RISK REDUCTION BY MARKETING FREQUENCY

by

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Abstract

Market risk is considered to be reduced through increased frequency of marketing. A model is developed for cattle over an eight year period. The marketing frequency varies from one time yearly to monthly. Market risk appears reduced by the increased frequency of marketing.

Key words: Market Risk, Finished Cattle, Feeder Cattle, Returns Per Head.

RISK REDUCTION THROUGH MARKETING FREQUENCY

Introduction

Risk reduction is of concern to all economic enterprises. Risk arises from problems of production and from shifts in price relationships of costs of inputs and price for products marketed.

While risk may be sizeable in the short-run or market period from variation in prices at the market, generally business firms commit capital to an enterprise on the basis of long-run expected returns to the investment. However, variation of returns can cause sizeable risk to a firm in the short-run.

Market risk is of special significance to agriculture because of the nature of the firm being a price-taker. Unlike more concentrated industries in the manufacturing or retail sector, market risk to agriculture is caused in great part by varying price relationships between inputs and the marketing of the final product.

With specialization of agriculture today, the matter of variance in returns is of major concern. In enterprises based on relatively major input costs, risk modification programs have taken varied forms. One major direction of reducing risk in specialized agriculture is the increased marketing frequency.

A Canadian model using data for a recent 20 year period investigated the boundaries of income variation to help livestock farmers and ranchers plan for the future. This illustrated possible planning horizons of risks and returns over the period of two decades. As the study suggested, "most farmers plan for only 1 to 5 years at a time. Even in their longest term

decisions perhaps no more than 20 years are usually taken into account."[1]

While the distribution of returns over a 50 year period may take the distribution characterized by the term normal, or bell-shaped in its curvature, yet in a more relative short-run situation or period of fewer years, the probability of losses may be skewed. While a normal curve can give one relatively accurate predictions of probabilities of outcome over time, a shorter time period results in less predictable returns.

With probability of returns estimated for the long-run from any given enterprise, the expected or mean value is useful to capital committed to the enterprise over the entire time horizon. However, in the short run, and especially with distributions of returns skewed or bimodal, the variance in returns or risk element is of major importance. In effect, "for the purpose of short-term planning, the modal outcome has the greater frequency and represents the price or yield which has the greatest likelihood of occurrence in any one year." Thus, the operator whose financial equity is such that he cannot sustain a severe loss in the short-run is not benefitted from planning horizons based on expected long-run returns.[2]

This paper will examine the effect of frequency of marketing on the level of risk of loss from a cattle feeding enterprise.

The Model

A simulation model, hereafter referred to as The Model, will be developed from average monthly prices for feeder cattle and fed cattle for a nine year period.

Major assumptions of The Model are the following:

1) constant costs of feed, death losses, and custom feedlot fees

2) evaluation of returns to equity capital based on total capital
   per head of $300

3) illustration of costs, profits and losses on a per head basis

4) constant turning of inventory with complete turnover every five
   months, with each monthly marketing representing a pen of 200
   head. The marketing frequency will be modified later to consider
   the returns from less frequent marketings.

The Model has a relatively constant commitment of capital throughout
the entire nine year period.[3] This suggests profits are not reinvested but
losses of equity on a particular month of marketings are immediately re-
placed. This allows purchase of a similar number of cattle each month.

Consideration of long-run returns to cattle feeding for the nine year
period assumes the investor had sufficient financial resources to replace
equity losses and continue the feeding operation.

Simulation Model of Risks and Returns

Data

The time period considered for cattle marketing is 1960-1968. Feeder
cattle were purchased monthly (beginning in July 1959) and finished cattle
were sold monthly five months after purchase as feeder cattle, (beginning
in January 1960). Final sales of finished cattle were in the month of
December 1968, of cattle purchased as feeder cattle in July of that year.
In effect, cattle inventory was turned every five months with one-fifth of
the cattle on feed at any one time being sold during each month.

