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**Returns to Retained Ownership through Finishing for Beef Cattle Originating from
Tennessee**

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Returns to Retained Ownership through Finishing for Beef Cattle Originating from Tennessee

Abstract

Annually, cow-calf producers face the decision of whether to sell their calves at weaning or to retain ownership of them. This study determines how animal characteristics, carcass quality, and a supplemental prepartum feeding program for cows impacts returns to retaining ownership of calves through finishing. Data from 2013-2014 regarding 160 cattle originating in Tennessee and finished in an Iowa feedlot using retained ownership was collected. An ordinary least squares regression indicates animal characteristics and carcass quality have a significant impact on retained ownership returns and the supplemental prepartum feeding program decreased returns. Sensitivity analysis determined how feed costs influence returns.

Keywords: Retained ownership, beef cattle finishing, cow-calf operation, profitability determinants, supplemental prepartum feeding program

JEL Classifications: Q12, Q13

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Introduction

The beef cattle industry in Tennessee is consistently the highest grossing sector of the state's agricultural industry (United States Department of Agriculture (USDA) Census of Agriculture, 2012; USDA Regional Integrated Pest Management Center, 2014). In 2012, total sales of beef cattle were \$552 million, which accounted for approximately 20 percent of the states' agricultural income (USDA Census of Agriculture, 2012). The Tennessee beef cattle industry is predominantly made up of cow-calf operations, which is similar to the beef cattle industry in most southeastern states. Cow-calf operations throughout Tennessee depend on cool-season grass pastures to meet nutritional requirements of cows and heifers, but most cattle are finished in feedlots outside of the state.

A decision cow-calf producers have to make is whether to sell calves/feeder cattle before they enter the feedlot or retain ownership through the feedlot and market fed cattle. In a long-term study, research has shown that retaining ownership in cattle to finishing can increase producers' net returns in most years (Watt, Little, and Petry, 1987). Subsequently, researchers have further investigated what drives the profitability of retaining ownership of cattle through finishing. One advantage of retained ownership of cattle through finishing is the increase in producers' marketing flexibility (White et al., 2007a). Beef cattle prices typically follow seasonal trends based on production cycles (i.e., calving season). Retaining ownership of cattle through finishing can allow producers to market cattle at various times of the year to benefit from seasonal price trends (Schroeder and Featherstone, 1990; White et al., 2007a).

Furthermore, producers that retain ownership of cattle through finishing may have the opportunity to use information about their cattle's carcass quality and performance in the feedlot to make more profitable production and marketing decisions (Marsh, 1999; White et al., 2007a, b). Grid-pricing or value-based marketing uses carcass quality characteristics to determine prices

received by producers. Therefore, producers can use this information to select breeding stock and replacement heifers to improve carcass quality traits allowing them to capitalize on price premiums for individual carcass characteristics (Marsh, 1999; White et al., 2007a, b). Animal performance data can be used to select breed stock and replacement heifers that provide higher average daily gains and lower feed to gain ratios of steers. Increasing average daily gain and decreasing feed to gain ratios of calves have been found to increase profitability because the number of days on feed needed to finish the cattle was reduced; thus, reducing in the cost of finishing (Langemeier, Schroeder, and Mintert, 1992; Lawrence, Wang, and Loy, 1999; Greiner, 2003).

Despite the positive aspects of retaining ownership of cattle through finishing, retaining ownership of the cattle can also increase producers' risk such as future cattle price declines and animal morbidity or mortality (Pope et al., 2011; Schroeder and Featherstone, 1990; White et al., 2007b). Several surveys have been conducted to determine how producers risk preference factors into the decision to retain ownership of cattle through finishing (Gillespie, Basarir, and Schupp, 2004; White et al., 2007b; Franken et al., 2010; Pope et al., 2011). Results have shown producers' risk preference was one of the most important factors in cow-calf producers' decision of retaining ownership of their cattle through finishing (Gillespie, Basarir, and Schupp, 2004; White et al., 2007b; Franken et al., 2010; Pope et al., 2011).

One possible way to increase net returns and potentially reduce risk associated with retained ownership of cattle through finishing is to provide cows with supplemental feed before calving. A prepartum supplemental feeding program has been shown to improve animal performance in the feedlot and carcass quality (Stalker et al., 2006; Bohnert et al., 2010). Recently, research has shown that providing cows a supplement in the last 90 days of gestation

can increase profitability of retained ownership of calves through finishing in Nebraska and Oregon (Stalker et al., 2006; Bohnert et al., 2010).

