

ABSTRACT

CALLAHAN, SCOTT EVANS. Three Essays on the Political Economy of Agricultural Programs. (Under the direction of Barry Goodwin.)

The essays apply methods of the political economy literature to the analysis of agricultural policy in the United States. Chapter one presents an analysis of summary statistics for the novel data used in the subsequent essays. These sources include individual crop subsidy transactions from the USDA Farm Services Agency, campaign contribution data from the Federal Election Commission and the data resulting from matching these two datasets to study the behavior of politically active farmers.

Chapter two contains an analysis of the impact of direct campaign contributions on farm bill amendment votes seeking to reduce cotton subsidy programs. By cross referencing the names of cotton subsidy receiving farmers in the subsidy database with individual campaign contributors, politically active cotton farmers are identified. Using a simultaneous probit-tobit-tobit model, the effects of campaign contributions by both cotton political action committees and individual cotton farmers on legislative votes are estimated. Results indicate that, while cotton PAC contributions have a greater effect on legislator vote decisions than individual cotton farmers, cotton farmers follow the same contribution strategies as cotton political action committees.

Chapter three contains a reduced form analysis of campaign contributions made by subsidy receiving farmers. This analysis studies the effects of relative geography on campaign contribution behavior. This is accomplished by applying a Tobit model to a panel of contributions, recording zero values not made to legislators. Results indicate that farmers appear to contribute heavily to local campaigns regardless of legislator power over agricultural policy, while the ability of legislators to influence agricultural legislation becomes a more important driver of campaign contributions to legislators in different states.

Chapter four studies the political allocation of agricultural disaster subsidies. Exploiting a regime change in agricultural disaster policy which occurred with the passage of the 2008 farm bill, disaster subsidy disbursement under both the 2005-2007 Crop Disaster Program and the SURE program that ran from 2008-2014 are estimated, and the effects of political factors on subsidy disbursement are compared. Results indicate that the transition from ad-hoc emergency disaster programs to a permanent agricultural disaster program did not reduce the political allocation of agricultural disaster subsidies, affirming results from both the prior agricultural disaster subsidy and FEMA disaster relief literatures.

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Three Essays on the Political Economy of Agricultural Programs

by
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DEDICATION

To my parents, grandparents and Kirkland coffee. This dissertation would not have been possible without your support.

BIOGRAPHY

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Chapter 1

Understanding Farm Support Programs: Summary Statistics on Individual Level Data from the Federal Election Commission and the USDA Farm Services Agency

1.1 Introduction

The study of political rent seeking behavior is often confounded by a lack of data. While detailed data are available for studies of political action committee (PAC) and individual campaign contribution behavior, there are several fundamental issues that must be considered carefully. Firstly, while detailed data are readily available for contributions from PACs to candidates, these contributions are highly regulated, with low spending limits. PACs are only allowed to contribute \$5,000 per candidate per year, while individuals are only allowed to contribute \$2,700 per candidate per election [35]. PACs have other means by which they can influence legislators, such as lobbying and issue advertisements, neither of which are traceable to specific legislators. Until recently, the study of individual contribution behavior has not been feasible, since these data don't contain sufficient information on the characteristics of individual contributors to determine their incentives.

Campaign contributions can be thought of as an input into a political production function. The output of this function could take a variety of forms. The bulk of the political economy literature studies the impact of campaign contributions made by PACs on voting decisions in the House of Representatives. In these studies, the vote decision is the output, which is convenient, since detailed vote decision data are readily available [10]. Examples of studies that take this approach include Chappell (1982), Stratmann (1995), Abler (1989), and Brooks, Cameron and Carter (1998). These studies share a focus on the impact

of PAC contributions on vote decisions for bills relevant to the PAC's interests. These studies form the point of departure for chapter 2.

Another form output could take is through disbursement of federal money. Some research conducted on the political allocation of crop disaster payments includes Garrett, Marsh and Marshall (2006). A more extensive literature on the political allocation of FEMA disaster subsidies likewise exists, including Garrett and Sobel (2003), Sobel, Russell and Leeson (2007), and Gasper (2015). These studies analyze the decision to disburse disaster payments as a function of the political characteristics of the areas receiving them.

The purpose of this essay is to explain data sources and analyze summary statistics, explain data matching procedures, and present summary statistics for the matched data. Section 1.2 discusses the data and the matching procedure. Section 1.3 reports summary statistics for the Farm Services Agency subsidy transaction data by crop and by program. Section 1.4 reports summary statistics for the data in which subsidies and contributions are matched.

1.2 Data Sources

The primary data comes from the USDA Farm Services Agency (FSA) [52]. Obtained via a Freedom of Information Act request, these data contain 299,516,399 transaction records, ranging from 1995 to 2014. These records contain information on both programs and crops. Further, these data contain a record of the full names and mailing addresses of all farmers receiving federal subsidies. These data are separated into two different databases. The first, called the Producer Payment Reporting System, is in use for the whole time series. These data, in addition to containing information on programs, also include information on the crop that the observation pertains to, if applicable. The Direct Attribution File, which begins in 2009 and does not contain information on crops. While there continue to be observations in the Producer Payment Reporting System throughout the entire time series, it appears that the Direct Attribution system largely replaces it.

Data on campaign contributions comes from the Center for Responsive Politics (CRP) [9]. CRP takes raw data from the Federal Election Commission (FEC) and augments it with industry or special interest codes describing the purpose of each PAC. There are several such codes for PACs representing various agricultural interests. This allows for easy identification of relevant PACs for any research topic.

CRP tracks data on direct campaign contributions from PACs to Campaign Committees. These direct contributions are the topic of study for the bulk of the vote based rent seeking literature mentioned in section 1.1. CRP also contains data on contributions from individual people, both directly to campaigns and to non-candidate PACs. To be tracked by the FEC, the individual's contribution must be at least \$200. These data contain the full name, postal zip code and the employer of the individual making the contribution, and are available from the 1980 election cycle to the present day. Beginning in the 2004 election cycle, information on the occupation of the individuals are also available.

Thus, it is possible to use the list of names from the FSA dataset to isolate the farmers from the FEC data. By matching these data, a list of farmers receiving crop subsidies and making some form of political contribution can be created. Between 1995 and 2008, there are 77,099 farmers who made at

least one political contribution to any kind of PAC, and 33,210 farmers who made direct contributions to campaigns for the House of Representatives.

1.3 Summary Statistics for Farm Services Agency Data

Table 1.1 displays summary statistics for the whole time series. Between 1995 and 2014, there were nearly 300 million individual subsidy transactions, totaling roughly \$315 billion dollars. The average transaction amount was \$1,375, with a standard deviation of \$4,374.80. There exist both staggeringly high and low transaction amounts, ranging in millions at the high end to over negative one million at the low end. These data include refunds to the FSA for prior over disbursement. For certain kinds of payments, farmers can receive them in advanced of the final determination of the payment. If the actual payment ends up being lower than expected, then farmers must refund the difference to the FSA [53]. These advanced payments are referred to as partial payments [53]. These numbers also suggest that there are some individuals who either own very large farms or multiple farms.

Tables 1.2, 1.3, and 1.4 report summary statistics during the regimes of the 1996, 2002 and 2008 farm bills. As can be seen by these numbers, mean transaction amounts and total subsidy disbursement have declined over the course of the time series, with mean transaction amounts declining from \$1,375 to \$844 and total disbursement declining from \$131 billion to \$69 billion between the 1996 and 2008 farm bill regimes. This suggests declining support for direct farm subsidy programs as time goes on, which is consistent with the increase in the importance of crop insurance as the primary agricultural policy tool.

Table 1.5 shows the top 50 programs for the 1996 farm bill regime. During this regime, the largest program in terms of total disbursement was Production Flexibility Contracts. Introduced during the 1996 farm bill, this program was the flagship subsidy program during this farm bill regime. Replacing a previous subsidy program that required farmers to keep producing the same crop they historically produced in order to receive subsidies, the Production Flexibility Contracts allowed farmers to receive subsidies while producing any crop, other than fruits and vegetables [53]. The total inflation adjusted expenditure on the Production Flexibility Contract program was roughly 48 billion, making up over one third the total amount disbursed during the 1996 farm bill regime. Following Production Flexibility Contracts are Loan Deficiency Payments at \$27 billion, Marketing Loss Assistance payments at \$24 billion and and Conservation Reserve Program Annual Land Rental payments at \$12 billion. Note that there are multiple disaster programs active during this time. Disaster programs, throughout the 1990's and mid 2000's, tended to be ad hoc programs passed by Congress as a perceived need arose [17]. This makes disaster subsidies the most likely avenue for a quid pro quo relationship between farmers and members of congress, if such a relationship exists. Disaster subsidy allocation will be the focus of chapter 4.

Table 1.6 reports summary statistics for the top 50 programs in effect during the 2002 farm bill regime. The Production Flexibility Contract program was replaced by the Direct and Countercyclical Payment Program with the implementation of the 2002 farm bill. This program allocates a direct subsidy based on acreage owned and historical yields, rather than current yields, reduce incentives for overproduction. In essence, the direct subsidy is akin to a lump sum subsidy. The countercyclical payments are based

upon a target commodity price set by the USDA. If the market price for the commodity is lower than this target price, farmers are paid the difference between these two prices times 85 percent of their total production. The second largest program by total expenditure is the CRP Annual Land Rental Program followed by Loan Deficiency Payments. The next three programs are all disaster subsidy programs. These programs disbursed a combined sum of nearly eight billion dollars between 2002 and 2008.

Table 1.7 shows the top 50 programs for the 2008 farm bill regime. Note that many of these program names are repeated. While the Direct Attribution dataset largely superseded the Producer Payment Reporting System, there continue to be observations recorded from the latter dataset for the entire time series. There are, in many cases, observations in both datasets for the same programs. During the 2008 farm bill regime, the Direct and Countercyclical Program remains the largest farm subsidy program, though total disbursement declines relative to the top programs of the 1996 and 2002 farm bills. The next largest program, the Supplemental Revenue Assistance Program, is intended to be a long-term crop disaster relief program that replaces the previously common ad hoc disaster relief programs [51]. The CRP Annual Rental appears three separate times. This is partially explained by having two separate datasets. However, this program appears twice with the same title and different program codes in the Direct Attribution File. What makes these two categories different is unknown.

As can be seen in tables 1.5 through 1.7, there are certain programs that, while having low outlays and few transactions, pay disproportionately large payments per transaction relative to Production Flexibility Contracts or Direct and Countercyclical Payments. Examples of such programs from the 1996 farm bill regime include Karnal Bunt Fungus Payments, which disbursed \$48 million to a mere 1,003 people, and Nursery Losses in Florida, which disbursed over \$8 million to 187 people. Each of these programs disbursed in excess of \$40,000 per transaction. The 2002 farm bill includes programs with substantially higher average subsidies per transaction. Among them are Florida Hurricane Citrus Disaster Payments, which disbursed a total of \$417 million to 5,503 people, with an average transaction amount of roughly \$75,000. The biggest example is the Avian Influenza Indemnity Program, disbursing a total of \$67 million to 341 people, averaging nearly \$200,000 per transaction. Also of note are Florida vegetable disaster payments and Florida nursery disaster payments, which both disbursed in excess of \$30,000 per transaction. In the top 50 farm subsidy programs of the 2008 farm bill, not a single one disburses more than \$20,000 per transaction. These program examples are significant, in that the gains from receiving these particular subsidies are highly concentrated, while the costs are highly diffuse, making these programs prime candidates for research on quid pro quo relationships. The relatively low levels of spending on these types programs is unlikely to draw attention from the media or government watch groups, reducing the probability that attention is drawn to legislators implementing such programs.

Figures 1.1 and 1.2 show FSA expenditures by program for the top ten programs in effect during the 1996 farm bill regime. In the first part of this legal regime, Production Flexibility Contracts were the dominant program, though this is outpaced by Loan Deficiency Payments and Marketing Loss Assistance between 1999 and 2001. Conservation Reserve Program Annual Rental Payments are consistent through most of the time series. Two separate ad hoc disaster programs appear during this farm bill regime, both disbursing subsidies between 1999 and 2002.

Figures 1.3 and 1.4 show FSA expenditures by year for the 2002 farm bill regime. For the entire time series, Direct and Countercyclical Payments are the dominant program. As with the previous farm

bill, CRP Annual Rental Payments are virtually constant. There are three different disaster subsidy programs in the top ten. These disaster programs see high levels of expenditures in 2003, 2005, 2007 and 2008. Loan Deficiency Payments spiked in 2005, while milk income loss assistance payments spike in 2003. Livestock Compensation and Peanut Quota Buyout Payments start relatively high in 2002 and go down substantially by 2004.

Figures 1.5 and 1.6 show the top ten programs for the 2008 farm bill. As with the previously discussed summary statistics, the included programs specify which dataset these data come from. As can be seen, when the observations drop to zero for a program in the PPRS dataset, the observations in the alternate dataset start. This suggests that these data are not repeated. Different programs appear to be phased out of the PPRS dataset at different times. As can be seen, disaster payments in the form of the Supplemental Revenue Recovery Program are still a non-trivial percentage of farm bill expenditures.

1.4 Summary Statistics for Politically Active Farmers

Table 1.8 reports summary statistics for contributions made by politically active farmers. Throughout this paper, the term “politically active farmer” denotes farmers who are listed in the Farm Services Agency dataset whom also appear in the Federal Elections Commission dataset as political donors. Note that the FEC only records contributions in excess of \$200 in their dataset, which means that only those farmers who have made at least one contribution of this size will be counted as politically active. Politically active farmers on average contribute \$1290.68 per election cycle. As can be seen, some contribute substantial amounts of money, with the highest level of contributions by a single farmer in a given election cycle being over \$400,000. Of direct contributions to legislators, farmers contribute the most to members of the House of Representatives. However, nearly half of all of the money contributed goes to non-candidate PACs. Of the money contributed to non-candidate PACs, approximately 40% of this is contributed to PACs representing agricultural interests. Farmers contribute a higher percentage of their contributions to agricultural PACs than to either senate or presidential campaigns. This suggests that politically active farmers are contributing a substantial amount to the PACs that represent their interests, suggesting strategic motivations. Inspection of these data suggest that the bulk of the contributions to non-candidate PACs that are non-agricultural PACs go to to state and national political parties.

Politically active farmers receive on average \$16,149.71 in farm subsidies per election cycle. This quantity of subsidies is highly variable, with the highest level of subsidies received by an individual farmer in an election cycle being over \$18 million. Note that politically active farmers receive \$33.77 in subsidies per dollar contributed. Despite this fact, contributions to specific legislators or PACs rarely meet the maximum contribution limit. The fact that contributions are so much lower than the rewards for political success are an unresolved question in the rent seeking literature [5]. Possible explanations include the premise that the probability that contributions have an effect on policy outcomes are low.

Table 1.9 presents summary statistics for the subsample of the time series that runs from the 2004 through 2014 election cycles. Beginning in the 2004 election cycle, the FEC began requiring individual contributors to list their occupation in their disclosure paperwork. An indicator variable, equal to one if the occupation uses the words “farmer”, “agriculture” or any derivative thereof, is created using this

occupational data. Only 24% of subsidy receiving farmers listed in the FSA dataset list their occupation as farming in the FEC data. This suggests that a large majority of farmers either identify their primary income as off-farm labor, or simply own the farms and hire/contract out the farm work. Inspection of these data show a large number of farmer mailing addresses located in inner city areas where no farms are present. None the less, for farmers located in rural areas where farms likely exist, these data could allow for research into off farm labor.

Figure 1.7 shows the levels of contributions made by politically active farmers according to recipient type. While there has been a general trend towards increasing contribution levels over time, according to Stratmann (2005b), this isn't the case for politically active farmers [5]. Levels of contributions per year appear to be relatively constant from the beginning of the time series in 1995 to 2006. Beginning in 2006, there appears to be a drastic climb culminating in 2012, with contributions past this date falling dramatically to levels similar to those before 2006. These increases appear to be driven by higher than normal contributions made to presidential, house and non-candidate PACs in the 2012 election cycle. The peaks and troughs are largely explained by election years, with the large spikes every four years coinciding with presidential elections. Note that contributions made to agricultural PACs do not display the annual seasonality that contributions to candidate and other non-candidate PACs display. The reason for seasonality in non-candidate PAC contributions is the prevalence of contributions to political parties. The reason for the dramatic spike in the 2012 election cycle relative to other election cycles in which a presidential election takes place is not clear.

Figure 1.8 shows the percentage of contributions per year according to recipient type. Here, it can be seen that legislators in the House of Representatives are steadily receiving between 20 and 40 percent of total contributions made by politically active farmers, except for a major trough in 2001 and 2002. Here we see a dramatic increase in Senate contributions to nearly 50 percent in the same years. Otherwise, senators receive below 20 percent of contributions in the other election cycles. There are spikes in House contributions for most election years, with the exception of the 2001 to 2002 anomaly. Senate contributions are fairly consistent, regardless of election seasonality. Presidential contributions seem to follow a pattern of peaks and troughs, though the pattern does not perfectly correspond with presidential election years. For example, for the 2008 and 2012 election cycles, there are increased presidential contributions in both year of the election and in the year prior, while contributions in the 1996 and 2000 election cycles seem to be concentrated in the year prior to the election. Agricultural PACs consistently receive over 10 percent of the total amount contributed by farmers, with this share increasing over the time series.

1.5 Research Questions

These data provide an unprecedented level of detail into both farm subsidy programs and the political contribution behavior of individual farmers. There are a plethora of research questions that these data can shed light on. The first question that comes to mind is whether or not farmers follow the same contribution strategies as the PACs that represent them. The second is whether or not receipts of subsidies have any effect on contribution behavior. These questions are addressed in chapter 2.

The next question is what characteristics drive farmers to contribute to local and non-local legislators, which is the topic of chapter 3. In particular, it appears that farmers strongly prefer contributing to the members of the House Committee on Agriculture, regardless of whether the legislator is their local representative or not. At the same time, unreported summary statistics suggest that the vast majority of non-local contributions are given to legislators of different districts within the donor's state. This raises questions about the contribution strategies of farmers. On one hand, if farmers don't seek to affect policy, we should expect that their contributions should be constrained to local elections. If they are engaged in rent seeking behavior, their contributions should be focused on the legislators who have the most power in creating or influencing agricultural policy. Prior results from chapter 2 suggest that, in reality, there is evidence of a combination of both types of behavior. Chapter 3 explores this issue, by creating panel of farmer contributions at the congressional district level, tracking how much farmers contribute to each incumbent legislator. This analysis uses a simple Tobit model applied to the panel of contributions.

The third question is whether or not Congress influences subsidy disbursement, namely agricultural disaster subsidies. To answer this question requires a close look at specific subsidy programs. Intuition suggests that the more direct control Congress has over subsidy allocation, the more likely they are able to influence disbursement. As such, ad hoc disaster subsidies are thought to be a likely avenue for quid pro quo relationships. Prior research has been conducted on the subject by Garrett, Marsh and Marshall (2006), finding that the presence of a member of Congress on a relevant oversight committee has a statistically significant impact on the quantity of disaster subsidies received by farmers, after controlling for the size of the disaster [17].

However, the ad hoc disaster programs were replaced by a set of permanent disaster subsidy programs with the passage of the 2008 farm bill. This policy, in theory should reduce congressional influence on disaster subsidy disbursement, while increasing presidential influence. Analyzing the effects of this policy shift, and its effects on the political allocation of subsidies, is the main focus of chapter 4.

1.6 Appendix

Table 1.1: Summary statistics for total subsidies, from 1995 to 2014. Prices are expressed in terms of 2012 dollars.

Stat	Total Subsidies
N	299,516,399
Min	-\$2,139,025.47
Max	\$17,106,388.59
Mean	\$1,051.41
Std. Dev.	\$4,386.98
Sum	\$314,915,753,765.08

Table 1.2: Summary statistics for total subsidies during the 1996 farm bill regime, from 1996 to 2002. Prices are expressed in terms of 2012 dollars.

Stat	Total Subsidies
N	95,363,016
Min	-\$1,380,513.85
Max	\$2,772,116.71
Mean	\$1,375.55
Std. Dev.	\$4,374.8
Sum	\$131,176,774,027.61

Table 1.3: Summary statistics for total subsidies during the 2002 farm bill regime, from 2002 to 2008. Prices are expressed in terms of 2012 dollars.

Stat	Total Subsidies
N	106,190,117
Min	-\$1,658,899.72
Max	\$17,106,388.59
Mean	\$884.11
Std. Dev.	\$4,787.97
Sum	\$93,883,235,748

Table 1.4: Summary statistics for total subsidies during the 2008 farm bill regime, from 2008 to 2014. Prices are expressed in terms of 2012 dollars.

Stat	Total Subsidies
N	86,672,693
Min	-\$2,139,025.47
Max	\$2,139,025.47
Mean	\$800.87
Std. Dev.	\$3,341.77
Sum	\$69,413,408,858

Table 1.5: Summary statistics for total subsidy disbursement under the 1996 farm bill regime for the top 50 programs. Prices are expressed in terms of 2012 dollars.

Program	Sum	N	Mean	Std. Dev.
PRODUCTION FLEXIBILITY	\$48,475,749,194.34	46,913,068	1,033.31	3,298.84
LOAN DEFICIENCY	\$27,422,596,063.63	12,192,324	2,249.17	5,254.40
MARKETING LOSS ASSISTANCE	\$24,794,130,120.18	20,246,795	1,224.60	3,892.46
CRP ANNUAL RENTAL	\$12,234,625,709.83	3,580,883	3,416.65	5,767.92
MARKET GAINS	\$4,303,715,934.40	1,345,990	3,197.44	9,748.76
CROP DISASTER PROGRAM	\$4,060,033,256.78	858,088	4,731.49	11,016.47
CROP LOSS DISASTER ASSISTANCE	\$2,646,085,858.16	262,745	10,070.93	18,899.46
DAIRY MARKET LOSS ASSISTANCE	\$1,330,545,882.35	274,611	4,845.20	6,362.97
LIVESTOCK EMERGENCY ASSISTANCE	\$1,301,125,313.72	791,577	1,643.71	3,198.65
OILSEED PROGRAM	\$1,259,693,555.66	1,223,982	1,029.18	1,740.23
CRP COST-SHARES	\$787,221,387.24	491,409	1,601.97	4,994.07
ENVIRONMENT QUALITY INCENTIVES	\$621,819,940.00	264,048	2,354.95	5,545.50
SUPL OILSEED PAYMENT PROGRAM	\$547,754,762.78	605,354	904.85	1,519.95
TOBACCO LOSS ASSISTANCE	\$464,307,519.13	486,264	954.85	2,554.56
NONINSURED ASSISTANCE PROGRAM	\$419,041,525.19	148,410	2,823.54	7,789.77
EMERGENCY CONSERVATION PROGRAM	\$301,888,371.18	157,597	1,915.57	3,892.04
SUGAR PIK DIVERSION PROGRAM	\$254,716,230.93	17,320	14,706.48	10,687.64
AGRICULTURAL CONSERVATION	\$223,729,007.69	128,949	1,735.02	2,750.32
CRP INCENTIVES	\$195,170,959.39	150,694	1,295.15	2,619.73
QUALITY LOSSES PROGRAM	\$186,201,979.91	36,310	5,128.12	11,269.82
SMALL HOG OPERATION PROGRAM	\$169,830,964.66	112,072	1,515.37	1,546.93
SUPPLEMENTAL TOBACCO LOSS	\$166,317,088.75	420,054	395.94	980.45
PEANUT MARKETING ASSISTANCE	\$157,745,032.74	39,052	4,039.36	7,741.36
DISASTER RESERVE ASSISTANCE	\$124,844,496.18	78,677	1,586.80	2,723.63
APPLE MARKET LOSS ASSISTANCE	\$123,344,576.70	8,446	14,603.90	13,544.36
LDP, NON-CONTRACT PFC GROWERS	\$113,234,569.65	91,306	1,240.17	2,904.62
LIVESTOCK INDEMNITY PROGRAM	\$86,759,641.12	110,732	783.51	1,997.27
NATIONAL WOOL ACT	\$81,216,093.72	150,473	539.74	3,363.96
PASTURE RECOVERY PROGRAM	\$71,196,217.77	47,286	1,505.65	979.10
PEANUT MARKETING ASST PGM III	\$69,905,503.83	18,821	3,714.23	7,030.49
KARNAL BUNT FUNGUS PAYMENT	\$48,524,373.11	1,003	48,379.24	134,904.93
APPLE & POTATO QUALITY LOSS	\$44,702,919.05	2,091	21,378.73	62,112.20
LAMB MEAT ADJUSTMENT ASSIST	\$40,008,888.95	54,475	734.44	2,299.70
WETLANDS RESERVE	\$36,124,955.59	1,504	24,019.25	82,174.19
PASTURE FLOOD COMPENSATION	\$26,473,355.67	13,811	1,916.83	2,834.60
INTEREST PAYMENTS	\$25,821,234.90	1,479,039	17.46	86.28
WAMLAP II - APPORTIONED	\$24,210,384.17	23,320	1,038.18	4,376.37
MILK MARKETING FEE	\$23,991,782.59	46,301	518.17	1,916.52
POTATO DIVERSION PROGRAM	\$22,155,993.72	1,107	20,014.45	39,350.50
WAMLAP III - APPORTIONED	\$21,280,518.93	22,859	930.95	3,887.28
DISASTER	\$18,360,671.24	9,586	1,915.36	9,790.86
AMERICAN INDIAN - LIVESTOCK FEED	\$16,859,186.07	3,724	4,527.17	7,135.22
WOOL & MOHAIR MARKET LOSS ASST	\$13,580,045.40	21,043	645.35	2,319.90
DAIRY DISASTER ASSISTANCE	\$12,687,134.18	1,345	9,432.81	12,203.92
NURSERY LOSSES - FLORIDA	\$8,951,275.31	187	47,867.78	38,293.61
AILFP - APPORTIONED	\$8,438,036.92	1,725	4,891.62	8,309.43
ACREAGE GRAZING PAYMENTS	\$8,097,859.98	5,934	1,364.65	2,948.33
CROP SPECIAL GRADE RICE LDP	\$6,865,863.54	330	20,805.65	45,722.14
NAP-SUPPLEMENTAL APPROPRIATIONS	\$5,410,675.86	1,479	3,658.33	7,989.73
TOBACCO DISASTER ASSISTANCE	\$3,596,134.88	472	7,618.93	19,421.40

Table 1.6: Summary statistics for total subsidy disbursement under the 2002 farm bill regime for the top 50 programs. Prices are expressed in terms of 2012 dollars.

Program	Sum	N	Mean	Std. Dev.
DIRECT AND COUNTER CYCLICAL PROG	\$48,213,501,329.29	85,374,217	\$564.73	\$2,015.74
CRP ANNUAL RENTAL	\$11,850,444,333.66	5,299,747	\$2,236.04	\$3,950.85
LOAN DEFICIENCY	\$11,684,669,165.99	4,958,637	\$2,356.43	\$5,364.11
01-02 CROP DISASTER ASSISTANCE	\$3,201,182,620.83	440,167	\$7,272.65	\$14,321.12
CROP DISASTER PROGRAM - 2005	\$2,889,614,432.94	366,017	\$7,894.75	\$14,651.83
05 - 07 CROP DISASTER ASSISTANCE	\$1,993,660,801.66	320,994	\$6,210.90	\$11,659.98
MILK INCOME LOSS CONTRACT	\$1,813,091,068.71	1,094,744	\$1,656.18	\$16,651.60
PEANUT QUOTA BUYOUT PROGRAM	\$1,631,912,564.49	97,489	\$16,739.45	\$53,196.70
MARKET GAINS	\$1,539,561,175.79	715,377	\$2,152.10	\$8,136.45
LIVESTOCK COMPENSATION PROGRAM	\$1,407,417,294.94	598,801	\$2,350.39	\$4,633.55
NONINSURED ASSISTANCE PROGRAM	\$997,352,606.71	201,858	\$4,940.86	\$15,218.84
MILK INC LOSS CONTR TRANSITIONAL	\$725,144,446.56	80,906	\$8,962.80	\$8,706.95
AUTO CRP - COST SHARES	\$682,997,680.46	413,756	\$1,650.73	\$3,633.32
TOBACCO LOSS ASSISTANCE	\$600,234,351.65	411,788	\$1,457.63	\$3,475.37
NONINSURED ASSISTANCE PROGRAM	\$577,155,535.89	779,591	\$740.33	\$1,655.97
PRODUCTION FLEXIBILITY	\$515,286,869.94	3,030,953	\$170.01	\$2,214.60
FL HURRICANE CITRUS DIS	\$417,247,021.57	5,503	\$75,821.74	\$293,518.24
EMERGENCY CONSERVATION PROGRAM	\$364,125,747.00	146,674	\$2,482.55	\$6,188.91
NRCS ENVIRON QLTY INCENTIVE	\$356,176,954.40	84,706	\$4,204.86	\$9,961.65
LIVESTOCK ASSISTANCE PROGRAM	\$313,217,770.61	149,752	\$2,091.58	\$5,123.41
05 - 07 LIVESTOCK COMPENSATION	\$287,716,015.16	219,730	\$1,309.41	\$2,303.90
TTPP TOBACCO PRODUCER	\$224,637,149.70	129,261	\$1,737.86	\$3,796.70
AUTO ENVIRON QLTY INCENTIVE PG	\$220,000,334.69	101,668	\$2,163.91	\$5,406.98
APPLE MARKET LOSS ASSISTANCE	\$210,098,825.99	14,232	\$14,762.42	\$20,601.96
CATTLE FEED PROGRAM	\$174,054,638.65	49,613	\$3,508.25	\$5,843.84
LIVESTOCK EMERGENCY ASSISTANCE	\$124,129,348.42	69,470	\$1,786.81	\$3,341.72
WETLANDS RESERVE	\$83,008,672.24	4,648	\$17,859.01	\$43,952.05
LAMB MEAT ADJUSTMENT ASSIST	\$69,400,856.41	71,048	\$976.82	\$3,363.96
AVIAN INFLUENZA INDEMNITY PROG	\$67,010,802.74	341	\$196,512.62	\$781,452.02
CRP COST-SHARES	\$63,995,908.13	50,221	\$1,274.29	\$3,255.94
TOBACCO PAYMENT PROGRAM	\$63,797,380.40	397,455	\$160.51	\$490.38
SUGAR BEET DISASTER PROGRAM	\$61,278,251.97	3,023	\$20,270.68	\$23,875.77
FL NURSERY DISASTER	\$59,934,222.65	1,673	\$35,824.40	\$42,550.73
HURRICANE INDEMNITY PROGRAM	\$46,063,689.21	2,911	\$15,824.01	\$25,327.35
ENVIRONMENT QUALITY INCENTIVES	\$35,228,573.48	16,893	\$2,085.39	\$4,817.64
TRADE ADJUSTMENT ASSISTANCE	\$33,209,887.68	8,089	\$4,105.56	\$4,166.17
LIVESTOCK INDEMNITY PROGRAM	\$26,468,165.70	1,816	\$14,574.98	\$23,631.48
05 - 07 LIVESTOCK INDEMNITY PROG	\$25,309,883.82	3,275	\$7,728.21	\$15,346.67
TREE INDEMNITY PROGRAM	\$22,707,528.86	1,597	\$14,218.87	\$23,659.13
HARD WHITE WINTER WHEAT	\$20,730,274.47	20,708	\$1,001.08	\$1,874.75
GRASSLANDS RESERVE PROGRAM	\$20,522,212.98	8,663	\$2,368.95	\$5,289.26
FL VEGETABLE DISASTER	\$18,050,784.41	385	\$46,885.15	\$63,745.19
TREE ASSISTANCE PROGRAM	\$14,395,481.86	1,213	\$11,867.67	\$21,126.70
SPECIALITY CROP - NURSERY	\$13,844,465.44	479	\$28,902.85	\$35,129.46
DAIRY MARKET LOSS ASSISTANCE	\$12,818,913.64	629	\$20,379.83	\$76,322.99
FORESTRY CONSERVATION RESERVE	\$11,949,467.80	3,093	\$3,863.39	\$14,299.26
SOIL/WATER CONSERVATION ASSIST	\$11,329,875.77	3,827	\$2,960.51	\$5,266.56
AGRICULTURAL MANAGEMENT ASSIST	\$10,608,782.52	2,150	\$4,934.32	\$8,441.72
AMERICAN INDIAN - LIVESTOCK FEED	\$9,192,358.04	2,032	\$4,523.80	\$10,597.10
CROP DISASTER - VIRGINIA	\$8,531,743.34	1,092	\$7,812.95	\$12,094.29

Table 1.7: Summary statistics for total subsidy disbursement under the 2008 farm bill regime for the top 50 programs. Prices are expressed in terms of 2012 dollars.

Program	File	Sum	N	Mean	Std. Dev.
DCP Program Direct Payments	DA	\$29,803,836,451.73	56,760,238	\$525.08	\$1,900.15
DIRECT AND COUNTER CYCLICAL PROG	PPRS	\$7,205,245,773.28	10,144,042	\$710.29	\$2,573.11
Supplemental Revenue Assistance Program	DA	\$5,761,453,279.88	400,590	\$14,382.42	\$25,455.78
Livestock Forage Program	DA	\$5,256,014,150.13	625,400	\$8,404.24	\$14,771.07
CRP Payment Annual Payment	DA	\$4,359,311,655.25	2,925,054	\$1,490.34	\$3,040.38
CRP Payment Annual Rental	DA	\$4,160,163,014.42	2,930,645	\$1,419.54	\$2,949.61
CRP Payment Annual Rental	DA	\$3,851,108,790.80	2,686,487	\$1,433.51	\$3,008.23
ACRE Direct Payments	DA	\$3,199,955,585.13	5,648,171	\$566.55	\$1,583.55
CRP ANNUAL RENTAL	PPRS	\$1,855,413,774.10	963,252	\$1,926.20	\$3,425.84
MILK INCOME LOSS II	PPRS	\$1,690,029,417.09	1,097,308	\$1,540.16	\$3,347.19
ACRE Payments	DA	\$1,349,947,883.87	405,991	\$3,325.07	\$7,881.32
Supplemental Revenue Assistance Recovery Act	DA	\$1,119,927,408.13	154,547	\$7,246.52	\$13,944.81
Non-Insured Assistance Program	DA	\$1,035,817,872.77	206,642	\$5,012.62	\$10,630.11
TOBACCO LOSS ASSISTANCE	PPRS	\$991,458,344.80	622,451	\$1,592.83	\$3,572.80
NONINSURED ASSISTANCE PROGRAM	PPRS	\$725,288,248.79	154,849	\$4,683.84	\$8,923.62
Cotton Transition Assistance	DA	\$724,331,529.42	514,321	\$1,408.33	\$3,664.39
AUTO CRP - COST SHARES	PPRS	\$479,861,252.68	399,398	\$1,201.46	\$3,157.40
LOAN DEFICIENCY	PPRS	\$384,685,693.07	133,395	\$2,883.81	\$8,827.26
DCP Program Counter Cyclical Payments	DA	\$354,443,763.35	1,431,698	\$247.57	\$818.51
DAIRY ECONOMIC LOSS ASSISTANCE	PPRS	\$309,776,462.30	103,023	\$3,006.87	\$5,059.87
MARKET GAINS	PPRS	\$307,401,965.09	101,719	\$3,022.07	\$6,759.17
LIVESTOCK FORAGE PROGRAM	PPRS	\$293,003,227.15	57,545	\$5,091.72	\$8,621.39
BIOMASS CROP ASSISTANCE	PPRS	\$286,937,291.37	28,924	\$9,920.39	\$26,781.89
CROP ASSISTANCE PROGRAM	PPRS	\$270,593,733.73	133,365	\$2,028.97	\$4,893.22
NONINSURED ASSISTANCE PROGRAM	PPRS	\$246,057,529.06	46,799	\$5,257.75	\$11,885.29
EMERGENCY CONSERVATION PROGRAM	PPRS	\$202,843,925.57	101,797	\$1,992.63	\$5,854.16
CRP Incentives	DA	\$194,209,119.19	128,805	\$1,507.78	\$3,455.14
05 - 07 CROP DISASTER ASSISTANCE	PPRS	\$187,082,536.23	31,339	\$5,969.64	\$12,797.45
Livestock Indemnity Payments	DA	\$186,456,880.89	53,595	\$3,479.00	\$9,126.92
CRP INCENTIVES	PPRS	\$185,629,667.29	100,108	\$1,854.29	\$3,959.60
Grasslands Reserve Program	DA	\$137,053,953.18	14,194	\$9,655.77	\$111,075.37
Auto CRP Cost Share	DA	\$108,979,355.15	117,953	\$923.92	\$2,731.42
LIVESTOCK INDEMNITY PROGRAM	PPRS	\$93,559,941.82	10,661	\$8,775.91	\$15,668.66
Livestock Indemnity Program	DA	\$89,957,194.70	13,085	\$6,874.83	\$13,907.02
Emergency Conservation Program - Stafford	DA	\$81,034,835.20	55,156	\$1,469.19	\$6,736.46
Emergency Conservation Program	DA	\$78,590,588.94	42,567	\$1,846.28	\$4,618.27
05 - 07 LIVESTOCK COMPENSATION	PPRS	\$76,945,305.87	40,428	\$1,903.27	\$5,815.64
CRP Common Incentive	DA	\$61,124,159.04	39,548	\$1,545.57	\$3,661.57
Trade Adjustment Assistance for Farmers	DA	\$57,925,877.75	11,510	\$5,032.66	\$2,800.42
STORAGE FORGIVEN	PPRS	\$42,517,653.49	104,899	\$405.32	\$1,163.13
GRASSLANDS RESERVE PROGRAM	PPRS	\$38,849,799.76	16,080	\$2,416.03	\$11,434.46
CRP-Emergency Forestry Annual Rental	DA	\$38,567,587.62	19,917	\$1,936.42	\$4,221.40
Emergency Assistance Program	DA	\$38,508,853.69	2,905	\$13,256.06	\$21,513.17
Tree Assistance Program	DA	\$37,344,073.67	2,182	\$17,114.61	\$25,371.45
Loan Deficiency	DA	\$29,595,868.63	21,336	\$1,387.13	\$2,624.60
Biomass Crop Assistance-Cost Share	DA	\$28,605,463.67	8,497	\$3,366.54	\$10,804.40
Emergency Assistance Livestock	DA	\$26,205,013.37	3,454	\$7,586.86	\$15,081.78
EMERGENCY ASSISTANCE PROGRAM	PPRS	\$23,900,690.14	1,802	\$13,263.42	\$19,823.89
Non-Insured Assistance Program	DA	\$23,467,009.08	2,143	\$10,950.54	\$16,375.94
Trade Adjustment Assistance for Farmers	DA	\$19,931,328.65	21,352	\$933.46	\$676.04

Table 1.8: Summary statistics for contributions made by farmers receiving crop subsidies. These statistics are based on the contributions of 157,424 farmers, made between 1995 and 2014.

