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E.M. Mousel

South Dakota State University

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SDSU IRM-SPA: Trend Analysis 2002 – 2008

E. M. Mousel¹

Department of Animal and Range Sciences, South Dakota State University

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SUMMARY

Production and financial efficiency data from cow-calf producers in eastern South Dakota was analyzed. Data was collected from 2002-2008; each herd represented one observation. The database consisted of 210 production observations and 140 financial observations. Analysis of production efficiency data was conducted according to the SPA guidelines, developed by the IRM Coordinating Committee of the National Cattlemen's Beef Association. Financial data was collected using the SPA system, in accordance with the SPA guidelines as well information collected from IRS Schedule F to calculate operating expense ratio (OER). Overall trends suggested that following the market peak of 2005, production efficiency has decreased and operating costs have increased resulting in a 53% reduction in profitability since 2002.

INTRODUCTION

Assessing trends in production and financial efficiencies of a business is critical to both short- and long-term decision making processes. In order to develop data sets that can be analyzed for trends in efficiency and profitability, producers have long been encouraged through Cooperative Extension programming and private lenders to keep annual production and financial records to aid in this process. The resulting analysis of the record keeping efforts of producers through Integrated Resource Management (IRM) provides valuable information to producers and allied industry on current year production and financial levels as well as longer term trends. Identification of trends in production and financial efficiency for decision making purposes by the individual producer and other stakeholders in the industry can improve long-term profitability and sustainability.

Integrated Resource Management is a method of managing the farm as a whole, rather than as separate, unrelated enterprises. Using this method, resources can be utilized to maximize the efficiency and profitability of the operation. A key component of the IRM approach to management is Standardized Performance Analysis (SPA). SPA integrates production and financial records to create information that can be used by cow-calf producers to make management decisions. The SD-IRM-SPA program was developed with the intent of providing producers in South Dakota with a useful analysis of their business to improve profitability and sustainability.

The objective of this analysis was to identify trends in production efficiency, profitability, and financial efficiency of producers in eastern South Dakota that have contributed records to the database. In addition, a database of actual production and financial efficiency information for cow-calf producers in this region is presented.

¹ Assistant professor.

MATERIALS AND METHODS

Data collected from cow-calf producers in eastern South Dakota who participated in the SDSU-IRM-SPA program were used in this study. Additional data was collected through individual consultation and through the SDSU Range 485 Advanced Ranch Management course. Data were collected for the 2002 through 2008 calendar years; data were from the cow-calf enterprise only. All production data, regardless of source, were collected using the SPA system, in accordance with the SPA guidelines, developed by the IRM Coordinating Committee of the National Cattlemen's Beef Association. Financial data was collected using the SPA system, in accordance with SPA guidelines; information was collected from IRS Schedule F to calculate OER. The OER is defined as the proportion of gross revenue used to cover operating expenses. The ratio was calculated as follows:

$$\text{Operating expense ratio} = \frac{\text{total operating expense} - \text{interest expense} - \text{depreciation expense}}{\text{value of farm production}}$$

Where value of farm production is defined as gross income minus the value of purchased feeder livestock and purchased feed.

Calf cost breakeven was calculated as follows:

$$\text{Calf cost breakeven} = \frac{\text{total cow cost}}{\text{pounds of calf weaned per cow exposed}}$$

Return on Assets (ROA) was calculated as follows:

$$\text{ROA} = \frac{\text{net farm income} + \text{interest paid} - \text{labor and management} + \text{capital gains}}{\text{total farm assets}}$$

All participants completed the production data however, not every participant reported financial data. Each herd represented one observation which resulted in a final database of 210 production observations and 140 financial observations. Producers who were involved with the program more than 1 yr may be included multiple times. Operations ranged from 47 to 1,125 cows.

The ultimate objective of this data set is to determine the factors that positively and negatively influence profitability in cow calf enterprises in eastern South Dakota. Future analysis of this data will be used for that purpose and the result will be published upon completion of the analysis. In the mean time, this preliminary analysis was conducted on the data set to simply identify mean differences between years and to observe trends in reproduction, production, and financial performance in eastern South Dakota cow-calf enterprises over the years 2002 to 2008.

Means and standard error estimates were derived using the Proc Means procedure of SAS (SAS Inst. Inc., Cary, NC). Mean differences were tested using the Proc GLM procedure of SAS. Differences were considered significant at the $P = 0.1$ level.

RESULTS AND DISCUSSION

Benchmarks for each parameter over the years 2002 to 2008 are reported in Table 1.

Mean pregnancy percentage over all years of the study was 94.6% (Table 1). Mean pregnancy percentage increased 2% ($P < 0.1$) in 2004 and 2005 and decreased by 1.5% and 0.5% in 2006 and 2007, respectively (Figure 1). Although the increase in pregnancy percentage observed in 2004 and 2005 coincided with the increase in weaned calf prices experienced over this same time period (Figure 3), it is difficult to discern from this data whether the two are actually related. It is not uncommon for producers to put more time and monetary expenditure for products that improve conception in the cow-calf enterprise as the market rises and reduce time and monetary expenditures as the market fades. Although the effect of monetary expenditures in the cow-calf enterprise on overall profitability has been well established, the effect of level of time and monetary expenditures on the cow-calf enterprise and their specific contribution to production efficiency is not thoroughly understood.

