

Measuring Levels of Loyalty for Large U.S. Agricultural Producers

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Introduction

Measuring a customer's loyalty to a certain business is a complex undertaking faced by agribusiness managers. A multitude of dynamic factors can impact a customer's decision to remain loyal—in any capacity—to a certain firm. Furthermore, few metrics are available for measuring loyalty. For agricultural input suppliers, the consolidation of farms has meant that agribusinesses have fewer customers who are accounting for a larger share of sales. As such, a metric for identifying the depth of large farmers' loyal relationships can help agribusinesses to create value by cultivating loyalty.

The objective of this research is to identify and measure different levels of loyalty to input brands among large agricultural crop producers in the United States.

Demographic information of these producers will help to identify characteristics of loyal customers at specific depths of loyalty. Econometric analysis will be used to evaluate relationships between different types of large producers and their indicated buying characteristics across different input brands.

Previous research in regards to large agricultural producer loyalty focused extensively on customer segmentation related to the importance of balance, convenience, performance, and price in various aspects of the farmer's buying decision (Gloy & Akridge, 1999). This work has been expanded upon to include service buyers, who fall into the traditional relationship buyer segment along with convenience buyers (Alexander, Wilson, & Foley, 2005). Additionally, Alexander, Wilson, and Foley (2005) and Gloy and Akridge (1999) examined attitudinal brand loyalty on a 5-point Likert scale in their analyses and found producers to be most loyal to expendable items such as seed, crop protection, and fertilizer. However, agribusinesses value not just attitudinal loyalty,

but seek to further measure the depth of their customers' loyalty for future investments in customer relationships. Thus, a method to evaluate the depth of customer loyalty was warranted.

The foundation for the structure of this question was based off of Narayandas' concept of the Loyalty Ladder (2005). The Loyalty Ladder assesses the levels of loyalty displayed in a business-to-business relationship. It accounts for levels of loyalty by segmenting different customer behaviors exhibited in the relationship and ranking them in an ordered fashion based on successively higher levels of loyalty, akin to rungs on a ladder, Figure 1.



Figure 1 The Loyalty Ladder, adapted from Narayandas, 2005.

Methods

Data

Data for this research comes from the 2013 Large Commercial Producer (LCP) survey. The purpose of this survey was to determine buying preferences, market segments, producer demographics, and information collection processes of large agricultural producers. Farms with greater than \$100,000 in gross farm sales were targeted.

Seven commodity groups were targeted: dairy, beef cattle, hogs, corn/soybean, wheat/barley/small grains, cotton, and fruits, nuts, and vegetables. Respondents from the states that accounted for 75% of total United States production were targeted for the specific commodity. For this analysis, only producers reporting crop acreages were considered.

Survey Design

For this analysis, eight levels were used to measure stated and revealed loyalty behaviors. At the lowest level, large farmers were asked if “(A) I will do more business with this brand.” At the next level on the ladder, farmers were asked if “(B) I endorse this brand to my neighbors.”

Loyalty strengthens when customers begin to pay premiums or forego savings opportunities as shown in the questions for the next levels: “(C) I try products other than this brand,” “(D) I would switch to another brand for a 5% savings,” and “(E) I would switch to another brand for a 10% savings.” These three levels were then reversed coded for survey design/readability purposes to enhance respondent accuracy¹.

¹ This is to say that the data has been coded so all the results reflect a measure of loyalty. For example, results report those loyal when given the opportunity to try other brands, switch for a 5% price savings opportunity, or switch for a 10% price savings opportunity.

Loyalty reaches the highest levels when customers provide collaboration and investment in the company, as revealed in the questions “(F) I would help this brand’s company develop new products and services,” and “(G) I would invest in this brand’s company.” At these levels, a large farm customer’s resources are invested into an input brand with the belief that these more valued relationships will help a large farm’s operation to maximize its potential value (Narayandas, 2005). The higher levels of loyalty are more difficult to obtain. While fewer customers report loyalty activity at higher levels, these levels reflect the value of the company to the customer.

The final level in the question sequence was a direct statement of loyalty, “(H) I am loyal to this brand.” This question provided a base with which to compare the seven questions above. These processes were repeated for seed, crop protection, fertilizer, and capital equipment buyer groups.