Cattle prices, markets, types, grades, and weights

Data for prices at particular markets, type of cattle, grades and weights were taken from official USDA sources.[4] Prices for cattle were based on choice steer prices for both feeder and finished cattle.[5] Prices for The Model represent average monthly prices. Prices of the 550-650 pound feeder cattle were calculated from prices at Kansas City. Finished cattle (900-1100 pounds) prices were prices prevailing at Omaha.[6]

Death losses

Death losses were calculated at the one percent level. This was re-flected in The Model by the purchase of 200 head of cattle and the marketing of 198 head at the end of the five-month feeding period. The death loss used is common to the industry for average conditions.[8]

Cost of gain

Cost of gain for the cattle on feed in The Model was at $.20 per pound of gain. Charges for transportation and marketing were $5.00 per head. Comparing this to actual cattle feeding operations, one major cattle feedlot in the Texas-Panhandle area reported costs of gain for the five year period of 1965-1969 averaging $21.18 per hundredweight for steers and $21.29 for heifers.[9]

Returns from cattle feeding

Average returns per head for the entire nine years were $15.63 (Table 2, in the Appendix) before considering costs of interest for debt capital.[10]

On a yearly basis of the nine years, only 1963 showed an overall loss ($9.13) on cattle marketed for the year. The most profitable year was 1965 with profits averaging $36.03 per head.

For any one month of marketing, the highest average loss per head was $28.42 in May 1963. Losses were reported for particular months in seven of the nine years. Highest average profits per head for any one month of marketing ranged between $50 and $60 for one or more months in 1962, 1965 and 1966. Maximum profits for any one month occurred in 1966, when profits reached $58.66 per head for March marketings.

The Model showed that a cattle feeder who placed pens of cattle on feed in each of the 108 months for marketing five months later showed losses in only one of the nine years. Probability of having an annual loss is only 11 percent. Yet, a cattle feeder would have lost money on the cattle in 32 out of the 108 months of The Model, for the period 1960 through 1968 or for 30 percent of the months.

In the case of cattle feeding the margins between feeder cattle prices and finished cattle prices would tend to be averaged out by increasing the frequency of buying and selling cattle from one time yearly to a monthly basis. Thus, the monthly purchase of feeder cattle and marketing of finished cattle with varying profit margins over time would tend to "average out" the possible extremes of relatively high or relatively low profits per head of cattle for any one month.

For a given year, the average returns per head for cattle marketed on a monthly basis would be expected to be more typical of prices for that year than were marketings conducted only one time yearly. In effect, less variability of average returns per head for a given year would be expected

with monthly marketings than with once a year marketings.

Decreased Marketing Frequency

Long-Run Profits, Probability of Loss and Annual Maximum Loss

Probability of annual loss, level of average returns per head and annual losses for less frequent marketing than once monthly is of interest to cattle feeders lacking sufficient equity to finance enough pens of cattle to market cattle monthly. Table 3, Appendix, shows these values. An evaluation of the data according to different marketing frequencies may suggest different levels of risk and returns for cattle feeders following these practices.

Average returns per head

Average returns per head for the entire nine year period are approximately $15 to $16 for marketing over four times yearly (Table 3, in the Appendix). For marketings on a once a year basis, average profits per head runs from approximately $10 to $20 depending on which month the annual marketing occurred. This suggests less certainty of the level or stability of average profit per head over time from less frequent marketings. Over the nine year period a cattle feeder marketing only in June averaged $10 per head. A cattle feeder marketing only in March had profits of $20 per head.[11]

Long-run expected returns from cattle feeding are less predictable as marketing frequency decreases. Fewer marketings per year show average returns for the entire nine year period different in either direction from the $15-$16 figure per head that was received for more frequent marketings.

Probability of loss as function of marketing frequency

Table 3, in the Appendix, also shows the possibilities of reducing risk of average loss per head from more frequent marketings. Probability of positive returns for total marketings per year are generally higher for the more frequent marketings. Eight out of the nine years provided positive returns for any marketing frequency of marketings greater than every fourth month.

However, no clear pattern of lower probability of loss for the nine year period is discerned for marketing more frequently except when comparing marketings on a one-time yearly basis to monthly marketing. Marketings every six months show profits consistently in 8 of the 9 years whereas half of the marketing programs that marketed every fourth month show profits only in 7 of the 9 years.

