Impact of Extension Education on Kansas Producers' 2014 Farm Bill Enrollment Decisions

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The 2014 Farm Bill offered producers a choice of programs to assist in risk management. Helping producers understand their choices among three programs, all with uncertain payouts determined by different factors, was a sizable challenge to extension economists tasked with providing Farm Bill education. Survey data collected at extension meetings were analyzed, and findings suggest that in-person extension education influences people's decisions, especially with regard to uncertain outcomes like commodity prices, yields, and program payments. The finding that more experienced producers consistently chose one of the programs may have implications for policy impacts that differ across producer demographic groups.

Key words: extension, farm bill, decision, risk management

Introduction

The Agricultural Act of 2014, known as the 2014 Farm Bill, has been characterized by many as one of the most complex pieces of farm policy in recent memory. This sentiment is driven by the Title I section, which requires commodity producers to select one of three programs that act as a safety net for the life of the legislation. Previous farm bills have used different types of programs to assist farmers during periods of low prices or revenue, but there was rarely more than one program available.[1] In addition to making a choice among three programs, uncertainty about the amount of the annual payments producers would receive added complexity, as payment amounts were determined by several factors, including prices, county- or farm-level yields, and limits (in some programs) on payment amounts. Helping producers understand their choices among the three programs, all with uncertain payouts determined by different factors, was a sizeable challenge for the extension economists tasked with providing Farm Bill education.

The legislation was passed in February 2014, program election (the process of picking a program for the life of the Farm Bill) through the Farm Service Agency (FSA) started in November 2014 and ended in April 2015. Extension economists used the period between the final passage of the Farm Bill and the deadline for signing up to fully understand the terms of the programs as written in the legislation, develop educational materials to help producers understand how the programs worked, calculate expected payments, and deliver educational materials to the public. The demand for this information was extremely high because every producer and landowner with FSA-registered "base acres" had to choose their program(s) and enroll with their local FSA office.[2] In Kansas,

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[1] The exception to this was the 2009 Farm Bill, which offered producers two enrollment options. The first was a fixed payment program and the second was the Average Crop Revenue Election (ACRE) program. ACRE program payments were determined by crop-specific revenue, calculated using the state average crop yield and a marketing year average price.

[2] Base acres were first calculated in the mid-1980s using farmer-reported acres and yields for the previous 5-year period and recorded with FSA. There was no requirement that producers continue to plant those crops, giving the farmers production flexibility, but all program payments were tied to the historical crops planted on those acres. This effectively "decoupled" farm production decisions and farm program payments, which helped meet rules negotiated in various trade agreements.

most producers own or operate base acres and were looking for information to help them make informed decisions. Kansas State University's Research and Extension (KSRE) service delivered a wide variety of programs, including 15 educational meetings held across the state in January and February 2015. Surveys were administered to meeting attendees prior to the start of the meeting to find out what programs they were considering enrolling in and learn more about their agricultural operations and perceptions. Surveys were also administered at the end of the meeting to ask whether their program preferences had been altered by the information they received. These pre- and post-event surveys enabled a unique and timely analysis of Farm Bill educational efforts.

We analyzed the survey data using discrete choice models. Results indicate how differences in producer experience, farm size, and farm organization membership affect program selections. Participants were more likely to switch their preferred program if information presented at the meeting altered their payout expectations. These results suggest that education provided by extension economists influences people's decisions, especially about uncertain outcomes like commodity prices, yields, and program payments. Our finding that more experienced producers consistently chose one of the programs may have implications for policy impacts that differ across producer demographic groups.

Farm Bill Program Background

Under the 2014 Farm Bill, landowners made decisions about yield updates and base acre allocations, while producers made program enrollment decisions (U.S. Department of Agriculture, 2014). The decision to update yield history on base acres essentially provides the opportunity to align the commodities that receive program payments with the crops that have actually been grown on the farm in recent years. Producers could not expand their total base under this Farm Bill (base acre updating does not occur in every farm bill). The 2014 Farm Bill sought to align production risks with the risk exposure actually faced on the farm. Another way to approach this decision was to evaluate the expected payments under both current base acre crops and updated base acre crops to determine which would have the highest expected payout under the preferred program. If keeping base acres in commodities that were no longer grown was expected to have a higher payout, then a landowner might opt to keep their old base acre production history. This decision, like that of program enrollment, was influenced by expectations about future prices and yields.

In addition to reporting the crops being grown on base acres, producers also report average yields. The second decision to be made prior to program enrollment was whether to update program yields, which previous farm bill programs have used to calculate payments. As with production history on base acres, yield updating is not allowed under every farm bill.

After the base acre and program yield update decisions were made, producers could decide to enroll in one of three programs: Agricultural Risk Coverage-Individual Level (ARC-IC), Agricultural Risk Coverage-County Level (ARC-CO), and Price Loss Coverage (PLC). The ARC-IC and ARC-CO programs are revenue safety nets for producers based on either their farm's crop yields and a national marketing price (ARC-IC) or county-level crop yields and national marketing year price (ARC-CO). The PLC program is triggered by the national marketing price only and is not connected to yields or production. For all three programs, program payouts are not known until after the crop marketing year is over.[3]

Extension Education Efforts

The common factor across all three programs is that payment calculations depend on events that have not yet occurred. Each year's payment is a function of yield and price outcomes determined by weather and other production and market conditions. For producers to choose the program with the

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[3] For more complete descriptions of each program, see Taylor et al. (2017).

"best" risk protection, they must forecast yield and price outcomes over the 5-year period covered by the 2014 Farm Bill. Perennial volatility in both the markets and production outcomes makes this an onerous task.