Variable	MIN	MAX	MEAN	STD
contributions	\$0.00	\$486,687.16	\$1,290.68	\$4,171.14
president	0	1	0.1	0.28
house	0	1	0.27	0.42
senate	0	1	0.16	0.34
non_cand_pac	0	1	0.48	0.48
ag_pac	0	1	0.19	0.38
total_subsidy	-\$313,321.01	\$18,887,292.91	\$16,149.71	\$61,363.01
disaster_subsidy	-\$33,906.56	\$788,285.55	\$958.27	\$6,970.00
disaster	0	69	0.13	0.75
house_don	\$0.00	\$211,773.62	\$369.39	\$1,619.67
senate_don	\$0.00	\$151,287.42	\$255.88	\$1,444.66
president_don	\$0.00	\$101,001.32	\$146.54	\$1,049.14
ag_pac_don	\$0.00	\$67,017.79	\$154.34	\$540.39
non_cand_pac_don	\$0.00	\$486,687.16	\$518.86	\$2,421.58
sub_don_ratio	-\$1,031.17	\$18,932.00	\$33.77	\$105.54
dis_sub_don_ratio	-\$37.71	\$5,973.82	\$2.04	\$27.17

Table 1.9: Summary statistics for contributions made by farmers receiving crop subsidies. These statistics are based on the contributions of 157,424 farmers, made between 2003 and 2014. This subset of the FEC time series includes information on the occupation of the donor.

Variable	MIN	MAX	MEAN	STD
contributions	\$0.00	\$278,173.63	\$1,315.80	\$3,837.40
president	0	1	0.11	0.3
house	0	1	0.26	0.42
senate	0	1	0.14	0.32
non_cand_pac	0	1	0.49	0.48
ag_pac	0	1	0.2	0.39
farmer	0	1	0.24	0.42
total_subsidy	-\$313,321.01	\$1,180,670.69	\$14,715.96	\$28,951.79
disaster_subsidy	-\$33,906.56	\$788,285.55	\$840.19	\$6,737.89
disaster	0.00	69.00	0.10	0.73
house_don	\$0.00	\$205,002.68	\$385.03	\$1,673.57
senate_don	\$0.00	\$151,287.42	\$238.64	\$1,441.96
president_don	\$0.00	\$101,001.32	\$172.69	\$1,181.82
ag_pac_don	\$0.00	\$67,017.79	\$173.04	\$583.33
non_cand_pac_don	\$0.00	\$94,007.95	\$519.44	\$1,575.37
sub_don_ratio	-\$1,031.17	\$18,932.00	31.85	104.26
dis_sub_don_ratio	-\$28.84	\$5,973.82	\$1.88	\$29.68

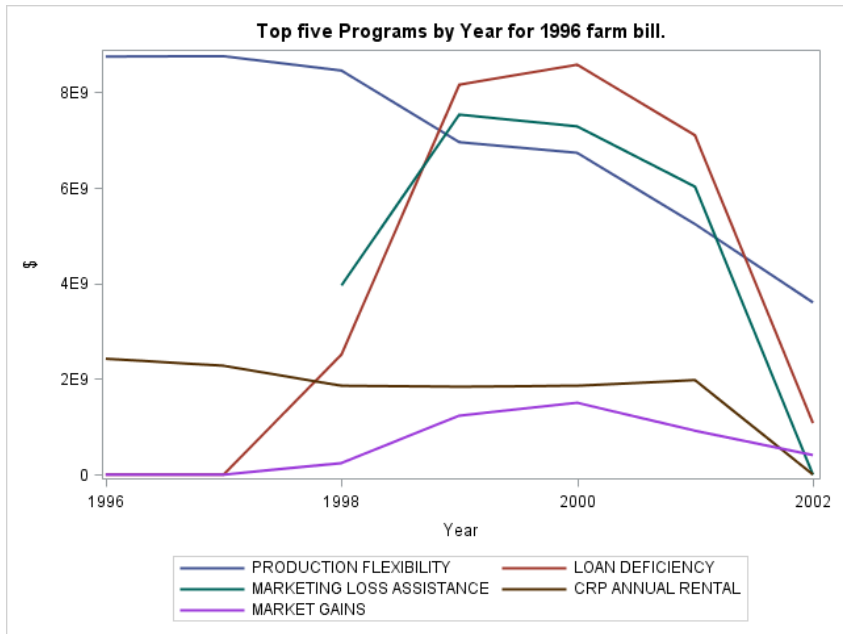


Figure 1.1: Top five programs of the 1996 farm bill by year. All dollar amounts are inflation adjusted to 2012 dollars.

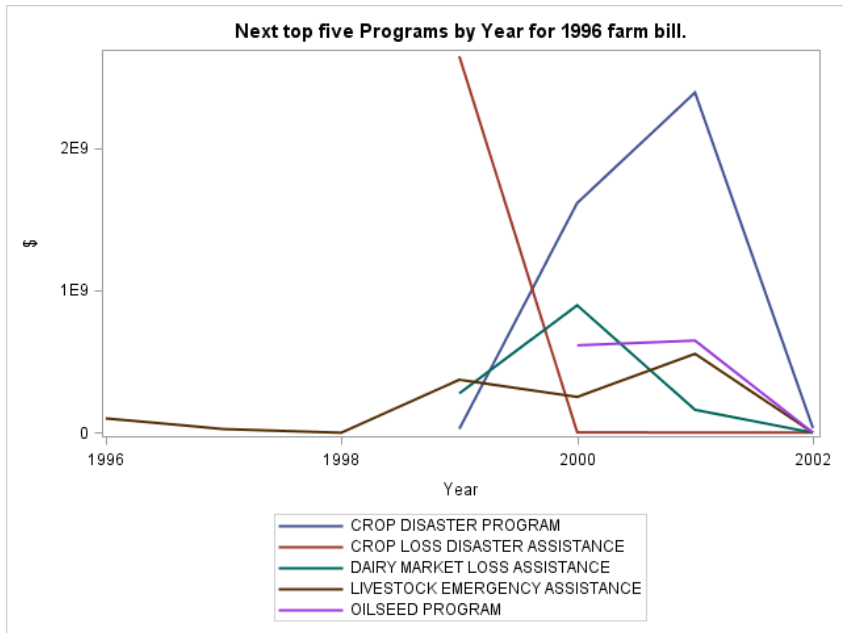


Figure 1.2: The next five largest programs by expenditure of the 1996 farm bill by year. All dollar amounts are inflation adjusted to 2012 dollars.

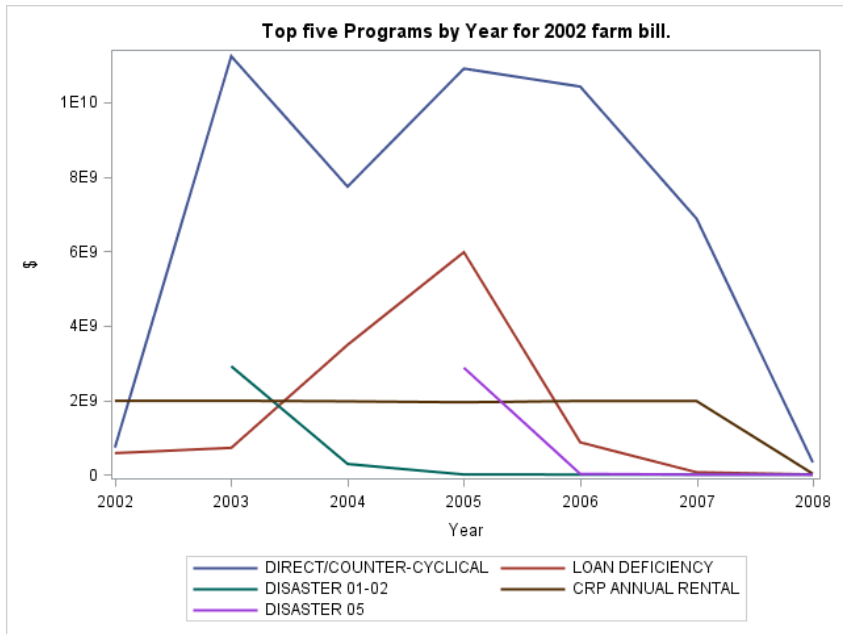


Figure 1.3: Top five programs of the 2002 farm bill by year. All dollar amounts are inflation adjusted to 2012 dollars.

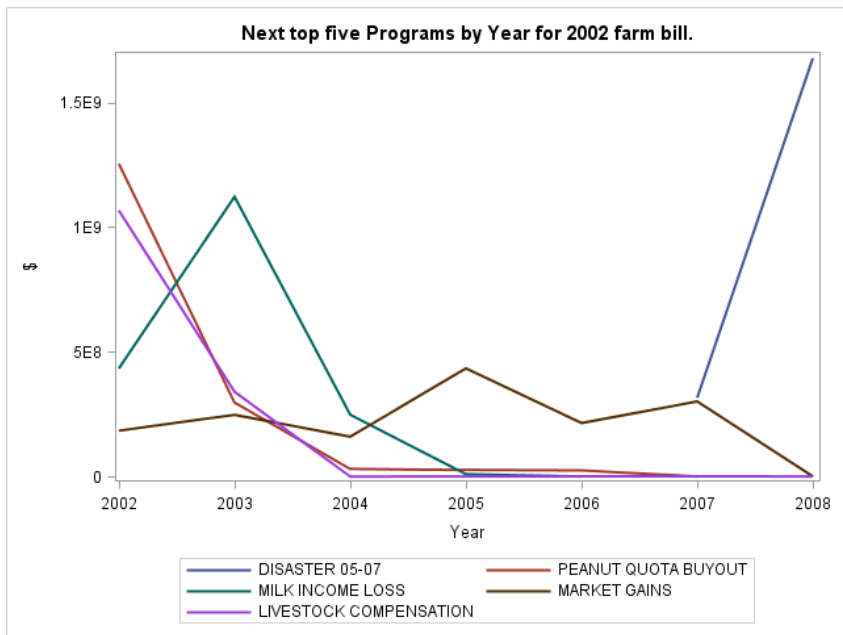


Figure 1.4: The next five largest programs by expenditure of the 2002 farm bill by year. All dollar amounts are inflation adjusted to 2012 dollars.

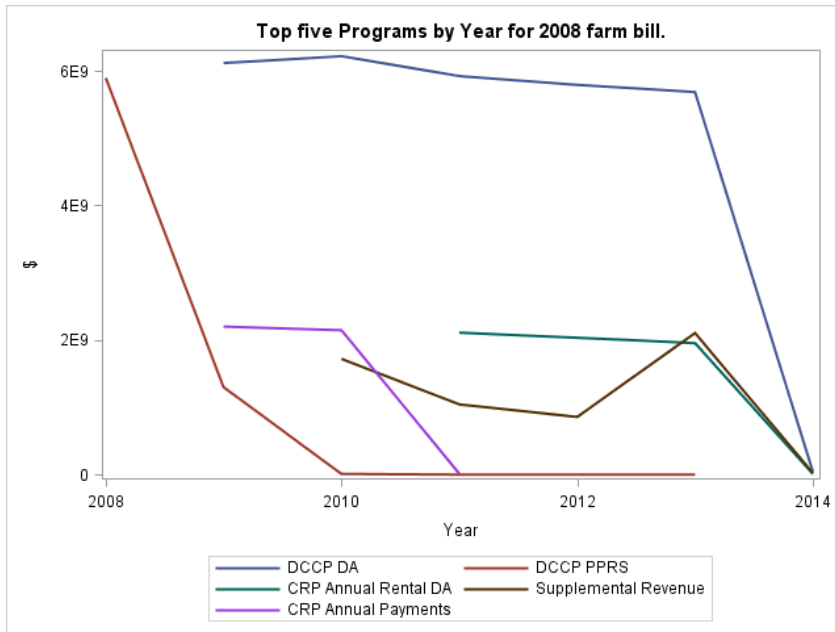


Figure 1.5: Top five programs of the 2008 farm bill by year. All dollar amounts are inflation adjusted to 2012 dollars.

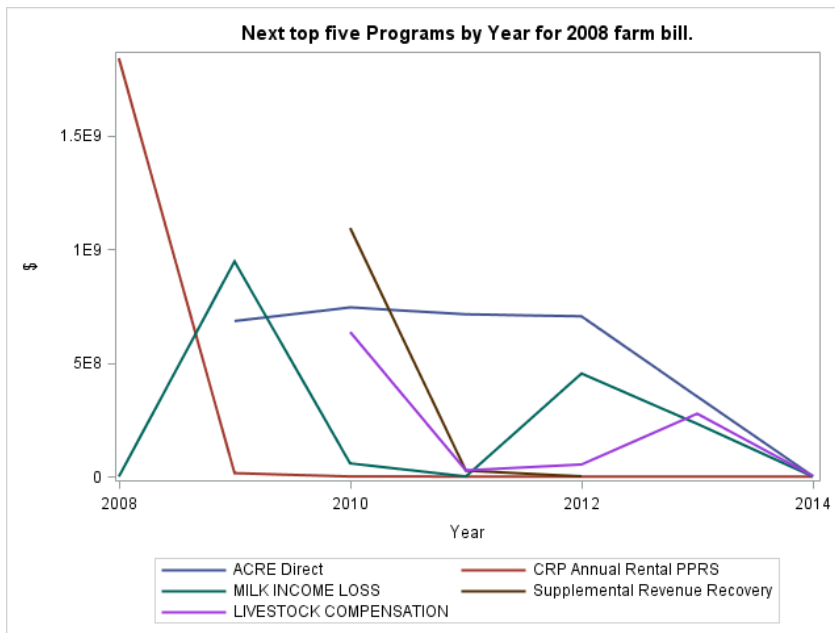


Figure 1.6: The next five largest programs by expenditure of the 2008 farm bill by year. All dollar amounts are inflation adjusted to 2012 dollars.

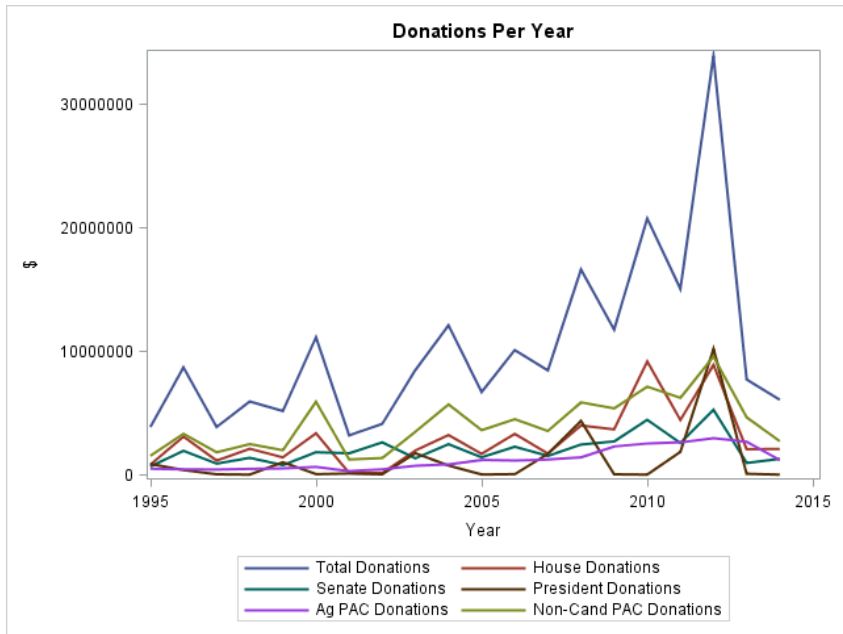


Figure 1.7: Graph of contributions made by politically active farmers differentiated by recipient type. All dollar amounts are inflation adjusted to 2012 dollars.

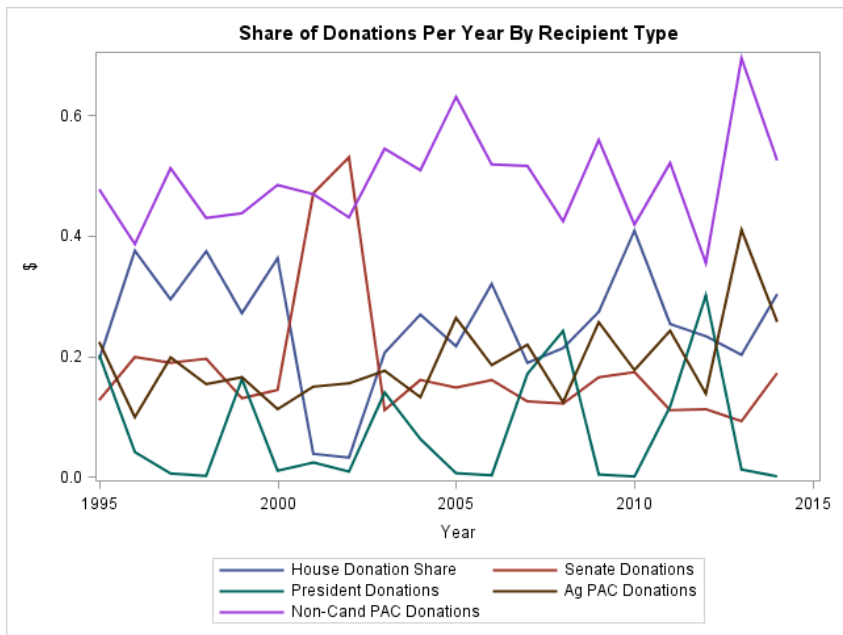


Figure 1.8: Graph of the shares contributions made by politically active farmers differentiated by recipient type. All dollar amounts are inflation adjusted to 2012 dollars.

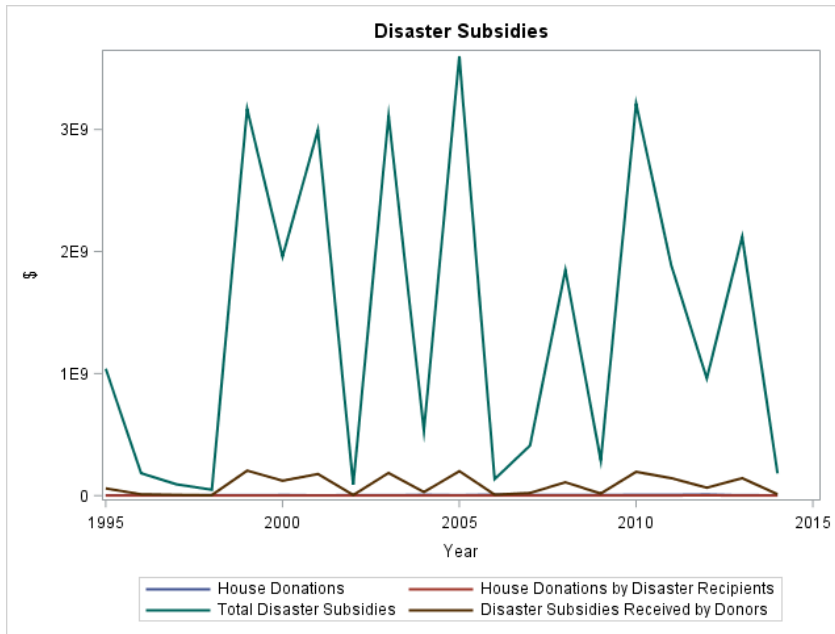


Figure 1.9: Graph of disaster subsidies and house contributions by year. All dollar amounts are inflation adjusted to 2012 dollars.

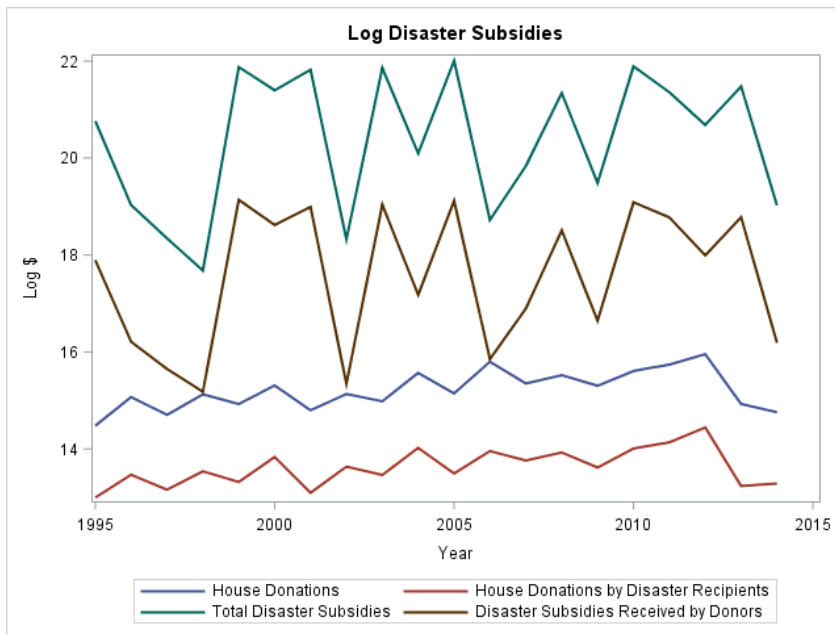


Figure 1.10: Graph of the log of disaster subsidies and house contributions by year. All dollar amounts are inflation adjusted to 2012 dollars.

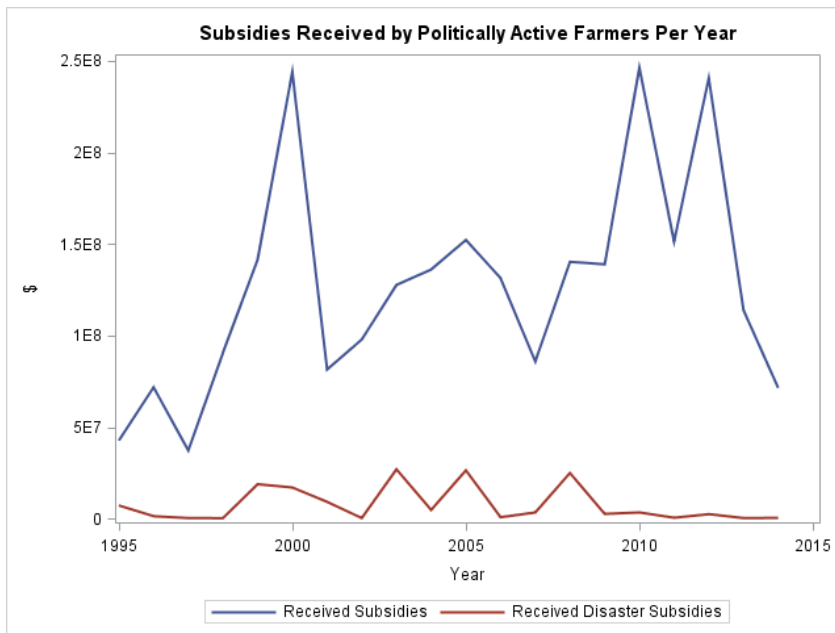


Figure 1.11: Graph comparing total subsidies received by politically active farmers to disaster subsidies received by politically active farmers. All dollar amounts are inflation adjusted to 2012 dollars.

Chapter 2

Do Campaign Contributions from Individual Farmers Influence Agricultural Policy? Evidence From Farm Bill Amendment Votes on Cotton Subsidy Programs.

2.1 Introduction

Over the last thirty years, there has been a great effort to study the impact of political action committee (PAC) activities on public policy outcomes. Many of these studies analyze the impact of campaign contributions made by agricultural PACs on farm bill amendment votes in the US Congress. Missing from previous analyses is the impact of campaign contributions made by individual farmers. There are many farmers in the US who benefit substantially from federal agricultural programs. This research studies campaign contributions made by farmers, using methods from the PAC contribution literature. The purpose of this research is to discern if campaign contributions constitute a form of investment made by individual farmers, and to explore whether or not these campaign contributions have an effect on legislative votes. These objectives are accomplished by studying the impact of campaign contributions made by cotton PACs and cotton farmers on farm bill amendment votes which, had they passed, would have curtailed cotton subsidy programs.

Section 2.2 develops the theoretical model and reviews supporting literature regarding campaign contributions, section 2.3 explains the econometric model, section 2.4 describes the data, section 2.5 presents empirical results and section 2.6 concludes.

2.2 Theory

Suppose that legislator j is facing a vote decision on a piece of legislation in congress. Denote their propensity to vote yes as V_j . Let D_j^p and D_j^f denote campaign contributions made by agricultural PACs and individual farmers to legislator j . Furthermore, let P_j denote the initial policy position of legislator j , a point in an ideological space determined by their personal political beliefs and the characteristics of their constituency. Then legislator j 's propensity to vote yes is as follows.

$$V_j = f(D_j^p, D_j^f, P_j) \quad (2.1)$$

In the absence of campaign contributions, the legislator will vote in accordance with their initial policy position. That is to say, if their propensity to vote yes is positive, then legislator will vote yes. If this propensity is non positive, then they will vote no. This initial policy position in turn is a function of the ideology of the legislator, which is unobservable, and the exogenous constituency characteristics of legislator j 's congressional district. Let X_j denote the characteristics of legislator j 's constituency and let I_j denote their ideology. Assuming that legislator j 's constituents favor the policy, we have the following.

$$P_j = g(X_j, I_j) \quad (2.2)$$

$$\frac{\partial P_j}{\partial X_j} = \frac{\partial g(X_j, I_j)}{\partial X_j} > 0 \quad (2.3)$$

Assuming the majority of the constituency favors the legislation, an increase in these characteristics, such as the number of people in favor of the policy, will increase the legislator's propensity to vote yes on the legislation. As such, the initial policy position of legislator j is itself a function of exogenous constituency characteristics, and the legislator's own ideology, denoted by I_j . The ideology of the legislator is assumed to be fixed.

In order to induce the legislator to deviate from their initial policy position, campaign contributions are required in order to offset the votes lost from deviation from the interests of their constituency. If the special interest group favors the legislation, then an increase in campaign contributions should have a positive effect on the propensity to vote yes.

$$\frac{\partial V_j}{\partial D_j^p} > 0 \quad (2.4)$$

$$\frac{\partial V_j}{\partial D_j^f} > 0 \quad (2.5)$$

Previous studies on interest group specific campaign contributions generally ignore the possible effect of individual campaign contributors on this vote decision. Individuals with a specific special interest are the people who form and fund the PACs. It seems reasonable to assume that, in addition to funding these PACs, they may also directly contribute to legislators, and that these contributions could affect legislator behavior.

Mueller and Stratmann (1994) provides theoretical motivations for the purpose of campaign con-

tributions from the perspective of the legislator [43]. Their model discriminates between informed and uninformed voters. In the absence of campaign contributions, the legislator’s policy positions reflect the interests of their median constituency, maximizing the number of votes they receive from well informed voters. Unlike informed voters, uninformed voters can be induced to vote for them or against their opponent through persuasive advertising. Since deviating from the aforementioned position results in a loss of votes from informed voters, campaign contributions are necessary to induce legislators to deviate. They must obtain contributions sufficient to induce at least as many uninformed voters to vote for them as the number of votes from informed voters that are lost in the process. This reasoning provides theoretical motivation for the observation that legislators devote substantial time and resources to obtaining campaign contributions. Another, more thorough theoretical treatment of this issue can be found in Baron (1994) [6].

Previous literature finds some evidence that PACs vary contribution strategies according to various characteristics of the legislator. The theoretical treatment in Stratmann (1991) suggests that if a PAC seeks to aid like minded legislators, then they will contribute more to legislators that represent their interests, while if they seek to affect policy changes, they will contribute less to such legislators, since they need not be influenced [42]. Stratmann (1992) points out that, since PACs only require a majority in Congress to achieve their goals, they will contribute only to those legislators who can be influenced most inexpensively. Legislators who represent districts whose constituents strongly prefer the policy don’t need contributions to induce the desired vote. Likewise, legislators whose constituents do not benefit from the policy likely require too many campaign contributions to make contributing worthwhile [43]. A more rigorous treatment of this relationship is provided by Stratmann (1996), which finds evidence that PACs vary their contribution strategies based upon the characteristics of the legislator’s constituencies, in order to get a majority in Congress [45]. There is also some evidence that PACs and legislators form long term relationships, in which PACs contribute progressively more as legislators continue to serve their special interests in Congress [29]. The effect of dynamic contribution behavior is beyond the scope of this research.

Based on these theoretical motivations, the contributions made by PACs to legislators are modeled as a function of the initial policy position of legislator j and the power of the legislator to influence the legislation, denoted by Y_j . Recall that P_j denotes the initial policy position of legislator j , based on the characteristics of their constituency and their personal political ideology. Then, we have the following relationship.

$$D_j^p = h^p(P_j, Y_j) \tag{2.6}$$

If the PACs contribute in an effort to influence the content of legislation, or to encourage powerful legislators to put effort into passage of the bill, then we expect legislators with more power over the relevant legislation to receive more campaign contributions.

$$\frac{\partial D_j^p}{\partial Y_j} > 0 \tag{2.7}$$

Note that the initial policy position P_j is not treated as a choice variable in this model. It is assumed that the constituency characteristics are exogenous, and thus the policy position necessary to best serve their constituency cannot be altered by the legislator. It is also assumed, for simplicity, that the ideology of the legislator is innate rather than chosen.

The impact of the initial policy position of the legislator on the quantity of contributions is assumed to be non-linear. Legislators who represent districts that strongly favor the policy don't need to be induced to vote in favor of it. Likewise, legislators who's constituencies strongly dislike the policy will require too much in the way of contributions to make attempts at influence worthwhile. There exists some initial policy position P_j^* that maximizes campaign contributions from the special interest PACs.

$$\begin{aligned}\frac{\partial D_j^p}{\partial P_j} &= 0 \\ \frac{\partial D_j^{p,2}}{\partial^2 P_j} &< 0\end{aligned}$$

What is less well understood is how individuals who belong to an identifiable special interest behave. Understanding the motivations behind individual contributions is critical, because individuals in general contribute substantially more to federal campaigns than PACs [5]. Several studies analyze individual contribution behavior for the population as a whole. Ensley (2009) studies the impact of ideology on contributions by individuals. He finds that individuals on both sides of the aisle are highly motivated by legislator ideology to contribute to federal campaigns, while finding little evidence for the difference between legislator ideologies motivating contribution behavior. These results indicate that individuals care more about actual policy positions than relative differences between candidates, which could explain the growing partisan divide in US politics [13].

Gimpel et al. (2006) study the geographic origins of campaign contributions made by individual donors to candidates and party committees. Using spatial econometric methods to control for network effects, they find that the bulk of out of state campaign contributions originate in a small number of wealthy, urban areas [20]. Donors to either party can be found in these affluent areas. Gimpel et al. (2008) expound on this, studying the contribution behavior of individuals based on relative geography to the legislator. Donors tend to be motivated by different factors contingent on geography [21]. In the case of elections that are non-local and non-contiguous, a major driver of contributions is the closeness of the election. Individuals contribute more out of district funds to legislators in tight races. Like Enseley (2009), Gimpel et al. also find evidence that donors are strongly motivated by partisanship. Their results also indicate that more senior legislators and those in leadership roles depend significantly more on non-local contributions than less powerful legislators.

In the case of individuals belonging to a special interest group, of key importance is whether or not they are contributing to campaigns as a form of investment, or if they instead treat campaign contributions as a form of consumption. If contributions are a form of consumption, then they are intended to benefit politicians whom the donor likes, not affect policy. Gordon, Hafer and Landa (2007) explore this issue. Looking at campaign contributions by business executives employed by Fortune 500 companies, they find strong evidence that executives are motivated by investment incentives [24]. They

further posit that the reason for such low levels of contributions is the low probability that the politician will be able to reciprocate in the future.

Fremeth, Kelleher and Schaufele (2013) study the same issue, using a panel of CEO contribution data. They study the contribution behavior over the careers of CEOs using panel data methods. They find that, when controlling for CEO income, there is a substantial increase in campaign contributions when an individual is hired as a CEO, and a substantial decrease when they retire [15].

Perhaps most relevant to this research is the work done by Ovtchinnikov and Pantaleoni (2012). They study the effect of campaign contributions made by individuals residing close to large firms and the impact of these contributions on firm performance. The premise is that, for large firms, the entire community is affected by government policy affecting that firm. They find that, not only do individuals residing in close proximity to large firms make significantly more in contributions to legislators that have power over that industry, but also find evidence that these contributions positively affect the performance of the firms.

Given this evidence, it is clear that, at least in some cases, individual contributions affect policy, and that individuals are motivated to treat contributions as a political investment, just as firms do. The key question as it pertains to this research is whether farmers also do so. Unlike the bulk of CEOs, the benefits that farmers receive from policy outcomes are not just regulatory in nature, but also come in the form of direct subsidies, subsidized crop insurance, and in some cases, import restrictions. Furthermore, while contributions from CEOs and from individuals affected by specific companies are intended to benefit a specific company, agricultural policy will typically be more far reaching. Due to the larger number of people involved, and the wide geographic dispersion, it is highly likely that politically active farmers face a free rider problem, far more so than say, corporate CEOs. On the other hand, farmers fund the farming PACs, which suggests that farmers do contribute in at least some way with investment motivations.