While these studies are helpful for understanding the risk and profitability of retaining ownership of cattle through finishing in the Midwest and Western United States, little is known about how these results hold for the Southeastern United States and Tennessee. Therefore, research is needed on the impact of a supplemental prepartum feeding program for cows in the Southeastern United States on the profitability of cattle being retained through finishing. High quality forage is typically more abundant in the Southeast than in the Western United States, which might make the supplemental prepartum feeding program unnecessary.

The objective of this study was to determine how animal characteristics, carcass quality, and a supplemental prepartum feeding program for cows impact Tennessee cow-calf producers' returns to retained ownership of cattle through finishing. Data from 2013-2014 regarding 160 feeder cattle originating in Tennessee and finished in an Iowa feedlot under a retained ownership marketing strategy were collected. An ordinary least squares (OLS) regression model was used to determine how a supplemental prepartum feeding program, animal characteristics, carcass quality, and feeder placement weight impacts retained ownership profitability. OLS coefficient estimates were standardized to determine which independent variables had the largest relative impact on retained ownership profitability. Sensitivity analysis was also conducted to determine how model results were altered based on possible feed cost changes. The results help Tennessee and other Southeastern cow-calf operators better understand the profitability of retaining ownership of cattle through finishing.

Data

Data were collected on 160 steers originating from University of Tennessee Research and Education Centers (RECs). From the 160 steers, 54 came from the Highland Rim REC in Springfield, Tennessee, 15 steers came from the Middle Tennessee REC in Spring Hill, Tennessee, and 91 came from the Plateau REC in Crossville, Tennessee. The steers were born between January and March of 2013. Sire and dam breeds of the steers were mixed between Angus, Simmental, Gelbvieh, and Herford. The steers were sent to the Tri-County Steer Carcass Futurity Cooperative (TCSCFC) feedlot in Lewis, Iowa in December of 2013 to be finished on a retained ownership contract. The TCSCFC recorded data on animal performance measures such as average daily gain, feed to gain efficiency, days on feed, and final weight. The feedlot also collected data on all of the production costs associated with retained ownership through finishing such as total feed cost, yardage, trucking, checkoff fee, and health treatments. Steers were slaughtered on April 15, May 6, May 20, or June 10 of 2014.

The 160 steers originated from cows which were involved in a supplemental feeding program experiment. Approximately 90 days prior to the first expected calving date of each cow herd, the cows were evenly split into two herds at their respective REC and placed on mixed grass pasture made up primarily of tall fescue. One herd did not receive a feeding supplement (i.e., the control herd) while the other herd received a supplement of dried distillers grains with solubles (DDGS) from the Jack Daniels Distillery in Lynchburg, Tennessee (i.e., the treatment herd). Each cow in the treatment group was fed at a rate of five pounds of DDGS three days a week. DDGS were fed for 90 days prior to the first expected calving date at which time supplementation ended. The DDGS cost \$260 per ton which means the supplemental prepartum feeding program cost \$25.37 per cow.

Slaughter data collection included carcass quality such as dressing percentage, ribeye area, fat cover, yield grade, and quality grade. Table 1 displays the summary statistics of the animal performance and carcass quality of the steers by weight class on delivery to the feedlot and by herd. We selected three weight classes of the steers on delivery to the Iowa feedlot including: 1) less than 700 pounds; 2) 700-800 pounds; and 3) greater than 900 pounds. In both the treatment and control herds, the highest observed average daily gain and lowest observed feed to gain ratio was found for steers that entered the feedlot at less than 700 pounds. In general, the average daily gain among all cattle was 4.04 pounds in both the control and treatment groups and the feed to gain ratio was 6.10 in the control group and 6.11 in the treatment group. Steers that entered the feedlot between 700 and 800 pounds were more likely to grade choice or higher for both the control and treatment herd.

[Place Table 1 Approximately Here]

The finished steers were sold on a grid-pricing marketing system. The actual price of beef for the slaughter dates were recorded by the feedlot and reported in the financial report. The grid prices were broken down by yield and quality grade and appear in Table 2.

