

Variable Procedure In Carcass Grade and Weight Sales of Slaughter Beef: Implications to Oklahoma Cattle Feeders

**Wayne D. Purcell
Ralph L. Tapp**

Bulletin B-669

August, 1969

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Variable Procedure In Carcass Grade and Weight Sales of Slaughter Beef: Implications to Oklahoma Cattle Feeders

Wayne D. Purcell and Ralph L. Tapp*

Cattle feeding has grown at a phenomenal rate in Oklahoma during the 1960's. There were 205,000 head on feed in Oklahoma January 1, 1969. This compares to 69,000 head on feed January 1, 1960. With the increase in feeding has come a change in structure of the feeding industry. Large lots, those with capacities of 1,000 head or more, have increased in relative importance and accounted for 177,000 head or 86 percent of the cattle on feed January 1, 1969 (1). Cattle feeding is "big business"; a lot with a capacity of 10,000 head requires an initial investment of around \$500,000.

The growth is expected to continue. Goodwin painted a favorable picture in a 1964 analysis. Availability of markets for live cattle was then the only factor limiting development of cattle feeding in the Texas-Oklahoma feeding area (2). By early 1969, these markets for live cattle were available in the form of federally inspected slaughter plants which had been constructed in the area. Combined with comparative advantages in the availability and costs of feed grains, availability and cost of feeder cattle and other factors of lesser importance, this is expected to make of the Southern Plains¹ the dominant feeding area in the nation (3).

Need for Efficiency in Marketing

Increased efficiency and advances in technology have paralleled, and facilitated, the growth in feeding. The Oklahoma cattle feeder is well versed in production techniques. Reported conversion rates and costs of

*Assistant Professor and former Research Assistant respectively, Department of Agricultural Economics, Oklahoma State University.

Research reported herein was conducted under Oklahoma Agricultural Experiment Station Project Number 1253.

¹This "Southern Plains" area includes the panhandle areas of Texas and Oklahoma, western Oklahoma, eastern New Mexico, the southwest part of Kansas, and the southeast tip of Colorado. The feeding area centered in Guymon (Texas County), Oklahoma is currently the area of most rapid growth.

gain compare favorably with other feeding areas. Needed specialized services, such as veterinary services or assistance in the installation and operation of feed mills, have emerged in the areas of concentrated feeding activity. While the western area is in a stronger competitive position than other feeding locations in the state, there is little doubt that Oklahoma feeders can compete as producers of slaughter beef.

Most analysts agree increases in the efficiency with which marketing activities are conducted have lagged behind advances in production. Two USDA economists noted as recently as 1966 that "there has been little change since Biblical days in the way most livestock are bought and sold" (4). But efficiency in marketing is important; the benefits of efficient production can be eliminated by inefficient and poorly informed marketing procedures.

The Problem

There are many possible sources of inefficiency in beef marketing, many potential "problems". This analysis was concerned with the problems associated with variable procedure in carcass grade and weight sales of slaughter beef (5). There was widespread concern in 1967 over the implications such practices as the taking of a (possibly excessive) pencil shrink to cover carcass weight loss during chilling could have on the equity and effectiveness of marketing procedures. Producers complained of being "taken" when selling on a carcass grade and weight basis. Concerned packers often refused to buy on a carcass grade and weight basis for fear of alienating feeders. Members of the Packers and Stockyards Administration (P & S) of the USDA, a regulatory arm of the Department, reported receiving complaints and requests for corrective action.² The theoretical benefits of carcass grade and weight selling techniques were not being realized in practice.

Despite the concern, little information was available to confirm or disconfirm the existence of a problem or establish its magnitude. One reason was the inaccessibility of data on actual shrink to permit comparisons with the pencil shrink taken during the exchange process. Buying packers have such information but it is not accessible to the public. However, information on such practices is crucially important if marketing decisions are to be made from a position of knowledge and understanding. This analysis was initiated to provide a basis for establishing the economic implications of selected variable procedures in carcass grade and weight sales of slaughter beef.

²The extent of the concern was made evident during 1968, after this analysis was begun, with the announcement of regulations by P & S concerning how carcasses are to be weighed and graded by packers in carcass grade and weight sales. These regulations will be discussed in more detail later. Given such a development, this analysis can be viewed as providing evidence concerning the need for, or lack of need for, such regulations.

Objectives and Procedure

The more formal objectives of the analysis can be summarized as follows:

1. To isolate the extent to which variable procedures become an integral part of carcass grade and weight sales of slaughter beef in Oklahoma;
2. To investigate the level of understanding among Oklahoma cattle feeders concerning the economic implications of variable procedures in carcass grade and weight sales of slaughter beef; and
3. To estimate the economic implications of selected variable procedures to the efficiency of the marketing effort and to the decision processes of the individual feeder.

A survey was taken of 35 Oklahoma cattle feeders, each with a lot capacity of 1,000 head or more, during the fall of 1967. This group fed almost 80 percent of the cattle fed in Oklahoma during 1967. It was assumed these "full-time" feeders would be best informed concerning marketing procedures and problems. In general, smaller feeders would be expected to be less well informed and experience more difficulty in handling problems associated with variable procedures. Thus, any conclusions drawn on the basis of problems experienced by the group of large feeders should hold for the smaller feeder as well.

The questionnaire employed in the survey was concerned with characteristics of the feeding operations and more detailed examination of marketing procedures than will be reported here. The problems associated with weighing and grading practices were of prime concern and the questionnaire was constructed to do the following:

1. Provide an indication of the range and variability in pencil shrink the feeders were being asked to accept from one sale or from one buyer to the next;
2. Test the feeders' understanding of the types of problems which could be associated with variable and possibly excessive pencil shrinks or variable grading procedures; and
3. Test the ability of the feeders to devise strategies or alternative exchange procedures which could potentially offset the implications of variable weighing and grading procedures.

From this base, it was possible to draw inferences and conclusions concerning the nature and magnitude of the economic implications growing out of variable weighing and grading procedures in carcass grade and weight sales.

Analysis of Weighing Variabilities

After price is negotiated, weight and grade are the remaining variables in determining the value of the beef carcass. Variations in weighing

procedures may be equally as important as price, but not all feeders view such variabilities as having economic or price implications. Many are concerned about conditions of weighing, pencil shrink, or other variables, but have only a limited understanding of their economic impact.

The beef carcass loses weight as it is chilled. Prior to the P & S regulations, the typical procedure was to weigh the carcass while hot and take an arbitrary pencil shrink to offset weight loss. Variations in the magnitude of this pencil shrink and convictions with regard to the relationship between the pencil shrink and actual shrink were the sources of the complaints being voiced.

There are both pragmatic and theoretical dimensions to the weighing problem. Of practical concern is the impact of variable weighing procedures on net returns to the feeder. At a more theoretical, but possibly more important, level is the impact on the effectiveness of the price mechanism as a coordinating and communicating device. Both dimensions will receive attention. As a frame of reference, a hypothetical but realistic illustration of the impact of variable weighing practices will be developed to clarify the implications of such variabilities.

A Frame of Reference

Consider a hypothetical steer which will yield a 600-pound carcass (hot weight) with a negotiated price schedule as follows:

High Good	\$40.00 per cwt.
Low Choice	40.50 per cwt.
Average Choice	41.00 per cwt.
High Choice	41.50 per cwt.

