

## Assessing Agricultural Input Brand Loyalty Among U.S. Mid-Size and Commercial Producers

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**ABSTRACT:** This study explores the prevalence and determinants of brand loyalty for agricultural input products. Results suggest that loyalty for both expendable and capital inputs is high among commercial farmers. Farmer attitudes, beliefs, and some demographic characteristics are useful identifiers of brand loyal farmers.

**Keywords:** brand loyalty, capital inputs, expendable inputs, farmer purchase decisions

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# **ASSESSING AGRICULTURAL INPUT BRAND LOYALTY AMONG U.S. MID-SIZE AND COMMERCIAL PRODUCERS**

## **Introduction**

U. S. agricultural input suppliers currently face unique marketing challenges. For many agribusiness input suppliers, large commercial farm enterprises have replaced traditional smaller farms as their primary customers. Understanding relationship dynamics in this emerging market environment is becoming more important.

In many instances, smaller farms behave like retail consumers. Relatively speaking, they wield little individual market power. On the other hand, larger farms have the ability to interact with input and output markets in a more business-like manner, taking advantage of powers of negotiation, economies of scale, and increased market access. As a result, the relationship between agribusinesses and their commercial farm customers is much different from that between agricultural firms and those operations that fit the historical farm profile.

This research adopts the key assumption that the market interaction between commercial agricultural producers and input suppliers is similar to that observed in a non-farm business-to-business (B2B) environment. With this assumption in mind, and given the changing structure of the U.S. agricultural sector, this study explores the importance of brand loyalty for U.S. agricultural input suppliers.

In this study, brand loyalty is the commitment of a customer to choose to purchase a preferred branded agricultural product or service now and in the future, despite situational changes and marketing efforts that may have the potential to cause switching behavior. Brand loyalty should prove important to agricultural input firms

because the literature suggests loyalty is prevalent among large businesses in general, the literature indicates loyalty is common among farm enterprises, and because loyalty has been found to be a determinant of, or at least correlated with, farm purchase decisions. This suggests that commercial farmer customers of agricultural input suppliers may exhibit similar behavior. Marketing programs that encourage brand loyalty and that are aimed appropriately at these producers are likely to be very effective.

### **Research Problem and Objectives**

The market environment in which agricultural input suppliers operate is characterized by the following dynamics: 1) an evolving customer base resulting from structural change in the agricultural sector (increased concentration leading to fewer farmer customers managing larger commercial farms), 2) continued consolidation within the agricultural input supply sector itself, 3) rapid technological advancements that allow for the frequent introduction of new products/techniques each year, and 4) a relatively high incidence of loyalty to input suppliers as well as to input brands. These market dynamics can present marketing challenges for agribusinesses that supply inputs.

By maintaining their relevancy, by satisfying their customers, and by understanding that their customers also behave like agribusinesses, input suppliers can overcome market challenges. One important strategy employed by these firms is the development of a strong brand for their products. Here, agricultural input suppliers face the problem of understanding the underlying determinants of brand loyalty and identifying effective marketing strategies to reach brand loyal customers. This research is aimed at helping agribusiness managers address these important issues.

The objective of this paper is to assess the nature of brand loyalty for capital and expendable inputs among commercial agricultural producers in the United States. Specifically, the study seeks to: 1) determine and define who among U.S. commercial agricultural producers is brand loyal, and 2) offer insights to input suppliers or agribusinesses seeking to meet business objectives through effective branding.

### **Literature Review**

The dissemination of research covering farmers' purchase decisions has largely been limited to extension publications, working papers, and a few theses from various universities. Many of these papers focus only on major farm machinery purchases, and very few specifically focus on the importance of brands and brand loyalty. Most public research in this area is quite dated. However, a number of these publications do provide insight on the importance of brand loyalty on input purchase decisions and provide a basis for this study's analysis.

### Research in Agriculture

An early study published by Kohls et. al. (1957) focused on the selection of farm machinery brands and dealers among rural farm customers. Within Central Indiana, a representative county was selected and 201 farmers were interviewed. The input choices available to the study's participants included 25 independent machinery dealers who handled at least ten major brands of farm machinery and a number of minor brands. Tractor purchases were excluded from the survey.

The study uncovered links between socioeconomic factors and brand preferences. An increase in farm income was found to correspond with being less loyal towards

branded machinery inputs. Older and more experienced farmers were found to exhibit fewer preferences towards brands. Loyalty tended to increase with a farmer's exposure to radio, television, and printed materials. Producers who reported that they perceived greater differences among available dealers also tended to have higher brand preferences. Finally, brand loyal producers were found to spend less time shopping for machinery.

In terms of journal publications dealing with brand loyalty for agricultural inputs, Kohl's research represented the exception. During the 1950's and 1960's, studies that addressed brand loyalty in agriculture were primarily conducted by researchers in the Midwest and Canada. The results of these studies were typically released through extension education departments or were contained within a Master's or Ph.D. thesis. The bulk of these publications were reviewed and summarized by Funk (1972).