Probit Analysis

To analyze the binary responses of producers throughout the Ladder in relation to certain producer variables, probit analyses were used to determine the probability of the selection of a certain level of loyalty in a specific category as a function of producer demographics. However, in a probit analysis, it is only the direction of the effect of the variables that can be interpreted from the resulting probit regression coefficients, not the probability of the effect (Wooldridge, 2009). Thus, the magnitude of the effect is found by taking the partial derivative of the response probability with respect to the explanatory variables being tested.

For this analysis, probit regressions and marginal effects were calculated in STATA (StataCorp, 2011) to determine the direction of the probability of likelihood of

loyalty to a certain category at a specific level. The categories that were each regressed include purchases of seed, crop protection, fertilizer, and capital equipment. Following the calculations of the probit coefficient estimates, marginal effects were calculated to determine the magnitude of the probability of loyalty.

The dependent variable for all regression series was the binary response to each question in the Ladder for a given category. Independent variables included years of education, age, and gross farm sales. Gross farm sales were scaled by a factor of \$1,000. Dummy variables were created to be independent variables for location. With the Northeastern census region as the base group, the South, Midwest, and West census regions were used to examine any geographical effects among the independent variables that may impact large producer loyalty. The role of the respondent was constructed as a dummy variable, with the primary farm decision maker role being the base group to independent variables other family member respondent, spouse respondent, and non-family member respondent. Total acreage of crop production was included, scaled to a factor of 100 acres. Additionally, the amount of custom work hired out was of interest and independent variables for the amount of custom fertilizer application, crop protection application, seeding, and harvesting were used.

Results

Loyalty to Seed Brands

The first category observed was loyalty to seed brands. Table 1 shows the average marginal effects and standard errors of the changes in the response probabilities given a 1% increase in the explanatory variable at each rung of the Loyalty Ladder and their

respective standard errors. As producers increased their use of custom hired fertilizer application services by 1%, there was an 18.28% (1% significance) probability they would state being loyal to their seed brand. Producers using 1% more custom fertilizer application services also reported increasing positive probabilities up the Ladder for loyalty to their seed brands at the continued business (7.22%, 10% significance), endorsement (8.19%, 10% significance), and 5% savings (9.31%, 1% significance) levels.

As producers reported a 1% increase in gross farm sales per \$1,000, the probability they would show loyalty to their seed brands was positive at the 5% savings (0.002%, 5% significance), 10% savings (0.002%, 10% significance), and product development collaboration (0.002%, 5% significance) levels of the Ladder. Thus, resisting savings incentives from competitors and collaborating to develop new products results in a 0.002% probability for positive loyalty as sales in increments of \$1,000 increase by 1%.

As survey respondents reported being a spouse relative to the primary decision maker, they stated a positive probability of loyalty (14.78%, 1% significance) to their seed brands when asked if they were loyal or not. This positive likelihood of loyalty to seed brands for spouses relative to the primary decision maker held true at the continued business (9.53%, 1% significance) and endorsement (15.88, 1% significance) levels of the Ladder. However, at the use one brand exclusively (-10.5%, 5% significance), 5% (-16.48%, 1% significance), and 10% savings (-13.71%, 5% significance) levels, the probabilities of spouses being loyal to seed brands relative to primary decision makers became negative. These results suggest that spouses may be more focused on the price

and performance of seed inputs as opposed to the brand name of the seed. Table 1 shows the results of the Ladder marginal effects on seed brand loyalty.

Loyalty to Crop Protection Brands

The second category observed was loyalty to the crop protection brands. Table 2 shows the average changes in the response probabilities given a 1% increase in the corresponding explanatory variable. Producers stated there was a 0.3% likelihood they would be loyal to crop protection brands as their age increased by 1% when asked directly if they were loyal to their crop protection brands. As reported age increased by 1%, there was a positive probability that the average respondent would report loyalty to crop protection brands at the 5% savings (0.35%, 1% significance) and 10% savings (0.32%, 5% significance) levels of the ladder. Thus, as the age of a producer increased, the producer showed a higher likelihood for loyalty to crop protection brands despite savings offers from other crop protection brands.

When asked directly if they were loyal, spouse respondents reported a 28.14% (1% significance) positive probability for loyalty to crop protection brands, relative to the primary farm decision maker respondents. Indeed, at the continued business level, spouses reported a 20.44% (1% significance) probability of being loyal to crop protection brands, as well as a 30.75% (1% significance) probability of loyalty at the endorsement level of the Ladder. However, at the 5% savings level, spouses had a -9.77% likelihood of being loyal to crop protection brands relative to the primary decision maker.

