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**Determining the Impacts of Cattle Origin and Ownership Characteristics on
Feedlot Performance**

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Selected Paper prepared for presentation at the Southern Agricultural Economics
Association's 2016 Annual Meeting, Mobile, Alabama, February 4-7 2017

Introduction

The beef production chain functions as a collective of distinct phases, starting with the cow-calf sector and finishing at the packer stage. Unlike poultry or pork production, which can occur in one location over a relatively short period, raising beef requires large acreage inputs and typically 18 to 22 months to produce a viable carcass (Ward 1997, NCBA 2009). These requirements have caused the cattle industry to become segmented into three principal phases: cow-calf, backgrounding/stocker and feedlot operations. Cow-calf producers concentrate on producing a calf crop for input into the beef supply chain. Next, stocker operators focus on adding weight and maturity to feeder cattle. Finally, feedlots concentrate on adding additional weight and finishing cattle to produce a carcass with acceptable yield and marbling characteristics. Finished cattle are then processed by beef packing firms for wholesale and retail distribution ~~and consumer consumption.~~

In the United States, approximately 619,172 operations are dedicated to producing beef cattle (NCBA 2015). This estimate includes cow-calf, stocker and feedlot operations. The cattle industry is the highest grossing agricultural sector with \$88.25 billion in farm gate receipts in 2014 (NCBA 2015). Cow-calf producers form the broad base of the beef industry and operate throughout the country from Florida to Alaska. As cattle progress toward the feedlot and packer levels the number of operations narrows. Seventy feedlots in the U.S. have an operating capacity greater than 50,000 head and about 40% of fed cattle are marketed from feedlots with a capacity of at least 32,000 head (LMIC 2015, Jones and Edwards 2016). Nearly 80% of commercial beef produced in the US is grain-finished in feedlots; hence feedlots are an integral part of the beef production process (Mathews and Johnson 2013).

The broad cow-calf industry produces calf inputs that vary in quality. While the poultry, pork and dairy industries produce livestock from a narrow genetic base, genetics in the beef cattle industry are expansive due to diverse breeds and crossbreeding programs (Ward 1997). The wide range of genetics, production environments and herd management practices makes it difficult to accurately forecast feedlot performance and carcass grading. Furthermore, individual background information, including birth and weaning weights, genetic composition, vaccination history, weaning protocol and implant schedule, is often not transferred from the buyer to seller as cattle are marketed, often multiple times, through narrowing channels. An animal's background impacts feeding efficiency, carcass quality and potential for economic returns. For example, a study conducted by Oklahoma State University (OSU) found that calves treated for bovine rhinotracheitis virus more than twice produced carcasses that graded lower than calves that are never treated or treated only once. Performance translates to economic returns and compared to calves that were never treated, calves that were treated once, twice and more than three times returned \$40.64, \$58.53 and \$291.93 per head less, respectively (Fulton et. al 2002).

The objective of this research is to determine how background characteristics influence cattle performance in a commercial feedlot setting. Without a certified marketing program, background and quality information can be lost or misrepresented in the market, creating an asymmetrical relationship between buyer and seller, which causes negative market externalities. Using origin and ownership variables, pen-level observations are categorized and analyzed to determine how background variables impact feedlot performance and economic returns.

Perceiving Cattle Quality

The dissemination of information across stages in the beef cattle industry has been a notable research topic for years. Tracing individual animals through the supply chain maintains useful information for production and trade purposes but traceability systems are complex and include privacy and liability concerns (Hobbs 2004). The U.S. Department of Agriculture (USDA) attempted to establish a national traceability program in 2002 with the National Animal Identification System (NAIS) to organize animal disease outbreak responses and to verify food safety standards for animal product exports (USDA 2006). NAIS encouraged livestock producers to register their farm premises and track the movement of livestock for disease control. In April 2006, 235,000 [livestock](#) premises were registered and the USDA hoped to achieve full participation by 2009 (Loyd and Redding 2006). Cattle producers expressed resistance and only 18% of cattle operations registered themselves by 2008 (Greene 2010). The low participation rate of cattle producers caused the USDA to declare NAIS ineffective for disease control in the cattle industry (Greene 2010).

While producers may be wary of traceability programs, research has shown that quality verification programs are increasing in popularity and can provide opportunities to receive price premiums at market (Lalman and Mourer 2014). The Oklahoma Quality Beef Network (OQBN) is a certified preconditioning program that requires producers to castrate bull calves, dehorn, wean calves for at least 45 days prior to the OQBN auction to qualify for the Vac-45 program (Mourer 2016). In 2012, 7.3% of calves marketed in Oklahoma were enrolled in a value-added program (Mourer 2014). The benefits of preconditioning calves include stronger immune systems, higher stress tolerance and improved feed efficiency (Lalman and Mourer 2014). Research of the OQBN sales identified premiums ranging from \$3.94/cwt to \$14.33/cwt for

preconditioned calves. The research also found that feedlot managers valued preconditioned calves at a \$5.25/cwt premium (Ward and Lalman 2003).

Quality assurance programs are a proven method to retain and transfer background information from cow-calf producer to stocker or feedlot operator. Another method to maintain the integrity of background information is retaining ownership through the cow-calf to feedlot stage. Retained ownership expands marketing opportunities and establishes a connection to exchange background and feedlot performance information. Knowledge of genetic composition, vaccine history and origin is useful for determining finishing dates and sorting pens in the feedlot. Genetic composition influences feeding efficiency and development of external fat. For example, Black Angus cattle typically have higher average daily gain rates and fat thickness compared to Red Angus, Brangus and Polled Hereford breeds (Parish et al. 2014). Meanwhile, vaccine history and origin directly influence the health of a pen. Step et al. (2008) found that steers sourced from a sale barn were treated more often for bovine respiratory disease and experienced a high death loss rate compared to steers sourced directly from the country.

Previous research confirms the value of performance and management data yet often it is unclear how to utilize background information to improve commercial feedlot management. Thompson et al. (2014) assessed the value of individual, genetic molecular breeding values (MBV) to determine the optimal days on feed. The value of using average daily gain and marbling MBVs is estimated to be \$0.47 per head. The study results indicate that sorting cattle based on MBV traits can increase feedlot profitability (Thompson et al. 2014). In regards to vaccinations, Chymis et al. (2007) noted that asymmetric information ~~can~~ could cause inefficient revaccination practices. Buyers are inclined to revaccinate cattle if the cost of vaccination is lower than the costs associated with sickness, treatments and death loss. Even though vaccination

doses are relatively inexpensive, costs can accumulate quickly as the feedlot's volume of cattle increases. Accurate background information can eliminate revaccinations and allow feedlot managers to sort cattle according to health history and identify high-risk animals. Understanding the value of background information can assist producers and feedlot managers to distinguish cattle quality and optimize feeding plans.

Background Characteristics and Categorization

The research utilizes data provided by a commercial feedlot in the U.S. Southern Plains region with an operating capacity of 50,000 head. For clarity, "Feedlot" will be used to distinguish the feedlot that provided data from the broader feedlot industry. Data was collected between January 2009 and December 2015 and includes pen-level observations with values averaged across all animals fed in each pen. Upon arrival, the pen is weighed and each animal receives a round of vaccinations, an implant and ID tag in the ear. The pens are not resorted during the feeding process. Pens containing Holsteins, heifer and steer mixes, cull cows and pens with missing data were removed from the raw data, leaving 4,648 useable observations of steers and heifers. The close out head count, number of animals marketed to the packer, totaled 519,985 head. In addition to feedlot performance data, each pen is assigned market price data with consideration of the current month, weight and gender of each pen. The purchase price is based on the feeder prices from the Combined Auction for Oklahoma Feeder Cattle USDA report and sale values are from the Negotiated Texas, Oklahoma, New Mexico report.

The Cost of Gain (COG) estimate, expressed as dollars per hundredweight gained, includes data covering the ration composition, dry matter intake (DMI), pounds gained, days on feed, head count, bunk fee and USDA market report data provided by the Livestock

Marketing Information Center (LMIC). Ration data indicates that corn and dry distillers grains (DDG) are the two most common ingredients and their market prices are used as proxies to estimate COG. The grain prices for the COG estimate are concurrent with the cattle prices and feeding period, making it possible to use purchase and sale prices, along with COG, to calculate returns for each pen.