[Place Table 2 Approximately Here]

Economic Model

While previous research has investigated determinants of feedlot profitability (e.g., Langemeier, Schroeder, and Mintert, 1992; Lawrence, Wang, and Loy, 1999; Mark, Schroeder, and Jones, 2000), no literature discussing the issue from the perspective of a cow-calf producer pursuing a retained ownership marketing strategy was identified. Therefore, net returns, or profits, to retaining ownership of calves through finishing were calculated for producers on a per-steer

basis. Net returns were calculated by subtracting the cost of retaining ownership (i.e., the total feed cost, yardage, trucking, checkoff fee, and health treatments), the cost of the supplemental prepartum feeding program if the steer was in the treatment group and the opportunity cost of selling the steer at weaning from the revenue received from finishing the steer. This is expressed as

$$(1) NR_i = p_i y_i - PC_i - OC_i - SC_i$$

where NR_i is the net return (\$/head) to retained ownership through finishing for steer i ; p_i (in \$/pound) is the grid price received at finishing which is a function of carcass quality; y_i is the finished weight of the steer in pounds; PC_i is the production cost for finishing the steer (in \$/head); SC_i is the cost incurred from the feed supplement of the steers from the treatment group; and OC_i is the opportunity cost of selling the steer at weaning (in \$/head). The production costs included total feed cost, health treatment costs, vaccine costs, yardage, trucking, data collection fee, checkoff fee, and miscellaneous costs such as ear tags and interest. The opportunity cost was equal to the weight of the steer when it was shipped to Iowa multiplied by the market price of feeder cattle at the time the steer was shipped. A profit-maximizing producer would select to retain ownership through finishing if the net returns were positive since the opportunity cost was included in the net returns.

Statistical Model

The objective of this research is to determine how animal characteristics, carcass quality, and a supplemental prepartum feeding program for cows impact Tennessee cow-calf producers' returns to retained ownership of cattle through finishing. Therefore, we specify a model with net returns as the dependent variable and animal characteristics, carcass quality, and a supplemental

prepartum feeding program for cows as the independent variables. The ordinary least squares regression model is expressed as

$$(2) \quad NR_i = \beta_0 + \sum_{k=1}^2 \beta_k W_{ki} + \beta_3 FG_i + \beta_4 ADG_i + \beta_5 D_i + \beta_6 GCM_i + \beta_7 GC_i + \beta_8 S_i + \varepsilon_i$$

where NR_i the net returns (\$/head) to retained ownership through finishing for steer i ; W_{ki} is an indicator variable for the $k=1,2$ weight classes of the steer on delivery; FG_i is the feed to gain efficiency; ADG_i is the average daily gain; D_i is the dressing percentage; GCM_i is an indicator variable that is equal to one if the steer graded choice minus; GC_i is an indicator variable that is equal to one if the steer graded choice or higher; S_i is the indicator variable that is equal to one if the steer's dam was provided supplemental feed during the final trimester of pregnancy; β_0, \dots, β_8 are parameters; and ε_i is the random error term which is independently and normally distributed. The lightest weight class (i.e., less than 700 pounds) was dropped from analysis to avoid multicollinearity. A sensitivity analysis was conducted using three feed cost scenarios. The three feed cost scenarios were: 1) as reported (i.e., observed); 2) 50 percent increase in the cost of feed; and 3) 50 percent decrease in the cost of feed. This will allow us to determine how sensitive retained ownership net returns are to possible changes in feed costs.

Standardized parameter estimates were computed following previous research on the determinants of profitability of cattle (e.g., Mark, Schroeder, and Jones, 2000; Forristall, May, and Lawrence, 2002; McDonald and Schroeder, 2000). This allows for a better comparison to be made regarding the relative impact of the particular independent variables on the profitability of retained ownership of calves. Calculating the standardized parameter estimates generates an estimate of how many standard deviations our dependent variable is expected to change in response to a standard deviation change in each independent variable (Forristall, May, and Lawrence, 2002; Mark, Schroeder, and Jones, 2000; McDonald and Schroeder, 2000). For

example, if the standardized parameter estimate for average daily gain is calculated as 0.5, then a one standard deviation increase in the average daily gain would be associated with retained ownership profitability increasing by 0.5 standard deviations. Following Pindyck and Rubinfeld (1998), the standardized parameter estimates were computed by multiplying the parameter estimate by the ratio of the standard deviation of the related independent variable and the standard deviation of the dependent variable.

