The Impact of Agricultural Political Action Committee Donations on Repeated Farm Bill Votes

Scott Callahan, North Carolina State University, secalla2@ncsu.edu

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1 Introduction

Over the last thirty years, there has been a great effort to study the impact of political action committee (PAC) activities on policy outcomes. In most cases, researchers study the impact of direct campaign donations on voting behavior for a single, specific bill. This study seeks to look at the impact of campaign donations on a pooled cross-section of final votes for U.S. farm bills. The reason for the focus on farm bill votes is that a new farm bill is typically passed every five or six years. It is a regularly repeated event.

The basic form for the model follows from Chappell (1982). Chappell's probit-tobit model forms the backbone of the entire political economy literature on vote decisions. The donation decision is represented by a tobit equation, since donations are censored with a lower bound of zero. This donation equation is a function of the power of the legislator to act on the issue. The probit equation represents the vote decision, which is a function of donations, constituency characteristics and the initial position of the legislator on the issue at hand [3].

There is a substantial literature utilizing this basic framework for studying congressional votes. Stratmann (1995) studies the impact of the timing of campaign donations by agricultural PACs on votes for farm bill amendments in the House of Representatives. The main deviation of this framework from Chapell's model is the use of two tobit equations; one for donations in the same election cycle as the farm bill vote, and one for donations lagged by one election cycle. The focus is on farm bill amendment votes which occurred during the debate for the 1981 and 1985 farm bills. Stratmann finds that donations in both the current and previous election cycles are significant determinants of a legislator's vote decision [14].

Abler (1989) studies coalition formation between the agricultural industry and PACs representing the interests of the poor, since farm bills set policy for both agricultural programs and food subsidies. He finds that there is significant evidence of agricultural PACs supporting farm bill amendments that do not help their industry, suggesting the existence of coalitions of farming PACs that represent different crops form to push a mutual agenda [1].

Brooks, Cameron and Carter (1998) studies the impact of direct campaign donations from pro and anti sugar interests on votes to repeal sugar tariffs. This is done with a three equation probit-tobit model. The pro-sugar PACs consist of PACs representing the interests of sugar producers, while the anti-sugar lobby consists of PACs representing firms that use sugar as an intermediate good, such as confectionary producers. The authors find that an increase in the propensity of a legislator to cast a vote favorable to sugar interests increases the amount of money donated by said sugar interests. Committee membership had no statistically significant impact on the vote decision [2].

Drope and Hansen (2004) look at the impact of PAC campaign donations, soft money and lobbying on the executive branch implementation of trade protection. The majority of protection measures impact the steel industry. This issue is low visibility, which lends itself to enhanced rent seeking behavior since the general public is not likely to notice. The dependent variable is the protection decision. Independent variables include the merits of the case, variables regarding foreign trade relations and political factors. Included in the political factors are lobbying, campaign donations and soft money donations towards legislators that sit on committees that oversee the trade protection bureaucracy, primarily the House Ways and Means committee and the Senate

Finance Committee. Results show that a one million dollar increase in firm spending on legislators increases the probability of a favorable judgment by ten percent. Political factors are significant in all models, along with true economic hardship. Using firm level data, this study finds that industries that lie in districts with relevant committee representation receive more trade protection than those that do not [6].

This study seeks to expand the political economy literature in two ways; first it seeks to quantify the impact of historical events on both the vote decisions of legislators and the donation decisions of PACs. To do this, farm bill votes are treated as repeated observations of the same event in a pooled cross section. Secondly, this study seeks to estimate the legislator's vote decision as a function of donations received from different subsets of the agricultural lobby simultaneously. This modification of the standard probit-tobit framework found in this literature should shed light on the varying power of different farming lobbies, and the impact of external events on donation amounts and legislative outcomes.

2 Model

This model is of the form of a simultaneous probit-tobit model [3]. The tobit equation represents the propensity of farming PACs to donate to a particular legislator, while the probit equation represents the propensity for a legislator to vote yes on a key piece of legislation. Let $D^*_{i,t}$ represent the propensity for farming PACs to donate to legislator i in period t and $P_{i,t}$ be a vector of variables describing the legislative power of legislator i in period t. If farming PACs have a negative propensity to donate, they will not donate, leading to a truncated dependent variable. $P_{i,t}$ contains information on political power and the committee membership of legislator i in period t. $P_{i,t}$ contains information on committee membership and committee seniority. Then, the donation equation is as follows.

$$D^*_{i,t} = \alpha + \beta P_{i,t} + \sigma\varepsilon_{1,t} \tag{1}$$

$$D_{i,t} = \begin{cases} D^*_{i,t} \text{ if } D^*_{i,t} > 0 \\ 0 \text{ otherwise.} \end{cases} \tag{2}$$

Let $V^*_{i,t}$ represent the probability that legislator i votes yes on a farm bill in period t. Since the observed behavior is a binary decision, the equation will be in the form of a probit model. This decision to vote yes is believed to depend in part on donations from farming PACs, denoted by $D_{i,t}$. In addition, the vote decision will depend on the farming characteristics of legislator i's constituency, denoted by $C_{i,t}$ and the initial political position of legislator i, denoted by $X_{i,t}$. Then, the probit equation is as follows.

$$V^*_{i,t} = \gamma + \delta D_{i,t} + \zeta C_{i,t} + \eta X_{i,t} + \varepsilon_{2,t} \tag{3}$$

$$V^*_{i,t} = \begin{cases} 1 \text{ if } V^*_{i,t} > 0 \\ 0 \text{ otherwise.} \end{cases} \tag{4}$$

Assumptions regarding the forms of the error terms are as follows. Donations and the voting decision are assumed to be endogenous. It is probable that a legislator's vote decision depends in part on how much campaign donation money they receive from a special interest group. It is also probable that special interest groups donate to legislators to entice them to vote in their favor.

$$E[\varepsilon_{k,t}] = 0$$
$$E[\varepsilon_{k,t}^2] = 1$$
$$E[\varepsilon_{1,t}\varepsilon_{2,t}] = \rho$$

These equations are estimated simultaneously and are identified using exclusion restrictions [16]. Unlike previous studies, this model consists of a time series of repeated farm bill votes. The five votes included in this study are for the 1986, 1990, 1996, 2002 and 2008 farm bills.

Since the focus is on how multiple farming lobbies influence the same vote decision, a model in which all of the farming lobbies are included seems more logical than separate estimations. The modified model follows.

Let $D^*_{i,j,t}$ represent the propensity for the PACs representing farming lobby j to donate to legislator i in period t and let $P_{i,t}$ represent the legislative power of legislator i in election cycle t. Then, we have the following donation equations, one for each farming lobby j.

$$D^*_{i,j,t} = \alpha + \beta P_{i,t} + \sigma_j \varepsilon_{i,j,t} \tag{5}$$
$$D_{i,,j,t} = \begin{cases} D^*_{i,j,t} \text{ if } D^*_{i,j,t} > 0 \\ 0 \text{ otherwise.} \end{cases} \tag{6}$$

Let $V^*_{i,t}$ represent the propensity for legislator i to vote yes on a farm bill in period t. This vote decision is a function of the donations from farming PACs, represented by $D_{i,j,t}$, the characteristics of legislator i's constituency denoted by $C_{i,t}$, and the political attitudes of legislator i, denoted by $X_{i,t}$. Then, we have the following equations.

$$V^*_{i,t} = \gamma + \sum_j \delta_j D_{i,j,t} + \zeta C_{i,t} + \eta X_{i,t} + \varepsilon_{i,t} \tag{7}$$
$$V^*_{i,t} = \begin{cases} 1 \text{ if } V^*_{i,t} > 0 \\ 0 \text{ otherwise.} \end{cases} \tag{8}$$

Error term assumptions are as follows.

$$E[\varepsilon_{k,t}] = 0$$
$$E[\varepsilon^{*2}_{k,t}] = 1$$
$$E[\varepsilon_{k,t}\varepsilon_{l,t}] = \rho_{k,l}$$

This equations will be estimated in the same fashion as the previous form of the model.

3 Data

The data for this model comes from several sources. Campaign contribution data comes from the Federal Election Commission [5]. These data provide information on the PAC that makes the donation, including the name and address. Similar data is provided for the campaign receiving the donation. PAC donations are aggregated to the crop level. An observation will represent all of the donations from PACs representing some particular crop to a specific legislator in a certain time period. Data from the 1986 ,1990, 1996, 2002 and 2008 election cycles are used.

Campaign contribution data is also drawn from the Center for Responsive Politics. Their open secrets dataset is a modified version of the FEC dataset, which includes information on the industry or cause that the donating PAC represents [7]. For this project, these codes are used in part to verify that the methods for determining what crop a PAC represents are not reporting erroneous results.

Legislator data comes from two sources. The first source is from Garrison Nelson [9]. The second comes from Garrison Nelson and Charles Stewart III [10]. These data contain information on legislator characteristics such as party, committee membership, seniority, etc. These data are augmented with estimates of legislator ideology obtained from the DW-Nominate dataset, which is a widely cited estimate for political ideology used frequently in the political science literature authored by political scientists Jeffrey Lewis, Keith Poole, and Howard Rosenthal [12].

Data on farm bill votes comes from an organization called Civic Impulse LLC [4]. Their website, called Gov Track, presents data on all floor level votes from the House of Representatives and the Senate. These include votes on bills, amendments, resolutions, etc. Unfortunately, this resource does not contain information on committee level voting decisions.

Data on the quantity of production comes from the USDA National Agricultural Statistics Service [13]. These data include the quantity of production for each crop presented in this paper. For ease of comparison, all quantities have been converted to pounds. Data on the number of farmers in a given locale comes from the Bureau of Economic Analysis [11]. These data come aggregated to the county level. Congressional district shape files, produced by Lewis, DeVine, Pitcher and Martis, are used to map county level data into congressional district data [8]. The key assumption behind this transformation is that farmers and crop production are uniformally distributed within each county. While a strong assumption, the estimates produced by these data should be substantially more precise than previous iterations of this paper using state level data to control for spatial heterogeneity. While looking at quantities of production is not as good a measure of political relevance within a congressional district as the value of production (which is not tracked at the county level by the USDA NASS), it does appear to work fairly well, as the results will show. It may also be possible to manually compute the value of production, since the state level price received appears to be a variable tracked annually by the USDA NASS. This step will be considered for future revisions of this paper.

Summary statistics for each crop lobby are presented in tables 1 through 5. Due to a lack of convergence, the cotton and wheat lobbies have been dropped from the model. Due to a lack of a time consistent measure of production, the tobacco industry has also been dropped. These summary statistics are weighted averages of the relevant variables conditional on a donation being made, and weighted by the size of the donation. These data are only compiled for election cycles that contain a farm bill vote.