If the carcass is weighed hot and a pencil shrink of 2.5 percent is employed, the pay weight is 585 pounds. Holding grade constant at high Good, the carcass has a value of \$234.00. But if the actual weight loss were only 1.5 percent, actual weight would be 591 pounds and with a price of \$40.00 per cwt., carcass value is \$236.40. With a pencil shrink of 2.5 percent, a price of \$40.41 would be required to achieve a value of \$236.40.³

The price of \$40.41 is \$.41 per cwt. above the \$40.00 price which was

³600 - .025 (600) = 585 pounds (5.85 cwt.), the pay weight with a pencil shrink of 2.5 percent;

5.85 x 40.00 = \$234.00, carcass value with a 2.5 percent pencil shrink.

With the actual weight loss of 1.5 percent: 5.91 x 40.00 = \$236.40, carcass value based on actual weight loss.

Therefore, \$234 ÷ 5.91 = \$39.59, the "real price" per cwt. and \$236.40 ÷ 5.85 = 40.41, the price per cwt. which would be required to realize "true carcass value" with a pencil shrink of 2.5 percent.

The term "real price" refers to the price which, with actual weight, would yield the same returns as negotiated or nominal price multiplied by the weight after the pencil shrink is taken. In the illustration, the "real price" of \$39.49 shows what the feeder receives per cwt. for actual weight when he negotiates a price of \$40.00 and takes a 2.5 percent pencil shrink.

negotiated for the high Good grade. With a yield of 60 percent, this converts to \$.25 per cwt. on a liveweight basis. Thus, what would be considered by most feeders as a significant change in price might go unnoticed when it evolves not from a change in price as such, but from the variable weighing practices which accompany the exchange process. For each one percent pencil shrink exceeds actual shrink, a similar level of

Table 1 — An Illustration of the Price Implications of Excessive Pencil Shrinks in Carcass Grade and Weight Sales of Slaughter Beef: Potential Losses to the Seller, Selected Prices and Pencil Shrinks.

Carcass Price Per Cwt.	Pencil Shrink Exceeds Actual Shrink By (Percentage Points)							
	.25	.50	.75	1.00	1.25	1.50	1.75	2.00
(Dollars)	(Potential losses, dollars per cwt.)							
30.00	.075	.15	.225	.30	.375	.45	.525	.60
32.00	.08	.16	.24	.32	.40	.48	.56	.64
34.00	.085	.17	.255	.34	.425	.51	.595	.68
36.00	.09	.18	.27	.36	.45	.54	.63	.72
38.00	.095	.19	.285	.38	.475	.57	.665	.76
40.00	.10	.20	.30	.40	.50	.60	.70	.80
42.00	.105	.21	.315	.42	.525	.63	.735	.84
44.00	.11	.22	.33	.44	.55	.66	.77	.88
46.00	.115	.23	.345	.46	.575	.69	.805	.92
48.00	.12	.24	.36	.48	.60	.72	.84	.96
50.00	.125	.25	.375	.50	.625	.75	.875	1.00
52.00	.13	.26	.39	.52	.65	.78	.91	1.04
54.00	.135	.27	.405	.54	.675	.81	.945	1.08
56.00	.14	.28	.42	.56	.70	.84	.98	1.12
58.00	.145	.29	.435	.58	.725	.87	1.015	1.16
60.00	.15	.30	.45	.60	.75	.90	1.05	1.20

Table 2 — Changes in Total Returns From a 1,000-Pound Steer Yielding 60 Percent Due to Excessive Pencil Shrinks, Selected Prices per cwt.

Carcass Price Per Cwt.	Pencil Shrink Exceeds Actual Shrink By (Percentage Points)							
	.25	.50	.75	1.00	1.25	1.50	1.75	2.00
(Dollars)	(Potential losses, dollars per head)							
30.00	.45	.90	1.35	1.80	2.25	2.70	3.15	3.60
32.00	.48	.96	1.44	1.92	2.40	2.88	3.36	3.84
34.00	.51	1.02	1.53	2.04	2.55	3.06	3.57	4.08
36.00	.54	1.08	1.62	2.16	2.70	3.24	3.78	4.32
38.00	.57	1.14	1.71	2.28	2.85	3.42	3.99	4.56
40.00	.60	1.20	1.80	2.40	3.00	3.60	4.20	4.80
42.00	.63	1.26	1.89	2.52	3.15	3.78	4.41	5.04
44.00	.66	1.32	1.98	2.64	3.30	3.96	4.62	5.28
46.00	.69	1.38	2.07	2.76	3.45	4.14	4.83	5.52
48.00	.72	1.44	2.16	2.88	3.60	4.32	5.04	5.76
50.00	.75	1.50	2.25	3.00	3.75	4.50	5.25	6.00
52.00	.78	1.56	2.34	3.12	3.90	4.68	5.46	6.24
54.00	.81	1.62	2.43	3.24	4.05	4.86	5.67	6.48
56.00	.84	1.68	2.52	3.36	4.20	5.04	5.88	6.72
58.00	.87	1.74	2.61	3.48	4.35	5.22	6.09	6.96
60.00	.90	1.80	2.70	3.60	4.50	5.40	6.30	7.20

price distortion develops. Other possible price implications for various prices and levels of shrink are illustrated in Tables 1 and 2.

Note the dollar value of a pencil shrink two percentage points in excess of actual shrink is over \$5.00 per animal at current price levels. With a pencil shrink two percentage points above actual shrink, negotiated price can be as much as \$.92 per cwt. above real price if carcass price is \$46.00. It is the quoted or negotiated price which the feeder uses in determining the relative desirability of the sale and in formulating an opinion as to the adequacy of the prevailing feeding program and product quality. Yet, price signals are the medium by which the price mechanism is supposed to direct production, to coordinate what is produced with the needs and desires of consumers. With a \$.92 possible "bias", there is much room for error. If pencil shrinks are variable or if they do exceed actual shrinks by significant amounts, then the problem can be serious indeed.

Incidence and Implications of Selected Variabilities

The thirty-five feeders interviewed were asked a battery of questions to establish their general understanding and competence concerning variable weighing procedures. The replies will be classified according to (1) feeders who sell 50 percent or more of their cattle on a carcass evaluation basis, and (2) feeders who sell primarily on a liveweight basis. Examination of the latter group helps to reveal areas in which they differ from the first group in understanding and competence in selling on a carcass evaluation basis. This was considered important since all feeders expected selling on a carcass evaluation basis to increase.

Feeders Who Sell on a Carcass Evaluation Basis — There is a tendency, as evidenced in Table 3, for the feeders with smaller feedlots to sell on a carcass evaluation basis. Ten of the seventeen feeders in the carcass group had a feedlot capacity of less than 2,000 head. Only one of the eighteen feeders preferring liveweight sales had a lot capacity of less than 2,000 head.

The feeders in the "carcass group" were asked a series of questions to establish their level of knowledge concerning weighing practices asso-

Table 3 — Preferred Method of Selling by Size of Operation.