Mean weaning percentage decreased 2% from 2002 to 2003 before increasing 6% from 2003 to 2005 (Figure 2). An 8% decline in mean weaning percentage was observed between 2005 and 2008 (Figure 2). As previously stated, it is difficult to determine the relationship between market prices, management, and coincidence in both the pregnancy percentage and weaning percentage data, as the effect of level of time and monetary expenditures on the cow-calf enterprise and their specific contribution to production efficiency is not thoroughly understood.

Mean percentage of calves born in the first 21 d of the calving season was 60.26% (Table 1). Although mean percentage of calves born in the first 21 d of the calving season generally was not very consistent over the 7 years of this data set, in all years, at least 90% of cows calved in the first 63 d of the calving season (Figure 4). The proportion of calves born in the first 21 d of the calving season is a critical measurement as calves born in the first 21 d of the calving season are older and generally heavier than their counterparts born at a later date due to the fact that all calves are typically weaned at the same time. Therefore, producers with a high proportion of calves born later in the calving season are sacrificing age, weaning weight and ultimately gross income, if calves are sold directly off the cow.

Although a 10% ($P < 0.1$) increase in mean weaning weights was observed in 2003, it is likely that mean weaning weights were depressed in 2002 and 2004 due to drought conditions throughout South Dakota (Figure 5). Even though the number of calves weaned at lighter weights due to feed shortages or early weaned to decrease nutrition demand for the cow cannot be derived from this data set, it likely was high in these years. However, the 5.5% decrease in mean weaning weights observed in 2006 – 2008 appears to be trending towards a change in management strategy as environmental conditions were not a factor in these years. It is likely that as weaned calf prices increased from 2002-2005 as the market reached its cyclical peak, producers were inclined to use creep feed to add additional weight to calves at a reasonable cost of gain. Conversely, as the price of corn spiked beginning in late 2006 (Figure 6) and the price of calves began to soften, cost of gain of calves on creep likely became negative and creep feed was eliminated from the production system, resulting in lighter calves (Figure 5).

Mean pounds of calf weaned per cow exposed during the breeding season followed a trend similar to weaning percentage and weaning weight (Figures 2, 5, and 6). The higher ($P < 0.1$) mean pounds of calf weaned per cow exposed during the breeding season observed in 2005 was a result of higher weaning percentage and heavier weaning weights (Figures 2 and 5). Although weaning weights in 2003 were also high, weaning percentage in 2003 was 6% lower than in 2005. Similar to the decrease ($P < 0.1$) observed

in both weaning percentage and weaning weight in 2006-2008, mean pounds of calf weaned per cow exposed during the breeding season decreased ($P < 0.1$) in 2006-2008 (Figure 6).

Mean breakeven calf cost increased ($P < 0.1$) 29% between 2002 and 2008 (Figure 7). Although mean breakeven calf cost increased numerically by 14% between 2002 and 2005, the increase was not significant ($P > 0.1$), likely due to the high variance in the relatively small number of sampling points for 2002-2004. However, mean breakeven calf cost increased ($P < 0.1$) 16% from 2002-2006, increased ($P < 0.1$) an additional 12% in 2007 and 4% in 2008 (Figure 7). The increase in breakeven calf cost, especially 2006-2008, is likely the result of several different factors. The decrease in both mean weaning percentage and mean weaning weight provides fewer overall pounds to spread essentially the same amount of operating and fixed costs over, effectively increasing unit cost of production. Similarly, annual operating costs rose over the 7-year period of this study as evidenced by the 30% increase ($P < 0.1$) in mean operating expense ratio from 2002-2008 (Figure 8). More importantly, the increase in operating expenses appeared to accelerate after 2005 as an 18% increase ($P < 0.1$) in mean operating expense ratio was observed between 2005 and 2008. Much of the increase in mean operating expense ratio after 2005 was likely due to increasing fuel prices (Figure 9). Fuel cost increases would not only increase general operating expenses but also feed costs to some degree and thus breakeven calf cost.

As a result of increasing costs, lower prices for weaned calves, and declining production efficiencies, mean percent return on assets decreased ($P < 0.1$) 53% between 2002-2008. Most notably, a 43% decline ($P < 0.1$) in mean percent return on assets was observed between 2005 and 2006. Although a 53% percent decrease in the primary measure of profitability is substantial, the mean percent return on assets seen in 2008 remains well above the historical mean percent return on assets of 3%.

Table 1. SDSU-IRM-SPA benchmarks 2002-2008 (pregnancy percentage, weaning percentage, calving distribution, wean weight, and pounds weaned per cow exposed: n=210; breakeven calf cost and percent return on assets: n=140).

Year	Pregnancy %	Wean %	Calving distribution (%)			Wean weight (lb)	Lb weaned/cow exposed	Breakeven calf cost	Return on assets (%)
			Day 1 to 21	Day 22 to 42	Day 43 to 63				
Average 2002-2008	94.65	88.40	60.26	25.37	9.04	517.39	456.89	0.86	9.66

Figure 1. Mean pregnancy percentage and standard deviation for 2002 – 2008 (n=210).