Table 1 reports the summary statistics for the cotton industry. Note that the variable for the quantity of cotton production is based exclusively on upland cotton. I could use advice for whether or not I should combine this with Pima cotton. The cotton lobby donates on average 1,429 dollars to each legislator they donate to per election cycle, with a standard deviation of 1,222. The smallest donation is roughly 55 dollars, while the largest is 7,649 dollars, indicating a large variation in donation amounts among recipients. Roughly 41 percent of these donations go to members of the House Committee on Agriculture, while 26 percent go to members of the House Appropriations Committee. On average, 47 percent of donations go to members of the Democratic party, while the average recipient of campaign donations leans slightly conservative with an ideology score of 53. The standard deviation of this ideology score is 19, indicating substantial heterogeneity in the partisanship of donation recipients. The committee seniority for the average recipient of donations is 3.6 years. 84 percent of the recipients of cotton industry donations vote yes on the farm bill. There are 1429 farmers and roughly 24 million pounds of cotton produced on average in each congressional district where the local House member receives donations. These statistics are based on a total of 450 donation observations

Table 2 reports summary statistics for the peanuts industry. The average recipient of peanut lobby donations received 1,811 dollars in direct campaign contributions, with a standard deviation of 2,052. The minimum donation is 324 while the maximum donation is $16,672, indicating a substantial variation in the size of donations. Members of the House Committee on Agriculture receive 57 percent of donations, while members of the House Appropriations Committee receive 25 percent. The committee seniority of the average recipient is approximately 3.4 years. Roughly 48 percent of the recipients of peanut lobby donations are Democrats, while the average ideology score is roughly 52, with a standard deviation of roughly 20. This indicates that, while the peanut lobby leans very slightly towards conservative Republicans on average, there is considerable diversity in the political attitudes of recipients. The average farming population in districts where the legislator received donations is 4,073, with an average of 8.6 million pounds of peanuts produced. These summary statistics are based on a total of 226 donation observations.

The summary statistics for the rice lobby are shown in table 3. The average recipient of rice lobby donations receive $2,129, with a standard deviation of $2,169. The lowest donation is approximately 232, while the largest donation is roughly 12,018. This indicates a great deal of heterogeneity in donation behavior. 83 percent of recipients vote yes on the farm bill. On average, 36 percent of recipients are members of the House Committee on Agriculture, while 12 percent are members of the House Appropriations Committee. On average, 48 percent of recipients are Democrats, with the average recipient having an ideology score of 53 percent. The standard deviation for the ideology score is roughly 20, indicating a slight preference for donating to Republicans and conservatives, though a large variation in the ideology of recipients. The average committee membership is 3.55 years. The farming population of districts in which legislators receive donations is 4232 people, with roughly 64 million pounds of rice produced in these districts. These statistics are based on a total of 200 donation observations.

Sugar beets lobby summary statistics are shown in table 4. The average recipient of donations receives $894 in direct campaign donations. The minimum donation is 213, while the maximum donation is \$6,644. The standard deviation is 630, indicating a lot of variation in the amount that particular legislators receive. 38 percent of recipients are members of the House Committee on Agriculture, while 21 percent are members of the House Appropriations Committee. On average, 47 percent of sugar beets lobby donation recipients are democrats. The ideology score of the average recipient is approximately 51, with a standard deviation of roughly 20. This indicates that the sugar beets lobby slightly prefers donating to Republicans, and on average donates to nearly perfect moderates, though there is considerable variation in ideology among recipients. The committee seniority of the average recipient is 3.81 years. 79 percent of recipients vote yes on the farm bill. The average farming population in districts for which the legislator received donations is 4,379, with roughly 238 million pounds of sugar beets produced in these districts. These summary statistics are based on a total of 364 donation observations.

Summary statistics for the sugar cane lobby are shown in table 5. The average recipient of sugar cane lobby donations receiveds \$1,415 in direct campaign donations. The largest donation is \$8,141 while the smallest donation is \$370. The standard deviation is \$1,022, indicating substantial variation in donation amounts. Roughly 80 percent of recipients voting yes on the farm bill. Roughly 25 percent of recipients are members of the House Committee on Agriculture, while 21 percent are members of the House Appropriations Committee. The seniority of the average recipient is 3.86 years. 53 percent of recipients are members of the Democratic party, with the average ideology score being roughly 50. The ideology score has a standard deviation of roughly 20, indicating a propensity to donate to both strong conservatives and strong liberals. The average farming population in congressional districts for which the legislator receives donations is 3,165, with an average level of production of 83 million pounds of sugar cane. These data are based on 948 donation observations, making the sugar cane lobby the most active crop lobby by far.

Time series graphs of these data are shown in figures 1 through 8. One potential point of confusion is the temporal variable on the horizontal axis of these graphs. This represents the congress in session during the farm bill vote. Beginning with donation amounts, shown in figure 1, we see that the sugar cane lobby is the most active in all of the election cycles containing farm bill votes. These donations fall dramatically in the election cycle for the 110th congress. The cotton lobby shows a spike in the 101st election cycle and falls in the 108th congress election cycle, while the rice lobby shows a spike in the 105th congress election cycle.

Figure 2 shows the quantity of production for each crop. All crop production data has been converted to pounds for consistent comparison. Here we see that sugar cane and sugar beets are the most produced crops of those included in this study. There is a severe drop in sugar beets production during the 107th congress, and a severe drop in sugar cane production during the 110th congress. Cotton, peanut and rice production are substantially lower in most years. Rice production appears to be increasing through most of the time series, while cotton production appears to be decreasing. Peanut production, while greater than zero in all election cycles, is relatively low compared to all other crops.

Figure 3 shows the size of the farming population over time. From the 101st congress onwards, the farming population is decreasing over time. As can be seen from figure 2, this does not appear to affect agricultural output. This is likely due to increased technological innovation in the agricultural industry.

The remainder of the graphs show the characteristics of the average recipient of farming PAC direct campaign donations. These averages are weighted by the size of the donation. Figure 4 shows the party affiliation of the average recipient of campaign donations. With the exception of the peanut lobby, it appears that donation patterns by party affiliation have similar trends across crops. There is an increase in donations to democrats in the election cycle occurring during the 101st congress. This drops for most crops during the election cycle during the 104th congress. Republicans retook the House of Representatives for the first time in decades in the election cycle for the 104th congress. Donations to Democrats increase for most crop lobbies during the 107th congress. Donations going to Democrats fall again during the election cycle taking place during the 110th congress.

Figure 5 shows the political ideology index of the average recipient of campaign donations. For all crops except sugar cane, there appears to be an upward trend in the conservatism of the average recipient of their donations from the beginning of the time series until the election cycle for the 108th congress. At this point, the conservatism of the average recipient declines for all crops except peanuts. Between this point and the election cycle for the 111th congress, the conservatism of the average recipient goes up for all crops except for sugar beets and peanuts. These trends are similar to the trends for average partisanship.

The seniority of the average recipient is shown in figure 6. Average seniority declines in the election cycle occuring during the 104th congress, likely due to the Republican Party upset in 1994. Seniority increases through the election cycle occurring during the 107th congress, and declines during the election cycle occurring during the 110th congress, likely caused by the Democratic Party upset in 2006.

The percentage of recipients belonging to the House Committee on Agriculture is shown in figure 7. Here we see that all crop lobbies donate to the agricultural committee, while some donate more than others. The sugar cane lobby donates the lowest percentage of their donations to members of this committee in most election cycles, though it is important to keep in mind that they donate more dollars than PACs representing most other crops. The rice lobby shows the most variation, donating as much as 60 percent in some election cycles, and as little as 20 percent in others. This drop in the percentage going to the agricultural committee coincides with an increase in the total level of donations. This graph suggests that all crops donate consistently to the agricultural committee in all election cycles, and donate to additional legislators sporadically.

Figure 8 shows the percentage of donations given to members of the House Appropriations Committee. It is obvious from the graph that donations to members of this committee are more volatile and lower in percentage overall than for the committee on agriculture. However, it does appear to be an important focus of donations. There is an increase across the board in the percentage of donations going to members of the appropriations committee in the election cycle for the 102st congress, followed by a drop across the board in the election cycle for the 105th congress. For most crops, appropriations committee donations increase across the board after this point, with the exception of the sugar beets and rice lobbies. For most crops, the appropriations committee accounts for between 20 and 30 percent of donations in most election cycles. This highlights the importance of including the appropriations committee in current research. It is one thing to have legislation benefiting agricultural interests passed. Additional legislation, drafted by the appropriations committee, must also be passed to fund it.

In some unreported versions of these models, the levels of SNAP benefits were included, since the farm bill also governs the SNAP program. SNAP benefits and farming population seemed to suffer from multicolinearity. I have not tried to add it back in since I disaggregated the control variables. I may try to incorporate this again in future versions.

4 Results

As discussed in section 2, two different general forms of the model are estimated. The first model estimates the impact of each lobby's donations on the legislators decision separately, with results shown in tables 7 through 15. The second version of the model estimates these effects jointly, shown in tables 17 and 19. Note that, between all of these regressions, certain explanatory variables in the vote equation are nearly identical between specifications and should intuitively have the same coefficients. These variables include political variables and the sole demographic variable, farming population.

Parameter estimates for the cotton lobby are shown in table 7. Beginning with the donation equation, results show that committee membership is extremely important in the decision to donate. The coefficients for both the agricultural committee membership indicator and the appropriations committee membership indicator are positive, of very high magnitude and statistically significant at the one percent level. The interaction of the agricultural committee indicator and committee seniority is positive, but statistically insignificant. The interaction of the appropriations committee indicator and committee seniority is negative and statistically insignificant. The impact of the amount of cotton produced in the legislator's district is positive and highly statistically significant. The temporal indicator for party majority, equal to one when Democrats control the House of Representatives, is positive and highly statistically significant. Sigma, representing the scalar multiplying the error term, is of large magnitude and statistically significant at the one percent level, implying that the error has a significantly larger variance in the donations equation relative to the vote equation.

Moving to the vote equation, the impact of cotton lobby donations on the vote decision of the legislator is positive, though not statistically significant. The political ideology variable, being a proxy for conservatism, is negative and statistically significant at the one percent level, though the coefficient itself is of very small magnitude. The farming population in a legislators district has a positive impact on the probability of voting yes, and it is statistically significant at the one percent level. The quantity of cotton harvested in the legislator's district also has a positive and statistically significant effect at the one percent level. The temporal indicator equal to one when Democrats control the House, is positive and statistically significant at the one percent level. The correlation coefficient between the equations is not statistically significant. The log likelihood for this model is -2,222.

The next model looks at the peanut lobby. Parameter estimates are shown in table 9. The impact of agricultural and committee membership on the quantity donated is positive, of large magnitude and statistically significant at the one percent level. The interaction of agricultural committee membership and committee seniority is positive, though not statistically significant. Counter to intuition, the interaction of appropriations committee membership and committee seniority is negative and statistically significant at the ten percent level. The impact of peanut production in the legislator's district on the size of the donation is positive and statistically significant at the one percent level. An indicator equal to one when Democrats control the House of Representatives is negative, of fairly large magnitude and statistically significant at the one percent level. Sigma, the coefficient on the error term of the donation equation, suggests that the standard deviation for this equation is ten times that of the vote equation, and highly statistically significant.

In the vote equation, the coefficient for peanuts donations is positive, though not statistically significant. The impact of political ideology is negative and statistically significant at the one percent level, implying that an increase in the conservatism of the candidate decreases the probability that they vote yes. Farming population has a positive, though low magnitude coefficient. This coefficient is statistically significant at the one percent level. Similarly, the impact of the quantity of peanuts produced in a legislator's district has a low magnitude, though it has a highly statistically significant impact on the probability of voting yes. The impact of a Democratic House majority is positive, highly significant and of large magnitude. The coefficient of correlation between these equations is negative and statistically insignificant. The log likelihood is -1,628.