Funk's monograph brought together the results from thirty-seven different studies. The following are some major findings of studies Funk summarized which relate specifically to brand loyalty:

- 1) Funk (1971): Illinois farmers have an 80% probability of purchasing the same feed brand in their next purchase, thus exhibiting a very high degree of brand loyalty.
- 2) Gifford (1956): For machinery, 26% of Indiana farmers were found to be highly brand loyal (60% or more of farm equipment is one brand), 39% were found to be medium brand loyal (40-59% of equipment consists of one brand), and 35% were found to be low brand loyal (less than 40% of inventory is one brand). In addition, Gifford found that high brand loyalty is more often associated with more expensive machinery. Brand loyalty is positively associated with having less farming experience, being younger, the availability of information, and gross income.

- 3) Storey (1958): This study complemented Gifford's and used the same analysis for determining the degree of machinery brand loyalty. He found that 48% of farmers were highly loyal, 33% were medium loyal, and 19% exhibited a low degree of loyalty. The difference was found to be due to Storey only using the last five machinery purchases, and that loyalty at any given time is higher than when compared to the entire time period of machinery inventory accumulation. He also found that middle-aged farmers had higher dealer loyalty than their counterparts, loyalty decreased along with farming experience, and farmers with medium and low dealer loyalty tended to make a greater use of information sources.
- 4) Rocke (1965): Brand loyalty was found to be determined by farm size, gross income, age, and education. Smaller farmers with lower gross income, younger farmers, and less educated farmers tended to be highly brand loyal.

The studies summarized by Funk (1972) were completed primarily in the 1950's and 1960's, with the exception of Funk (1971). The farmers observed in these studies more than likely are not representative of the farmers today in terms of size and structure of farming operation. Nonetheless, the results obtained aid in establishing likely directions for this research.

Funk and Tarte (1978) examined the farmer decision process for purchasing broiler feed. Data for their paper were obtained from interviews conducted with 100 Ontario broiler producers. Chi-square analyses were used to reveal the interaction between brand loyalty and farm and farmer characteristics. Key findings were: 1) farmers who report higher profit expectations are likely to be non-loyal, 2) farmers who

engage in a greater amount of search activities are likely to switch feed brands more often, 3) younger (less than 45 years old) and less-experienced (10 years or less) chicken producers are more likely to be non-loyal.

An extension publication (Funk and Vincent, 1978) sought to understand the product and company attributes that corn farmers use when evaluating a purchase for corn herbicides. Brand loyalty over a seven-year period was analyzed (1970-1976) because during this time frame four major brands (Astrex, Bladex, Lasso, and Sutan) were available to the Ontario corn farmers. Brand loyalty was defined as the extent to which farmers change brands and/or herbicide treatments from one year to the next. A change occurs when a brand is either added or removed from a farmer's chemical weed control program from one year to the next. One-fifth of the sample made no changes during the observation period. Fifty-eight percent made one or two changes, and another twenty-three percent made three or more changes. Farmers who were loyal to corn herbicide brands were found to experience low failure rates, perceived differences among brands, did not engage in many search activities for information, had smaller farms, were older, and had been farming for a longer period of time.

Foxall (1979) conducted a study on farmers' tractor purchase decisions. Using responses from a questionnaire completed by 55 Northern England farmers, he found that over 41% of the sample reported "previous ownership" as their source of initial information about a recently purchased farm tractor. Foxall observed that these responses indicated a high level of satisfaction with the brand purchased and subsequent brand loyalty. Farmers in his survey exhibited relatively little search behavior. A major conclusion that can be drawn is that a brand represents an "information package" which

acts to decrease the amount of time any particular farm manager must spend searching for information about an input which meets his demands.

### **Conceptual Model**

A conceptual model of brand loyalty (figure 1) is developed based on the review of the literature. The model proposed incorporates variables found to influence brand loyalty as well as variables of current interest (discussed below).

Historically, brand loyal farmer customers could be grouped based on demographic characteristics such as age, income, farm size, and education. Depending on the study, income negatively (Kohls et. al., 1957; Rocke, 1965) or positively (Gifford, 1956) impacted brand loyalty. Generally, it appears that age (also a proxy for farming experience or years farming) positively impacts expendable input brand loyalty (Funk and Tarte, 1976; Funk and Vincent, 1978; Funk and Tarte, 1978), but negatively impacts capital input brand loyalty (Gifford, 1956; Kohls et. al., 1957). In the three studies that reported the impact of farm size and education, both variables appear to negatively impact brand loyalty (Rocke, 1965; Funk and Vincent, 1978).