For the purposes of this research, the contribution decision of the individuals is modeled in the same way as that of agricultural PACs, with one exception. The individual farmers receive crop subsidies. These subsidies constitute a wealth transfer to farmers, a direct benefit of the legislative decisions. These subsidies are predetermined by past policies. The protection of these subsidies is hypothesized to increase the propensity of individual farmers to contribute to legislators in anticipation of a vote that affects subsidy programs. Let S_j denote the subsidies received by farmers making contributions to legislator j , recalling that D_j^f denotes campaign contributions made by farmers to legislator j .

$$D_j^f = h^f(S_j, P_j, Y_j)$$

$$\frac{\partial D_j^f}{\partial S_j} > 0$$

2.3 Empirical Model

The empirical specification used here is a simultaneous probit-tobit-tobit model. The simultaneous probit-tobit model, introduced by Chappell (1984), has been frequently applied to agricultural rent seeking studies [25]. Brooks, Cameron and Carter (1998) use such a specification in analyzing the impact of contributions by competing lobbies on vote decisions on sugar legislation [8]. Stratmann (1996)

uses this specification, studying the impact of contributions on farm bill amendment votes dependent on when the contributions were made. The empirical specification for this study borrows heavily from Stratmann (1996) [8].

There are other notable empirical studies within this literature using different empirical specifications. Drope and Hansen (2004), which studies the affect of soft money and lobbying expenditures in addition to hard money PAC expenditures on trade protection decisions, finds that soft money and lobbying expenditures are also major components driving trade protection policy [12]. Stratmann (1998) studies the timing of campaign contributions with a very narrow scope, finding that the frequency of campaign contributions increases right before and right after farm bill amendment votes [46]. Abler (1989) looks at vote trading by legislators on farm bill amendment votes, finding evidence that legislators will vote for programs that are not in the interests of their constituency in order to obtain votes for programmes that are [3]. Stratmann (1992) also finds evidence of log-rolling [44].

Let V_j^* denote the propensity of legislator j to vote yes on a given farm bill amendment vote. This propensity is a continuous latent variable representing how strongly the legislator favors the legislation, and can take any real value. This propensity is based in part on constituency characteristics, denoted by X_j and ideology, denoted by I_j . The constituency characteristics included in X_j are the number of subsidy-receiving cotton farmers located within legislator j 's district, and the total amount of subsidies they receive. The ideology variables included in I_j are an indicator for party affiliation, a measure of ideology, and the interaction between the two. This propensity can be further influenced by campaign contributions, denoted by D_j^p for agricultural PACs and D_j^f for individual farmers. If the propensity to vote yes, V_j^* is positive, then the observed value, V_j , is equal to one. Otherwise, it equals zero. A weak propensity to vote yes will manifest in the same outcome as a strong propensity to vote yes. The propensity to vote yes matters to the special interest group, because the stronger the propensity to vote against the legislation, the more costly it will be to induce the legislator to change their vote.

The propensity for agricultural PACs to contribute to legislator j , $D_j^{p,*}$, depends on the constituency characteristics of legislator j , X_j , the ideology of legislator j , and the power of legislator j over the issue, P_j . In the case of contributions, the propensity to contribute is a continuous variable able to take any real value, which is equal to the observed contribution if the contribution is greater than zero. The measures of legislator power included in this model are agricultural committee membership, agricultural committee seniority and chamber seniority. In the contribution equations, the square of the number of subsidy-receiving cotton farmers and the square of total cotton subsidies disbursed are also included, to capture the anticipated non-linear effect explained in section 2.2. The observed value, D_j^p equals the propensity if greater than zero. Otherwise, the observed value equals zero. The propensity for individual farmers to contribute to legislator j , $D_j^{f,*}$, is estimated as a function of the same characteristics as that of agricultural PACs. One additional element is added to the farmer contribution equation, which the quantity of subsidies received by the farmers making the contributions, denoted by S_j . Since the amendment votes concern subsidy disbursement, a measure of the benefits received by farmers aids in controlling for how subsidy programs affect their behavior.

Furthermore, it stands to reason that agricultural PACs and farmers will make campaign contributions for reasons unrelated to the amendment vote. For example, in each set of farm bill amendment votes, which occur roughly at the same time, there will be amendment votes which affect farmers of

specific crops, and other amendment votes which affect agricultural interests as a whole. The portion of the campaign contributions made by cotton farmers intended to affect the amendment vote cannot be explicitly separated from the portion which is intended to affect other votes. To control for the contributions unrelated to cotton interests, campaign contributions from agricultural PACs unrelated to the amendment vote are included in the agricultural PAC contribution equation, denoted by \bar{D}_j^p . Likewise, \bar{D}_j^f represents contributions made by farmers of crops other than cotton, and is included in the farmer contribution equation. If the component of cotton PAC and cotton farmer campaign contributions unrelated to the cotton amendment vote correlate with the contributions made by PACs and farmers of different crops, then including these contributions as explanatory variables controls for the contributions unrelated to the specific vote in question.

The timing of the contribution variables relative to the vote decision is critically important in identifying the effect of contributions on votes. The campaign contributions included in this regression are those that are made between the start date of the relevant Congress and the date that the vote takes place. Since both votes take place well before the election season, noise generated from contributions made with consumption motivations are minimized. The unit of observation is campaign contributions from all cotton PACs and all cotton farmers to a given legislator taking place between the start of the Congress and the date that the vote takes place.

Let $\alpha_0 - \alpha_4$, $\beta_0 - \beta_5$ and $\gamma_0 - \gamma_4$ denote vectors of regression coefficients. Let $\varepsilon_{v,j}$, $\varepsilon_{p,j}$ and $\varepsilon_{f,j}$ denote error terms. This gives us the following empirical model.

$$V_j^* = \alpha_0 + \alpha_1 D_j^p + \alpha_2 D_j^f + \alpha_3 X_j + \alpha_4 I_j + \varepsilon_{v,j} \quad (2.8)$$

$$D_j^{p,*} = \beta_0 + \beta_1 P_j + \beta_2 X_j + \beta_3 I_j + \beta_4 \bar{D}_j^p + \sigma_p \varepsilon_{p,j} \quad (2.9)$$

$$D_j^{f,*} = \gamma_0 + \gamma_1 P_j + \gamma_2 X_j + \gamma_3 I_j + \gamma_4 \bar{D}_j^f + \gamma_5 S_j + \sigma_f \varepsilon_{f,j} \quad (2.10)$$

$$V_j = \begin{cases} 1 & \text{if } V_j^* > 0 \\ 0 & \text{otherwise.} \end{cases} \quad (2.11)$$

$$D_j^p = \begin{cases} D_j^{p,*} & \text{if } D_j^{p,*} > 0 \\ 0 & \text{otherwise.} \end{cases} \quad (2.12)$$

$$D_j^f = \begin{cases} D_j^{f,*} & \text{if } D_j^{f,*} > 0 \\ 0 & \text{otherwise.} \end{cases} \quad (2.13)$$

The contribution variables, D_j^p and D_j^f are assumed to be endogenous in the vote equation. The coefficients for the contribution variables are identified in the vote equation via exclusion restrictions. The legislator power variables, to include membership on the House Committee on Agriculture, seniority on this committee and chamber seniority, are assumed to be exogenous. The reduced form contribution equations, with the legislator power variables and contributions from non-cotton farmers and PACs serving as instruments, identify the coefficients for contributions in the vote equation [45]. Theory and intuition dictate that members of the agricultural committee should have more sway organizing the content of the farm bill and informing other legislators of the policy implications of various amendment votes. More senior members of the congress, both in general and on the agricultural committee, should

likewise have more influence over the fate of amendment votes.

The assumptions on the error terms are as follows.

$$E[\varepsilon]_{v,j} = E[\varepsilon]_{p,j} = E[\varepsilon]_{f,j} = 0 \quad (2.14)$$

$$E[\varepsilon^2]_{v,j} = E[\varepsilon^2]_{p,j} = E[\varepsilon^2]_{f,j} = 1 \quad (2.15)$$

$$E[\varepsilon]_{v,j}\varepsilon_{p,j} = \rho_{v,p} \quad (2.16)$$

$$E[\varepsilon]_{v,j}\varepsilon_{f,j} = \rho_{v,f} \quad (2.17)$$

$$E[\varepsilon]_{p,j}\varepsilon_{f,j} = \rho_{p,f} \quad (2.18)$$

$$E[\varepsilon]_{k,j}\varepsilon_{k',j'} = 0, k \neq k', j \neq j' \quad (2.19)$$

The correlation coefficients $\rho_{v,p}$, $\rho_{f,p}$ and $\rho_{v,f}$ are estimated as parameters in this model, accounting for the possible endogeneity of the campaign contribution variables in the vote equation [25]. If these correlation coefficients are statistically different from zero for the correlation between each contribution equation and the vote equation, then contributions are endogenous. Failure to reject this hypothesis implies that contributions are exogenous in the vote equation.

The empirical model is estimated using the QLIM procedure in SAS software. The QLIM procedure is capable of estimating the probit-tobit-tobit specification so long as only one structural equation is included [33]. The model is estimated using full information maximum likelihood, with starting values generated from OLS regression and optimization completed using the Quasi-Newton method. The structural vote equation and the reduced form contribution equations are simultaneously estimated.

2.4 Data

The data for this research comes from several sources. Congressional voting data comes from Civic Impulse, LLC. As previously stated, this research focuses on two farm bill amendment votes affecting cotton subsidy programs. The first is House amendment 932, roll call vote 33, voted upon on February 28th, 1996, which sought to phase out marketing assistance loans and loan deficiency payments to cotton producers after the 1998 crop season [10]. This vote failed by a margin of 167-253.

The other vote decision, House amendment 715, roll call 752, sought to reduce the direct payment rate for cotton by two thirds of a cent in order to increase funding to the grassland reserve program [11]. Given that the direct payment rate was \$0.0667 per pound, the proposed amendment would reduce direct payments to cotton producers by approximately 10%. Taking place on July 27th, 2007, this vote failed by a margin of 175-251.

Campaign contribution data for individuals comes from the Federal Election Commission [14]. These data provide information on the individual making the contribution. These data contain the full name and mailing zip code of the donor. Only contributions that exceed \$200 in nominal terms are recorded in the publicly available campaign contribution data.

Campaign contribution data also comes 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 PAC represents [9]. This enables easy identification of which PACs represent the interests of

cotton farmers. For these purposes, PACs are coded as agricultural if they represent the interests of farmers. PACs representing livestock, agricultural services, chemicals, equipment and traders are not included. These data include a code specifically for cotton PACs, allowing for both the construction of a cotton PAC contribution variable and a variable for all non-cotton farming PACs.

Data on receipts of crop subsidies come from a FOIA request made to the USDA Farm Services Agency (FSA) [52]. These data contain a record of every single transaction made by the FSA from 1995 to 2014, including the full names and full mailing addresses of the recipients. These data also contain information on the specific farm program for which the subsidy pertains, and the crop, if applicable.

Since the FEC data on individual contributions includes the full names and postal zip codes of the donors, it is possible to use fuzzy matching techniques to match political contributions to receipts of subsidies from the FSA at the individual level. These data are matched by last name, first initial, suffix and postal zip code. This makes it possible to identify which donors in the FEC dataset are farmers.

If a politically active farmer has received at least one cotton subsidy, the individual is coded as a cotton farmer, and their campaign contributions are included in the cotton farmer contribution variable. If they are not a cotton farmer, but receive some other form of farm subsidy, then their contributions are counted in the non-cotton farmer contribution variable. Any individual who receives cotton subsidies during the same Congress as the vote is coded as a cotton farmer, regardless of whether or not they receive subsidies prior to the relevant vote decision.

It should be noted that there are two reasons why the farmer contribution variable is underreported. The first is that only contributions above \$200 are included in the FEC data. The second is that only farmers who receive federal subsidies are counted as farmers by the matching process. While this is a limitation of the matching process, it should not significantly under report farmer campaign contributions intended to influence legislation on agricultural programs. First, since the relevant votes pertain to curtailing subsidy programs, farmers who don't receive subsidies have no vested interest in their continuance. Secondly, the smaller the contribution, the less of an impact this contribution should have on the vote decision of the legislator.

Legislator data comes from Garrison Nelson and Charles Stewart III [40]. These data contain information on legislator characteristics such as party, committee membership, committee seniority and chamber seniority. These data are augmented with estimates of legislator ideology obtained from the DW-Nominate dataset, which estimates political ideology, created by Lewis, Poole, and Rosenthal [32]. Their estimates are the result of plotting roll call vote decisions on a two dimensional space. Their first dimension coordinate, closely correlated with attitudes towards economic intervention, is used to construct a variable called liberal, which ranges from zero for a perfectly conservative legislator to 100 for a perfectly liberal legislator in the economic sense. The specific legislator characteristics used in these models are party affiliation, political ideology, the interaction of both, agricultural committee membership, agricultural committee seniority, and chamber seniority.

Individuals are assigned to a congressional district using geocoded postal zip codes. These zip codes are assigned to congressional districts using congressional district shape files obtained from Pritcher, Lewis, DeVine and Martis [30].

Summary statistics are presented in tables 2.1 through 2.8. Table 2.1 reports summary statistics for the contributions themselves. In both relevant election cycles, there were 11 PACs representing the

interests of cotton farmers. These PACs made a total of 191 contributions prior to the cotton amendment vote to the 1996 farm bill, averaging \$910 and totaling \$173,830. At the same time, a total of 112 cotton farmers made 116 campaign contributions, averaging \$996 and totalling \$115,547.44. This suggests that cotton farmers, while not contributing as much as cotton PACs, are still politically active in terms of total contributions. Further dividing contributions by farmers into local and non-local categories, we see that farmers made more contributions and contributed more in total to out of district legislators than within district legislators during the 104th congress, suggesting cotton farmers actively contribute to non-local elections. Further evidence against consumption motivations stem from the fact that the relevant vote occurs before the primary election season. On average, cotton farmers and PACs are contributing roughly the same amount on average as farmers and PACs representing other crops. On average, the contributing farmers received \$1,143.77 in cotton subsidies during this time, which is only slightly more than their total contribution levels. The total quantity of subsidies received is \$99,508, which is less than the total amount contributed. During this period, cotton subsidies were relatively low, totalling \$82 million in the period between the start of the 104th Congress and the date of the cotton subsidy amendment vote to the 1996 farm bill.

Between 1996 and 2007, the most substantial policy change is the increase in subsidy levels for cotton. Over \$2 billion was disbursed to cotton farmers during this time. It can also be seen that received subsidies increased by an order of magnitude. The number of cotton PACs remains the same, at 11. These PACs contributed a total of \$181,713 in 2007, roughly the same as their contribution levels prior to the amendment vote in 1996. Likewise, contribution levels for other farming PACs are almost identical to their levels in 1996. While cotton farmers also maintain contribution levels, the characteristics of the recipients change. While more contributions are made to non-local campaigns, the average and total level of contributions is higher for local races. Also, farmers of other crops contributed one third as much as they did prior to the 1996 cotton amendment vote. This is likely due to the fact that the vote occurred much earlier in the cycle than the vote in 1996.

Summary statistics for model variables are shown in table 2.2. For both relevant cotton subsidy program votes, the percentage of yes votes is around 40%. Both votes failed by large margins. At any given time, approximately 11% of legislators are members of the House Committee on Agriculture. The average chamber seniority goes up by a full term between the 1996 and the 2008 election cycles, suggesting that incumbency advantage is increasing over time. Party affiliation reflects the fact that Republicans had a majority in 1996 while Democrats had a majority in 2007.

Tables 2.3 through 2.5 report correlation coefficients for model variables. Shown in table 2.3, the decision to vote yes on on the cotton amendment to the 1996 farm bill is negatively correlated with the campaign contribution variables and cotton farming constituency characteristics. Cotton farmer and Cotton PAC contributions are positively and highly correlated with each other. Correlation coefficients suggest that liberalism and Democratic Party membership are negatively correlated with the decision to vote yes.

Correlations for the variables in the cotton PAC contribution equation during the 1996 election cycle are reported in table 2.4. Cotton PAC contributions are positively correlated with cotton farming constituency characteristics, and negatively correlated with Democratic Party membership and economic liberalism. This suggests that cotton PACs are less likely to contribute to people more politically inclined

to support their interest. This could be caused by two factors. One, Republicans controlled the House of Representatives during this time, and two, based on the vote, Republicans are more likely to support the amendment curtailing cotton subsidy programs. In other words, Republicans are more likely to need to be influenced away from supporting the amendment. Cotton PAC contributions are positively and highly correlated with agricultural committee membership and seniority, while being weakly correlated with chamber seniority. This suggests the PACs are more concerned with shoring up support among powerful members of the agricultural committee, the committee which drafts the farm bill, than senior legislators as a whole.

Interestingly, the explanatory variable which is most highly correlated with cotton PAC contributions is contributions from non-cotton farming PACs. This high positive correlation suggests that cotton PACs are contributing, in many cases, to the same legislators as other agricultural PACs. Plausible reasons for this include that agricultural PACs are trying to incentivize log-rolling, or that there are other jointly beneficial amendments to the farm bill that the agricultural lobby is united in trying to achieve. It should be noted that all of the house roll call votes on farm bill amendments, for both the 1996 farm bill and 2008 farm bill, occur within a few days of each other. Note also, that the correlation between the cotton farming population variable and the cotton total subsidy disbursement variables are extremely high. This could indicate the presence of multicollinearity in the subsequent estimations.

Contributions by cotton farmers have the same correlation patterns, for the most part. Subsidies received by the donating cotton farmers are positively and highly correlated with cotton farmer contributions. Agricultural committee membership and seniority are less highly correlated with cotton farmer contributions than with cotton PAC contributions. Likewise, contributions from non-cotton farmers are less highly correlated with cotton farmer contributions than non-cotton PAC contributions are with cotton PAC contributions.

Correlation coefficients for the variables of the cotton subsidy amendment vote to the 2008 farm bill, reported in table 2.6, are similar to those in the equation for the 1996 vote. Critical differences include a reversal in correlation coefficients between ideology variables and the yes vote. In this vote, liberals and Democrats are more likely to vote yes than Republicans are. Note also, that during this congress, Democrats held a majority of seats in the House of Representatives. Correlations between total cotton subsidy disbursement and the number of subsidy-receiving cotton farmers is even higher in the 110th congress, at .93. This implies probable multicollinearity between these variables.

Likewise, the correlation coefficients for the cotton PAC contribution equation in 2008, shown in table 2.7, are similar to those in 1996. The primary difference is that the correlations on the partisanship variables are reversed. This reflects the reversal in the partisan makeup of congress. As previously noted, Democrats are also more likely to vote yes on this amendment in 2008, which implies that Democrats are more likely to require incentives to vote no.

Correlations between model variables for the 2008 cotton contribution equation, reported in table 2.8, shows a much higher positive correlation between subsidies received and the size of the contribution. Note that, by the end of the 2002 farm bill regime, cotton subsidies had increased by orders of magnitude relative to the end of the 1990 farm bill regime depicted in the previous amendment vote. Unlike cotton PACs, cotton farmers maintain their preference for contributing to Republicans.

Figures 2.1 through 2.12 show choropleth maps of model variables by congressional district. Figures

2.3 and 2.4 report the number of cotton subsidy recipients and the total quantity of cotton subsidies disbursed during the 104th congress. Note that, with few exceptions, these farmers and subsidies are concentrated in Alabama, Arizona, Arkansas, California, Georgia, Louisiana, Mississippi and Texas. Note also that, during the 104th congress, there is not a perfect correspondence between subsidy recipients and subsidy receipts. This implies that cotton subsidies are not equally disbursed among cotton farmers. For example, while there is a high percentage of cotton farmers in southern Georgia, they did not receive proportionally high levels of subsidies. As can be seen in figure 2.1, few legislators in these states voted for the subsidy reduction, and those that did so, did not represent congressional districts with substantial levels of cotton farming. Figure 2.2 shows which districts are represented by members of the House Committee on Agriculture. A significant number of these districts represent areas with substantial cotton farming operations. Comparing this with yes votes on the anti-cotton amendment, few agricultural committee members voted for the amendment. Those that did so do not represent districts with high levels of cotton farming.

Contributions from cotton PACs and cotton farmers during the 104th Congress are shown in figures 2.5 and 2.6. While cotton PACs contributed heavily to legislators representing cotton districts in the 104th congress, they also contributed to legislators outside of cotton districts. Many of these legislators appear to be on the House Committee on Agriculture. Contributions made by farmers appear to be more constrained to legislators representing districts with cotton farming.

The distribution of farmers does not substantially change between the 104th and 110th congresses. The figures for the number of subsidy-receiving cotton farmers and total cotton subsidy disbursement are shown in figures 2.9 and 2.10. During this period, cotton farmers appear to spread to New Mexico. As seen in the 104th congress, subsidies don't appear to be allocated evenly among farmers. For example, certain congressional districts in parts of Arizona don't appear to have significantly high numbers of cotton subsidy recipients, but do receive a significant proportion of cotton subsidies. Likewise, the northern congressional district of New Mexico appears to have a proportionately high number of subsidy-receiving cotton farmers, but does not receive a proportionately high quantity of cotton subsidies.

As can be seen in figure 2.7, those who voted yes on the reduction in cotton subsidies in the 110th congress, for the most part, do not represent districts with substantial cotton farming. There appears to be one exception in Texas. Figure 2.8 shows districts represented by members of the House Committee on Agriculture. It would appear from this figure that legislators representing the center line of the country prefer membership on the agricultural committee. Elsewhere, there is heterogeneity in districts represented by the committee between the two congresses studied. As shown previously, contributions by cotton PACs, shown in figure 2.11, while being partially concentrated among districts with high levels of cotton farming, do flow to other districts. Alternatively, contributions from cotton farmers, shown in figure 2.12, appear to flow predominately to districts with cotton farmers. This result, for both congresses, is somewhat surprising, given the fact that in each case, the majority of contributions are made out of district.

Graphs of kernel density estimates for the contribution variables are shown in figures 2.13 and 2.14. As can be seen, these contribution variables are censored heavily below.

2.5 Results

The results from the empirical analysis are reported in tables 2.9 through 2.12. Beginning with the agricultural PAC contribution equation corresponding with the cotton amendment vote to the 1996 farm bill, it appears that cotton PAC contributions are highly correlated with contributions from other farming PACs. When controlling for the actions of other farming PACs, in essence controlling for contributions that are unrelated to this specific amendment vote, partisanship and legislator power variables lose statistical significance. When contributions from other farming PACs are omitted, agricultural committee membership becomes highly significant. This suggests that, while cotton PACs do contribute heavily to members of the House Committee on Agriculture, these contributions follow the same pattern as the rest of the agricultural PACs, and are not necessarily related to specific measures to prevent a yes vote for the subsidy reduction.

As expected, the coefficients on variables for the total number of cotton subsidy recipients and the total level of cotton subsidies are statistically significant. These coefficients and their squared terms suggests that there exists a median level of constituency characteristics that maximizes contributions. Partisanship variables have coefficients that are not statistically different from zero, though the signs of the coefficients suggest an increased propensity to contribute to Democrats, and a reduced propensity to contribute to liberals.

Results for the individual cotton farmer contribution equation suggests the existence of a similar pattern of behavior. While the total subsidy receipt variables lack statistical significance, the farming population variables suggest a similar trend of contributing to legislators that represent the median cotton constituency. This implies strategic contribution behavior by cotton farmers. If contributions were simply allocated to local legislators as a form of individual consumption, then the squared terms should be non negative. Unlike cotton PACs, the contributions made by farmers of other crops do not have a statistically significant impact on contributions made by cotton farmers. Also, the subsidies received by the contributing farmers, while having a positive effect, lacks statistical significance. Recall that, during this period of time, the levels of subsidies received by cotton farmers were quite low. Partisanship does appear to have some impact, with a statistically significant and negative effect of liberalism on the amount contributed to the legislator.

Partisanship appears to have a highly significant impact on the decision to vote yes on the cotton amendment vote. Note again, that the passage of this amendment would have negatively affected the cotton farming industry by eliminating a number of subsidy programs. Results suggest that liberals and Democrats have a significant and negative propensity to vote for the subsidy reduction. However, liberal Democrats appear to favor it. This suggests that those on the far left, and likely those on both political extremes, dislike cotton subsidy programs. The farming population and total subsidy variables suggest, as expected, that the more cotton subsidy recipients and the more cotton subsidy disbursement present in their district, the less likely they are to vote yes on the reduction in cotton subsidies. While these coefficients lack high levels of statistical significance, they are jointly statistically significant at the one percent level. Results suggest that an increase in the number of cotton farmers by 1,000 reduces the probability a legislator votes yes on the subsidy reduction by 33 percent. Likewise, an increase in total subsidy disbursement of \$1,000,000 reduces the probability of a yes vote by 49 percent.

As expected, and consistent with the prior literature, contributions made by cotton PACs has the anticipated negative impact on the decision to vote for cotton subsidy reductions, and is statistically significant. Results indicate that a \$1,000 increase in contributions by cotton PACs reduces the probability for a yes vote by 28 percent. While contributions from cotton farmers also have a negative effect on the propensity to vote yes, the magnitude is small and lacks statistical significance. A \$1,000 increase in farmer contributions decreases the probability of a yes vote by only 2.4 percent. The correlation coefficients suggest that contributions are not endogenous in the vote equation, and thus, the vote can be estimated separately.

As previously stated, the amendment to eliminate certain cotton subsidy programs failed by a margin of 165-264. Ideally, the topic of study would be a vote decision that was decided by a closer margin than this. The model predicts the vote to be 146-283, correctly predicting 91 percent of the votes. The model overestimates the effectiveness of campaign contributions. The counterfactual analysis states that, had no campaign contributions been made, the actual vote would have been 183-246.

There are a number of important differences between the circumstances surrounding the amendment in 1996 and the amendment in 2008. First, the disbursement of cotton subsidies increased 20 fold between the two periods. Secondly, rather than eliminate specific farm subsidy programs, the amendment vote that took place in 2007 would have reduced cotton direct payments by 10 percent. Further, since the vote took place in mid 2007, a non-election year, the likelihood that the included contributions are a form of consumption expenditure for cotton farmers rather than an investment expenditure is even lower than in the previous analysis. Lastly, while the Republican Party held a majority in the House of Representatives in the 104th congress, the Democratic Party held a majority in the 110th congress, in which this amendment vote took place.

The results for the cotton PAC contribution equation are weaker than in the 1996 case. While most of the coefficients have the same signs as before, all coefficients lose statistical significance with the exception of contributions from other farming PACs. Alternatively, for the farmer contribution equation, the quantity of subsidies received by the contributing cotton farmers has a positive and highly statistically significant impact on how much they contribute. The fact that received subsidies increase in statistical significance relative to the previous amendment vote is intuitive, due to the increased levels of cotton support provided by the government. The higher the level of subsidies, the more valuable protecting them becomes. While the number of cotton farmers within the legislator's district continues to have a positive and statistically significant impact on farmer contributions, the squared term loses statistical significance. However, a Wald statistic rejects the null hypothesis that these coefficients are jointly zero. The correlation among error terms suggests that the cotton PAC contributions are endogenous in the vote equation, necessitating simultaneous estimation.

The vote equation shows some differences from the similar vote taken 12 years prior. First, the partisanship variables lose statistical significance. While signs are preserved, the magnitudes of the marginal effects also decrease significantly. The importance of the number of subsidy-receiving cotton farmers increases in statistical significance and magnitude. While total cotton subsidy disbursement continues to lack statistical significance, is the anticipated sign, and a Wald statistic rejects the null hypothesis that the effects of the cotton farmer population and total cotton subsidy disbursement are jointly zero.

Cotton PAC contributions have a negative and highly statistically significant impact on the decision

to vote for cotton subsidy reductions. Results indicate that a \$1,000 increase in cotton PAC contributions reduces the probability of a yes vote by 31 percent. Farmer contributions lack statistical significance, but again have the anticipated sign. A \$1,000 increase in cotton farmer contributions reduces the probability of a yes vote by 3 percent.

The amendment vote in 2007 failed by a margin of 171-253. The model predicts the final vote tally to be 185-253. In this case, the model underestimates the effectiveness of campaign contributions, with 93 percent of votes correctly predicted. The counterfactual analysis suggests that the vote would have been 206-213 had no campaign contributions been made by either the cotton PACs or the cotton farmers.

2.6 Conclusion

This research accomplishes two main objectives; determining if evidence supports the conclusion that farmers treat campaign contributions as an investment expenditure, and whether campaign contributions by farmers have a significant impact on the vote decisions of legislators. For the first hypothesis, some of the evidence does support the notion that farmers invest in campaign contributions. The fact that the farming population variable has a positive coefficient, while the square of the farming population variable has a negative coefficient, suggests that farmers are contributing to legislators representing districts that possess a median cotton farming constituency. This implication follows from the coefficients suggesting the presence of an optimal number of cotton farmers, beyond which contributions from cotton farmers decline. Further, the summary statistics from the contribution data show that farmers make more contributions to out of district legislators than they make to their local legislators. Finally, the choropleth in figure 2.12 shows that cotton farmers contributed substantially to legislators outside of the cotton belt in 2007, coinciding with high levels of contributions from cotton PACs, suggesting a certain level of sophistication in how contributions are allocated. Further, the partisan motivators for contributions are largely the same between cotton PACs and cotton farmers. This evidence in total suggests that cotton farmers and cotton PACs behave similarly, further supporting the hypothesis that campaign contributions made by farmers are motivated by investment, rather than consumption behavior, and is likely guided by their PACs.

On the other hand, the empirical results fail to reject the null hypothesis that cotton farmer contributions have no effect on farm bill amendment votes. In unreported analyses, the model fails to reject this null hypothesis even when cotton PAC contributions are omitted. However, the signs of the coefficients are correct for the hypothesis that contributions influence legislators to vote in their favor. It is important to recall that, due to data censoring by the FEC, only the largest of these contributions are represented in these data. It is possible that the combined effect of contributions by cotton farmers, including those not reported, has a stronger effect on legislative outcomes than the estimates in this model suggest. It is also possible that, given the wide geographic distribution of cotton farming as evidenced in figures 2.3 and 2.9, that farmers face a collective action dilemma. The farmers may have difficulty organizing outside of their respective PACs. Gardner (1987) suggests that the level of support for farm commodities is a function of how geographically disbursed commodity producers are [16]. The more dispersed the farmers are, the harder it is to both organize PACs and coordinate contributions. In

other words, cotton farmers, who are dispersed from California to Georgia, could face a substantial free rider problem that hinders political action.

These results further highlight potential areas of future research. Based on the summary statistics on farmer contributions, geography may play an important role in campaign contribution behavior. Prior research has shown this to be the case for campaign contributions in general [21]. A detailed analysis of farmer contributions, taking the distance between the contributors and recipients into account is warranted. Furthermore, results from this research also suggest that the subsidies received by politically active farmers have a significant impact on their propensity to contribute to political campaigns. While treated as exogenous in this analysis, the relationship between campaign contributions and receipts of subsidies should be investigated in detail. Prior research shows that agricultural disaster subsidy allocations are politically motivated [17]. Other research shows that these disaster subsidy disbursements affect farmer behavior [34]. If such a quid pro quo exists, these data may be useful in quantifying it.

2.7 Appendix

Table 2.1: Summary statistics for the individual contributions and subsidy disbursements. All variables are expressed in terms of 2012 dollars. Contributions are made by 11 cotton PACs in both election cycles, 112 cotton farmers in the 1996 election cycle and 121 cotton farmers in the 2008 election cycle.

Variable	Cycle	N	Mean	Std. Dev.	Min	Max	Sum
Farm Don.	1996	116	\$996.10	\$743.16	\$292.75	\$4,434.20	\$115,547.44
L-Farm Don.	1996	47	\$957.40	\$782.19	\$292.75	\$4,434.20	\$44,997.63
NL-Farm Don.	1996	69	\$1,001.25	\$634.47	\$301.35	\$3,013.45	\$69,086.08
Other Farm Don.	1996	725	\$919.04	\$739.55	\$292.75	\$8,868.40	\$666,305.37
L-Other Farm Don.	1996	355	\$827.81	\$632.32	\$292.75	\$3,723.82	\$293,872.24
NL-Other Farm Don.	1996	370	\$1,004.74	\$818.86	\$292.75	\$8,868.40	\$371,755.11
PAC Don.	1996	191	\$910.11	\$477.02	\$36.59	\$3,013.45	\$173,830.27
Received Subsidies	1996	87	\$1,143.77	\$4,703.11	-\$6,806.38	\$31,243.41	\$99,508.29
Total Subsidies	1996	127,393	\$650.30	\$4,725.68	-\$83,492.75	\$316,194.90	\$82,843,294.96
Other PAC Don.	1996	4,886	\$941.97	\$596.51	\$52.74	\$7,533.62	\$4,602,470.91
Farm Don.	2008	140	\$808.78	\$862.62	\$221.47	\$5,093.74	\$113,229.30
L-Farm Don.	2008	62	\$1,040.27	\$1,036.49	\$221.47	\$5,093.74	\$64,496.65
NL-Farm Don.	2008	78	\$624.78	\$644.00	\$221.47	\$4,761.53	\$48,732.65
Other Farm Don.	2008	274	\$774.89	\$715.98	\$221.47	\$5,093.74	\$212,320.16
L-Other Farm Don.	2008	176	\$805.37	\$737.87	\$221.47	\$5,093.74	\$141,744.25
NL-Other Farm Don.	2008	98	\$720.16	\$675.12	\$221.47	\$5,093.74	\$70,575.91
PAC Don.	2008	148	\$1,227.79	\$530.62	\$553.67	\$2,768.33	\$181,713.46
Other PAC Don.	2008	3,136	\$1,497.03	\$1,046.43	\$77.51	\$5,536.67	\$4,694,692.07
Received Subsidies	2008	112	\$19,281.39	\$29,096.00	\$1.11	\$163,649.77	\$2,159,515.97
Total Subsidies	2008	152,994	\$13,161.33	\$38,874.89	\$1.11	\$1,429,154.78	\$2,013,603,820.90

Table 2.2: Summary statistics for model variables. All dollar amounts are expressed in terms of 2012 dollars.

Variable	Cycle	N	Mean	Std. Dev.	Min	Max
Yes Vote	1996	425	0.39	0.49	0	1
Cotton Farm Don.	1996	429	\$244.58	\$1,055.22	\$0.00	\$10,652.71
Cotton PAC Don.	1996	429	\$392.96	\$1,254.96	\$0.00	\$10,686.79
Ag. Com.	1996	429	0.12	0.32	0	1
Ag. Com. Sen.	1996	429	0.39	1.56	0	16
Chamber Sen.	1996	429	4.98	4.08	1	23
Cotton Farm Pop.	1996	429	198.67	780.43	0	8468
Cotton Tot. Sub.	1996	429	\$102,381.12	\$563,517.33	-\$764,511.43	\$5,500,658.71
Democrat	1996	429	0.47	0.5	0	1
Liberal	1996	429	60.15	20.89	17.09	96.64
Yes Vote	2008	423	0.4	0.49	0	1
Cotton Farm Don.	2008	424	\$257.65	\$1,094.67	\$0.00	\$10,796.50
Cotton PAC Don.	2008	424	\$416.82	\$1,464.21	\$0.00	\$16,167.07
Ag. Com.	2008	424	0.11	0.31	0	1
Ag. Com. Sen.	2008	424	0.33	1.22	0	9
Chamber Sen.	2008	424	6.04	4.4	1	27
Cotton Farm Pop.	2008	424	224.86	860.96	0	11489
Cotton Tot. Sub.	2008	424	\$2,054,609.71	\$9,702,109.90	\$0.00	\$121,365,271.09
Democrat	2008	424	0.54	0.5	0	1
Liberal	2008	424	59.15	24.46	6.534	96.69

Table 2.3: Correlation coefficients for the variables included in the vote equation for the 1996 cotton amendment vote.