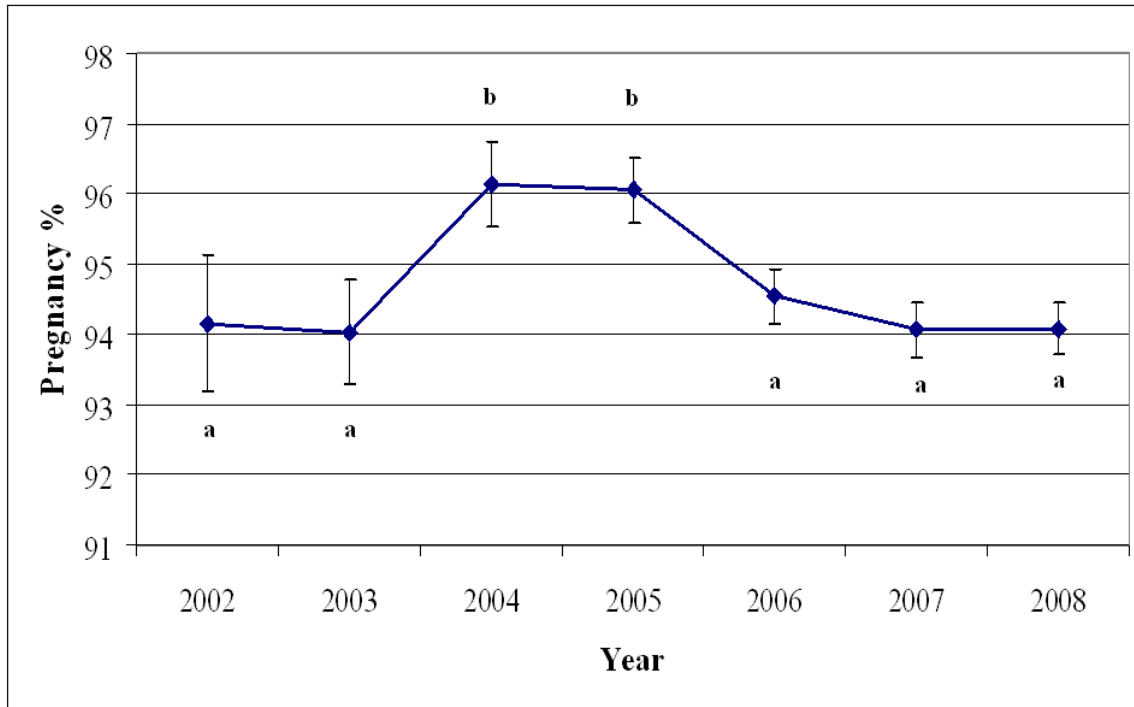


Figure 2. Mean weaning percentage and standard deviation for 2002 – 2008 (n=210).

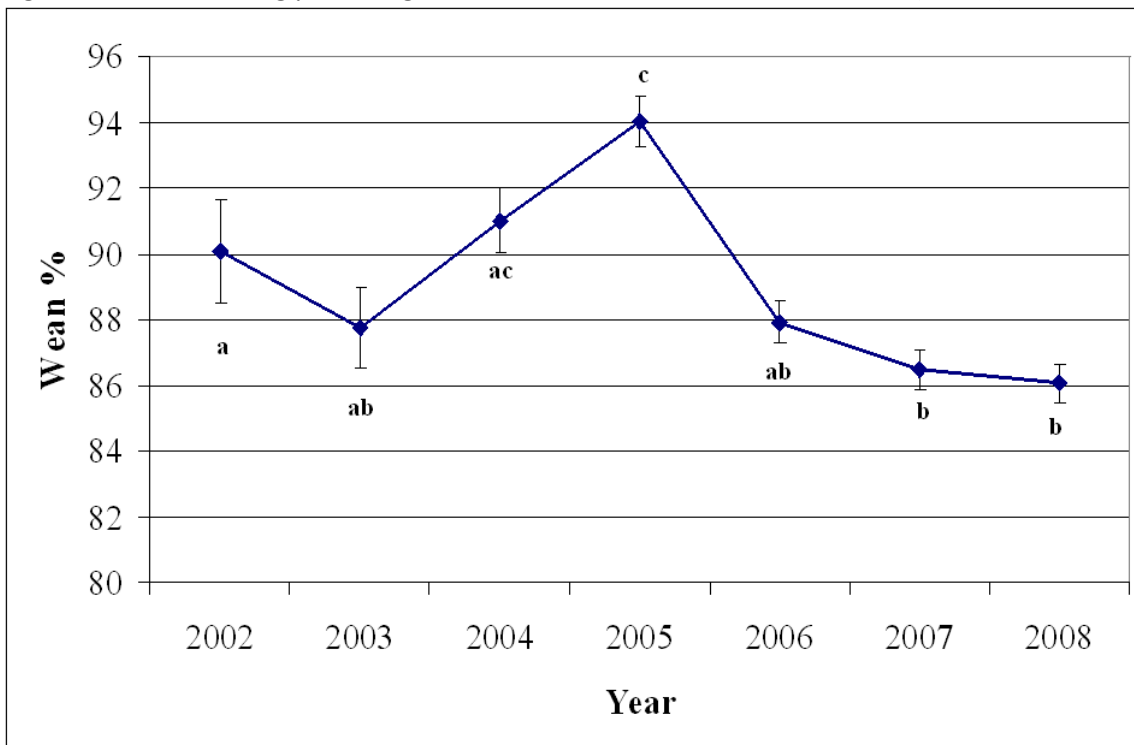


Figure 3. Average 500-600 lb calf price received for 2004-2008 at Bales Continental Commission Inc. Huron, SD.