The origin and ownership class variables make this dataset unique. The Owner variable has three distinct classifications. Returning Customers retain pens in the feedlot at least four of the seven years captured in the dataset. Occasional Customers retained lots for three or fewer years and often only retain cattle once. The remaining lots are owned by the Feedlot. Origin is classified as Country, Sale Barn or Other. Country origin signals that the pen was sourced directly from one ranch and was not exposed to a sale barn setting. Sale Barn origin indicates the pen was marketed at an auction facility and was commingled with pens from various operations prior to arriving at the feedlot. Other is the smallest origin category and includes pens originating from wheat pasture, a growing yard or a backgrounding program.

Pen-level observations are useful to examine the variability of animal performance. Constraints of the pen-level observations include benchmarking the Feedlot with the broader feeding industry. The observations were converted to a monthly value by averaging together the pens that closed out each month. The monthly averages were weighted by close out head to account for variations in pen size. To benchmark, the Feedlot monthly averages were compared to the monthly averages published by the Kansas State University Focus on Feedlots (FOF)

[1 An additional COG series was calculated holding feed prices constant. This "Set COG" emphasizes differences in COG due to feed to gain, days on feed, and other production values rather than changes in feed market values. These Set-COG and Concurrent COG values are reported in Tables 2-8. The Concurrent COG is used to calculate returns.](#)

program. Table 1 summarizes the means for steers and heifers from the Feedlot and FOF program.

With the exception of end weights for Feedlot-owned heifers, cattle from the FOF program weigh heavier. Feedlot-owned steers are fed nearly two weeks longer while heifers in both programs average the same length on feed. ADG and Feed-Gain rates are better for Feedlot-owned cattle than FOF lots, except for the heifer Feed-Gain ratio. The Feedlot experiences a higher rate of death loss compared to the pens reported in the FOF program. To test the strength of comparison, correlations between the monthly FOF and Feedlot data were calculated. The strongest correlations are cost of gain (0.95), final weight (0.61) and average daily gain (0.58). The weakest correlations include days on feed (0.18) and in-weight (0.31).

The pen-level observations in the dataset can be organized by placement weight to examine performance variations across weight classes and gender. Placement weight alters the impact of select performance variables on finishing profitability. For example, heavier cattle are impacted less by the Feed-Gain ratio and Cost of Gain since they are fed for relatively shorter periods (Langemeier, Schroeder and Mintert 1992). Descriptive tables organize the pens by placement weight, starting with <550 pounds and increasing in 50-pound increments to 950 pounds and above. The tables include means for purchase, in and sale weights, shrink, days on feed, average daily gain, feed-gain ratio, sick head days, death loss as well as the estimates for cost of gain and returns per head. Due to the variance of pen size the means are weighted by close out head. Table 2 provides the performance means for all Feedlot pens. Expected trends can be confirmed by the values across the weight categories. As placement weight increases, days on feed, sickness and death loss decline while ADG and Feed-Gain ratio increase. Cattle

finishing research conducted by Langemeier, Schroeder and Mintert (1992) observed the same relationships between performance variables and weight categories.

Origin and ownership variables permit the data to be further disaggregated based on background characteristics. The sale barn is the largest origin source with only 33% of pens are sourced directly from the country. Of the country-sourced pens, 56% are customer cattle under retained ownership. When pens are separated by origin, distinct characteristics emerge for both steers and heifers. Averaged over all weight categories, country-sourced steers outperform Sale Barn steers in all performance measurements. Tables 3 and 4 display the trends for steers and heifers sourced from the country and sale barns. Steers sourced from the country are commonly placed 50 pounds heavier and finish at a heavier weight compared to lots from the sale barn. For heifers, pens from the country also outperform Sale Barn pens for all performance variables. Country heifers enter and exit the feedlot at heavier weights and are on feed for five fewer days than Sale Barn heifers. ADG and the Feed-Gain ratio values show that Country pens have a higher feeding efficiency. The sickness rate and death loss are also lower for country-sourced heifers. Origin has a significant impact on the outcomes of feedlot performance. The descriptive mean tables show that Country pens outperform Sale Barn pens. Cattle that are sourced from the country avoid additional transportation and experience less stress. Research of cattle handling has shown that longer transportation periods and mixing unfamiliar pens together increases stress. The higher stress not only negatively impacts feedlot performance but it can also cause a higher rate of undesirable dark meat in the carcass (Warriss 1990).

Ownership status highlights expected and unexpected trends concerning pen performance and customer selection. Tables 5 and 6 show steer and heifer means by ownership status. Customer steers and heifers entered and exited the feedlot at heavier weights compared to

Feedlot-owned pens. Feedlot-owned steers exhibited lower sickness and death rates. Feed efficiency variables are split, customer steers show a slightly higher ADG and lower dynamic COG. Heifers owned by the Feedlot show higher feeding efficiency and lower sickness and death rates than customer heifers. Trends shown in the descriptive mean tables raise questions about the selection process for customer cattle and a customer's motivation to place cattle on feed.

Origin and ownership characteristics are closely related and often intersect. 61 percent of customer cattle are sourced directly from the country while 78 percent of feedlot-owned cattle are sourced from sale barns. To untangle the interactions between origin and ownership, the customer lots are separated by origin. Means for customer steers and heifers are listed in Tables 7 and 8. Customer steers sourced from the country outperform customer sale barn-sourced cattle in all feed efficiency and health variables. They also have a significantly better rate of return and lower COG. In contrast, customer Sale Barn steers have worse feedlot performance and returns than all sale barn sourced steers. This observation suggests that customers may purchase low quality cattle from the sale barn in order to fill a pen or feed lower quality animals and attempt to achieve some return in the market. The same trend holds true for heifers, with customer country-sourced pens performing better than customer Sale Barn pens. Customer sale barn heifers perform worse than all heifers sourced from the sale barn, which further suggests that customers purchase poor quality cattle from a sale barn to retain.

Model Results and Implications

To understand the impact of background and performance variables, ~~several~~ Mixed Linear Models (MLM) and an Ordered Logit Model (OLM) were developed with the data. The

reference base for all models is set as Owner = Feedlot, Origin = Sale Barn, Gender = Steers and the Close Out Month = September. The first MLM, Returns per Head, highlights the influence of background, close out month and performance on the level of return. Parameter estimates, expressed as dollars per head, are listed in Table 9. Ownership status and country origin have a significant impact on returns. Pens of returning customers earn an additional \$4.63 per head while occasional customers are discounted \$4.13 compared to pens owned by the Feedlot. Country pens receive a \$2.87 per head premium compared to pens sourced from a sale barn. Heifers receive a premium of \$18.03 over steers, a result that is confirmed by the descriptive mean returns of heifer and steer pens. As expected COG and Feeder price have a negative estimate since higher input prices reduce returns. The Live price estimate is highly significant and positive. Performance variables such as days on feed, in weight, sale weight and ADG have positive estimates. Positive performance estimates suggests that heavier animals receive higher returns. In-weight and sale weight have squared terms to correct for the non-linearity of animal weight, which eventually plateaus rather than continue in a linear fashion. The parameter estimate for ADG is fairly large due to the difficulty of increasing the rate of daily gain by an entire pound. The Feed-Gain ratio was not included in the model since factors of the ratio are already incorporated into other independent variables, therefore confounding the effect of a Feed-Gain estimate.

To evaluate feed efficiency, Average Daily Gain is set as a dependent variable for the second MLM regression. Table 10 lists the parameter estimates for ADG. The estimates for returning and occasional customers are significant. ADG increases by 0.02 lbs. for returning customer pens and by 0.01 lbs. for occasional customer pens compared to Feedlot-owned lots. Origin also has a significant influence on ADG. Compared to pens from a sale barn, Country

pens have a higher ADG and pens from Other sources have a lower ADG. Steers exhibit a higher ADG than heifers, a result that is confirmed in the descriptive mean tables. Estimates for the close out months show a slight seasonal pattern. With September as the base month, ADG is lower from February to June, nearly unchanged in the fall and slightly higher during the winter months. Days on feed, the Feed-Gain Ratio and Sick Head Days have significant, negative estimates. The relationship between these variables support feed efficiency expectations. Cattle with a higher rate of average daily gain can reach the finishing weight faster, require less DMI and are resistant to sickness.

For health evaluation, the rate of death loss was set as a MLM dependent variable. Table 11 lists the parameter estimates for death loss. Country origin is the only significant background characteristic. Pens sourced from the country experience a 0.27% lower death loss rate than sale barn pens. Previous research has shown that cattle shipped from a ranch directly to the feedlot experience lower stress and exposure to disease. Estimates for the customer pens indicate a lower death loss rate than firm-owned cattle, but the estimates are not statistically significant. The monthly estimates indicate a seasonal pattern with September serving as the base month. Death loss is lower during the winter months and increases substantially during the summer.

