donation variables is omitted. The estimates are statistically different—at the 0.001 level of significance—from those in the full legislature model, but they are economically very similar. This indicates that the primary results of this study are not, in fact, dependent on the specification of the endogenous variables in the model.

The positive correlation between PAC contributions from both sources and the probability of a vote in favor of the 2014 Farm Bill indicates that the final bill was preferable for both groups relative to the expected result of a temporary extension of the 2008 Farm Bill. For agricultural interests, an extension of the 2008 Farm Bill would have meant continued commodity support absent from the 2014 bill, but negotiating power would likely have deteriorated such that support in a future version of the 2014 legislation would have been weaker than in the version that passed. Support among legislators of both major parties for agricultural subsidies is expected to decline in the future (Barnaby and Russell, 2016).

Adjusted predictions that an otherwise-average legislator would vote in favor of the 2014 Farm Bill range from 36.32% at the minimum agricultural PAC donation amount ($0) to 100% at the maximum amount ($1,521,020), a difference of 63.68 percentage points. The median donation amount ($42,750) is associated with a 48.26% probability of voting in favor of the bill. Thus, legislators receiving donation amounts in the bottom half of the agricultural PAC donation distribution are more likely to vote against the 2014 Farm Bill than to vote in favor of it. Contributions in excess of $49,000 are associated with a greater than 50% chance a legislator voted in favor of the bill. Finally, an increase in contributions of $93,401 from $18,100 (25th percentile) to $111,501 (75th percentile) is associated with an increased probability of voting in favor of the bill of 26.07 percentage points from 41.28% to 67.35%. While these findings are not proof of a causal relationship between campaign contributions from agricultural PACs and votes in favor of policies that benefit agricultural producers, they are certainly indicative of such a relationship. It is possible that other confounding factors that affect this relationship have been omitted from the model, but I

Table 6. Adjusted Predictions for PAC Contributions of $25,000 and $125,000, Holding All Other Variables at Their Means

	Agricultural PACs	Environmental PACs
$25,000	46.85%	73.80%
$125,000	72.47%	90.56%
Change (percentage points)	25.62	16.76

have controlled for many major factors that are likely to affect a legislator's decision to vote on the 2014 Farm Bill.

Though conservation spending was reduced in the 2014 Farm Bill relative to the 2008 bill, the positive correlation between environmental PAC contributions and the probability of voting in favor of the 2014 bill is consistent with two other major changes to the bill. The 2014 Farm Bill significantly reduced subsidies for commodities by eliminating direct payments to farmers. Further, under the 2014 bill, farmers are required to file a conservation plan for their operation in order to receive crop insurance premium subsidies. Such subsidies range from 40% to 60% and represent a significant reduction in per acre production costs. Reductions in commodity support and crop insurance premium subsidies are major goals of environmental lobbying organizations (Schechinger, 2016; Weir and Cox, 2016).

As evidenced by the adjusted predictions in table 5, the estimated effects of environmental PAC contributions on the 2014 Farm Bill vote are smaller than the effects of agricultural PAC contributions. Since more than half of legislators received no money from environmental PACs, the 25th, 50th, and 75th percentiles of environmental PAC donation amounts are calculated using only donation amounts above $0. Holding all other variables at their means, the adjusted prediction at the minimum donation amount ($0) is 59.29%, while the prediction at the maximum amount ($569,471) is 100%, a difference of 40.71 percentage points. Over the same percentile range, agricultural PAC contributions are associated with an increased probability of a vote in favor of the bill of 63.68 percentage points. The 25th, 50th, and 75th percentile environmental PAC donation amounts ($2,000, $6,418, and $18,059, respectively) are associated with adjusted predictions of 59.82%, 60.97%, and 63.95%, respectively. Thus, an increase in environmental PAC contributions from the 25th to the 75th percentiles is associated with a much smaller increase in the probability of voting in favor of the bill than for agricultural PAC contributions—4.13 percentage points for the former and 26.07 percentage points for the latter.

Given that the adjusted predictions discussed above are calculated at the means and that the distributions of agricultural and environmental PAC contributions are different, it is useful to examine the adjusted predictions and the associated changes in the probability of a "Yea" vote at given dollar amounts. Table 6 shows the adjusted predictions for agricultural and environmental PAC contributions of $25,000 and $125,000, holding all other variables at their means. The changes in predicted probability of a "Yea" vote on the 2014 Farm Bill associated with this $100,000 increase in contributions were 25.62 percentage points for agricultural PACs and 16.76 percentage points for environmental PACs. This result is indicative of a higher degree of influence for agricultural PACs than for environmental PACs. I expected the higher degree of targeting of funds from environmental PACs to make their contributions more effective at the margin. The fact that their contributions are actually *less effective* implies that, perhaps, environmental groups did not favor the changes made to agricultural policy by the 2014 Farm Bill as much as agricultural groups did.

Conclusion

This paper examined the effects of legislator ideology, electoral incentives, and agricultural and environmental interest group PAC contributions on the passage of the 2014 Farm Bill. The Farm Bill affects many constituencies and functions as a grant of government privilege to agricultural

producers, conservation advocates, and those requiring food assistance. While the data and model employed in this paper do not allow for positive proof that these relationships are causal, the use of instrumental variables and several control variables thought to be related to the legislators' vote decision increase our confidence that the estimates are indicative of causal relationships.

This study indicates that, of the three factors examined, legislator ideology plays a relatively minor role in determining agricultural policy. Legislators in the ideological extremes—both left and right—are somewhat less likely to support agricultural support policies, but only those on the far right have a statistically significantly lower probability of voting in favor of such legislation than other legislators. This indicates that budgetary concerns are most likely the primary ideological issue since, as Barnaby and Russell (2016) note, such concerns dominate current efforts to reduce agricultural support.

A more important factor, as indicated by the results of the analysis, is the size of rural constituencies. The findings of this study indicate that legislative incentives provided by agricultural residents (i.e., their preference for agricultural support policies given the direct and indirect positive effects such policies have on rural communities) are effective in increasing the probability that legislators will vote in favor of agricultural support policies, specifically the 2014 Farm Bill. As rural populations continue to shrink across the United States, an important source of political support for agricultural policy will also diminish.

A meta-analysis of the campaign-contribution literature by Ansolabehere, de Figueiredo, and Snyder (2003) indicates that—while findings are mixed across laws, legislatures, and interest groups—statistically significant effects of campaign contributions by agricultural interest groups are relatively consistent. This paper contributes to the literature on the effects of PAC contributions on agricultural legislation by i) estimating the effects of recent efforts by agricultural interests and ii) determining whether and in what direction PAC contributions by environmental interests affect such legislation. Our findings are indicative of a positive and economically significant relationship between agricultural and environmental PAC contributions and legislation designed to support agriculture and conservation interests. Additionally, I find that agricultural PACs donate more and appear to have more influence than environmental interests. Rational campaign donors obviously perceive some benefit from the campaign contributions they provide to legislators. This paper identifies the practical size of the effect these contributions may have.

Future research in this area should focus on disaggregating the influence of agricultural interest groups on the policy process. Given the regional policy disagreements that led to a choice of Title I policies for farmers, an examination of the regional or commodity-based influence on agricultural policy will inform producers, policy analysts, legislators, regulators, and the public on the degree to which specific groups exert influence over the political process.

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