Risk of having losses for the year appears greater for one marketing per year. The majority of the marketing patterns that marketed once yearly showed profits only six of the nine years (or losses three of the nine years). Marketings one time annually, in September, showed the highest probability of loss, four out of the nine years. This limited analysis does not suggest a close relationship between frequency of marketings and reduced risk.

Maximum annual loss as a function of marketing frequency

In some instances, maximum losses per head for a year are less with less frequent marketings than with more frequent marketings. However, the maximum loss level is lower with monthly marketings than with 11 of the 12 one-time-yearly marketings.

Summary and Conclusion

From the foregoing analysis of effect of marketing frequency upon

average profits per head, risk of loss and level of loss, regular monthly

marketings appear to provide generally higher average returns per head,

a lower probability of losses and generally lower level of losses for any

year than would marketings on one-time yearly basis. Any risks of loss

on unleveraged investments are magnified by leveraging.

Footnotes

[1]Harold C. Love, "Income Variation in Beef Production, A Budget Study of Feeder Calf Production in Southern Alberta, 1946-1965," The Univeristy of Alberta, Agricultural Economics and Rural Sociology Research Bulletin 1 (Edmonton: The University of Alberta, reprinted 1970).

[2]Ibid., p. 5.

[3]The use of a simulated model for evaluating strategies of leverage, interest costs, risk comparisons and tax management is suggested by David Wells in "Financial Planning in Cattle Feeding," Calf News, 11 (November 1973), p. 68. The Model will be compared to actual reported costs and returns from feedyard firms, throughout the chapter.

In contrast to this model of regular patterns of cattle marketings, other models have sought to determine the optimal time to buy and sell cattle for feedlot finishing. A study by Green concluded some feedlot managers would not always feed cattle if expected price margins were relatively low.

Green considered decision-making of feedlot managers as based upon their objective functions. These were noted to vary. Some feedlot managers seek to maximize returns per head of cattle feed. Others seek to maximize returns for a given time period. There are other feedlot managers who seek a "satisfactory" return on equity and relatively stable earnings.

Richard D. Green, "Expectation Formulations and Optimal Decisions in Cattle Feedlot Problems" (unpublished Ph.D. dissertation, Agricultural Economics Department, University of Missouri, Columbia, 1972).

[4]Data were taken from studies compiled Southwestern Public Service Company, Amarillo, Texas. The writer acknowledges the cooperation of Mr. Sam Thomas of the Company in making this data available.

[5]Prices for "good grade" cattle and for heifers tend to be lower than those for steers. However, heifers comprised only 16 percent of the total steer and heifers, of the 900-1099 pound class, on feed January 1, 1973, according to Cattle on Feed, 1973. Also, cattle feedlot management spokesmen told of purchasing "good grade" feeder cattle and feeding to "choice grade" which would tend to increase the possible profits per head).

[6]Data from the 1960-1968 period represents a period of relative stability in price levels for feed grains and the costs of production. Also, marketing data of prices for that period for the Kansas City and the Omaha markets represents a period when those two markets served a sizeable portion of the market for feeder cattle and for fed cattle, respectively.

Footnotes (Cont.)

[7] "Hoof to Hamburger," Wall Street Journal, May 24, 1974, pp. 1-30.

[8] Russell Gum and Elmer L. Menzie, The Arizona Cattle Feeding Industry. Agricultural Experiment Station, Technical Bulletin 191. Tucson, Arizona: The University of Arizona, January 1972, p. 8.

Data Sheet from South Central Kansas Custom Feedyard, mid-1972, Flint Hills Beef Feeders, Inc., Potwin, Kansas.

"Hoof to Hamburger," Wall Street Journal, May 24, 1973, pp. 1 and 30.

[9] Data from a Texas Panhandle cattle feeding club (corporation) serving area farmer-ranchers as reported to University of Missouri Agricultural Economics professors on feedlot tour in 1971.