Location relative to the Northeastern census region played a major role in the probability of producers being loyal to crop protection brands. Southern (22.65%, 10% significance), Midwestern (21.68%, 5% significance), and Western (25.15%, 5%

significance) producers stated a positive likelihood of being loyal to their crop protection brands relative to Northeastern producers. This claim held true, especially at the higher levels of the Ladder. At the product development collaboration level, Southern producers reported a 22.22% (5% significance) likelihood for being loyal to crop protection brands, while Western producers reported a 23.78% (significance) likelihood. Probabilities for loyalty to crop protection brands were highest at the investment level for Midwestern (25.58%, 1% significance), Western (34.06%, 5% significance), and especially Southern (40.24%, 5% significance) producers in comparison to Northeastern producers. Table 2 depicts the marginal effects of the Loyalty Ladder on crop protection brand loyalty.

Loyalty to Fertilizer Brands

The third category observed was loyalty to fertilizer brands. Table 3 shows the average marginal effects of fertilizer brand loyalty for the changes in response probabilities given a 1% increase in an explanatory variable, which will be described in further detail below.

As producers increase their use of custom fertilizer application services by 1%, there was a positive likelihood they reported loyalty to fertilizer brands at the continued business (13.52%, 1% significance), use one brand exclusively (16.92%, 1% significance), and 5% savings (11.16%, 5% significance) levels of the Ladder.

Overall, higher amounts of education amongst producers decreased the probability of being loyal to fertilizer brands. As education levels increased by 1%, producers reported there was a 2.69% chance they were not loyal to their fertilizer brands when asked directly if they were loyal to fertilizer brands. On the Ladder, a 1% increase in education resulted in a -1.85% loyalty probability (1% significance) at the continued

business level, a -2.45% loyalty probability (1% significance) at the endorsement level, and a -1.27% loyalty probability (10% significance) at the product development collaboration level. This finding suggests that as producers report higher education, they are less likely to be loyal to their fertilizer brands.

In comparison to the primary decision maker, there was a 29.94% probability (1% significance) that spouses would claim they were loyal to fertilizer brands when asked directly if they were loyal. At the continued business and endorsement levels, on average spouses reported a 25.36% (1% significance) and 35% (1% significance) likelihood, respectively, for being loyal to fertilizer brands. At the use one brand exclusively level, there was a -17.63% probability, indicating spouses had a negative likelihood for fertilizer brand loyalty at this level. However, at the highest levels of the ladder, product development collaboration and investment, spouses had a 13.36% (5% significance) and 8.51% (10% significance) likelihood, respectively, they were loyal to fertilizer brands.

Geographic location played a major role in the depth of loyalty for fertilizer brands, particularly for Midwestern producers relative to Northeastern producers. Midwestern producers were 18.21% (10% significance), 15.10% (10% significance), 24.10% (1% significance), and 14% (10% significance) more likely to report being loyal to fertilizer brands at the endorsement, 10% savings, product development collaboration, and investment levels of the Ladder, respectively, than Northeastern producers. Southern producers and Western producers had positive probabilities of 20.59% (10% significance) and 21.02% (10% significance), respectively, for fertilizer brands when asked if they were loyal to fertilizer brands. At the product development collaboration, both groups had strong probabilities of loyalty: Southern producers had a probability of

29.39% (1% significance) and Western producers had a probability of 27.25% (5% significance) of being loyal at this level, relative to Northeastern producers.

Loyalty to Capital Equipment Brands

The final category observed was loyalty to capital equipment brands. Table 4 illustrates the average changes in the response probabilities given a 1% increase in the corresponding explanatory variables for each level of the Loyalty Ladder.

Of particular interest for this set of results were the marginal effects of the custom services utilized by the producers, due to the relationship between such activities and their capital equipment requirements. As producers reported increasing their use of custom fertilizer application services (less of their own equipment) by 1%, they reported positive probabilities of loyalty to capital equipment brands at the endorsement (10.02%, 5% significance) and use one brand exclusively (10.74%, 5% significance) levels of the Ladder.

By contrast, use of custom application for crop protection services and custom harvesting had the opposite effect on capital equipment loyalty. As large producers increased their use of custom crop protection application services by 1%, they reported negative probabilities for capital equipment brand loyalty at the continued business (-9.13%, 5% significance), use one brand exclusively (-12.6%, 5% significance), 10% savings (-9.3%, 10% significance), product development collaboration (-13.47%, 1% significance), and investment (-10.19%, 5% significance) levels of the Ladder. Similarly, as producers increased their use of custom harvesting services by 1%, there were negative probabilities for loyalty to capital equipment brands at the 10% savings (-13.35%, 10% significance) and product development collaboration (-12.94%, 10% significance) levels.