An Ordered Logit Model (OLM) was developed to analyze the maximum likelihood estimates of reaching a certain level of returns per head based on the background characteristics. The dependent variable, returns per head, for the OLM is not limited to a binary term, rather it is defined in eight, consecutive return categories. Figure 1 shows the distribution of returns by category. Origin, ownership, gender and close out month are class variables with the same base parameters as the MLM regressions. Feedlot performance and health measurements are included as continuous variables.

Since the regression is set to descend the parameter estimate relationships are interpreted as either advancing towards or regressing from a higher, more satisfactory, return category. The highest possible return category is Returns/head = \$300.00 or greater. Sale Barn Origin is set as the base variable and the estimates for Country and Other sources are in relation to the base variable. Odds ratios, the exponential value of the maximum likelihood estimate, are used to interpret the results of the OLM and are listed in Table 12. Point estimates above 1 indicate a higher probability for returns to fall in a higher category, whereas estimates less than 1 decrease the chance for a better return. Customer cattle have better probabilities of higher returns than Feedlot owned pens. The odds for Returning Customers are 1.28:1, meaning that a pen of a Returning Customer is 1.28 times more likely to advance to a higher return level than a pen owned by the Feedlot. Odds between Occasional Customer and Feedlot-owned pens are nearly equal at 1.04:1 odds. The maximum likelihood estimate for Returning Customers is the only background variable that is significant. Heifers have a significantly better odds ratio for higher returns than steers. Closing out between April and August or in December gives the pen better return odds than pens closed out in September.

Odds for market parameters follow expectations. Input costs, COG and feeder price, have odds that are less than 1, signaling that higher input prices lower the probability for a higher return. Live price has a 1.91:1 odds ratio. Performance variables that improve the odds of a higher return include days on feed, sale weight and most significantly, average daily gain. The greater odds for these variables suggest heavier cattle are more likely to produce better returns. A higher average daily gain combined with a longer feeding period results in heavier cattle and a probability of reaching a more favorable return category. In-weight, shrink, feed-gain and death loss lower the probability of reaching a higher return category. Therefore, returns are penalized

for lighter placement cattle, pens that experience increased stress or transportation, pens with high DMI and pens with a high death loss rate. Except for in and sale weights, all performance parameters have significant maximum likelihood estimates.

Conclusion

The descriptive mean category tables, MLM estimates and OLM results illustrate the impacts of a pen's background characteristics on feedlot performance and economic returns. This research confirms that more information about cattle background can help feedlots and producers retaining their own cattle to improve feedlot performance, efficiency and returns. Additional research recommendations include studying the motivations to retain cattle in the feedlot and using pen-level data to examine the variability of performance measurements. Further examination of the connections between background characteristics and feedlot performance would improve the expectations of feeding outcomes and improve feedlot management strategies.

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Table 1. Feedlot and KSU Focus on Feedlots Mean Values, Jan. 2009 – Dec. 2015

Variable	Unit	Steers		Heifers	
		Feedlot	KSU	Feedlot	KSU
In-Weight	lbs.	724.93	804.08	722.03	735.18
Final Weight	lbs.	1342.53	1367.98	1254.99	1233
Days on Feed	days	167	154	151	151
Average Daily Gain	lbs.	3.77	3.62	3.61	3.24
Dry Matter Feed Conversion	lbs.	5.97	6.00	6.54	6.26
Death Loss	%	1.86	1.35	2.46	1.46
Cost of Gain	\$	99.59	93.87	112.08	98.91

Table 2. Means by Weight Category, All Pens, Jan. 2009—Dec. 2015

Variable	Units	<550	550-600	600-650	650-700	700-750	750-800	800-850	850-900	900-950	950<	Overall
Purchase Weight	lbs.	513.39	579.76	625.25	675.13	725.76	775.50	822.30	873.27	921.89	979.20	728.73
In-Weight	lbs.	494.84	556.17	601.66	650.86	701.92	751.62	800.43	849.06	895.19	943.51	704.99
Shrink	%	-3.61	-4.07	-3.78	-3.59	-3.29	-3.08	-2.66	-2.77	-2.90	-3.63	3.33
Sale Weight	lbs.	1147.45	1172.90	1203.30	1252.51	1301.86	1324.36	1352.30	1390.23	1434.23	1490.06	1290.65
Days on Feed	days	213	189	179	170	161	151	143	137	131	129	161
Avg. Daily Gain	lbs./day	3.07	3.27	3.37	3.55	3.71	3.80	3.85	3.97	4.11	4.25	3.66
Feed-Gain Ratio	lbs.	5.85	5.90	5.93	5.92	5.95	6.04	6.12	6.19	6.20	6.42	6.00
Sick Head Days	%	0.74	0.73	0.94	0.82	0.70	0.59	0.58	0.47	0.33	0.41	0.69
Death Loss	%	2.54	2.56	2.47	2.16	1.89	1.58	1.27	1.10	0.88	0.82	1.84
Gen COG	\$/ewt	106.50	107.19	105.40	111.00	111.43	97.38	99.06	97.80	95.89	100.63	101.03
Ret COG	\$/hd	78.56	78.55	77.62	76.09	78.23	79.39	74.76	79.89	78.62	74.63	77.03
Return	\$/hd	-43.56	-33.55	-60.01	-69.89	-31.24	-38.89	-54.72	-32.34	-99.21	-63.72	46.82
Count	head	13,768	35,243	65,927	93,007	99,466	91,248	58,561	36,772	21,749	4,243	519,985

-(Weighted by Close Out Head)

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Table 3. Origin Means by Weight Categories, Steers, Jan. 2009—Dec. 2015 - (Weighted by Close Out Head)

Variable	Units	<550	550-600	600-650	650-700	700-750	750-800	800-850	850-900	900-950	950<	Overall
<i>Country Origin</i>												
Purchase Weight	lbs.	505.53	583.53	626.44	675.48	727.50	775.93	824.69	872.34	923.99	972.86	776.40
In Weight	lbs.	492.66	566.17	610.67	660.13	711.11	761.49	810.08	854.84	903.83	938.54	759.97
Shrink	%	-2.51	-2.99	-2.52	-2.27	-2.26	-1.86	-1.77	-2.00	-2.18	-3.52	2.18
Sale Weight	lbs.	1269.04	1276.48	1282.99	1298.38	1341.70	1358.91	1374.68	1408.22	1459.21	1505.57	1362.36
Days on Feed	days	235	201	189	177	166	152	144	137	130	129	156
Avg. Daily Gain	lbs./day	3.32	3.55	3.56	3.62	3.81	3.94	3.93	4.05	4.26	4.39	3.89
Feed-Gain Ratio	lbs.	5.65	5.56	5.64	5.80	5.81	5.84	6.00	6.06	6.09	6.29	5.90
Sick Head Days	%	1.08	0.43	0.64	0.67	0.52	0.45	0.40	0.36	0.30	0.32	0.47
Death Loss	%	3.08	1.47	2.43	1.99	1.44	1.20	0.93	0.85	0.68	0.64	1.29
Set COG	\$/ewt	69.78	68.06	69.01	70.94	70.73	71.27	73.13	73.40	73.54	73.87	71.74
Return	\$/hd.	-47.89	-28.48	-30.01	-71.69	-56.69	-25.19	-31.74	-41.05	22.12	-66.36	-36.49
Count	pens	25	34	70	97	158	180	153	124	73	32	946
	head	1453	3211	7245	9875	17531	20112	18215	13965	8156	2748	102512
<i>Sale Barn Origin</i>												
Purchase Weight	lbs.	505.19	581.21	624.94	677.82	725.39	775.93	820.67	874.84	920.30	971.76	748.33
In Weight	lbs.	480.19	556.43	598.96	651.76	698.57	748.40	793.50	844.38	888.77	932.21	721.04
Shrink	%	-4.95	-4.26	-4.16	-3.84	-3.70	-3.55	-3.32	-3.48	-3.43	-4.05	3.68
Sale Weight	lbs.	1193.18	1233.09	1262.28	1296.85	1324.64	1345.47	1370.68	1392.08	1420.26	1460.20	1332.22
Days on Feed	days	237	199	189	176	166	156	148	139	132	127	163
Avg. Daily Gain	lbs./day	3.01	3.41	3.52	3.67	3.77	3.83	3.91	3.95	4.03	4.17	3.78
Feed-Gain Ratio	lbs.	5.97	5.80	5.75	5.80	5.91	6.02	6.07	6.21	6.23	6.33	5.96
Sick Head Days	%	0.70	0.93	1.03	0.89	0.76	0.62	0.53	0.39	0.33	0.70	0.70
Death Loss	%	2.32	4.18	3.01	2.54	2.25	1.88	1.47	1.25	0.90	0.79	2.08