[10] Cost of interest on debt financing of cattle feeding will be treated later in this chapter. Assuming each head of cattle represented $100 of equity and $200 of debt capital for the five month feeding period, interest of 9 percent would result in the following added charge per head: $200 x 9/100 x 150/360 = $7.50. A capital cost per head of $7.50 would reduce the average returns to approximately $8.00 ($15.63 - $7.50) for the nine year period. While capital costs reduce the net dollars return per head, the return to equity may be increased through leveraging.

[11] The comparison for marketings less than monthly were all based on marketings made on similar months each year, i.e., a marketing pattern of January or January and July would be continued for the entire nine year period. It is assumed, for purpose of analysis, that a cattle feeder marketing one time yearly would market during the same month each of the nine years.
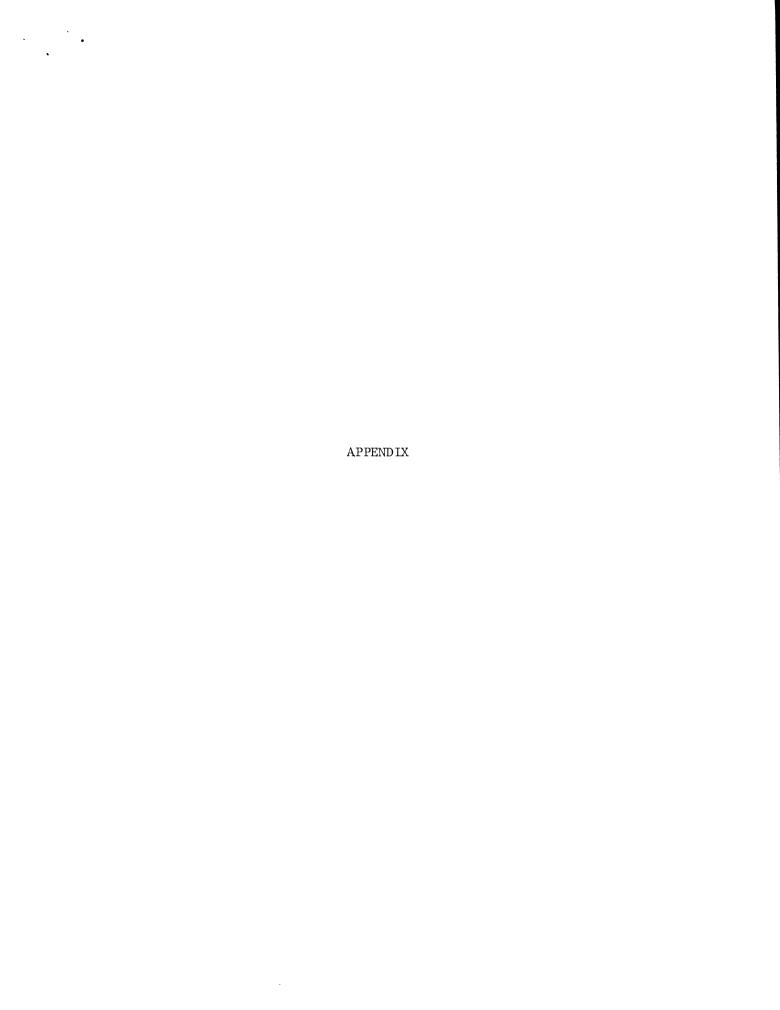
APPENDIX