Preferred Method of Selling	Number of Feeders		
	Capacity of Lot (Head)		
	Under 2,000	2,000-5,000	Over 5,000
Carcass evaluation	8	2	1
Liveweight	1	11	6
Both (50% for each)	2	2	2

ciated with their sales transactions. The general level of knowledge and variability in that knowledge across feeders are important indicators of the economic significance of variable weighing and grading practices.

Concerning the timing of weighing, most feeders expressed definite opinions. Twelve of the seventeen carcass feeders felt the carcasses were weighed "hot" (soon after slaughter before being moved into the cooler). Three other feeders felt some packers wait until the following day to weigh the carcasses. Two feeders were unaware of the importance of time of weighing. Considerable uncertainty prevailed concerning the timing of related operations such as shrouding. Only ten feeders voiced an opinion in response to questions concerning the time of shrouding. Five felt the carcass passed over the scales while shrouded and five felt the carcasses were weighed before shrouding.

The significance of this uncertainty varies with the degree to which accurate weights are obtained when carcasses are weighed with shrouds and adjustment is made for the weight of the shroud. There is some evidence to show that the weight of the wet shrouds varies significantly, but the adjustment factor is usually constant (6). The adjustment would be expected to be consistent with the heavier wet shroud weights, providing a measure of protection for the buyer. If wet shroud weights are less than the weight of the tare employed to offset the weight of the shroud, then pay weight will be "short" by the difference. Such an inaccurate adjustment in the buyer's favor can decrease net returns to feeders.

All but one of the 17 feeders were aware the carcass loses weight in the cooler. Estimates of what percentage loss might be expected varied from 1 to 4 percent with an average of about 2.1 percent. There were also such divergent replies as "up to 4 percent" and "never over 1.5 percent". Most indicated a need for this type of information, admitting they were not well informed. All were quick to note that the buyer covers weight loss in the cooler with a pencil shrink. All indicated they were informed as to how much this pencil shrink would be before price negotiations begin, or requested such information in its absence. Fifteen of the feeders felt they were paid on the basis of hot weights with a pencil shrink in every carcass transaction. One was paid on a chilled carcass weight in every case as a result of a special agreement with a retail chain store. Another feeder was paid on a chilled weight on some sales, but on a hot weight on other sales.

The feeders were asked for estimates of the variation in pencil shrink they are required to take from one buyer to another or from one transaction to another. Responses to this question from 13 of the 17 feeders are shown in Figure 1. The remaining feeders did not respond to the question.

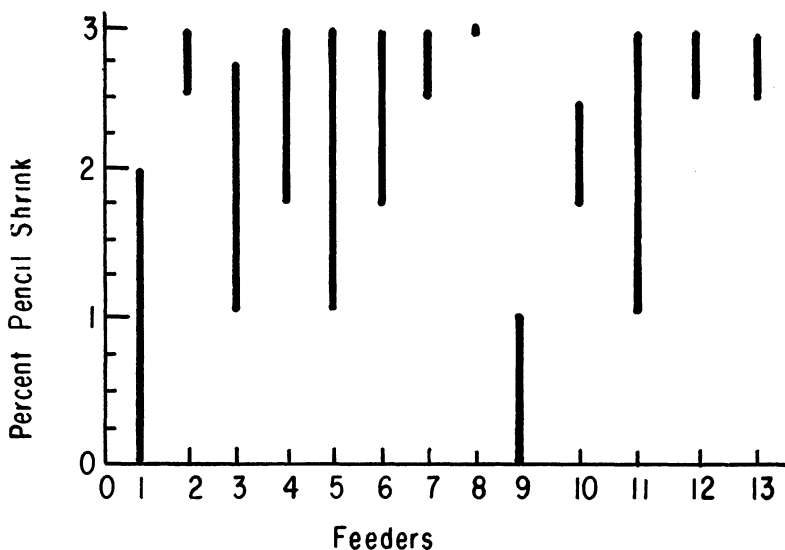


Figure 1. Pencil Shrinks Oklahoma Feeders Selling Predominantly on a Carcass Basis are Asked to Take in Various Transactions.

The average (considering the midpoints of the ranges) is 2.17 percent. The average range is 1.6 percent to 2.7 percent. The highs range from 1 to 3 percent; the lows from 0 to 3 percent. Note that the lower extreme of some ranges is in excess of the higher extreme of others. Obviously, there is considerable variability in the magnitude of pencil shrinks employed. Also apparent is a tendency for 3 percent to emerge as something of a "standard" for the upper extreme in the ranges. Although the frequency of the various points along the ranges could not be determined precisely, the 3 percent figure was the most frequent shrink taken.

Figure 2 shows a comparison of the range in pencil shrinks the 13 carcass feeders feel are justified and the pencil shrinks they have been asked to take.

Several feeders assumed the actual shrink and the shrink they have been asked to take were the same. Given this and the expressed lack of information regarding expected shrink, no concrete conclusions can be drawn. A more reliable basis of comparison is needed. Therefore, in Figure 3 the ranges of Figure 1 have been plotted in terms of deviations from 1.25 percent, assumed to be representative figure for the majority of coolers for an overnight chill.⁴ The figures to the right of the ranges in Figure 3 show the price implications of the respective excesses (or deficits) in pencil shrink relative to the assumed shrink of 1.25 percent.

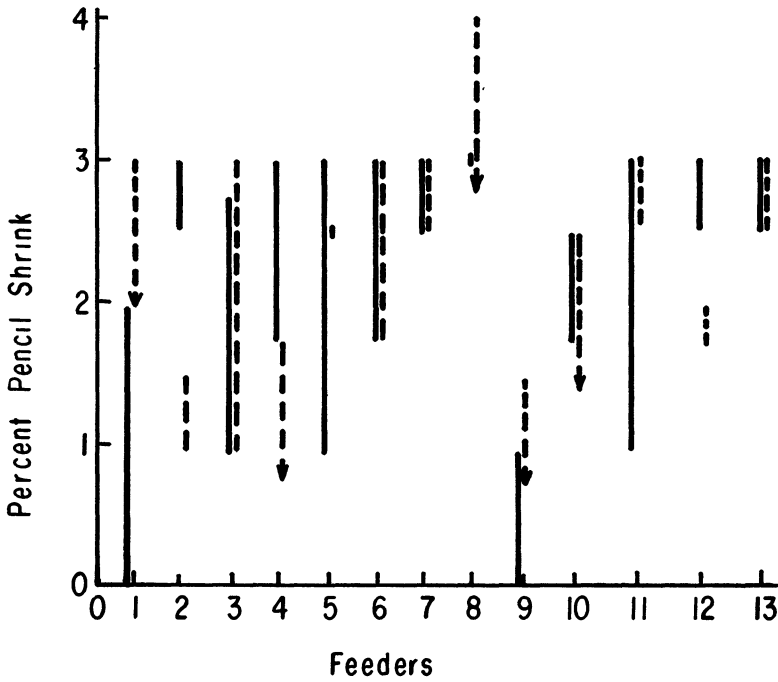


Figure 2. Comparison of Pencil Shrinks Oklahoma Feeders Selling Predominantly on a Carcass Basis are Asked to Take and Shrinks the Feeders Feel Would be Justified.

Note the solid lines represent the range of pencil shrink feeders are asked to take while the dashed lines represent the shrinks feeders feel would be justified. The downward arrows in the figure result from answers such as "3 percent or less", "not more than 2 percent", etc.