Set-COG	\$/ewt	72.40	70.03	69.16	69.67	70.75	71.73	72.27	73.27	73.20	72.86	71.12
Return	\$/hd.	-98.90	-87.24	-48.88	-69.48	-58.47	-43.75	-20.92	-86.64	-11.10	-115.98	-53.10
Count	pens	29	47	146	353	434	380	216	144	98	11	1858
-	head	1431	4722	16271	46999	57597	48251	27842	17442	12194	584	233334

Table 4. Origin Means by Weight Categories, Heifers, Jan. 2009—Dec. 2015

—(Weighted by Close-Out Head)

Variable	Units	<550	550-600	600-650	650-700	700-750	750-800	800-850	850-900	900-950	950<	Overall
<i>Country Origin</i>												
Purchase Weight	lbs.	510.21	575.25	629.05	674.08	726.31	773.19	824.99	865.26	916.11	972.95	685.94
In-Weight	lbs.	495.10	555.41	612.83	658.69	709.22	754.30	810.43	836.65	890.67	925.62	668.67
Shrink	%	-2.96	-3.46	-2.58	-2.28	-2.36	-2.44	-1.76	-3.31	-2.78	-4.86	2.60
Sale Weight	lbs.	1118.48	1152.53	1174.02	1184.78	1216.95	1262.14	1271.10	1342.17	1340.63	1415.37	1204.58
Days on Feed	days	206	190	172	159	146	138	131	127	125	123	159
Avg. Daily Gain	lbs./day	3.03	3.15	3.28	3.32	3.49	3.68	3.52	3.99	3.60	3.99	3.40
Feed-Gain Ratio	lbs.	5.77	5.86	6.00	6.06	6.14	6.21	6.39	6.66	8.97	11.14	6.10
Sick-Head-Days	%	0.61	0.78	0.77	0.69	0.72	0.73	0.90	1.09	6.80	4.69	0.76
Death Loss	%	1.91	1.76	1.53	0.94	1.05	0.99	1.22	1.64	11.11	12.61	1.32
Set-COG	\$/ewt	70.82	71.11	73.11	73.74	74.31	74.86	77.50	78.58	102.86	108.94	73.95
Return	\$/hd.	-9.62	-14.62	-33.03	-33.89	-13.70	-2.76	-20.18	18.88	17.66	-116.68	-17.90
Count	pens	64	60	101	97	110	80	65	27	1	2	607
	head	5455	5177	9209	9124	10550	7451	4738	2231	40	68	54043
<i>Sale-Barn Origin</i>												
Purchase Weight	lbs.	519.18	580.16	624.07	670.64	724.21	774.64	819.62	872.47	925.57	975.67	663.23
In-Weight	lbs.	495.63	554.70	597.42	642.61	695.69	744.72	789.07	840.55	888.62	952.39	635.77
Shrink	%	-4.54	-4.39	-4.27	-4.18	-3.93	-3.86	-3.73	-3.66	-4.00	-2.39	4.17
Sale Weight	lbs.	1125.38	1148.60	1163.93	1180.47	1211.77	1239.15	1270.67	1316.86	1424.70	1498.56	1184.68
Days on Feed	days	206	184	173	159	147	137	133	128	123	117	164
Avg. Daily Gain	lbs./day	3.07	3.22	3.28	3.39	3.51	3.60	3.63	3.72	4.39	4.69	3.37
Feed-Gain Ratio	lbs.	5.94	5.99	6.05	6.11	6.18	6.30	6.50	6.57	7.34	6.09	6.12
Sick-Head-Days	%	0.80	0.72	1.03	0.79	0.68	0.61	1.19	1.74	0.70	0.84	0.84
Death Loss	%	3.05	2.56	2.47	2.02	1.58	1.35	1.27	1.35	3.74	0.00	2.12
Set-COG	\$/ewt	71.82	71.88	72.33	72.56	73.12	73.96	76.10	76.52	83.59	72.47	72.80

<u>Return</u>	<u>\$/hd.</u>	<u>-49.81</u>	<u>-57.24</u>	<u>-53.61</u>	<u>-68.11</u>	<u>-51.85</u>	<u>-52.72</u>	<u>3.59</u>	<u>-52.11</u>	<u>-53.76</u>	<u>232.95</u>	<u>-53.97</u>
<u>Count</u>	<u>pens</u>	<u>58</u>	<u>196</u>	<u>285</u>	<u>241</u>	<u>122</u>	<u>130</u>	<u>59</u>	<u>20</u>	<u>8</u>	<u>4</u>	<u>1123</u>
.	<u>head</u>	<u>4870</u>	<u>21685</u>	<u>32443</u>	<u>26174</u>	<u>12275</u>	<u>13691</u>	<u>5884</u>	<u>1428</u>	<u>223</u>	<u>88</u>	<u>118762</u>

Table 5. Ownership Means by Weight Categories, Steers, Jan. 2009 – Dec. 2015 *(Weighted by Close Out Head)*