Parameter estimates for the rice lobby are shown in table 11. The impact of agricultural committee membership on the size of the donation given by the rice lobby is positive, of large magnitude and statistically significant at the one percent level. However, while being positive, the coefficient on appropriations committee membership is not statistically significant. The interaction of agricultural committee membership with committee seniority is positive and significant at the one percent level. The interaction of appropriations committee membership and committee seniority is negative, though not significant. The rice lobby appears to donate more when democrats are in power. Rice production in a legislator's district has a positive and highly statistically significant impact on how much they receive in rice PAC donations. The impact of the Democratic Party having a majority in the House is negative and statistically significant at the one percent level. Sigma, the coefficient on the error term in the donation equation, is highly significant, and suggests that the standard error is roughly 11 times that of the vote equation.

The impact of rice lobby donations is positive, of small magnitude, and not statistically significant. The impact of political ideology is negative, though of very small magnitude, and significant at the one percent level. This implies that an increase in the conservatism of a legislator decreases the probability they vote yes on the legislation. The variable for the farming population in a legislator's district has a positive coefficient which is highly statistically significant, while the quantity of rice produced has a statistically insignificant effect. The probability a legislator votes yes increases when Democrats have a majority in the House. The correlation coefficient between the equations is negative and highly statistically significant. The log likelihood is -1,680.

Results for the sugar beets lobby are shown in table 13. Beginning with the donation equation, agricultural committee membership and appropriations committee membership have a positive impact on the size of the donation. Agricultural committee membership is highly statistically significant, while appropriations committee membership is not statistically significant at all. The interaction of committee seniority and agricultural committee membership is positive, while the interaction with appropriations committee membership is negative. Neither are statistically significant. The amount of sugar beets produced in a legislator's district has a positive and highly statistically significant impact on the amount of direct campaign donations they receive. The sugar beets lobby appears to donate more when Democrats have a majority in the House. These political effects are statistically significant at the one percent level. The variance in the donation equation appears to be roughly nine times that of the vote equation.

In the vote equation, donations by the sugar beets lobby have a positive and highly statistically significant impact on the decision to vote yes on a farm bill. This coefficient is significant at the five percent level. The ideology coefficient is negative, of very low magnitude, and is statistically significant at the one percent level. The size of the farming population has a highly statistically significant and positive effect, though the magnitude is low. Contrary to intuition, having sugar beets producers in a legislator's district makes them less likely to vote yes on the farm bill, according to this coefficient. The impact is statistically significant at the five percent level. Legislators are more likely to vote yes on the farm bill when Democrats control the House. The impact of Democratic control of the House on the vote decision is significant at the one percent level. The correlation coefficient between these two equations is negative and highly statistically significant. The log likelihood is -2,155.

Table 15 shows parameter estimates for the sugar cane lobby. Agricultural committee membership and appropriations committee membership both have a positive and large magnitude impact on the amount donated to a legislator. These coefficients are significant at the one percent level. An interaction of committee seniority with agricultural committee membership had a negligible effect, as does an interaction of appropriations committee membership and committee seniority. The coefficient for the Democratic party majority indicator is negative, suggesting the sugar cane lobby donates less when Democrats control the House, though this is not statistically significant. The variance of the donation equation is nearly eight times the variance of the vote equation.

Sugar cane donations have a positive and statistically significant impact on the decision to vote yes on the farm bill. This coefficient is statistically significant at the five percent level. The impact of ideology is negative and statistically significant at the one percent level, suggesting that conservatives are less likely to vote yes on the farm bill. This coefficient is also significant at the one percent level. The impact of the size of the farming population in a legislator's district is also positive and statistically significant. While the impact of the quantity of sugar cane produced in a legislator's district is positive, the coefficient is not statistically significant. Overall, it appears that having a Democratic party majority in the House will increase the probability that legislators vote yes on a farm bill. This coefficient is significant at a one percent level. The correlation coefficient between the equations is negative and highly statistically significant. The log likelihood is -3588.

Before moving on to the combined models, it is important to keep in mind that the only variables that differ between the previously mentioned models in the vote equation are donations and pounds of crops. The remainder of the variables are identical in each model. As can be seen in tables 7 through 15, the coefficients for these common variables have the same signs, similar magnitudes and similar levels of significance. This suggests that the vote equation is fairly robust.

The literature generally looks at a specific vote in isolation, or the relationships between lobbies. The previous estimations, while consisting of a pooled time series, assume that each crop lobby is the sole source of influence for the farm bill vote. This is appropriate for previous studies, which look at amendment votes [14]. However, since the vote in this paper is a vote on a finalized farm bill, it is more logical to consider the combined effect. Table 17 shows parameter estimates for a combined model, in which the donations of the various lobbies enter the vote equation as separate terms. Table 19 shows estimates for a combined model in which the log of the sum of these donations appears in the vote equation.

Beginning with the model shown in table 17, we see that parameter estimates for the donation equations are comparable to the separate estimations. Likewise, the common variables in the vote equation also have comparable coefficients and standard errors. However, the coefficients on the donation terms in the vote equation vary quite a bit. The cotton donations coefficient becomes negative in the combined model, and loses statistical significance. The peanut donations coefficient also becomes negative and is statistically significant at the ten percent level. The rice donations coefficient loses significance and changes sign, as does the sugar beets donation coefficient. The only donation coefficient that maintains a positive sign and statistical significance is the coefficient on sugar cane donations. The magnitude increases, as does the statistical significance. In most cases, the variables representing pounds of crops maintain similar magnitudes and the same signs, but lose statistical significance. The exception is the variable for the quantity of rice produced, which becomes negative.

Looking at the correlations between the error terms of the equations of this model, it becomes apparent that the donation equations have positive and highly statistically significant correlations with each other. What also becomes apparent is that the correlations between the error terms in the vote equation and the donations equations are negative. In the case of the correlation coefficient between the vote equation and both cotton and sugar cane donations, these coefficients are statistically significant.

This suggests two things for improving model performance. First, the donations amounts for the various lobbies may be colinear, as suggested by the dramatic changes in coefficients and standard errors. This also suggests that, for the most part, the actions of the individual crop lobbies have little impact on farm bill voting decisions. To address these concerns, a second version of the model, where the donation term entering the vote equation is the log of a sum of donations for all crop lobbies, is presented in table 19. In some sense, this model is more intuitive, since the output of this process is a vote decision which effects all of the farming lobbies. Assuming all of the lobbies want a yes vote, it may be the case that the legislator takes the total amount of donations from supporters into consideration rather than the total from each subset of supporters.

The coefficients of the various donations equations are comparable to the individual lobby models and the previous combined model. The coefficient for the sum of donations in the vote equation is positive and statistically significant at the one percent level. The coefficients on the quantity of production variables are similar to that of the other combined model, as are the correlations.

5 Discussion

Since completing this draft of the results section, I found data on congressional seniority, i.e. how long a legislator has served. I added this in place of the interaction of the committees and committee seniority. It has a similarly negligible effect.

In some variations of these specifications, both ideology and an interaction of ideology with the Democratic majority indicator are included. In these versions, the conservatism variable has a positive coefficient, and the interaction term has a negative coefficient. These have been omitted, due to problems estimating standard errors in the current specification.

6 Conclusion

This paper takes a traditional approach to the study of the impact of campaign donations on legislative outcomes, using a probit-tobit model of the general framework set forth by Chappell (1982) [3]. The deviations from the previous literature are as follows. First, the focus is repeated final farm bill votes in a pooled cross section, rather than particular amendment votes. Second, political variables also include appropriations committee membership, instead of solely focusing on the agricultural committee. Thirdly, thanks to use of a pooled cross section, political regime changes are studied. Finally, the joint impact of multiple farming lobbies on the vote decision are studied.

Ideally, this study would focus on repeated farm bill amendment votes as previous studies have done. After extensive inspection of voting records, amendment votes are present in the data [4]. Farm bills typically are finalized in the second year of the congress, while they are typically introduced and amended in the first year of the congress, which made finding the amendments difficult, the Civic Impulse LLC website requires searching in each year rather than in each congress. Unfortunately, the Civic Impulse website does not always contain an explanation of what each amendment sought to accomplish. Despite these difficulties, it is possible that the focus could be shifted to amendment votes, which would greatly improve the strength of this model. With that said, focusing instead on votes for the complete farm bill allows for repeated observations of what is, essentially, the same event. If each farming PAC seeks a yes vote, and each farm bill achieves the same objectives, then this structure is reasonable. Agricultural committee membership appears to be a significant determinant of campaign donation behavior by agricultural PACs, as shown in Stratmann (1995). Appropriations committee membership is also highly significant in determining the level of contributions, which makes intuitive sense, given the fact that most agricultural programs require congress to appropriate federal funds, and funding bills are drafted by this committee. Based on figures 7 and 8, along with the summary statistics displayed in 7 through 15, in most cases, the bulk of direct campaign donations go to members of these two committees.

In previous drafts, I controlled for the votes that took place while the Bipartisan campaign Reform Act was in full force using an indicator variable. I chose to change the focus to partisan political regimes, since the impact of contribution limits has already been thoroughly studied by Stratmann (2006) [15]. Additionally, assuming transactions costs are sufficiently low, contribution limits should not have much impact on agricultural PACs, since they represent the interests of groups of people rather than specific organizations. As such, contribution limits can be bypassed by forming more PACs.

The sole partisan indicator included in this model is equal to one when Democrats have a majority in the House of Representatives. The impact on the donation decisions of the agricultural PACs appears to depend to some degree on which crop the PACs represent. In the case of the sugar beets industry, this correlation is fairly weak., while it is negative and highly statistically significant for the cotton, rice and peanuts PACs. In the case of the sugar cane industry, the Democratic majority indicator isn't statistically significant, which may indicate some degree of partisan neutrality.

Abler (1989) studied vote trading on farm bill amendment votes, showing that various agricultural interests and the lobby supporting SNAP engage in cooperation and competition in their support of farm bill amendment votes. Here, the joint impact of agricultural PACs on the complete farm bill are studied. When the amount of donations enters the vote equation separately, the results are inconclusive. This could be due to multicolinearity, since these variables are very highly correlated. When these variables are summed, the effect is positive and highly statistically significant. In this version of the model, the donation equations that are significantly correlated with the vote equation are the cotton, rice, sugar beets and sugar cane PACs. The peanuts equation is not.

Moving forward, there is some room for improvement with regards to temporal indicator variables. The analysis thus far is based on an assumption that all farm bill votes are repeated instances of the same event. However, if farm bills are different, and have varying impacts on the different crop lobbies, then there may be sufficient variation to detect evidence of these effects. In particular, if there is a farm bill that represents a major shift in the nature of agricultural programs, this would be a worthy candidate. It is my understanding that there has been a major shift away from direct crop subsidies towards crop insurance subsidies. The farm bill that implemented this shift is likely the best topic of study.

Obs	Name	Frequency	Min	Max	Mean	Std_Dev
1	congress	450	99.0000	110.00	102.80	3.71
2	COTTON_DONATIONS	450	55.5741	7649.61	1429.93	1222.88
3	farm_pop	450	0.0000	52027.78	4591.51	7644.27
4	cotton_pounds	450	0.0000	753529122.00	23995489.50	79785867.75
5	vote	441	0.0000	1.00	0.84	0.37
6	cotton_ag_com	450	0.0000	1.00	0.41	0.49
7	cotton_app_com	450	0.0000	1.00	0.26	0.44
8	cotton_ag_com_seniority	450	0.0000	16.00	1.41	2.18
9	cotton_app_com_seniority	450	0.0000	24.00	1.07	2.42
10	cotton_democrat	450	0.0000	1.00	0.47	0.50
11	cotton_first_dim	450	15.5500	98.90	53.03	19.05
12	cotton_committee_seniority	450	1.0000	24.00	3.59	2.75

Table 1: Summary statistics for the blank cotton.