Other demographic variables that might be important are geographic location and type of commodity produced. Within the United States, there is a concentration of specific production in particular regions. For example, corn and soybeans are prevalent in the Corn Belt states, while cotton production tends to be concentrated in warmer and Southern states. Inputs required for production by corn farmers differ from those of livestock or cotton producers. Thus, differences among purchase decisions may lead to differences in observed loyalty.



The issue of the relevance of demographic variables has recently been raised because of the evolving nature and structure of U.S. agriculture, changes in buyer and seller dynamics, and changes in behavioral and attitudinal characteristics of farmer customers. Farm size and income are reaching unprecedented levels, advanced education is much more easily accessible, and individuals are farming longer. Farm and farmer demographic characteristics may continue to play a role in predicting brand loyalty, but their role may not be as prominent as observed in the past. Further, the effect that these farm and farmer demographic characteristics may have on brand loyalty may differ from that observed previously.

Brand loyal farmers can also be characterized by their actions. For instance, those farmers who are willing to engage in search activities (for alternatives, lower prices, etc.) may be less likely to be brand loyal if the situation with their current brand has led them to search for alternatives. In previous studies, search activity consistently negatively impacted brand loyalty for expendable as well as capital inputs (Funk and Tarte, 1978; Funk and Vincent, 1978; Foxall, 1979; Kool, et. al., 1997). The amount of time spent shopping for a capital input product is also negatively associated with loyalty (Kohls et. al., 1957). Managing risk and having a risk management plan in place can be an indication of an unfavorable attitude towards risk and should be positively associated with brand loyalty. Past studies found that having an unfavorable attitude towards risk increases the incidence of brand loyalty for expendable inputs (Funk and Tarte, 1976; Funk and Vincent, 1978). Also, if it is found that brand loyal producers more often search the Internet for information or alternatives, then the web can be used as an effective tool for communication, advertisements, orders, and the like.

Planned growth in farm size over the last two decades has created much interest in the purchase decisions of these farms. On the one hand, growth expectations can coincide with an increased focus on reducing costs, which could reduce interest in brands. Alternatively, as farm size increases, so does the value of a manager's time and making purchases based on brand name may reduce the time spent shopping. Because of these two opposing effects, no assumptions are made concerning the effect expected growth has on brand loyalty. In short, observing what farmers do or plan to do can be important when trying to predict loyalty.

Farmer attitudes and beliefs can often indicate brand loyalty. Producers who have higher profit expectations are less likely to be brand loyal (Funk and Tarte, 1976; Funk and Vincent, 1978). This is plausible if, as farm size increases, farm managers focus more on cost minimization rather than on brands. Also, if time is perceived to be valuable, then producers who think that shopping or purchasing inputs is time consuming will more likely be brand loyal given that brands act as a signal for past experience and performance.

Other variables that capture farmer perceptions and attitudes might include opinions about farming and the environment and the expressed willingness to try new technologies. The ability to relate to customers means that agribusiness must in a meaningful sense know and understand their customers. It is important to know what their customers value and in a sense support or validate their values. For instance, if customers are particularly concerned about the environment and are brand loyal, a business can exploit that opportunity when developing products that are environmentally friendly. Further, if farmers hold particular opinions about their managerial ability or the

quality of information provided by suppliers, agribusinesses can cater to these concerns (product or not) through information services, meetings, etc. to meet the needs of their customers. For new product introductions, having a frame of reference about those producers who are likely to try the new products could prove useful for marketing programs. Early adopters may be more willing to take on the risk of trying a new products or techniques and thus may be less inclined to be loyal to brands. Conversely, if brands convey information about quality, then early adopters may be more brand loyal.

Product characteristics and/or favorable product experiences impact brand loyalty. Quality and service (Funk and Tarte, 1976), and performance (Funk and Vincent, 1978) have been shown to impact loyalty. Perceived brand differences often encourage brand loyalty (Funk and Tarte, 1976; Funk and Vincent, 1978; Kohls et. al., 1957). For expendable inputs, cost (price) negatively impacts loyalty (Kool, et. al., 1997), while for capital inputs, price positively impacts loyalty (Gifford, 1956). It is expected that quality, service, perceived brand differences, and input price should continue to have similar impacts on brand loyalty.

Farm managers operate in an age where media exposure is very high and the use of electronic devices for production, information, and other management activities continues to rise. There is much research covering the impact of advertising and media exposure on purchase behavior and general brand loyalty. Media exposure may prove to be an effective avenue for creating brand loyal customers and for enhancing relationships in agricultural markets. Research has shown that loyalty tends to increase with a farmer's exposure to radio, television, and printed materials (Kohls, et. al., 1957).