Variable	Yes Vote	Pac Don.	Farm Don.	Farm Pop.	Tot. Sub.	Democrat	Liberal
Yes Vote	1.00	-0.22	-0.14	-0.17	-0.14	-0.10	-0.07
Pac Don.	-0.23	1.00	0.46	0.39	0.47	-0.07	-0.11
Farm Don.	-0.14	0.46	1.00	0.37	0.34	-0.09	-0.14
Farm Pop.	-0.17	0.39	0.37	1.00	0.78	0.00	-0.05
Tot. Sub.	-0.14	0.47	0.34	0.78	1.00	0.01	-0.03
Democrat	-0.10	-0.07	-0.09	0.00	0.01	1.00	0.92
Liberal	-0.07	-0.11	-0.14	-0.05	-0.03	0.92	1.00

Table 2.4: Correlation coefficients for variables included in the cotton PAC contribution equation for the 1996 cotton amendment vote.

Variable	Pac Don.	Farm Pop.	Tot. Sub.	Dem.	Lib.	Ag. Com.	Ag.Sen.	Ch. Sen.	Other Don.
Pac Don.	1.00	0.39	0.47	-0.07	-0.11	0.50	0.40	-0.04	0.58
Farm Pop.	0.39	1.00	0.78	0.00	-0.05	0.22	0.28	-0.03	0.25
Tot. Sub.	0.47	0.78	1.00	0.01	-0.03	0.23	0.26	-0.02	0.21
Democrat	-0.07	0.00	0.01	1.00	0.92	-0.02	0.05	0.24	-0.10
Liberal	-0.11	-0.05	-0.03	0.92	1.00	-0.06	0.04	0.29	-0.16
Ag. Com.	0.50	0.22	0.23	-0.02	-0.06	1.00	0.69	-0.12	0.51
Ag. Com. Sen.	0.40	0.28	0.26	0.05	0.04	0.69	1.00	0.13	0.36
Chamber Sen.	-0.04	-0.03	-0.02	0.24	0.29	-0.12	0.13	1.00	-0.06
Other PAC Don.	0.58	0.25	0.21	-0.10	-0.16	0.51	0.36	-0.06	1.00

Table 2.5: Correlation coefficients for variables included in the cotton farmer contribution equation for the 1996 cotton amendment vote.

Variable	Farm Don	Rec. Sub.	Pop.	Tot. Sub.	Dem.	Lib.	Ag. Com.	Ag. Sen.	Ch. Sen.	Other Don.
Farm Don	1.00	0.34	0.37	0.34	-0.09	-0.14	0.21	0.14	-0.09	0.18
Rec. Sub.	0.34	1.00	0.39	0.64	0.03	-0.01	0.14	0.12	-0.04	0.08
Farm Pop.	0.37	0.39	1.00	0.78	0.00	-0.05	0.22	0.28	-0.03	0.11
Tot. Sub.	0.34	0.64	0.78	1.00	0.01	-0.03	0.23	0.26	-0.02	0.08
Democrat	-0.09	0.03	0.00	0.01	1.00	0.92	-0.02	0.05	0.24	-0.29
Liberal	-0.14	-0.01	-0.05	-0.03	0.92	1.00	-0.06	0.04	0.29	-0.32
Ag. Com.	0.21	0.14	0.22	0.23	-0.02	-0.06	1.00	0.69	-0.12	0.18
Ag. Com. Sen.	0.14	0.12	0.28	0.26	0.05	0.04	0.69	1.00	0.13	0.07
Chamber Sen.	-0.09	-0.04	-0.03	-0.02	0.24	0.29	-0.12	0.13	1.00	-0.19
Other Farm Don.	0.18	0.08	0.12	0.08	-0.29	-0.32	0.18	0.07	-0.19	1.00

Table 2.6: Correlation coefficients for the variables included in the vote equation for the 2007 cotton amendment vote.

Variable	Yes Vote	Pac Don.	Farm Don.	Farm Pop.	Tot. Sub.	Democrat	Liberal	Liberal Dem.
Yes Vote	1	-0.22	-0.18	-0.2	-0.17	0.221	0.24	0.242
Pac Don.	-0.224	1	0.46	0.302	0.3	0.066	0.02	0.036
Farm Don.	-0.183	0.46	1	0.383	0.33	-0.026	-0.061	-0.048
Farm Pop.	-0.2	0.3	0.38	1	0.93	-0.047	-0.095	-0.073
Tot. Sub.	-0.17	0.3	0.33	0.925	1	0.012	-0.03	-0.011
Democrat	0.221	0.07	-0.03	-0.047	0.01	1	0.956	0.992
Liberal	0.24	0.02	-0.06	-0.095	-0.03	0.956	1	0.975
Liberal Dem.	0.242	0.04	-0.05	-0.073	-0.01	0.992	0.975	1

Table 2.7: Correlation coefficients for variables included in the cotton PAC contribution equation for the 2007 cotton amendment vote.

Variable	Pac Don.	Pop.	Tot. Sub.	Dem.	Lib.	Ag. Com.	Ag.Sen.	Ch. Sen.	Other Don.
Pac Don.	1	0.302	0.3	0.066	0.02	0.485	0.542	-0.082	0.65
Farm Pop.	0.3	1	0.93	-0.047	-0.095	0.162	0.158	-0.035	0.22
Tot. Sub.	0.3	0.925	1	0.012	-0.03	0.137	0.103	-0.04	0.26
Democrat	0.07	-0.047	0.01	1	0.956	0.011	-0.024	0.034	0.06
Liberal	0.02	-0.095	-0.03	0.956	1	-0.049	-0.054	0.112	0
Ag. Com.	0.49	0.162	0.14	0.011	-0.049	1	0.793	-0.232	0.59
Ag. Com. Sen.	0.54	0.158	0.1	-0.024	-0.054	0.793	1	-0.078	0.59
Chamber Sen.	-0.08	-0.035	-0.04	0.034	0.112	-0.232	-0.078	1	-0.09
Other PAC Don.	0.65	0.221	0.26	0.057	0.003	0.589	0.593	-0.085	1

Table 2.8: Correlation coefficients for variables included in the cotton farmer contribution equation for the 2007 cotton amendment vote.

Variable	Farm Don	Rec. Sub.	Pop.	Tot. Sub.	Dem.	Lib.	Ag. Com.	Ag. Sen.	Ch. Sen.	Other Don.
Farm Don	1	0.62	0.383	0.33	-0.026	-0.061	0.258	0.331	-0.061	0.37
Rec. Sub.	0.62	1	0.125	0.12	0.038	0.003	0.238	0.435	0.002	0.59
Farm Pop.	0.38	0.12	1	0.93	-0.047	-0.095	0.162	0.158	-0.035	0.15
Tot. Sub.	0.33	0.12	0.925	1	0.012	-0.03	0.137	0.103	-0.04	0.14
Democrat	-0.03	0.04	-0.047	0.01	1	0.956	0.011	-0.024	0.034	-0.06
Liberal	-0.06	0	-0.095	-0.03	0.956	1	-0.049	-0.054	0.112	-0.1
Ag. Com.	0.26	0.24	0.162	0.14	0.011	-0.049	1	0.793	-0.232	0.29
Ag. Com. Sen.	0.33	0.43	0.158	0.1	-0.024	-0.054	0.793	1	-0.078	0.38
Chamber Sen.	-0.06	0	-0.035	-0.04	0.034	0.112	-0.232	-0.078	1	-0.07
Other Farm Don.	0.37	0.59	0.153	0.14	-0.063	-0.098	0.294	0.378	-0.072	1

Table 2.9: Estimation results for the cotton amendment votes in 1996 and 2008. Note that the contribution variables and farming population variables are rescaled in terms of thousands. The total subsidy variables are rescaled in terms of millions. *, **, and *** denote statistical significance at the 10%, 5% and 1% levels, respectively.

Dependent Variable	Vote	PAC Contribution	Farmer Contribution	Vote	PAC Contribution	Farmer Contribution
Cycle	1996	1996	1996	2008	2008	2008
Intercept	1.430 (0.492)***	-2.228 (1.055)***	-0.406 (1.765)**	0.422 (0.449)	-5.860 (2.297)***	-4.848 (2.034)
PAC Contribution	-0.882 (0.111)***			-1.026 (0.195)***		
Farmer Contribution	-0.074 (0.195)			-0.101 (0.589)		
Democrat	-5.138 (1.363)***	1.267 (2.923)	5.708 (5.843)	-0.880 (1.146)	1.007 (5.061)	0.028 (4.783)
Liberal	-0.029 (0.011)***	-0.038 (0.026)	-0.086 (0.044)**	-0.015 (0.012)	0.001 (0.064)	0.018 (0.056)
Liberal Democrat	0.072 (0.019)***	-0.007 (0.043)	-0.051 (0.085)	0.026 (0.018)	-0.011 (0.087)	-0.018 (0.078)
Farming Pop.	-1.528 (1.076)*	1.037 (0.401)***	3.844 (0.765)***	-3.936 (1.282)***	1.922 (1.255)	3.182 (1.165)***
Total Subsidies	-1.043 (0.545)	2.936 (0.725)***	0.179 (1.353)	-0.106 (0.176)	0.018 (0.123)	-0.080 (0.110)
Received Subsidies			0.057 (0.092)			0.020 (0.005)***
Squared Farm Pop.		-0.137 (0.055)***	-0.438 (0.100)***		-0.080 (0.155)	-0.195 (0.149)
Squared Tot. Sub.		-0.438 (0.145)***	0.044 (0.256)		-0.001 (0.001)	0.000 (0.001)
Agricultural Com.		2.163 (0.555)	0.225 (1.057)		1.786 (1.124)	2.787 (1.335)
Ag. Com Seniority		-0.041 (0.102)	0.127 (0.204)		0.256 (0.248)	-0.252 (0.319)
Chamber Seniority		0.062 (0.045)	-0.102 (0.097)		-0.123 (0.087)	-0.050 (0.077)
Other Pac Don.		0.101 (0.013)***			0.115 (0.019)***	
Other Farm Don.			0.107 (0.093)			-0.154 (0.255)
σ		1.975 (0.160)***	3.150 (0.353)***		3.174 (0.325)***	3.118 (0.379)***
$\rho_{v,p}$	0.213 (0.179)			0.718 (0.133)***		
$\rho_{v,f}$	-0.018 (0.209)			0.031 (0.228)		
$\rho_{p,f}$	0.211 (0.109)***			0.718 (0.133)***		
Log-Likelihood	-670.638			-599.848		

Table 2.10: Marginal effects for the estimations shown in table 2.9. Marginal effects are calculated using the average of partial effects approach.

Dependent Variable	Vote	PAC Contribution	Farmer Contribution	Vote	PAC Contribution	Farmer Contribution
Cycle	1996	1996	1996	2008	2008	2008
PAC Contribution	-0.2846			-0.3179		
Farmer Contribution	-0.0240			-0.0314		
Democrat	-0.5303	0.2600	1.3391	-0.2211	0.1291	0.0031
Liberal	-0.0095	-0.0070	-0.0173	-0.0047	0.0001	0.0025
Liberal Democrat	0.0233	-0.0013	-0.0102	0.0079	-0.0014	-0.0025
Farming Pop.	-0.3367	0.1918	0.7734	-1.2194	0.2449	0.4494
Total Subsidies	-0.4931	0.5430	0.0360	-0.0327	0.0023	-0.0113
Received Subsidies			0.0116			0.0028
Squared Farm Pop.		-0.0253	-0.0881		-0.0001	-0.0275
Squared Tot. Sub.		-0.0810	0.0088		-0.0102	0.0000
Agricultural Com.		0.5781	0.0271		0.2707	0.4996
Ag. Com Seniority		-0.0076	0.0256		0.0326	-0.0356
Chamber Seniority		0.0115	-0.0205		-0.0157	-0.0070
Other Pac Don.		0.0186			0.0147	
Other Farm Don.			0.0215			-0.0217

Table 2.11: Counterfactual analysis of the impact of campaign contributions on the vote decision. Votes are coded as yes votes if the predicted probability of a yes vote is greater than 0.5.

Counterfactual	Cycle	Yes	No
Actual	1996	165	264
Predicted With Contributions	1996	146	283
Predicted Without Contributions	1996	183	246
Actual	2008	171	253
Predicted With Contributions	2008	185	239
Predicted Without Contributions	2008	206	218

Table 2.12: Wald statistics for joint significance of model variables. *, **, and *** denote statistical significance at the 10%, 5% and 1% levels, respectively.

Equation	Null Hypothesis	Statistic (1996)	Statistics (2008)
Vote	PAC Don. & Farmer Don. = 0	12.49***	3.43*
Vote	Farm Pop & Tot. Sub = 0	4.44***	10.89***
PAC Contribution	Tot. Sub. & Tot. Sub. Squared = 0	17.72***	0.02
PAC Contribution	Farm Pop. & Farm Pop. Squared = 0	6.47**	2.35
Farmer Contribution	Tot. Sub. & Tot. Sub. Squared = 0	0.04	0.53
Farmer Contribution	Farm Pop. & Farm Pop. Squared = 0	25.06***	8.25***

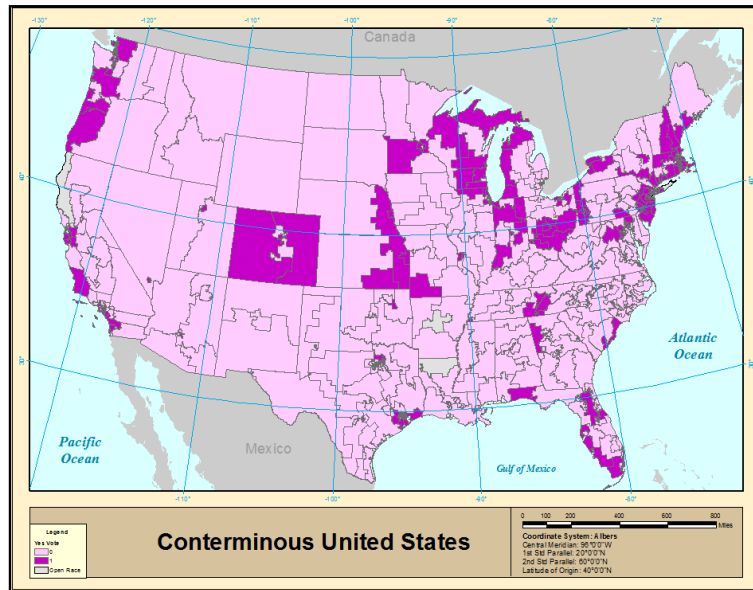


Figure 2.1: Map of roll call votes for the cotton amendment to the 1996 farm bill. This vote would have reduced subsidy payments to cotton farmers.



Figure 2.2: Map of agricultural committee membership in the 104th congress.

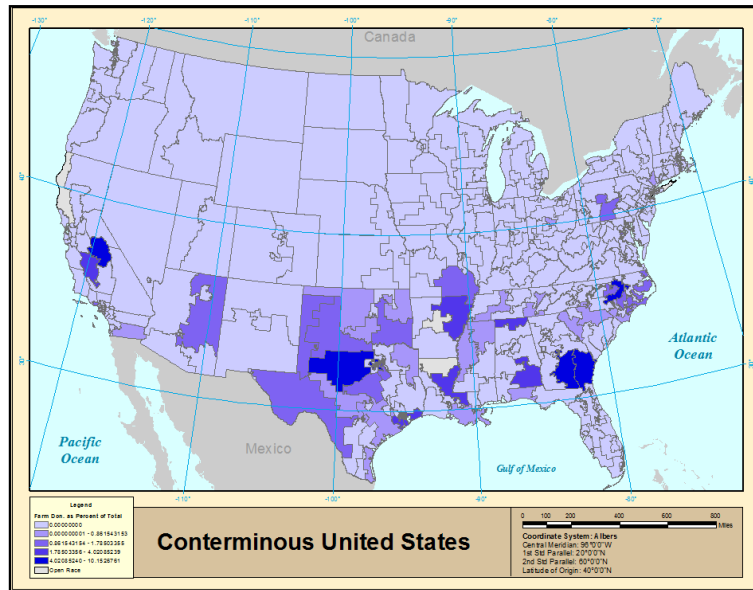


Figure 2.3: Map of cotton farming population by congressional district during the 104th congress.

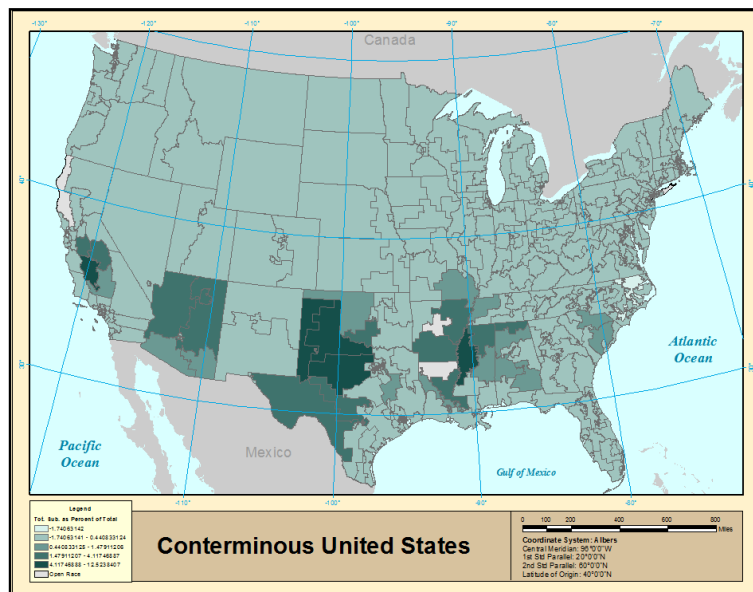


Figure 2.4: Map of total cotton subsidy disbursement between the beginning of the 104th Congress and the date of the cotton amendment vote.

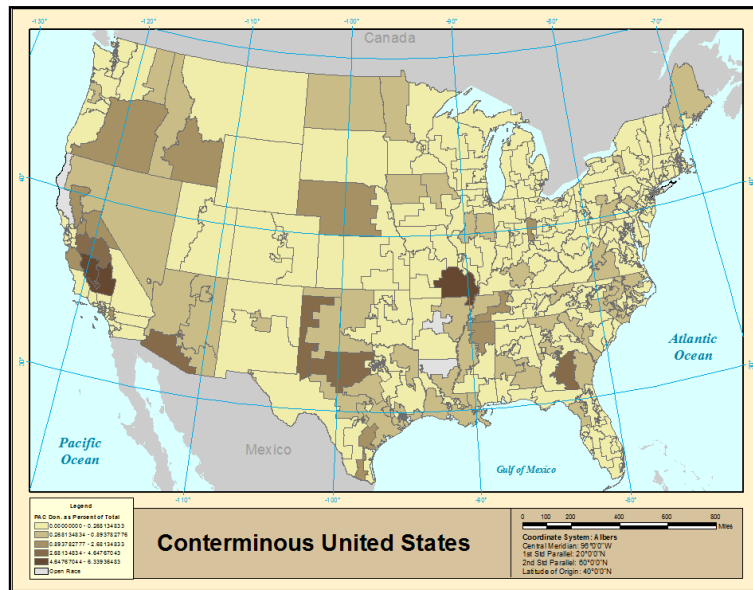


Figure 2.5: Map of campaign contributions received by legislators from PACs representing cotton farmers, made between the start of the 104th Congress and the date of the cotton amendment vote.

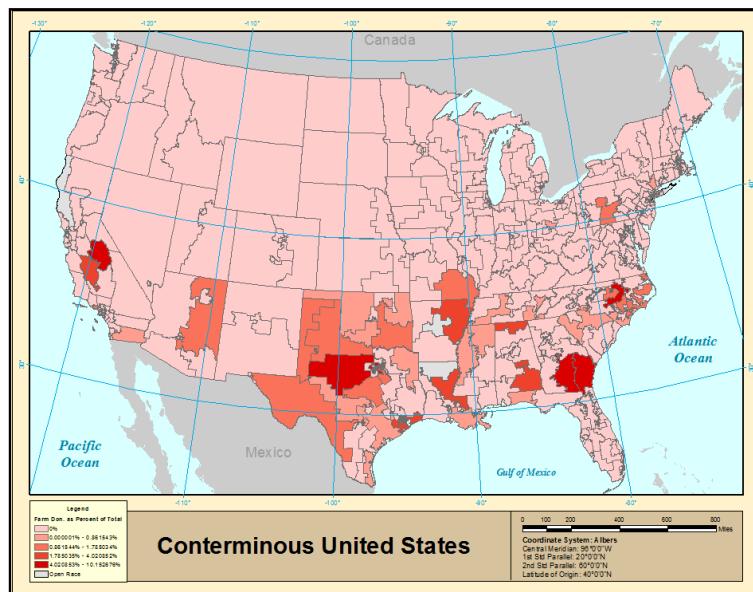


Figure 2.6: Map of campaign contributions received by legislators from cotton farmers, made between the start of the 104th Congress and the date of the cotton amendment vote.

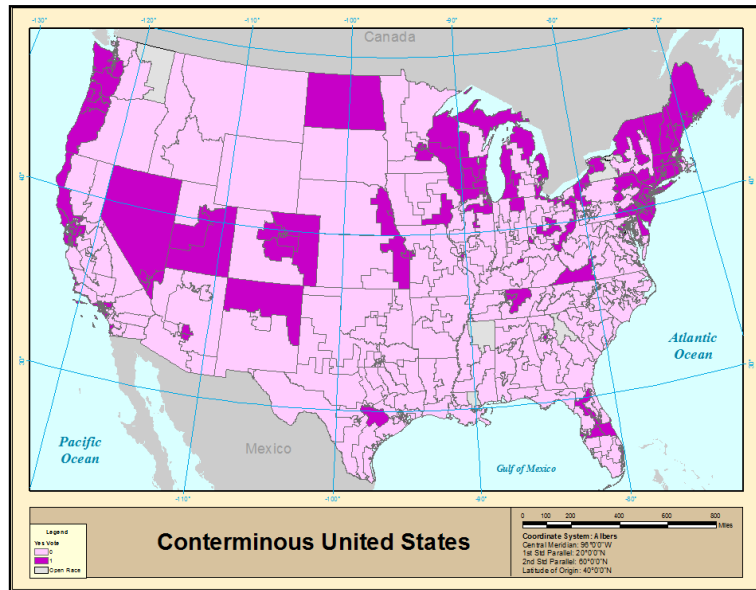


Figure 2.7: Map of roll call votes for the cotton amendment to the 2008 farm bill. This vote would have reduced subsidy payments to cotton farmers.



Figure 2.8: Map of agricultural committee membership in the 110th congress.

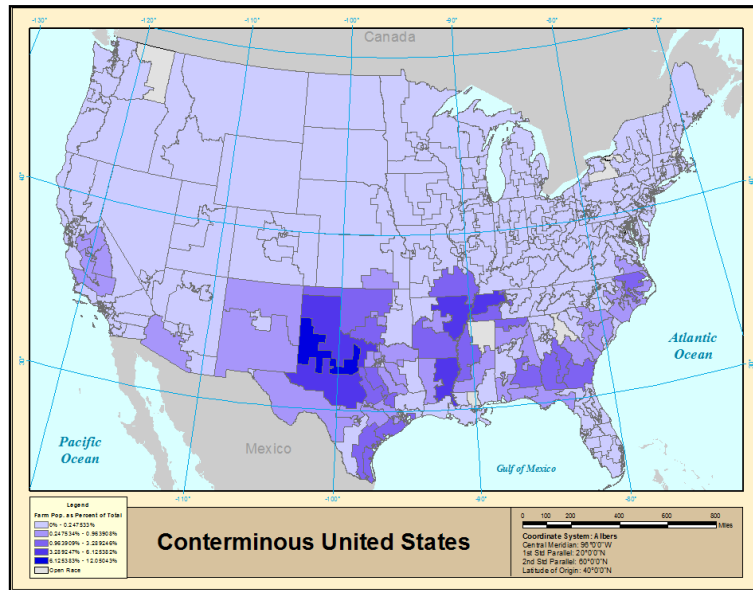


Figure 2.9: Map of cotton farming population by congressional district during the 110th congress.

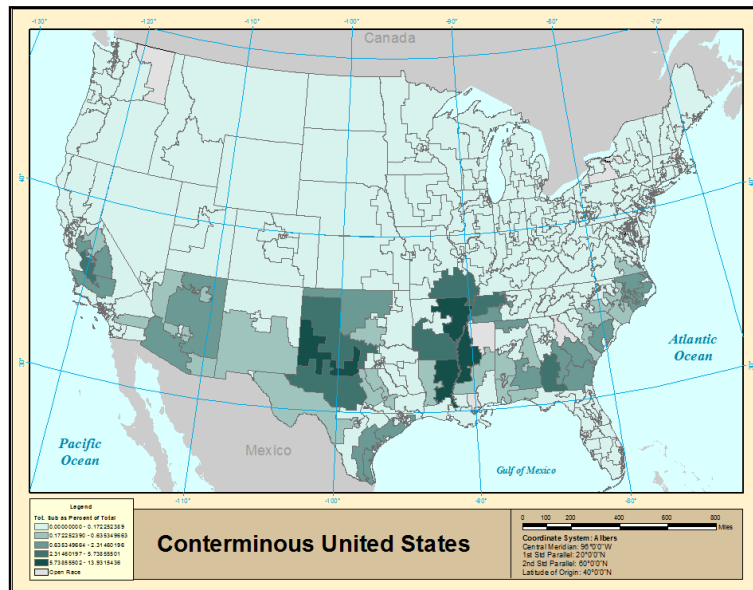


Figure 2.10: Map of total cotton subsidy disbursement between the beginning of the 110th Congress and the date of the cotton amendment vote.



Figure 2.11: Map of campaign contributions received by legislators from PACs representing cotton farmers, made between the start of the 110th Congress and the date of the cotton amendment vote.

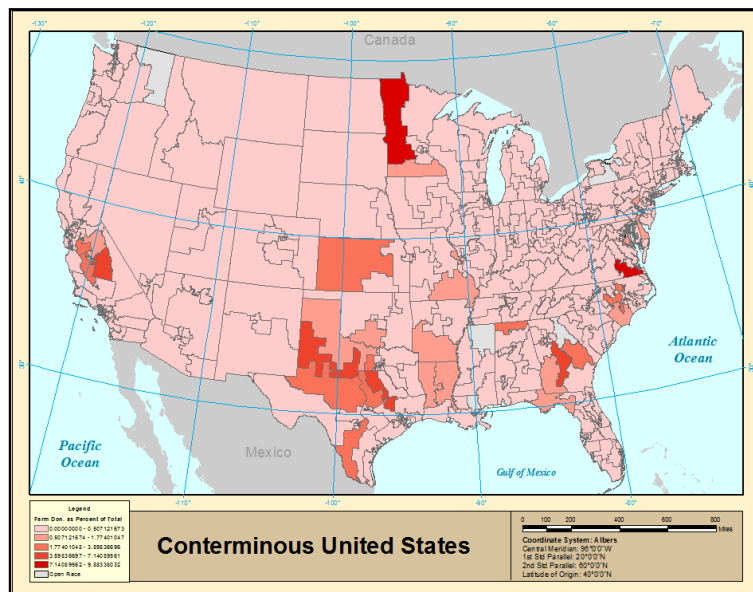


Figure 2.12: Map of campaign contributions received by legislators from cotton farmers, made between the start of the 110th Congress and the date of the cotton amendment vote.

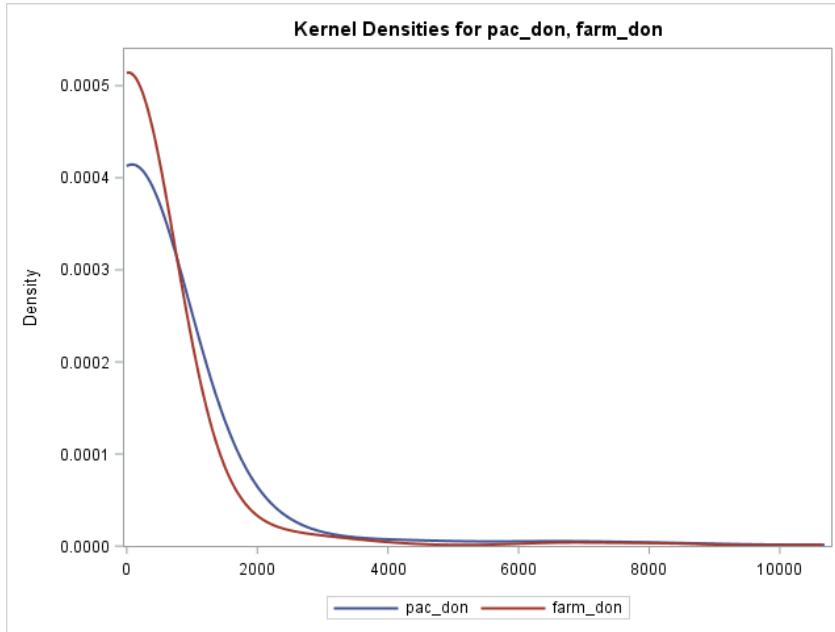


Figure 2.13: Kernel density estimates for cotton farmer contributions and cotton PAC contributions made between the start of the 104th Congress and the date of the cotton amendment vote. Figures generated using the SAS KDE procedure, using a bandwidth value of 1.

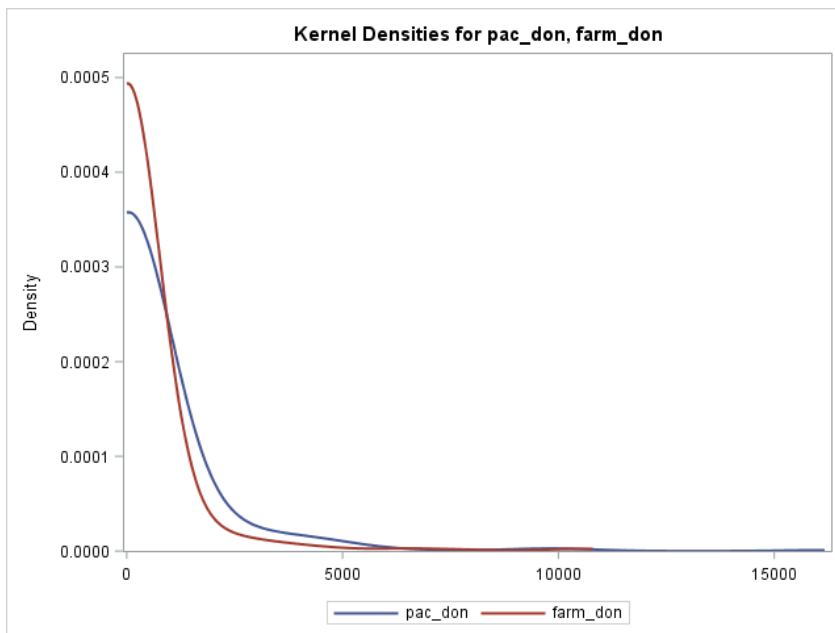


Figure 2.14: Kernel density estimates for cotton farmer contributions and cotton PAC contributions made between the start of the 110th Congress and the date of the cotton amendment vote. Figures generated using the SAS KDE procedure, using a bandwidth value of 1.

Chapter 3

Campaign Contributions Made by Farmers: Does Geography Affect Behavior?

3.1 Introduction

The agricultural lobby has been studied in depth by the agricultural economic and political economy literatures for decades. This research suggests that agricultural interests have had great success in shaping beneficial government policy. While the influence of agricultural political action committees (PACs) has been thoroughly studied over the last 30 years, little research has been done on the political activities of individual farmers. The analysis in chapter 2 suggests that geography may play a role in the political contribution behavior exhibited by farmers. On one hand, a slim majority of contributions made by politically active farmers go to legislators representing their own congressional districts. Contributions made out of district, by and large, still go to legislators representing the donor's state. At the same time, there appears to be a stark preference for contributing to members of the House Committee on Agriculture. This preference is evident in contributions made both within district and out of district.

This research seeks to analyze the role of geography in further detail. The goal is understanding what motivates farmers to contribute. One null hypothesis is that farmers are simply contributing to local elections, and thus, treat campaign contributions as a form of consumption. In this case, it could be that members of the House Committee on Agriculture are more likely to represent districts with relatively larger numbers of farmers. On the other hand, if farmers treat campaign contributions as a political investment, then we would expect for them to contribute to legislators with power over shaping agricultural policy whether or not these legislators represent their district. This analysis studies which of these motivations appear to drive farmer contribution behavior. A further topic of interest is whether or not contributions made by farmers increase during election cycles in which farm bills are passed. Elevated contribution levels during such election cycles would also point towards the political investment hypothesis.

The paper will proceed as follows. Section 3.2 will review the relevant literature, section 3.3 will describe the empirical model, section 3.4 discusses the data used in the empirical analysis and section 3.5 will discuss the empirical results. Section 3.6 concludes.

3.2 Theory and Prior Literature

There are two separate literatures relevant to this research. The first is the agricultural rent seeking literature, based in large part on the actions of agricultural PACs. Much of this literature applies the simultaneous probit-tobit model introduced by Chappell, which studies the interaction between legislators and political action committees by modeling the legislator vote decision as a function of campaign contributions and constituency characteristics, and the contribution decision of the PACs as a function of legislator power [25]. Stratmann (1995) uses such a model to analyze the importance of the timing of contributions on the vote decision. Brooks, Cameron and Cater study the impact of contributions by rival lobbies on votes to repeal sugar tariffs [8]. Drope and Hansen incorporate lobbying and soft money spending by PACs on votes for the implementation of trade protection in the steel industry [12]. Wright also studies the relationship between lobbying and direct campaign contributions on votes within the House Committee on Agriculture [55]. Stratmann 1998 uses different empirical methods to refine the study of contribution timing and farm bill amendment votes, focusing on contributions occurring in close proximity to relevant votes [46].

There is, however, a major unresolved issue with this literature. Despite the fact that maximum contribution limits are quite low, it is rare that these upper limits bind. Even in studies that find that PAC contributions have a statistically significant effect on policy, the magnitude of the effect is quite small. PACs in general have a variety of avenues to aid or sway legislators. PACs can attempt to mold legislation through lobbying. While data from these activities are available from the FEC, the information applies to lobbying efforts directed towards specific agencies, for specific bills. There is no information on which legislators are lobbied [9]. At the same time, PACs can aid legislators through the use of issue advertising. Issue advertising circumvents direct campaign contribution laws by advertising on behalf of a cause that a legislator supports, rather than for the legislators themselves [35]. As such, direct campaign contributions by PACs, while being the best understood due to extensive regulation, is the least likely avenue for PACs to sway legislators. When it comes to direct campaign contributions, individual donors contribute substantially more to congressional campaigns than PACs [5].

A more recent literature on individual campaign contributions is emerging. These studies focus on political contributions made by individuals, without any identifiable special interest. Ensley (2009) studies the relationship between individual campaign contributions and legislator ideology. This research finds evidence that individual political donors, both Republican and Democrat, are strongly motivated by political ideology. Further, these results are robust when the ideological divergence of opponents is considered. This suggests that donors care more about the candidate's policy positions than the difference between the candidates policy positions when making campaign contributions, which could explain the increasing ideological divergence in federal political campaigns. Results also indicate a propensity to contribute to legislators in tight races.

Gimpel, Lee and Kaminski study the geographic origins of individual campaign contributions and the importance of social networks in contribution behavior [20]. They find that contributions tend to originate from a small number of geographic locations. These locations are both affluent and urban. Campaign contributions from these locations flow to both Republicans and Democrats, and the landscape of contribution behavior doesn't resemble known electoral patterns. That is to say, that substantial levels of contributions to Republicans can be found in affluent urban areas characterized by Democratic Party dominance in election results, and vice versa. Evidence suggests that local elections do not drive contributions. Using geospatial econometric methods, they further find evidence of the importance of social networks in driving contribution behavior.

Gimpel, Lee and Pearson-Merkowitz go even further, studying local, semi-local and non-local contributions [21]. Here, the focus of their study is a topic they call monetary surrogacy, or contributing to like minded non-local politicians. This behavior, according to the authors, allows individuals to participate in the political process whether or not their local race is competitive. As with their prior work, evidence suggests the existence of a specialized class of political donors, typically located in affluent urban areas, and often in non-competitive congressional districts. Donors, regardless of geography, are highly motivated by partisanship. These results suggest that out of district contributions are likely coordinated by political organizations that serve to direct individual donors and lessen their informational costs. These out of district contributions flow towards highly competitive congressional races. When the districts with large propensities to contribute happen to be competitive, donors do not reduce out of district contributions. Instead, they maintain out of district contribution levels and contribute more to local congressional races. Also, their analysis suggests that there is an inverse relationship between the legislator's seniority and the amount of contributions they receive from their local constituency.