<u>Variable</u>	<u>Units</u>	<u><550</u>	<u>550-600</u>	<u>600-650</u>	<u>650-700</u>	<u>700-750</u>	<u>750-800</u>	<u>800-850</u>	<u>850-900</u>	<u>900-950</u>	<u>950<</u>	<u>Overall</u>
<i>Customer Ownership</i>												
<u>Purchase Weight</u>	<u>lbs.</u>	<u>508.71</u>	<u>574.96</u>	<u>624.32</u>	<u>677.34</u>	<u>727.41</u>	<u>777.61</u>	<u>823.69</u>	<u>869.85</u>	<u>925.03</u>	<u>993.29</u>	<u>768.76</u>
<u>In Weight</u>	<u>lbs.</u>	<u>489.82</u>	<u>552.88</u>	<u>604.37</u>	<u>657.63</u>	<u>711.65</u>	<u>760.64</u>	<u>809.45</u>	<u>848.71</u>	<u>907.01</u>	<u>959.91</u>	<u>750.68</u>
<u>Shrink</u>	<u>%</u>	<u>-3.71</u>	<u>-3.84</u>	<u>-3.21</u>	<u>-2.91</u>	<u>-2.17</u>	<u>-2.17</u>	<u>-1.73</u>	<u>-2.43</u>	<u>-1.95</u>	<u>-3.34</u>	<u>2.44</u>
<u>Sale Weight</u>	<u>lbs.</u>	<u>1231.52</u>	<u>1274.07</u>	<u>1276.56</u>	<u>1295.11</u>	<u>1343.57</u>	<u>1364.92</u>	<u>1379.19</u>	<u>1409.09</u>	<u>1437.83</u>	<u>1487.12</u>	<u>1357.83</u>
<u>Days on Feed</u>	<u>days</u>	<u>240</u>	<u>213</u>	<u>198</u>	<u>182</u>	<u>164</u>	<u>153</u>	<u>144</u>	<u>140</u>	<u>132</u>	<u>132</u>	<u>161</u>
<u>Avg. Daily Gain</u>	<u>lbs./day</u>	<u>3.10</u>	<u>3.40</u>	<u>3.42</u>	<u>3.53</u>	<u>3.86</u>	<u>3.96</u>	<u>3.97</u>	<u>4.01</u>	<u>4.02</u>	<u>4.00</u>	<u>3.82</u>
<u>Feed-Gain Ratio</u>	<u>lbs.</u>	<u>5.96</u>	<u>5.84</u>	<u>6.01</u>	<u>6.10</u>	<u>5.90</u>	<u>5.95</u>	<u>6.03</u>	<u>6.18</u>	<u>6.18</u>	<u>6.44</u>	<u>6.03</u>
<u>Sick Head Days</u>	<u>%</u>	<u>0.82</u>	<u>0.81</u>	<u>1.07</u>	<u>1.15</u>	<u>0.72</u>	<u>0.60</u>	<u>0.50</u>	<u>0.51</u>	<u>0.30</u>	<u>0.33</u>	<u>0.66</u>
<u>Death Loss</u>	<u>%</u>	<u>2.71</u>	<u>3.13</u>	<u>3.44</u>	<u>3.36</u>	<u>2.10</u>	<u>1.77</u>	<u>1.30</u>	<u>1.27</u>	<u>0.75</u>	<u>0.65</u>	<u>1.90</u>
<u>Concurrent COG</u>	<u>\$/cwt</u>	<u>99.13</u>	<u>105.79</u>	<u>101.19</u>	<u>98.17</u>	<u>98.12</u>	<u>92.82</u>	<u>89.48</u>	<u>86.14</u>	<u>89.62</u>	<u>86.68</u>	<u>93.66</u>
<u>Set COG</u>	<u>\$/cwt</u>	<u>72.87</u>	<u>70.86</u>	<u>72.87</u>	<u>73.62</u>	<u>71.57</u>	<u>71.99</u>	<u>73.36</u>	<u>74.18</u>	<u>74.68</u>	<u>75.24</u>	<u>72.93</u>
<u>Return</u>	<u>\$/hd.</u>	<u>-74.02</u>	<u>-60.37</u>	<u>-61.11</u>	<u>-71.19</u>	<u>-61.77</u>	<u>-16.56</u>	<u>16.00</u>	<u>-1.04</u>	<u>6.83</u>	<u>-69.01</u>	<u>-28.40</u>
<u>Count</u>	<u>pens</u>	<u>53</u>	<u>33</u>	<u>62</u>	<u>81</u>	<u>124</u>	<u>142</u>	<u>120</u>	<u>83</u>	<u>61</u>	<u>38</u>	<u>797</u>
	<u>head</u>	<u>2842</u>	<u>2064</u>	<u>4031</u>	<u>5035</u>	<u>9736</u>	<u>12362</u>	<u>10429</u>	<u>6451</u>	<u>4863</u>	<u>2186</u>	<u>59999</u>
<i>Firm Ownership</i>												
<u>Purchase Weight</u>	<u>lbs.</u>	<u>491.39</u>	<u>584.37</u>	<u>625.53</u>	<u>677.43</u>	<u>725.70</u>	<u>775.54</u>	<u>821.91</u>	<u>874.88</u>	<u>920.93</u>	<u>963.38</u>	<u>756.12</u>
<u>In Weight</u>	<u>lbs.</u>	<u>481.06</u>	<u>562.94</u>	<u>602.11</u>	<u>652.86</u>	<u>700.41</u>	<u>750.74</u>	<u>798.06</u>	<u>850.45</u>	<u>891.83</u>	<u>924.88</u>	<u>731.24</u>
<u>Shrink</u>	<u>%</u>	<u>-2.07</u>	<u>-3.68</u>	<u>-3.74</u>	<u>-3.62</u>	<u>-3.49</u>	<u>-3.20</u>	<u>-2.90</u>	<u>-2.79</u>	<u>-3.16</u>	<u>-3.99</u>	<u>3.33</u>
<u>Sale Weight</u>	<u>lbs.</u>	<u>1275.26</u>	<u>1244.45</u>	<u>1267.04</u>	<u>1297.23</u>	<u>1326.22</u>	<u>1345.69</u>	<u>1370.16</u>	<u>1395.05</u>	<u>1433.52</u>	<u>1495.71</u>	<u>1338.45</u>
<u>Days on Feed</u>	<u>days</u>	<u>218</u>	<u>195</u>	<u>188</u>	<u>176</u>	<u>166</u>	<u>155</u>	<u>147</u>	<u>137</u>	<u>131</u>	<u>126</u>	<u>160</u>
<u>Avg. Daily Gain</u>	<u>lbs./day</u>	<u>3.65</u>	<u>3.49</u>	<u>3.55</u>	<u>3.67</u>	<u>3.77</u>	<u>3.84</u>	<u>3.90</u>	<u>3.98</u>	<u>4.13</u>	<u>4.52</u>	<u>3.81</u>
<u>Feed-Gain Ratio</u>	<u>lbs.</u>	<u>4.96</u>	<u>5.65</u>	<u>5.67</u>	<u>5.77</u>	<u>5.88</u>	<u>5.97</u>	<u>6.04</u>	<u>6.13</u>	<u>6.18</u>	<u>6.25</u>	<u>5.92</u>
<u>Sick Head Days</u>	<u>%</u>	<u>1.57</u>	<u>0.70</u>	<u>0.87</u>	<u>0.82</u>	<u>0.70</u>	<u>0.56</u>	<u>0.47</u>	<u>0.34</u>	<u>0.31</u>	<u>0.33</u>	<u>0.62</u>
<u>Death Loss</u>	<u>%</u>	<u>3.73</u>	<u>3.01</u>	<u>2.70</u>	<u>2.35</u>	<u>2.04</u>	<u>1.67</u>	<u>1.25</u>	<u>1.01</u>	<u>0.85</u>	<u>0.62</u>	<u>1.81</u>
<u>Concurrent COG</u>	<u>\$/cwt</u>	<u>102.32</u>	<u>108.15</u>	<u>103.12</u>	<u>102.69</u>	<u>100.58</u>	<u>97.35</u>	<u>98.85</u>	<u>97.90</u>	<u>97.23</u>	<u>113.74</u>	<u>100.07</u>
<u>Set COG</u>	<u>\$/cwt</u>	<u>61.55</u>	<u>68.63</u>	<u>68.59</u>	<u>69.55</u>	<u>70.62</u>	<u>71.60</u>	<u>72.44</u>	<u>73.18</u>	<u>73.11</u>	<u>72.80</u>	<u>71.07</u>

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Table 7. Means by Weight Categories, Customer Steers

(Weighted by Close Out Head)

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<u>Return</u>	<u>\$/hd.</u>	<u>-57.42</u>	<u>-51.88</u>	<u>-56.59</u>	<u>-61.55</u>	<u>-46.46</u>	<u>-46.54</u>	<u>-13.34</u>	<u>-21.35</u>	<u>-51.53</u>
<u>Count</u>	<u>pens</u>	<u>58</u>	<u>198</u>	<u>294</u>	<u>230</u>	<u>131</u>	<u>137</u>	<u>62</u>	<u>16</u>	<u>1126</u>
<u>-</u>	<u>head</u>	<u>6231</u>	<u>22881</u>	<u>35073</u>	<u>27726</u>	<u>15650</u>	<u>15970</u>	<u>7264</u>	<u>2108</u>	<u>132903</u>

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Table 5. Ownership Means by Weight Categories, Steers, Jan. 2009—Dec. 2015

(Weighted by Close Out Head)

Variable	Units	<550	550-600	600-650	650-700	700-750	750-800	800-850	850-900	900-950	950<	Overall
<i>Customer Ownership</i>												
Purchase Weight	lbs.	508.71	574.96	624.32	677.34	727.41	777.61	823.69	869.85	925.03	993.29	768.76
In Weight	lbs.	489.82	552.88	604.37	657.63	711.65	760.64	809.45	848.71	907.01	959.91	750.68
Shrink	%	-3.71	-3.84	-3.21	-2.91	-2.17	-2.17	-1.73	-2.43	-1.95	-3.34	2.44
Sale Weight	lbs.	1231.52	1274.07	1276.56	1295.11	1343.57	1364.92	1379.19	1409.09	1437.83	1487.12	1357.83
Days on Feed	days	240	213	198	182	164	153	144	140	132	132	161
Avg. Daily Gain	lbs./day	3.10	3.40	3.42	3.53	3.86	3.96	3.97	4.01	4.02	4.00	3.82
Feed Gain Ratio	lbs.	5.96	5.84	6.01	6.10	5.90	5.95	6.03	6.18	6.18	6.44	6.03
Sick Head Days	%	0.82	0.81	1.07	1.15	0.72	0.60	0.50	0.51	0.30	0.33	0.66
Death Loss	%	2.71	3.13	3.44	3.36	2.10	1.77	1.30	1.27	0.75	0.65	1.90
Set COG	\$/cwt	72.87	70.86	72.87	73.62	71.57	71.99	73.36	74.18	74.68	75.24	72.93
Return	\$/hd.	-74.02	-60.37	-61.11	-71.19	-61.77	-16.56	16.00	-1.04	6.83	-69.01	-28.40
Count	pens	53	33	62	81	124	142	120	83	61	38	797
	head	2842	2064	4031	5035	9736	12362	10429	6451	4863	2186	59999
<i>Firm Ownership</i>												
Purchase Weight	lbs.	491.39	584.37	625.53	677.43	725.70	775.54	821.91	874.88	920.93	963.38	756.12
In Weight	lbs.	481.06	562.94	602.11	652.86	700.41	750.74	798.06	850.45	891.83	924.88	731.24
Shrink	%	-2.07	-3.68	-3.74	-3.62	-3.49	-3.20	-2.90	-2.79	-3.16	-3.99	3.33
Sale Weight	lbs.	1275.26	1244.45	1267.04	1297.23	1326.22	1345.69	1370.16	1395.05	1433.52	1495.71	1338.45
Days on Feed	days	218	195	188	176	166	155	147	137	131	126	160
Avg. Daily Gain	lbs./day	3.65	3.49	3.55	3.67	3.77	3.84	3.90	3.98	4.13	4.52	3.81
Feed Gain Ratio	lbs.	4.96	5.65	5.67	5.77	5.88	5.97	6.04	6.13	6.18	6.25	5.92
Sick Head Days	%	1.57	0.70	0.87	0.82	0.70	0.56	0.47	0.34	0.31	0.33	0.62
Death Loss	%	3.73	3.01	2.70	2.35	2.04	1.67	1.25	1.01	0.85	0.62	1.81
Set COG	\$/cwt	61.55	68.63	68.59	69.55	70.62	71.60	72.44	73.18	73.11	72.80	71.07
Return	\$/hd.	-69.97	-68.31	-37.75	-70.60	-58.29	-45.70	-39.91	-82.63	-2.30	-65.01	-53.46
Count	pens	2	51	156	372	481	429	260	195	122	13	2081
-	head	205	6053	19725	52129	66630	57023	36861	26394	16617	1901	283539