We hypothesized the supplemental feed treatment group variable, S_i , will not have an impact on retained ownership returns because high quality forage was available to cows. This expected result differs from recent research which found that providing cows a supplement in the last 90 days of gestation increased retained ownership returns in Nebraska and Oregon (Stalker et al., 2006; Bohnert et al., 2010). Previous research found that a higher placement weight of cattle into the feedlot decreased cattle profitability for feedlot operators (Lawrence, Wang, and Loy, 1999; Langemeier, Schroeder, and Mintert, 1992; Forristall, May, and Lawrence, 2002; Mark, Schroeder, and Jones, 2000). However, given this research examines net returns to cow-calf producers pursuing a retained ownership strategy compared to profitability of cattle from a feedlot's perspective, we were uncertain how cattle placement weight may impact returns. We hypothesized an increased feed to gain ratio will decrease net returns and an increase average daily gains will increase net returns, which follows from previous research (Langemeier, Schroeder, and Mintert, 1992; Lawrence, Wang, and Loy, 1999; Greiner, 2003). Additionally, increases in dressing percentage and quality grade were expected to have a positive impact on net returns. When feed costs were increased by 50 percent, we hypothesized that net returns will decrease the most with an increase in feed to gain ratio. When feed costs were assumed to decreased, net returns will increase the most with an increase in average daily gain.

Empirical Results

Table 3 shows the average net returns for each of the three feed cost scenarios by weight class when entering the feedlot and by herd (i.e., control or treatment). Across all entry weights, the average overall observed retained ownership net returns was \$258.75 per head in the control herd and \$230.64 per head in the treatment herd. In the observed feed cost scenario, the highest net returns for steers were found on average for steers that entered the feedlot between 700 and 800 pounds in the control herd, and the highest net returns for steers were found when steers were between 800 and 900 pounds in the treatment herd. As expected, if feed costs were 50 percent higher net returns among all placement weights were reduced to an average of \$49.96 per head in the control herd and \$15.36 per head in the treatment herd. As expected, if feed costs were 50 percent lower, net returns among all placement weights were increased to \$446.22 per head and \$446.05 per head for the control and treatment herds, respectively.

[Place Table 3 Approximately Here]

The results of estimating the OLS model are presented in Table 4 for the three feed cost scenarios. Placement weight dummy variables, feed to gain ratio, average daily gain, dressing percentage, and quality grades were all significant across all models at, at least the 0.05 level. Interestingly, providing the steer's dam with supplemental feed during the final trimester of pregnancy was also found to be significant and negative for all three feed cost scenarios. If a steer was from the supplemental feed program treatment group, on average, retained ownership net returns were reduced by -\$27.29, -\$33.85, and -\$20.73 per head in the observed feed cost scenario, the scenario when feed costs were increased by 50 percent, and the scenario when feed costs were reduced by 50 percent, respectively. This indicated that the supplemental prepartum feed program, which cost \$25.37 per head, will not increase producers' net returns to retaining ownership in Tennessee.

Examination of the coefficients for the placement weight dummy variables provides interesting insight into the cow-calf producers' retained ownership decision. The placement weight dummy variables were compared to steers that entered the feedlot at a weight under 700 pounds. When steers entered the feedlot at a heavier weight, net returns to retained ownership of steers increased under all feed cost scenarios. Under the observed feed cost scenario, if a steer entered the feedlot at a weight between 800 and 900 pounds compared to entering at less than 700 pounds, on average, net returns to retained ownership increased by \$116 per head. Under the scenario that feed costs increased by 50 percent, if cattle weighed between 800 and 900 pounds when entering the feedlot compared to weighing less than 700 pounds, net returns increased by \$145 per head.

[Place Table 4 Approximately Here]

As the feed to gain ratio increased, retained ownership profitability significantly decreased across all models. The impact of the feed to gain ratio was the most negative when feed costs were increased by 50 percent. As the average daily gain of the steers increased, retained ownership profitability also increased across all feed cost scenarios. Average daily gain had the smallest impact on the net returns to retained ownership when feed costs were increased by 50 percent, which might be explained by steers with the highest average daily gain consuming more feed. A higher dressing percentage also results in increased retained ownership profitability across all feed cost scenarios. If a steer graded choice (-) or graded choice or higher, net returns to retained ownership increased across all three feed cost scenarios relative to steers grading select (+) or lower. Dressing percentage coefficients and quality grade dummy variable coefficients did not vary much based on changes in feed costs. The R squared of all models

suggests that a majority of the variation in retained ownership profitability was explained by the independent variables given all model's R squared values were greater than 0.75.

Table 5 displays the calculated standardized beta coefficients which explains the relative impact of each independent variable on retained ownership profitability. In the observed feed cost scenario, the quality grade of choice or higher, the feed to gain ratio, and the quality grade of choice (-) had the largest impact on retained ownership profitability. To exemplify, a one standard deviation change in the feed to gain ratio was associated with retained ownership profitability changing from the mean by -0.47 standard deviations. The relative importance of the independent variables changes depending on possible changes in feed costs. For example, when feed costs increased by 50 percent, the feed to gain ratio became the most important variable in explaining retained ownership profitability, which was expected given feed costs have become more expensive. Meanwhile, when feed costs decreased by 50 percent, the quality grade of choice or higher had the largest impact on net returns. As expected, feed to gain ratio and average daily gain change the most throughout the three models as feed costs were varied followed by placement weights of 800-900 pounds.