## **Data and Methodology**

Data for the study were obtained from the 2003 Commercial Producer Project conducted by the Center for Food and Agricultural Business (CAB) at Purdue University. The survey was mailed to, e-mailed to, or conducted over the phone with a total of 14,301 producers across the United States during February 2003, and specifically targeted midsize and large commercial producers with annual gross sales in at least one enterprise of \$100,000 or more. The database of producers was obtained from Farm Journal, Inc. Data used in this study covered six crop and livestock enterprise classes including corn/soybeans, wheat/barley/canola, cotton, dairy, swine, and beef. Over 2,100 surveys were returned, representing a response rate of 15%.

Of particular interest to this study are farmer responses to statements (discussed below) concerning their own perceived loyalty to purchasing branded capital and expendable products. Information also was collected on farm and farmer characteristics, buying preferences, attitudes and behaviors, and management plans and activities.

Survey respondents were asked to respond to the following statements:

- I consider myself loyal to the brands of expendable items I buy, and
- I consider myself loyal to the brands of capital items I buy.

Producers responded to these statements using a 5-point Likert scale.

Respondents indicated that they: 1) strongly disagreed, 2) disagreed, 3) neither disagreed nor agreed (undecided), 4) agreed, or 5) strongly agreed with each statement. Responses to each statement represent a discrete variable with five response categories.

Responses to the brand loyalty statements are collapsed into two categories. Strongly agree and agree responses are treated as one response. Strongly disagreeing,

disagreeing, and neither agreeing nor disagreeing comprise the second (reference) category. This classification allows for a dependent variable with two discrete response categories. The binomial logistic model (BLM) is ideal for estimating and testing hypothesized relationships. Separate models are estimated for each dependent variable (as represented by the two statements of interest). The model is specified as follows:

Let the chosen dependent variable measuring loyalty have J categories, with the running index  $j=0, \dots, J$  (in the case of the BLM,  $J=1$ ). Let  $p(y_i = j)$  be the probability that individual  $i$  falls into category  $j$ . The model is then

$$p(y = j) = \frac{e^{\beta_j x_i}}{1 + \sum_{k=1}^J e^{\beta_k x_i}} \quad \text{For } j = 1, 2, \dots, J$$

$$p(y = 0) = \frac{1}{1 + \sum_{k=1}^J e^{\beta_k x_i}}$$

where  $x_i$  is a column vector of variables describing individual  $i$  and  $\beta_j$  is a row vector of coefficients for category  $j$  (Greene, 2000). Each category is compared with the lowest category. Differentiation allows us to obtain the marginal effects (change in  $P_j$  with respect to a change in  $x_i$ ) as follows:

$$\frac{\partial P_j}{\partial x_i} = P_j [\beta_j - \sum_{k=0}^J P_k \beta_k] = P_j [\beta_j - \bar{\beta}]$$

### Dependent Variables

Dependent variables for this study are reflective of the focus statements described above. A total of 2,112 responses were obtained for the statement measuring expendable input brand loyalty. About 39% of respondents reported that they agreed or strongly agreed with the statement that they considered themselves loyal to the brands of expendable items that they buy (table 1).

A total of 2,069 individuals responded to the statement measuring capital input brand loyalty. Well over half of the individuals who responded to the question covering capital input brand loyalty expressed loyalty (58.14%).

### Explanatory Variables

Data obtained in the commercial producer survey that measures income (farm size), age, and education are very similar to those variables measured in previous studies. Selecting comparable measures for search activity, perceived brand differences, media exposure, shopping time, and risk aversion is not as straightforward. However, several variables from the commercial producer project reasonably capture the inherent meaning and intent of the non-demographic factors that have been found in the literature to influence input brand and/or dealer loyalty.

Explanatory variables (table 2) are reflective of the factors proposed to influence loyalty in the research model outlined. Demographic variables are self reported and the remaining variables are based on survey responses. Brand loyalty-related variables are captured in a binary manner with the exception of the variables measuring media exposure and dealer influence on purchase decisions.

## Farm and Farmer Characteristics

The first section covers farm and farmer variables that are brand- and dealer-related. Average reported annual sales in dollars for survey respondents are about \$1.5 million. The majority of respondents is between the ages of 35 and 54 and represents about 52% of the survey respondents. Just under 14% of the survey respondents are under age 35, while a third of survey respondents (34%) are over age 55.

A small percentage of respondents attended high school (3%) but did not obtain a high school diploma (EDUC1). Forty-two percent of respondents graduated from high school, earned an associate's degree, or graduated from a trade school program (EDUC2). The majority of respondents attended a 4-year college or obtained a post-secondary degree (54.23%) (EDUC3).

Respondents may be operating more than one farming enterprise at once, and thus could be classified in more than one production category. The vast majority (68%) of farmers produce corn and soybeans (CORNBEAN). Nineteen percent of respondents produce wheat and/or barley (WHTBARL). Sixteen percent of the respondents were classified as cotton producers (COTTON). Dairy production is undertaken by nearly one-fifth of the survey respondents. Nearly 20% of the respondents are classified as pork producers and about 27% are classified as cattle producers.