The deviations are based on a hypothetical carcass priced at \$40 per hundredweight.

At the \$40.00 per hundredweight price each .25 percent increment (excess) in pencil shrink results in a \$.10 per hundredweight reduction in real price (as is shown at the pencil shrink level of 2.25 percent). Assuming the carcass actually shrinks 1.25 percent, the feeder is receiving \$.40 less than \$40.00 (\$39.60) for the actual cold carcass weight of the carcass if he accepts a 2.25 percent cooler shrink. Should the pencil shrink employed be only .25 percent with the same actual shrink of 1.25 percent, the feeder would receive \$.40 more than \$40.00 (\$40.40) for the actual cold carcass weight.

⁴Actual shrink varies across coolers due to condition of the cooler, control of humidity, etc. The USDA, in a survey to support their proposed regulations, found many coolers held shrink to less than 1 percent for an overnight chill. Few if any were found to exceed 1.5 percent. Given a range of from .75 to 1.50 percent, the figure 1.25 is considered to be realistic (7).

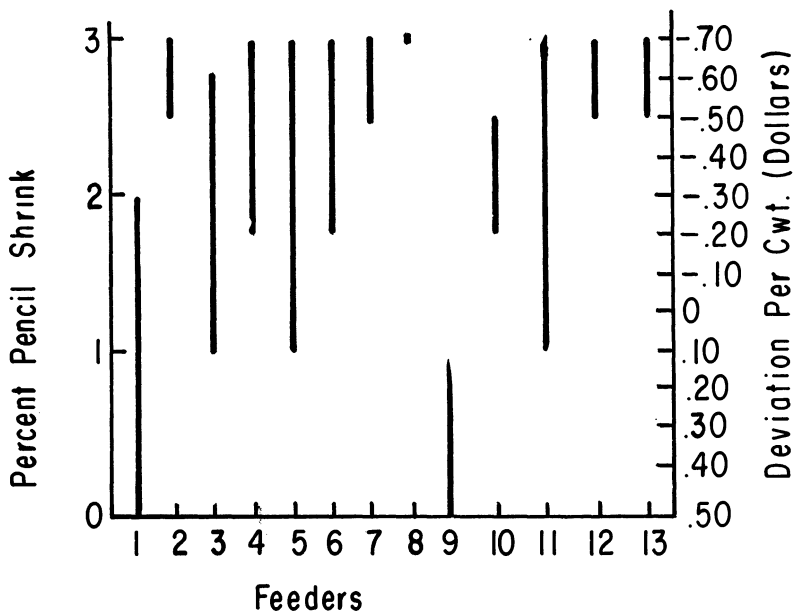


Figure 3. Pencil Shrinks Oklahoma Feeders Selling Predominantly on a Carcass Basis Are Asked to Take Compared to an Assumed Standard of 1.25 Percent.

When the price is \$40.00 per hundredweight, the average excess pencil shrink of .92 percent results in a real price \$.36 below the \$40.00 contract price. The pay weight averages nearly 1 percent below the cold carcass weight, resulting in an almost 1 percent reduction in real price. At the maximum pencil shrink of 3 percent in Figure 3, the more typical shrink employed, price is biased upwards \$.70 as real price is only \$39.30.⁵

In response to a specific question, most of the feeders felt that pencil shrinks were too high, especially when the pencil shrink was 2.5 percent or more. Two questions logically follow:

1. Do feeders try to offset the excess pencil shrink taken by packers, and if so, how?
2. To what extent are they able to offset the economic implications of excessive pencil shrinks?

The replies of 16 of the 17 feeders to questions relating to the first question are shown in Table 4.

⁵The average pencil shrink taken, 2.17 percent, minus the assumed actual shrink of 1.25 percent gives .92 percent (.0092 times \$40 per cwt. equals the \$.36 price deviation). A 3 percent shrink would be 1.75 percent above the assumed shrink of 1.25 percent (.0175 times \$40 per cwt. equals \$.70 per cwt.).

Table 4 — Reaction of Feeders Selling Predominantly on a Carcass Basis to Situations in Which Pencil Shrinks Requested by Buyer are Considered too High.

Nature of Reaction	Number Feeders Choosing
Offset the impact of any excess pencil shrink by seeking a higher price	10
Try to secure chilled weights	1
Try to negotiate a lower pencil shrink	1
Seek other buyers	3
No way to offset	1
No reaction to question	1

The degree to which feeders were successful in achieving a higher price, chilled weights, or a lower pencil shrink is uncertain. Replies to related questions indicated that while recognized as an appropriate strategy, few feeders actually succeed in attempts to bargain for a higher price. However, such a reply does indicate awareness of a problem. In contrast, the feeder who viewed the situation as being impossible to change could scarcely improve his position over time. Also, it would seem that in the long run moving to other buyers would be an unproductive strategy. If an alternative buyer cannot be found who offers the same price with a lower pencil shrink, or a higher price with the same pencil shrink, then the issue of excessive pencil shrinks must ultimately be faced.

To test the feeders ability to determine real price and make effective comparisons, feeders were asked to choose between such alternatives as those in the following hypothetical decision situation:

Bid A: \$40.00 With a 2 percent pencil shrink

Bid B: \$40.50 With a 3.5 percent pencil shrink

In order to choose correctly, the feeder must consider pencil shrink and convert the two different levels of shrink to price implications. All feeders were judged capable of making the calculations and comparisons needed to choose the better bid. The ease with which the necessary adjustments were made differed considerably, however. Some of the feeders were obviously not accustomed to making such comparisons.

In commenting on the inefficiencies caused by variable pencil shrinks, one can note an adverse effect on the feeder's short-run profit position, on the ability of the price system to transmit effective messages to the feeder, and on the accuracy and effectiveness of market news reports. In the following paragraphs these three aspects of the pencil shrink "problem" will be discussed in some detail.

First, the comparison of alternative bids is made unnecessarily cumbersome and complex. Not only price but the pencil shrink associated

with that price requires consideration. The feeder must be aware of the pencil shrink to avoid selling his cattle at an artificially inflated price (a price which yields a smaller net return than some lower price associated with a lower pencil shrink). Comparing bids with varying pencil shrinks when selling on a carcass evaluation basis is difficult. Even more difficult and cumbersome, perhaps, is a comparison between liveweight and carcass bids.