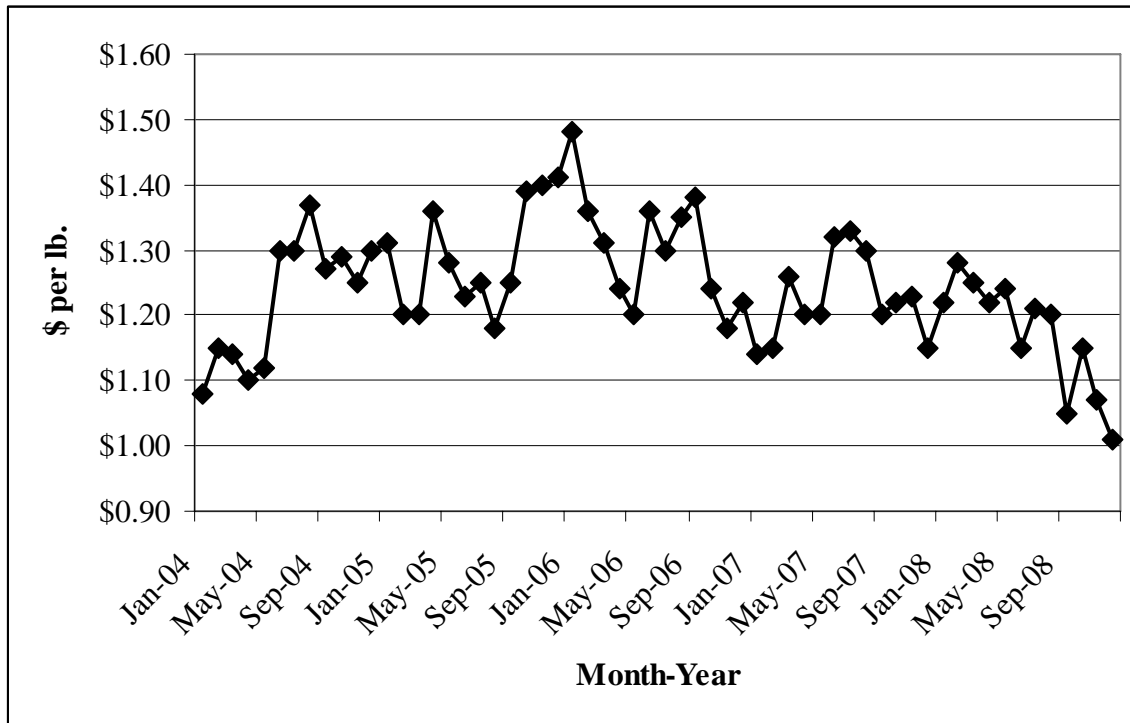


Figure 4. Mean percent of calves born day 1 – 21, day 22-42, and day 43-63 of the calving season and standard deviation for 2002 – 2008 (n=210).