If a respondent reported being a spouse, relative to a primary decision maker, there was a 13.78% likelihood the respondent would state they were loyal when directly asked if they were loyal to capital equipment brands. At the continued business (12.81%, 1% significance) and endorsement (20.29%, 1% significance) levels of the Ladder, there were positive probabilities that the spouse was loyal to capital equipment brands relative to the primary decision maker on average. However, at the use one brand exclusively (-0.1631, 1% significance) and 5% cost savings (-0.1482, 1% significance) levels, the probability spouses would report loyalty to capital equipment brands, relative to primary decision makers, became negative. This is consistent with previous findings among the crop input brand categories in which spouses claim loyalty and were indeed loyal at the first two levels of the Ladder, but changed their probabilities for capital equipment brand loyalty at the higher levels of the Ladder. Table 4 further illustrates the significant marginal effects for the Ladder regressions with regards to loyalty towards capital equipment brands, given a 1% change in the independent variables.

Conclusions

This research applies the Loyalty Ladder structure (Narayandas, 2005) to the behaviors of large agricultural producers to measure levels of loyalty to agribusiness input suppliers.

This research highlights the fact loyalty is more complicated than simply evaluating levels of depth and is often not as predictable, nor as consistent, as one might expect.

Agribusinesses should consider the differences in farm types and managerial styles when marketing similar products to customers. Age and living in the West had negative implications for loyalty to seed brands, while these same factors indicated

positive likelihood of loyalty for crop protection brands. Even within categories, loyalty was not consistent. This was most prominently shown in spouses across where, at some levels, the factors indicated a positive likelihood for loyalty while at other levels, a negative likelihood. This impacts the business relationships agribusinesses have with their current customers, as well as future customers, as it further emphasizes the need for customized services for specific producer segments. Overall, variability was one of the main constants throughout these research findings.

Further research will be needed in the future to determine the role spouses and their views play in the decision-making processes of a large farming operation. Furthermore, agribusiness representatives should ensure the value and performance of their products and/or services are communicated not only to the primary decision maker, but to all members of the operation's management team. This is of increased importance as the age of farm operators increases and new management teams transition into on-farm decision-making roles.

The use of hired custom services can also play a significant role in loyal attitudes towards brands, particularly those of capital equipment. As producers used less of their own equipment for fertilizer application (hired more custom fertilizer application services), they became more loyal to their capital equipment brands. In contrast, crop producers who used more of their own equipment for applying crop protection and harvesting (lower uses of custom crop protection application and harvesting services) indicated more loyalty to capital equipment brands. This creates an interesting challenge for capital equipment dealers: dealers may need to reexamine their loyalty programs to account for the use of off-farm customer services.

This analysis only calculated the probability of a producer selecting loyalty at a certain level, not the probability of moving up (or down) to a new level of loyalty. Further research should consider a survey design that could be reconstructed such that producers would only select the maximum behavior they would be most likely to select. With such a design, ordered probits could be used and likelihood of switching between levels could be observed more accurately. This would allow agribusiness managers to value the cost-benefit tradeoffs to agribusinesses for investing in activities to increase customer loyalty by measuring the costs between the levels. Furthermore, additional evaluation of the ordering of the levels could be performed to tailor the depths of loyalty to agricultural producers' purchasing decisions more optimally.