Respondents report that, on average, they expect a 25% increase in the size of their primary operation over the next 5 years (GROWTH). About 15% of farmers report that they place orders online for agricultural inputs (ORDONLINE).

### Farmer Beliefs and Attitudes

A little over 26% of survey respondents expressed the belief that expendable brands are more or less the same (EXPSAME). Twenty-three percent of respondents feel the same way about capital input brands (CAPSAME). About 58% of farmers in the survey agree or strongly agree that purchasing inputs is time consuming (TIMECONS). Nearly 34% view farming more as a business than as a way of life (VIEWBUS). Fifty-eight percent reported that environmental regulations impacted input purchase decisions (ENVIR). About 53% of respondents said that food safety and security regulations impact input purchase decisions (FOOD). Most respondents indicated that they were the first or among the first to try new products, services, or techniques (FIRSTADOPT).

### Product Characteristics

One-quarter of respondents reported that they purchase the lowest priced expendable products (LOWPRICE1). A slightly higher percentage (31%) reported that they believed that branded expendable products offer a higher level of performance (PERFORM1). Less than twenty percent of respondents revealed that they purchased the lowest priced capital inputs (LOWPRICE2). But, the majority of respondents (54%) feel that substantial differences exist across branded capital input products (PERFORM 2).

### Media

Because there are a number of potential variables that capture reported media use when collecting relevant information for purchasing decisions, a media index (MEDINDEX) was developed that captured the relative importance of media for obtaining information. Respondents were asked to report how often they obtained useful



information from twelve media sources (suppliers' meetings, direct mail, telephone contact, agricultural websites, television, radio programs, field days, general farm publications, newspapers, newsletters, and farm shows). Responses for each media source ranged from 1 (never) to 5 (always). The index is calculated by summing responses for the twelve media sources and then dividing by the highest possible sum. For example, if a producer reports a "1" for each media variable, their index assignment is 0.20  $((1 \times 12) / 60)$ . This measurement provides the relative importance of media for individual respondents. The average index assignment is 0.5795 or approximately 0.58.

## **BLM Results**

### Capital Input Brand Loyalty

Eight variables have statistically significant coefficients for the model predicting capital input brand loyalty (BLOYALCAP) (table 3). Two "traditional" variables are statistically significant indicators of brand loyalty. Attending high school but not completing (EDUC1) and producing corn or soybeans (CORNBEAN) increases the likelihood of being brand loyal to capital inputs. Other variables that positively influence capital input brand loyalty include the reported use of media to obtain information useful for making input decisions (MEDINDEX), the perception that substantial differences in performance exist across branded capital input products (PERFORM2), and reporting that food safety/security regulations impact input purchase decisions (FOOD).

Respondents who perceive that capital input brands are more or less the same (CAPSAME) and respondents who report that they purchase the lowest priced inputs

(LOWPRICE2) are less likely to be brand loyal. The same is true for respondents who report that they view farming more as a business than as a way of life (VIEWBUS).

Reporting the belief that shopping for inputs is time consuming (TIMECONS), reporting that they order products online (ORDONLINE), reporting that environmental regulations are important (ENVIR), reported growth (GROWTH), and being among the first to adopt new techniques and products (FIRSTADOPT) are not responses that distinguish brand loyal producers from those who are not.

Marginal effects indicate education directly affects the likelihood of being brand loyal. Those who reported attending high school but did not graduate (EDUC1) are more than 15-percentage points more likely to be brand loyal. Corn and/or soybean producers are the most likely to be brand loyal; they are nearly 7-percentage points more likely to report loyalty. If a respondent believes that capital input brands are more or less the same, they are 6-percentage points less likely to be brand loyal.

Viewing farming more as a business than as a way of life, and favoring the lowest priced inputs reduces the probability of being brand loyal by 7- and 6-percentage points, respectively. Reporting a perceived difference in performance among capital brands and reporting that food safety regulations impact input decisions increases the probability of being brand loyal by nearly 10- and 13-percentage points, respectively. On average, a one-point increase in the media index (which is scaled up from “0 to 1” to “0 to 100”) increases the likelihood of being brand loyal by half a percentage point. Stated another way, an increase in the index by 10-percentage points increases the brand loyal probability by about 5-percentage points.

In short, those who are more likely to be brand loyal to the capital inputs that they purchase are: 1) individuals who attended high school but did not obtain a diploma, 2) corn and soybean producers, 3) managers who more often rely on media sources for information when making capital input purchase decisions, 4) respondents who more often report that food safety issues influence capital input purchase decisions, and 5) producers who believe that substantial differences in performance exist across capital input brands.

Factors that influence brand non-loyalty are: 1) the perception that capital input brands are more or less the same, 2) viewing farming more as a business than a way of life, and 3) exhibiting a preference for the lowest priced capital input products.