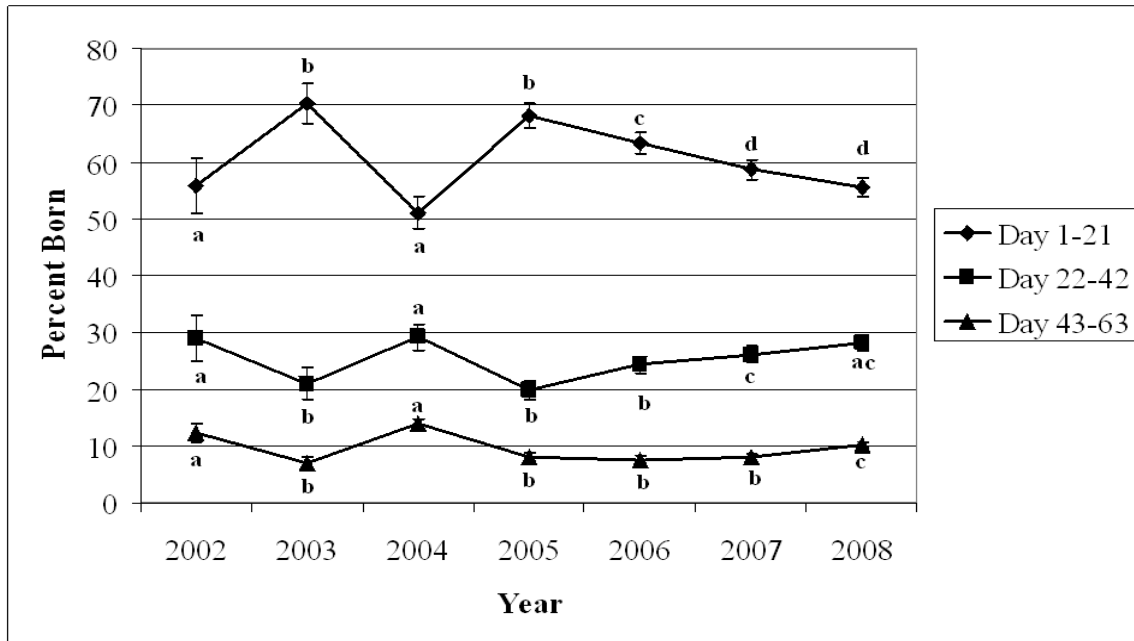


Figure 5. Mean weaning weight (lbs) and standard deviation for 2002 – 2008 (n=210).

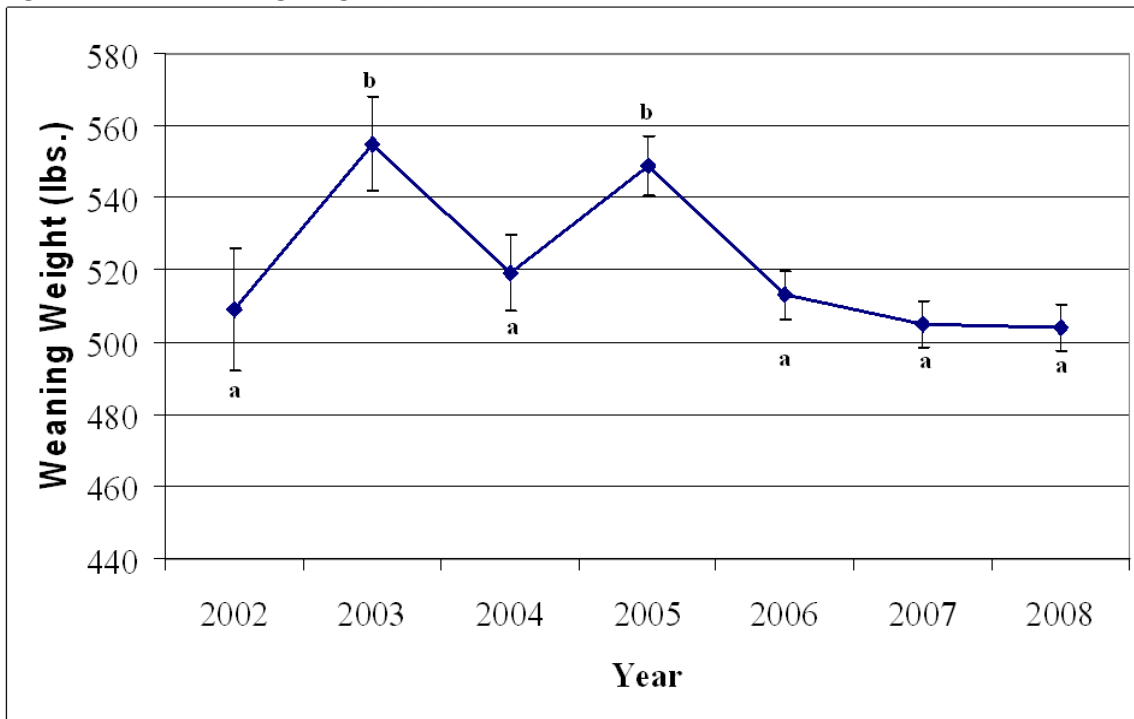


Figure 6. U.S. monthly average corn farm price received for 2000-2008 (Data Source: <http://www.nass.usda.gov/index.asp>).