Table 1. Marginal Effects of Probit Regressions for Loyalty to Seed Brands

Independent Variables	Continued Business	Endorsement	Use One Brand Exclusively	5% Savings	10% Savings	Product Development Collaboration	Investment	I am Loyal
Total Acres (per 100 acres) Farmed	-0.000008 (0.0006)	-0.0003 (0.0008)	-0.0029*** (0.0011)	-0.00005 (0.0006)	-0.0006 (0.0009)	0.0005 (0.0008)	0.0010 (0.0008)	0.0007 (0.0008)
Custom Fertilizer Services Hired	0.0722* (0.0369)	0.0819* (0.0428)	0.0523 (0.0441)	0.0931*** (0.0348)	0.0517 (0.0405)	0.0610 (0.0454)	0.0601 (0.0425)	0.1828*** (0.0459)
Custom Crop Protection Services Hired	-0.0461 (0.0386)	-0.0975** (0.0450)	-0.0629 (0.0466)	-0.0523 (0.0362)	0.0105 (0.0476)	-0.0311 (0.0480)	-0.585 (0.0454)	-0.0657 (0.0486)
Custom Seeding Services Hired	0.0410 (0.0706)	-0.0101 (0.0826)	-0.0122 (0.0882)	-0.0822 (0.0614)	-0.1530* (0.0885)	-0.0865 (0.0896)	0.0021 (0.0870)	0.0182 (0.0908)
Custom Harvesting Services Hired	-0.0371 (0.0537)	-0.0913 (0.0637)	-0.0537 (0.0678)	-0.0281 (0.0493)	-0.0675 (0.0680)	-0.0364 (0.0691)	-0.0738 (0.0674)	-0.1265* (0.0704)
Years of Education	0.0000 (0.0058)	-0.0091 (0.0068)	-0.0097 (0.0071)	0.0042 (0.0054)	-0.0169** (0.0072)	-0.0019 (0.0073)	0.0095 (0.0069)	-0.0127* (0.0073)
Age	-0.0020* (0.0011)	-0.0015 (0.0012)	0.0013 (0.0013)	0.0002 (0.0010)	-0.0016 (0.0013)	-0.0014 (0.0013)	-0.0023* (0.0012)	0.0012 (0.0013)
Gross Farm Sales (per \$1,000)	0.000004 (0.00001)	-0.00002 (0.00001)	0.00002 (0.00001)	0.00002** (0.00001)	0.00002* (0.00001)	0.00002** (0.00001)	0.000001 (0.00001)	-0.00002 (0.00001)
Other Family Member Respondent	-0.0573 (0.0799)	-0.0425 (0.0891)	0.0353 (0.0907)	0.0213 (0.0654)	-0.0481 (0.0913)	0.0943 (0.0919)	0.0942 (0.0923)	0.0635 (0.0910)
Spouse Respondent	0.0953*** (0.0357)	0.1588*** (0.0426)	-0.1050** (0.0502)	-0.1648*** (0.0501)	-0.1371** (0.0541)	0.0767 (0.0536)	-0.0319 (0.0503)	0.1478*** (0.0524)
Non-Family Member Respondent	-0.3301** (0.1678)	-0.1778 (0.1674)	-0.1790 (0.1407)	-0.1370 (0.1542)	-0.0087 (0.1657)	-0.0291 (0.1716)	-0.2178* (0.1145)	0.3201*** (0.1087)
South	-0.0906 (0.0924)	-0.0116 (0.0892)	-0.0835 (0.0857)	-0.1346 (0.0903)	-0.1092 (0.0937)	0.0924 (0.0936)	0.1385 (0.1027)	-0.0760 (0.0941)
Midwest	-0.0643 (0.0695)	-0.0415 (0.0806)	-0.0684 (0.0860)	-0.0236 (0.0641)	-0.0289 (0.0863)	0.0823 (0.0886)	0.1220 (0.0836)	0.0322 (0.0881)
West	-0.1731* (0.1000)	-0.0717 (0.0929)	-0.0213 (0.0901)	-0.0937 (0.0862)	-0.0580 (0.0942)	0.0476 (0.0952)	0.0132 (0.0982)	-0.1789* (0.0917)
N	1,172	1,172	1,172	1,172	1,172	1,172	1,172	1,172
Pseudo R-Squared	0.0249	0.0237	0.0148	0.0492	0.0226	0.0146	0.0232	0.0481

Statistical significance at the 10%, 5%, and 1% level denoted by *, **, and ***, respectively.

Table 2. Marginal Effects of Probit Regressions for Loyalty to Crop Protection Brands