What does this mean for agribusinesses that supply capital farm inputs? When multiple factors are considered, demographics are less meaningful characteristics that distinguish brand loyal customers. Behaviors (purchasing the lowest priced inputs), attitudes and beliefs (such as view of farming and a belief in brand differentiation), and individual purchase processes (use of media as source of information; allowing food safety issues to impact purchase decisions) are more significant indicators of loyalty.

#### Expendable Input Brand Loyalty

Table 4 shows the results of the logit model predicting the likelihood of reporting brand loyalty for expendable products. Three demographic characteristics have statistically significant, negative coefficients (SALES, AGE54 and COTTON). An increase in reported gross sales corresponds with a decrease in the likelihood of being brand loyal to expendables. (A \$1M increase in reported gross sales decreases the probability of being brand loyal by about 1.35-percentage points.) Producers between 35

and 54 years old are less likely to be loyal to the expendable brands that they buy by about 9-percentage points. Respondents who grow cotton are 7-percentage points less likely than those in other production categories to express loyalty.

Five other variables have statistically significant coefficients. MEDINDEX, FOOD, and PERFORM1 all have statistically significant, positive coefficients. This suggests that agreeing with the corresponding statements increases the likelihood of being brand loyal. An increasing use of the media for input information, reporting the importance of food safety and security issues, and perceiving that expendable brands perform better than generics are all indicators of expendable brand loyalty. Marginal effects for the three variables are 0.0039, 0.1001, and 0.2256, respectively.

Ordering inputs and replacement products online (ORDONLINE) reduces the likelihood of loyalty by approximately 11-percentage points, while reporting that they purchase the lowest priced input products (LOWPRICE1) reduces the probability by about 8-percentage points.

In summary, respondents who are loyal to the expendable products that they buy likely possess the following characteristics: 1) they often obtain information from media sources, 2) they take food safety and security issues into account when making input purchase decisions, and 3) they perceive that brands perform better than generics. Reporting a higher than average level of sales, being between the age of 35 and 54, producing cotton, placing orders for agricultural inputs and products online, and valuing low prices are factors which tend to indicate brand non-loyalty for expendable inputs.

## **Conclusions**

The results found for brand loyalty reveal that, unlike previous studies, demographic variables are not the most reliable indicators of loyalty. Marketers should first assess what other factors are important to loyalty and subsequently determine if there is a link with demographics. What appears to be more important are the attitudes, beliefs, and actions of respondents.

Based on empirical model results, it can be inferred that brand differentiation, media exposure, brand performance, and the ability to order online are issues that directly affect brand loyalty. These issues can be directly addressed by agribusinesses seeking to build brand loyalty while operating in an evolving market environment. The remaining factors that include attitudes and beliefs can be used as tools to identify potential customers. These data can be obtained through the development of personal relationships or professional rapport with farmer customers, or assessed through market research. In addition, strategies for loyalty should focus less on price and more on the value that can be obtained through product quality, service, and providing relevant information.

Little research specific to business-to-business relationships in the agricultural input sector exists in the literature. Previous studies that explored brand loyalty in the agricultural input sector are quite dated, with much work over two decades old. This research extends the current body of literature. The results from this study can aid agricultural input suppliers that operate in a B2B market environment to develop more effective marketing strategies. This research can also serve as a catalyst that leads to further discussion on the role of brand loyalty in U.S. agriculture.