3.3 Empirical Model

To answer the questions regarding the impact of geography on farmer campaign contribution behavior, a reduced form estimation model is used. Since data exists on both the legislators that farmers contribute to, and those whom they don't contribute to, the estimation equations will consist of tobit models to account for zero observations. Consider the following empirical model.

$$D_{i,j,t} = \alpha C_{i,t} + \beta L_{j,t} + \gamma G_{i,j,t} + \tau T_t + \sigma \varepsilon_{i,j,t} \quad (3.1)$$

$$D_{i,j,t}^* = \begin{cases} D_{i,j,t} & \text{if } D_{i,j,t} > 0 \\ 0 & \text{otherwise.} \end{cases} \quad (3.2)$$

$$E[\varepsilon_{i,j,t}] = 0 \quad (3.3)$$

$$E[\varepsilon_{i,j,t}^2] = 1 \quad (3.4)$$

The contribution variable $D_{i,j,t}$ denotes contributions by farmers in congressional district i to legislator j in election cycle t . $C_{i,j,t}$ is a vector of variables containing information pertinent to the farmers in congressional district i . These include the quantity of subsidies received by the farmers making the contributions, the total number of subsidy receiving farmers within the district, and indicator variables

for which region encompasses the congressional district, as distinguished by the USDA Farm Services Agency. Since the subsidies are aggregate subsidies received by farmers making campaign contributions, this varies by legislator j . The base geography is the region defined by the USDA as the corn belt. Contributions for Alaska and Hawaii are dropped.

$L_{j,t}$ represents the vector of variables pertaining to legislative characteristics. These characteristics include chamber seniority, vote shares received in the prior election, membership on the House Committee on Agriculture, membership on the House Appropriations Committee, and the interaction of these two committee indicators with committee seniority. Also included are partisanship variables, such as Democratic Party membership, a measure of liberalism, and the interaction of these two variables. T_t includes temporal indicators. The vector of variables $G_{i,j,t}$ denotes variables dependent on geography. In this model, these variables include an indicator for whether or not the farmers and the legislator are in the same district, an indicator for whether or not the legislator is in the same state, and interactions of these indicators with the committee membership and seniority variables. The sole temporal indicator variable is whether or not a farm bill vote occurs within the election cycle.

A total of six estimations are conducted using this basic framework. Model one considers only within district contributions. Model two considers within state contributions, controlling for which legislator represents the district making the contribution. Model three estimates a comprehensive model incorporating all contributions, without controlling for relative geography, to understand how failing to control for relative geography biases results. Model four, the primary focus of this research, estimates contributions from all congressional districts to all incumbent legislators, controlling for geography. Model five looks at out of district contributions, controlling for contributions made within the same state. Model six includes only out of state contributions. By estimating each geographic type of contributions both jointly and separately allows for robustness checks, and to gauge how appropriate the joint model is. Disparities could indicate heterogeneous strategies based on relative location, requiring separate estimation.

The expected signs of coefficients will vary depending on each of the hypotheses. These competing hypotheses only affect the signs on a subset of variables. Beginning with those that should not vary, are the partisanship variables. Based on prior results, a strong propensity to contribute to members of the Democratic Party is expected. Likewise, a negative propensity to contribute to liberals or liberal Democrats is also expected. The number of subsidy receiving farmers living within the contributing congressional district should have a positive effect on contributions. Given the fact that all observations pertain to incumbents, and the suggestions by prior research that individuals prefer donating to competitive races, the coefficient on the percentage of the popular vote received in the prior election should be negative. In these models, the square of this term is also included to account for non-linear relationships.

If farmers are not engaging in investment behavior, then the total amount of subsidies received by donating farmers should not have a significant impact on contributions when farming population is controlled for. Committee and legislator tenure variables for out of state and out of district contributions should not be statistically different from zero. Positive coefficients are still expected for agriculture committee membership for within district contributions, if legislators representing districts with high levels of farming activities are more likely to be members of the House Committee on Agriculture. However, the impact of legislative tenure and committee tenure should not be statistically different than zero. Neither should the effects of representation on the House Appropriations committee and seniority on

that committee be significantly different from zero, since membership on this committee is not likely to be affected by the prevalence of farmers within a legislator’s district. If this is correct, then the geographic indicator variables for the geographic relationship between candidates and donors should both be positive, with the local indicator having a higher magnitude than the indicator for whether or not the legislator is in the same state.

On the other hand, if farmers are making campaign contributions in an effort to influence legislators, these contributions are expected to flow towards legislators who draft agricultural policy or fund agricultural programs. It is also expected that the power of a legislator, here modeled by committee seniority and tenure in the chamber, will also affect their ability to influence legislation, and thus, their ability to aid farmers. As such, if the political investment hypothesis is correct, positive coefficients are expected for all of the included measures of committee membership and seniority, regardless of the geographic relationship between the donors and recipients. If legislator power is the motivator behind contributions, then the geographic legislator indicators shouldn’t be statistically different from zero.

This empirical model can also accommodate differing strategies based upon geography. It could be the case that farmers contribute substantially to members of the relevant committees, with positive coefficients on seniority variables, while at the same time also showing a preference for contributing to more local races. If this hypothesis is correct, then positive coefficients are expected on all committee variables, tenure variables, geographic relationship variables, and the interactions of the committee and tenure variables with the geographic relationship variables.

Models seven through twelve are analogous to models one through six, except that the contribution and received subsidy variables are expressed in per capita terms. Expressing these variables in per capita terms allows for a more accurate reflection of the motivations of the farmers themselves, while the model in terms of levels allows instead allows for an understanding of overall money transfers. Further, examining per capita contributions bypasses the probable endogeneity of the agricultural committee membership variables. In models one through six, if agricultural committee members disproportionately represent areas with large numbers of subsidy receiving farmers, then more farmers will be contributing, resulting in a statistically significant coefficient, even if membership on the committee doesn’t significantly impact contribution behavior. Using per capita variables solves this issue. The expected signs of the coefficients do not change between these specifications.

Fit statistics are also presented. Fit is measured using the squared correlation between predicted and actual values of the dependent variable. Marginal effects are calculated using the average of partial effects approach [54].

3.4 Data

Individual data comes from the Federal Elections Commission [14]. These data contain campaign contributions from individual farmers to legislators in the House of Representatives. Farmers are identified using subsidy data obtained by Freedom of Information Act request from the USDA Farm Services Agency (FSA) [52]. These data contain a record of every single crop subsidy transaction made between 1995 and 2014. There are nearly 300 million transaction records. These data include the full name and

mailing address of the recipients. The names are matched by postal zip code, last name, first initial, and suffix. Note that there are two major caveats regarding these data. The first is that, rather than having a list of the names of all farmers in the US, this is a list of subsidy receiving farmers. As such, the farmers included in this study are the ones who receive the most benefits from the government.

The congressional district in which an individual resides is determined using geocoded postal zip codes. Historical congressional district shapefiles are used to determine where the center of each zip code lies using GIS software [30].

Information on legislator characteristics comes from a number of sources. Information on legislator tenure, committee assignments and committee seniority comes from Charles Stewart III [40]. Data on election results comes from the Constituency Level Election Archive [28]. Political ideology measures come from the DW-Nominate dataset [32]. The first dimension coordinate, representing economic liberalism is rescaled, with a score of zero indicating a politician is perfectly conservative and a score of 100 indicating that the politician is perfectly liberal.

Summary statistics for these data are presented in table 3.1. Note that these summary statistics are conditional on the values of the variables being different from zero. There are 18,644 instances of contributions being made by farmers in a specific congressional district to a given legislator. The average quantity of contributions is \$4,370. Note however, that there are considerable differences in contributions between counties, as the maximum amount of contributions from a specific county to a legislator is over one million dollars. The total amount contributed by farmers to congressional campaigns over the ten election cycle time series is \$81 million. Over half of these contributions are made to local legislators. The mean local contribution is approximately \$16,316. Approximately \$25 million worth of contributions are contributed out of district to legislators representing the same state as the farmers making the contributions. The average size of these contributions is \$3,056. With a substantially larger number of contributions, this suggests that farmers are highly active in contributing to out of district legislators, but contribute substantially less than they contribute to their local legislators. The variable non-local contributions represents contributions made to legislators in different states. As can be seen, farmers are also highly active in making out of state contributions, but the average contribution size, at \$1,418, is even lower than for non-local contributions within the same state. Only \$10 million are contributed to out of state legislators during the span of this time series. This suggests, as expected, that geography is an important determinant of contribution behavior. In particular, the importance of committee assignment in determining out of district contributions will be critical in understanding whether or not contributions are strategically targeting legislators with influence over farm programs.

The received subsidies variable should be interpreted with care. This variable represents the subsidies received by the individuals making a campaign contribution. Since different individuals are making contributions to different legislators within the same congressional district, this varies for different observations for the same donor congressional district and election cycle. The average amount of subsidies received by farmers making campaign contributions is \$21,036 with a standard deviation of \$27,560. Note that negative subsidy levels are possible. Certain subsidy programs offer payments in advanced, based on expected market conditions. If the realization of these conditions differs from what was expected, then farmers are required to refund excess subsidies to the USDA. These are recorded as negative subsidy payments in the USDA FSA dataset.

The percentage of legislators who are members of the Democratic Party are slightly below 50%. This is because the majority of congresses in the time series had Republican majorities. Somewhat more surprising given this fact is the average value of the partisanship variable, indicating somewhat that the Congress on average was more liberal than conservative.

At any given moment, around 11% of the Congress is a member of the House Committee on Agriculture, while 14% are members of the House Committee on Appropriations. The average seniority of a member of the House of Representatives is 5.58 terms. Note that the average vote share for House representatives is 65%, which is intuitive considering the high incumbency rates for House legislators.

Tables 3.2 through 3.7 report correlation coefficients for model variables, based on geography. Table 3.2 looks at the correlation between contributions, received subsidies and legislative characteristics for the entire dataset without controlling for geography. As should be expected, contributions and the subsidies received by donors are positively and highly correlated. Vote shares are positively correlated with chamber seniority and appropriations committee seniority, while negatively correlated with agricultural committee seniority. Chamber seniority itself is also negatively correlated with both agricultural committee membership and seniority, suggesting that membership on the agricultural committee is less common among more senior legislators. What is somewhat surprising is that contributions by farmers are very weakly correlated with agricultural and appropriations committee membership. This suggests that, when considering contributions from each congressional district to every incumbent legislator, membership on relevant committees does not drive contribution behavior.

Geography does appear to be the significant driver of contribution behavior. Table 3.3 reports correlation coefficients for contributions and geographic indicator variables. Contributions are strongly positively correlated with the indicator for local legislators. The indicator for non local races within the same state as the donor is weakly positively correlated with contributions. There is a negative correlation between contributions and the indicator for races located in different states. Surprisingly, the correlation between the number of subsidy receiving farmers and both contributions and subsidies received is very weak.

Interactions of the indicators for local elections and the committee variables are shown in table 3.4. Contributions are strongly and positively correlated with agricultural and appropriations committee membership, along with committee seniority variables, when these variables are interacted with the local indicator. This suggests that, without controlling for geography, the correlation between contributions and relevant committee memberships could be erroneous.

To better explore this, table 3.5 explores the correlation between contributions and committee variables interacted with an indicator equal to one if the legislator represents a non-local district within the same state as the donor. The correlation between the relevant committee variables and contributions is weaker than in the case of local races, but is still positive. This suggests that there could be some propensity to direct contributions towards legislators in the same state that have influence over legislation that creates or funds agricultural programs.

Now the analysis shifts to subsets of the total sample. Table 3.6 shows correlation coefficients between contributions and committee membership for local contributions only. Agricultural committee membership is highly correlated with contributions, as is agricultural committee seniority. Appropriations committee membership and seniority are weakly and positively correlated with contributions. As is

the case in table 3.2, contributions are negatively correlated with chamber seniority. However, for local contributions, this negative correlation is much stronger. This could be caused by a negative attitude towards entrenched incumbents, or this could instead be related to the fact that the longer a legislator serves in congress, the less likely they are to lose elections and thus need campaign funds. Table 3.7 looks at the subsample of contributions made to legislators in the same state as the donor. The correlation coefficients maintain the same signs, but the magnitude diminishes.

Graphs of the contribution data are presented in figures 3.1 through 3.6. Figure 3.1 shows the sums of campaign contributions from farmers by geography. From the beginning of the time series until the 112th congress, contributions are generally increasing. Note that, for each farm bill, there is a spike in contributions in the previous congress. This suggests that farmers may increase contributions to the races of the legislators who will draft or pass the farm bill. This spike is only evident in non-local contributions in the Congress preceding the vote for the 2014 farm bill. Note also the huge reduction in contributions in 113th congress. This decline affects local and non-local contributions alike. The cause is unknown. Compare this to figure 3.4, which shows the average contribution per capita. While fewer farmers make contributions out of district or out of state, the average size of the contributions is comparable in several election cycles of the time series. In particular, at many points, the average size of an out of district contribution exceeds the average local contribution. Note that during the 113th congress, the smallest average contributions were made to local legislators. This suggests that farmers may have had cause to stop supporting their local legislators en masse during the 2014 farm bill vote.

Figure 3.2 shows the sums of campaign contributions made by farmer to members of the House Committee on Agriculture by geography. Here, it can be seen that contributions continue to follow a pattern of spikes and troughs that correspond to farm bill votes. The only exception is the 110th congress. There is no noticeable drop in contributions for this congress, which corresponds to the 2008 farm bill vote. Note too that contributions fall dramatically in 113th Congress for members of the agricultural committee. Also, note too that non-local contributions vary less than contributions to local candidates. Figure 3.5 shows the average per capita contribution made to members of the House Committee on Agriculture. Here, it can be seen that in nearly every congress, farmers contribute more per capita to non-local agricultural committee members within their state than to their local legislator. However, they contribute comparatively little per person to out of state members of the agricultural committee. Also, while figure 3.2 suggests that total contributions went down in the 113th congress, the per capita amount contributed to members of the agricultural committee increased. While farmers in general contributed less, the individual farmers themselves who continued to contribute contributed more.

The most surprising contribution trends are shown in figure 3.3, which shows the sums of contributions made by farmers to members of the House Committee on Appropriations. Here, there is a huge spike in contributions in the 109th congress. Also, the drop off in the 113th Congress is less severe than with agricultural committee contributions or contributions in general. Note that the spike does not affect out of state contributions, but does affect out of district contributions within the same state. The trend for fewer contributions during congresses in which farm bill votes take place is still present with appropriations committee contributions. Figure 3.6 shows the mean of per capita contributions made to members of the appropriations committee. The spike seen in figure 3.3 is also present in per capita contributions, indicating that farmers contributed substantially more per person to members of

the appropriations committee when the legislator was local.

3.5 Results

Estimation results are presented in tables 3.8 and 3.9. For each estimation, the dependent variable for contributions, the received subsidies variable and the variable for the total number of subsidy receiving farmers residing within the congressional district are rescaled in terms of thousands.

Model one considers only local contributions. In this case, as expected, the amount of subsidies received by the donating farmers and the number of farmers within the congressional district have a positive and statistically significant impact on campaign contributions. Farmers contribute significantly more to Democrats, while the impact of liberalism interacted with Democratic Party membership is negative and statistically significant, implying a propensity to contribute to moderates.

Agricultural committee membership likewise has a positive and statistically significant impact on contributions, as does appropriations committee membership. However, the impact of seniority on these committees is not statistically different from zero. The effect of chamber seniority is negative and statistically significant, as is the percentage of the popular vote received in the prior election cycle. This suggests a propensity to contribute more to legislators in more competitive congressional races, in keeping with Gimpel et al [21]. It is probable that legislators are more likely to serve on the House Committee on Agriculture if they represent heavily agricultural districts. If this is the case, then the statistical significance of the agricultural committee indicator is likely driven by the fact that the agricultural committee members are local, rather than strategic contribution behavior intended to foster influence over agricultural programs.

Model two widens the scope to all contributions made to legislators within the same state as the campaign contributors. Farming population and received subsidies maintain the same signs and statistical significance as in model one. The only change in the partisanship variables is that the measure of ideology, expressed as liberalism on a percentage scale, is significantly negative, indicating a propensity against contributing to liberals. Again, this suggests a propensity to contribute to more moderate democrats.

When considering contributions within the same state as the donor, farmers contribute substantially more to legislations representing their district than out of district contributions within the same state. Also, as expected, the interactions of the local indicator and the committee membership variables are positive and statistically significant. These results also suggest a propensity to contribute less to the more senior members of the agricultural and appropriations committees.

Of primary interest is whether or not farmers prefer contributing to members of the relevant committees when the legislators represent different congressional districts. These results suggest that farmers do choose to contribute more to non-local legislations within the same state if they are members of the agricultural or appropriations committees. This increased propensity is evidence in support of the political investment hypothesis.

Model three shows the naive case, estimating the model over the entire dataset without controlling for the geographic relationship between legislators and campaign donors. The unit of observation is the

quantity of contributions from one district to a legislator. All districts and incumbent legislators are included in the sample. The partisanship variables have similar coefficients to the prior models, as does received subsidies. Interestingly, the number of subsidy receiving farmers has a negative and statistically significant coefficient.

These results suggest that, when failing to control for geographic relationships, that membership on both the agricultural and appropriations committee membership has a positive and statistically significant impact on campaign contributions. However, seniority on these committees does not have a significant effect.

However, controlling for geographic relationships results in a stark contrast in results. Model four is the primary focus of this paper, estimating the impact of geographic relationships on campaign contributions by farmers from each congressional district to each incumbent legislator. As with models one and two, both subsidies received and the farming population of the district have positive and statistically significant impacts on how much farmers contribute to House campaigns. Likewise, the coefficients on the partisanship variables maintain the same interpretation as before.

As in model two, the indicator for a local election is highly significant, as are the interactions of this indicator with the committee variables. These results suggest a high propensity to contribute to local legislators in general, and an even higher propensity to contribute to them if they are on the agricultural or appropriations committees. Both committee seniority variables have a negative and significant impact on the propensity to contribute. Likewise, there is also a strong propensity to contribute to out of district legislators from the same state as the donor. These results also indicate that legislators in the same state as the donor who are on the relevant committees receive significantly more in contributions than legislators within the same state who are not on these committees. As with local contributions, the impact of seniority on this contribution decision is negative and statistically significant.

After controlling for geographic relationships, the coefficients on the committee variables are substantially different from the prior models. Agricultural and appropriations committee membership lose statistical significance once geographic relationships are controlled for. This suggests that farmers are not significantly contributing to agricultural and appropriations committee members from different states. However, the coefficients on the committee tenure and chamber tenure variables are positive and statistically significant. This suggests different contribution strategies based upon aggregation. The farmers, while not contributing significantly to out of state legislators, do appear to contribute significantly more to the more senior members of these committees if they are in a different state. If farmers are strategically contributing to influence agricultural legislation and funding, then we would expect to see positive and significant coefficients for these variables.

The remaining models focus on non-local contributions. If farmers use different contribution strategies based upon geography, estimating these decisions separately might be a superior alternative to the joint model. Model five looks at out of district contributions only, controlling for whether the legislator represents the same state as the donor. As can be seen, similar to model four, the coefficients for committee membership are not statistically significant. And also similarly to model four, the committee seniority on the agricultural committee has a positive and highly significant impact on the contribution decision of the farmers. Likewise, chamber seniority also has a positive and statistically significant impact on contributions.

Also, like model four, there is a significant propensity to contribute to legislators in the same state, even when the within district contributions are dropped from the model. Likewise, committee membership plays a significant role in determining contributions to legislators in the same state as the farmers, while committee seniority has a significant and negative effect on these contributions. In this case, the number of farmers residing in the donor's district does not have a significant impact on the amount of contributions being made.

Model six considers only out of state contributions. Partisanship variables maintain the same signs and levels of significance as previous models, suggesting that the propensity to contribute to members of the Democratic Party are not driven by local legislators being predominantly Democrats. Interestingly, districts with more farmers seem to contribute less to out of state legislators. This result is at first surprising. However, it is well known that farmers are not a cohesive political block. It is known that the amount of favors received by the government is dependent on what crop is being farmed. Gardner (1987) finds that farmers that are more geographically concentrated receive more government support [16]. This is likely due to reduced transactions costs in organizing politically. If this is the case, we might expect that a small number of farmers concentrated in certain regions will contribute more than farmers in general, which would cause this farming population coefficient to be negative and statistically significant. Further research is needed to explore this issue.

In model six, all of the committee membership and seniority variables lose statistical significance, which is somewhat surprising given the results of model five.

In every model presented here, the coefficient for the indicator denoting a Congress in which a farm bill vote takes place is negative and highly statistically significant. If the political investment hypothesis is true, this coefficient is expected to be positive and statistically significant. If the alternative hypothesis that farmers simply contribute to local elections or other legislators whom they agree with on a partisan basis, we would expect this coefficient to be zero. Based on figure 3.1, it appears that contributions peak in the Congress prior to the farm bill vote. In other words, contribution levels increase during the election cycle in which the legislators who will vote for the farm bill are running, rather than aiding their reelection campaigns while the farm bill is being drafted and passed. It is also true that contributions increase in the Congress following the farm bill vote. However, it is unlikely that this is due to a reward mechanism for the vote, because each farm bill vote coinciding with this time series occurs in the second year of the congress, prior to campaign season. If legislators were being rewarded for their work on the farm bill, we would expect for these contributions to occur after the vote, but during the same Congress as the vote to aid in the upcoming election.

Now the analysis shifts to models seven through twelve. Again, these models are the same as the prior ones, except that the dependent variable and the received subsidies variable are expressed in per capita terms rather than in terms of levels. These models should help us better understand the motivations behind the contribution decision, rather than the flow of money itself. For the coefficients on received subsidies, partisanship variables, chamber seniority, vote shares, geographic indicators and the farm bill vote indicator, the signs are the same as in models one through six. The committee membership and seniority variables differ substantially.

In model seven, which examines only local per capita contributions, agricultural committee membership and seniority are not statistically different from zero. These results imply that the average

contribution made by a farmer does not depend on whether or not the local legislator is on the House Committee on Agriculture. However, contributions to the local legislator do appear to increase if the legislator is a member of the House Committee on Appropriations. This suggests that the statistical significance of the agricultural committee membership variable in model one is driven by the number of farmers making contributions, rather than by their incentives.

Model eight analyzes contributions per capita made within the same state as the donors. Here, the impacts of the agricultural and appropriations committee variables are positive and highly statistically significant. However, the impact of local agricultural committee membership is negative. These variables are constructed such that the base variables values are not changed when the local indicator equals one. Taking this into account, these results imply, as in model one, that agricultural committee membership is not a significant driver of per capita contributions at the local level, while membership has a significant and positive effect on contributions made to other legislators representing the same state. Results for model nine, where geographic relationships are not controlled for, imply the same conclusions as model three.

Model ten is the joint model in terms of per capita contributions and subsidies. For out of state contributions, committee membership coefficients are not statistically different from zero. Like the case in model four, agricultural committee seniority has a positive and statistically significant impact on contribution behavior towards out of state legislators, supporting the political investment hypothesis. Likewise, the coefficients on the same state indicator and the interaction of this indicator with committee membership and seniority variables have the same implications as in model four. Legislators receive on average more contributions if they represent the same state as the donor and are on the agricultural or appropriations committees. However, increased tenure on these committees reduces contributions. At the local level, results differ. Agricultural committee membership has a negative and weakly significant impact on contributions per capita, while appropriations committee membership has a positive and statistically significant impact, with the same interpretation as before.

Model eleven looks at out of district contributions, controlling for when a legislator represents the same state as the donor. The implications from this model are the same as for model five. Model twelve looks at out of state per capita contributions. There is one major difference in results between models twelve and six. In model twelve, the effect of agricultural committee seniority has a positive and statistically significant effect, suggesting that agricultural committee seniority does increase the average level of contributions made by farmers to legislators out of state.

3.6 Conclusion

These results suggest the existence of different strategies based in part on the geographic relationship between politically active farmers and legislators. Strong evidence suggests that farmers contribute substantially to the incumbent legislators who represent their district. Evidence also suggests that these contributions depend on committee membership and seniority depending upon geography. The difference in results between the first set of models and the second suggest that agricultural committee membership is endogenous. When looking at total contribution levels, agricultural committee members

receive substantially more in contributions from local farmers than non members. However, when looking at contributions per capita, there is no statistically significant difference in local contribution behavior. This suggests that there are simply more politically active farmers in districts represented by agricultural committee members, and that the individual farmers don't increase their personal contributions amounts when their local representative is on the agricultural committee. However, we do see that appropriations committee members receive more money from local farmers both in total and per capita. Due to the importance of the appropriations committee to virtually all interests, there is no reason to believe they would disproportionately represent farming districts, suggesting investment motivations pertaining to campaign contributions directed towards the legislators with power over funding. At the same time, the negative coefficients on the chamber seniority and vote share variables suggest that farmers are more likely to contribute, both in total and per capita, to more competitive local races, in line with the work by Gimpel et al [21].

Results also suggest that, while the majority of campaign funding is flowing to local legislators, the allocation of the remainder of this funding by farmers possesses characteristics favoring the political investment hypothesis. For example, when it comes to out of district contributions made to legislators in the same state as the donor, agricultural and appropriations committee membership has a positive and significant effect on contributions, suggesting that relevant committee assignments matter both in terms of total contribution levels and in the individual contribution decision. However, seniority on these committees appear to reduce contributions made to legislators within the same state, again suggesting a propensity to contribute to more competitive congressional races at the state level. Thus, it appears that farmers follow different contribution strategies towards local legislators versus non local legislators within the same state.

Results for out of state contributions follow a different pattern than local and within state contributions. Here we see that, both in the comprehensive models and the separate estimations, that for out of state contributions, agricultural committee seniority has a positive effect on contribution amounts, as does chamber seniority. This implies that factors relevant to political investment behavior determine the contributions made out of state, both in total and per capita. Again, it is important to remember that out of state contributions represent a small minority of total campaign contribution expenditures made by farmers. The models that fail to take geographic relationships into account demonstrate the necessity of doing so. When these relationships are ignored, results indicate that farmers, both in total and per capita, strongly prefer to contribute to members of the House Committee on Agriculture and the House Committee on Appropriations, which does not appear to be true across the board. Further, in all specifications, the subsidies received by the politically active farmers, both in total and per capita, increase their propensity to contribute, suggesting that farm subsidy programs do play a role in campaign contribution behavior.

Another interesting result comes from the per capita contribution models. While the total number of subsidy receiving farmers has a positive impact on local and within state per capita contributions, it has a negative impact on out of state contributions. It is likely that farmers coordinate their activities in local and within state elections, with the aid of political action committees. However, the negative relationship between farming population and per capita contributions to out of state legislators suggests a free rider problem with regard to these contributions.

These results provide evidence of the effects of geographic relationships on the propensity of individual citizens with an identifiable special interest to contribute to federal campaigns. Evidence in support of the political investment theory is mixed. However, these results suggest that in some ways, both the political investment hypothesis and the political consumption hypothesis are partially correct. It appears that farmers have a strong preference for contributing to local incumbent legislators, and that these contributions occur regardless of agricultural committee membership on a per capita basis. However, contributions out of district appear to be driven by factors in line with the political investment hypothesis, suggesting that the behavior is highly dependent on relative geography. Further research should focus on taking into account spatial correlation among neighboring districts.

3.7 Appendix

Table 3.1: Summary statistics for model variables. All monetary variables are expressed as 2012 dollars.

Variable	N	Mean	Std. Dev.	Min	Max	Sum
Contributions	18644	\$4,370.04	\$14,794.76	\$7.04	\$1,130,328.00	\$81,475,109.08
Contributions (Per Cap.)	18644	\$1,156.10	\$1,596.88	\$7.04	\$53,321.52	
Local Contributions	2759	\$16,316.67	\$34,154.95	\$56.96	\$1,130,328.00	\$45,017,698.11
Local Don. (Per Cap.)	2759	\$1,110.39	\$953.52	\$56.96	\$25,689.27	
Samestate Contributions	8499	\$3,056.45	\$6,238.28	\$21.45	\$229,064.47	\$25,976,741.63
Samestate Don. (Per Cap.)	8499	\$1,191.31	\$1,394.34	\$21.45	\$53,321.52	
Non-Local Contributions	7386	\$1,418.99	\$2,846.27	\$7.04	\$95,489.83	\$10,480,669.34
Non-Local Don. (Per Cap.)	7386	\$1,132.65	\$1,964.15	\$7.04	\$53,300.70	
Received Subsidies	17676	\$21,035.53	\$27,559.91	-\$17,138.81	\$428,875.43	
Farming Population	4320	3965.95	6996.02	1	56110	
Democrat	4136	0.49	0.5	0	1	
Liberal	4136	58.15	23.83	0	97.77	
Chamber Seniority	4136	5.58	4.23	1	30	
Vote Percentage	4013	65.15	11.47	28.68	100	
Ag. Committee	4136	0.11	0.32	0	1	
Ag. Com Seniority	471	3.12	2.52	1	16	
App. Committee	4136	0.14	0.35	0	1	
App. Com Seniority	588	5.53	4.39	1	21	

Table 3.2: Correlation coefficients for all contributions, committee assignments and other model variables.

Variable	Don	Sub	Ag com.	Ag com. Sen.	App com.	App com. Sen.	Chamber Sen.	Vote pct.
Contributions	1	0.22	0.01	0.01	0	0	-0.01	-0.01
Subsidies	0.22	1	0.02	0.03	0	0	-0.01	-0.01
Ag com.	0.01	0.02	1	0.76	-0.14	-0.11	-0.19	-0.1
Ag com. Sen.	0.01	0.03	0.76	1	-0.11	-0.08	-0.02	-0.02
App com.	0	0	-0.14	-0.11	1	0.76	0.17	0.09
App com. Sen.	0	0	-0.11	-0.08	0.76	1	0.36	0.07
Chamber sen.	-0.01	-0.01	-0.19	-0.02	0.17	0.36	1	0.22
Vote pct.	-0.01	-0.01	-0.1	-0.02	0.09	0.07	0.22	1

Table 3.3: Correlation coefficients for all contributions, along with geographic indicator variables.

Variable	Don.	Rec. Sub.	Local	NL-SS	DS	Farm Pop.
Contributions	1	0.22	0.32	0.04	-0.11	0.02
Received Subsidies	0.22	1	0.17	0.12	-0.16	0.04
Local	0.32	0.17	1	-0.01	-0.22	0
Non-Local Same State	0.04	0.12	-0.01	1	-0.97	-0.05
Different State	-0.11	-0.16	-0.22	-0.97	1	0.05
Farming Population	0.02	0.04	0	-0.05	0.05	1

Table 3.4: Correlation coefficients for all contributions, with committee assignments interacted with an indicator for local races.

Variable	Don	Sub	L-ag com.	L-ag com. sen.	L-app com.	L-app com. Sen.
Contributions	1	0.22	0.31	0.23	0.17	0.11
Subsidy	0.2	1	0.15	0.12	0.06	0.03
Local ag com.	0.3	0.15	1	0.78	0.01	0
Local ag com. sen.	0.2	0.12	0.78	1	0	0
Local app com.	0.2	0.06	0.01	0	1	0.78
Local app com. Sen.	0.1	0.03	0	0	0.78	1

Table 3.5: Correlation coefficients for all contributions, with committee assignments interacted with an indicator for non-local races within the same state as the donor.

Variable	Don	Sub	SS ag com	SS ag com sen	SS app com	SS app com sen
Contributions	1	0.22	0.11	0.07	0.05	0.03
Subsidy	0.22	1	0.14	0.1	0.06	0.04
Samestate Ag. com. sen.	0.11	0.14	1	0.77	0	0
Samestate Ag. com. sen.	0.07	0.1	0.77	1	0	0
Samestate App. com. sen.	0.05	0.06	0	0	1	0.78
Samestate App. com. sen.	0.03	0.04	0	0	0.78	1

Table 3.6: Correlation coefficients for local contributions, committee assignments and other model variables.

Variable	Don	Sub	Ag com.	Ag com. Sen.	App com.	App com. Sen.	Chamber Sen.	Vote pct.
Contributions	1	0.24	0.24	0.17	0.05	0.01	-0.13	-0.07
Subsidies	0.24	1	0.27	0.23	-0.02	-0.05	-0.1	-0.04
Ag. com.	0.24	0.27	1	0.76	-0.14	-0.11	-0.19	-0.1
Ag. com. Sen.	0.17	0.23	0.76	1	-0.11	-0.08	-0.01	-0.02
App. com.	0.05	-0.02	-0.14	-0.11	1	0.76	0.18	0.09
App. com. Sen.	0.01	-0.05	-0.11	-0.08	0.76	1	0.37	0.07
Chamber sen.	-0.13	-0.1	-0.19	-0.01	0.18	0.37	1	0.23
Vote pct.	-0.07	-0.04	-0.1	-0.02	0.09	0.07	0.23	1

Table 3.7: Correlation coefficients for contributions made to all legislators representing the same state as the donor, committee assignments and other model variables.

Variable	Don	Sub	Ag com.	Ag com. Sen.	App com.	App com. Sen.	Chamber Sen.	Vote pct.
Contributions	1	0.23	0.08	0.05	0.01	0	-0.05	-0.02
Subsidies	0.23	1	0.12	0.09	0.01	-0.01	-0.06	-0.02
Ag. com.	0.08	0.12	1	0.76	-0.12	-0.1	-0.17	-0.1
Ag. com. Sen.	0.05	0.09	0.76	1	-0.09	-0.07	0.01	-0.05
App. com.	0.01	0.01	-0.12	-0.09	1	0.76	0.15	0.08
App. com. Sen.	0	-0.01	-0.1	-0.07	0.76	1	0.32	0.06
Chamber sen.	-0.05	-0.06	-0.17	0.01	0.15	0.32	1	0.19
Vote pct.	-0.02	-0.02	-0.1	-0.05	0.08	0.06	0.19	1

Table 3.8: Regression results for models one through six. Regression coefficients for the vote equation. *,** and *** denote statistical significance at the 10%,5% and 1% level, respectively.