A hypothetical example indicates the complexities of such decision processes. Assume the feeder is bid \$24 liveweight and \$40 on a carcass basis. (These are equivalent bids under the assumption the carcass yields 60 percent of the live pay weight). When selling liveweight, pay weight is typically the weight at the feeders scales minus a 4 percent shrink. Thus, a steer weighing 1,041 pounds has a live pay weight of 1,000 pounds after the 4 percent pencil shrink is deducted. Such a steer will return \$240 if sold on a liveweight basis. The feeder can sell the steer for \$40 per hundredweight on a carcass basis, but he must decide if the animal will yield over 60 percent (yield a carcass weighing over 600 pounds). If the feeder feels the carcass will yield over 600 pounds and decides to sell on a carcass basis, has he made a logical decision? The answer would invariably be "yes" were it not for the variable pencil shrinks which accompany carcass sales. Such variability adds to the complexity of bid comparisons. To illustrate, assume the pencil shrink associated with the carcass bid is 3 percent. If the carcass weighs less than 618.5 pounds, the feeder will make an incorrect decision by selling on a carcass basis. His returns would be less than the \$240 he could have received on a liveweight basis.⁶ But assume the feeder is somewhat more fortunate and the carcass weighs 625 pounds or yields 62.5 percent. It appears the 2.5 percent yield increase (over the 60 percent) would not be enough to offset the 3 percent pencil shrink. However, pay weight on the carcass alternative is now 6.0625 cwt., yielding a total return of \$242.50 as compared to the \$240 on a liveweight basis. A feeder could easily make the mistake of comparing the 2.5 percent excess over the 60 percent (which has a 1,000-pound base) with the 3 percent pencil shrink (which has a 625-pound base).

If the feeder is successful in avoiding all the possible arithmetic errors, he is still faced with the possibility of making an error in judgement. The feeder does not know what his cattle will actually yield. He may use the incorrect method of selling due to errors in estimating yield or due to excessive pencil shrinks and resulting low pay weights. In the example above if the carcass weighed less than 618.5 pounds, the feeder

⁶For example, assume the animal yields 61 percent or a carcass weighing 610 pounds (assuming the 4 percent live shrink is correct.) With a 3 percent pencil shrink on the carcass, pay weight is 5.917 cwt. and total returns \$236.68 as compared to \$240.

should sell on a liveweight basis. Consistent accuracy to this degree of perfection is impossible to obtain.

A second inefficiency attributable to variable pencil shrinks is the concealment of price signals through which the marketing system relays needed information to the feeder. Over time, the wants and needs of consumers change. This change, as related to their purchases of beef, is evidenced by the quantity and type of meat they buy. The retailer must note these changes and adjust his supply of meat accordingly. Similarly, the retailer's changing need must be met by the packer, and the packer's changing needs must be met by the feeder. The market system seeks to transmit these needed changes from the consumer through the intermediaries to the feeder via price signals related to particular carcass characteristics. For example, premiums might be paid for heavily muscled carcasses and discounts levied against overly fat and wasteful carcasses. Fluctuations in price arising from variable weighing practices, not from value gradients, conceal "true" price signals and negate the effectiveness of price as a communicative device.

To illustrate how the price signals for needed changes can be lost, Figure 4 was constructed. Individual feeders in the survey had been exposed to pencil shrinks primarily in the 1 to 3 percent range. It would then be possible for the typical feeder to experience the set of "price signals" shown in the figure. Nine sales are shown, each at a price of \$40.80 per hundredweight. Each successive sale is accompanied by an increase in pencil shrink of .25 percentage points. (A pencil shrink of one percent was employed in the first sale). The constant price of \$40.80 gives the appearance of price stability, often to be desired, but the constant price is deceiving. Real prices trend downward from \$40.80 to \$40.00.

The problem which prevails has been simplified for the presentation in Figure 4. The problem the feeder faces is more complex. The feeder may sell with a 2 percent pencil shrink one week, sell another type of cattle with a 3 percent shrink the next week. Much heavier cattle of the original type may be sold with a 2.5 percent shrink the following month. Concurrently, market reports indicate the cattle market is changing each day. The reports the feeder hears are usually price quotes without the shrink conditions and therefore in the form of a range of prices for a particular grade of cattle. The feeder is unable to isolate the price that a specific type of cattle would bring. With these and other variables affecting and counteracting this \$.80 spread in "real price" the price signal can be concealed and needed adjustments delayed.

A third inefficiency attributable to variable pencil shrinks emerges through an effect on the market news reporting system, leading to reporting of wider price ranges than would otherwise be necessary. The market

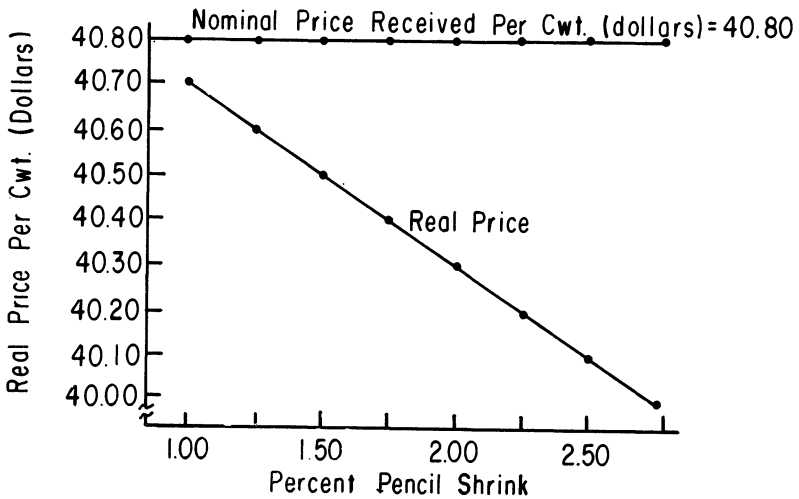


Figure 4. An Illustration of the Impact of Variable Weighing Practices on the Effectiveness of Price as a Communicative Device.

reports usually do not include the pencil shrink involved when particular prices are paid for carcasses. Assume there are two “identical” 1,000-pound steers that will dress 60 percent. One could command a price of \$41.25 with a 3 percent shrink and the other \$40.00 with no pencil shrink. The market reports might report a \$1.25 range in price for the two steers, but the range would be more artificial than real since both steers would have brought \$40 if pencil shrink had not been a factor.

Feeders Who Sell on a Liveweight Basis — Eighteen of the 35 feeders interviewed sold primarily on a liveweight basis. All but one of the 18 had tried selling on a carcass evaluation basis. In anticipation of increasing sales on this basis, the liveweight feeders were asked a series of questions concerning weighing practices they had encountered, or will encounter, when selling on a carcass evaluation basis. Most of the problems, results, and difficulties of the previous section apply to these feeders as well. The areas in which the liveweight feeders depart significantly from the previous section will be presented here.

All the liveweight feeders knew that a carcass loses weight when chilled. Estimates of this weight loss varied from 1 to 3 percent with an average of 2.1 percent (which was also the average of the “carcass feeders” estimates). Everyone in this group had been paid on hot carcass weights. The variation in pencil shrink 12 of the 18 feeders in this group have been asked to take from one transaction to another is shown in Figure 5. The remaining six feeders declined to respond or answered “I have no idea”, etc.

The average (considering the midpoints of the ranges) is 2.4 as opposed to 2.17 for the carcass feeders. The average range is 1.9 to 2.9 percent as opposed to 1.6 to 2.7 percent for the carcass feeders. The highs range from 2 percent to 3.25 percent; the lows from 1.5 percent to 3 percent. Comparable figures for the carcass feeders are 1 to 3 percent for the highs, 0 to 3 percent for the lows. There is some support for a conclusion that feeders in this group also take a slightly higher pencil shrink under comparable conditions.

In Figure 6, the ranges depicted in Figure 5 are plotted in terms of deviations from 1.25 percent, again used as a representative shrink for the majority of coolers for an overnight chill.