Obs	Name	Frequency	Min	Max	Mean	Std_Dev
1	congress	226	99.000	110.00	104.57	3.82
2	PEANUTS_DONATIONS	226	324.215	16672.24	1811.86	2051.48
3	farm_pop	226	0.000	52027.78	4073.43	7041.18
4	peanuts_pounds	226	0.000	183532284.17	8614080.16	23431005.27
5	vote	224	0.000	1.00	0.83	0.37
6	peanuts_ag_com	226	0.000	1.00	0.57	0.50
7	peanuts_app_com	226	0.000	1.00	0.25	0.44
8	peanuts_ag_com_seniority	226	0.000	16.00	1.97	2.35
9	peanuts_app_com_seniority	226	0.000	11.33	0.97	1.95
10	peanuts_democrat	226	0.000	1.00	0.48	0.50
11	peanuts_first_dim	226	17.550	90.15	51.71	20.25
12	peanuts_committee_seniority	226	1.000	16.00	3.40	2.27

Table 2: Summary statistics for the peanuts lobby.

Obs	Name	Frequency	Min	Max	Mean	Std_Dev
1	congress	200	99.000	110.00	105.46	3.26
2	RICE_DONATIONS	200	231.559	12017.90	2129.09	2169.68
3	farm_pop	200	0.000	52027.78	4232.68	8193.19
4	rice_pounds	200	0.000	2078616792.10	63916730.50	238668844.39
5	vote	195	0.000	1.00	0.83	0.38
6	rice_ag_com	200	0.000	1.00	0.36	0.48
7	rice_app_com	200	0.000	1.00	0.12	0.32
8	rice_ag_com_seniority	200	0.000	16.00	1.29	2.29
9	rice_app_com_seniority	200	0.000	11.00	0.48	1.55
10	rice_democrat	200	0.000	1.00	0.48	0.50
11	rice_first_dim	200	19.850	98.90	52.91	20.72
12	rice_committee_seniority	200	1.000	16.00	3.55	2.66

Table 3: Summary statistics for the rice lobby.

Obs	Name	Frequency	Min	Max	Mean	Std_Dev
1	congress	364	99.000	110.00	102.85	3.71
2	SUGAR_BEETS_DONATIONS	364	213.382	6644.00	894.20	630.49
3	farm_pop	364	0.000	48950.43	4378.73	7035.13
4	sugar_beets_pounds	364	0.000	7476841207.40	238786889.93	786777807.19
5	vote	358	0.000	1.00	0.79	0.41
6	sugar_beets_ag_com	364	0.000	1.00	0.38	0.49
7	sugar_beets_app_com	364	0.000	1.00	0.21	0.41
8	sugar_beets_ag_com_seniority	364	0.000	8.50	1.18	1.82
9	sugar_beets_app_com_seniority	364	0.000	22.00	0.92	2.28
10	sugar_beets_democrat	364	0.000	1.00	0.47	0.50
11	sugar_beets_first_dim	364	16.550	98.90	50.87	20.50
12	sugar_beets_committee_seniority	364	1.000	26.00	3.81	3.14

Table 4: Summary statistics for the sugar beets lobby.

Obs	Name	Frequency	Min	Max	Mean	Std_Dev
1	congress	948	99.000	110.00	103.42	3.60
2	SUGAR_CANE_DONATIONS	948	370.494	8141.70	1415.51	1022.54
3	farm_pop	948	0.000	52027.78	3164.51	6074.18
4	sugar_cane_pounds	948	0.000	11788761148.00	83053460.81	730512098.93
5	vote	918	0.000	1.00	0.80	0.40
6	sugar_cane_ag_com	948	0.000	1.00	0.25	0.43
7	sugar_cane_app_com	948	0.000	1.00	0.21	0.41
8	sugar_cane_ag_com_seniority	948	0.000	16.00	0.81	1.73
9	sugar_cane_app_com_seniority	948	0.000	24.00	0.96	2.47
10	sugar_cane_democrat	948	0.000	1.00	0.53	0.50
11	sugar_cane_first_dim	948	14.450	98.90	49.61	20.24
12	sugar_cane_committee_seniority	948	0.667	24.00	3.86	3.07

Table 5: Summary statistics for the sugar cane lobby.

Model Fit Summary	
Number of Endogenous Variables	2
Endogenous Variable	YES COTTON_DONATIONS
Number of Observations	1691
Missing Values	511
Log Likelihood	−2222
Maximum Absolute Gradient	1.62133E−6
Number of Iterations	121
Optimization Method	Quasi−Newton
AIC	4473
Schwarz Criterion	4555

Parameter Estimates					
Parameter	DF	Estimate	Standard Error	t Value	Approx Pr ¿ —t—
COTTON_DONATIONS.Intercept	1	−16.646805	1.249420	−13.32	¡.0001
COTTON_DONATIONS.ag_com	1	9.191257	1.490116	6.17	¡.0001
COTTON_DONATIONS.app_com	1	5.614430	1.436260	3.91	¡.0001
COTTON_DONATIONS.ag_com_seniority	1	0.306138	0.336042	0.91	0.3623
COTTON_DONATIONS.app_com_seniority	1	−0.319914	0.206527	−1.55	0.1214
COTTON_DONATIONS.Dem_Control	1	4.526104	0.806804	5.61	¡.0001
COTTON_DONATIONS.cotton_pounds	1	0.548776	0.056593	9.70	¡.0001
_Sigma.COTTON_DONATIONS	1	8.998099	0.502328	17.91	¡.0001
YES.Intercept	1	−0.268057	0.108090	−2.48	0.0131
YES.COTTON_DONATIONS	1	0.067164	0.038590	1.74	0.0818
YES.FIRST_DIMENSION_COORDINATE	1	−0.011447	0.001608	−7.12	¡.0001
YES.farm_pop	1	0.050957	0.015868	3.21	0.0013
YES.cotton_pounds	1	0.010047	0.008210	1.22	0.2210
YES.Dem_Control	1	1.035347	0.072723	14.24	¡.0001
_Rho	1	−0.189095	0.145936	−1.30	0.1951

Table 7: Probit-Tobit regression results for cotton.

Model Fit Summary	
Number of Endogenous Variables	2
Endogenous Variable	YES PEANUTS_DONATIONS
Number of Observations	1690
Missing Values	512
Log Likelihood	−1628
Maximum Absolute Gradient	0.00253
Number of Iterations	120
Optimization Method	Quasi−Newton
AIC	3286
Schwarz Criterion	3367

Parameter Estimates					
Parameter	DF	Estimate	Standard Error	t Value	Approx Pr ¿ —t—
PEANUTS_DONATIONS.Intercept	1	−19.765873	1.977917	−9.99	¡.0001
PEANUTS_DONATIONS.ag_com	1	12.334541	2.055282	6.00	¡.0001
PEANUTS_DONATIONS.app_com	1	6.017525	2.367960	2.54	0.0110
PEANUTS_DONATIONS.ag_com_seniority	1	0.281517	0.433059	0.65	0.5156
PEANUTS_DONATIONS.app_com_seniority	1	−0.416910	0.395615	−1.05	0.2920
PEANUTS_DONATIONS.Dem_Control	1	−1.566152	1.083779	−1.45	0.1484
PEANUTS_DONATIONS.peanuts_pounds	1	0.632563	0.095721	6.61	¡.0001
_Sigma.PEANUTS_DONATIONS	1	10.460975	0.866579	12.07	¡.0001
YES.Intercept	1	−0.292667	0.108287	−2.70	0.0069
YES.PEANUTS_DONATIONS	1	0.051120	0.040450	1.26	0.2063
YES.FIRST_DIMENSION_COORDINATE	1	−0.011623	0.001597	−7.28	¡.0001
YES.farm_pop	1	0.060090	0.015274	3.93	¡.0001
YES.Dem_Control	1	1.075296	0.066456	16.18	¡.0001
YES.peanuts_pounds	1	0.019376	0.010135	1.91	0.0559
_Rho	1	−0.138790	0.144548	−0.96	0.3370

Table 9: Probit-Tobit regression results for peanuts.

Number of Endogenous Variables	2
Endogenous Variable	YES RICE_DONATIONS
Number of Observations	1692
Missing Values	510
Log Likelihood	−1680
Maximum Absolute Gradient	0.00908
Number of Iterations	133
Optimization Method	Quasi−Newton
AIC	3390
Schwarz Criterion	3472

Parameter Estimates					
Parameter	DF	Estimate	Standard Error	t Value	Approx Pr ¿ —t—
RICE_DONATIONS.Intercept	1	−18.227774	1.923523	−9.48	¡.0001
RICE_DONATIONS.ag_com	1	4.457469	2.308456	1.93	0.0535
RICE_DONATIONS.app_com	1	2.144803	3.002168	0.71	0.4750
RICE_DONATIONS.ag_com_seniority	1	0.987865	0.531428	1.86	0.0630
RICE_DONATIONS.app_com_seniority	1	−0.780467	0.532801	−1.46	0.1430
RICE_DONATIONS.Dem_Control	1	−5.846607	1.321876	−4.42	¡.0001
RICE_DONATIONS.rice_pounds	1	0.685284	0.111848	6.13	¡.0001
_Sigma.RICE_DONATIONS	1	12.623195	1.067389	11.83	¡.0001
YES.Intercept	1	−0.328312	0.104229	−3.15	0.0016
YES.RICE_DONATIONS	1	0.132862	0.046143	2.88	0.0040
YES.FIRST_DIMENSION_COORDINATE	1	−0.010734	0.001563	−6.87	¡.0001
YES.farm_pop	1	0.060187	0.014929	4.03	¡.0001
YES.Dem_Control	1	1.058816	0.065168	16.25	¡.0001
YES.rice_pounds	1	−0.005598	0.009232	−0.61	0.5443
_Rho	1	−0.651463	0.141079	−4.62	¡.0001

Table 11: Probit-Tobit regression results for rice.

Number of Endogenous Variables	2
Endogenous Variable	YES SUGAR_BEETS_DONATIONS
Number of Observations	1691
Missing Values	511
Log Likelihood	−2155
Maximum Absolute Gradient	0.00178
Number of Iterations	115
Optimization Method	Quasi−Newton
AIC	4341
Schwarz Criterion	4422

Parameter Estimates					
Parameter	DF	Estimate	Standard Error	t Value	Approx Pr ¿ —t—
SUGAR_BEETS_DONATIONS.Intercept	1	−14.466032	1.196249	−12.09	¡.0001
SUGAR_BEETS_DONATIONS.ag_com	1	5.613024	1.658023	3.39	0.0007
SUGAR_BEETS_DONATIONS.app_com	1	0.437549	1.761653	0.25	0.8038
SUGAR_BEETS_DONATIONS.ag_com_seniority	1	0.577200	0.381782	1.51	0.1306
SUGAR_BEETS_DONATIONS.app_com_seniority	1	−0.024790	0.233510	−0.11	0.9155
SUGAR_BEETS_DONATIONS.Dem_Control	1	1.526154	0.799508	1.91	0.0563
SUGAR_BEETS_DONATIONS.sugar_beets_pounds	1	0.439751	0.061380	7.16	¡.0001
_Sigma.SUGAR_BEETS_DONATIONS	1	10.056838	0.610554	16.47	¡.0001
YES.Intercept	1	−0.319854	0.104630	−3.06	0.0022
YES.SUGAR_BEETS_DONATIONS	1	0.127612	0.037573	3.40	0.0007
YES.FIRST_DIMENSION_COORDINATE	1	−0.011107	0.001575	−7.05	¡.0001
YES.farm_pop	1	0.066156	0.015762	4.20	¡.0001
YES.sugar_beets_pounds	1	−0.017720	0.007310	−2.42	0.0153
YES.Dem_Control	1	0.967085	0.073466	13.16	¡.0001
_Rho	1	−0.562246	0.123399	−4.56	¡.0001

Table 13: Probit-Tobit results for sugar beets.