Model	I		II		III		IV		V		VI	
Data	Local		Samestate		All		All		Non-Local		Different State	
Variable	Estimate	Std. Error	Estimate	Std. Error	Estimate	Std. Error	Estimate	Std. Error	Estimate	Std. Error	Estimate	Std. Error
Intercept	46.89693	(15.751)***	3.407905	(3.362)	-21.1547	(1.614)***	-10.825	(1.479)***	-4.31228	(0.574)***	-2.824594	(0.465)***
Received Subsidies	0.300292	(0.024)***	0.395302	(0.006)***	0.874091	(0.006)***	0.523	(0.004)***	0.237479	(0.002)***	0.221153	(0.003)***
Farmer Pop.	1.142271	(0.106)***	0.292351	(0.023)***	-0.04844	(0.010)***	0.034	(0.009)***	-0.00039	(0.003)	-0.019929	(0.003)***
Democrat	40.70932	(11.859)***	10.05294	(2.516)***	12.48803	(1.243)***	9.870	(1.185)***	3.368564	(0.458)***	1.508877	(0.379)***
Liberal	-0.12084	(0.090)	-0.07324	(0.020)***	-0.11732	(0.009)***	-0.100	(0.009)***	-0.03948	(0.003)***	-0.027027	(0.003)***
Dem/Lib	-0.60631	(0.168)***	-0.13293	(0.036)***	-0.12737	(0.018)***	-0.103	(0.017)***	-0.03246	(0.006)***	-0.01098	(0.005)**
Ag. Com.	10.71149	(2.772)***	2.539551	(0.590)***	1.549813	(0.277)***	-0.257	(0.316)	-0.02859	(0.121)	0.139741	(0.085)
Ag. Com. Sen.	-1.0533	(0.651)	0.129045	(0.129)	-0.03456	(0.065)	0.311	(0.067)***	0.093853	(0.026)***	-0.00167	(0.019)
App. Com.	10.89602	(2.515)***	1.020464	(0.583)*	0.877079	(0.276)***	-0.420	(0.330)	-0.1294	(0.125)	-0.031724	(0.086)
App. Com. Sen.	-0.08307	(0.376)	0.098315	(0.088)	0.004919	(0.040)	0.078	(0.044)*	0.022132	(0.017)	-0.005843	(0.012)
Chamber Sen.	-0.83842	(0.172)***	-0.24475	(0.036)***	0.055032	(0.018)***	0.113	(0.016)***	0.051045	(0.006)***	0.062697	(0.005)***
Vote Share	-0.89886	(0.439)***	-0.51003	(0.094)***	-0.44331	(0.045)***	-0.625	(0.042)***	-0.22989	(0.016)***	-0.156457	(0.014)***
Sq. Vote Share	0.004306	(0.003)	0.002683	(0.001)***	0.002702	(0.000)***	0.004	(0.000)***	0.001411	(0.000)***	0.000955	(0.000)***
Local	.	.	23.47136	(4.421)***	.	.	19.740	(0.331)***	.	.	.	.
L-Ag. Com.	.	.	11.53152	(1.521)***	.	.	13.652	(1.228)***	.	.	.	.
L-Ag. Com. Sen.	.	.	-0.88747	(0.365)**	.	.	-0.973	(0.297)***	.	.	.	.
L-App. Com.	.	.	10.30273	(1.460)***	.	.	10.728	(1.175)***	.	.	.	.
L-App. Com. Sen.	.	.	-0.57946	(0.206)***	.	.	-0.566	(0.166)***	.	.	.	.
Samestate	.	.	.	.	.	.	19.471	(0.188)***	7.801955	(0.075)***	.	.
SS-Ag. Com.	.	.	.	.	.	.	3.952	(0.550)***	1.806333	(0.206)***	.	.
SS-Ag. Com. Sen.	.	.	.	.	.	.	-0.688	(0.122)***	-0.24292	(0.046)***	.	.
SS-App. Com.	.	.	.	.	.	.	1.925	(0.567)***	0.892292	(0.212)***	.	.
SS-App. Com. Sen.	.	.	.	.	.	.	-0.226	(0.079)***	-0.11313	(0.030)***	.	.
Farmbill Cycle	-5.05916	(1.163)***	-1.38782	(0.246)***	-0.71213	(0.126)***	-1.033	(0.119)***	-0.35383	(0.046)***	-0.247025	(0.038)***
Appalachian	18.80636	(2.209)***	7.18308	(0.471)***	2.439376	(0.208)***	2.857	(0.192)***	0.924641	(0.075)***	0.505038	(0.059)***
North East	-16.9468	(2.198)***	-13.2117	(0.520)***	-8.63585	(0.256)***	-8.503	(0.250)***	-3.30979	(0.097)***	-1.797973	(0.077)***
South East	-0.14164	(2.308)	-2.04101	(0.476)***	-2.58828	(0.234)***	-2.281	(0.221)***	-0.95497	(0.085)***	-0.72828	(0.070)***
Delta	19.1842	(3.368)***	12.22928	(0.859)***	0.039786	(0.314)	2.102	(0.280)***	0.7279	(0.108)***	0.162658	(0.085)*
North Plains	-6.08454	(4.151)	8.611294	(1.261)***	1.370244	(0.421)***	2.332	(0.371)***	0.942565	(0.146)***	0.630857	(0.112)***
South Plains	6.001659	(2.383)**	-2.24467	(0.436)***	-0.30766	(0.230)	-1.558	(0.216)***	-0.77698	(0.084)***	-0.418031	(0.071)***
Mountain	-7.54614	(2.719)***	2.049981	(0.721)***	-3.60936	(0.307)***	-2.041	(0.290)***	-0.67591	(0.111)***	-0.904886	(0.092)***
Lakes	-5.17525	(2.526)**	-0.45696	(0.557)	-2.81268	(0.272)***	-2.898	(0.264)***	-1.09021	(0.102)***	-1.01593	(0.089)***
Pacific	-4.37571	(2.203)**	-10.4417	(0.433)***	-5.4532	(0.242)***	-7.833	(0.233)***	-3.22095	(0.091)***	-1.521578	(0.079)***
Sigma	32.32744	(0.453)***	18.07257	(0.127)***	18.2892	(0.108)***	14.624	(0.081)***	5.586641	(0.037)***	3.700584	(0.040)***
N	4036	.	76538	.	1746240	.	1746240	.	1742204	.	1669702	.
Fit	0.221	.	0.178	.	0.006	.	0.113	.	0.038	.	0.013	.

Table 3.9: Regression results for models seven through twelve. Regression coefficients for the vote equation. *,** and *** denote statistical significance at the 10%,5% and 1% level, respectively.

Model	VII		VIII		IX		X		XI		XII	
Data	Local		Samestate		All		All		Non-Local		Different State	
Variable	Estimate	Std. Error	Estimate	Std. Error	Estimate	Std. Error	Estimate	Std. Error	Estimate	Std. Error	Estimate	Std. Error
Intercept	2.658724	(0.581)***	0.37771	(0.368)	-3.63579	(0.253)***	-2.038	(0.245)***	-2.21591	(0.272)***	-2.323	(0.380)***
Rec. Sub. (Per Cap.)	0.021017	(0.002)***	0.069159	(0.001)***	0.171692	(0.001)***	0.123	(0.001)***	0.135952	(0.001)***	0.191019	(0.002)***
Farmer Pop.	0.005742	(0.004)	0.025123	(0.002)***	-0.00435	(0.002)***	0.002	(0.001)	-0.00041	(0.002)	-0.013	(0.002)***
Democrat	2.029602	(0.422)***	1.802829	(0.269)***	2.209737	(0.193)***	1.783	(0.191)***	1.785587	(0.214)***	1.263	(0.309)***
Liberal	-0.00976	(0.003)***	-0.00787	(0.002)***	-0.01915	(0.001)***	-0.017	(0.001)***	-0.01819	(0.002)***	-0.022	(0.002)***
Dem/Lib	-0.02681	(0.006)***	-0.02349	(0.004)***	-0.02319	(0.003)***	-0.019	(0.003)***	-0.01811	(0.003)***	-0.010	(0.004)**
Ag. Com.	0.07563	(0.100)	0.453534	(0.063)***	0.262458	(0.043)***	-0.044	(0.051)	-0.02906	(0.056)	0.089	(0.068)
Ag. Com. Sen.	-0.00735	(0.024)	0.003785	(0.014)	0.02085	(0.010)**	0.058	(0.011)***	0.059154	(0.012)***	0.037	(0.014)***
App. Com.	0.309883	(0.090)***	0.201907	(0.062)***	0.153814	(0.043)***	-0.037	(0.053)	-0.03688	(0.058)	0.040	(0.070)
App. Com. Sen.	0.009937	(0.013)	0.003132	(0.009)	-0.00183	(0.006)	0.011	(0.007)	0.009592	(0.008)	-0.009	(0.009)
Chamber Sen.	-0.0363	(0.006)***	-0.02699	(0.004)***	0.008453	(0.003)***	0.019	(0.003)***	0.02383	(0.003)***	0.051	(0.004)***
Vote Share	-0.03058	(0.016)*	-0.04674	(0.010)***	-0.06313	(0.007)***	-0.095	(0.007)***	-0.1041	(0.008)***	-0.132	(0.011)***
Sq. Vote Share	0.000146	(0.000)***	0.000231	(0.000)***	0.0000381	(0.000)***	0.001	(0.000)***	0.000638	(0.000)***	0.001	(0.000)***
Local	.	.	2.478779	(0.048)***	.	.	3.028	(0.057)***	.	.	.	.
L-Ag. Com.	.	.	-0.47467	(0.171)***	.	.	-0.346	(0.205)*	.	.	.	.
L-Ag. Com. Sen.	.	.	-0.01638	(0.041)	.	.	0.012	(0.050)	.	.	.	.
L-App. Com.	.	.	0.246626	(0.164)	.	.	0.429	(0.198)**	.	.	.	.
L-App. Com. Sen.	.	.	-0.01437	(0.023)	.	.	-0.033	(0.028)***	.	.	.	.
Samestate	.	.	.	.	.	.	3.481	(0.034)***	3.742833	(0.038)***	.	.
SS-Ag. Com.	.	.	.	.	.	.	0.913	(0.088)***	0.980467	(0.096)***	.	.
SS-Ag.Com. Sen.	.	.	.	.	.	.	-0.124	(0.019)***	-0.13265	(0.021)***	.	.
SS-App. Com.	.	.	.	.	.	.	0.379	(0.091)***	0.418876	(0.099)***	.	.
SS-App. Com. Sen.	.	.	.	.	.	.	-0.042	(0.013)***	-0.0463	(0.014)***	.	.
Farmhill Cycle	-0.12145	(0.041)***	-0.14926	(0.026)***	-0.14194	(0.020)***	-0.174	(0.019)***	-0.18493	(0.022)***	-0.222	(0.031)***
Appalachian	0.357405	(0.080)***	0.609682	(0.052)***	0.328133	(0.033)***	0.405	(0.032)***	0.432569	(0.035)***	0.432	(0.045)***
North East	-0.85998	(0.078)***	-1.59411	(0.056)***	-1.44829	(0.041)***	-1.485	(0.041)***	-1.58865	(0.046)***	-1.461	(0.063)***
South East	-0.12654	(0.083)	-0.25253	(0.051)***	-0.36339	(0.036)***	-0.380	(0.036)***	-0.4326	(0.040)***	-0.563	(0.057)***
Delta	0.213123	(0.123)*	1.195403	(0.095)***	0.005659	(0.049)	0.316	(0.046)***	0.334757	(0.051)***	0.170	(0.069)**
North Plains	0.110985	(0.152)	0.702455	(0.141)***	0.072883	(0.067)	0.343	(0.062)***	0.413812	(0.069)***	0.494	(0.092)***
South Plains	0.146162	(0.086)*	-0.29427	(0.047)***	0.054013	(0.035)	-0.275	(0.035)***	-0.33025	(0.039)***	-0.260	(0.058)***
Mountain	-0.27301	(0.098)***	0.506622	(0.075)***	-0.5278	(0.047)***	-0.301	(0.046)***	-0.31141	(0.052)***	-0.719	(0.076)***
Lakes	-0.19384	(0.091)***	-0.1168	(0.060)*	-0.49194	(0.043)***	-0.515	(0.043)***	-0.55055	(0.048)***	-0.841	(0.073)***
Pacific	-0.31657	(0.078)**	-1.2769	(0.046)**	-0.73872	(0.037)***	-1.330	(0.038)***	-1.47546	(0.042)***	-1.141	(0.064)***
Sigma	1.186443	(0.018)***	2.02821	(0.016)***	2.978994	(0.021)***	2.448	(0.016)***	2.65347	(0.019)***	3.050	(0.034)***
N	4036		76538		1746240		1746240		1742204		1669702	
Fit	0.131		0.037		0.010		0.020		0.014		0.009	

Table 3.10: Marginal effects for each model. Marginal effects are calculated as the average of partial effects.

Model	I	II	III	IV	V	VI	VII	VIII	IX	X	XI	XII
Data	Local	Samestate	All	All	Non-Local	Different State	Local	Samestate	All	All	Non-Local	Different State
Variable	Effect	Effect	Effect	Effect	Effect	Effect	Effect	Effect	Effect	Effect	Effect	Effect
Received Subsidies	0.09108	0.01966	0.00175	0.00088	0.00029	0.00010	.	.	.	.	.	.
Rec. Sub. (Per Cap.)	.	.	.	.	.	.	0.00880	0.00441	0.00175	0.00021	0.00017	0.00007
Farmer Pop.	0.34646	0.01454	-0.00010	0.00006	0.00000	-0.00001	0.00241	0.00160	-0.00010	0.00000	0.00000	0.00000
Democrat	14.71692	0.59431	0.04341	0.02293	0.00555	0.00079	0.93893	0.15925	0.04341	0.00451	0.00325	0.00061
Liberal	-0.03665	-0.00364	-0.00024	-0.00017	-0.00005	-0.00001	-0.00409	-0.00050	-0.00024	-0.00003	-0.00002	-0.00001
Dem/Lib	-0.18390	-0.00661	-0.00026	-0.00017	-0.00004	0.00000	-0.01123	-0.00150	-0.00026	-0.00003	-0.00002	0.00000
Ag. Com.	3.61548	0.13553	0.01016	-0.00043	-0.00003	0.00006	0.03227	0.03248	0.01016	-0.00007	-0.00004	0.00004
Ag. Com. Sen.	-0.31948	0.00642	-0.00007	0.00052	0.00011	0.00000	-0.00308	0.00024	-0.00007	0.00010	0.00007	0.00001
App. Com.	3.67072	0.05188	0.00183	-0.00070	-0.00015	-0.00001	0.13931	0.01355	0.00183	-0.00006	-0.00004	0.00002
App. Com. Sen.	-0.02519	0.00489	0.00001	0.00013	0.00003	0.00000	0.00416	0.00020	0.00001	0.00002	0.00001	0.00000
Chamber Sen.	-0.25430	-0.01217	0.00011	0.00019	0.00006	0.00003	-0.01520	-0.00172	0.00011	0.00003	0.00003	0.00002
Vote Share	-0.27263	-0.02536	-0.00089	-0.00105	-0.00028	-0.00007	-0.01281	-0.00298	-0.00089	-0.00016	-0.00013	-0.00005
Sq. Vote Share	0.00131	0.00013	0.00001	0.00001	0.00000	0.00000	0.00006	0.00001	0.00001	0.00000	0.00000	0.00000
Local	.	2.50013	.	0.11230	.	.	.	0.33446	.	0.01687	.	.
L-Ag. Com.	.	0.88074	.	0.05227	.	.	.	-0.02592	.	-0.00053	.	.
L-Ag. Com. Sen.	.	-0.04413	.	-0.00163	.	.	.	-0.00105	.	0.00002	.	.
L-App. Com.	.	0.67528	.	0.02756	.	.	.	0.01675	.	0.00082	.	.
L-App. Com. Sen.	.	-0.02881	.	-0.00095	.	.	.	-0.00092	.	-0.00006	.	.
Samestate	.	.	.	0.06922	0.02603	.	.	.	.	0.01513	0.01424	.
SS-Ag. Com.	.	.	.	0.00790	0.00273	.	.	.	.	0.00203	0.00160	.
SS-Ag. Com. Sen.	.	.	.	-0.00116	-0.00029	.	.	.	.	-0.00021	-0.00016	.
SS-App. Com.	.	.	.	0.00346	0.00121	.	.	.	.	0.00072	0.00058	.
SS-App. Com. Sen.	.	.	.	-0.00038	-0.00014	.	.	.	.	-0.00007	-0.00006	.
Farmbill Cycle	-1.51361	-0.06831	-0.00142	-0.00171	-0.00042	-0.00011	-0.05047	-0.00942	-0.00142	-0.00029	-0.00022	-0.00009
Appalachian	6.89207	0.44138	0.00542	0.00533	0.00124	0.00024	0.16360	0.04618	0.00542	0.00076	0.00059	0.00018
North East	-4.37480	-0.48537	-0.01262	-0.01116	-0.00303	-0.00061	-0.29924	-0.07165	-0.01262	-0.00189	-0.00145	-0.00045
South East	-0.04290	-0.09600	-0.00467	-0.00353	-0.00105	-0.00028	-0.05132	-0.01509	-0.00467	-0.00059	-0.00048	-0.00020
Delta	7.33560	0.95450	0.00008	0.00389	0.00097	0.00007	0.09514	0.11521	0.00008	0.00059	0.00045	0.00007
North Plains	-1.70386	0.58985	0.00297	0.00437	0.00130	0.00031	0.04810	0.05728	0.00297	0.00065	0.00058	0.00022
South Plains	1.94193	-0.10585	-0.00061	-0.00249	-0.00088	-0.00017	0.06362	-0.01757	-0.00061	-0.00044	-0.00038	-0.00010
Mountain	-2.09201	0.10929	-0.00609	-0.00314	-0.00075	-0.00034	-0.10560	0.03820	-0.00609	-0.00047	-0.00035	-0.00024
Lakes	-1.46108	-0.02235	-0.00482	-0.00456	-0.00114	-0.00037	-0.07608	-0.00715	-0.00482	-0.00080	-0.00057	-0.00027
Pacific	-1.27160	-0.42393	-0.00891	-0.01056	-0.00309	-0.00054	-0.12323	-0.06568	-0.00891	-0.00178	-0.00143	-0.00037

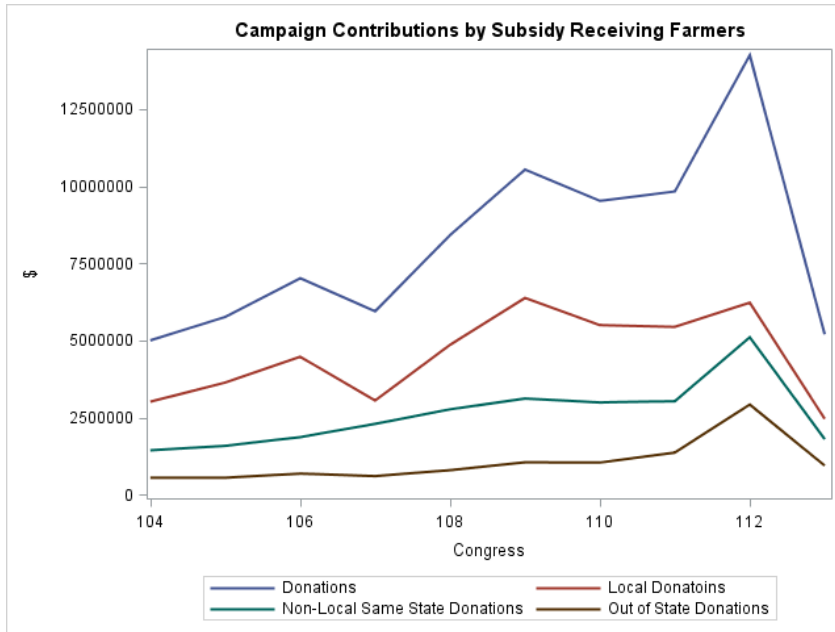


Figure 3.1: Graph of campaign contributions made by farmers by geography over time.

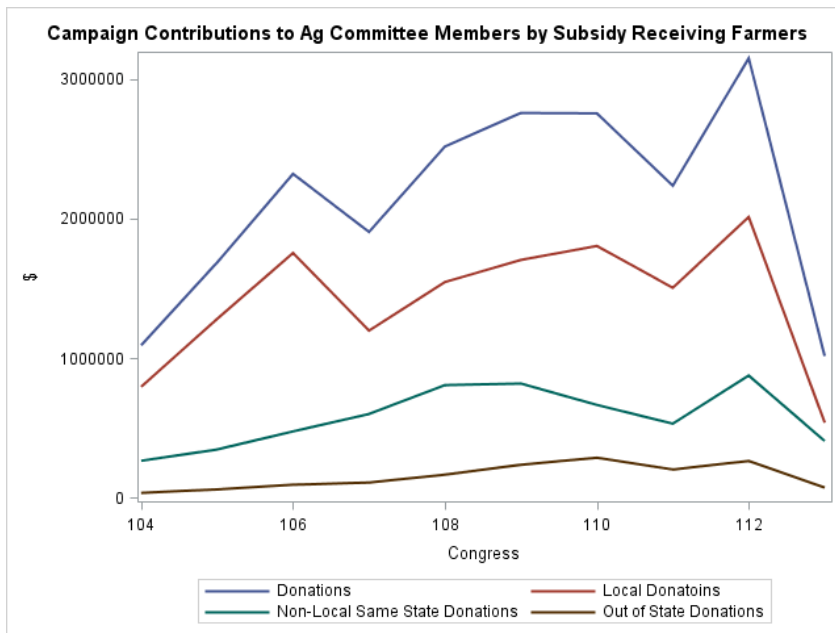


Figure 3.2: Graph of campaign contributions made by farmers to members of the House Committee on Agriculture by geography over time.

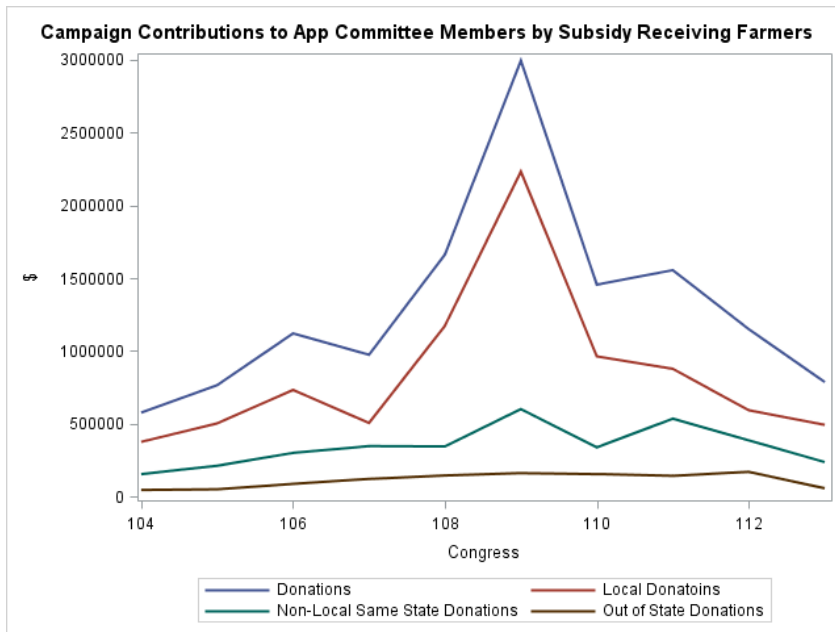


Figure 3.3: Graph of campaign contributions made by farmers to members of the House Committee on Appropriations by geography over time.

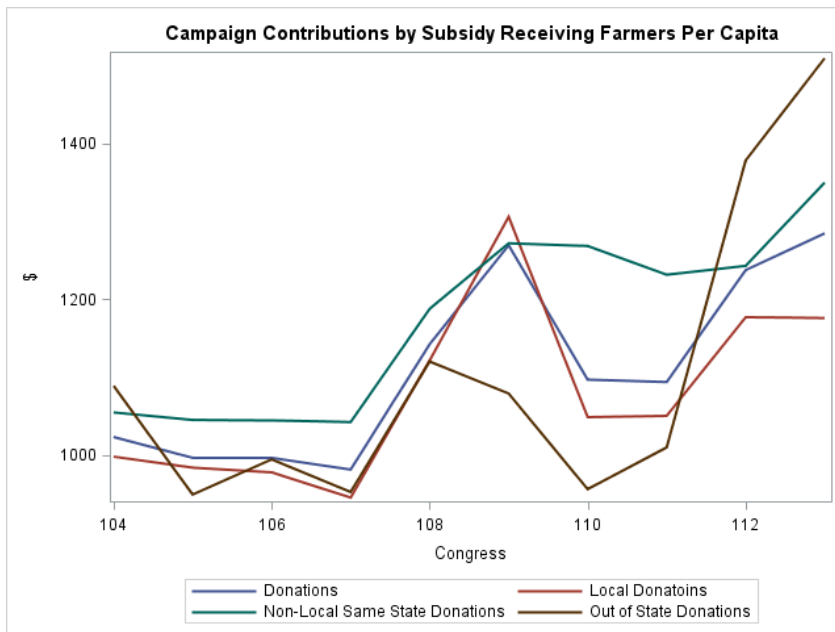


Figure 3.4: Graph of per capita campaign contributions made by farmers by geography over time.

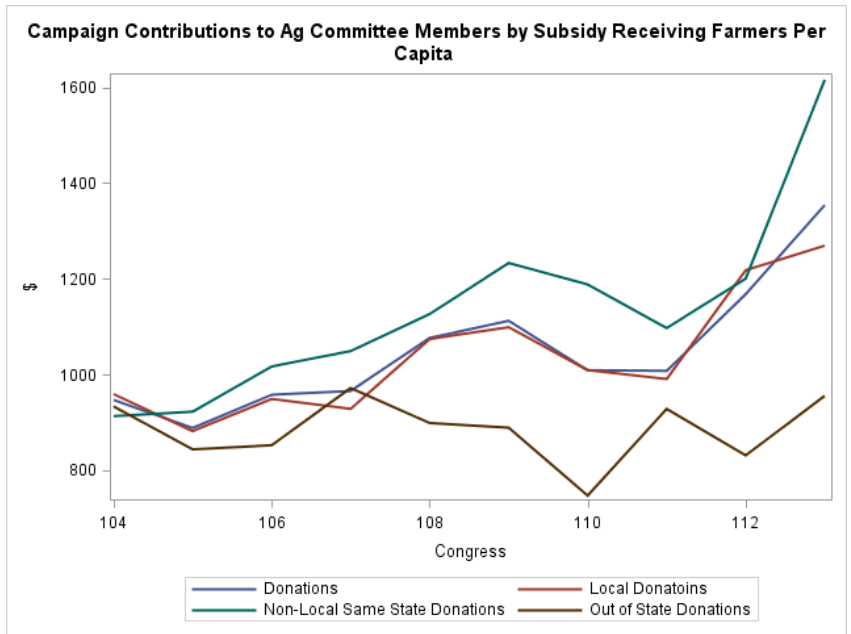


Figure 3.5: Graph of per capita campaign contributions made by farmers to members of the House Committee on Agriculture by geography over time.

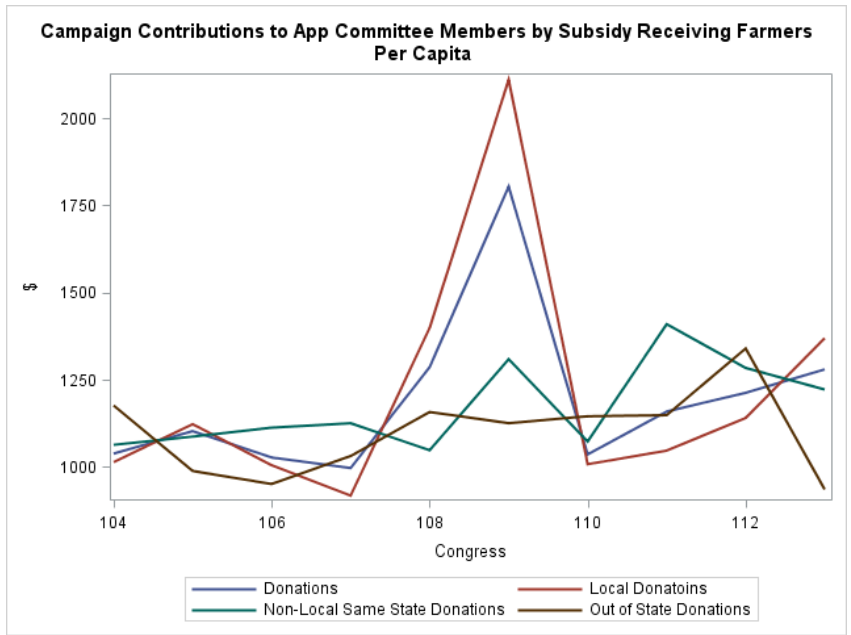


Figure 3.6: Graph of per capita campaign contributions made by farmers to members of the House Committee on Appropriations by geography over time.

Chapter 4

Agricultural Disaster Payments: Are They Still Politically Allocated?

4.1 Introduction

Disaster subsidies have long been a topic of interest in the agricultural economics literature. These subsidies are typically disbursed via emergency legislation in an ad hoc manner. For most of the history of agricultural disaster programs, these programs have not been components of the farm bill. Despite subsidized crop insurance being a welfare improving, market oriented alternative for mitigating agricultural risk, disaster subsidy programs persist. At present, subsidized crop insurance, disaster subsidies and countercyclical subsidy payments coexist, despite considerable overlap in both the goals and practical effects of these programs. Previous work finds evidence of political motivations affecting disaster subsidy disbursement, both agricultural and otherwise.

Following the implementation of the 2008 farm bill, the USDA implemented the Supplemental Revenue Assistance Program (SURE), a permanent federal program for the allocation of disaster payments. The previous regimes of ad-hoc payment programs, passed on an irregular basis by congress, provides ample opportunity for members of congress to directly affect where disaster payments go, incentivizing over disbursement to their home districts. A permanent program, implemented by the executive branch, should reduce the opportunities for politically motivated subsidy disbursement by members of congress, while at the same time increasing the opportunities for the executive branch to engage in the same behavior. The purpose of this paper is to revisit the topic of political allocation of agricultural disaster payments, to determine whether or not the implementation of a long term program solution changed the political aspects of agricultural disaster payment allocation.

Section 4.2 reviews the prior literature on the political allocation of disaster subsidies, section 4.3 explains the institutional history of agricultural disaster programs, section 4.4 discusses the empirical model, section 4.5 explains the data used in the empirical analysis, and section 4.6 analyzes the results. Section 4.7 concludes.

4.2 Literature Review

Over the last several decades, until the passage of the 2008 farm bill, agricultural disaster programs have been ad hoc in nature. Economists find the continued existence of these programs to be inefficient, promoting moral hazard by reducing incentives to purchase crop insurance. Goodwin and Smith (1995) provide historical context, stating that starting the 1970's, disaster payments became a routine policy when widespread yield losses were experienced, amounting in essence to free catastrophic insurance [23]. They further state that a majority of producers opted not to purchase federal crop insurance during this period. The strong motivation towards moral hazard is clear; if the government will freely disburse subsidies during times of hardship for agriculture, why pay for federal crop insurance? Furthermore, there are also clear opportunities for congress to control subsidy disbursement, given the ad hoc nature of the programs. By passing emergency legislation, the congress maintains more control over disbursement than would be possible through a long term disaster program maintained by the executive branch.

The continued existence of agricultural disaster programs is also highly redundant. Throughout the history of US farm programs, there have been significant levels of direct farm subsidies. Since 2002, the flagship direct subsidy program has been direct and countercyclical payments, amounting to over \$48 billion disbursed during the 2002 farm bill regime and over \$37 billion disbursed during the 2008 farm bill regime. Direct payments are subsidies disbursed based on historical production, decoupled from current production. This removes the incentive for overproduction created by past subsidy programs. The countercyclical payments are disbursed when the market price for a commodity is below a certain target price set by the USDA. In essence, countercyclical payments protect farmers from low prices [53]. It should be noted that, while direct payments were phased out with the passage of the 2014 farm bill, countercyclical payments persist to this day.

Over the last two decades, crop insurance has become an increasingly important component of agricultural policy. After the implementation of the 2002 farm bill, crop insurance became the primary farm aid policy of the US government. The government pays 63% of crop insurance premiums. Assuming that insurance premiums are actuarially fair, the farmer paid loss ratio is estimated to be 2.06 since the year 2000 [38]. This means that for every dollar farmers pay into crop insurance, they are paid on average \$2.06 back. Today there exists a multitude of types of crop insurance, including both yield and revenue insurance.

Given the prevalence of crop insurance subsidies, countercyclical payments, and other risk reducing farm subsidy programs, the continued existence of disaster subsidy programs for insured farmers is highly redundant. Several studies have found evidence of the negative effects that disaster payments and crop insurance have on farmer behavior. Goodwin and Rejesus (2007) find that farmers residing in counties that frequently receive federal disaster payments are less likely to purchase crop insurance. They also find that farmers who purchase insurance and receive disaster payments tend to have higher returns to farming, which could suggest that both crop insurance payments and disaster payments constitute wealth transfers, rather than risk mitigation [22]. Schoengold et al. (2015) find that crop insurance and disaster payments have significant negative effects on conservation tillage practices, providing direct evidence of moral hazard [34]. Smith and Goodwin (1996) find that crop insurance reduces use of agricultural chemical inputs to production [37]. Goodwin and Vado find that both crop insurance and disaster payments

increase risk in agriculture [37]. These programs, along with subsidized crop insurance, likely affect both the input production decisions as shown here, and the decision to continue farming land particularly susceptible to production risk.

Further, there is evidence that disaster payments in general are partially politically motivated. Garrett, Marsh and Marshall (2006) conduct an analysis of the impact of congressional committee representation on agricultural disaster payments. Controlling for the size of the disaster using weather variables, and controlling for the endogeneity of crop insurance payments, they find that states represented by members of the House and Senate committees on agriculture and appropriations has a statistically significant impact on the quantity of disaster subsidies received. Further, they find that the committee membership variables are not endogenous in the disaster subsidy disbursement equation. The previously mentioned paper by Schoengold et al. also control for political motivations when conducting their analysis.

Political motivations for disaster payments allocation are not unique to agriculture. Garrett and Sobel (2003) study the allocation of disaster payments by the Federal Emergency Management Agency (FEMA). They find evidence that disaster payments are motivated by multiple tiers of political factors. The first stage of receiving disaster funding is for the governor of an affected state to request a disaster declaration from the president. Garrett and Sobel find evidence that the decision of the president to declare a disaster is motivated by the electoral importance of the state to the president, and whether or not the disaster occurs in an election year. The second stage of the FEMA payment process is allocation of funds by congress. The authors further find evidence that states represented by members of the FEMA oversight committee receive more disaster funding, estimating that half of the the total disbursement is due to political influences rather than necessity [18]. In 2003, FEMA was incorporated into the newly created Department of Homeland Security. According to Sobel, Coyne and Leeson (2007), after this institutional change, the effect of congressional influence on FEMA payments disappeared, while the impacts of political factors on the president's decision to declare a disaster persist [39].

Husted and Nickerson (2013) conduct a similar study to Garrett and Sobel, with a much longer time series, spanning 1969 through 2005. They find, as with prior studies, that presidents up for reelection are more likely to declare a disaster, that the number of electoral votes has a significant impact on this decision, and that the decision is more likely when a governor of the same party is running for reelection. They further find that the total disbursement increases after the political reorganization of FEMA into the Department of Homeland Security. Democrats also award more disaster aid than Republicans [26].

Gaspar (2015) conducts an analysis of the decision of the president to deny disaster declaration requests. Unlike the prior studies, this analysis is conducted at the county level. Results echo those found in the previous studies. He finds that in non-election years, disaster severity is the primary predictor of disaster requests being granted, while political factors drive disaster requests during election years. Drivers include the competitiveness of the presidential election, and whether or not the governor is of the same party as the president [19].

4.3 Institutional History of Agricultural Disaster Programs

Given the ad hoc nature of the disaster programs, these programs vary significantly in the triggers for disbursement, the timing of the payments relative to the negative event that triggered it, and other institutional details. The following presents information on the major disaster payment programs implemented since 2001. There are significant issues with the timing of the payments relative to the timing of the events that caused them, which will be elaborated upon when describing the data in section 4.5. In particular, a Government Accountability Office report states, which is affirmed by this analysis, that for certain ad hoc disaster programs, the lag between the crop loss and the program payment can be as high as four years.

The 2001-2002 Crop Disaster Program was implemented by the “Agricultural Assistance Act of 2003”, authorizing the Secretary of Agriculture to provide assistance to producers who suffered crop losses due to adverse weather conditions. This legislation allows producers to receive disaster payments for the 2001 and 2002 crop years. Producers must choose which of the crop years they wish to receive benefits for; they cannot receive benefits for both. Producers were eligible for benefits when the quantity lost exceeded 35% of expected production, or had a quality reduction of over 20%. This program did not require producers to have purchased crop insurance on insurable crops to qualify [48].

The 2003/2004/2005 Crop Disaster Program is similar to the prior program. Authorized by the “Military Construction and Emergency Hurricane Supplemental Appropriations Act of 2005”, farmers qualified for benefits if they suffered a 35% quantity loss or a 20% quality loss, just as before. Furthermore, special programs specific to crop losses in Virginia, totaling \$50 million, and fruit and vegetable losses in North Carolina, totaling \$3 million, were also included. These payments were available both to insured farmers, farmers of insurable crops who chose not to insure, and farmers of non-insurable crops. Farmers of insurable crops who chose not to insure, or farmers of non-insurable crops who chose not to enroll in the non-insurable crop disaster assistance program, were required to enroll in the applicable program for the two crop years after the application for the disaster payment. Like the prior program, producers could only receive disaster payments for one of the applicable crop years, and were only eligible for payments for the 2005 crop year if their losses were caused by hurricanes in 2004, in counties that were declared disaster areas by the president [49].