The figures to the right of the ranges in Figure 6 show the price implications of the respective excesses in pencil shrink relative to the assumed "normal" shrink of 1.25 percent. When priced at \$40 per hundredweight the average deviation from 1.25 percent is 1.15 percentage points or \$.46 per hundredweight. Thus, on the average, these feeders may lose \$.10 per hundredweight more than the carcass feeders (with an

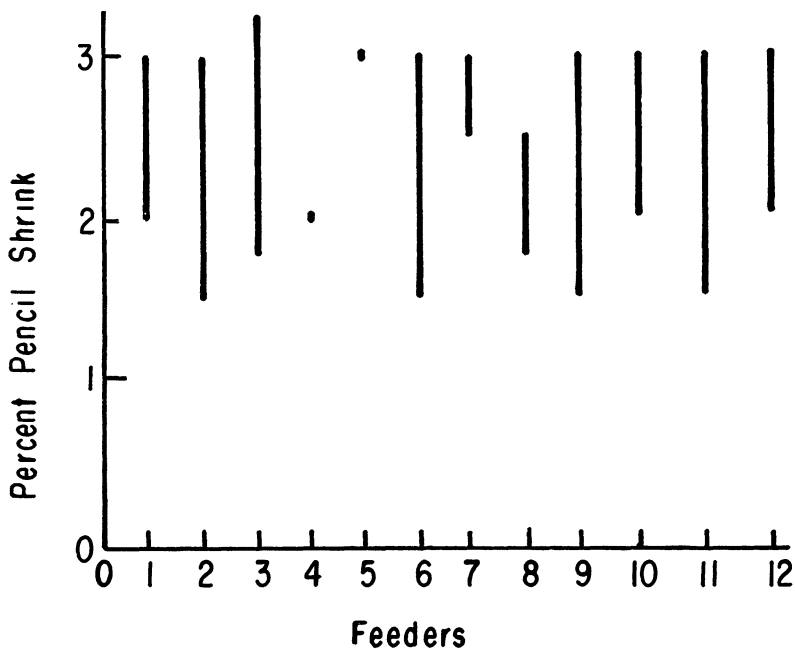


Figure 5. Pencil Shrinks Oklahoma Feeders Who Sell on a Liveweight Basis Have Been Asked to Take During Periodic Exposures to Sales on a Carcass Basis.

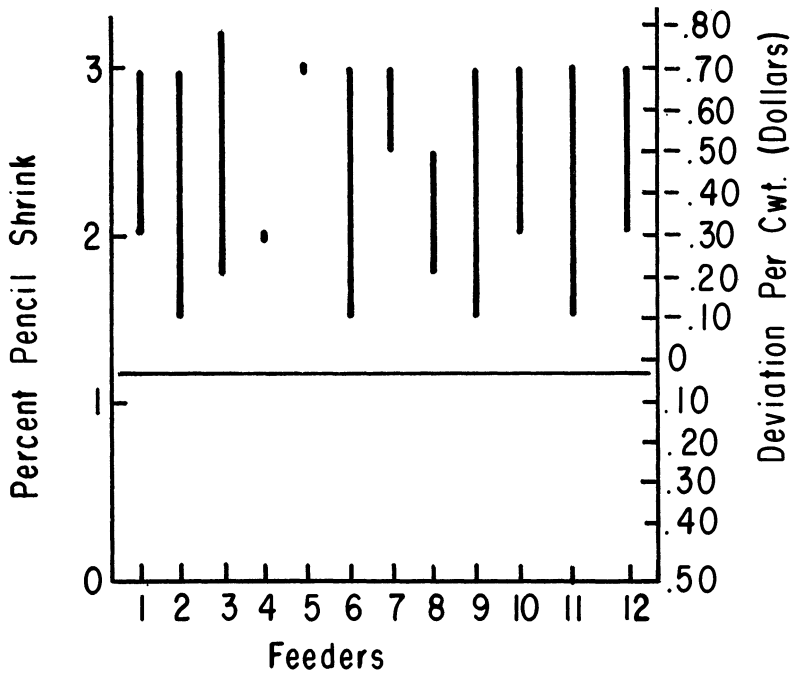


Figure 6. Pencil Shrinks Oklahoma Feeders Who Sell on a Liveweight Basis Have Been Asked to Take During Periodic Exposure to Sales on a Carcass Basis Compared to an Assumed Standard of 1.25 Percent.

average deviation of \$.36 per hundredweight). The more typical shrink of 3 percent results in a loss of \$.70 per hundredweight as before.

Figure 7 shows a comparison of the ranges in pencil shrinks the 12 feeders in this group feel are justified and the pencil shrinks they have been asked to take. All but one felt pencil shrinks were too high. There was no appreciable difference between the two groups in their recognition of the need to offset the effects of the high pencil shrink via higher prices. Two of the liveweight feeders experienced problems in converting pencil shrinks to price implications, but in general there were no obvious differences in abilities of the two groups. As might be expected, there was wider variation in ability within groups than across groups.

Analysis of Grading Variabilities

In carcass grade and weight sales, the procedure employed in grading the carcass is also important. A small percentage of carcasses will at-

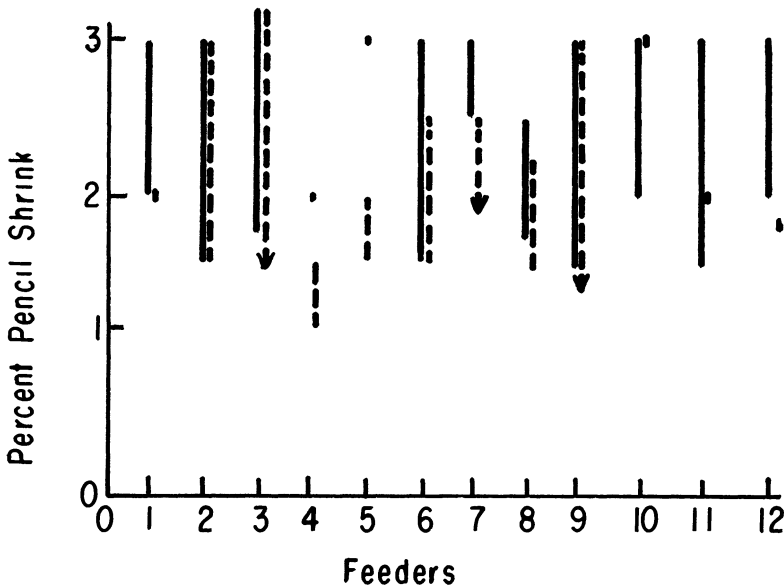


Figure 7. Comparison Between Pencil Shrinks Oklahoma Feeders Who Sell on a Liveweight Basis Have Been Asked to Take During Periodic Exposure to Sales on a Carcass Basis and Shrinks the Feeders Feel are Justified.

tain a higher grade after thorough chilling.⁷ Brief comment on the feeders' responses to questions regarding grading and the possible problems associated with variable grading procedures will be offered here.⁸

All but two of the 35 feeders knew that a carcass can grade higher after chilling. Most were aware of some of the reasons, such as improvement in marbling. Seven of the 35 feeders did not know whether they were paid on the basis of grades from hot or chilled carcasses. When pressed, many of the 28 who indicated they knew revealed they were relying on what they had been told by packers.