Table 1

Monthly Profits from Cattle Feeding, 1960-68

Month	1960	1961	1962	1963	1964	1965	1966	1967	1968
					Dollars				
January	- 2.44	+43.23	+22.36	+21.79	-17.60	+26.41	+33.46	+ 1.03	+15.29
February	+ 8.40	+35.38	+29.00	- 4.26	-19.84	+23.00	+43.07	- 4.17	+31.43
March	+28.54	+28.48	+35.63	-17.79	-13.92	+30.69	+58.66	- 5.16	+36.32
April	+39.61	+14.25	+34.61	-21.46	-16.28	+40.07	+47.55	- 2.96	+36.81
May	+38.97	- 5.46	+20.44	-28.42	-19.95	+56.65	+30.56	+ 8.63	+34.47
June	+18.43	-12.86	+14.17	-22.45	-12.79	+57.48	+ 8.98	+10.46	+27.71
July	+ 8.28	-15.73	+19.40	+ 2.06	+ 8.37	+45.97	- 4.18	+15.34	+31.70
August	-10.23	- 3.38	+31.93	+ 4.67	+21.86	+46.09	-10.70	+33.72	+25.47
September	-14.24	- 4.30	+50.10	- 6.72	+32.92	+36.85	- 0.82	+34.47	+19.90
October	+ 3.45	+ .84	+48.24	- 2.55	+30.61	+25.82	- 7.19	+19.07	+10.22
November	+17.39	+14.32	+54.52	-10.29	+26.67	+20.48	- 6.07	+11.74	+26.61
December	+28.23	+25.45	+38.98	-24.19	+22.45	+22.85	- 2.63	+ 7.10	+22.70
All 12 months averaged	+13.70	+10.02	+33.28	- 9.13	+ 3.54	+36.03	+15.89	+10.77	+26.55

Source: Data were taken from studies compiled by Southwestern Public Service Company, Amarillo.

Table 2

Returns Per Head Per Year from Monthly Marketings of Cattle, 1960-68, and Returns Per Head for Whole Nine-year Period

Year	Average	Maximum Profits Month	Minimum Profits Month	Range Between Maximum and Minimum Profits
		----------------Dollars----------------		
1960	+13.70	39.61	-14.24	53.85
1961	+10.02	43.23	-15.73	58.96
1962	+33.28	54.52	+14.17	40.35
1963	-09.13	21.79	-28.42	50.21
1964	+03.54	32.92	-19.95	52.87
1965	+36.03	57.48	+20.48	37.00
1966	+15.89	58.66	-10.70	69.36
1967	+10.77	34.47	-05.16	39.63
1968	+26.55	36.81	+10.22	26.59
1960-68	+15.63	58.66	-28.43	87.09

Source: Data are a summary compilation of data in Table 1.

Table 3

Marketing Frequency, Probability of Profits and Maximum Annual Loss for 1960-1968

Marketing Frequency	Average Returns Per Head[a]	Probability of Positive Returns for Marketings, of Each Year	Average Maximum Loss Per Head in any Year
Monthly	15.60	8/9	-$ 9.13
alternate months			
-from January	15.40	8/9	-$ 4.32
-from February	15.00	8/9	-$11.71
every third month			
-from January	51.40	8/9	-$ 0.04
-from February	15.90	8/9	-$ 9.58
-from March	15.60	8/9	-$17.79
every fourth month			
-from January	15.80	7/9	-$ 4.45
-from February	13.30	7/9	-$ 9.75
-from March	16.60	8/9	-$ 8.67
-from April	16.80	8/9	-$13.66
every sixth month			
-from January	14.20	8/9	-$ 4.62
-from February	15.60	8/9	-$ 9.15
-from March	18.30	8/9	-$12.26
-from April	16.70	8/9	-$12.01
-from May	16.20	8/9	-$19.36
-from June	12.80	8/9	-$23.32
every twelfth month			
-from January	16.00	7/9	-$17.60
-from February	15.80	6/9	-$19.84
-from March	20.20	6/9	-$17.79
-from April	19.10	6/9	-$21.46
-from May	15.10	6/9	-$28.42
-from June	9.90	6/9	-$22.45
-from July	12.40	7/9	-$15.73
-from August	15.50	6/9	-$10.23
-from September	16.50	5/9	-$14.24
-from October	14.30	7/9	-$ 7.19

Table 3   (continued)

Marketing Frequency	Average Returns Per Head[a]	Probability of Positive Returns for Marketings, of Each Year	Average Maximum Loss Per Head in any Year
-from November	17.30	7/9	-$10.29
-from December	15.70	7/9	-$24.19

[a]Data on average returns per head is rounded to the nearest 1/10 of a dollar.

Source: Above data was developed from the returns shown in The Model in Table 1 by considering possible patterns of marketing and returns for each of the nine years in a separate manner.