The uncertainty of future events underlying an empirical evaluation of the three programs translates into a challenge for extension economists in developing objective and relevant information for producers. While the exact approach to extension material development and delivery varied across states, the educational information available to producers was generally the same. Extension economists first had to explain how the programs work so that producers understood the fundamental differences in programs based on revenue versus price. Second, they had to offer a reasonably objective method for evaluating the programs using farm-specific information and producers' expectations about prices and yields. As Ellison et al. (2017) note, extension economists generally responded to these needs through print media (e.g., bulletins, online posts), in-person or distance technology presentations, and quantitative decision tools for simulating payment outcomes using different price and yield assumptions (e.g., spreadsheets, online calculators).

In Kansas, KSRE offered all three categories of education, including a series of 15 meetings held across the state to describe the programs, explain the fundamental differences, and introduce spreadsheets designed to help producers evaluate their specific information and possible program outcomes. The goal of these meetings was not to give advice on which programs to enroll in but rather to improve producers' understanding of the legislation and how their enrollment choice would depend on their expectations of future events.

Literature Review

A number of previous studies have used surveys to address agricultural producers' preferences for policy alternatives over time (Zulauf, Guither, and Henderson, 1987; Orazem, Otto, and Edelman, 1989; Barkley and Flinchbaugh, 1990; Coble et al., 2002). The challenge of conducting surveys of producers to evaluate national farm policy is that preferred policies tend to vary by crop mix and geographic location. Coble et al. (2002) surveyed producers in four states, choosing the two main crops in each state for analysis. Analyzing 1,800 responses, they estimated a logit model of preferred policy alternatives including deficiency payments, export enhancement programs, crop insurance subsidies, loan rate programs, and disaster payments. Each policy was compared to an alternative, and respondents were asked to rate their level of agreement with various statements. Independent variables included several producer and operation characteristics (e.g., education, income, farm size) and a series of questions evaluating producers' perceptions of price and yield risk, risk aversion measures, and risk from changes in government programs. Key findings from this study include evidence that risk perceptions and recent experiences affect policy preferences. Specifically, producers who perceive changes in government programs to be a source of risk and those who recently experienced a low-income year were more likely to prefer returning to previous programs.

Mitchell et al. (2012) used a survey to analyze farmers' intentions to sign up for the 2009 Average Crop Revenue Election (ACRE) program offered in the 2009 Farm Bill. This program was a precursor to the current ARC-CO program in that payments were triggered when a measure of crop-specific revenue fell below the benchmark revenue level. Unlike the ARC-CO program, which is based on county-level revenues, the ACRE program was based on state-level revenues. Mitchell et al. (2012) conducted a producer survey prior to the sign-up deadline for the ACRE program, asking whether respondents intended to enroll in ACRE for the next 5 years or remain in the direct-payment program. This was the first experience many producers had with a program in which payments were unknown and would be determined by future price and yield outcomes. This uncertainty aspect led many economists to conduct analyses that would determine which types of farmers would likely benefit from each program and, hence, were expected to select it. Most analyses suggested that ACRE would result in a higher total payout, and many land grant university economists recommended enrollment (Mitchell et al., 2012). This was a quite different educational

strategy than the one employed 5 years later for the 2014 Farm Bill, where most economists did not make explicit recommendations about choosing among ARC-IC, ARC-CO, and PLC. Despite the recommendations for ACRE enrollment, only 8% of the farms nationwide enrolled in ACRE, much lower than the educational efforts would have suggested. Mitchell et al. (2012) found evidence that producers' beliefs about prices and yields, as well as risk attitudes, affected their choice of program in which to enroll. It is possible that producers held very strong beliefs about the outcomes of the old, familiar deficiency program but viewed a new program with uncertain outcomes as risky and tended not to choose it.

Data Collection

The KSRE Farm Bill meetings were held in January and February 2015, which gave producers 2–3 months to make their final decisions. The motivation for administering the survey before the meeting began was to better understand who was attending the meetings, where they were getting Farm Bill information, and which programs they were likely to choose prior to hearing the KSRE presentation . An exit survey was also administered to ask whether their preferred program or their expectations for program payments had changed. Across all 15 locations, 869 matched surveys (having both a pre- and post-meeting response) were returned.[4] Table 1 lists summary statistics from these surveys.

Online supplements A and B (available at www.jareonline.org) present the text of the pre- and post-meeting surveys, respectively. This approach of surveying producers before and after Farm Bill education offers a unique opportunity to evaluate the impacts of the KSRE program as well as of producers' beliefs on their stated preferences.

Variables include characteristics of the respondent and the farms they own or operate, characteristics of their risk preferences, and the program in which they planned to enroll both before and after the meeting. On average, respondents had 28.8 years of experience with farming, owning farmland, or managing farmland (*Experience*) and received 74.3% of their income from agricultural activities (*Income*). Respondents were also asked how many agricultural acres they owned (*OwnAcres*) and rent (*RentAcres*), which averaged 1,020 acres and 1,355 acres, respectively.

The timing of the enrollment decision and the amount of information available to producers likely contribute to their decision process. The 2014 Farm Bill was passed in February 2014 and final enrollment occurred in Spring 2015. This lag in timing meant that the first payment under the 2014 Farm Bill, the 2014 crop year payment, would not actually be made until October 2015. As such, the information used to determine the 2014 ARC-CO payments was partially available to producers prior to the enrollment deadline. To assist producers with their enrollment decision, KSRE generated and periodically updated estimates of the 2014 ARC-CO payment using publicly available information.[5] The variable (*KSUPay*) is a county-level estimate of the expected 2014 payment for wheat based on all the information available during the enrollment period. The variable averaged $21.34/acre, and 11.9% of respondents were from counties with no expected payment for 2014 under the ARC-CO program. The date of the meeting they attended was also recorded to determine the number of days in advance of the FSA sign-up deadline they were answering the survey (*Days*), which averaged 71 days. This variable captures some of the uncertainty and information availability (e.g., rule clarifications, marketing year average [MYA] price and yield updates) that was changing over the period in which decisions were being made.

