Alternative Cow Herd Investment Strategies: Constant Size and Constant Investment

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Summary

Two heifer replacement strategies were compared over a 25-year period. One strategy retained the same number of heifers each year to maintain a constant herd size. The second strategy retained the same dollar value of heifer calves each year based on their opportunity cost as feeder calves. The constant investment strategy herd size varied throughout the period, but generated higher average profit and higher net worth than did the constant herd size strategy.

Constant investment is a simple strategy to adjust the level of investment in beef cows and the resource base (pasture, labor, winter feed) in response to market signals driven by the cattle cycle. This strategy automatically increases heifer retention when the opportunity cost is low and reduces the number retained when cost is high. The effect is a lower average cost of cows in the herd, lower overall investment, and a higher net return on investment. Iowa producers, who often have greater flexibility in land use than producers in other major beef cow regions, can better utilize this strategy that generates greater profits and net worth growth.

Introduction

The cattle cycle can be traced back to the Civil War with a good deal of predictability. Each 10 to 12 years, typically near the middle of a decade, beef production peaks and prices decline in response to the large supplies. The lower prices result in losses to cattle producers that, in turn, reduce production, which eventually causes higher prices and profits—typically at the end of the decade —thus encouraging more beef production and continuation of the cycle. Given the biological clock of beef production—more than three years from the birth of a heifer calf until her offspring reaches finish weight—and the psychological lag for producers to decide to expand or contract the herd, the cycles range from 10 to 12 years. Within this cycle, profit per cow can vary from $250 to -$40 in inflation adjusted terms. Producers who can increase production in profitable years and reduce production in unprofitable years will receive higher average profits and greater net worth growth.

One strategy for investing in a cyclical enterprise is "dollar cost averaging." This strategy is commonly used in the stock market and for mutual funds. The principle is to invest the same dollar amount, say $100, each period. When stock prices have fallen, the $100 buys more shares than when the stock is expensive. The average cost of the stock in the portfolio is lower than if you had purchased the same number of shares each period because more shares were purchased at a lower price than at the higher price. A beef cow herd fits this model well, because the cow is a capital investment that generates a return over a number of years, and prices and returns are cyclical. Because of the length of the cycle, heifers retained through the lower part of the price cycle will produce calves that are sold during the higher part of the price cycle and vice versa.

Materials and Methods

The constant investment strategy (CI) and a more typical constant herd size (CHS) heifer retention strategy were compared over the 1970 to 1994 calf crops. Both herds started with the identical number of animals—100 bred cows and heifers, four bulls, and 20 replacement heifers. Cows were calved in the spring and calves and cull cows were sold in November. Performance of the two herds was identical. The culling rate on a percentage basis was also identical for the two herds. Iowa State University Extension enterprise budgets for each year were used to calculate net returns, and costs were calculated on a per cow basis. Market prices (USDA Agricultural Market News Service) were used for sales and feed inputs. Values reported in the budgets were used for pasture, interest rates, and other non-feed variables and fixed cost. Net worth was calculated on the market value of the herd and accumulated earnings from previous years. Money was borrowed if cash flow was insufficient to cover cost.

Heifer calves were kept back each fall and charged to the cow herd at opportunity cost, had they been sold as feeder calves. The CHS strategy kept back the same number of heifers each year and, given a known conception rate, death loss, and culling rate, the herd size was maintained at 100 bred cows and heifers each year. The CI strategy retained the same dollar amount of heifers each fall, based on their opportunity cost as feeder calves. This dollar amount was equal to the average amount in nominal terms invested by the CHS strategy over the entire period. Therefore, both herds invested the same amount of money in replacement heifers over the time period.

Results and Discussion

Average annual profits for CI were 40% higher than those of CHS (Table 1). CI had a lower minimum return and higher maximum return compared with CHS.

The net worth at the end of the 25 years was $100,000 higher for CI—$367,492 versus $267,419.

Table 1. Annual returns and net worth for the constant investment and constant herd size heifer retention strategy.