[Place Table 5 Approximately Here]

Conclusions and Implications

In general, the cattle industry in Tennessee primarily consists of cow-calf producers, which is similar to most southeastern beef producing states. A complex decision faced by cow-calf producers is determining whether to sell feeder cattle before they enter the feedlot or retain ownership through the feedlot stage and market fed cattle. While previous research has examined determinants of feedlot profitability in the Western United States, little is known about retained

ownership profitability in the Southeastern United States and Tennessee. Furthermore, research is needed on the impact of a supplemental prepartum feeding program for cows in the Southeast on the profitability of retaining ownership of cattle through finishing. This is a common method for increasing profitability and reducing risk of retained ownership through finishing (Stalker et al., 2006; Bohnert et al., 2010); however, research only exists for cattle from Western United States. The Southeastern United States is typically more likely to have high quality forage than the Western United States, which might make the supplemental prepartum feeding program unnecessary.

We determined how animal characteristics, carcass quality, and a supplemental prepartum feeding program for cows impacts net returns to retained ownership for Tennessee cow-calf producers. We found that the prepartum feed program reduced net returns for producers, which might be explained by higher quality forage that was available to the cows in this experiment. Feed to gain ratio, average daily gain, dressing percentage, and quality grade were found to significantly impact net returns. Increases in the feed to gain ratio were shown to decrease retained ownership profitability while increases in average daily gain, dressing percentage and a higher quality grade all improved retained ownership profitability. We also found that an increase in placement weight resulted in an increase in the profitability of retaining ownership of steers through finishing. The standardized beta coefficients indicated feed to gain ratio and quality grade had the largest impact in explaining retained ownership profitability. Future research can be conducted to further evaluate how the relationship of feeder and fed prices impacts returns to a retained ownership marketing strategy for cattle producers in Tennessee and the Southeastern U.S.

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Table 1. Summary Statistics of Animal Performance and Caracass Quality for Steers by Entry Weight Class and Herd for 2013-2014

Variable	Control Herd				Treatment Herd			
	< 700 lb (n=33)	700-800 lb (n=38)	800-900 lb ^a (n=10)	All Weights (n=81)	< 700 lb (n=36)	700-800 lb (n=29)	800-900 lb (n=14)	All Weights (n=79)
	Mean	Mean	Mean	Mean	Mean	Mean	Mean	Mean
Feed to Gain	5.81	6.24	6.50	6.10	5.90	6.18	6.50	6.11
Ratio (lbs)	(0.38)	(0.34)	(0.37)	(0.43)	(0.39)	(0.35)	(0.32)	(0.42)
Average Daily	4.11	3.99	4.02	4.04	4.22	3.97	3.76	4.04
Gain (lbs)	(0.37)	(0.41)	(0.54)	(0.41)	(0.40)	(0.34)	(0.40)	(0.41)
Dressing %	61.21	61.84%	61.06%	61.49%	61.14%	61.37%	62.46%	61.46%
	(1.70)	(0.02)	(0.02)	(0.02)	(0.01)	(0.01)	(0.01)	(0.01)
% Select (+)	18.18%	15.79%	20.00%	17.23%	19.44%	13.79%	14.29%	16.46%
or lower	(0.39)	(0.37)	(0.42)	(0.38)	(0.40)	(0.35)	(0.36)	(0.37)
% Choice (-)	60.60%	47.37%	80.00%	56.79%	61.11%	58.62%	14.29%	62.03%
	(0.50)	(0.51)	(0.42)	(0.50)	(0.49)	(0.50)	(0.36)	(0.49)
% Choice	21.21%	36.84%	0.00%	25.93%	19.44%	58.62%	14.29%	21.52%
or higher	(0.42)	(0.49)	(0.00)	(0.44)	(0.40)	(0.50)	(0.36)	(0.41)

Note: Standard deviations are in parenthesis. The number of head shipped to Iowa in each respective weight class is denoted by n.

^aTwo steers in this analysis entered the feedlot over 900 pounds. One steer entered at 914 pounds and the other at 950 pounds. For analysis, these steers were sorted into the 800-900 pound entry weight category.

