

## EVALUATION OF CARCASS MERIT PRICING BY PORK PACKERS

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### Summary

Live hog prices must reflect end-use value to convey market information from consumers to producers. Precise end-use value is excessively costly to trace for each carcass given current technology. Pricing structures must be based upon carcass merit information that is correlated with end-use value. This study uses pork carcass cut out data from 794 carcasses to estimate hog carcass values based upon carcass characteristics. Carcass values varied by nearly \$20/cwt based on quality differences alone. In addition, considerable differences were present in pricing schedules of different pork packers suggesting that hog producers need to shop around when deciding to which packer they sell their hogs.

(Key Words: Hog Carcass Merit Pricing, Pork Pricing Systems, Packer Pricing.)

### Introduction

Consumers are willing to pay for high quality lean meat. However, a recent quality survey found that only 16% of retail pork was "ideal" quality, and over half was "questionable" quality. Producers have direct control over the leanness and yields of pork products that they produce through selection of genetics and production methods. However, these products will be produced only with economic incentives. Swine producers must be paid for desirable carcass traits and receive discounts for hogs possessing undesirable traits. Value-based

pricing of hogs, pricing based upon end-use values of carcasses, is one method to help enhance retail pork quality and is a primary goal of the pork industry. The National Pork Producers Council has established live hog pricing guidelines for pork processors to increase conveyance of consumer preferences to hog producers. To ensure that hogs are priced based on end-use value requires purchasing them on a carcass merit basis. The percentage of hogs sold on merit increased from 14% in 1984 to 25% in 1990. Although value-based buying is increasing, most hogs are still purchased without knowledge of specific carcass quality characteristics. This study examined how price structures of pork packers reflect value-based pricing systems.

### Procedures

A sample of carcass fabrication yields was acquired from a yield test of 794 carcasses conducted by a midwestern pork packer. Backfat was measured using a Fat-O-Meter, and loin eye areas were physically measured. Carcass values were calculated by multiplying weights of the individual fabricated cuts, fat, lean, trim, skin, and bone for each carcass by their associated U.S. Department of Agriculture prices plus a midwestern packer's overages for the most closely equivalent wholesale products. Individual carcass values were regressed against carcass traits (backfat, loin eye area, weight, weight squared, muscling, and carcass length) to determine how these traits related to carcass value. Packers'

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pricing schedules were compared with carcass values to determine how closely packers' pricing systems reflected carcass values.

## Results and Discussion

Average yields of the major primal cuts from the 794 carcasses are reported in Table 1. Ham, the largest cut, represented almost one-fourth of the carcasses on average; however, this varied from 20% to almost 29%. The total lean cuts of boneless picnic, Boston butt, loin, and ham represented about 58% of the carcass, but again had a wide range of 51% to 65%. Table 1 shows that carcasses vary considerably in fabricated cut yields. The data were not random, they were stratified to cover the range of carcasses typically delivered to packers. Table 2 reports summary statistics of carcass traits. Carcass values averaged \$71.80/cwt ranging from \$63.23/cwt to \$80.12/cwt (prices were for the week ending September 13, 1991, the period for which packer price schedules were obtained). Assuming 74% dressing percentage, this \$17/cwt range in carcass values transfers to more than a \$12.50/cwt live hog price range. Although this represents value differences across a wide range of carcasses, it nonetheless portrays the importance of merit pricing.

Table 3 shows how hog carcass values change as carcass weight and backfat thickness vary (carcass length was allowed to vary in relation to carcass weight according to the average relation between weight and length), holding other factors constant. The base carcass is assumed to be 185 lb carcass with 1.2 in backfat. Premiums of 3% to 6% are warranted for lighter-weight lean hogs (with the exception of excessively light-weight carcasses). Discounts exceed 5% as carcass weight increases beyond 205 lb and backfat depth increases to 1.6 in or more. This is similar to, and reconfirms, the pork value guide published by the National Pork Producers Council.