The 2005-2007 Crop Disaster Program was authorized by the “U.S. Troop Readiness, Veterans’ Care, Katrina Recovery, and Iraq Accountability Appropriations Act of 2007”. This program again has some similarities to the prior program. Producers were required to pick which crop year they wished to receive benefits for. Eligibility required that producers had obtained crop insurance or enrolled in the Noninsured Crop Disaster Assistance Program. Producers had to have been prevented from planting, have had a 35 percent loss of production or a 35 percent loss in value for the crop to receive payments. Only certain crops qualified for value loss disaster payments. Examples of such crops include vegetables, aquaculture, floriculture and Christmas trees [50].

The nature of disaster payments shifted from ad hoc measures to permanent programs with the passage of the 2008 farm bill. The 2008 farm bill created five permanent disaster payment programs. These programs are the Livestock Forage Disaster Program, the Livestock Forage Indemnity Program, the Emergency Assistance for Livestock, Honeybees and Farm-Raised Fish Program, the Tree Assistance

Program for Orchardists and Nursery Tree Growers, and the Supplemental Revenue Assistance (SURE) Program [7]. The latter is the primary focus of this research. Due to the establishment of a permanent disaster payments program, directly controlled by the USDA and funded by standard appropriations bills, it could be the case that the opportunities for the political allocation of disaster payments by congress are reduced or eliminated.

Unlike prior disaster aid programs, the SURE program guarantees revenue. The SURE program has two triggers. If the Secretary of Agriculture declared a county to be a disaster county, then farmers within that county or within a contiguous county must have at least a ten percent production loss in a crop which makes up at least five percent of farm revenue to qualify for payments. In the absence of a disaster declaration in their county or a contiguous county, farmers only qualify if they suffer a production loss of at least 50%. Further, eligibility requires farmers to have at a minimum catastrophic crop insurance for insurable crops or be registered in the Noninsured Crop Disaster Assistance Program for non-insurable crops. If crops are not eligible for either program, they are not covered by the SURE program [51]. Since the program is revenue based, payments require data on prices, which are not available until September or October of the year following the crop year[31]. This means there will be a delay of at least a year between the event that triggers the payment and the payment itself. Further, a report by the Government Accountability Office states that payments for the 2008 crop year did not begin until early 2010, suggesting a lag of two years between the crop year and program year [36].

4.4 Empirical Model

This paper estimates the impact of political factors on disaster subsidy disbursement for both the 2005-2007 Crop Disaster Program and the SURE program. A simple Tobit model is used for the estimation of county level disbursement during the 2005-2007 Crop Disaster Program. Let α_0 , α_1 , α_2 be vectors of regression coefficients, with S_i^* denoting the propensity to disburse disaster payments, the vector P_i denoting the political factors, and the vector X_i denoting metrics of crop disaster severity for county i . Then, we have the following model.

$$S_i^* = \alpha_0 + \alpha_1 P_i + \alpha_2 X_i + \varepsilon_i \quad (4.1)$$

$$S_i = \begin{cases} S_i^* & \text{if } S_i^* > 0 \\ 0 & \text{otherwise.} \end{cases} \quad (4.2)$$

$$E[\varepsilon_i] = 0 \quad (4.3)$$

$$E[\varepsilon_i^2] = \sigma^2 \quad (4.4)$$

Since farmers have the ability to choose which crop year they wish to receive disaster payments for, the crop year cannot be imputed from the timing of the payment. Thus, disaster severity variables for each possible year must be included within the vector of disaster severity variables. For political variables, the year chosen is 2007, the year in which the disaster bill was passed.

The variables contained within the vector P_i are indicators, which include membership on the House

Committee on Agriculture, the Subcommittee on General Farm Commodities and Risk Management, the House Committee on Appropriations, the Subcommittee on Agriculture, Rural Development, Food and Drug Administration and Related Agencies, the Senate Committee on Agriculture, Nutrition and Forestry, the Subcommittee on Commodities, Risk Management and Trade, the Senate Committee on Appropriations, the Subcommittee on Agriculture, Rural Development, Food and Drug Administration and Related Agencies, and an indicator for whether or not the governor representing the state was a member of the same political party as the president in 2007.

The variables contained within the vector X_i control for disaster severity. First there are a number of variables that control for the importance of agriculture within the county. These include the number of acres of farm land, the number of farming operations, and farmer income in 2007, when the bill became law. Controlling for disaster severity is done through the use of crop insurance variables, such as total annual liability, indemnities and the farmer paid loss ratios for 2005, 2006 and 2007. Also, monthly palmer drought severity indices are included for these three years. Regional indicators are used to control for spatial heterogeneity. State level indicators are not used, since this would preclude analyzing the effect of the gubernatorial political factors on subsidy disbursement.

Unlike the 2005-2007 Crop Disaster Program, the SURE program has a more regimented temporal structure. As previously stated, farmers are eligible if their county or a contiguous county is declared a disaster county by the Secretary of Agriculture, and contingent on this declaration, are eligible for SURE program payments if they experience a production loss of at least 10% on an economically significant crop. This suggests two separate mechanisms which should be taken into account; the decision to declare a disaster and the decision of how much funding to allocate. To model this process, a type 2 Tobit model is used [4]. Let $D_{i,t}^*$ denote the propensity to grant disaster assistance, $S_{i,t}^*$ denote the amount of subsidies received contingent on qualifying, $X_{1,i,t}$ denote metrics of disaster severity affecting whether or not disaster subsidies are allocated, $X_{2,i,t}$ denote metrics of disaster severity affecting the quantity of subsidies allocated, contingent on subsidies being disbursed in county i and period t . $P_{i,t}$ denotes political variables pertaining to county i during period t . Then, we have the following model.

$$D_{i,t}^* = \alpha_0 + \alpha_1 P_{i,t} + \alpha_2 X_{1,i,t} + \varepsilon_{1,i,t} \quad (4.5)$$

$$D_{i,t} = \begin{cases} 1 & \text{if } D_{i,t}^* > 0 \\ 0 & \text{otherwise.} \end{cases} \quad (4.6)$$

$$S_{i,t}^* = \beta_0 + \beta_1 P_{i,t} + \beta_2 X_{2,i,t} + \sigma \varepsilon_{2,i,t} \quad (4.7)$$

$$S_{i,t} = \begin{cases} S_{i,t}^* & \text{if } D_{i,t}^* > 0 \\ 0 & \text{otherwise.} \end{cases} \quad (4.8)$$

$$E[\varepsilon_{1,i,t}] = E[\varepsilon_{2,i,t}] = 0 \quad (4.9)$$

$$E[\varepsilon_{1,i,t}^2] = \sigma_1 \quad (4.10)$$

$$E[\varepsilon_{2,i,t}^2] = \sigma_2 \quad (4.11)$$

$$E[\varepsilon_{1,i,t}, \varepsilon_{2,i,t}] = \rho \quad (4.12)$$

Due to the structure of the SURE program, the crop year can be inferred from the transaction date. Since the program initially covers the 2008 crop year, and the first payments take place in 2010, a two year lag is inferred from the data. As such, political and demographic variables correspond to the transaction year, while weather, crop insurance, yield and revenue information correspond to the inferred crop year.

Both the qualification equation and the disbursement equation contain the following elements. The included political and demographic variables are the same as before. Due to the increased sample size resulting from having a four year panel, state indicators are used to control for spatial heterogeneity. Since crop years can be inferred from the timing of subsidy disbursements, monthly Palmer drought severity indices are included for the inferred crop year only. Likewise, the amount of the total liability, the total indemnity and the farmer paid loss ratio are also included in both equations, corresponding to the inferred crop year.

Since qualifying for subsidies is based in part on having a production loss, the qualification equation contains the percentage change in yield for barley, corn, cotton, peanuts, rice, sorghum, soy and wheat, to control for yield losses. The percentage change is calculated based upon a five year moving average. Since the actual payment amount is based on revenue, the percentage change in revenue for the same crops are included in the disbursement equation. Revenues are calculated by multiplying county level production values times state level prices. These percentage changes in revenue are also calculated using a five year moving average.

While Garrett, Marsh and Marshall include endogenous crop insurance payouts within their model, instrumenting them with a variety of variables, attempts to do so with this research have been unsuccessful. As one should expect, all of the relevant crop insurance payout determinants are highly correlated with the disaster subsidy disbursement, rendering them invalid for use as instruments. The primary difference between the programs of the 1990s and the programs analyzed here are the level of participation in crop insurance and the requirement that it be purchased to qualify for these programs, which are likely to make the crop insurance covariates endogenous with respect to disaster subsidies. For this reason, these models instead attempt to explain all of the legitimate component of disaster payment variation, in order to draw inference for the impact of political factors on the remainder of the variation not accounted for by disaster severity and farm demographic information.

4.5 Data

Data on subsidy disbursement come from a FOIA request to the USDA Farm Services Agency (FSA) [52]. These data contain individual transaction level records. Program descriptors allow for identification of payments made through the 2005-2007 Crop Disaster Program and the SURE program. For the 2005-2007 Crop Disaster Program, data from all time periods are aggregated into one observation at the county level. For the SURE program, observations are aggregated by the year in which the subsidy was disbursed and by county.

As suggested by the Government Accountability Office, for ad hoc disaster programs like the 2005-2007 Crop Disaster Program, there is a large delay between the events that trigger payments and the

transaction date of the payment. Note that farmers were able to claim benefits for the 2005, 2006 or 2007 crop years. Table 4.1 shows transactions for the 2005-2007 Crop Disaster Program by year. The vast majority of transactions took place in 2008, with the bulk taking place between 2007 and 2009. There are some payments disbursed as late as 2012. It is possible that payments as late as 2012 were disbursed for a crop loss that took place in 2005, potentially confounding attempts to enforce maximum subsidy caps. Average annual disbursements for the SURE program are reported in table 4.4. The mean transaction sizes during the SURE program are substantially higher than for 2005-2007 Crop Disaster Program, with the highest average transaction amount being double that of the prior program.

Information on crop insurance comes from the USDA Risk Management Agency (RMA) [2]. These data contain county level information on crop insurance, separated by crop and insurance type. All observations are aggregated to the county level. Since disaster subsidy data from the FSA dataset does not contain crop codes, all crops are aggregated together. The insurance variables chosen to control for disaster severity are total indemnities and total liability. In this context, the indemnity is the total amount of the loss, while the liability is the maximum possible payout if there is a total loss. These variables are summed by county. Also included as a covariate in the model is the farmer paid loss ratio. The farmer paid loss ratio, defined as total indemnities divided by the total premium paid by farmers after the application of subsidies, measures how much farmers receive in crop insurance payments per dollar paid for crop insurance. Due to the subsidized nature of crop insurance, farmers on average receive far more in indemnity payments than they pay in premiums, according to tables 4.3 and 4.4. So, despite the fact that farmers on average receive over twice as much in insurance payments as they pay in premiums, disaster payment programs persist until the passage of the 2014 farm bill.

Figure 4.1 reports a choropleth map of disaster payment disbursement by county during the 2005-2007 Crop Disaster Program. Like the prior ad hoc disaster programs before it, the benefits of these programs are highly concentrated in arid agricultural regions, such as the centerline of the county and central California. Eastern coastal areas likewise receive more in disaster payments, presumably caused by storm damage. Figure 4.2 shows an analogous map for the SURE program. While benefits continue to go to the areas that historically received ad hoc disaster payments, we see also that SURE payments are heavily disbursed to the corn belt, suggesting an expansion in the number of farmers benefiting from this particular program.

While total subsidy disbursement fits a consistent geographic pattern, disbursement per capita for the 2005-2007 Crop Disaster Program, shown in figure 4.3 suggests that individual farmers in the western US and in Florida received more per person than in the center line of the country, where the highest levels of payments were allocated. On a per capita basis, it also appears that farmers outside of the corn belt receive more than those within the corn belt. Per capita allocation of SURE payments, shown in figure 4.4, shows no discernible pattern, with subsidies being disbursed more evenly across counties. This is consistent with the low thresholds necessary to trigger payments, resulting in higher numbers of farmers qualifying.

Farm demographic data comes from the Bureau of Economic Analysis [47]. Three variables are obtained from these data; county level acres of farmland, farmer income and the number of farming operations. Since these statistics are only sampled every five years, the values between years are linearly imputed. In particular, for the number of farming operations and the number of acres of farmland, these

variables should not be subject to major changes over time, so that linear imputation should result in a good approximation of true values. Crop yields and prices are used to control for revenue in the SURE Program model. These data come from the USDA National Agricultural Statistics Service [1].

Congressional committee assignments come from Charles Stewart III [40],[41]. The relevant committees accounted for in this analysis are the House Committee on Agriculture, the House Committee on Appropriations, the Senate Committee on Agriculture, Nutrition and Forestry, and the Senate Committee on Appropriations. Subcommittee information was acquired from the Proquest congressional database, and manually coded. The relevant subcommittees of the House and Senate agricultural committees oversee the implementation of FSA programs, while the relevant subcommittees on the House and Senate appropriations committees oversee USDA funding. These subcommittees are the House Agricultural Subcommittee on General Farm Commodities and Risk Management, the House Appropriations Subcommittee on Agriculture, Rural Development, Food and Drug Administration, and Related Agencies, the Senate Agricultural Subcommittee on Commodities, Risk Management and Trade, and the Senate Appropriations Subcommittee on Agriculture, Rural Development, Food and Drug Administration, and Related Agencies. Members of these subcommittees have direct oversight functions over the USDA FSA, making legislators on these subcommittees the most likely to have the ability to exert influence.

For the sake of comparison, figures 4.5 and 4.6 show choropleth maps for which districts are represented by members of the House agricultural subcommittee with FSA oversight authority. Note, the districts were redrawn for the 113th congress. These graphs show that members of these House subcommittees consistently represent districts in the center line of the country, where total payment disbursement is highest. At the same time, there are other regions which don't consistently receive high levels of disaster payments that are represented by members of this subcommittee at least once in the time series. Figure 4.7 shows an analogous graph for the Senate agricultural subcommittee with FSA oversight authority. While the center line of the country is heavily represented by members of the Senate agricultural subcommittee, there are other represented states, namely Arkansas, Ohio and Mississippi, that receive relatively few disaster subsidies in terms of levels.

Also important is the location of relevant appropriation subcommittee members with USDA oversight authority. Figures 4.8 and 4.9 show which congressional districts are represented by members of the House appropriations subcommittee. Here we see that few of these legislators represent the center line of the country, with repeat membership occurring mostly in the south east, California and the corn belt. The areas represented by these members don't appear to receive disproportionately high levels of disaster subsidies, either in terms of levels or per capita. Figure 4.10 shows an analogous choropleth for membership on the Senate subcommittee that oversees USDA appropriations. Unlike the analogous House committee, members of the Senate appropriations subcommittee do appear to disproportionately represent areas that receive high levels of disaster subsidies.

Finally, the political party of the governor representing the state where the subsidy is disbursed is included. Figures 4.11 and 4.12 show the relationship between presidential and governor political party affiliation. The relevant characteristic of the governors is whether or not they belong to the same political party as the President. Note that the party of the President changed between the 2005-2007 Crop Disaster Program and the SURE program, and that several governorships switched hands between Re-

publicans and Democrats, resulting in temporal variation that can be exploited to better ascertain if the political party of the governor has an effect on disbursement of payments under the SURE program.

The unit of observation in the 2005-2007 Crop Disaster Program model is county level disaster payments, as a function of county level farm demographic variables at the time the program was passed into law, crop insurance variables, and Palmer drought severity indices for each crop year that was eligible for benefits. If a county contains less than 100 acres of crop land, the observation is dropped. This is important because there is no guarantee that the farmer, who's mailing address the observation is based on, actually lives at the site of the farm. There are some observations for major metropolitan areas, such as downtown New York City, where farms can't plausibly exist. By deleting counties with no farm land from the analysis, bias caused by the most severe county level mismatches is reduced.

To control for the direct effects of weather on crop disaster payments, monthly Palmer drought severity indices are used to control for drought conditions. In the case of the 2005-2007 Crop Disaster Program, these monthly variables are included for the 2005, 2006 and 2007, since the payments in question could be disbursed for events that occurred in any of these crop years. For the SURE program, the monthly drought severity indices are based on the assumed two year lag between the crop year and the payment date.

Indicators for Senate committee and governor partisanship variables are based on the state where the county is located. More problematic is the assignment of counties to congressional districts. Nearly half of the counties included in the analysis bisect congressional districts. The county is coded as having representation on a given House committee if any part of this county bisects a congressional district represented by a member of that committee.

4.6 Results

Estimations are conducted using the QLIM procedure in SAS software, using full information maximum likelihood, optimized using the quasi-Newton algorithm. Empirical results for the 2005-2007 Crop Disaster Program are reported in tables 4.5 and 4.6. The dependent variables in models one, two and three are the level of inflation adjusted disaster payments, disaster payments per capita and disaster payments per farm acre.

The regressors total liability and total indemnities are also scaled in the same terms as the dependent variable. Disaster payments per capita are calculated as disaster payments per disaster payment recipient, while the per capita liability and indemnity variables are scaled per farming operation. Table 4.7 reports Wald statistics for the farm demographic, crop insurance, drought and regional indicator variables.

For all three models, the crop insurance variables have a jointly significant impact on disaster payment disbursement. The monthly Palmer drought severity indices have a significant joint effect on disaster payment disbursement in terms of levels and disbursement per acre for each applicable crop year, while the Palmer drought indices for 2005 don't have a joint impact on payments per capita. Regional indicators are not jointly different from zero in all three models. Having controlled for disaster severity and spatial characteristics through the use of the regional indicators, of primary interest is whether the

political variables explain the remainder of the variation.

On a per farm and per acre basis, and contrary to intuition, counties represented by members of the House Committee on Agriculture receive significantly less in disaster payments than those without representation, on a per capita and per acre basis. However, counties represented by House members on the subcommittee with direct oversight authority receive significantly more in disaster payments per farm acre.

In terms of levels, counties represented by legislators on the House Committee on Appropriations receive fewer disaster payments, while on a per capita or per acre basis, the effect on receipts are not statistically different from zero. The effect of membership on the House subcommittee which oversees USDA appropriations has a statistically lower payment in terms of levels, but a statistically higher payment per acre, suggesting that while there may be fewer farmers or fewer farmers incurring losses in their districts, on a per acre basis they do receive more in disaster funding than counties without representation on this committee.

Moving to the Senate, in terms of levels and on a per acre basis, counties in states represented by a member on the Senate Committee on Agriculture receive more disaster payments than those in states without representation, though on a per capita basis, they receive less, with the latter finding being contrary to intuition. It could be the case that states represented by members of the Senate agricultural committee have higher numbers of farmers than other states, resulting in a lower per capita disbursement relative to other states. However, on a per farm basis, counties in states represented by members of the Senate agricultural subcommittee with FSA oversight authority receive more disaster payments than those without, while this effect is not statistically different from zero in terms of overall disbursement or per acre.

Counties within states represented by members of the Senate Committee on Appropriations receive significantly less than counties in states without such representation in terms of levels, while the effect is statistically indistinguishable from zero in per capita or per acre terms. Since the appropriations committees oversee funding for the entire federal government, it seems reasonable to conclude that funding for agricultural disaster programs isn't a high priority for the typical member of the committee. Counties represented by members of the subcommittee that oversees USDA funding, however, receive significantly more in disaster payments than those that do not. However, this effect isn't statistically different from zero on a per capita or per acre basis.

Lastly, counties within a state where the governor is a member of the same political party as the president receive significantly more in disaster payments per capita than those in states where this is not the case. While the effect is also positive in terms of levels and per farm, it is not statistically different from zero. This does suggest, however, that presidential politics played at least a small role prior to the implementation of a permanent disaster payment program.

It is also worth noting the effects of the number of acres of farm land and the number of farms on disaster payment disbursement. Obviously, both variables have a significant positive effect in terms of levels. However, while the number of acres of farmland within a county has a positive impact on disaster payment disbursement per capita and per acre, the number of farms has a significant negative effect. This suggests that counties with a smaller number of larger farms receive more in disaster payments than counties with a larger number of smaller farms, which in turn suggests that larger scale farms receive

more in disaster payments.

This analysis of a program representative of the prior regime of ad hoc disaster payment programs, forms a basis of comparison against the more recent regime, the SURE program. Estimates for the SURE program are reported in tables 4.8 through 4.12.

Wald statistics for farm demographics, crop insurance, Palmer drought severity indices, percentage changes in yields for major crops, percentage changes in revenues for major crops and state indicators are reported in table 4.12. For the participation equation, the farm demographic variables, crop insurance variables and state indicator variables have effects which are jointly distinguishable from zero, while the drought severity indices and percentage change in yields are not statistically significant. This is surprising, given that the eligibility for the program should be determined in some part by crop losses. It could be the case that this result is driven by the fact that a very minor reduction in yields qualifies farmers in counties declared as disaster counties. This suggests that yields and drought play little role in qualifying for SURE payments. While possible that the effect is dominated by the crop insurance variables, it should be noted that the same farm bill that created the SURE program also created revenue insurance policies, potentially reducing the correlation between yields and insurance payouts.

For the disbursement equation, which is itself conditional on disaster payments being made, farm demographics and crop insurance covariates jointly have a highly statistically significant impact on disbursement, in terms of levels, per capita and per acre. Palmer drought severity indices have a joint impact in terms of levels and per capita, but not on a per acre basis. State indicators only have a significant joint effect on disbursement per capita. Unlike with the eligibility equation, the analogous variables in the disbursement equation, the percentage change in revenue for major crops, has a jointly statistically significant impact in each estimation.

Tables 4.8 and 4.9 report estimates of parameters in the participation equation. Political variables have little effect on whether or not counties are eligible to receive payments. The only political factor which has a positive and significant impact on eligibility in each model is membership of the local Senator on the agricultural committee. Counties in states represented by members of the Senate agricultural subcommittee that oversees the USDA FSA are less likely to qualify than agricultural committee members in general. This should not be surprising, given the lax conditions required to be eligible for payments under the SURE program.

Tables 4.10 and 4.11 report estimation results for the payment allocation equation. In the allocation equation, political factors have a greater impact. Farmers represented by members of the House appropriations subcommittee that oversees FSA funding receive significantly higher SURE payments in terms of levels, per farm and per capita terms relative to those who do not. Farmers in districts represented by members of the House Committee on Appropriations in general receive significantly less than those in other counties. This is intuitive, since members of other appropriations subcommittees likely have other funding priorities. In the Senate, for most models, appropriations committee membership, along with membership on the subcommittee that oversees USDA funding, has no significant impact on payment disbursement. While membership on the Senate agricultural committee has a negative impact on SURE payment allocation, membership on the senate subcommittee that oversees the USDA FSA has a positive and statistically significant impact on SURE payment allocation in terms of levels, per capita and per acre terms.

Finally, in each estimation, the effect of the governor belonging to the same political party as the president is positive, and for the models in per capita and per acre terms, is weakly statistically significant. This suggests that the president has at least a minor affect on payments. Due to only one president being in power during the time series, and the lack of variation in governor party affiliations in the more heavily agricultural states, it is difficult to estimate the effect of a change in gubernatorial party affiliation on changes in SURE payment allocation.

4.7 Conclusion

From these results, two major implications are clear. First, the transition from ad hoc disaster programs to a permanent disaster program has not reduced politically motivated allocations of disaster payments. During both the 2005-2007 Crop Disaster Program and the SURE program, farmers in counties represented by members of the House appropriations subcommittee with USDA funding oversight authority and the Senate agricultural subcommittee with USDA FSA oversight authority received more per acre in disaster subsidies than farmers not represented by members of these subcommittees. During both programs, the effect of gubernatorial party affiliation on payments has a positive impact in each case, with the effect being statistically significant in some cases. This suggests that not only did gubernatorial partisanship have at least some impact on payments during the SURE program, but that it had some effect on ad hoc disaster payment allocation too. The fact that political allocation of disaster payments persists provides more impetus to cancel agricultural disaster programs in the future farm bill, especially considering how heavily subsidized federal crop insurance has become in the last two decades. It should be noted that the SURE payment program was phased out with the passage of the 2014 farm bill. However, the other permanent disaster payment programs implemented at the same time as the SURE program remain active.

4.8 Appendix

Table 4.1: Annual disaster subsidy disbursement under the 2005-2007 Crop Disaster Program.

Year	N	Mean	Std. Dev.	Min	Max
2007	42,051	\$7,509.68	\$12,812.19	\$1.11	\$531,520.18
2008	301,656	\$5,959.89	\$11,473.07	\$1.07	\$713,380.97
2009	7,744	\$8,088.92	\$15,977.12	\$1.07	\$342,421.55
2010	2	\$575.18	\$711.07	\$72.38	\$1,077.98
2011	32	\$405.49	\$854.99	\$2.04	\$4,677.26
2012	6	\$35.08	\$34.83	\$3.46	\$78.00

Table 4.2: Annual disaster subsidy disbursement under the SURE program.

Year	N	Mean	Std. Dev.	Min	Max
2010	140,765	\$19,985.18	\$30,341.34	\$0.00	\$947,471.21
2011	73,521	\$14,548.60	\$25,406.88	-\$173,760.80	\$836,794.10
2012	52,742	\$16,264.52	\$28,238.95	-\$100,001.31	\$500,006.53
2013	117,047	\$17,977.34	\$30,408.19	-\$188,696.47	\$1,519,671.71
2014	3,139	\$11,635.04	\$29,488.90	-\$193,987.71	\$434,173.59

Table 4.3: Summary statistics for model variables used in the 2005-2007 Crop Disaster Program estimations.

Variable	Min.	Max.	Mean	Std. Dev.	Sum.
Acres	0.00	6,101,943.00	289,906.01	369,994.98	989,449,204.00
Farming Operations	0.00	6,687.00	707.70	557.44	2,415,372.00
Loss Ratio 2005	0.00	34.49	1.86	2.81	5,566.89
Loss Ratio 2006	0.00	51.23	2.45	3.36	7,332.30
Loss Ratio 2007	0.00	926.42	2.79	17.25	8,303.78
Income	\$0.00	\$9,940,000.00	\$2,580,579.29	\$2,204,356.32	\$8,807,517,100.00
Indemnity 2005	\$0.00	\$132,690,122.00	\$887,466.69	\$3,295,543.68	\$2,660,625,144.00
Indemnity 2006	\$0.00	\$83,182,573.00	\$1,273,713.90	\$3,325,558.48	\$3,804,583,406.00
Indemnity 2007	\$0.00	\$37,977,277.00	\$1,326,872.65	\$2,815,442.93	\$3,954,080,499.00
Liability 2005	\$0.00	\$566,617,402.00	\$16,066,420.48	\$27,834,035.38	\$48,167,128,595.00
Liability 2006	\$0.00	\$616,661,129.00	\$18,181,913.30	\$31,119,952.28	\$54,309,375,029.00
Liability 2007	\$0.00	\$631,084,252.00	\$24,549,262.70	\$39,230,982.19	\$73,156,802,854.00
Number of Recipients	0.00	1,587.00	124.40	181.06	384,020.00
Disaster Sub.	\$204.80	\$16,631,375.28	\$788,660.29	\$1,419,370.42	\$2,434,594,325.40

Table 4.4: Summary statistics for model variables used in the SURE Program estimations.

Variable	Min.	Max.	Mean	Std. Dev.	Sum.
Acres	0	6,044,665.80	295,819.14	391,859.67	5,672,331,958.20
Farming Op.	0	6,496.00	690.60	547.54	13,242,296.80
Loss Ratio	0	280.25	1.90	3.91	42526.50
Income	0	\$9,972,000.00	\$2,773,181.30	\$2,153,535.84	\$53,175,751,450.00
Indemnity	0	\$153,951,863.00	\$2,785,931.28	\$7,386,052.42	\$62,307,352,967.00
Liability	0	\$1,397,596,039.90	\$27,244,359.21	\$52,110,002.56	\$609,320,093,831.00
Num. Recip.	0	1,614.00	45.48	100.52	460,034.00
Disaster Sub.	0	\$32,747,123.58	\$813,059.90	\$2,106,020.63	\$8,224,913,964.10

Table 4.5: Tobit regression results for the 2005-2007 Crop Disaster Program. *, **, *** denote statistical significance at the 10%, 5% and 1% levels, respectively.

Model	Levels		Per Capita		Per Acre	
Variable	Parameter	Std. Error	Parameter	Std. Error	Parameter	Std. Error
Intercept	-3.651	(0.798)***	8.133	(0.284)***	-0.601	(0.171)***
House Ag. Com.	-0.100	(0.131)	-0.091	(0.041)**	-0.062	(0.026)**
House Ag. Subcom.	0.133	(0.151)	-0.039	(0.052)	0.087	(0.032)***
House App. Com.	-0.411	(0.132)***	0.025	(0.042)	-0.042	(0.026)
House App. Subcom.	-0.050	(0.208)***	0.009	(0.068)	0.093	(0.041)**
Senate Ag. Com.	0.616	(0.155)***	-0.148	(0.048)***	0.149	(0.029)***
Senate Ag. Subcom.	-0.010	(0.041)	0.208	(0.060)***	0.025	(0.037)
Senate App. Com.	-0.395	(0.156)***	0.062	(0.049)	0.027	(0.030)
Senate App. Subcom.	0.097	(0.047)***	-0.034	(0.057)	-0.043	(0.035)
Governor Party	0.071	(0.141)	0.161	(0.044)***	0.039	(0.027)
Log Acres	0.346	(0.080)***	0.543	(0.022)***	0.086	(0.014)***
Log Number Recip.	0.168	(0.037)***	-0.003	(0.012)	0.088	(0.008)***
Log Farm Operations	0.442	(0.088)***	-0.879	(0.012)***	-0.255	(0.017)***
Log Farmer Income	0.075	(0.029)***	-0.170	(0.014)***	-0.017	(0.013)
Log Liability 2005	0.067	(0.039)*	0.061	(0.023)***	0.106	(0.035)***
Log Indemnity 2005	0.135	(0.025)***	-0.030	(0.015)*	0.104	(0.021)***
Loss Ratio 2005	0.001	(0.022)	0.050	(0.007)***	0.013	(0.004)***
Log Liability 2006	-0.010	(0.044)	0.058	(0.026)**	0.013	(0.038)
Log Indemnity 2006	0.212	(0.028)***	-0.038	(0.016)**	0.194	(0.020)***
Loss Ratio 2006	0.044	(0.018)**	0.032	(0.006)***	0.020	(0.003)***
Log Liability 2007	-0.018	(0.031)	-0.105	(0.018)***	-0.095	(0.022)***
Log Indemnity 2007	0.175	(0.025)***	0.116	(0.013)***	0.302	(0.015)***
Loss Ratio 2007	0.005	(0.003)*	0.001	(0.001)*	0.001	(0.001)**
Appalachian	0.326	(0.347)	0.424	(0.111)***	0.183	(0.068)***
North East	2.511	(0.415)***	0.855	(0.129)***	0.750	(0.080)***
South East	0.573	(0.396)	0.441	(0.122)***	0.090	(0.075)
Delta	-0.628	(0.363)*	-0.049	(0.115)	-0.192	(0.069)***
North Plains	-0.388	(0.319)	-0.446	(0.097)***	-0.275	(0.060)***
South Plains	0.441	(0.414)	0.244	(0.128)*	0.022	(0.079)
Mountain	0.049	(0.355)	-0.411	(0.111)***	-0.295	(0.067)***
Great Lakes	0.530	(0.315)*	-0.038	(0.097)	0.200	(0.061)***
Pacific	0.182	(0.438)	0.300	(0.141)**	-0.140	(0.085)
σ	2.441	(0.034)***	0.757	(0.010)***	0.480	(0.006)***
Loglike	-6731.000		-3437.000		-2327.000	

Table 4.6: Tobit regression results for the 2005-2007 Crop Disaster Program continued. *, **, *** denote statistical significance at the 10%, 5% and 1% levels, respectively.

Model	Levels		Per Capita		Per Acre	
Variable	Parameter	Std. Error	Parameter	Std. Error	Parameter	Std. Error
January PDSI 2005	-0.109	(0.049)*	-0.003	(0.016)	-0.007	(0.009)
February PDSI 2005	0.063	(0.064)	-0.008	(0.020)	0.028	(0.012)**
March PDSI 2005	0.055	(0.086)	0.014	(0.027)	-0.006	(0.016)
April PDSI 2005	0.048	(0.091)	0.002	(0.028)	-0.012	(0.017)
May PDSI 2005	-0.291	(0.100)***	0.021	(0.032)	0.000	(0.019)
June PDSI 2005	-0.168	(0.105)	0.119	(0.034)***	-0.073	(0.020)***
July PDSI 2005	0.341	(0.105)***	-0.051	(0.033)	0.083	(0.020)***
August PDSI 2005	0.139	(0.077)*	-0.103	(0.023)***	-0.004	(0.015)
September PDSI 2005	-0.158	(0.067)**	0.054	(0.021)***	0.002	(0.013)
October PDSI 2005	0.086	(0.086)	0.017	(0.027)	-0.007	(0.016)
November PDSI 2005	-0.320	(0.192)*	-0.001	(0.061)	-0.105	(0.037)***
December PDSI 2005	0.433	(0.178)**	-0.148	(0.056)***	0.138	(0.034)***
January PDSI 2006	-0.510	(0.157)***	0.289	(0.049)***	-0.006	(0.029)
February PDSI 2006	0.157	(0.157)	-0.110	(0.049)**	-0.055	(0.029)*
March PDSI 2006	0.266	(0.104)**	0.029	(0.032)***	0.064	(0.020)***
April PDSI 2006	-0.132	(0.075)*	-0.073	(0.023)	-0.077	(0.014)***
May PDSI 2006	0.065	(0.080)	0.015	(0.024)	0.031	(0.015)**
June PDSI 2006	-0.274	(0.087)***	-0.017	(0.027)	-0.034	(0.016)**
July PDSI 2006	0.108	(0.073)	0.023	(0.023)	-0.006	(0.014)
August PDSI 2006	0.046	(0.067)	0.036	(0.021)*	-0.014	(0.013)
September PDSI 2006	-0.029	(0.088)	-0.140	(0.027)***	0.035	(0.016)**
October PDSI 2006	0.166	(0.081)**	0.038	(0.026)	-0.018	(0.015)
November PDSI 2006	-0.044	(0.081)	0.024	(0.026)	0.019	(0.015)
December PDSI 2006	0.237	(0.107)**	0.216	(0.033)***	0.138	(0.020)***
January PDSI 2007	-0.242	(0.115)**	-0.069	(0.036)*	-0.129	(0.022)***
February PDSI 2007	0.011	(0.103)	-0.084	(0.031)***	-0.014	(0.019)
March PDSI 2007	0.163	(0.122)	0.030	(0.038)	0.053	(0.023)**
April PDSI 2007	-0.167	(0.113)	-0.023	(0.035)	-0.031	(0.022)
May PDSI 2007	-0.192	(0.110)*	-0.111	(0.035)***	-0.087	(0.021)***
June PDSI 2007	0.153	(0.131)	-0.110	(0.041)***	0.011	(0.025)
July PDSI 2007	-0.019	(0.108)	0.117	(0.034)***	0.065	(0.020)***
August PDSI 2007	-0.107	(0.069)	0.009	(0.022)	-0.035	(0.013)***
September PDSI 2007	0.127	(0.057)*	-0.012	(0.017)	0.000	(0.011)
October PDSI 2007	0.333	(0.116)***	0.228	(0.035)***	0.127	(0.022)***
November PDSI 2007	-0.351	(0.133)***	-0.117	(0.041)***	-0.114	(0.025)***
December PDSI 2007	-0.167	(0.072)**	-0.118	(0.023)***	-0.029	(0.014)**

Table 4.7: Wald statistics for farm demographic, crop insurance, drought and regional indicator variables for the 2005-2007 Crop Disaster Program.