Independent Variables	Continued Business	Endorsement	Use One Brand Exclusively	5% Savings	10% Savings	Product Development Collaboration	Investment	I am Loyal
Total Acres (per 100 acres) Farmed	-0.0005 (0.0008)	-0.0013 (0.0009)	-0.0032*** (0.0011)	-0.0008 (0.0007)	-0.0022** (0.0010)	-0.0003 (0.0008)	0.0010 (0.0006)	0.0004 (0.0008)
Custom Fertilizer Services Hired	0.0458 (0.0445)	0.0171 (0.0477)	0.0513 (0.0470)	0.0028 (0.0427)	-0.0097 (0.0466)	0.0134 (0.0466)	-0.0267 (0.0388)	0.1051** (0.0457)
Custom Crop Protection Services Hired	-0.0029 (0.0474)	0.0137 (0.0505)	0.0228 (0.0470)	0.0459 (0.0457)	0.0323 (0.0493)	-0.1293*** (0.0500)	0.0169 (0.0416)	-0.0589 (0.0487)
Custom Seeding Services Hired	-0.0387 (0.0871)	-0.0775 (0.0928)	-0.1042 (0.0919)	-0.0170 (0.0833)	-0.1861** (0.0911)	0.0842 (0.0905)	-0.0002 (0.0741)	0.0145 (0.0893)
Custom Harvesting Services Hired	0.0237 (0.0661)	0.0334 (0.0703)	0.1191 (0.0694)	0.0149 (0.0626)	0.1228* (0.0685)	-0.0138 (0.0687)	0.0317 (0.0562)	-0.0344 (0.0675)
Years of Education	-0.0077 (0.0071)	-0.0218*** (0.0076)	-0.0028 (0.0075)	-0.0023 (0.0068)	-0.0159** (0.0074)	-0.0065 (0.0074)	0.0062 (0.0062)	-0.0210*** (0.0073)
Age	-0.0009 (0.0013)	0.0001 (0.0014)	-0.0003 (0.0014)	0.0035*** (0.0012)	0.0032** (0.0014)	-0.0004 (0.0013)	-0.0017 (0.0011)	0.0030** (0.0013)
Gross Farm Sales (per \$1,000)	-0.000008 (0.00001)	-0.00002 (0.00001)	0.000008 (0.00001)	0.00002** (0.00001)	0.000008 (0.00001)	0.00001 (0.00001)	-0.000003 (0.00001)	-0.00003** (0.00001)
Other Family Member Respondent	0.0198 (0.0921)	0.1493 (0.0948)	0.0311 (0.1001)	0.0014 (0.0915)	-0.1069 (0.0919)	0.0856 (0.1005)	0.0024 (0.0817)	0.0621 (0.0999)
Spouse Respondent	0.2044*** (0.0426)	0.3075*** (0.0483)	-0.0551 (0.0561)	-0.0977* (0.0554)	-0.0385 (0.0556)	0.0753 (0.0571)	0.0747 (0.0514)	0.2814*** (0.0567)
Non-Family Member Respondent	-0.2256 (0.1627)	-0.1678 (0.1594)	-0.2506* (0.1344)	-0.1864 (0.1605)	-0.1688 (0.1440)	-0.0204 (0.1589)	-0.0330 (0.1258)	0.2264 (0.1582)
South	0.0504 (0.0907)	0.0674 (0.1028)	-0.1354 (0.0946)	0.0342 (0.0853)	0.0683 (0.1043)	0.2222** (0.1043)	0.4024** (0.1718)	0.2265* (0.1189)
Midwest	0.0844 (0.0909)	0.0364 (0.0966)	-0.0921 (0.0952)	0.1160 (0.0877)	0.1470 (0.0901)	0.1338 (0.0951)	0.2558*** (0.0917)	0.2168** (0.0936)
West	0.0669 (0.0875)	0.0992 (0.0995)	-0.1308 (0.0937)	0.0280 (0.0845)	0.0834 (0.1019)	0.2378** (0.1018)	0.3406** (0.1711)	0.2515** (0.1155)
N	1,080	1,080	1,080	1,080	1,080	1,080	1,080	1,080
Pseudo R-Squared	0.1088	0.0378	0.0183	0.0209	0.0237	0.0162	0.0180	0.0457

Statistical significance at the 10%, 5%, and 1% level denoted by *, **, and ***, respectively.