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[4] After removing surveys with missing data, there are 981 matched surveys (which include both a pre- and post-meeting response). The surveys included program options for all three programs (ARC-CO, PLC, and ARC-IC). Only 12.5% of respondents were interested in the ARC-IC program prior to the educational meeting, and 1.6% chose it as their preferred program in the post-meeting survey. This lack of interest in the ARC-IC program was the basis for removing all responses choosing ARC-IC and focusing the quantitative analysis on the choice between ARC-CO and PLC.

[5] The estimated payments were not considered final because some information and rule clarification from FSA still needed to be made. Similar estimates for the remaining years of the Farm Bill were not made, because the necessary information would not be available until later in 2015 or 2016.

Table 1. Summary Statistics

Variable	Definition	Mean	Std. Dev.	Min.	Max.
Dependent variable: Logit model					
ARC-CO	Binary variable = 1 if ARC-CO was preferred program after education, 0 otherwisee	0.74	0.44	0	1
Dependent variables: Multinomial logit model					
ARC-CO_nochange	Binary variable = 1 if ARC-CO was preferred program before and after education, 0 otherwise	0.43	0.49	0	1
PLC_nochange	Binary variable = 1 if PLC was preferred program before and after education, 0 otherwise	0.16	0.37	0	1
ARC-CO_switch	Binary variable = 1 if ARC-CO was the preferred program only after education, 0 otherwise	0.32	0.47	0	1
PLC_switch	Binary variable = 1 if PLC was the preferred program only after education, 0 otherwise	0.09	0.29	0	1
Explanatory variables					
Days	Number of days prior to enrollment deadline educational meeting was attended	70.89	10.11	53	85
Experience	Number of years involved in production agriculture	28.78	15.20	0	68
Income	Percentage of income derived from agriculture	74.32	27.51	0	100
OwnAcres	Number of agricultural acres owned	1,020.04	1,880.37	0	35,000
RentAcres	Number of agricultural acres rented	1,355.66	2,179.32	0	31,000
ACRE2009	Binary variable = 1 if respondent enrolled in ACRE program during previous Farm Bill, 0 otherwise	0.19	0.39	0	1
Coverage	Percentage of crop insurance coverage carried on wheat acres	44.48	36.01	0	100
RiskAttitude	Agreement with statement: "I accept more risk in my farming business than other crop producers." on 5-point scale (1=strongly agree, . . . , 5=strongly disagree)	3.62	1.13	1	5
KSUPay	Kansas State University estimate of 2014 county payment for ARC-CO per acre	21.34	9.82	0	34.76
HighPay	Binary variable = 1 if expected payment from preferred program was higher after attending educational meeting, 0 otherwise	0.26	0.44	0	1
LowPay	Binary variable = 1 if expected payment from preferred program was lower after attending educational meeting, 0 otherwise	0.12	0.32	0	1
Information sources: Categorical variables denoting sources of information on the Farm Bill					
InPerson	Binary variable = 1 if source is in-person meetings	0.73	0.45	0	1
Online	Binary variable = 1 if source is online materials	0.22	0.42	0	1
PrintNews	Binary variable = 1 if source is newspaper or magazine, 0 otherwise	0.56	0.50	0	1
RadioTV	Binary variable = 1 if source is radio or television	0.22	0.41	0	1

Table 1. – continued from previous page

Variable	Definition	Mean	Std. Dev.	Min.	Max.
OtherProd	Binary variable = 1 if source is other producers	0.59	0.49	0	1
OtherSource	Binary variable = 1 if source is from other outlets	0.13	0.34	0	1
Industry membership: Categorical variables denoting membership in various groups					
KFB	Binary variable = 1 if member of Kansas Farm Bureau, 0 otherwise	0.60	0.49	0	1
AFB	Binary variable =1 if member of American Farm Bureau, 0 otherwise	0.05	0.21	0	1
KSCommodity	Binary variable =1 if member of a Kansas commodity group, 0 otherwise	0.19	0.40	0	1
FU	Binary variable =1 if member of Farmers Union, 0 otherwise	0.03	0.18	0	1
OtherMember	Binary variable =1 if member of other organization, 0 otherwise	0.05	0.22	0	1
Risk protection: Categorical variables indicating the program with best risk protection					
ARC-CORisk	Binary variable =1 if selected ARC-CO, 0 otherwise	0.49	0.50	0	1
PLCRisk	Binary variable =1 if selected PLC, 0 otherwise	0.34	0.48	0	1
DkRisk	Binary variable =1 if selected "Don't Know," 0 otherwise	0.17	0.38	0	1
Highest payout: Categorical variables indicating the program with highest annual payout					
ARC-COPay	Binary variable =1 if selected ARC-CO, 0 otherwise	0.53	0.50	0	1
PLCPay	Binary variable =1 if selected PLC, 0 otherwise	0.17	0.38	0	1
DkPay	Binary variable =1 if selected "Don't Know," 0 otherwise	0.29	0.46	0	1

Respondents were asked whether they had enrolled in the ACRE program during the 2009 Farm Bill (*ACRE2009*), and 19.1% of respondents answered positively. This question was asked to determine whether they had firsthand experience with a revenue-based program. The primary difference between ACRE and ARC-CO is the formula used to determine payments. ACRE was based on state, rather than county, yields, but both programs use MYA prices and share uncertainty about future payments.

In an attempt to identify likely sources of information and involvement in the agriculture industry, respondents were asked whether they were members of any prominent farm organizations. A total of 59.6% of respondents were members of the Kansas Farm Bureau (*KFB*), while a further 4.7%, 19.4%, 3.2%, and 5.3% were members of the American Farm Bureau (*AFB*). any of the Kansas commodity groups (*KSCommodity*), the Farmers Union (*FU*), and all other organizations (*OtherMember*), respectively.