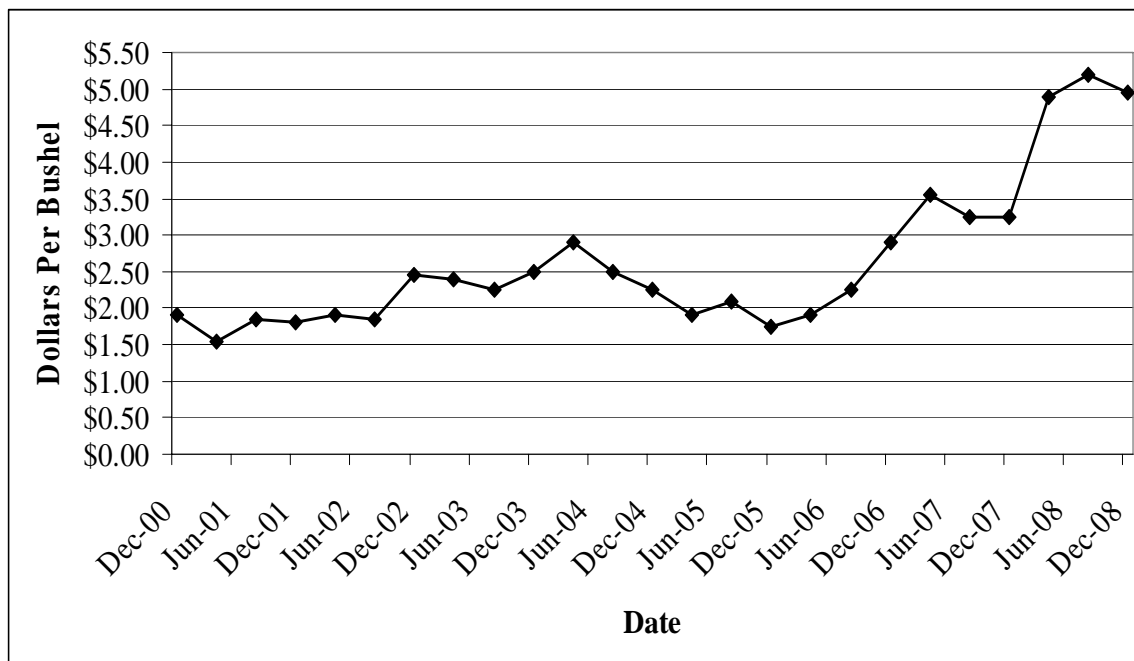


Figure 7. Mean pounds of calf weaned per cow exposed and standard deviation for 2002-2008 (n=210).

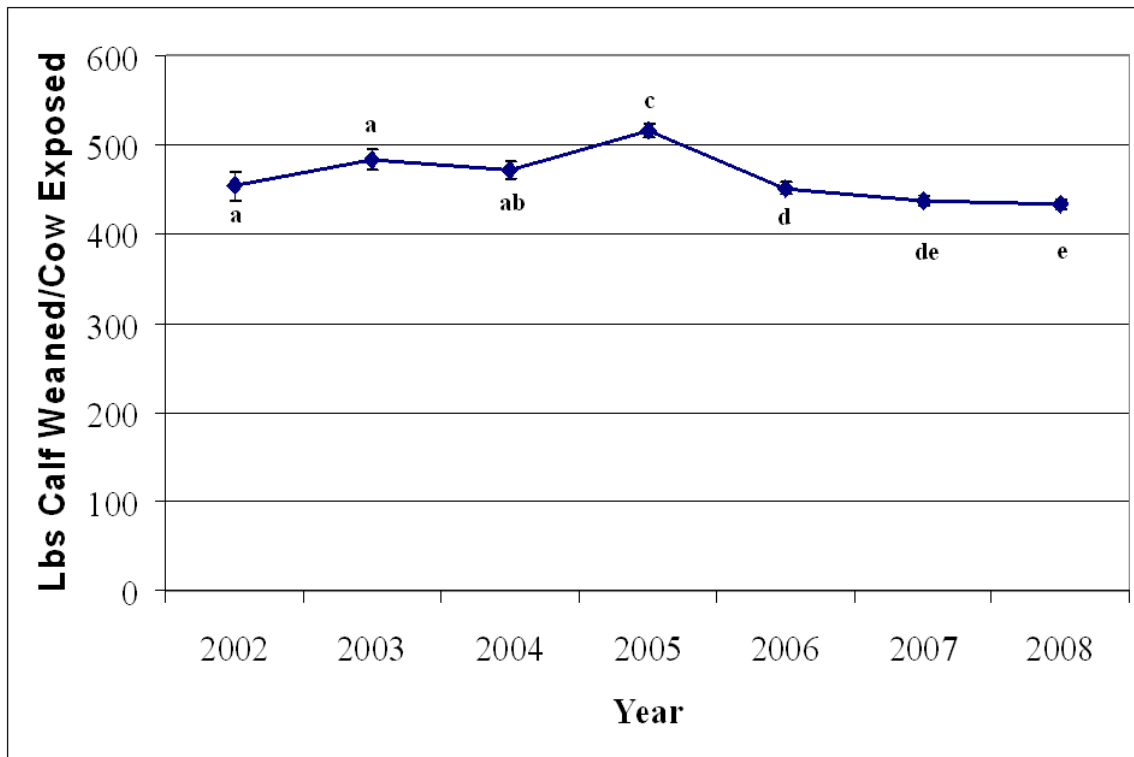


Figure 8. Mean breakeven calf cost and standard deviation for 2002-2008 (n=140).