Annual profits	Constant herd size	Constant investment
Average 1970-1994	$6,937	$9,856
Minimum 1970-1994	-$987	-$4,121
Maximum 1970-1994	$16,900	$32,669
Net worth 1994	$267,419	$367,492

Figure 1 shows the herd size for CI over time. It starts at 100 cows and increases to more than 160 cows before returning to approximately 80 cows in 1994. This change in herd size requires the producer to adjust pasture and hay acreage. Iowa producers who have the option of using hay or pasture in many crop rotation plans have greater flexibility to adjust herd size than do beef producers in regions where grazing is their only option. Figure 2 is the dollar investment required to retain the same number of heifers each year under the CHS strategy.

The trend in herd profit is similar for both systems (Figure 3), but it is larger and more variable under the CI strategy. Losses in 1974 to 1976, due to low calf prices, were magnified under the CI strategy because additional low cost heifers were retained and not marketed in 1974, which resulted in higher feed costs in 1975 and 1976 before selling a calf (Figure 4). The CI strategy was then selling considerably more calves in the late 1970s and early 1980s when calf prices were higher.

Net worth increased faster under CI, particularly during the supply-contracting, price-increasing phase of the cattle cycle (Figure 5). Differences between the strategies occurred in 1978 and 1979 as marketings increased and through 1987 to 1994 while marketings and herd size declined but prices were high. Although the analysis ends in 1994, the low calf prices in 1995 would have increased heifer retention, again rebuilding the herd.

Implications
Market signals driven by the cattle cycle provide cow owners an opportunity to invest more profitably in beef cow herds. Following a simple "dollar cost averaging" investment strategy used in the stock market, produces higher average profits and greater net worth than does a more common constant herd strategy.
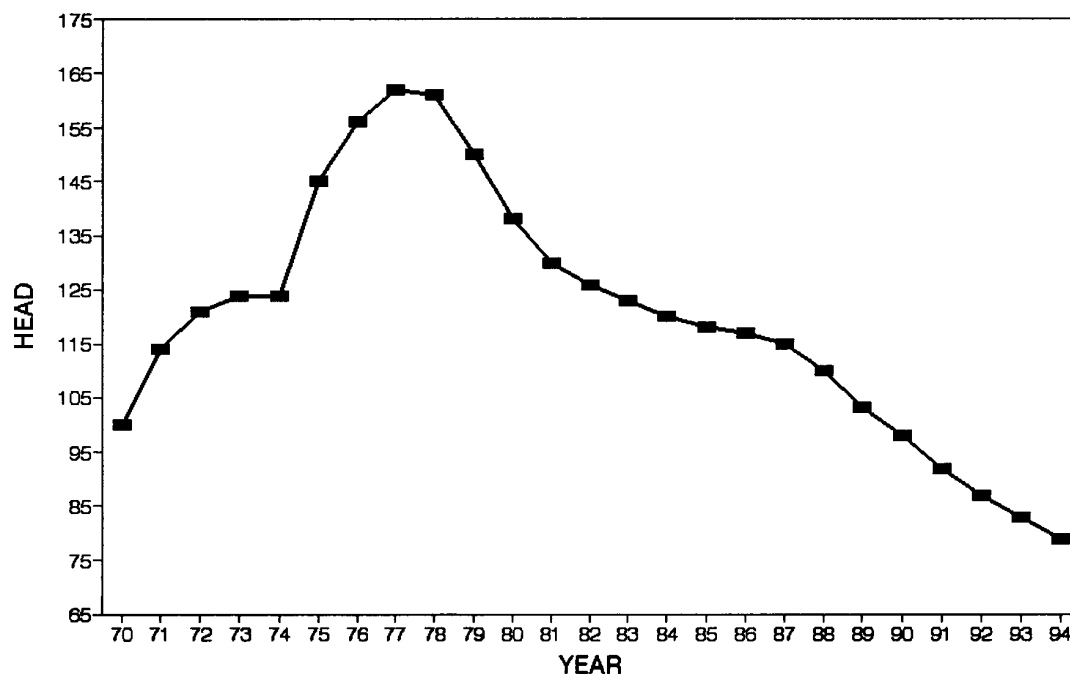
Figure 1. Herd size, constant investment cost.