Respondents most commonly obtained their information on the 2014 Farm Bill from in-person meetings (*InPerson*) (72.8% of respondents) and from other producers (*OtherProd*) (59.4% of respondents). Other information sources were from magazines and newspapers (*PrintNews*) (56.5%), web-based (*Online*) (22.3%), radio or television (*RadioTV*) (21.5%), and all other sources (*OtherSource*) (13.2%).

Respondents were also asked a series of questions related to risk preferences and expectations. Respondents were asked to list the type, if any, of crop insurance they carried and the coverage

level. From their answers, we created a continuous variable equal to the percentage of coverage (*Coverage*), which had an average value of 44.5%. However, respondents' who purchase crop insurance have an average level of coverage of 73%, while 43% of respondents have no coverage. Questions regarding expected outcomes under the Farm Bill were also asked to gauge the anticipated impact of the program in terms of payments and risk protection. Respondents were asked which program would have the highest payout over the life of the Farm Bill and could choose from ARC-CO (53.2% of respondents), PLC (17.4%), or "Don't know" (29.5%) (*ARC-COPay*, *PLCPay*, *DkPay*). Similarly, respondents selected which program they thought would provide the greatest risk protection (*ARC-CORisk*, *PLCRisk*, *DkRisk*). The majority of respondents (48.7%) chose ARC-CO, followed by PLC (34.4%) and "Don't know" (16.9%).

Respondents were asked a series of questions intended to elicit their risk preferences. Following Franken, Pennings, and Garcia (2014), we composed a set of Likert-scale questions to assess producer risk preferences. The final models presented here use responses regarding the level of agreement with the following statement: "I accept more risk in my farming business than other crop producers." The variable (*RiskAttitude*) is measured on a five-point scale (1 = strongly agree, ..., 5 = strongly disagree) and had an average value of 3.6.

Both pre- and post-meeting survey instruments included a question asking respondents what they expected to receive in dollar per acre annual payments. Possible answers included $0/acre, $1–$30/acre, $31–$60/acre, $61–$90/acre, and >$90 per acre. The amount respondents expected to receive in annual payments is a function of their expectations about prices and yields over the life of the legislation. Information presented during the meeting had the potential to influence those expectations and, therefore, their preferred program. We created two variables from these data to represent changes in expectations after attending the meeting. The first is a binary variable equal to 1 if the respondent their post-meeting choice of expected payment was greater than their pre-meeting choice, and 0 otherwise (*HighPay*). In total, 26.0% of respondents expected higher program payments after attending the meeting. Similarly, the second variable is equal to 1 if their post-meeting choice was lower , and 0 otherwise (*LowPay*). This variable has a value of 11.9%.

Empirical Modeling

The empirical model is based on the theory of planned behavior (Ajzen and Driver, 1991), which posits that individual beliefs generate certain attitudes and behaviors. By including a measure of producers' beliefs about risk protection and the uncertain outcomes of commodity prices and yields, we hoped to explain preferences for different programs. This survey was conducted prior to the sign-up deadline, and we were not able to resurvey producers after the deadline to find out which program they actually selected.[6] However, they had to choose from among three programs with uncertain outcomes, and it is possible that information they obtained from the meetings altered their beliefs and, subsequently, their program preferences.

The survey data collected allow us to empirically model two distinct questions. First, what factors, including risk preferences, expectations of future payouts, and demographics, have a statistically significant impact on the respondents' enrollment decisions? This question is answered by estimating a binary logit model in which the dependent variable is program respondents' stated choices of programs they plan to enroll in after attending the KSRE meeting. Second, what impact, if any, did attending the KSRE meeting have on participants' enrollment decisions? Based on the survey data, 41.0% of respondents changed their preferred program after attending the meeting. To determine what factors may have affected their decision to switch, we estimate a multinomial logit with the dependent variable indicating whether the participant changed their mind about the program they preferred or kept their original, pre-meeting choice. Independent variables in this model are identical to those used in the binary logit model.

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[6] Future research is encouraged to examine observed county-level sign-up behavior, which is publicly available.

Binary Logit Model of Program Choice

The dependent variable of the binary logit choice model is the preferred program each respondent chose for their wheat base acres at the end of the KSRE meeting. A lack of interest in the ARC-IC program for wheat base acres (0.2% of respondents selected this option) motivated us to estimate a binary-choice logit model in which respondents picked either ARC-CO (66.4% of respondents) or PLC (33.4%). The dependent variable (*ARC-CO*) is set equal to 1 if the respondent chose ARC-CO and 0 if they chose PLC. The empirical model is specified as

$$z_i = f\left(Days_t,\ Experience_i,\ Income_i,\ OwnAcres_i,\ RentAcres_i,\ ACRE2009_i,\right.$$

$$Coverage_i,\ RiskAttitude_i,\ KSUPay_c,\ HighPay_i,\ LowPay_i,$$

(1) $$\qquad InPerson_i,\ Online_i,\ PrintNews_i,\ RadioTV_i,\ OtherProd_i,\ OtherSource_i,$$

$$KFB_i,\ AFB_i,\ KSCommodity_i,\ FU_i,\ OtherMember_i,$$

$$\left. ARCCORisk_i,\ PLCRisk_i,\ DkRisk_i,\ ARCCOPay_i\ PLCPay_i,\ DkPay_i\right),$$

where subscript *i* denotes a variable specific to the respondent, subscript *t* denotes a variable specific to one of the 15 meeting locations, and subscript *c* denotes a variable specific to the county in which the respondent lives.