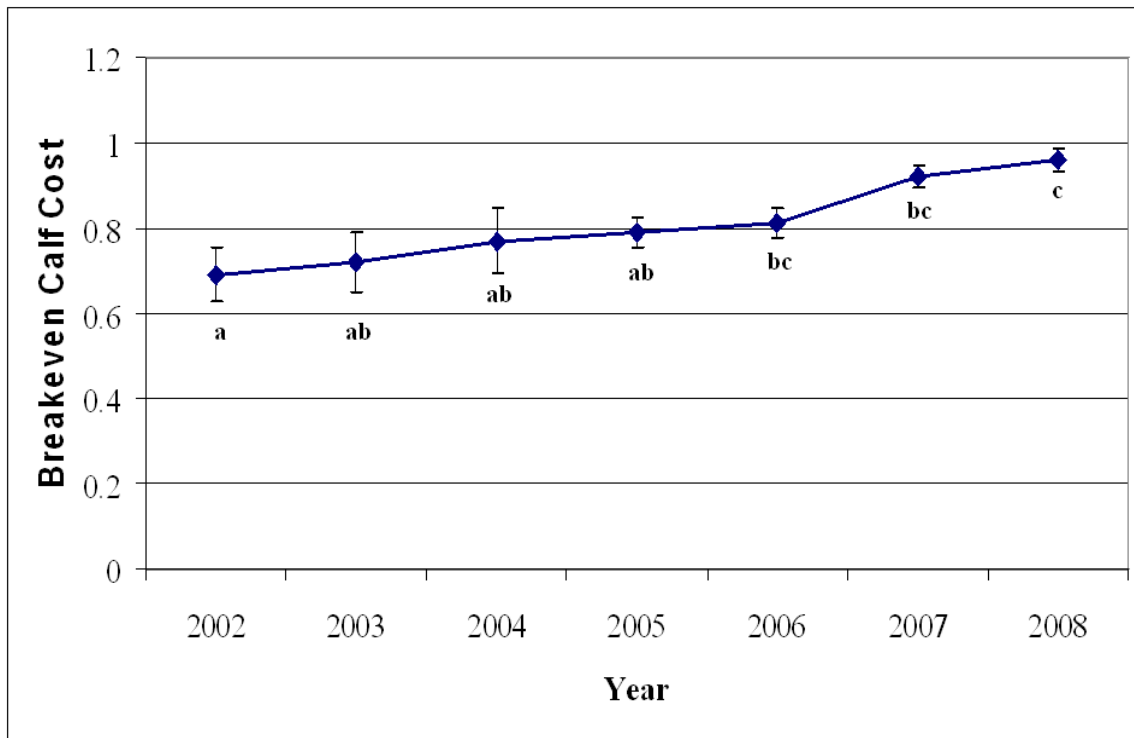


Figure 9. Mean operating expense ratio and standard deviation for 2002-2008 (n=140).

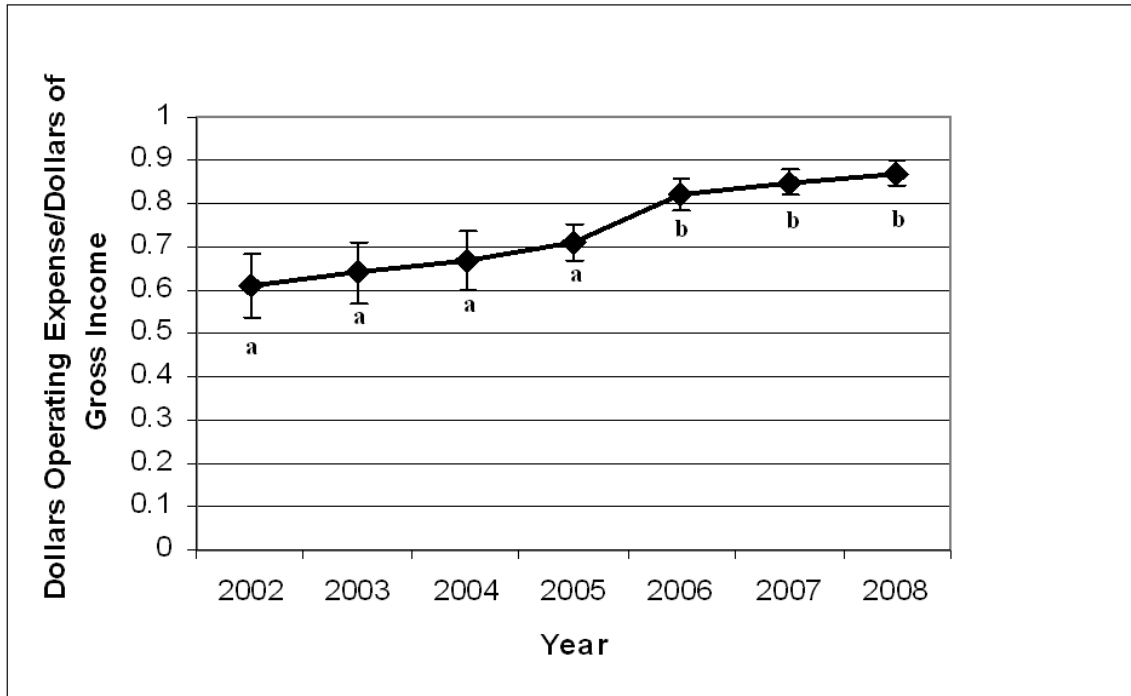


Figure 10. Retail price (dollars/gallon) of diesel fuel in U.S. for 2002-2008 (Data source: <http://tonto.eia.doe.gov/oog/info/wohdp/diesel.asp>).