Table 6. Ownership Means by Weight Categories, Heifers, Jan. 2009—Dec. 2015

(Weighted by Close Out Head)

Variable	Units	<550	550-600	600-650	650-700	700-750	750-800	800-850	850-900	900-950	950<	Overall
<i>Customer Ownership</i>												
Purchase Weight	lbs.	506.14	576.94	626.33	672.59	727.86	774.31	824.67	872.19	924.13	974.48	686.72
In Weight	lbs.	487.24	554.67	607.61	651.88	708.46	757.60	808.72	850.19	888.93	940.72	667.38
Shrink	%	-3.73	-3.87	-3.00	-3.08	-2.67	-2.16	-1.94	-2.51	-3.81	-3.47	2.91
Sale Weight	lbs.	1127.34	1153.75	1169.28	1180.36	1221.93	1247.70	1276.73	1309.44	1411.92	1462.30	1203.39
Days on Feed	days	215	191	176	162	148	139	131	126	123	119	162
Avg. Daily Gain	lbs./day	2.99	3.15	3.20	3.28	3.47	3.54	3.59	3.63	4.27	4.39	3.34
Feed Gain Ratio	lbs.	5.97	5.95	6.09	6.25	6.30	6.37	6.40	6.72	7.59	8.29	6.24
Sick Head Days	%	0.76	1.12	1.29	1.24	1.11	0.97	1.19	2.57	1.63	2.52	1.19
Death Loss	%	2.77	2.25	2.42	2.37	1.75	1.65	1.55	2.37	4.86	5.50	2.15
Set COG	\$/cwt	72.76	71.89	73.83	74.98	75.76	76.90	77.44	80.01	86.52	88.37	75.21
Return	\$/hd.	-3.82	-38.21	-22.96	-52.89	-11.17	-6.60	-11.54	23.73	-42.90	80.55	-20.57
Count	pens	68	61	97	115	106	80	69	33	9	6	644
	head	4490	4245	7098	8117	7450	5892	4007	1819	263	156	43537
<i>Firm Ownership</i>												
Purchase Weight	lbs.	521.46	579.50	624.98	671.13	723.99	774.14	820.96	864.62			666.02
In Weight	lbs.	503.06	554.95	599.90	645.57	699.19	745.59	794.94	831.71			640.68
Shrink	%	-3.52	-4.23	-4.02	-3.81	-3.43	-3.68	-3.17	-3.82			3.85
Sale Weight	lbs.	1119.39	1148.40	1165.91	1181.82	1210.22	1245.11	1264.77	1341.98			1186.96
Days on Feed	days	199	184	172	158	146	137	132	128			162
Avg. Daily Gain	lbs./day	3.10	3.22	3.30	3.40	3.51	3.64	3.56	4.00			3.39
Feed Gain Ratio	lbs.	5.76	5.96	6.04	6.05	6.10	6.25	6.48	6.56			6.08
Sick Head Days	%	0.65	0.66	0.90	0.62	0.54	0.54	0.93	0.23			0.69
Death Loss	%	2.26	2.45	2.24	1.53	1.18	1.08	1.18	0.70			1.78
Set COG	\$/cwt	70.29	71.71	72.36	72.27	72.74	73.79	76.55	76.60			72.64
Return	\$/hd.	-57.42	-51.88	-56.59	-61.55	-46.46	-46.54	-13.34	-21.35			-51.53
Count	pens	58	198	294	230	131	137	62	16			1126
	head	6231	22881	35073	27726	15650	15970	7264	2108	-	-	132903

Table 7. Means by Weight Categories, Customer Steers

(Weighted by Close Out Head)

Variable	Units	<550	550-600	600-650	650-700	700-750	750-800	800-850	850-900	900-950	950<	Overall
<i>Customer, Country Origin</i>												
Purchase Weight	lbs.	507.85	575.69	624.24	678.85	729.64	777.05	824.16	868.86	924.55	983.51	776.32
In Weight	lbs.	494.57	553.46	610.77	662.02	715.73	765.03	814.35	856.32	912.60	955.65	763.19
Shrink	%	-2.58	-3.88	-2.18	-2.47	-1.91	-1.54	-1.19	-1.44	-1.30	-2.81	1.78
Sale Weight	lbs.	1268.01	1297.82	1302.86	1308.75	1361.10	1373.43	1384.71	1415.34	1449.10	1501.35	1374.08
Days on Feed	days	238	211	193	178	164	151	144	139	131	133	157
Avg. Daily Gain	lbs./day	3.26	3.55	3.60	3.66	3.95	4.03	3.97	4.03	4.09	4.10	3.92
Feed Gain Ratio	lbs.	5.77	5.68	5.71	5.89	5.79	5.79	5.99	6.07	6.08	6.35	5.90
Sick Head Days	%	1.00	0.45	0.94	0.95	0.52	0.43	0.36	0.41	0.28	0.31	0.50
Death Loss	%	2.97	1.92	3.15	2.30	1.44	1.21	0.96	0.92	0.60	0.63	1.36
Set COG	\$/ewt	71.14	69.03	69.99	71.62	70.55	70.90	73.46	74.19	74.55	75.33	72.06
Return	\$/hd.	-44.26	-69.30	-27.27	-53.64	-59.17	29.50	22.88	24.73	43.97	-76.33	-3.85
Count	pens	23	16	32	45	78	100	84	54	38	22	492
	head	1248	1085	2118	2847	6753	9256	7531	3918	3263	1231	39250
<i>Customer, Sale Barn Origin</i>												
Purchase Weight	lbs.	505.19	575.62	625.43	673.55	721.25	780.83	819.97	870.38	920.36	994.12	737.67
In Weight	lbs.	480.19	552.38	597.63	649.33	696.99	745.74	789.92	832.07	888.16	944.52	707.87
Shrink	%	-4.95	-4.02	-4.45	-3.59	-3.37	-4.48	-3.67	-4.41	-3.49	-4.97	4.07
Sale Weight	lbs.	1193.18	1237.61	1244.41	1274.57	1294.27	1343.06	1355.13	1408.38	1427.40	1492.84	1316.75
Days on Feed	days	237	214	198	186	167	158	145	143	131	126	171
Avg. Daily Gain	lbs./day	3.01	3.20	3.28	3.38	3.59	3.79	3.91	4.07	4.14	4.34	3.65
Feed Gain Ratio	lbs.	5.97	6.07	6.22	6.38	6.27	6.41	6.24	6.33	6.22	6.44	6.27
Sick Head Days	%	0.70	1.23	1.32	1.48	1.42	1.21	1.00	0.70	0.39	1.44	1.10
Death Loss	%	2.32	4.99	3.95	4.97	4.08	3.49	2.43	1.87	1.09	1.32	3.25
Set COG	\$/ewt	72.40	73.43	74.25	76.22	74.91	74.72	73.72	73.39	73.06	72.19	74.18
Return	\$/hd.	-98.90	-27.31	-125.65	-78.30	-83.52	-145.38	-10.33	-45.86	-79.82	-162.74	-80.70
Count	pens	29	15	28	35	37	35	31	27	14	8	259
-	head	1431	857	1673	2026	2386	2687	2380	2277	893	200	16810

Table 8. Means by Weight Categories, Customer Heifers

(Weighted by Close Out Head)

Variable	Units	<550	550-600	600-650	650-700	700-750	750-800	800-850	850-900	900-950	950<	Overall
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Country Origin