Table 2. Grid Price Received at the Four Harvest Dates, (\$/cwt.)

Quality Grade	Yield Grade	April 15, 2014	May 6, 2014	May 20, 2014	June 10, 2014
		(n=29)	(n=53)	(n=40)	(n=38)
Prime	1	\$268.18	\$267.89	\$265.08	\$263.60
	2	\$261.68	\$261.39	\$258.58	\$257.10
	3	\$259.18	\$258.89	\$256.08	\$254.60
	4	\$248.01	\$247.85	\$245.15	\$243.60
Choice	1	\$246.19	\$244.81	\$242.06	\$240.21
	2	\$242.19	\$240.81	\$238.06	\$236.21
	3	\$239.69	\$238.31	\$235.56	\$233.71
	4	\$228.52	\$227.27	\$224.63	\$222.71
Select	1	\$238.54	\$234.42	\$229.83	\$229.29
	2	\$234.54	\$230.42	\$225.83	\$225.29
	3	\$232.04	\$227.92	\$223.33	\$222.79
	4	\$220.87	\$216.88	\$212.40	\$211.79

Note: “n” represents the number of head slaughtered on the given date.

Table 3. Summary Statistics of Net Returns to Retained Ownership of Steers (\$/head) by Entry Weight Class and Herd for 2013-2014.

Variable	Control Herd				Treatment Herd			
	< 700 lb (n=33)	700-800 lb (n=38)	800-900 lb (n=10)	All Weights (n=81)	< 700 lb (n=36)	700-800 lb (n=29)	800-900 lb (n=14)	All Weights (n=79)
	Mean	Mean	Mean	Mean	Mean	Mean	Mean	Mean
<i>NR</i> : Observed	\$247.48 (104.43)	\$268.53 (100.34)	\$258.75 (133.01)	\$258.75 (105.39)	\$221.26 (108.46)	\$218.99 (87.88)	\$278.92 (65.01)	\$230.64 (96.25)
<i>NR</i> : Feed Costs 50% higher	\$39.42 (97.66)	\$57.34 (93.45)	\$56.76 (119.19)	\$49.96 (97.62)	-\$3.57 (104.98)	\$6.54 (91.98)	\$82.33 (74.59)	\$15.36 (99.54)
<i>NR</i> : Feed Costs 50% lower	\$455.67 (\$116.94)	\$479.84 (113.35)	\$460.84 (149.69)	\$467.65 (118.61)	\$446.22 (119.43)	\$431.56 (92.31)	\$475.61 (63.48)	\$446.05 (101.81)

Note: Standard deviations are in parenthesis. The number of head slaughtered on the given date is denoted by n

Table 4. Parameter Estimates of Retained Ownership Net Returns for Steers Originating from Tennessee (n=160)

Independent Variables	Observed Costs	Feed Costs +50%	Feed Costs - 50%
Treatment Group	-27.29*** (7.73)	-33.85*** (8.08)	-20.73** (8.96)
700-800 Pounds	42.58*** (9.27)	52.99*** (9.69)	32.17*** (10.74)
800-900 Pounds	115.82*** (13.82)	144.93*** (14.44)	86.69*** (16.00)
Feed to Gain Ratio	-111.44*** (13.08)	-146.84*** (13.66)	-76.02*** (15.15)
Average Daily Gain	80.97*** (11.39)	40.69*** (11.90)	121.26*** (13.19)
Dressing %	29.87*** (2.56)	28.72*** (2.68)	31.02*** (2.97)
Choice (-)	97.40*** (11.45)	102.90*** (11.96)	91.90*** (13.26)
Choice or higher	141.12*** (13.92)	142.67** (14.55)	139.58*** (16.13)
Constant	-1351.38*** (178.70)	-1122.88*** (186.73)	-1580.01*** (206.99)
R^2	0.78	0.75	0.76

Note: Number in parentheses are standard errors; *** denotes significance at the 1% level.

Table 5. Determinants of Retained Ownership Returns Standardized Beta Coefficients

Independent Variables	Observed Costs	Feed Costs +50%	Feed Costs - 50%
Treatment Group	-0.13	-0.17	-0.09
700-800 Pounds	0.21	0.22	0.12
800-900 Pounds	0.41	0.20	0.12
Feed to Gain Ratio	-0.47	-0.63	-0.29
Average Daily Gain	0.33	0.17	0.45
Dressing %	0.46	0.45	0.44
Choice (-)	0.47	0.51	0.41
Choice or Higher	0.60	0.61	0.54