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Seasonal Variation in Fed Cattle Profitability Including Both Production and Price Risk

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Introduction

- Previous literature has identified two primary sources of risk associated with buying and selling fed cattle (Fausti and Feuz, 1995):
  - Production risk
  - Price risk
- Although both play an important role in determining fed cattle profit variability, previous research has tended to focus on one or the other.
- When considering the impact of production and price risks, seasonality – season in which animals are fed/marketed – becomes an important factor.
- To date, the interaction of seasonal production and price risks on fed cattle returns is unknown.
- A better understanding of these seasonal effects on cattle feeding profitability may help cattle feeders increase returns, reduce risk, or both.

Objective

The purpose of this research is to examine the seasonal variation in fed cattle profitability considering both production and price (specifically Choice-Select price spread) risk.

Data/Methodology

- Data for 2,303 steers and 698 heifers originate from the Tri-County Steer Carcass Futurity Cooperative (TCSCFC) in Lewis, Iowa. Data were collected from November 2004 through February 2015.
- General forms of five feedlot performance and hot-carcass quality characteristics are estimated using regression models assuming multiplicative heteroskedasticity (Belasco et al., 2009).

Dependent Variables

- Average daily gain
- Feed-to-gain ratio
- Veterinary costs
- Marbling score (quality grade)
- Yield grade

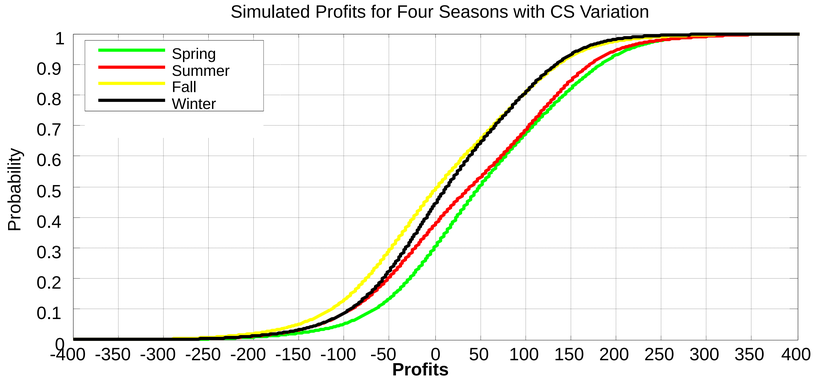
Independent Variables

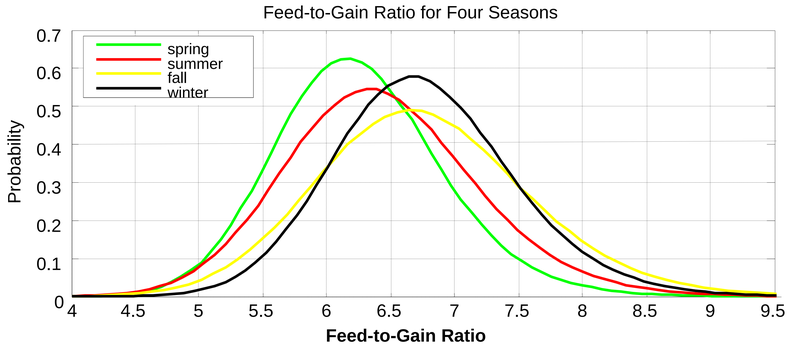
- Placement season dummies
- Animal sex
- Placement weight
- Days on feed
- Number of health treatments

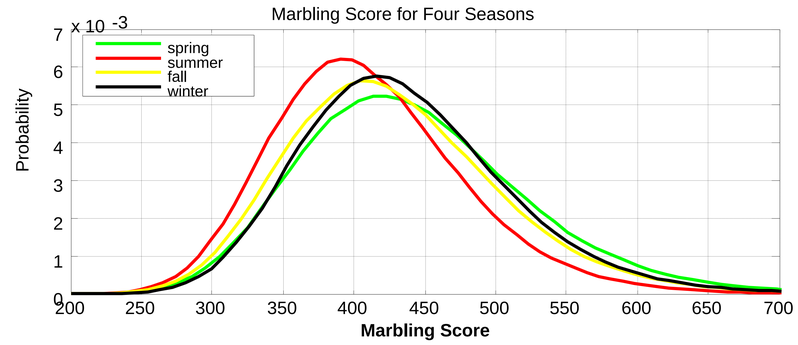
- These five equations – along with seasonal distributions of the Choice-Select spread – are used as part of a multivariate stochastic simulation.
- The covariance structure of the five feedlot performance and hot-carcass quality characteristics is derived from heteroskedastic error variances and correlation coefficients of the residuals from regression analysis.
- The Choice-Select spread is assumed independent from the biological factors.
- Draws are taken from the multivariate normal distribution to obtain simulated cattle performance, hot carcass characteristics, and Choice-Select spread, and ex ante profits are calculated for each draw.

Results

- Cattle placed in the spring are the most profitable according to first-degree stochastic dominance analysis of cumulative distribution functions across seasons.
- Winter-placed cattle yield profits with the lowest variance, and summer-placed cattle yield profits with highest variance.







- Spring-placed cattle display the lowest feed-to-gain ratio with the lowest variance, followed by summer and winter.
- Fall-placed cattle display the highest mean and variance of feed-to-gain ratio. .
- Spring-placed cattle show superior feed efficiency by mean-variance analysis.
- Spring-placed cattle yield beef with the highest mean and variance of marbling scores.
- Summer-placed cattle yield beef with the lowest mean and variance of marbling scores.
- Both lower feed-to-gain ratio and higher marbling score contribute positively to profitability of cattle placed in spring.

Reference/Contact

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- Fausti, S.W., and D.W. Feuz. "Production Uncertainty and Factor Price Disparity in the Slaughter Cattle Market: Theory and Evidence." *American Journal of Agricultural Economics* 77(August 1995): 533-540.
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Conclusion

Both model results and simulation show that seasonality impacts cattle performance and hot carcass quality characteristics, which lead to profitability variation across seasons. Further analysis will focus on quantification of seasonal effects of production and price risk on profitability.