<u>Purchase Weight</u>	lbs.	<u>500.79</u>	<u>577.77</u>	<u>627.85</u>	<u>674.79</u>	<u>728.59</u>	<u>772.58</u>	<u>824.27</u>	<u>866.76</u>	<u>916.11</u>	<u>972.95</u>	<u>692.61</u>
<u>In Weight</u>	lbs.	<u>483.23</u>	<u>556.97</u>	<u>610.73</u>	<u>658.18</u>	<u>713.46</u>	<u>760.58</u>	<u>810.99</u>	<u>845.46</u>	<u>890.67</u>	<u>925.62</u>	<u>676.54</u>
<u>Shrink</u>	%	<u>-3.49</u>	<u>-3.61</u>	<u>-2.74</u>	<u>-2.46</u>	<u>-2.09</u>	<u>-1.56</u>	<u>-1.61</u>	<u>-2.45</u>	<u>-2.78</u>	<u>-4.86</u>	<u>2.42</u>
<u>Sale Weight</u>	lbs.	<u>1134.22</u>	<u>1169.76</u>	<u>1191.09</u>	<u>1194.52</u>	<u>1231.00</u>	<u>1258.21</u>	<u>1273.88</u>	<u>1317.28</u>	<u>1340.63</u>	<u>1415.37</u>	<u>1216.62</u>
<u>Days on Feed</u>	days	<u>217</u>	<u>193</u>	<u>176</u>	<u>159</u>	<u>147</u>	<u>139</u>	<u>130</u>	<u>126</u>	<u>125</u>	<u>123</u>	<u>160</u>
<u>Avg. Daily Gain</u>	lbs./day	<u>3.01</u>	<u>3.18</u>	<u>3.31</u>	<u>3.37</u>	<u>3.52</u>	<u>3.59</u>	<u>3.56</u>	<u>3.73</u>	<u>3.60</u>	<u>3.99</u>	<u>3.41</u>
<u>Feed-Gain Ratio</u>	lbs.	<u>5.92</u>	<u>5.89</u>	<u>5.99</u>	<u>6.06</u>	<u>6.22</u>	<u>6.20</u>	<u>6.35</u>	<u>6.87</u>	<u>8.97</u>	<u>11.14</u>	<u>6.15</u>
<u>Sick Head Days</u>	%	<u>0.72</u>	<u>1.14</u>	<u>1.19</u>	<u>1.01</u>	<u>0.90</u>	<u>0.73</u>	<u>1.10</u>	<u>2.54</u>	<u>6.80</u>	<u>4.69</u>	<u>1.04</u>
<u>Death Loss</u>	%	<u>2.32</u>	<u>2.26</u>	<u>1.91</u>	<u>1.28</u>	<u>1.26</u>	<u>1.12</u>	<u>1.20</u>	<u>3.55</u>	<u>11.11</u>	<u>12.61</u>	<u>1.64</u>
<u>Concurrent COG</u>	\$/cwt	<u>102.02</u>	<u>100.96</u>	<u>101.24</u>	<u>96.69</u>	<u>95.23</u>	<u>98.63</u>	<u>102.72</u>	<u>110.43</u>	<u>166.92</u>	<u>178.67</u>	<u>99.67</u>
<u>Set COG</u>	\$/cwt	<u>72.34</u>	<u>71.44</u>	<u>72.84</u>	<u>73.58</u>	<u>75.53</u>	<u>75.75</u>	<u>77.31</u>	<u>81.96</u>	<u>102.86</u>	<u>108.94</u>	<u>74.68</u>
<u>Return</u>	\$/hd.	<u>12.92</u>	<u>11.36</u>	<u>-2.44</u>	<u>0.45</u>	<u>19.67</u>	<u>11.43</u>	<u>-11.27</u>	<u>22.36</u>	<u>17.66</u>	<u>-116.68</u>	<u>6.46</u>
<u>Count</u>	pens	<u>33</u>	<u>35</u>	<u>61</u>	<u>64</u>	<u>70</u>	<u>51</u>	<u>50</u>	<u>17</u>	<u>1</u>	<u>2</u>	<u>384</u>
	head	<u>2219</u>	<u>2357</u>	<u>4504</u>	<u>4696</u>	<u>5459</u>	<u>3701</u>	<u>3045</u>	<u>864</u>	<u>40</u>	<u>68</u>	<u>26953</u>

Sale Barn Origin

<u>Purchase Weight</u>	lbs.	<u>509.05</u>	<u>575.90</u>	<u>623.54</u>	<u>670.14</u>	<u>725.40</u>	<u>778.07</u>	<u>821.82</u>	<u>880.31</u>	<u>925.57</u>	<u>975.67</u>	<u>669.29</u>
<u>In Weight</u>	lbs.	<u>486.27</u>	<u>551.79</u>	<u>601.47</u>	<u>641.13</u>	<u>692.86</u>	<u>745.98</u>	<u>788.00</u>	<u>848.85</u>	<u>888.62</u>	<u>952.39</u>	<u>641.76</u>
<u>Shrink</u>	%	<u>-4.47</u>	<u>-4.19</u>	<u>-3.53</u>	<u>-4.33</u>	<u>-4.47</u>	<u>-4.13</u>	<u>-4.11</u>	<u>-3.57</u>	<u>-4.00</u>	<u>-2.39</u>	<u>4.13</u>
<u>Sale Weight</u>	lbs.	<u>1117.55</u>	<u>1133.76</u>	<u>1133.54</u>	<u>1162.56</u>	<u>1199.10</u>	<u>1240.59</u>	<u>1295.31</u>	<u>1321.44</u>	<u>1424.70</u>	<u>1498.56</u>	<u>1180.61</u>
<u>Days on Feed</u>	days	<u>215</u>	<u>188</u>	<u>175</u>	<u>164</u>	<u>152</u>	<u>138</u>	<u>133</u>	<u>127</u>	<u>123</u>	<u>117</u>	<u>168</u>
<u>Avg. Daily Gain</u>	lbs./day	<u>2.94</u>	<u>3.10</u>	<u>3.04</u>	<u>3.18</u>	<u>3.33</u>	<u>3.59</u>	<u>3.80</u>	<u>3.71</u>	<u>4.39</u>	<u>4.69</u>	<u>3.26</u>
<u>Feed-Gain Ratio</u>	lbs.	<u>6.05</u>	<u>6.03</u>	<u>6.18</u>	<u>6.56</u>	<u>6.55</u>	<u>6.56</u>	<u>6.53</u>	<u>6.54</u>	<u>7.34</u>	<u>6.09</u>	<u>6.36</u>
<u>Sick Head Days</u>	%	<u>0.82</u>	<u>1.08</u>	<u>1.48</u>	<u>1.71</u>	<u>1.52</u>	<u>1.60</u>	<u>1.82</u>	<u>3.25</u>	<u>0.70</u>	<u>0.84</u>	<u>1.49</u>
<u>Death Loss</u>	%	<u>3.14</u>	<u>2.25</u>	<u>3.24</u>	<u>4.37</u>	<u>3.07</u>	<u>3.05</u>	<u>2.28</u>	<u>1.51</u>	<u>3.74</u>	<u>0.00</u>	<u>3.15</u>
<u>Concurrent COG</u>	\$/cwt	<u>104.89</u>	<u>113.66</u>	<u>112.77</u>	<u>119.21</u>	<u>109.38</u>	<u>100.61</u>	<u>93.97</u>	<u>119.14</u>	<u>120.11</u>	<u>108.26</u>	<u>110.85</u>
<u>Set COG</u>	\$/cwt	<u>73.26</u>	<u>72.46</u>	<u>74.36</u>	<u>77.15</u>	<u>76.47</u>	<u>75.94</u>	<u>75.75</u>	<u>76.12</u>	<u>83.59</u>	<u>72.47</u>	<u>75.26</u>
<u>Return</u>	\$/hd.	<u>0.22</u>	<u>-100.09</u>	<u>-60.22</u>	<u>-133.90</u>	<u>-98.68</u>	<u>-42.70</u>	<u>32.94</u>	<u>-9.60</u>	<u>-53.76</u>	<u>232.95</u>	<u>-66.50</u>
<u>Count</u>	pens	<u>33</u>	<u>26</u>	<u>35</u>	<u>45</u>	<u>32</u>	<u>23</u>	<u>16</u>	<u>14</u>	<u>8</u>	<u>4</u>	<u>236</u>
-	head	<u>2015</u>	<u>1888</u>	<u>2526</u>	<u>3016</u>	<u>1835</u>	<u>1602</u>	<u>694</u>	<u>687</u>	<u>223</u>	<u>88</u>	<u>14574</u>

Table 8. Means by Weight Categories, Customer Heifers

(Weighted by Close Out Head)