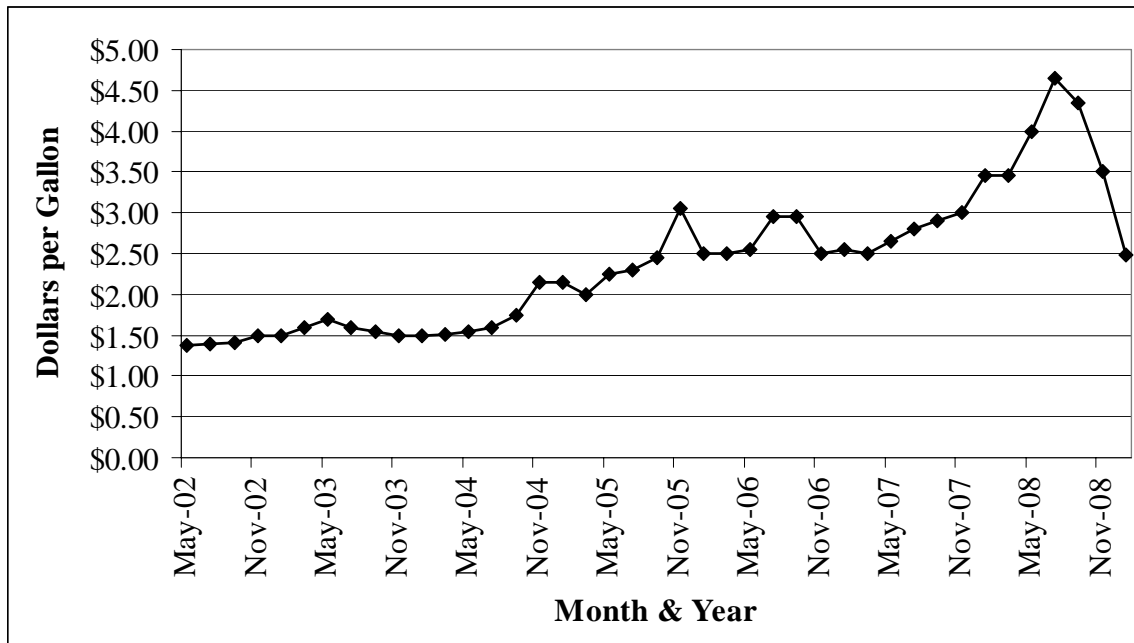
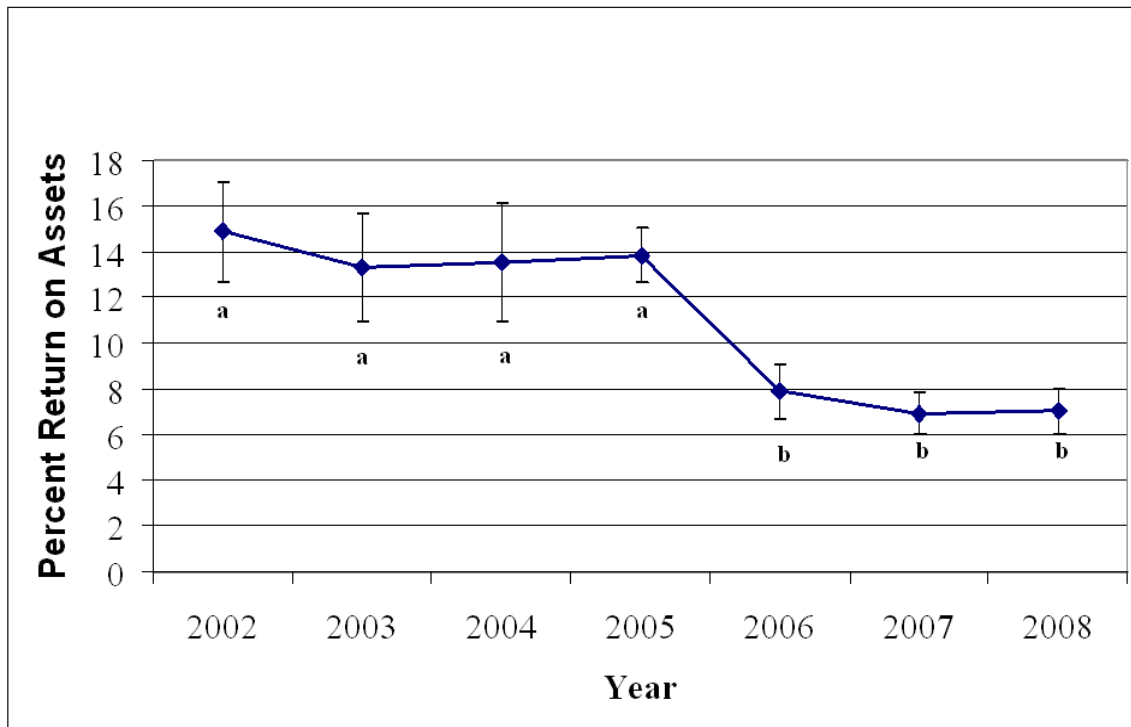


Figure 11. Mean percent return on assets and standard deviation for 2002-2008 (n=140).



IMPLICATIONS

Lower market prices appear to have led many producers to allow production efficiency to slip since the market peak of 2005 in eastern South Dakota. Although prudent expenditure of time and money is important in any business, producers should be wary of cutting important corners that can severely compromise production efficiency. Invariably, reductions in production efficiency will lead to lower profitability. Additionally, this analysis demonstrates that additional data collection and analysis is needed to model the effect of management factors on production efficiency and ultimately profitability.

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