Number of Endogenous Variables	2
Endogenous Variable	YES SUGAR_CANE_DONATIONS
Number of Observations	1691
Missing Values	511
Log Likelihood	−3588
Maximum Absolute Gradient	0.00130
Number of Iterations	117
Optimization Method	Quasi−Newton
AIC	7207
Schwarz Criterion	7288

Parameter Estimates					
Parameter	DF	Estimate	Standard Error	t Value	Approx Pr ¿ —t—
SUGAR_CANE_DONATIONS.Intercept	1	−3.226907	0.449427	−7.18	¡.0001
SUGAR_CANE_DONATIONS.ag_com	1	4.531001	1.135178	3.99	¡.0001
SUGAR_CANE_DONATIONS.app_com	1	2.176728	0.978325	2.22	0.0261
SUGAR_CANE_DONATIONS.ag_com_seniority	1	0.404854	0.274134	1.48	0.1397
SUGAR_CANE_DONATIONS.app_com_seniority	1	−0.080440	0.136171	−0.59	0.5547
SUGAR_CANE_DONATIONS.Dem_Control	1	−0.645372	0.467641	−1.38	0.1676
SUGAR_CANE_DONATIONS.sugar_cane_pounds	1	0.157349	0.066366	2.37	0.0177
_Sigma.SUGAR_CANE_DONATIONS	1	7.918434	0.281436	28.14	¡.0001
YES.Intercept	1	−0.554814	0.119227	−4.65	¡.0001
YES.SUGAR_CANE_DONATIONS	1	0.130202	0.033839	3.85	0.0001
YES.FIRST_DIMENSION_COORDINATE	1	−0.009916	0.001613	−6.15	¡.0001
YES.farm_pop	1	0.048850	0.015361	3.18	0.0015
YES.sugar_cane_pounds	1	0.000582	0.010101	0.06	0.9541
YES.Dem_Control	1	1.038645	0.072752	14.28	¡.0001
_Rho	1	−0.403183	0.140787	−2.86	0.0042

Table 15: Probit-Tobit results for sugar cane.

Number of Endogenous Variables	6
Endogenous Variable	YES COTTON_DONATIONS PEANUTS_DONATIONS RICE_DONATIONS SUGAR_BEETS_DONATIONS SUGAR_CANE_DONATIONS
Number of Observations	1687
Missing Values	515
Log Likelihood	−7051
Maximum Absolute Gradient	1.1165E−6
Number of Iterations	16
Optimization Method	Trust Region
AIC	14239
Schwarz Criterion	14614
Seed for Monte Carlo Integration	279169000
Number of Draws	20

Parameter Estimates					
Parameter	DF	Estimate	Standard Error	t Value	Approx Pr ¿ —t—
COTTON_DONATIONS.Intercept	1	−16.558041	1.246448	−13.28	¡.0001
COTTON_DONATIONS.ag_com	1	9.958914	1.532718	6.50	¡.0001
COTTON_DONATIONS.app_com	1	5.760531	1.453386	3.96	¡.0001
COTTON_DONATIONS.ag_com_seniority	1	0.277400	0.346826	0.80	0.4238
COTTON_DONATIONS.app_com_seniority	1	−0.332639	0.207926	−1.60	0.1096
COTTON_DONATIONS.Dem_Control	1	3.946509	0.804213	4.91	¡.0001
COTTON_DONATIONS.cotton_pounds	1	0.452491	0.049451	9.15	¡.0001
_Sigma.COTTON_DONATIONS	1	9.421791	0.547555	17.21	¡.0001
PEANUTS_DONATIONS.Intercept	1	−20.560261	2.081077	−9.88	¡.0001
PEANUTS_DONATIONS.ag_com	1	13.366095	2.139280	6.25	¡.0001
PEANUTS_DONATIONS.app_com	1	6.322308	2.378436	2.66	0.0079
PEANUTS_DONATIONS.ag_com_seniority	1	0.226650	0.444478	0.51	0.6101
PEANUTS_DONATIONS.app_com_seniority	1	−0.479975	0.404450	−1.19	0.2353
PEANUTS_DONATIONS.Dem_Control	1	−1.432430	1.083577	−1.32	0.1862
PEANUTS_DONATIONS.peanuts_pounds	1	0.571789	0.089422	6.39	¡.0001
_Sigma.PEANUTS_DONATIONS	1	10.906736	0.935079	11.66	¡.0001
RICE_DONATIONS.Intercept	1	−17.772349	1.911769	−9.30	¡.0001
RICE_DONATIONS.ag_com	1	4.099609	2.540358	1.61	0.1066
RICE_DONATIONS.app_com	1	−0.062520	3.204024	−0.02	0.9844
RICE_DONATIONS.ag_com_seniority	1	1.004391	0.587252	1.71	0.0872
RICE_DONATIONS.app_com_seniority	1	−0.595813	0.554069	−1.08	0.2822
RICE_DONATIONS.Dem_Control	1	−6.906731	1.394995	−4.95	¡.0001
RICE_DONATIONS.rice_pounds	1	0.616520	0.110944	5.56	¡.0001
_Sigma.RICE_DONATIONS	1	12.697730	1.085225	11.70	¡.0001
SUGAR_BEETS_DONATIONS.Intercept	1	−14.239356	1.197352	−11.89	¡.0001
SUGAR_BEETS_DONATIONS.ag_com	1	6.885984	1.736994	3.96	¡.0001
SUGAR_BEETS_DONATIONS.app_com	1	−0.769927	1.866722	−0.41	0.6800
SUGAR_BEETS_DONATIONS.ag_com_seniority	1	0.442901	0.408858	1.08	0.2787
SUGAR_BEETS_DONATIONS.app_com_seniority	1	0.017548	0.253046	0.07	0.9447
SUGAR_BEETS_DONATIONS.Dem_Control	1	0.853818	0.828167	1.03	0.3026
SUGAR_BEETS_DONATIONS.sugar_beets_pounds	1	0.344959	0.054926	6.28	¡.0001
_Sigma.SUGAR_BEETS_DONATIONS	1	10.411779	0.650490	16.01	¡.0001
SUGAR_CANE_DONATIONS.Intercept	1	−3.194326	0.443696	−7.20	¡.0001
SUGAR_CANE_DONATIONS.ag_com	1	4.296008	1.021338	4.21	¡.0001
SUGAR_CANE_DONATIONS.app_com	1	2.294499	0.875396	2.62	0.0088
SUGAR_CANE_DONATIONS.ag_com_seniority	1	0.433614	0.246719	1.76	0.0788
SUGAR_CANE_DONATIONS.app_com_seniority	1	−0.152053	0.120319	−1.26	0.2063
SUGAR_CANE_DONATIONS.Dem_Control	1	−0.563360	0.458794	−1.23	0.2195
SUGAR_CANE_DONATIONS.sugar_cane_pounds	1	0.121765	0.056786	2.14	0.0320
_Sigma.SUGAR_CANE_DONATIONS	1	7.945205	0.282831	28.09	¡.0001
YES.Intercept	1	−0.635013	0.102030	−6.22	¡.0001
YES.COTTON_DONATIONS	1	−0.033554	0.042764	−0.78	0.4327
YES.PEANUTS_DONATIONS	1	−0.065874	0.039753	−1.66	0.0975
YES.RICE_DONATIONS	1	−0.009170	0.044062	−0.21	0.8351
YES.SUGAR_BEETS_DONATIONS	1	−0.097990	0.054753	−1.79	0.0735
YES.SUGAR_CANE_DONATIONS	1	0.218557	0.024526	8.91	¡.0001
YES.FIRST_DIMENSION_COORDINATE	1	−0.008723	0.001535	−5.68	¡.0001
YES.farm_pop	1	0.035129	0.014254	2.46	0.0137
YES.cotton_pounds	1	0.009140	0.007496	1.22	0.2227
YES.peanuts_pounds	1	0.021128	0.008904	2.37	0.0176
YES.rice_pounds	1	0.004167	0.007764	0.54	0.5915
YES.sugar_beets_pounds	1	0.005814	0.007464	0.78	0.4361
YES.sugar_cane_pounds	1	−0.004430	0.009736	−0.46	0.6491
YES.Dem_Control	1	0.963075	0.082944	11.61	¡.0001
_Rho.COTTON_DONATIONS.PEANUTS_DONATIONS	1	0.437722	0.057944	7.55	¡.0001
_Rho.COTTON_DONATIONS.RICE_DONATIONS	1	0.250242	0.069198	3.62	0.0003
_Rho.COTTON_DONATIONS.SUGAR_BEETS_DONATIONS	1	0.419407	0.049048	8.55	¡.0001
_Rho.COTTON_DONATIONS.SUGAR_CANE_DONATIONS	1	0.583689	0.034232	17.05	¡.0001
_Rho.COTTON_DONATIONS.YES	1	−0.215891	0.104071	−2.07	0.0380
_Rho.PEANUTS_DONATIONS.RICE_DONATIONS	1	0.181885	0.082048	2.22	0.0266

Parameter Estimates					
Parameter	DF	Estimate	Standard Error	t Value	Approx Pr ¿ —t—
_Rho.PEANUTS_DONATIONS.SUGAR_BEETS_DONATIONS	1	0.441615	0.059068	7.48	¡.0001
_Rho.PEANUTS_DONATIONS.SUGAR_CANE_DONATIONS	1	0.426887	0.057171	7.47	¡.0001
_Rho.PEANUTS_DONATIONS.YES	1	0.018118	0.114093	0.16	0.8738
_Rho.RICE_DONATIONS.SUGAR_BEETS_DONATIONS	1	0.197365	0.068803	2.87	0.0041
_Rho.RICE_DONATIONS.SUGAR_CANE_DONATIONS	1	0.196808	0.055313	3.56	0.0004
_Rho.RICE_DONATIONS.YES	1	−0.185128	0.145633	−1.27	0.2037
_Rho.SUGAR_BEETS_DONATIONS.SUGAR_CANE_DONATIONS	1	0.539905	0.036978	14.60	¡.0001
_Rho.SUGAR_BEETS_DONATIONS.YES	1	−0.133898	0.158587	−0.84	0.3985
_Rho.SUGAR_CANE_DONATIONS.YES	1	−0.664565	0.084452	−7.87	¡.0001

Table 17: Probit-Tobit combined model, treating the donations of each farming lobby as separate influences upon the legislator.