Multinomial Logit Model of Program Choice

The multinomial logit model is specified similarly to the binary logit model presented in equation (1), with the exception of the dependent variables, which are defined based on how respondents answered the question of preferred program in the pre- and post-meeting survey instruments. The surveys asked respondents prior to the meeting which program they would enroll in if the decision were made that day and then again in the exit survey to record any systematic changes in their program preferences that could be attributed to information they received during the meeting. The dependent variables are constructed categorically based on their initial selection, whether they changed their selection, and what program they switched to if they changed their selection. ARC-CO was chosen as the preferred program and remained the preferred program among 43.0% of respondents. Likewise, PLC was preferred both before and after the meeting by 16.0% of respondents. However, some respondents changed their preferred program after the meeting: 32.0% switched their selection from PLC to ARC-CO and 9.0% switched from ARC-CO to PLC. Table 1 provides summary statistics of the various categories of the dependent variable.

Empirical Results

Binary Logit Model

Table 2 contains coefficients and odds ratios of the binary logit model.[7] The dependent variable is to equal to 1 if the producer selected ARC-CO for their wheat base acres, and 0 otherwise. An odds ratio greater than 1 indicates that an increase in the value of a factor increases the probability of the dependent variable (ARC-CO) being selected, while an odds ratio less than 1 indicates an increase in a factor lowers the probability of selecting ARC-CO.

    Being a member of a Kansas commodity groups increases the probability that a producer would select ARC-CO over PLC. Characteristics that decrease the probability of choosing ARC-CO for their wheat base acres, and instead increased the likelihood of selecting PLC, include having more

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[7] The variables discussed in the results section are determined to be statistically significant using the threshold of a 90% confident interval.

Table 2. Logit Regression Model Results ($N = 800$)

Variable	Coefficient	Std. Err.	Marginal Effect	Odds Ratio
Dependent Variable: *ARC-CO*				
Days	-0.013	0.010	-0.002	0.987
Experience	-0.010	0.007	-0.001	0.990
Income	0.003	0.004	0	1.003
OwnAcres	$-6.93E-05$	$4.39E-05$	$-9.25E-06$	1
RentAcres	$-5.22E-05$	$4.23E-05$	$-6.96E-06$	1
ACRE2009	-0.272	0.256	-0.036	0.762
Coverage	-0.002	0.003	$-3.31E-04$	0.998
RiskAttitude	0.01	0.088	0.001	1.01
InPerson	0.228	0.232	0.03	1.256
Online	0.341	0.25	0.045	1.406
PrintNews	-0.168	0.218	-0.022	0.845
RadioTV	0.195	0.262	0.026	1.215
OtherProd	-0.278	0.211	-0.037	0.757
OtherSource	0.257	0.308	0.034	1.293
KFB	-0.148	0.207	-0.02	0.863
AFB	-0.427	0.464	-0.057	0.652
KSCommodity	0.906	0.284	0.121	2.475
FU	-0.151	0.558	-0.02	0.859
OtherMember	0.35	0.473	0.047	1.419
LowPay	0.085	0.329	0.011	1.089
HighPay	0.382	0.243	0.051	1.465
KSUPay	0.014	0.01	0.002	1.015
PLCRisk	-1.543	0.23	-0.224	0.214
DkRisk	-0.86	0.292	-0.109	0.423
PLCPay	-2.612	0.267	-0.452	0.073
DkPay	-1.01	0.247	-0.132	0.364
Constant	3.613	0.948		37.065
Pseudo-R^2	0.246			

years of experience farming and a larger number of owned acres. PLC was also more likely to be chosen if the respondent selected PLC as the program having either the highest level of risk protection or the largest expected annual payout. They also were more likely to enroll in PLC if they stated that they "Didn't know" which program offered the best risk protection or highest payout.[8] Producers' tendency to prefer a program they believed would offer either a higher payout or better risk protection supports planned behavior theory (Ajzen and Driver, 1991) and is consistent with findings by Mitchell et al. (2012).

Multinomial Logit Model

The multinomial logit model is appropriate to analyze the pre- and post-meeting survey data because the program choices faced by producers were not ordered or nested. The base case omitted from the regression is the choice of ARC-CO in both the pre- and post-meeting survey (ARC-CO supporter), which applies to 42.7% of the sample. These respondents did not change their selections and, therefore, either had their beliefs confirmed or were not presented with sufficient reason to switch to another program. The results presented in Table 3 are interpreted relative to this baseline choice.

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[8] According to FSA rules, if no program is selected, the farm will be automatically enrolled in PLC.