Figure 2.   Investment cost, constant herd size.
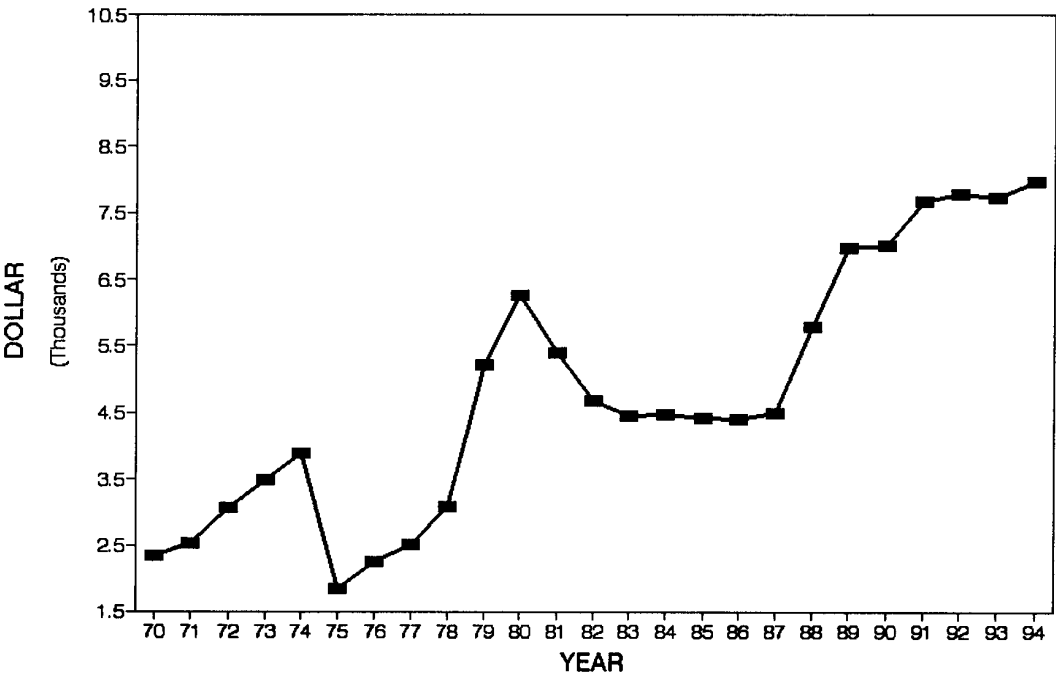