Null Hypothesis	Levels	Per Capita	Per Acre
Log Acres & Num Recip & Log Income = 0	162.46***	0.24	24.48***
Log Liability 2005 & Log Indemnity 2005 & Loss Ratio 2005 = 0	23.98***	27.59***	33.55***
Jan.-Dec. 2005 PDSI = 0	1.51***	0	4.46**
Log Liability 2006 & Log Indemnity 2006 & Loss Ratio 2006 = 0	29.08***	8.26***	29.95***
Jan.-Dec. 2006 PDSI = 0	0.19	2.97*	9.36***
Log Liability 2007 & Log Indemnity 2007 & Loss Ratio 2007 = 0	33.42***	3.64*	75.44***
Jan.-Dec. 2007 PDSI = 0	16.37***	14.19***	73.83***
Regional Indicators = 0	2.51	0.01	0.6

Table 4.8: Participation component of the type two Tobit estimation results for disaster payments under the SURE program. *, **, *** denote statistical significance at the 10%, 5% and 1% levels, respectively.

Model	Levels		Per Capita		Per Acre	
Variable	Parameter	Std. Error	Parameter	Std. Error	Parameter	Std. Error
Intercept	-1.240	(0.256)***	-2.605	(0.293)***	-2.433	(0.267)***
House Ag. Com.	0.023	(0.046)	0.047	(0.048)	0.027	(0.043)
House Ag. Subcom.	-0.085	(0.057)	-0.142	(0.059)**	-0.088	(0.054)
House App. Com.	-0.050	(0.045)	-0.092	(0.048)*	-0.030	(0.043)
House App. Subcom.	0.031	(0.071)	0.027	(0.076)	-0.029	(0.070)
Senate Ag. Com.	0.161	(0.059)***	0.145	(0.063)**	0.154	(0.057)***
Senate Ag. Subcom.	-0.107	(0.053)**	-0.114	(0.057)**	-0.144	(0.051)***
Senate App. Com.	0.020	(0.050)	0.028	(0.053)	0.030	(0.048)
Senate App. Subcom.	-0.003	(0.059)	0.037	(0.062)	0.071	(0.056)
Governor Party	0.025	(0.071)	-0.016	(0.075)	0.052	(0.072)
Log Acres	-0.025	(0.026)	0.036	(0.028)	0.089	(0.025)***
Log Number Recip.	0.470	(0.008)***	48.990	(0.848)***	45.156	(0.843)***
Log Liability	0.023	(0.005)***	0.066	(0.009)***	0.054	(0.015)***
Log Indemnity	-0.004	(0.006)	0.002	(0.011)	-0.090	(0.024)***
Loss Ratio	-0.005	(0.006)	0.000	(0.004)	0.003	(0.004)
Log Farm Op.	0.096	(0.026)***	0.166	(0.029)***	0.093	(0.025)***
Log Farmer Income	0.001	(0.014)	0.036	(0.020)*	0.000	(0.023)
January PDSI	0.007	(0.014)	0.013	(0.015)	0.011	(0.014)
February PDSI	-0.010	(0.022)	-0.008	(0.023)	-0.030	(0.022)
March PDSI	-0.024	(0.021)	-0.006	(0.023)	-0.013	(0.021)
April PDSI	0.001	(0.024)	-0.034	(0.026)	-0.006	(0.023)
May PDSI	0.027	(0.022)	0.038	(0.024)	0.043	(0.022)
June PDSI	-0.005	(0.026)	-0.005	(0.028)	-0.017	(0.026)
July PDSI	-0.036	(0.022)	-0.029	(0.023)	-0.029	(0.022)
August PDSI	0.002	(0.017)	0.001	(0.018)	0.000	(0.016)
September PDSI	-0.021	(0.020)	-0.033	(0.021)	-0.026	(0.019)
October PDSI	0.020	(0.020)	0.016	(0.022)	0.024	(0.019)
November PDSI	0.009	(0.024)	0.005	(0.026)	0.009	(0.023)
December PDSI	-0.001	(0.019)	0.023	(0.021)	0.012	(0.019)
%Δ Barley Yield	-0.029	(0.073)	-0.005	(0.076)	-0.014	(0.065)
%Δ Corn Yield	-0.104	(0.046)**	-0.141	(0.055)*	-0.076	(0.044)*
%Δ Cotton Yield	-0.052	(0.074)	-0.044	(0.067)	-0.078	(0.073)
%Δ Peanuts Yield	0.123	(0.089)	0.192	(0.102)	0.092	(0.089)
%Δ Rice Yield	0.041	(0.231)	-0.012	(0.232)	0.037	(0.216)
%Δ Sorghum Yield	-0.063	(0.062)	-0.118	(0.063)	-0.100	(0.058)*
%Δ Soy Yield	0.046	(0.034)	-0.017	(0.040)	0.038	(0.033)
%Δ Wheat Yield	0.022	(0.028)	-0.001	(0.030)	0.019	(0.027)
Year 2011	-0.062	(0.060)	-0.221	(0.063)***	-0.034	(0.059)
Year 2012	-0.156	(0.077)**	-0.110	(0.075)	-0.143	(0.063)*
Year 2013	-0.113	(0.074)	-0.037	(0.073)	-0.138	(0.059)***
Year 2014	-0.928	(0.061)***	-1.512	(0.067)***	-0.962	(0.060)***
ρ	-0.845	(0.010)***	-0.230	(0.020)***	-0.854	(0.008)***

Table 4.9: State indicator coefficients for the participation component of the type two Tobit estimation results for disaster payments under the SURE program. *, **, *** denote statistical significance at the 10%, 5% and 1% levels, respectively.

Model	Levels		Per Capita		Per Acre	
Variable	Parameter	Std. Error	Parameter	Std. Error	Parameter	Std. Error
AZ	-0.743	(0.253)***	-1.033	(0.264)***	-0.848	(0.240)***
AR	-0.229	(0.159)	-0.262	(0.169)	-0.274	(0.155)*
CA	-0.338	(0.162)**	-0.422	(0.174)**	-0.380	(0.158)**
CO	-0.399	(0.177)**	-0.129	(0.184)	-0.053	(0.164)
CT	-0.385	(0.304)	-0.459	(0.314)	-0.303	(0.305)
DE	-0.629	(0.435)	-0.232	(0.422)	-0.561	(0.422)
FL	-0.337	(0.140)**	-0.285	(0.147)*	-0.248	(0.141)*
GA	-0.001	(0.121)	0.176	(0.129)	0.128	(0.121)
ID	-0.447	(0.149)***	-0.541	(0.157)***	-0.371	(0.147)**
IL	-0.060	(0.155)	0.061	(0.163)	0.055	(0.155)
IN	-0.422	(0.145)***	-0.261	(0.150)*	-0.396	(0.149)***
IA	-0.553	(0.155)***	-0.473	(0.158)***	-0.414	(0.150)***
KS	-0.240	(0.145)***	-0.355	(0.154)**	-0.096	(0.139)
KY	-0.306	(0.152)**	-0.105	(0.160)	-0.236	(0.151)
LA	-0.518	(0.135)***	-0.590	(0.144)	-0.394	(0.133)***
ME	-0.288	(0.216)	-0.475	(0.228)**	-0.141	(0.214)
MD	-0.194	(0.177)	-0.137	(0.186)	-0.192	(0.180)
MA	0.085	(0.241)	0.418	(0.260)	0.022	(0.261)
MI	-0.147	(0.147)	-0.049	(0.155)	-0.024	(0.146)
MN	-0.361	(0.156)**	-0.375	(0.164)**	-0.262	(0.154)
MS	-0.564	(0.136)***	-0.639	(0.142)***	-0.514	(0.133)***
MO	-0.434	(0.156)***	-0.293	(0.164)*	-0.381	(0.152)**
MT	-0.126	(0.176)	-0.080	(0.187)	0.095	(0.167)
NE	-0.347	(0.149)**	-0.450	(0.157)***	-0.144	(0.144)
NV	-1.012	(0.276)***	-0.991	(0.298)***	-0.946	(0.259)***
NH	-0.389	(0.229)*	-0.366	(0.245)	-0.357	(0.231)
NJ	-0.289	(0.204)	-0.372	(0.225)*	0.191	(0.196)
NM	-0.052	(0.177)	-0.185	(0.186)	-0.117	(0.163)
NY	-0.245	(0.163)	-0.322	(0.173)*	-0.152	(0.162)
NC	-0.235	(0.134)*	-0.101	(0.141)	-0.067	(0.136)
ND	0.080	(0.199)	0.118	(0.217)	0.176	(0.187)
OH	-0.314	(0.139)**	-0.239	(0.148)	-0.252	(0.138)*
OK	-0.203	(0.153)	0.098	(0.157)	0.230	(0.139)*
OR	-0.557	(0.180)***	-0.618	(0.189)***	-0.444	(0.171)***
PA	-0.782	(0.147)***	-0.959	(0.155)***	-0.688	(0.145)***
RI	0.189	(0.302)	0.264	(0.320)	0.819	(0.303)***
SC	-0.417	(0.147)***	-0.316	(0.154)**	-0.178	(0.141)
SD	-0.270	(0.165)	-0.325	(0.173)*	-0.032	(0.157)
TN	-0.252	(0.119)**	-0.306	(0.125)**	-0.212	(0.118)*
TX	-0.590	(0.118)***	-0.502	(0.126)***	-0.289	(0.113)**
UT	-0.800	(0.214)***	-0.936	(0.228)***	-0.874	(0.213)***
VT	0.215	(0.212)	0.283	(0.229)	0.220	(0.217)
VA	-0.373	(0.129)***	-0.333	(0.135)**	-0.228	(0.127)*
WA	-0.508	(0.193)***	-0.617	(0.217)***	-0.477	(0.187)**
WV	-1.137	(0.190)***	-1.113	(0.198)***	-1.097	(0.188)***
WI	-0.489	(0.146)***	-0.453	(0.152)***	-0.388	(0.145)***
WY	-0.438	(0.191)**	-0.734	(0.206)***	-0.364	(0.179)**

Table 4.10: Subsidy allocation component of the type two Tobit estimation results for disaster payments under the SURE program. *, **, *** denote statistical significance at the 10%, 5% and 1% levels, respectively. Coefficients for state indicator variables are omitted.

Model Variable	Levels		Per Capita		Per Acre	
	Parameter	Std. Error	Parameter	Std. Error	Parameter	Std. Error
Intercept	6.575	(0.388)***	7.288	(0.269)***	3.243	(0.134)***
House Ag. Com.	0.011	(0.051)	-0.034	(0.033)	-0.009	(0.017)
House Ag. Subcom.	-0.033	(0.060)	0.007	(0.038)	0.022	(0.020)
House App. Com.	-0.151	(0.056)***	-0.057	(0.037)	-0.040	(0.019)**
House App. Subcom.	0.293	(0.087)***	0.164	(0.057)***	0.100	(0.029)***
Senate Ag. Com.	-0.174	(0.067)***	-0.095	(0.043)**	-0.113	(0.022)***
Senate Ag. Subcom.	0.204	(0.058)***	0.067	(0.037)*	0.108	(0.019)***
Senate App. Com.	-0.021	(0.057)	-0.078	(0.037)**	-0.019	(0.019)
Senate App. Subcom.	-0.079	(0.064)	-0.056	(0.042)	-0.031	(0.021)
Governor Party	0.108	(0.072)	0.077	(0.047)*	0.041	(0.024)*
Log Acres	0.227	(0.035)***	-0.019	(0.024)	-0.187	(0.012)***
Log Number Recip.	0.010	(0.000)***	0.091	(0.012)***	0.500	(0.007)***
Log Liability	0.075	(0.008)***	0.127	(0.008)***	0.062	(0.007)***
Log Indemnity	0.029	(0.009)***	0.004	(0.009)	0.097	(0.010)***
Loss Ratio (Farmer Paid).	0.020	(0.008)**	0.011	(0.006)**	0.004	(0.003)
Log Farm Operations	-0.177	(0.032)***	0.099	(0.024)***	-0.095	(0.011)***
Log Farmer Income	0.152	(0.023)***	0.105	(0.018)***	0.066	(0.011)***
January PDSI	-0.031	(0.019)	-0.004	(0.012)	-0.020	(0.006)***
February PDSI	0.125	(0.028)***	0.059	(0.019)***	0.051	(0.009)***
March PDSI	-0.025	(0.026)	-0.027	(0.017)	0.015	(0.009)*
April PDSI	-0.090	(0.028)***	-0.041	(0.018)**	-0.044	(0.009)***
May PDSI	0.012	(0.027)	0.016	(0.018)	-0.018	(0.009)**
June PDSI	0.101	(0.027)***	0.020	(0.018)	0.056	(0.009)***
July PDSI	-0.040	(0.021)*	-0.012	(0.014)	-0.008	(0.007)
August PDSI	-0.046	(0.018)***	-0.035	(0.011)***	-0.019	(0.006)***
September PDSI	0.088	(0.021)***	0.054	(0.014)***	0.026	(0.007)***
October PDSI	-0.080	(0.022)***	-0.045	(0.014)***	-0.033	(0.007)***
November PDSI	0.071	(0.027)***	0.055	(0.018)***	0.028	(0.009)***
December PDSI	-0.075	(0.023)***	-0.062	(0.015)	-0.027	(0.007)***
%Δ Barley Revenue	-0.011	(0.023)	-0.011	(0.015)	-0.006	(0.008)
%Δ Corn Revenue	-0.020	(0.016)	0.000	(0.010)**	-0.003	(0.005)
%Δ Cotton Revenue	0.065	(0.018)***	0.025	(0.012)	0.012	(0.006)***
%Δ Peanuts Revenue	0.023	(0.026)	0.007	(0.017)	0.006	(0.009)
%Δ Rice Revenue	-0.479	(0.184)***	-0.395	(0.121)***	-0.176	(0.060)***
%Δ Sorghum Revenue	-0.020	(0.014)	-0.015	(0.009)*	-0.014	(0.005)***
%Δ Soy Revenue	-0.025	(0.010)**	-0.008	(0.008)	-0.014	(0.003)***
%Δ Wheat Revenue	0.002	(0.010)	0.008	(0.007)	-0.010	(0.003)***
Year 2011	-0.575	(0.062)***	-0.311	(0.040)***	-0.218	(0.021)***
Year 2012	-0.094	(0.122)	-0.031	(0.068)	0.053	(0.027)**
Year 2013	0.051	(0.120)	0.060	(0.067)	0.106	(0.024)***
Year 2014	-1.091	(0.090)***	-0.880	(0.061)***	-0.208	(0.029)***
σ	1.687	(0.012)***	1.042	(0.008)***	0.560	(0.004)***
Loglike		-21567.000		-18046.000		-11141.000

Table 4.11: State indicator coefficients for the subsidy allocation component of the type two Tobit estimation results for disaster payments under the SURE program. *, **, *** denote statistical significance at the 10%, 5% and 1% levels, respectively.

Model	Levels		Per Capita		Per Acre	
Variable	Parameter	Std. Error	Parameter	Std. Error	Parameter	Std. Error
AZ	0.542	(0.453)	0.478	(0.324)	0.343	(0.147)***
AR	-0.067	(0.191)	-0.088	(0.125)	-0.014	(0.063)
CA	0.159	(0.192)	-0.010	(0.125)	-0.009	(0.063)
CO	-0.301	(0.194)	-0.366	(0.125)***	-0.088	(0.064)
CT	0.962	(0.323)***	0.397	(0.207)*	0.519	(0.107)***
DE	-0.119	(0.337)	-0.790	(0.213)***	-0.059	(0.112)
FL	0.334	(0.174)*	0.217	(0.114)*	0.071	(0.058)
GA	-0.122	(0.149)	-0.388	(0.097)***	-0.130	(0.049)***
ID	-0.064	(0.196)	-0.453	(0.129)***	0.133	(0.065)**
IL	-0.190	(0.157)	-0.387	(0.101)***	-0.265	(0.053)***
IN	0.218	(0.156)	-0.301	(0.101)***	0.058	(0.052)
IA	0.031	(0.165)	-0.385	(0.107)***	0.048	(0.055)
KS	-0.278	(0.157)*	-0.565	(0.101)***	-0.090	(0.052)*
KY	-0.164	(0.176)	-0.163	(0.114)	-0.041	(0.058)
LA	0.487	(0.183)***	0.275	(0.121)**	0.152	(0.061)**
ME	-0.874	(0.352)**	-0.793	(0.243)***	-0.238	(0.117)**
MD	-0.210	(0.215)	-0.387	(0.140)***	-0.182	(0.072)**
MA	0.264	(0.255)	0.015	(0.164)	0.147	(0.085)*
MI	0.077	(0.176)	-0.069	(0.114)	-0.056	(0.058)
MN	0.005	(0.177)	-0.071	(0.115)	-0.061	(0.059)
MS	0.126	(0.182)	0.019	(0.121)	0.065	(0.060)
MO	-0.057	(0.170)	-0.472	(0.109)***	-0.066	(0.056)
MT	-0.401	(0.198)**	-0.225	(0.128)*	-0.066	(0.065)
NE	-0.344	(0.168)**	-0.431	(0.109)***	-0.159	(0.056)***
NV	0.293	(0.410)	0.028	(0.277)	0.080	(0.134)
NH	-0.773	(0.341)**	-0.711	(0.232)	-0.318	(0.113)***
NJ	0.789	(0.254)***	0.222	(0.165)	0.520	(0.084)***
NM	-0.314	(0.229)	-0.216	(0.150)	0.164	(0.074)**
NY	-0.323	(0.214)	0.033	(0.142)	-0.132	(0.071)*
NC	0.054	(0.158)	-0.388	(0.103)	0.008	(0.053)
ND	0.418	(0.180)**	0.025	(0.116)	0.097	(0.059)
OH	-0.348	(0.160)**	-0.514	(0.104)***	-0.133	(0.053)**
OK	-0.497	(0.156)***	-0.642	(0.100)***	-0.129	(0.052)**
OR	-0.286	(0.238)	-0.219	(0.158)	0.068	(0.078)
PA	0.390	(0.224)*	0.347	(0.156)**	0.064	(0.074)
RI	-0.835	(0.437)*	-0.792	(0.293)***	-0.116	(0.146)
SC	-0.339	(0.174)*	-0.507	(0.112)***	-0.187	(0.057)***
SD	-0.150	(0.182)	-0.207	(0.118)*	-0.105	(0.060)*
TN	0.012	(0.150)	0.069	(0.099)	-0.020	(0.050)
TX	0.044	(0.133)	-0.329	(0.086)***	0.058	(0.044)
UT	-0.142	(0.363)	-0.160	(0.254)	0.068	(0.120)
VT	-0.068	(0.232)	-0.372	(0.150)**	0.014	(0.077)
VA	-0.324	(0.161)**	-0.521	(0.105)***	-0.018	(0.053)
WA	0.250	(0.219)	-0.095	(0.141)	-0.058	(0.072)
WV	0.219	(0.355)	0.072	(0.272)	0.229	(0.116)**
WI	0.125	(0.173)	-0.101	(0.113)	0.001	(0.058)
WY	-0.768	(0.286)***	-0.290	(0.194)	0.159	(0.093)*

Table 4.12: Wald statistics for farm demographic, crop insurance, yield, revenue, drought and state indicator variables for the SURE program.

Null Hypothesis	Equation	Levels	Per Capita	Per Acre
Log Acres & Num Recip & Log Farm Op. & Log Income = 0	Particip.	479.58***	3369.5***	2894.4***
Log Liability & Log Indemnity & Loss Ratio = 0	Particip.	4.91**	53.02***	2.9*
Jan.-Dec. PDSI = 0	Particip.	1.83	0.66	1.3
%Δ Yields = 0	Particip.	0	0.25	0.1
States Indicators = 0	Particip.	11.67***	9.52***	5.53***
Log Acres & Num Recip & Log Income = 0	Disburse	37.18***	66.49***	239.7***
Log Liability & Log Indemnity & Loss Ratio = 0	Disburse	149.45***	242.98***	436.88***
Jan.-Dec. PDSI = 0	Disburse	2.76*	15.07***	2.51
%Δ Revenue = 0	Disburse	6.1**	9.7***	10.98***
States Indicators = 0	Disburse	0.19	7.24***	0.03

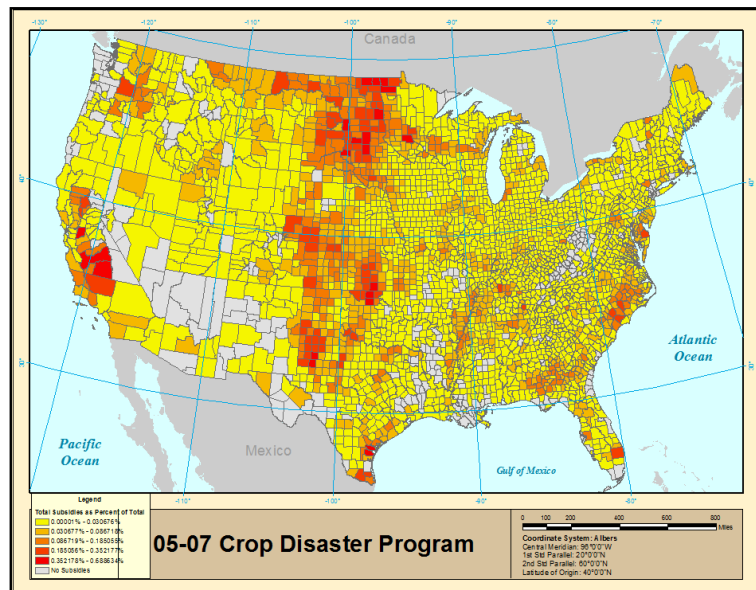


Figure 4.1: Total disbursement of payments under the 2005-2007 Crop Disaster Program.

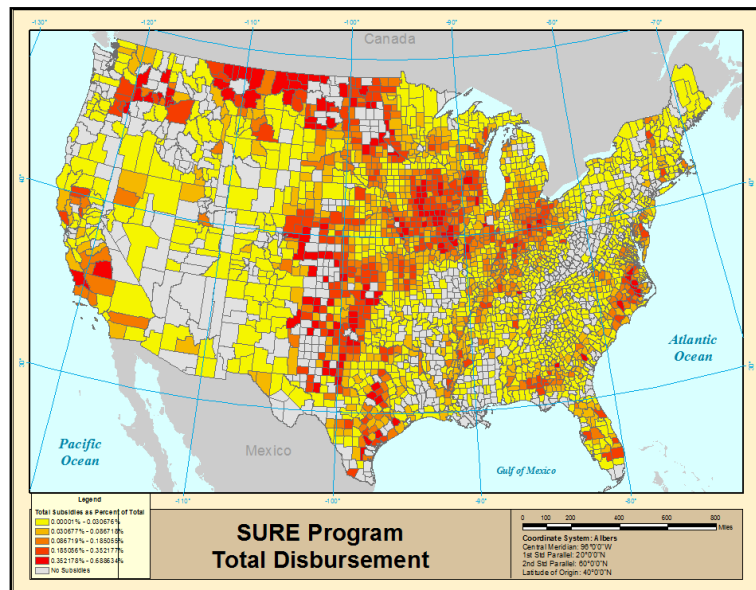


Figure 4.2: Total subsidy disbursement under the SURE program.

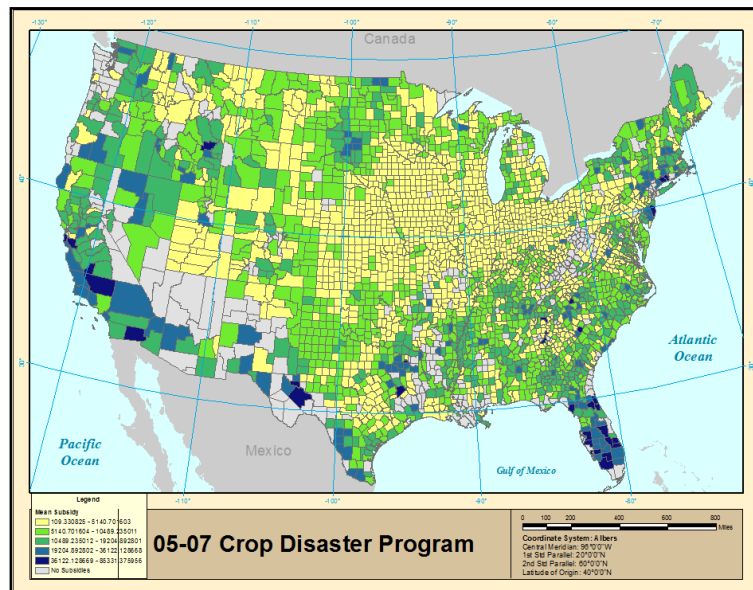


Figure 4.3: Per capita disbursement of payments under the 2005-2007 Crop Disaster Program.

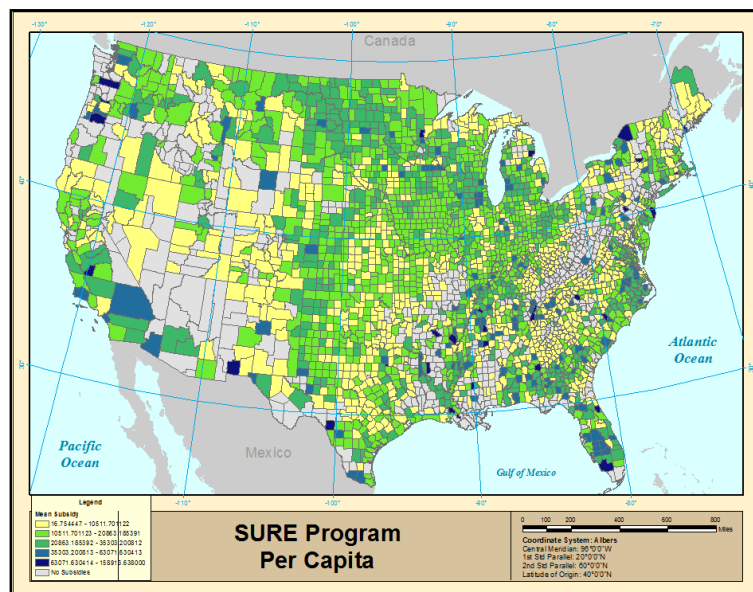


Figure 4.4: Per capita subsidy disbursement under the SURE program.

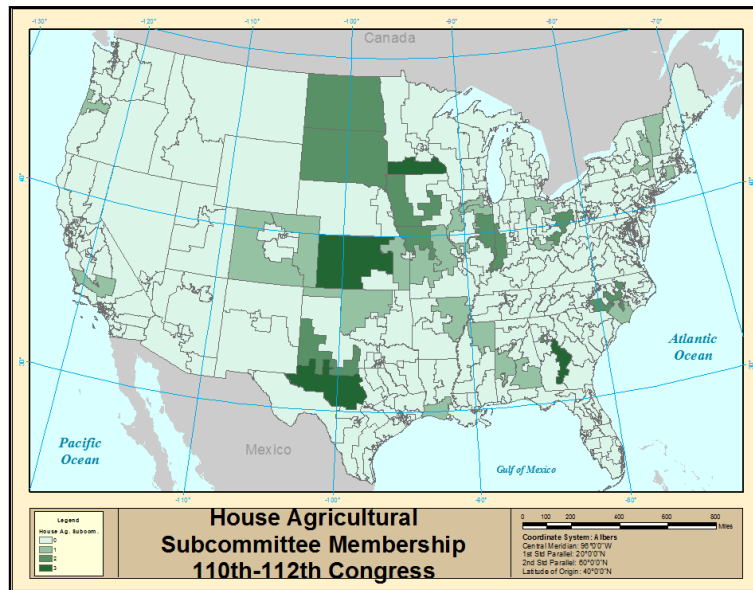


Figure 4.5: Membership on the House Agricultural Subcommittee on General Farm Commodities and Risk Management for the 110th through 112th congresses. This subcommittee oversees FSA programs.

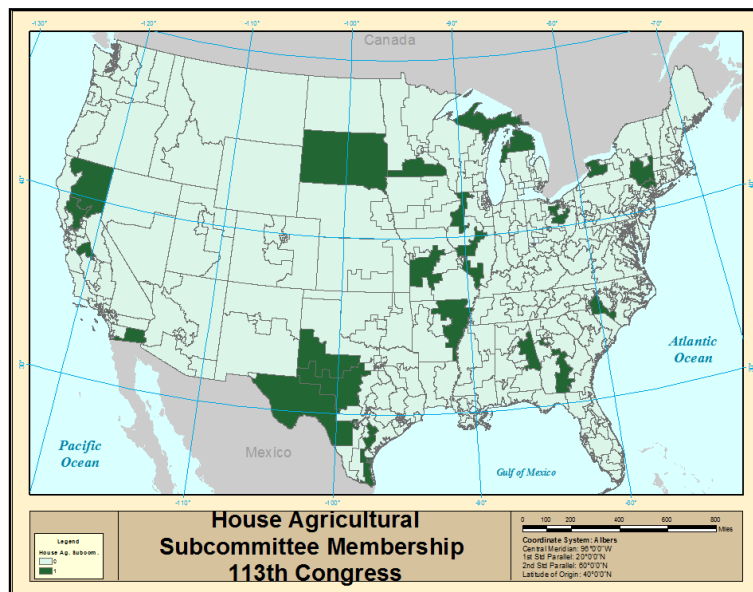


Figure 4.6: Membership on the House Agricultural Subcommittee on General Farm Commodities and Risk Management for the 113th congress. This subcommittee oversees FSA programs.

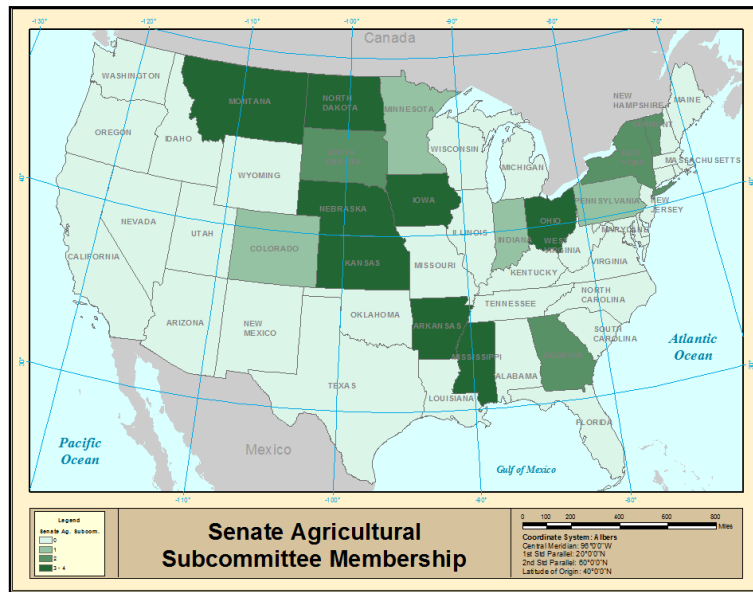


Figure 4.7: Membership on the Senate Agricultural Subcommittee on Commodities, Markets and Trade. This subcommittee oversees FSA programs.

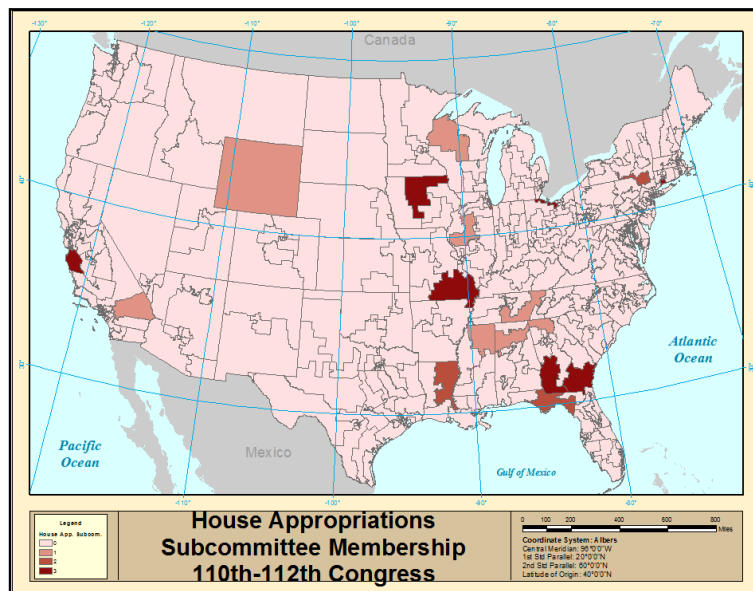


Figure 4.8: Membership on the House Appropriations Subcommittee on Agriculture, Rural Development, Food and Drug Administration and Related Agencies for the 110th through 112th congresses. This subcommittee oversees agricultural appropriations.

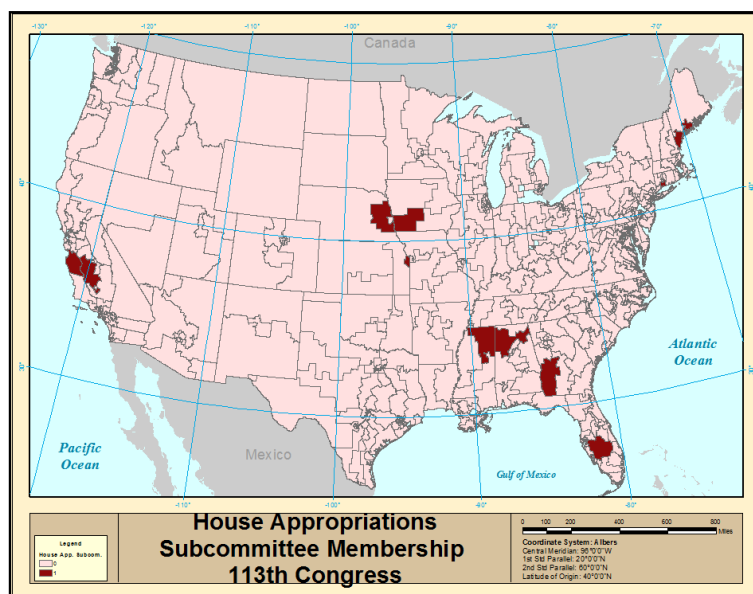


Figure 4.9: Membership on the House Agricultural Subcommittee on Agriculture, Rural Development, Food and Drug Administration and Related Agencies for the 113th congress. This subcommittee oversees agricultural appropriations.

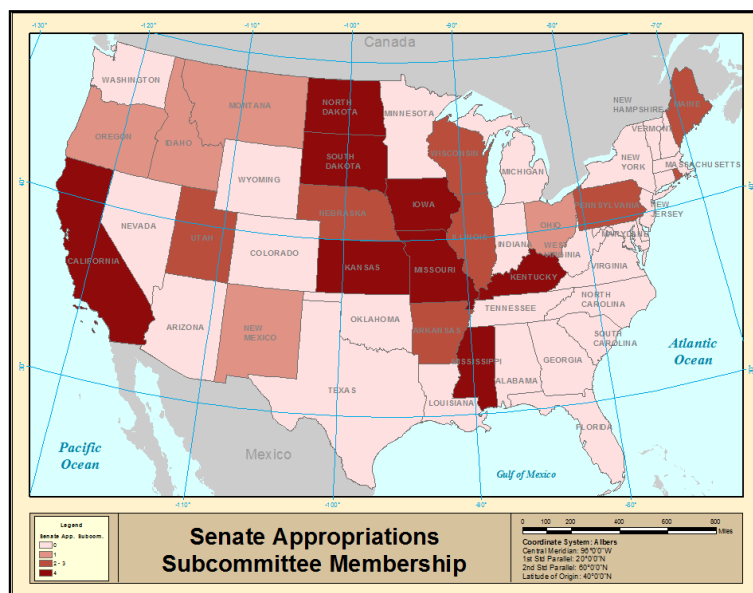


Figure 4.10: Membership on the Senate Agricultural Subcommittee on Agriculture, Rural Development, Food and Drug Administration and Related Agencies. This subcommittee oversees agricultural appropriations.

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