Table 3. Multinomial Logit Regression Model Results

Base Case: ARC-CO_nochange	Case 2: PLC Nochange		Case 3: ARC-CO Switch		Case 4: PLC Switch	
	Coefficient	Marginal Effect	Coefficient	Marginal Effect	Coefficient	Marginal Effect
Days	0.036***	0.004	0.013	0.002	−0.013	−0.002
Experience	0.015*	0.001	0.001	-3.284×10^{-4}	0.002	-1.388×10^{-4}
Income	−0.001	-8.610×10^{-5}	0.001	3.904×10^{-4}	−0.004	-3.092×10^{-4}
OwnAcres	9.100×10^{-5}	5.760×10^{-5}	4.150×10^{-5}	1.530×10^{-6}	1.285×10^{-4}*	5.890×10^{-6}
RentAcres	4.340×10^{-5}	1.260×10^{-5}	3.980×10^{-5}	3.030×10^{-6}	1.105×10^{-4}*	5.620×10^{-6}
ACRE2009	0.344	0.041	−0.156	−0.036	−0.055	−0.006
Coverage	0.005	0.001	0.001	2.970×10^{-5}	−0.001	-2.024×10^{-4}
RiskAttitude	−0.029	−0.004	0.014	0.002	0.045	0.003
InPerson	−0.082	0.023	−0.522***	−0.067	−0.915***	−0.047
Online	−0.044	0.033	−0.294	−0.012	−1.575***	−0.097
PrintNews	0.057	0.006	−0.142	−0.031	0.201	0.016
RadioTV	−0.093	0.006	−0.178	−0.014	−0.586	−0.033
OtherProd	0.475*	0.059	−0.188	−0.04	−0.266	−0.022
OtherSource	−0.207	−0.037	0.465*	0.084	0.142	0.002
KFB	0.035	0.012	−0.296	−0.053	0.012	0.007
AFB	1.083**	0.104	0.614	0.091	−0.6	−0.075
KSCommodity	−1.299***	−0.125	−0.11	0.024	−0.266	0.009
FU	0.104	0.042	−0.636	−0.098	−0.694	−0.033
OtherMember	−0.383	−0.042	0.122	0.034	−0.059	1.683×10^{-4}
LowPay	−0.248	−0.047	0.327	0.049	0.64	0.039
HighPay	−0.42	−0.117	1.618***	0.26	1.483***	0.067
KSUPay	−0.009	4.148×10^{-4}	−0.017*	−0.002	−0.043***	−0.002
PLCRisk	1.64***	0.141	0.371*	−0.028	1.837***	0.086
DkRisk	0.966***	0.042	0.896***	0.103	1.654***	0.065
PLCPay	2.688***	0.304	−0.385	−0.226	2.302***	0.155
DkPay	1.251***	0.108	−0.059	−0.066	0.746*	0.034
Constant	−6.015***		−1.168		−1.201	
Pseudo-R^2	0.206					

Notes: Single, double, and triple asterisks (*, **, ***) indicate statistical significance at the 10%, 5%, and less than 1% level, respectively.

Survey respondents who stated their preferred program for wheat base acres was PLC both before and after the meeting (PLC supporter) represent 16.3% of the sample. This group did not change their preferred program, suggesting that the meeting did not significantly alter their beliefs and attitudes regarding the PLC and ARC-CO programs. A producer was more likely to be a persistent PLC supporter if they had more years of experience in agriculture, owned more acres of land, and attended a meeting further out in time from the deadline. Purchasing crop insurance also increased the probability of a respondent being a PLC supporter. Respondents were more likely to be PLC supporters if they were members of the American Farm Bureau but less likely to be PLC supporters if they belonged to a Kansas commodity group. PLC supporters were also more likely to have listed PLC as the program with the most income risk protection and the highest expected annual payout. For the remaining variables in the model, PLC supporters were not statistically different from ARC-CO supporters.

The next two groups comprised producers who switched their preferred program after participating in the meeting. The first group chose ARC-CO in their exit survey (ARC-CO switcher) and represent 31.8% of the sample. Relative to the ARC-CO supporters, respondents were more likely to be ARC-CO switchers if they obtained information on the Farm Bill from sources other than those listed (online, print media, radio/TV, in-person meetings). However, they were less likely to be an ARC-CO switcher if they obtained their information from online sources. ARC-CO switchers were also more likely than ARC-CO supporters to choose either "Don't know" or PLC as having the highest risk protection.

One key difference between the ARC-CO switchers and the ARC-CO supporters is how they responded to the question of expected annual payments from their preferred program. Answers to this question were categorical ranges and respondents who changed the category of their response to a higher value on their post-meeting survey were more likely to be ARC-CO switchers than ARC-CO supporters. This result is consistent with the hypothesis that changing a person's beliefs will change their intentions. It also supported the idea that producers chose programs based on getting the highest payout as much as for risk protection purposes.

The final group is the PLC switchers, 9.2% of the sample. Producers were more likely to be PLC switchers than ARC-CO supporters as the amount farmland they owned or rented increased. PLC switchers were less likely than ARC-CO supporters to get their information from in-person meetings or online sources. Producers were less likely to be PLC switchers if their farms were located in counties with an expected payment from ARC-CO in the first year of the program (2014). PLC switchers were more likely to have chosen either PLC or "Don't know" as both the option with the highest risk protection and the option with the highest annual payout.

As with producers who switched to ARC-CO, PLC switchers were more likely than ARC-CO supporters to have changed their expectations about the level of annual payment they would get from their preferred program. If they selected a higher expected payment category when answering their exit survey, they were more likely to be PLC switchers.

Policy Implications

Several respondent characteristics affected their expected enrollment decisions and may be useful indicators of enrollment preferences when drafting future farm policy. The membership variables included in the model control for several unobservable characteristics of Kansas commodity group members, including (but not limited to) access to different information sources and familiarity with the policy-making process. It is also possible that members of the commodity groups are more active in their industry or have a different philosophy on the role of government programs in providing risk management. Mitchell et al. (2012) found that farm organization membership had statistically significant impacts on ACRE enrollment, suggesting that this characteristic reflects beliefs or attitudes that affect behavior.
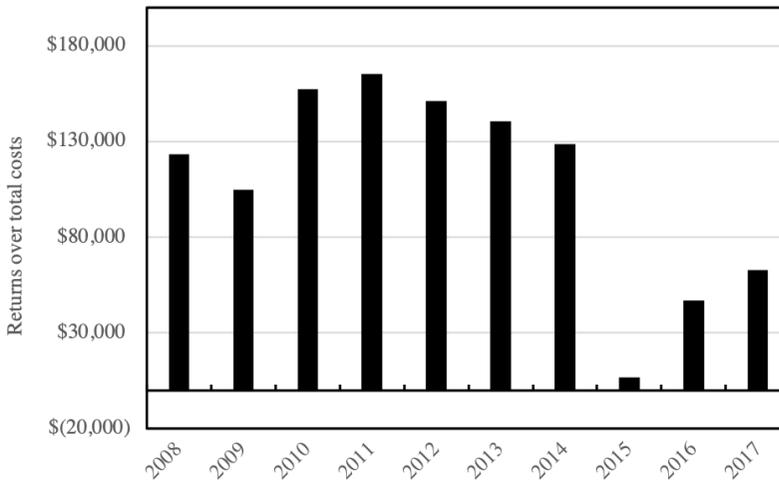
Figure 1. Net Returns ($/Operator) for Non-Irrigated Crop Farms in Kansas

Another characteristic that affects behavior is the impact of producer experience on program selection. Producers with more years of experience in agriculture are more likely to select the PLC program. This may be due to the similarity of the PLC program to the target price programs of previous farm bills. However, it may also be due to their longer horizon of profitability outcomes relative to producers with fewer years of farming experience.