Number of Endogenous Variables	6
Endogenous Variable	YES COTTON_DONATIONS PEANUTS_DONATIONS RICE_DONATIONS SUGAR_BEETS_DONATIONS SUGAR_CANE_DONATIONS
Number of Observations	1687
Missing Values	515
Log Likelihood	−7061
Maximum Absolute Gradient	1.23045E−6
Number of Iterations	13
Optimization Method	Trust Region
AIC	14242
Schwarz Criterion	14568
Seed for Monte Carlo Integration	475873000
Number of Draws	20

Parameter Estimates					
Parameter	DF	Estimate	Standard Error	t Value	Approx Pr ¿ —t—
COTTON_DONATIONS.Intercept	1	−16.803850	1.262989	−13.30	¡.0001
COTTON_DONATIONS.ag_com	1	9.873048	1.546443	6.38	¡.0001
COTTON_DONATIONS.app_com	1	5.925904	1.462805	4.05	¡.0001
COTTON_DONATIONS.ag_com_seniority	1	0.310558	0.351414	0.88	0.3768
COTTON_DONATIONS.app_com_seniority	1	−0.347393	0.208161	−1.67	0.0951
COTTON_DONATIONS.Dem_Control	1	4.146104	0.795654	5.21	¡.0001
COTTON_DONATIONS.cotton_pounds	1	0.453378	0.049628	9.14	¡.0001
_Sigma.COTTON_DONATIONS	1	9.521502	0.558474	17.05	¡.0001
PEANUTS_DONATIONS.Intercept	1	−20.401018	2.063363	−9.89	¡.0001
PEANUTS_DONATIONS.ag_com	1	13.102996	2.114218	6.20	¡.0001
PEANUTS_DONATIONS.app_com	1	6.264829	2.359821	2.65	0.0079
PEANUTS_DONATIONS.ag_com_seniority	1	0.282348	0.438578	0.64	0.5197
PEANUTS_DONATIONS.app_com_seniority	1	−0.457142	0.393504	−1.16	0.2453
PEANUTS_DONATIONS.Dem_Control	1	−1.440258	1.086551	−1.33	0.1850
PEANUTS_DONATIONS.peanuts_pounds	1	0.563959	0.089584	6.30	¡.0001
_Sigma.PEANUTS_DONATIONS	1	10.819766	0.923604	11.71	¡.0001
RICE_DONATIONS.Intercept	1	−17.931576	1.924344	−9.32	¡.0001
RICE_DONATIONS.ag_com	1	3.934784	2.494288	1.58	0.1147
RICE_DONATIONS.app_com	1	0.742460	3.135443	0.24	0.8128
RICE_DONATIONS.ag_com_seniority	1	1.075253	0.576149	1.87	0.0620
RICE_DONATIONS.app_com_seniority	1	−0.680588	0.549816	−1.24	0.2158
RICE_DONATIONS.Dem_Control	1	−6.619209	1.345341	−4.92	¡.0001
RICE_DONATIONS.rice_pounds	1	0.629482	0.109366	5.76	¡.0001
_Sigma.RICE_DONATIONS	1	12.682055	1.083449	11.71	¡.0001
SUGAR_BEETS_DONATIONS.Intercept	1	−14.490594	1.208567	−11.99	¡.0001
SUGAR_BEETS_DONATIONS.ag_com	1	6.620415	1.709532	3.87	0.0001
SUGAR_BEETS_DONATIONS.app_com	1	−0.214340	1.822367	−0.12	0.9064
SUGAR_BEETS_DONATIONS.ag_com_seniority	1	0.520801	0.402780	1.29	0.1960
SUGAR_BEETS_DONATIONS.app_com_seniority	1	−0.025585	0.245835	−0.10	0.9171
SUGAR_BEETS_DONATIONS.Dem_Control	1	1.202238	0.808605	1.49	0.1371
SUGAR_BEETS_DONATIONS.sugar_beets_pounds	1	0.335115	0.054260	6.18	¡.0001
_Sigma.SUGAR_BEETS_DONATIONS	1	10.444775	0.654025	15.97	¡.0001
SUGAR_CANE_DONATIONS.Intercept	1	−3.147607	0.447565	−7.03	¡.0001
SUGAR_CANE_DONATIONS.ag_com	1	4.675982	1.145928	4.08	¡.0001
SUGAR_CANE_DONATIONS.app_com	1	2.005906	1.005411	2.00	0.0460
SUGAR_CANE_DONATIONS.ag_com_seniority	1	0.366788	0.285089	1.29	0.1982
SUGAR_CANE_DONATIONS.app_com_seniority	1	−0.054647	0.137984	−0.40	0.6921
SUGAR_CANE_DONATIONS.Dem_Control	1	−0.798104	0.467687	−1.71	0.0879
SUGAR_CANE_DONATIONS.sugar_cane_pounds	1	0.122341	0.058135	2.10	0.0353
_Sigma.SUGAR_CANE_DONATIONS	1	7.964927	0.284985	27.95	¡.0001
YES.Intercept	1	−0.480429	0.117226	−4.10	¡.0001
YES.all_donations	1	0.073720	0.020733	3.56	0.0004
YES.FIRST_DIMENSION_COORDINATE	1	−0.010618	0.001584	−6.70	¡.0001
YES.farm_pop	1	0.053518	0.015158	3.53	0.0004
YES.Dem_Control	1	1.059239	0.066192	16.00	¡.0001
_Rho.COTTON_DONATIONS.PEANUTS_DONATIONS	1	0.426855	0.059542	7.17	¡.0001
_Rho.COTTON_DONATIONS.RICE_DONATIONS	1	0.259640	0.066448	3.91	¡.0001
_Rho.COTTON_DONATIONS.SUGAR_BEETS_DONATIONS	1	0.440380	0.047750	9.22	¡.0001
_Rho.COTTON_DONATIONS.SUGAR_CANE_DONATIONS	1	0.596849	0.033840	17.64	¡.0001
_Rho.COTTON_DONATIONS.YES	1	−0.190499	0.082282	−2.32	0.0206
_Rho.PEANUTS_DONATIONS.RICE_DONATIONS	1	0.236216	0.080450	2.94	0.0033
_Rho.PEANUTS_DONATIONS.SUGAR_BEETS_DONATIONS	1	0.415732	0.061228	6.79	¡.0001
_Rho.PEANUTS_DONATIONS.SUGAR_CANE_DONATIONS	1	0.415065	0.057393	7.23	¡.0001
_Rho.PEANUTS_DONATIONS.YES	1	−0.099248	0.087484	−1.13	0.2566
_Rho.RICE_DONATIONS.SUGAR_BEETS_DONATIONS	1	0.216601	0.067422	3.21	0.0013
_Rho.RICE_DONATIONS.SUGAR_CANE_DONATIONS	1	0.153103	0.057165	2.68	0.0074
_Rho.RICE_DONATIONS.YES	1	−0.350477	0.074183	−4.72	¡.0001
_Rho.SUGAR_BEETS_DONATIONS.SUGAR_CANE_DONATIONS	1	0.536405	0.036637	14.64	¡.0001
_Rho.SUGAR_BEETS_DONATIONS.YES	1	−0.339893	0.074454	−4.57	¡.0001
_Rho.SUGAR_CANE_DONATIONS.YES	1	−0.173332	0.085730	−2.02	0.0432

Parameter Estimates					
Parameter	DF	Estimate	Standard Error	t Value	Approx Pr ¿ —t—

Table 19: Probit-Tobit combined model, assuming that legislators care primarily about the total amount of donations received from the farming lobby .

Figure 1: Inflation adjusted campaign donations for applicable congresses by crop.

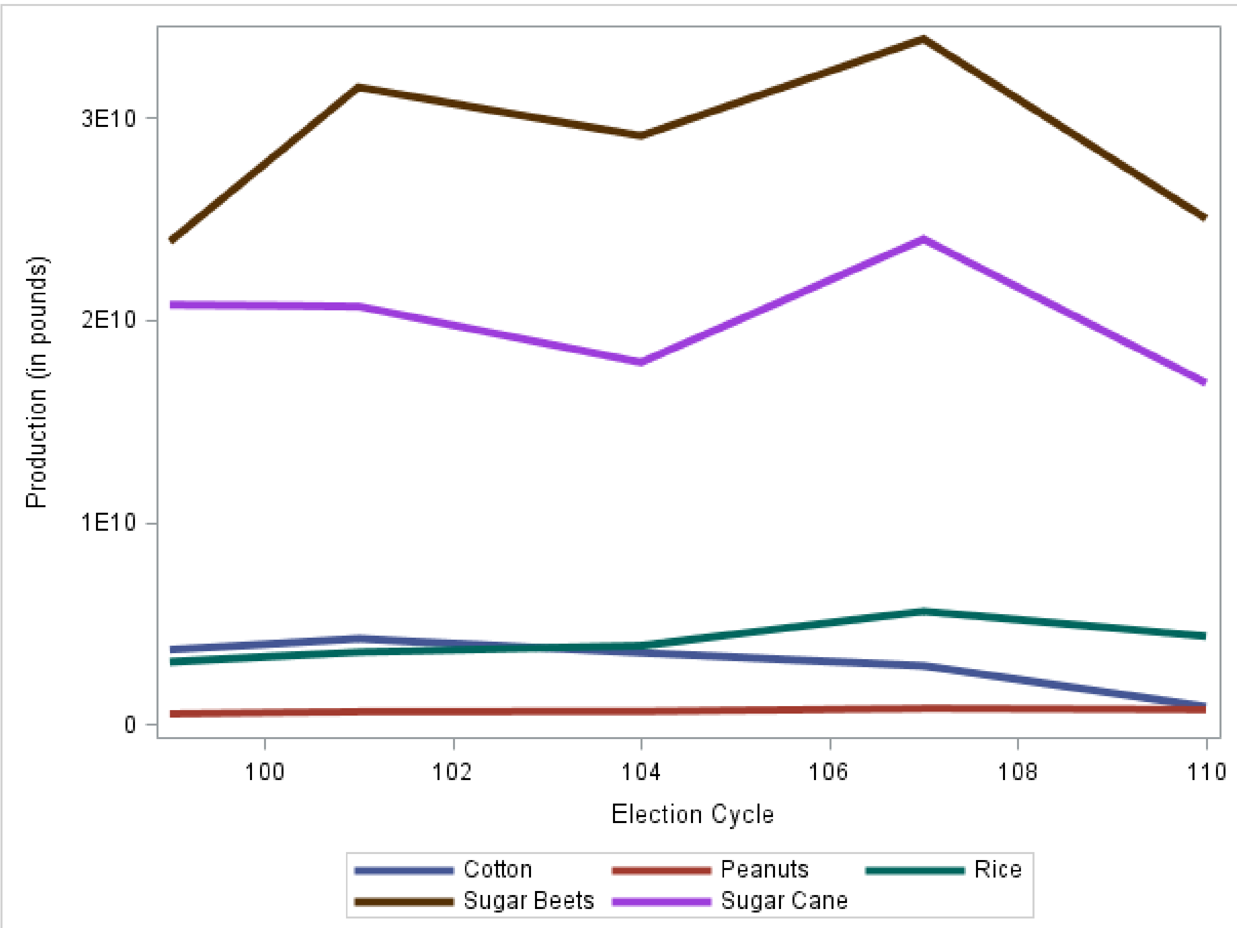

Figure 2: quantity of production for applicable congresses by crop. These variables are matched to legislators at the congressional district level.