Table 3. Marginal Effects of Probit Regressions for Loyalty to Fertilizer Brands

Independent Variables	Continued Business	Endorsement	Use One Brand Exclusively	5% Savings	10% Savings	Product Development Collaboration	Investment	I Am Loyal
Total Acres (per 100 acres) Farmed	-0.0006 (0.0020)	-0.0013 (0.0009)	-0.0005 (0.0009)	0.00009 (0.0008)	-0.0011 (0.0009)	-0.0006 (0.0008)	0.0027 (0.0022)	0.0004 (0.0008)
Custom Fertilizer Services Hired	0.1352*** (0.0454)	-0.0554 (0.0472)	0.1692*** (0.0468)	0.1116** (0.0452)	0.0313 (0.0439)	-0.0476 (0.0448)	-0.0273 (0.0378)	0.0569 (0.0444)
Custom Crop Protection Services Hired	-0.0527 (0.0481)	0.0249 (0.0500)	-0.0566 (0.0497)	-0.0177 (0.0481)	-0.0060 (0.0465)	-0.0416 (0.0479)	0.0281 (0.0399)	0.0030 (0.0472)
Custom Seeding Services Hired	-0.1080 (0.0884)	-0.1520* (0.0915)	-0.0574 (0.0905)	-0.1156 (0.0880)	-0.1526* (0.0874)	0.0284 (0.0872)	-0.0423 (0.0738)	-0.0623 (0.0885)
Custom Harvesting Services Hired	0.0775 (0.0662)	0.0948 (0.0678)	-0.0977 (0.0675)	0.0308 (0.0657)	0.0468 (0.0635)	0.0042 (0.0645)	0.0058 (0.0541)	-0.0600 (0.0655)
Years of Education	-0.0185*** (0.0071)	-0.0245*** (0.0074)	-0.0011 (0.0074)	-0.0015 (0.0071)	-0.0100 (0.0070)	-0.0127* (0.0072)	0.0023 (0.0060)	-0.0269*** (0.0071)
Age	0.0020 (0.0013)	0.0020 (0.0014)	0.0000 (0.0013)	0.0042*** (0.0013)	0.0036*** (0.0013)	-0.0009 (0.0013)	-0.0017 (0.0011)	0.0034*** (0.0013)
Gross Farm Sales (per \$1,000)	-0.00003 (0.00003)	-0.00002 (0.00001)	0.00001 (0.00001)	-0.000006 (0.00001)	0.000005 (0.00001)	0.000007 (0.00001)	-0.00008** (0.00004)	-0.00003** (0.00001)
Other Family Member Respondent	0.0954 (0.0831)	-0.0030 (0.0961)	-0.0003 (0.0962)	0.0659 (0.0887)	-0.1062 (0.0809)	0.1597* (0.0953)	-0.0293 (0.0743)	0.0704 (0.0946)
Spouse Respondent	0.2536*** (0.0397)	0.3500*** (0.0484)	-0.1763*** (0.0533)	-0.0706 (0.0547)	-0.0009 (0.0522)	0.1336** (0.0548)	0.0851* (0.0491)	0.2994*** (0.0550)
Non-Family Member Respondent	0.0686 (0.1615)	0.2599 (0.1657)	-0.1175 (0.1759)	-0.1966 (0.1778)	-0.0393 (0.1678)	0.0361 (0.1789)	0.0513 (0.1584)	0.2755 (0.1740)
South	0.0313 (0.0917)	0.1640 (0.1031)	-0.0905 (0.1005)	0.0468 (0.0923)	0.0776 (0.1067)	0.2939*** (0.1113)	0.1467 (0.1178)	0.2059* (0.1191)
Midwest	0.0924 (0.0917)	0.1821* (0.0933)	0.0129 (0.0951)	0.1120 (0.0912)	0.1510* (0.0887)	0.2410*** (0.0918)	0.1400* (0.0790)	0.2285** (0.0911)
West	0.0709 (0.0893)	0.1478 (0.1021)	-0.0498 (0.0992)	0.0698 (0.0892)	0.1088 (0.1053)	0.2725** (0.1110)	0.1426 (0.1143)	0.2102* (0.1169)
N	1,135	1,135	1,135	1,135	1,135	1,135	1,135	1,135
Pseudo R-Squared	0.0371	0.0532	0.0289	0.0199	0.0182	0.0155	0.0128	0.0599

Statistical significance at the 10%, 5%, and 1% level denoted by *, **, and ***, respectively.

Table 4. Marginal Effects of Probit Regressions for Loyalty to Capital Equipment Brands