Understanding the impact of years of experience in agriculture on policy preference requires some context for the profitability of farming in Kansas in the years leading up to the enrollment period for the 2014 Farm Bill. Figure 1 shows net returns per farm operator for 2006–2015. Net returns dropped below $100,000 per operator for the first time in 7 years in crop year 2014 (Kansas Farm Management Association, 2016), then fell even more dramatically in the 2015 crop year. With the enrollment deadline occurring in the spring of 2015, most producers had yet to feel the impact of the significantly lower commodity prices that would reduce returns to farming. Instead, their recent experience was primarily high returns due to high commodity prices. The logit and multinomial logit model results indicate that producers with fewer years of experience were more likely to choose ARC-CO, a revenue based program, while producers with more years of experience were more likely to select PLC, which only triggers a payment when prices fall below a reference price. More experienced producers may have preferred PLC because they had more firsthand experience with lower prices than the less experienced producers, who may have weighed their beliefs more heavily toward recent experience. This explanation is similar to the results found in Coble et al. (2002), who found that producers who had low income years were more likely to prefer the old programs than change to new programs. More broadly, this behavior is consistent with loss aversion and reference point aspects of prospect theory in decision making (Barberis, 2013; Bocquého, Jacquet, and Reynaud, 2014; Babcock, 2015). Future research could explore these behavioral aspects in more detail to further explain diverse responses to Farm Bill program alternatives.

Another result of interest from the multinomial logit analysis of changes in program preferences before and after attending a meeting is the impact of the information received on producers' expectations or beliefs. Producers who switched their preferred program, either to ARC-CO or PLC, were more likely to have changed their expectations of the annual payments they were going to receive from these programs. This suggests that extension education has an impact on how producers behave, especially when there is a large amount of uncertainty regarding the potential outcomes. As Mitchell et al. (2012) noted, extension economists did a large amount of analysis and education on the 2009 ACRE program and, in many cases, recommended that producers select that program. However, enrollment in the ACRE program was very low. One key difference between the outcomes

of the 2009 ACRE program and the 2014 Farm Bill program selection was the availability of a known alternative. Even though extension economists recommended the ACRE program, producers had the option to remain with the direct payment program, a relatively well-understood program with more certainty regarding the expected payments. During the 2014 Farm Bill program enrollment, producers were given a choice of three programs, all of which had uncertain outcomes. In this case, the impact of extension economists and their educational efforts in Kansas was significant.

Conclusion

Surveys of pre- and post-educational meeting beliefs are extremely useful to identify the impact of extension education on decision making. In the case of the 2014 Farm Bill, there was such a large amount of uncertainty surrounding the program enrollment decisions facing producers that extension economists were able to help fill an information void that affected how producers viewed their program options. The insights from this analysis can help policy makers who are already beginning to prepare for the next farm bill, which will likely be written during or following a significant downturn in the farm economy. This research suggests that experience will affect producers' beliefs; offering producers a menu of program choices with uncertain outcomes will have implications on program preference.

   This research has also shown that extension economists can have an impact on producers' choices when they are faced with choosing between farm-support programs without full information. Policy makers may need to consider greater funding of formal, targeted extension educational efforts to assist producers.

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Online Supplement A: Pre-Meeting Survey Instrument

2014 Farm Bill Survey Questions

1. Which best describes you?

   (a) _____ landowner (you lease out most of your ag land)

   (b) _____ farmer/rancher (you primarily operate ag land)

   (c) _____ farm manager (you manage land for others)

   (d) _____ lender

   (e) _____ educator

   (f) _____ other, please specify: _____

2. How many total acres of cropland do you own and/or rent?

   (a) Owned land: _____ acres

   (b) Rented land: _____ acres

3. How many years have you been farming, owned farmland, or managed farmland?

   (a) _____ years

4. What percent of your primary source of agricultural income is from crops?

   (a) _____ %

5. Did you sign up for the ACRE program under the 2008 Farm Bill?

   (a) _____ yes

   (b) _____ no

   (c) _____ don't know

6. Have you gathered information about the 2014 Farm Bill programs from any of the following sources, including today's meeting? (Check all that apply)

   (a) _____ in-person meetings

   (b) _____ online videos or webinars

   (c) _____ newspapers or magazines

   (d) _____ radio or television

   (e) _____ talking to other producers

   (f) _____ other, please specify: _____

7. Are you a member of any farm organizations? (Check all that apply)

   (a) _____ Kansas Farm Bureau

   (b) _____ American Farm Bureau

   (c) _____ Kansas commodity groups (corn, wheat, grain sorghum, soybean)

   (d) _____ Farmers Union

   (e) _____ other, please specify: _____

8. Do you own or operate cropland that is registered with the Farm Service Agency (FSA) and has a unique FS farmnumber?

    (a) _____ yes

    (b) _____ no

    (c) _____ don't know

9. How many FSA farms do you own or operate?

    (a) _____ farms

Of these farms, please select your largest (in acres) FSA farm to answer the following questions:

