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Discussion of "Kinds and Sources of Risk in
Livestock Production and Marketing"

Carl E. Olson

The purpose of the paper by Helmers and Atwood was twofold. Their first purpose was to compare various crop and livestock activities on the basis of historical price and income variability. Their second purpose was to determine the financial vulnerability in terms of equity and net income of four agricultural production organizations over time. Their main concern was not to determine the effectiveness of various risk management strategies but rather to determine the relative riskiness of the different activities and organizations.

The methods of analysis used to accomplish both purposes of their paper are well described in the paper. The results of the price and net returns variability of the activities and organizations are interesting.

The methods used in the analysis are the traditional methods utilized with the exception of their second purpose. Here a multi-period model was used rather than a single-period model. Also included is the constraint that the firm must generate a certain level of income, which is traditionally not done in risk research.

Net income before tax is used when identifying the effects of risk on the farm and ranch unit. I would offer the suggestion that future work look at after tax income. This would enable tax management considerations to be included in the operational and organizational strategies being evaluated.

The authors identified several problems in using variability indexes. The aggregate variability of individual crop enterprises is usually much less than what it is for an individual firm. Hence there are some problems regarding the magnitude of the variability on specific firms as we look at aggregate variability. Past studies have looked at enterprises rather than whole farm income risks.

There has not been much work done on how all enterprises feasible for the land and climatic resources available fit together to enable the development of overall long and short run organizational and operational strategies the producer might use to reduce their production and marketing risks. The paper by Helmers and Atwood did look at whole units in terms of variability of net income. The authors identified many of the problems encountered with our present risk measures when looking at whole unit net incomes. They suggested the use of relative variance, such as the standard deviation of the net income divided by the mean of the net income, as a measure that can be used to compare relative risk of activities and

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operations. However, they pointed out the problems using this when comparing high fixed cost and low fixed cost enterprises and operations.

There are two major sources of risk in livestock production. The first source is product price risk, or perhaps we could call it marketing risk. When planning, the price variability that the livestock producer faces is more complex than the price variability confronting the crop producer. Often times the livestock producer's planning period may be 30 months in terms of having a marketable product. It is very difficult to forecast price over this long period of time.

The second source of risk that needs to be dealt with in risk management in livestock production is the production risk. Basically, production risk is dealing with what it costs to get the desired gains on the livestock to have the desired product for the market. Helmers and Atwood suggest using a polyperiod annual risk constraining model (PARC) to look at the risks facing the livestock producers over time. This is a very good idea in that it enables the firm to make operational changes as they are needed by the firm to react to changes in the market and production risks faced by the firm. Again, I emphasize that livestock production is a multi-period process and what one does now will affect net income two to three years later.

In the paper the polyperiod model was set up on a firm survival or safety first criteria. That is, the unit must generate a certain firm survival level of income. This is a very valid approach to take in that the operator will have the fixed commitments that he must meet each year plus his family living expenses which must be covered on a regular basis. If the fixed commitment cannot be met, the firm may go bankrupt. Hence the production unit does have variation in its operational strategies from year to year, and our modeling techniques must enable the firm to make some changes. The PARC model does this very nicely.

Some Ideas of Sources of Risk in Livestock Production and Problems with Risk Analysis in Livestock Operations.

Livestock production is a multi-year process, and it takes approximately 30 months for a heifer calf to produce a marketable product, a 400 pound feeder calf in a range livestock situation. The heifer calf is brought into the breeding herd as a replacement heifer, and bred to calve at approximately two years. It is another six months before the heifer's calf is ready to market at the desired weight. Cow-yearling range operations require an additional 10 to 12 months to obtain a marketable product. Hence, multi-period analytical framework must be used to analyze the risk involved in producing beef feeder animals. Feedlot operators can reduce some of the price risk of their by buying and selling on the same day.

Livestock operations require a large capital commitment in highly specialized equipment and fertilizer, making it a high fixed cost industry. There are not only high fixed costs in terms of durable capital, there are high fixed costs in terms of the livestock breeding herd itself and considerable "sunk costs" in terms of feeding the animal for two years to two and a half years before obtaining a marketable product. A cow-yearling

operation requires approximately 42 months of sunk costs incurred before receiving any kind of a return from the firstcalf cow.

Feedlots have high fixed costs in terms of the facilities: However, there is a faster turnover of money in the feedlot operation.

Livestock are a way of marketing crops. This crop can be a forage crop such as hay, rangeland, and/or pasture, or it can be a grain crop. The Western range livestock operations, particularly the inter-mountain west and the western plains, have livestock that are utilizing a land resource that has very limited alternatives in terms of agriculture. There are other "products" that can be produced, hunting, sightseeing, rock hunting, etc. However, the market for these products is extremely limited.

A livestock ranch is organized to fit the physical and environmental resources that are available. The operations must ask the question, what type livestock operation will generate a satisfactory income over time, given the resources available? There are many "risk management" decisions involved with the basic organization questions. These include, what "type" of livestock to run? When to market? When to replace breeding animals? How to finance land, durable capital and the breeding herd? Market of price risks are involved with the basic organizational questions.

Once the basic organization is established, the manager must adopt a set of operational strategies that will reduce both price and product risk. Product risk is associated with the factors that will influence the amount of product the firm has for sale from a production period and the costs per unit of product that is sold. The product that is available for sale is affected by many different things. Adverse weather can change the percent calf crop and can alter weaning weights. Disease can affect the rates of gain. Prices of the inputs that the producer uses are subject to variation over the period of time that is involved with the production process. These are areas of risk facing all livestock producers.

Another area of risk facing the livestock producer in the inter-mountain west is the change in public land uses. Changing the permitted AUM's of grazing on the public land and varying the fees that the livestock producers pay for the use of that land affect the basic organization of the ranch and its operational strategies. There was some work done earlier at Wyoming that showed how variations in permit availability and the levels of fees affected the operation and organization of two ranch situations.

One thing that the Helmers and Atwood paper pointed out was that the cow-calf operation did not grow. That is, it did not change its basic organization to any great extent over the time period of the analysis. This is because, in my opinion, the livestock ranch is organized on the basis of labor and resource availability. It is difficult to change the size of a livestock operation, particularly a breeding operation, by a few head. There are time and labor requirements at certain times of the year that make changes in numbers of livestock a very difficult strategy to follow.

In my discussion of the Helmers and Atwood paper I have attempted to point out areas that we need further research in livestock production. The paper presented a model to analyze a livestock operation over a period of time. Such modelling will enable the firm to change its operational decisions within a given organization. This is the type of modelling that must be done with risk management in livestock production. We need whole unit risk management analysis in order to develop strategies, analyze strategies that might be useful to livestock producers and crop producers.

End Notes

1/ Peryam, J. Stephen and Carl E. Olson. Impacts of Potential Changes in BLM Grazing Policies on Westcentral Wyoming Cattle Ranches, Research Journal 87, Agricultural Experiment Station, University of Wyoming, Laramie, Wyo. Feb. 1975.

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