Again, the ability of the feeders to adopt a strategy which has potential to offset the problem was a matter of interest. The feeders were posed a hypothetical situation in which the buyer announced his intentions to pay on the basis of hot-carcass grades. The strategies suggested by the feeders are shown in Table 5.

Given the typical relationship between prices of the various grades, procedures in grading is also significant. Overall, the Oklahoma feeders

⁷The "upgrading" is due primarily to an improvement in marbling as the carcass becomes chilled.

⁸Answers from the two groups, the "carcass" and "liveweight" sellers, revealed no significant differences and the two groups will be pooled here.

Table 5 — Reaction of Feeders to a Situation in Which the Buyer Would Pay on Hot-Carcass Grades.

Nature of Reaction	Number Feeders Choosing
Insist on chilled-carcass grades	10
Bargain for higher prices	6
Seek another buyer	5
Go along with the buyer	3
No response to question	11

were less well informed concerning procedure in grading than in weighing. If the price differential between high Good and low Choice is \$.50 per cwt., then carcasses which “upgrade” carry an additional price bias of \$.50. The total magnitude of this problem depends upon (1) the number of carcasses which do upgrade, and (2) the extent to which packers adopt a practice of paying on hot-carcass grades (by block-stamping the carcass), and then “regrading” after chilling thoroughly (rolling the carcass with the final USDA grade).

Considering the alternative strategies noted in Table 5, the “insist on chilled grades” and “bargain for higher price” alternatives denote realistic approaches to the problem; whether they would be successful depends largely on the distribution of bargaining power between buyer and seller. Seeking other buyers offers only limited possibility. If other buyers also wish to pay on hot grades, a more positive approach to the problem would be needed. Feeders who “go along with the buyer” offer no positive solution to the problem and are, over time, likely to be subjected to net returns below those of other feeders with comparable cattle. Note also that 11 of the 35 feeders did not feel qualified to make a response of any type.

The P & S Regulations

Reference has been made to the regulations concerning procedure on carcass grade and weight sales of slaughter cattle. These regulations, as they appeared originally in the Federal Register, are shown at the end of this section (8).

There is considerable detail on procedure in the regulations. Parts (d) and (e) are the more important parts, dealing with weighing and grading procedures respectively. Most of the publicity has emerged from prolonged discussion over part (d) providing for payment on hot weights.

The feeders were questioned about the regulations. The proposed regulations were announced on May 30, 1967. During August and September when interviewed, only 14 of the 35 feeders were even vaguely familiar with the content and purpose of the regulations. Those showing

familiarity supported the principle of the proposed regulations but questioned whether they could be effective.

P & S Regulations Concerning Purchase of Livestock by Packers on a Carcass Grade, Carcass Weight, or Carcass Grade and Weight Basis.

- (a) Each packer purchasing livestock on a carcass grade, carcass weight, or carcass grade and weight basis shall, prior to such purchases, make known to the seller the details of the purchase contract. Such details shall include, when applicable, expected date and place of slaughter, carcass price, condemnation terms, style of dressing, grading to be used, accounting, and any special conditions.
- (b) Each packer purchasing livestock on a carcass grade, carcass weight, or carcass grade and weight basis, shall maintain the identity of each seller's livestock and the carcasses therefrom and shall, after determination of the amount of the purchase price, transmit or deliver to the seller, or his duly authorized agent, a true written account of such purchase showing the number, weight, and price of the carcasses of each grade (identifying the grade) and of the ungraded carcasses, an explanation of any condemnations, and any other information affecting final accounting. Packers purchasing livestock on such a basis shall maintain sufficient records to substantiate the settlement of each transaction, and shall, upon request from the seller or his duly authorized agent, make available for their inspection all such substantiating records which affect final accounting.
- (c) When livestock is purchased by a packer on a carcass weight, or carcass grade and weight basis, purchase and settlement therefore shall be on the basis of carcass price. This paragraph does not apply to purchases of livestock by a packer on a guaranteed yield basis.
- (d) Settlement and final payment for livestock purchased by a packer on a carcass weight, or carcass grade and weight basis shall be on actual (hot) carcass weights determined before shrouding. The hooks, rollers, and gambrels or other similar equipment used at a packing establishment in connection with the weighing of carcasses of the same species of livestock shall be uniform in weight. The tare weight shall include only the weight of such equipment.
- (e) Settlement and final payment for livestock purchased by a packer on a USDA carcass grade shall be on an official (final — not preliminary) grade. If settlement and final payment are based upon any grades other than official USDA grades, such other grades shall be set forth in detailed written specifications which shall be made available to the seller or his duly authorized agent. For purposes of settlement and final payment, carcasses shall be final graded

within 72 hours after slaughter: Provided, however, that when such 72-hour period expires on a weekend or holiday, carcasses shall be final graded not later than the close of the next work day following such weekend or holiday.

Summary and Conclusions

The fed beef industry is growing rapidly in Oklahoma. Numbers of cattle and calves on feed have increased from 69,000 in January, 1960 to 205,000 in January, 1969. Growth has been largely in the large feedlots with up to 20,000 head capacity.

During such periods of growth and development, it is important to initiate and/or adopt efficient marketing procedures. Marketing advances have lagged relative to improvements in production techniques and feedlot management. Carcass grade and weight selling, theoretically an advancement in marketing procedure, has been a point of much concern within the industry. Information on this and alternative ways of selling is needed to facilitate decisions which contribute to progressive development in marketing procedure.

Carcass sales of fed beef have been plagued with charges of inefficiency and inequity. However, no concerted effort has been made to investigate and estimate the economic implications and variabilities associated with carcass sales. Variable weighing and grading procedures can affect the seller's net returns and destroy the ability of the price mechanism to effect, via price signals, needed changes and revisions throughout the marketing system. If feeders are unable to discern price premiums and price discounts, the result is a delay in needed adjustments. Such possibilities can be established conceptually but must be tested empirically to determine the nature and direction of associated economic implications. Oklahoma feeders currently sell a much higher percentage of beef by the carcass method than the average U.S. feeder, such sales are expected to increase, and information on the economic impact of such variable practices and procedures is badly needed. Therefore, establishing the economic implications of any weighing and grading variabilities associated with carcass grade and weight sales of slaughter beef in Oklahoma became the primary objective of the analysis.

The adopted procedure included a survey of thirty-five large Oklahoma feeders, analysis of the data obtained in the survey, and study of related works and concepts. The thirty-five lots surveyed contained approximately 80 percent of the fed cattle on hand in the state. Feeders interviewed had lot capacities of from 1,000 to 20,000 head.

Seventeen of the 35 feeders reported they sell 50 percent or more of their cattle on a carcass basis. About 33 percent of all cattle in the state

are sold carcass grade and weight. All but one of the 35 feeders had sold at least a few loads of cattle on a carcass basis. Carcass selling procedure typically involves negotiation of a schedule of prices by weight and grade groupings.

The alternative to carcass selling is liveweight selling. Sixty-seven percent of the cattle in the survey were sold liveweight. Essentially all liveweight sales are direct to the packer via a negotiated price and payment on the basis of liveweight. Eighteen of the 35 feeders reported they sell predominantly on a liveweight basis.