10. What state is your FSA farm located in?

    (a) _____

11. What county is your FSA farm primarily located in?

    (a) _____

12. Which of the following crops have you planted on your FSA farm in the past 5 years? (Select all that apply)

    (a) _____ wheat

    (b) _____ corn

    (c) _____ soybeans

    (d) _____ grain sorghum

    (e) _____ other, please specify: _____

13. On your FSA farm, which of the following crops has the largest number of FSA base acres? (Please select only one)

    (a) _____ wheat

    (b) _____ corn

    (c) _____ soybeans

    (d) _____ grain sorghum

    (e) _____ other, please specify: _____

14. If you rent this farm, what type of lease do you have?

    (a) _____ crop share

    (b) _____ fixed cash rent

    (c) _____ other, please specify: _____

Please answer the following questions for your FSA farm as if you are the sole decision maker:

15. Did you, or are you planning to, update the FSA program yields for any of your base acre crops?

    (a) _____ yes

    (b) _____ no

    (c) _____ don't know

16. Did you, or are you planning to, reallocate the FSA base acres on your farm?

    (a) _____ yes

    (b) _____ no

    (c) _____ don't know

17. If you enrolled today in the farm bill programs, which program(s) would you select for the following commodities on your FSA farm?

	Wheat	Corn	Grain Sorghum	Soybeans
Agricultural Risk Coverage at the Individual Level (ARC-IC)	☐	☐	☐	☐
Agricultural Risk Coverage at the County Level (ARC-CO)	☐	☐	☐	☐
Price Loss Coverage (PLC)	☐	☐	☐	☐
Supplemental Coverage Option (SCO)	☐	☐	☐	☐

18. For the programs you listed in the previous question, what do you expect the annual payouts to be?

    (a) _____ $0 per acre/year

    (b) _____ $1 - $30 per acre/year

    (c) _____ $31 - $60 per acre/year

    (d) _____ $61 - $90 per acre/year

    (e) _____ more than $90 per acre/year

19. Please rate your agreement with these statements (circle one number for each statement)

	Strongly Agree		$\longleftrightarrow$		Strongly Disagree	Don't Know
I usually like "playing it safe" (for instance, "locking in a price") instead of taking risks for market prices of my crops.	1	2	3	4	5	*
When selling/marketing my crops, I prefer financial certainty to financial uncertainty.	1	2	3	4	5	*
When selling/marketing my crops, I am willing to take higher financial risks in order to realize higher average returns.	1	2	3	4	5	*
I like taking financial risks with my farming business.	1	2	3	4	5	*
I accept more risk in my farming business than other crop producers.	1	2	3	4	5	*
With respect to the conduct of business, I dislike risk.	1	2	3	4	5	*

20. Did you buy crop insurance for the 2014-2015 season? If yes, please check the type and fill in the percentage of coverage:

	Wheat	Corn	Grain Sorghum	Soybeans
Revenue Protection	☐	☐	☐	☐
Yield Protection	☐	☐	☐	☐
Revenue Protection-Harvest Price Exclusion	☐	☐	☐	☐
% of Coverage				

Online Supplement B: Post-Meeting Survey Instrument

2014 Farm Bill Survey Questions

Please answer the following questions for your largest (in acres) FSA farm as if you are the sole decision maker.

1. If you signed up today for the farm bill programs, which program(s) would you select for the followingcommodities on your FSA farm:

	Wheat	Corn	Grain Sorghum	Soybeans
Agricultural Risk Coverage at the Individual Level (ARC-IC)	☐	☐	☐	☐
Agricultural Risk Coverage at the County Level (ARC-CO)	☐	☐	☐	☐
Price Loss Coverage (PLC)	☐	☐	☐	☐
Supplemental Coverage Option (SCO)	☐	☐	☐	☐

2. For the programs you listed in the previous question, what do you expect the annual payouts to be?

    (a) _____ $0 per acre/year

    (b) _____ $1 - $30 per acre/year

    (c) _____ $31 - $60 per acre/year

    (d) _____ $61 - $90 per acre/year

    (e) _____ more than $90 per acre/year

The following questions help us to better understand your outlook on farming and government programs. Even if you are not sure, please give us your best guess.

3. Which program do you think will have the highest total payout across the next five years?

    (a) _____ Agricultural Risk Coverage at the Individual Level (ARC-IC)

    (b) _____ Agricultural Risk Coverage at the County Level (ARC-CO)

    (c) _____ Price Loss Coverage (PLC)

    (d) _____ don't know

4. Which program do you think offers the most income risk protection for your farm over the next five years?

    (a) _____ Agricultural Risk Coverage at the Individual Level (ARC-IC)

    (b) _____ Agricultural Risk Coverage at the County Level (ARC-CO)

    (c) _____ Price Loss Coverage (PLC)

    (d) _____ don't know

5. What do you expect commodity prices to do in the next five years?

    (a) _____ increase from current prices

    (b) _____ decrease from current prices

    (c) _____ stay about the same as current prices

    (d) _____ don't know

6. What do you expect yields in your county to do over the next five years?

    (a) _____ increase from historic yields

    (b) _____ decrease from historic yields

    (c) _____ stay about the same as historic yields

    (d) _____ don't know

7. What do you expect your farm's yields to be over the next five years as compared to the county average?

    (a) _____ my farm's yields will be above the county average

    (b) _____ my farm's yields will be below the county average

    (c) _____ my farm yield will have about the same as the county average

    (d) _____ don't know

8. How much do you value the information you received from the meeting today?

    (a) _____ not valuable at all

    (b) _____ somewhat valuable

    (c) _____ valuable

    (d) _____ very valuable

9. List the most important thing(s) you learned during today's meeting: _____

10. Please share any other comments you have about the facility, materials, speakers, or anything else you would like us to know: _____