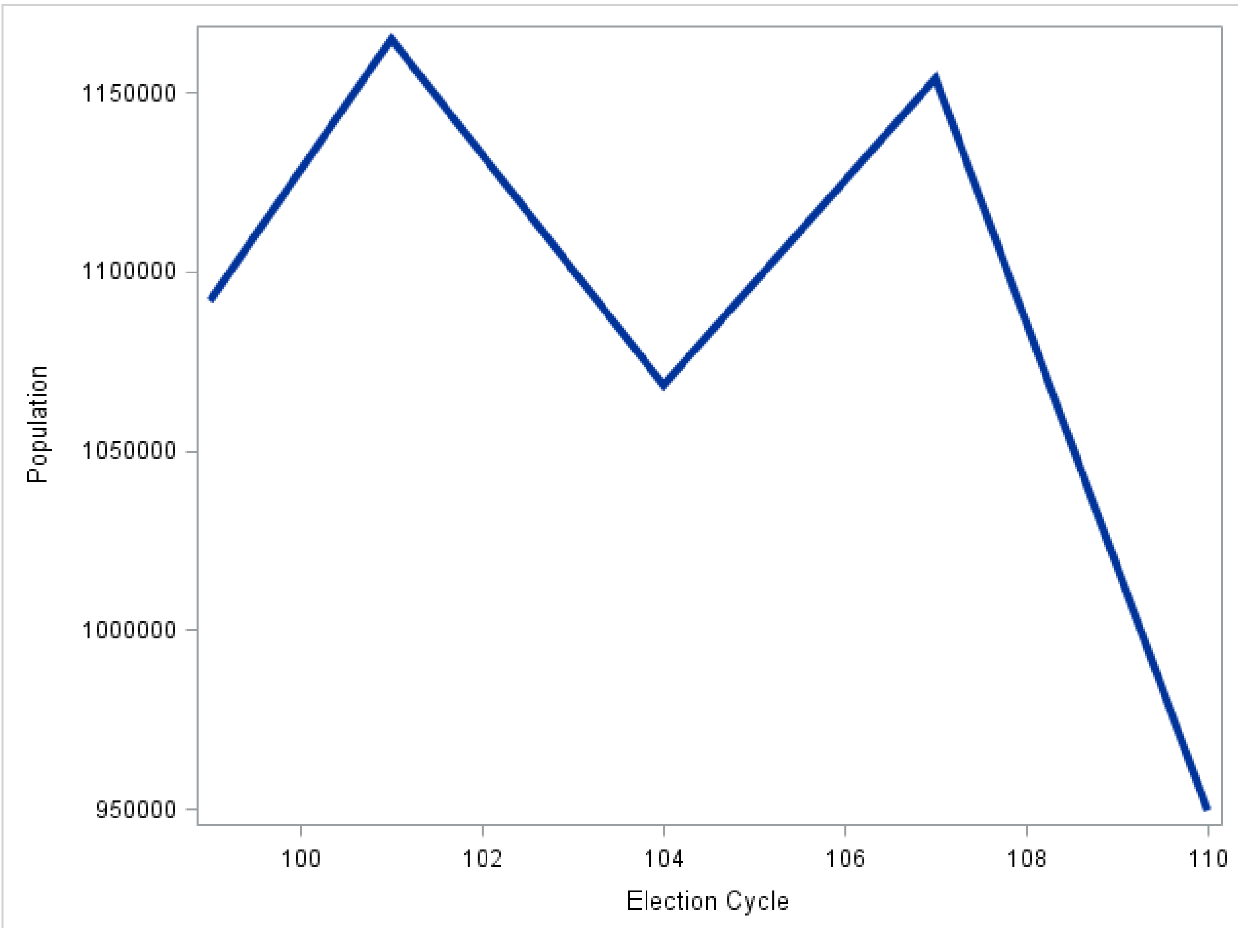

Figure 3: Total farming population for applicable congresses. This variable are matched to legislators at the congressional district level.

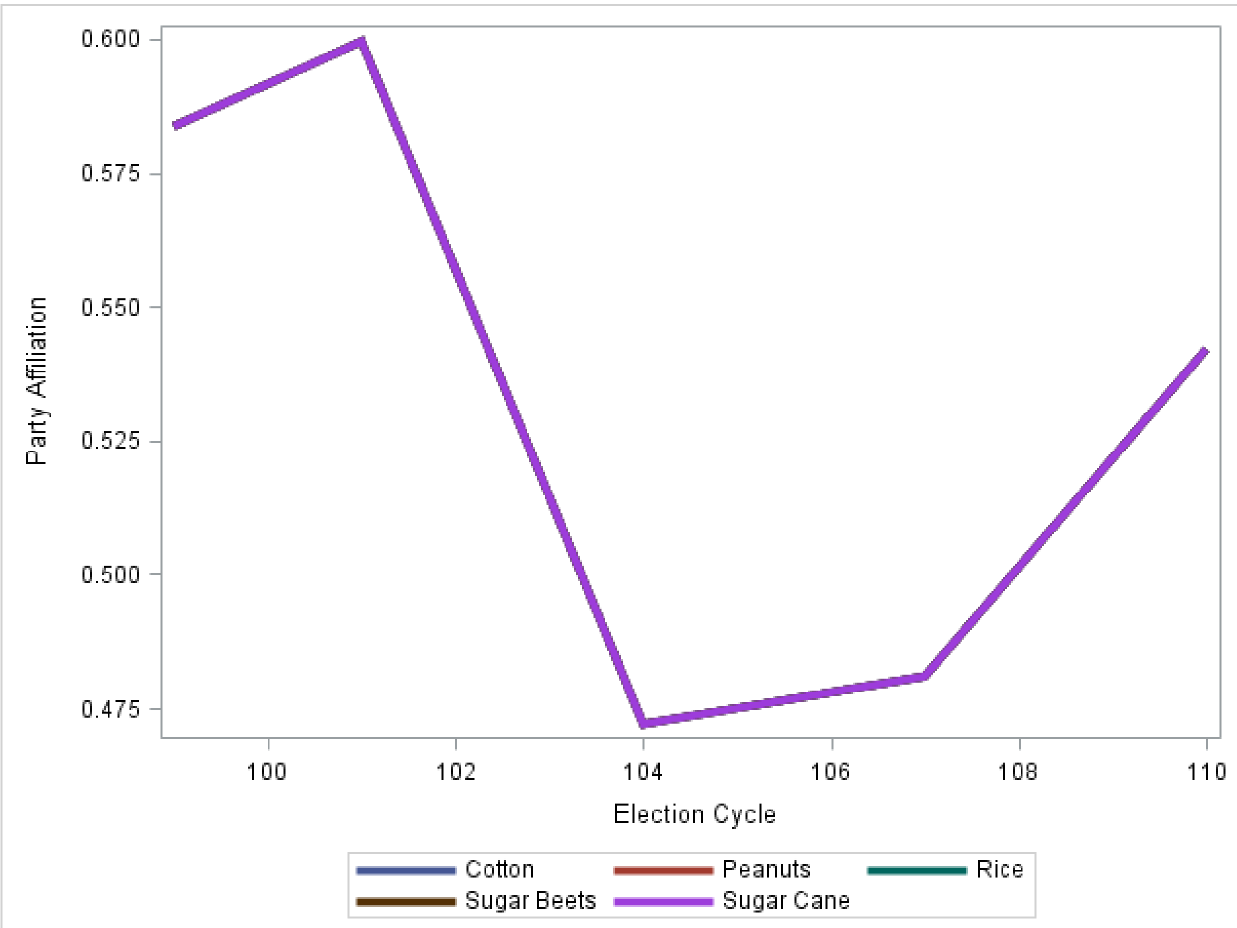

Figure 4: Party affiliation of the average recipient of campaign donations for applicable congresses by crop. This is based on the weighted average of indicators equal to one if the legislator is a Democrat, weighted by the size of the donation.

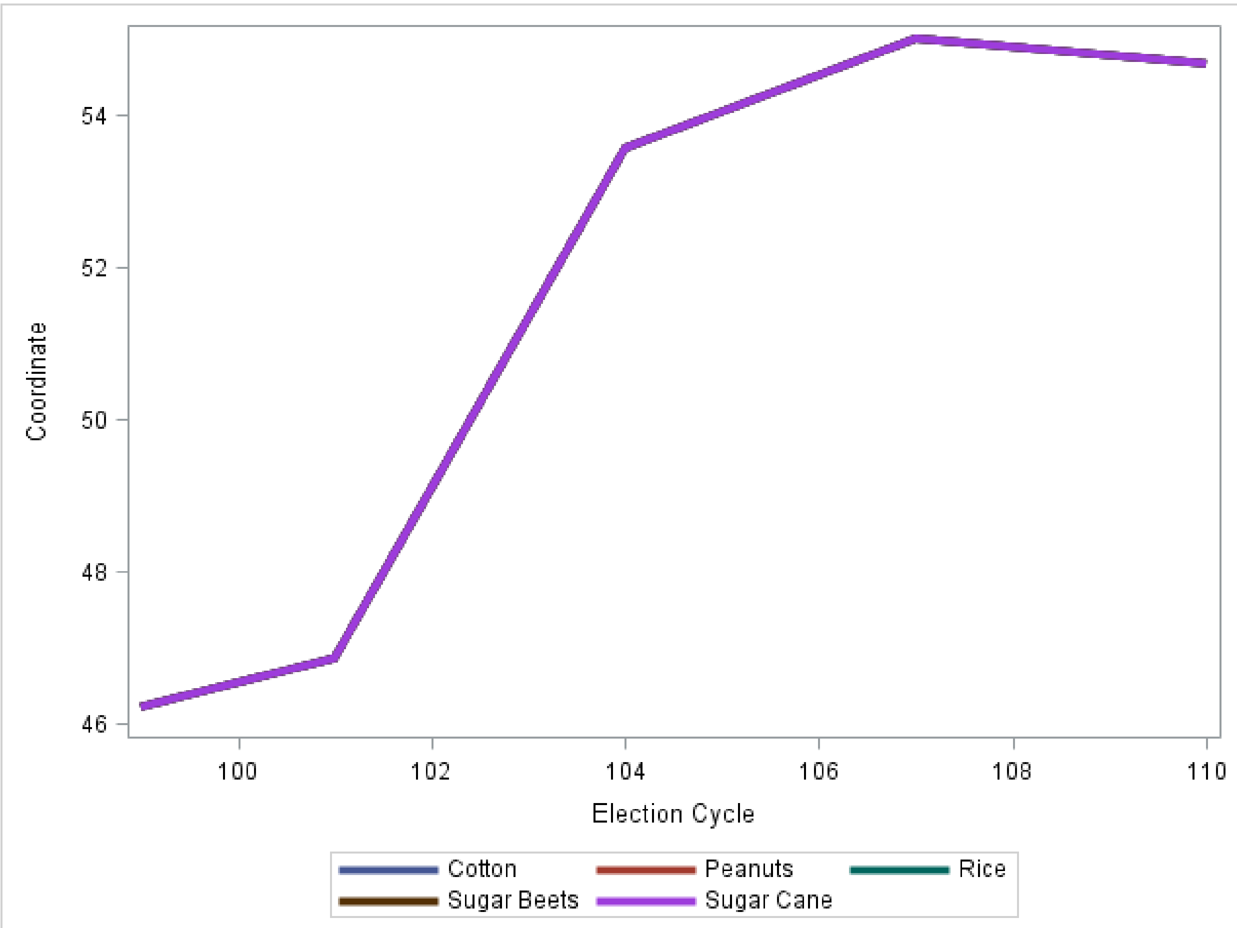

Figure 5: Ideology of the average recipient of campaign donations for applicable congresses by crop, weighted by the donation amount. A score of zero indicates that a candidate is extremely liberal, while a score of 100 indicates a candidate is extremely conservative. A perfect moderate has a score of 50.