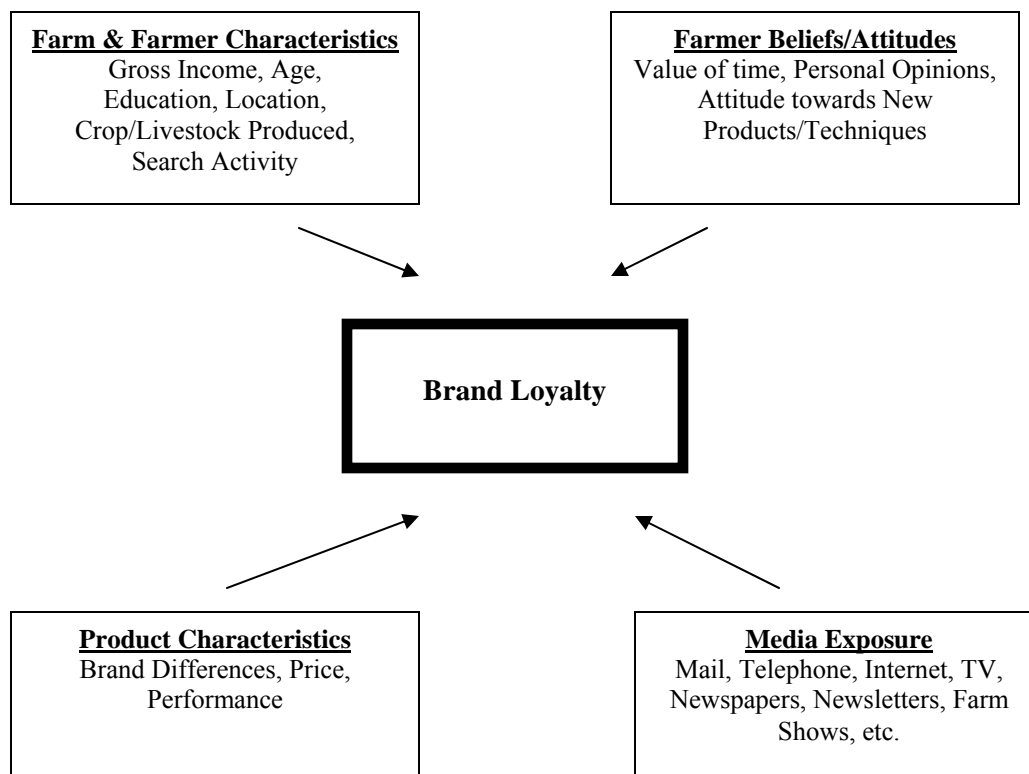


Figure 1: Research Model of Brand Loyalty

Table 1: Dependent Variable List for BLMs Estimating Brand and Supplier Loyalty

Variable	Definition	Mean	Std Dev
BLOYALCAP	=1 if strongly agreed or agreed with statement that they are loyal to capital input brands purchased; =0 otherwise	0.5814	0.4934
BLOYALEXP	=1 if strongly agreed or agreed with statement that they are loyal to expendable input brands purchased; =0 otherwise	0.3902	0.4880

Table 2: Explanatory Variable List<sup>1</sup>

Variable	Definition	Mean	Std Dev
-----Variables Measuring Farm and Farmer Characteristics-----			
SALES	Total annual farm sales in dollars	1,519,240	4,657,841
AGE35	=1 if under age 35; =0 otherwise	0.1375	0.3443
AGE54	=1 if aged 35-54; =0 otherwise	0.5159	0.4998
AGE55plus*	=1 if over age 54; = 0 otherwise	0.3431	0.4749
EDUC1	=1 if attended high school; =0 otherwise	0.0319	0.1757
EDUC2	=1 if high school, associate degree, or trade program graduate; =0 otherwise	0.4249	0.4944
EDUC3*	=1 if 4-year college attendee or graduate; =0 otherwise	0.5423	0.4983
CORNBEAN	=1 if produce corn/soybeans; =0 otherwise	0.6822	0.46575
WHTBARL	=1 if produce wheat/barley; =0 otherwise	0.1949	0.3962
COTTON	=1 if produce cotton; =0 otherwise	0.1635	0.3699
DAIRY	=1 if dairy producer; = 0 otherwise	0.2013	0.4010
PORK	=1 if pork producer; = 0 otherwise	0.2026	0.4020
CATTLE*	=1 if cattle producer; = 0 otherwise	0.2705	0.4443
GROWTH	Percentage change in primary operation over next five years	0.254	0.491
ORDONLINE	=1 if place order for agricultural inputs online; =0 otherwise	0.1491	0.3562
-----Variables Capturing Farmer Beliefs and Attitudes-----			
EXPSAME	=1 if believe expendable brands are more or less the same; =0 otherwise	0.2662	0.4421
CAPSAME	=1 if perceive capital brands are more or less the same; =0 otherwise	0.2258	0.4182
TIMECONS	=1 if believe that purchasing inputs is time consuming; =0 otherwise	0.5811	0.4935
VIEWBUS	=1 if view farming more as business than way of life; =0 otherwise	0.3379	0.4731

<sup>1</sup>(\*) indicates a reference category.

Table 2: Continued

Variable	Definition	Mean	Std Dev
ENVIR	=1 if environmental regulations are important when making input purchase decisions; =0 otherwise	0.5831	0.4931
FOOD	=1 if food/security regulations are important when making input purchase decisions; = 0 otherwise	0.5266	0.4994
FIRSTADOPT	=1 if very first or among first to try new products, techniques; =0 otherwise	0.5980	0.4904
-----Variables Capturing the Importance of Product Characteristics-----			
LOWPRICE1	=1 if buy lowest priced expendable products; =0 otherwise	0.2405	0.4275
PERFORM1	=1 if reported that branded expendable products offer a higher level of performance; =0 otherwise	0.3135	0.4640
LOWPRICE2	=1 if purchases the lowest priced capital input products; =0 otherwise	0.1928	0.3947
PERFORM2	=1 if reported that substantial differences exist across branded capital input products; =0 otherwise	0.5467	0.4979
----- General Media Variable -----			
MEDINDEX	Index measuring reported media exposure ranging from 0 to 1	0.5795	0.0993



Table 3: BLM Results Predicting Brand Loyalty for Capital Inputs (BLOYALCAP)<sup>1,2,3</sup>