Variable	Units	<550	550-600	600-650	650-700	700-750	750-800	800-850	850-900	900-950	950<	Overall
<i>Country Origin</i>												
Purchase Weight	lbs.	500.79	577.77	627.85	674.79	728.59	772.58	824.27	866.76	916.11	972.95	692.61
In Weight	lbs.	483.23	556.97	610.73	658.18	713.46	760.58	810.99	845.46	890.67	925.62	676.54
Shrink	%	-3.49	-3.61	-2.74	-2.46	-2.09	-1.56	-1.61	-2.45	-2.78	-4.86	2.42
Sale Weight	lbs.	1134.22	1169.76	1191.09	1194.52	1231.00	1258.21	1273.88	1317.28	1340.63	1415.37	1216.62
Days on Feed	days	217	193	176	159	147	139	130	126	125	123	160
Avg. Daily Gain	lbs./day	3.01	3.18	3.31	3.37	3.52	3.59	3.56	3.73	3.60	3.99	3.41
Feed-Gain Ratio	lbs.	5.92	5.89	5.99	6.06	6.22	6.20	6.35	6.87	8.97	11.14	6.15
Sick Head-Days	%	0.72	1.14	1.19	1.01	0.90	0.73	1.10	2.54	6.80	4.69	1.04
Death Loss	%	2.32	2.26	1.91	1.28	1.26	1.12	1.20	3.55	11.11	12.61	1.64
Set-COG	\$/ewt	72.34	71.44	72.84	73.58	75.53	75.75	77.31	81.96	102.86	108.94	74.68
Return	\$/hd.	12.92	11.36	-2.44	0.45	19.67	11.43	-11.27	22.36	17.66	-116.68	6.46
Count	pens	33	35	61	64	70	51	50	17	1	2	384
	head	2219	2357	4504	4696	5459	3701	3045	864	40	68	26953
<i>Sale Barn Origin</i>												
Purchase Weight	lbs.	509.05	575.90	623.54	670.14	725.40	778.07	821.82	880.31	925.57	975.67	669.29
In Weight	lbs.	486.27	551.79	601.47	641.13	692.86	745.98	788.00	848.85	888.62	952.39	641.76
Shrink	%	-4.47	-4.19	-3.53	-4.33	-4.47	-4.13	-4.11	-3.57	-4.00	-2.39	4.13
Sale Weight	lbs.	1117.55	1133.76	1133.54	1162.56	1199.10	1240.59	1295.31	1321.44	1424.70	1498.56	1180.61
Days on Feed	days	215	188	175	164	152	138	133	127	123	117	168
Avg. Daily Gain	lbs./day	2.94	3.10	3.04	3.18	3.33	3.59	3.80	3.71	4.39	4.69	3.26
Feed-Gain Ratio	lbs.	6.05	6.03	6.18	6.56	6.55	6.56	6.53	6.54	7.34	6.09	6.36
Sick Head-Days	%	0.82	1.08	1.48	1.71	1.52	1.60	1.82	3.25	0.70	0.84	1.49
Death Loss	%	3.14	2.25	3.24	4.37	3.07	3.05	2.28	1.51	3.74	0.00	3.15
Set-COG	\$/ewt	73.26	72.46	74.36	77.15	76.47	75.94	75.75	76.12	83.59	72.47	75.26
Return	\$/hd.	0.22	-100.09	-60.22	-133.90	-98.68	-42.70	32.94	-9.60	-53.76	232.95	-66.50
Count	pens	33	26	35	45	32	23	16	14	8	4	236
-	head	2015	1888	2526	3016	1835	1602	694	687	223	88	14574

Table 9. Returns per Head, Mixed Linear Model Parameter Estimates

Parameter	Estimate	Standard Error
Intercept	-782.08***	108.19
Returning Customer	4.63**	2.06
Occasional Customer	-4.13*	2.38
Country Origin	2.87**	1.28
Other Origin	7.18	4.47
Heifers	18.03***	1.93
<i>Close Out Month</i>		
January	-1.62	2.28
February	1.29	2.53
March	-6.30**	2.77
April	5.06*	2.89
May	3.66	3.06
June	5.91**	2.54
July	10.94***	2.22
August	6.47***	2.42
October	0.41	2.63
November	5.84**	2.52
December	5.06*	2.91
<i>Performance</i>		
Cost of Gain	-5.45***	0.02
Feeder Price	-7.50***	0.03
Live Price	12.84***	0.05
Days on Feed	2.10***	0.25
In Weight	0.57***	0.13
In Weight Squared	-3.1E-04***	0.00
Sale Weight	0.18	0.14
Sale Weight Squared	-1.5E-04***	0.00
Shrink	-10.94***	0.36
Death Loss	-3.32***	0.27
Average Daily Gain	64.77***	11.13

Significance at 1% ***, 5% **, 10% *

Parameter estimates weighted by head count at close out

Table 10. Average Daily Gain, Mixed Linear Model Parameter Estimates

Parameter	Estimate	Standard Error
Intercept	6.5236***	0.2163
Returning Customer	0.0509***	0.00981
Occasional Customer	0.0614***	0.01404
Country Origin	0.0251***	0.00872
Other Origin	-0.1425***	0.02798
Heifer	-0.2615***	0.011
<i>Close Out Month</i>		
January	0.0907***	0.0153
February	-0.0299*	0.0159
March	-0.0958***	0.0162
April	-0.1347***	0.0154
May	-0.1125***	0.0151
June	-0.0456***	0.0141
July	0.0025	0.0128
August	0.0032	0.0141
October	0.0234	0.0148
November	0.0621***	0.0143
December	0.1124***	0.0152
<i>Feedlot Performance</i>		
Days on Feed	-0.0055***	0.0004
In Weight	0.0016***	0.0004
In Weight Squared	-2.14E-7***	0.0000
Shrink	0.0482***	0.0023
Feed-Gain Ratio	-0.6328***	0.0186
Feed-Gain Ratio Squared	0.0208***	0.0010
Sick Head Days	-0.0045*	0.0026

Significance at 1% ***, 5% **, 10% *

Parameter estimates weighted by head count at close out

Table 11. Death Loss, Mixed Linear Model Parameter Estimates

Parameter	Estimate	Standard Error
Intercept	-14.1496***	1.5326
Returning Customer	-0.0690	0.0598
Occasional Customer	-0.1062	0.0805
Country Origin	-0.2684***	0.0477
Other Origin	-0.0946	0.1310
Heifer	-1.1767***	0.0753
<i>Close Out Month</i>		
January	-0.5514***	0.0779
February	-0.7313***	0.0981
March	-0.7328***	0.1056
April	0.1491	0.1149
May	0.3293***	0.1253
June	0.5237***	0.0911
July	0.3254***	0.0764
August	0.0639	0.0781
October	-0.0450	0.0796
November	-0.3362***	0.0790
December	-0.4486***	0.0821
<i>Feedlot Performance</i>		
Days on Feed	-0.0078***	0.0025
In Weight	-0.0268***	0.0027
In Weight Squared	7.086E-6***	0.0000
Shrink	-0.2353***	0.0141
Feed-Gain Ratio	5.0043***	0.1521
Feed-Gain Ratio Squared	-0.1198***	0.0085
Average Daily Gain	2.1099***	0.0876
Sick Head Days	0.7317***	0.0235

Significance at 1% ***, 5% **, 10% *

Parameter estimates weighted by head count at close out

Table 12. Returns per Head Ordered Logit, Odds Ratio Estimates

Parameters	Point Estimate	95% Wald Confidence Limits	
Country vs. Sale Barn Origin	1.03	0.86	1.24
Other vs. Sale Barn Origin	1.01	0.63	1.62
Returning Customer vs. Firm Ownership	1.28	1.05	1.56
Occasional Customer vs. Firm Ownership	1.04	0.81	1.34
Heifers vs. Steers	1.76	1.35	2.31
<i>Close Out Month, x vs. September</i>			
January	0.70	0.51	0.98
February	0.74	0.52	1.06
March	0.70	0.49	1.01
April	1.07	0.75	1.53
May	1.00	0.71	1.42
June	1.11	0.78	1.57
July	1.46	1.06	2.00
August	1.20	0.86	1.69
October	0.99	0.70	1.40
November	0.97	0.68	1.39
December	1.16	0.82	1.66
<i>Market Parameters</i>			
Cost of Gain	0.76	0.75	0.77
Feeder Price	0.68	0.67	0.69
Live Price	1.91	1.86	1.96
<i>Feedlot Performance</i>			
Days on Feed	1.04	1.01	1.07
In Weight	0.99	0.98	1.01
Sale Weight	1.01	0.99	1.03
Shrink	0.56	0.54	0.59
Average Daily Gain	3.31	0.96	11.42
Feed-Gain Ratio	0.60	0.40	0.90
Death Loss	0.81	0.78	0.84

Figures