Independent Variables	Continued Business	Endorsement	Use One Brand Exclusively	5% Savings	10% Savings	Product Development Collaboration	Investment	I Am Loyal
Total Acres (per 100 acres) Farmed	0.0003 (0.0007)	-0.0018** (0.0008)	-0.0007 (0.0008)	0.0002 (0.0007)	-0.0004 (0.0008)	0.0003 (0.0008)	0.0006 (0.0008)	0.0010 (0.0008)
Custom Fertilizer Services Hired	0.1002** (0.0437)	0.0209 (0.0459)	0.1074** (0.0474)	0.0466 (0.0392)	0.0336 (0.0473)	0.0515 (0.0471)	0.0538 (0.0453)	0.1118** (0.0470)
Custom Crop Protection Services Hired	-0.0913** (0.0460)	-0.0633 (0.0490)	-0.1260** (0.0503)	-0.0590 (0.0411)	-0.0930* (0.0501)	-0.1347*** (0.0504)	-0.1019** (0.0486)	-0.1095** (0.0499)
Custom Seeding Services Hired	0.0580 (0.0872)	-0.0717 (0.0933)	-0.0318 (0.0961)	0.0053 (0.0763)	-0.0262 (0.0969)	0.1554 (0.0963)	0.0038 (0.0938)	0.0353 (0.0947)
Custom Harvesting Services Hired	-0.0841 (0.0618)	-0.0675 (0.0666)	-0.0710 (0.0682)	-0.0062 (0.0554)	-0.1335* (0.0686)	-0.1294* (0.0693)	-0.0309 (0.0667)	-0.1553** (0.0673)
Years of Education	-0.0015 (0.0069)	-0.0048 (0.0073)	-0.0009 (0.0075)	0.0035 (0.0061)	-0.0125* (0.0075)	-0.0016 (0.0075)	0.0062 (0.0072)	-0.0153** (0.0074)
Age	0.0004 (0.0012)	0.0003 (0.0013)	-0.0004 (0.0013)	0.0017 (0.0011)	0.0003 (0.0013)	-0.0015 (0.0013)	-0.0016 (0.0013)	0.0016 (0.0013)
Sales (per \$1,000)	-0.000003 (0.00001)	-0.000007 (0.00001)	0.00001 (0.00001)	0.00001 (0.00001)	0.00002* (0.00001)	0.000005 (0.00001)	-0.000008 (0.00001)	-0.000007 (0.00001)
Other Family	0.0127 (0.0860)	-0.0982 (0.0959)	-0.0789 (0.0952)	0.0349 (0.0742)	-0.0566 (0.0960)	0.1329 (0.0931)	0.0216 (0.0929)	0.0414 (0.0920)
Spouse	0.1281*** (0.0451)	0.2029*** (0.0473)	-0.1631*** (0.0556)	-0.1482*** (0.0540)	-0.0885 (0.0573)	0.0840 (0.0569)	-0.0370 (0.0541)	0.1378*** (0.0526)
Non-Family	-0.1599 (0.2046)	-0.0465 (0.2034)	0.1446 (0.1965)	-0.0942 (0.1895)	-0.0043 (0.2082)	-0.1250 (0.2001)	-0.1977 (0.1607)	-0.1678 (0.2103)
South	0.0092 (0.0864)	0.0729 (0.0899)	0.0060 (0.0982)	0.0247 (0.0724)	0.0140 (0.0982)	0.0551 (0.0993)	0.0256 (0.0965)	0.0656 (0.0930)
Midwest	0.0570 (0.0831)	0.0811 (0.0889)	0.0149 (0.0916)	0.0762 (0.0752)	0.0570 (0.0917)	0.0541 (0.0918)	0.0138 (0.0884)	0.1327 (0.0906)
West	0.0909 (0.0769)	0.0948 (0.0873)	0.0602 (0.0954)	0.0504 (0.0678)	0.2078 (0.0964)	0.0466 (0.0978)	-0.0407 (0.0913)	0.0618 (0.0920)
N	1,102	1,102	1,102	1,102	1,102	1,102	1,102	1,102
Pseudo R-Squared	0.0149	0.0210	0.0175	0.0179	0.0177	0.0141	0.0113	0.0301

Statistical significance at the 10%, 5%, and 1% level denoted by *, **, and ***, respectively.

REFERENCES

- Alexander, C. E., Wilson, C. A., & Foley, D. H. (2005). Agricultural Market Segments: Who Is Buying What? *Journal of Agribusiness*, 23(2), 113-132.
- Gloy, B. A., & Akridge, J. T. (1999). Segmenting the Commercial Producer Marketplace for Agricultural Inputs. *International Food and Agribusiness Review*, 2(2), 145-163.
- Narayandas, D. (2005, September). Building Loyalty in Business Markets. *Harvard Business Review*, pp. 1-9.
- StataCorp. (2011). Stata Statistical Software: Release 12. College Station, TX, Texas: StataCorp LP.
- Wooldridge, J. M. (2009). *Introductory Econometrics: A Modern Approach* (4th Edition ed.). Mason, OH: South-Western Cengage Learning.