	Coefficient (Standard Error)	T-Statistic	P-Value	Marginal Effect
CONSTANT	-1.3734 (0.3679)	-3.733	0.0002	
SALES	-0.0386 (0.0024)	-1.610	0.1073	
AGE35	0.1161 (0.1772)	0.656	0.5120	
AGE54	0.0041 (0.1279)	0.032	0.9744	
EDUC1	0.6870* (0.3768)	1.823	0.0682	0.1549
EDUC2	0.0044 (0.1133)	0.004	0.9969	
CORNBEAN	0.2839** (0.1253)	2.265	0.0235	0.0698
WHTBARL	0.1895 (0.1467)	1.292	0.1965	
COTTON	0.1457 (0.1672)	0.872	0.3832	
DAIRY	-0.0254 (0.1486)	-0.171	0.8642	
PORK	0.0174 (0.1390)	0.126	0.8999	
CAPSAME	-0.2402* (0.1306)	-1.838	0.0660	-0.0592
MEDINDEX	0.0204*** (0.0058)	3.513	0.0004	0.0050
TIMECONS	0.1821 (0.1124)	1.620	0.1053	
VIEWBUS	-0.2858** (0.1155)	-2.475	0.0133	-0.0702
ORDONLINE	-0.2397 (0.1498)	-1.601	0.1095	
ENVIR	-0.2703 (0.1321)	-2.195	0.0282	
FOOD	0.5162*** (0.1200)	4.302	0.0000	0.1258
LOWPRICE2	-0.2322* (0.1384)	-1.678	0.0934	-0.5727
PERFORM2	0.4261*** (0.1113)	3.827	0.0001	0.1040
GROWTH	-0.0007 (0.1121)	-0.619	0.5357	
FIRSTADOPT	0.6824 (0.1131)	0.603	0.5463	
Log Likelihood	-994.04			
Restricted L.L.	-1040.43			
Chi-squared	92.79***			
Predicted Correctly	61.46%			

<sup>1</sup>Estimates measuring the likelihood agreeing that respondents are brand loyal; Observations = 1523

<sup>2</sup>(\*), (\*\*), and (\*\*\*) indicate significance at the 0.10, 0.05, and 0.01 level of significance, respectively.

<sup>3</sup>Marginal effects for statistically significant coefficients shown only.

Table 4: BLM Results Predicting Brand Loyalty for Expendable Inputs  
(BLOYALEXP)<sup>1,2,3</sup>

	Coefficient (Standard Error)	T-Statistic	P-Value	Marginal Effect
CONSTANT	-2.0068*** (0.4536)	-4.424	0.0000	
SALES	-0.0578** (0.2844)	-2.035	0.0419	-0.0135
AGE35	-0.1145 (0.1794)	-0.639	0.5231	
AGE54	-0.3721*** (0.1292)	-2.880	0.0040	-0.0875
EDUC1	0.3787 (0.3363)	1.126	0.2601	
EDUC2	0.1616 (0.1161)	1.392	0.1640	
CORNBEAN	0.1799 (0.1297)	1.386	0.9513	
WHTBARL	0.0567 (0.1524)	0.373	0.7095	
COTTON	-0.3002* (0.1785)	-1.682	0.0926	-0.0681
DAIRY	0.0123 (0.1555)	0.080	0.9366	
PORK	0.1972 (0.1393)	1.416	0.1568	
EXPSAME	0.0140 (0.1280)	0.109	0.9129	
MEDINDEX	0.0167*** (0.0059)	2.789	0.0053	0.0039
TIMECONS	0.0070 (0.1151)	0.061	0.9513	
VIEWBUS	-0.4812 (0.1193)	-0.403	0.6867	
ORDONLINE	-0.4709*** (0.1616)	-2.914	0.0036	-0.1049
ENVIR	0.3499 (0.4064)	0.861	0.3893	
FOOD	0.4324*** (0.1225)	3.528	0.0004	0.1001
LOWPRICE1	-0.3633*** (0.1358)	-2.675	0.0075	-0.0827
TRADE	0.0250 (0.1192)	0.210	0.8337	
PERFORM1	0.9440*** (0.1179)	8.002	0.9440	0.2256
GROWTH	0.0006 (0.0011)	0.532	0.5944	
FIRSTADOPT	-0.0277 (0.1158)	-0.240	0.8106	
Log Likelihood	-965.25			
Restricted L.L.	-1044.16			
Chi-squared	157.83***			
Predicted Correctly	66.45%			

<sup>1</sup>Estimates measuring the likelihood of agreeing with being brand loyal; Number observations = 1565

<sup>2</sup>(\*), (\*\*), and (\*\*\*) indicate significance at the 0.10, 0.05, and 0.01 level of significance, respectively.

<sup>3</sup>Marginal effects for statistically significant coefficients shown only.

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