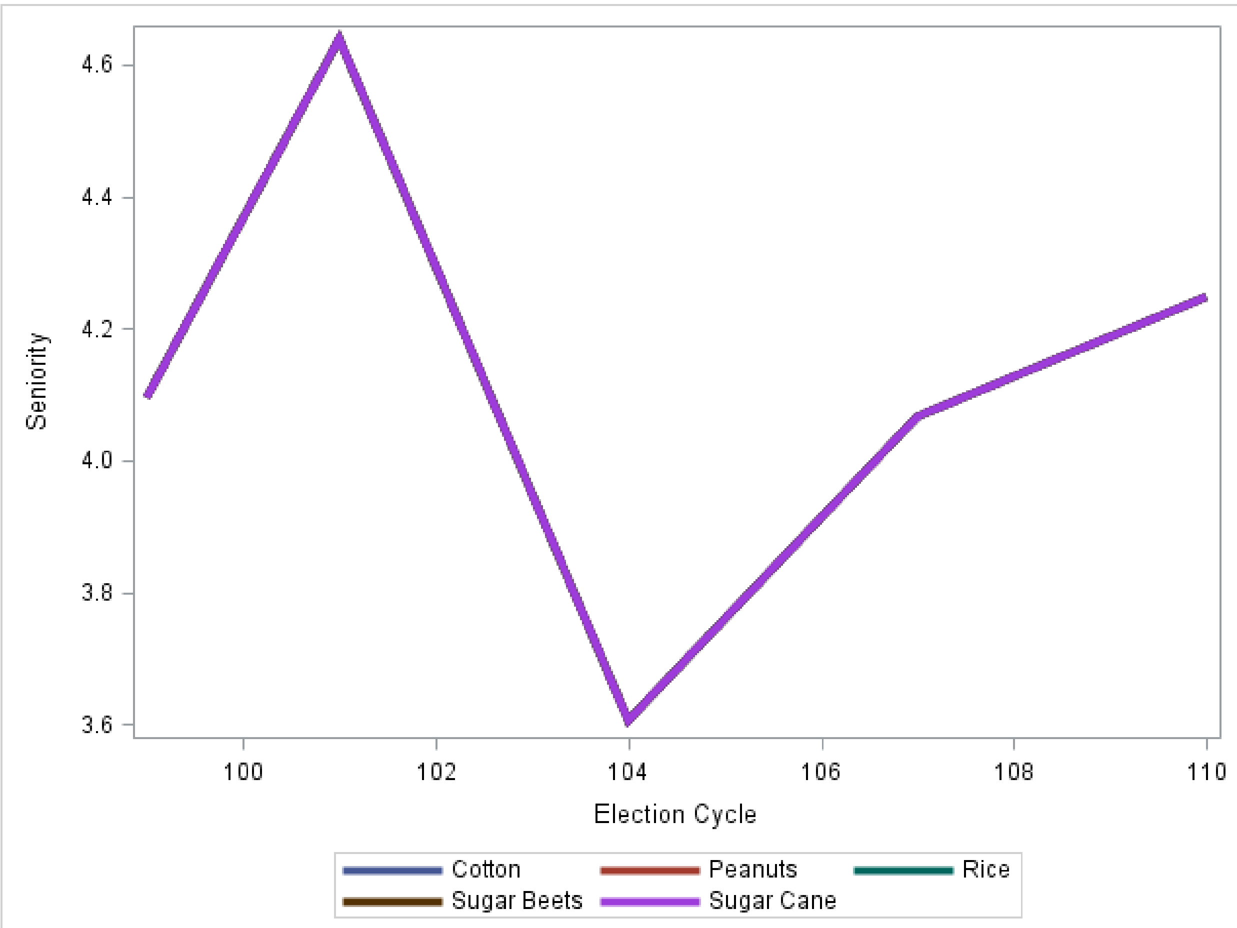

Figure 6: The committee seniority of the average recipient of campaign donations for applicable congresses by crop, weighted by the size of the donation.

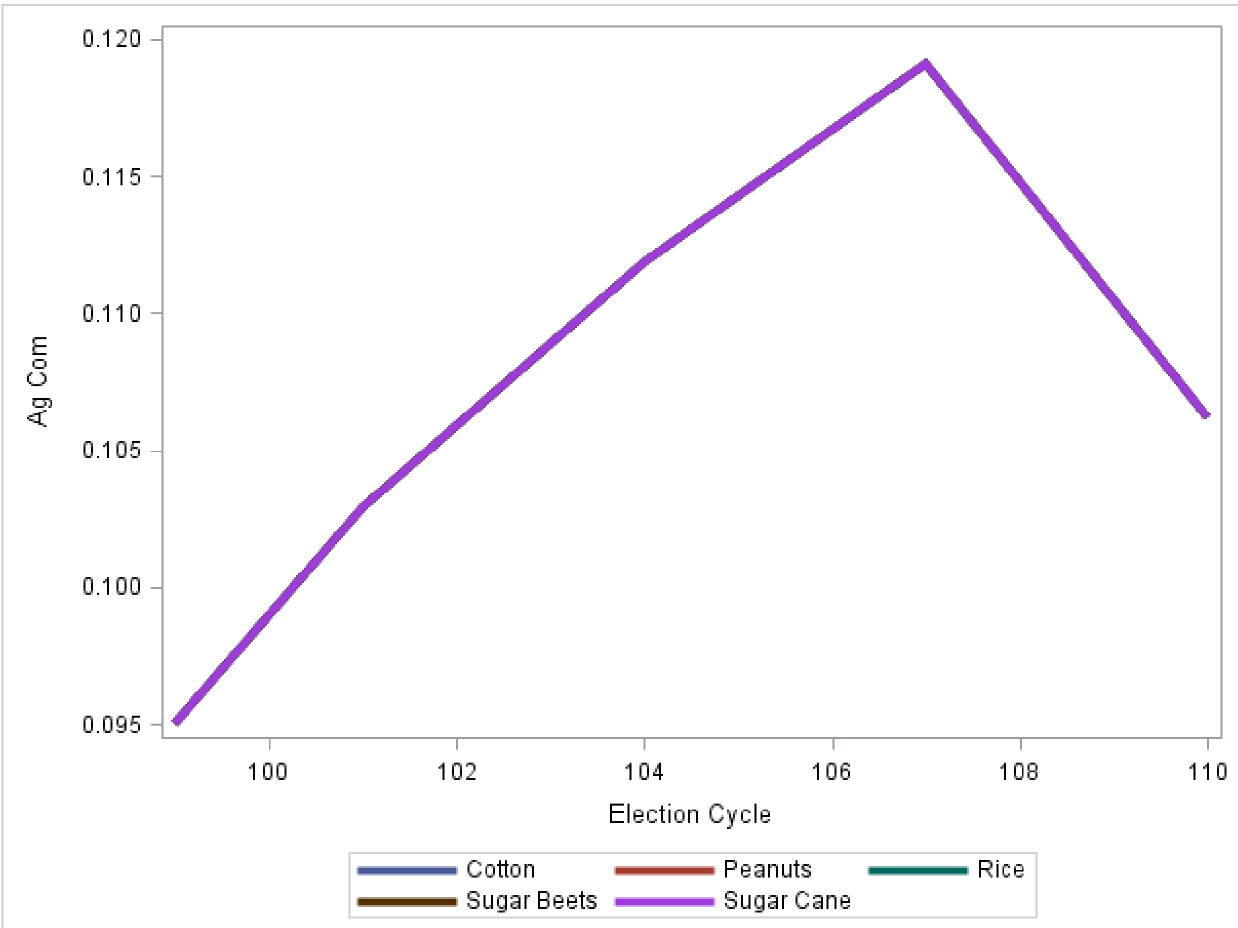

Figure 7: The fraction of recipients of campaign donations on the House agricultural committee for applicable congresses by crop, weighted by the donation amount.

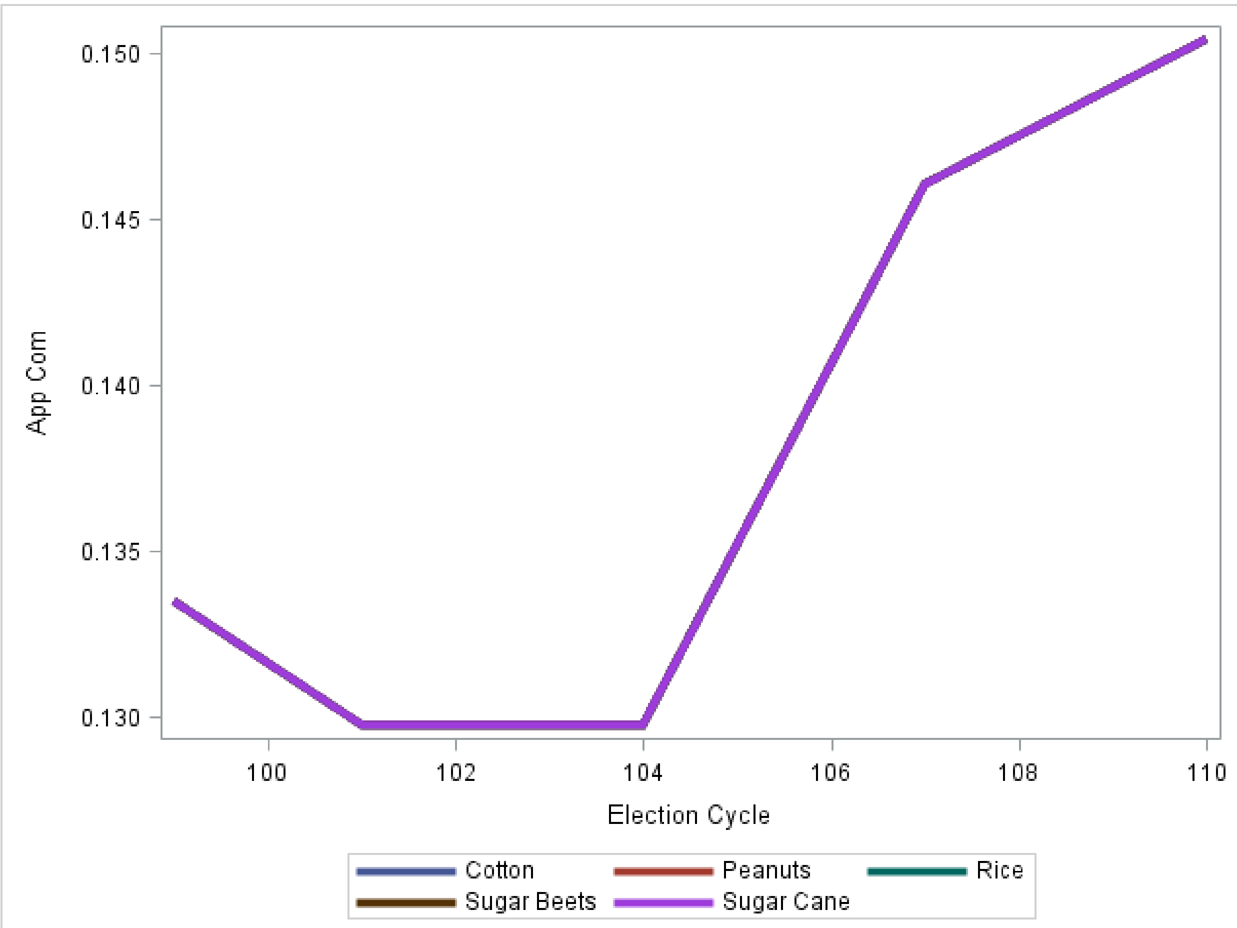

Figure 8: The fraction of recipients of campaign donations on the House appropriations committee for applicable congresses by crop, weighted by the donation amount.

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