Pencil shrinks employed by packers in negotiating carcass sales are the primary source of variability in weighing procedure. Pencil shrinks of from 0 to 3.25 percent were reported by the feeders when selling on a carcass basis. This variation in pencil shrinks permits carcass price to vary more than \$1.00 per hundredweight while returns per carcass remain constant. A one percentage point excess shrink will result in a loss of approximately \$.41 per hundredweight. In addition, payment on preliminary rather than final grades may result in a loss of \$.50 or more per hundredweight on some carcasses.

The thirty-five feeders interviewed were asked a group of questions to establish their experience with, understanding of, and competence in initiating strategies to offset variable conditions of exchange. In response to a question concerning the time of weighing, most feeders felt the carcasses were weighed "hot" (soon after slaughter before being moved into the cooler). However, two feeders were not aware of the importance of the time of weighing and three other feeders felt some packers wait until the following day to weigh the carcasses.

As noted, the pencil shrink taken by the feeders ranged from 0 to 3.25 percent with 3 percent emerging as a "standard". Actual shrink, based on a survey by the Packers and Stockyards Administration, USDA, varies from .75 to 1.5 percent for an overnight chill. Selecting 1.25 percent as a basis for comparison, it was noted that all but one of the feeders in the survey had consistently taken pencil shrinks in excess of 1.25 percent. The average shrink taken by feeders selling predominantly on a carcass basis, compared to the 1.25 percent, would result in a real price \$.36 per hundredweight below a negotiated price of, say, \$40.00 per hundredweight. The same comparison for feeders selling primarily on a liveweight basis resulted in a real price \$.46 per hundredweight below such a negotiated price. With the more typical pencil shrink of 3 percent, the real price is \$.70 below negotiated price assuming negotiated prices of approximately \$40.00 per cwt.

Feeders were asked for their reaction to a situation in which the pencil shrinks requested by the buyer were considered to be too high. Several feeders would seek other buyers or negotiate for more equitable weighing

conditions. A majority of the feeders felt bargaining for a higher price was the proper strategy to employ. However, there was little indication that feeders were actually able to offset the effects of high pencil shrinks through price bargaining or through other types of negotiation. In many cases bargaining for a higher price was not attempted since the feeder was not aware that the pencil shrink taken might be excessive.

Variable grading practices also have an impact on returns to feeders and the ability of the price mechanism to relay needed changes from consumer to producer. The feeders were questioned with regard to grading of animals sold on a carcass grade and weight basis. Most knew a carcass can reach a higher grade with complete chilling. Several feeders did not know whether they were paid on hot or cold carcass grades. With a price differential of \$.50 per grade, the feeder would lose \$3.00 on a 600-pound carcass if the packer paid on the basis of preliminary "hot" grades and then sold the carcass on the basis of a higher grade after thorough chilling.

A possible solution to weighing and grading problems is the P & S regulation dealing with carcass grade and weight sales which become effective April 6, 1968. The regulation provides for payment on actual hot weights and final grades. The regulation was made public as a proposal on May 30, 1967, but only 14 of the 35 Oklahoma feeders interviewed were even vaguely familiar with the content and propose of the regulation in the fall of 1967.

The primary objective of this analysis was to establish and measure the economic implications of variable weighing procedures in carcass grade and weight sales of slaughter cattle in Oklahoma. To clarify and emphasize conclusions relating to this objective, certain of the inferences drawn as part of the analysis are noted here. Important inferences in conclusion form are as follows:

1. The widespread practice of employing an arbitrary pencil shrink to evolve pay weights in carcass grade and weight purchases of slaughter cattle can decrease returns to individual feeders and result in an inequitable distribution of returns among feeders as a whole.
 - a. Pencil shrinks of 3 percent are commonplace. Shrinks of 3 percent exceed the actual shrink for an overnight chill by 1.75 percent in most cases. At a negotiated price of \$40.00 per cwt. the seller receives \$39.30 per cwt. with an actual weight loss of 1.25 percent and a pencil shrink of 3 percent. The \$39.20 is the "real price."
 - b. There is substantial variation among feeders in their ability to deal with problems associated with excessive shrinks. Some feeders do not recognize a problem exists. Others understand the im-

- plications of an excessive pencil shrink, but fall short in recognizing what (if any) strategies have potential to offset the implications of excessive shrinks.
2. The effectiveness of the price mechanism as a means of communicating incentive for change and adjustment from consumer to producer (pricing efficiency) is decreased by variable weighing procedures which introduce an element of bias into price signals. Coordination of economic activity throughout the beef marketing system is thus threatened.
 - a. Variable pencil shrinks conceal price signals which the price mechanism seeks to transmit from consumer to producer. Pencil shrinks ranging from 1 to 3 percent, if associated with transactions showing a negotiated price of \$40.00 per cwt. and using 1 percent as actual shrink, lead to a real price ranging from \$40.00 down to \$39.20 (based on a 1,000-pound steer dressing 60 percent).
 - b. Varying pencil shrinks, by distorting and often concealing real price, have slowed the adoption and use of carcass grade and weight sales. Comparisons to liveweight alternatives are made cumbersome and unnecessarily difficult. Consequently, the theoretical advantages of carcass grade and weight sales have not always been realized in practice.
 3. The task of reporting market news activity is made more difficult, and the reports rendered less useful, by variable pencil shrinks in carcass grade and weight sales. Since individual sales and related exchange conditions cannot be feasibly reported, a price range and some (often implicit) assumption regarding the shrinks employed is necessary.
 4. Regulations similar to those now being placed in effect by P & S will, if operational, perform an economically productive function. The requirement which specifies that hot weights be used as pay weights would eliminate the need for an arbitrary pencil shrink, help to prevent distortion of the price signal, and provide the element of standardization needed to facilitate meaningful comparison between sales alternatives. However, the survey results show (1) only 14 of the 35 feeders interviewed were even vaguely familiar with the regulations nearly 6 months after they were proposed, and (2) there was concern among the 14 as to whether the regulations could be operational.
 5. Variable grading procedure has potential of economic implications similar to those associated with variable weighing procedures, but at a possibly lower level of occurrence and magnitude.
 - a. A significant percentage of beef carcasses which are classified

- as "liners" will attain a higher grade when thoroughly chilled than when hot or partially chilled. If settlement is on the basis of preliminary grades and the carcasses are subsequently regarded, the "true" value of carcasses which will upgrade is not reflected in the net returns to the seller.
- b. The Oklahoma feeders interviewed were less aware of the economic implications associated with variable grading procedures than those associated with variable weighing procedures. Thus, the extent to which such grading procedure affects returns and the effectiveness of the price mechanism varies directly with the extent to which "hot grades" are used for payment purposes, and the proportion of carcasses which will upgrade. Few of the feeders were sufficiently concerned with the timing and procedure of grading to indicate strategies are being employed to offset any problems which exist.
 - c. The P & S regulations, which require payment on the basis of "final" grades, would — if operational — eliminate problems associated with variable grading procedure.
6. Carcass grade and weight sales, already high relative to the national average, will continue to increase in Oklahoma. Currently, feeders are not sufficiently well informed concerning the nature and magnitude of economic implications associated with variable weighing and grading procedures. An educational effort to eliminate this gap in the currently available body of knowledge is needed.

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