Figure 3.   Annual profit comparison: constant herd size and constant investment.
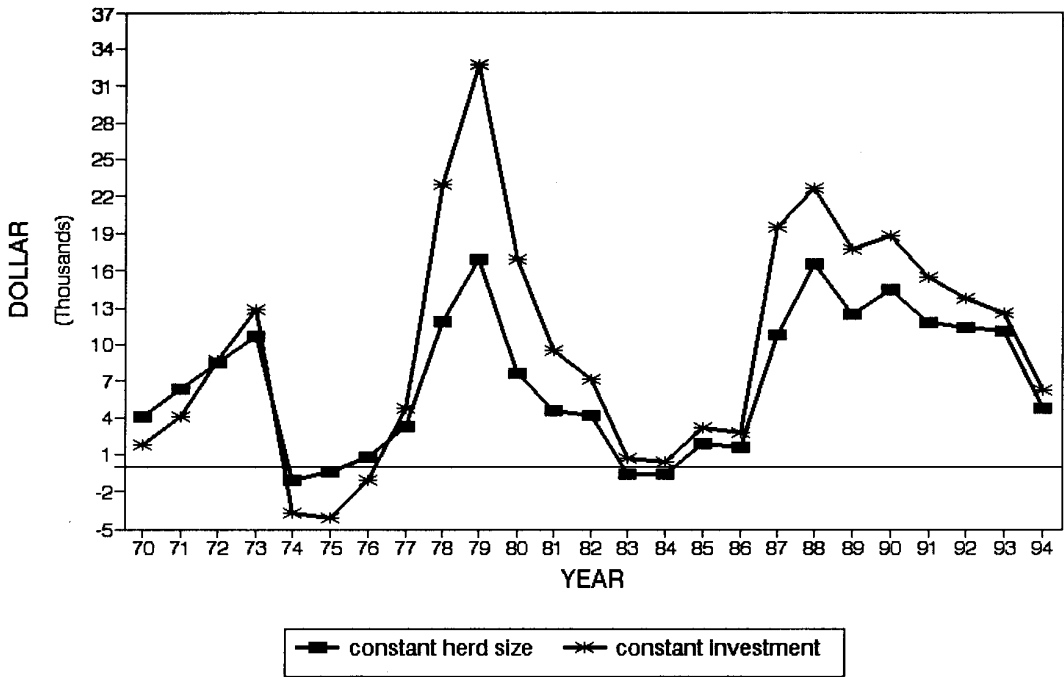
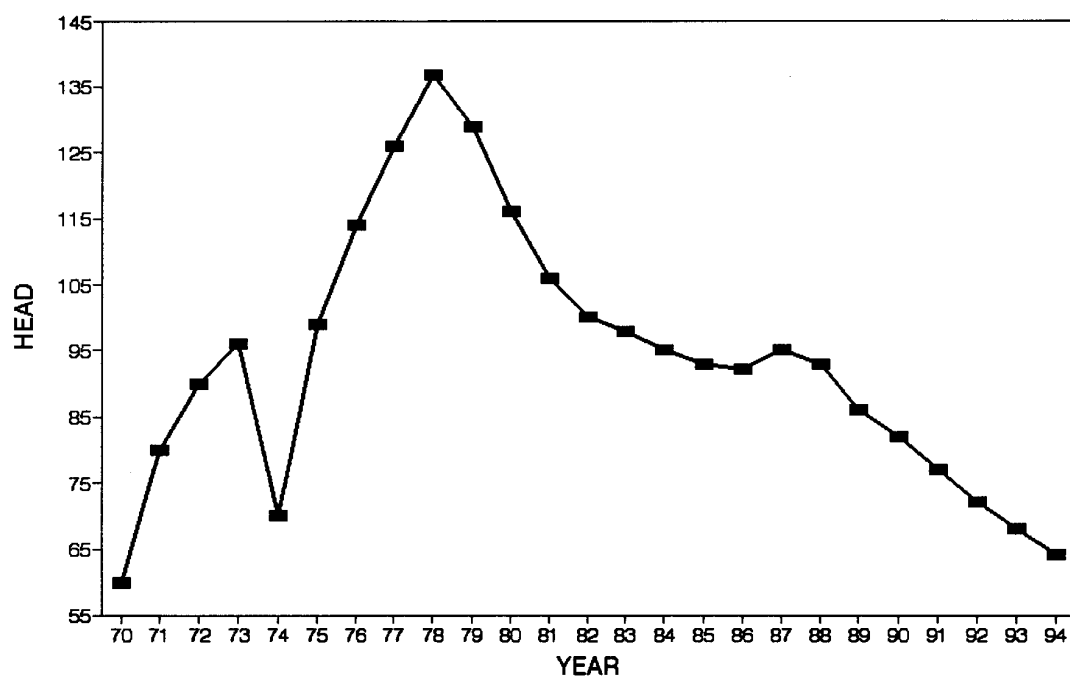**Figure 4. Total annual marketings, constant investment.**

Figure 5. Nominal herd net worth: constant investment cost.

constant herd size — constant investment