Price structures of several packing firms were collected from data surveyed by Clark Consulting International Inc. Packers were asked to value carcasses of 240 lb hogs with 74% dressing (constant 177.6 lb carcass) with varying backfat and loin eye area and a base live hog price of \$50/cwt. These prices are packer reported and do not necessarily reflect actual prices paid.

Figures 1 through 3 illustrate three packers' actual and expected pricing structures (based on estimated value) as backfat varies. These three pricing systems are presented here as examples showing that although some packers' pricing schedules were highly consistent with estimated carcass values (Figure 2), others were not (Figure 1 and 3). As can be seen, packer one (Figure 1) has a step function pricing schedule that tends to value carcasses in a discrete manner. This results in undervaluing the leanest hogs with less than 0.6 in backfat and overvaluing 1 to 1.2 in backfat hogs. Overall, the root mean squared error between the modeled and actual values for packer one was \$1.86/cwt (1.53% of the mean price). Packers two's pricing structure was considerably more consistent with the modeled structure. The root mean squared error between actual and modeled carcass values for packer two was less than \$0.90/cwt (less than 0.80% of the mean price). Packer three had the most diverse pricing structure relative to estimated value with a root mean squared difference of \$4.72/cwt (3.89% of the mean). Packer three's (Figure 3) premiums for lean hogs were considerably (as much as \$4/cwt or more) higher than the estimated values and his discounts for lean hogs were considerably lower. This packer's pricing structure certainly favors leaner hogs more than the typical wholesale market would suggest, although premiums for the leanest carcasses (0.4 in backfat) are less relative to the modeled values than premiums for moderately lean carcasses (0.6 to 1.0 in backfat).

Clearly, hog producers need to shop around, to the extent that packer availability allows, given significant differences in

packers' pricing schedules. Producers who produce high-yielding lean hogs benefit from searching for packers that pay highest premiums for this trait. Rigid step-

function pricing schedules used by some packers can work to either the advantage or disadvantage of the producer, depending upon the type of hogs produced.

**Table 1. Summary Statistics of Hog Carcass Primal Yields**

Primal	Average	Standard Deviation	Minimum	Maximum
----- % of Carcass -----				
Boneless picnic	7.13	0.74	4.72	9.82
Boston butt	8.04	0.74	5.30	10.33
Loin	18.27	1.70	13.98	24.33
Ham	24.47	1.15	20.26	28.92
Skinless belly	15.22	1.72	9.66	19.76
Picnic cushion	1.28	0.19	0.75	1.88
Sparerib	3.72	0.39	2.59	5.39
Jowl	1.83	0.41	0.44	3.47
Total lean <sup>a</sup>	57.92	2.80	51.32	65.33

<sup>a</sup>Total lean = boneless picnic + Boston butt + loin + ham.

**Table 2. Summary Statistics of Selected Hog Carcass Attributes**

Carcass Attribute	Average	Standard Deviation	Minimum	Maximum
Value <sup>a</sup> (\$/cwt)	71.80	3.53	63.23	80.12
Cold Carcass Weight (lb)	185.56	26.58	119.04	273.06
Last Rib Fat (in)	1.25	0.31	0.50	2.20
Carcass Length (in)	31.74	1.61	27.30	36.70
Loin Eye Area (sq in)	5.63	1.21	2.55	11.05

<sup>a</sup>Estimated wholesale value using prices from week ended September 13, 1991.

**Table 3. Carcass Value with Varying Backfat and Weight**

Carcass Length (in)	Cold Carcass Weight (lb)	Last Rib Backfat Thickness (in)							
		0.6	0.8	1.0	1.2	1.4	1.6	1.8	2.0
----- Carcass Value as a Percentage of Base (%) -----									
30	145	109	107	105	104	102	100	99	97
30	155	108	106	104	103	101	100	98	96
31	165	107	105	103	102	100	99	97	96
31	175	105	104	102	101	99	98	96	95
32	185	104	103	101	BASE	99	97	96	94
32	195	103	102	100	99	98	96	95	94
33	205	102	101	99	98	97	96	94	93
33	215	101	100	98	97	96	95	94	93
34	225	99	98	97	96	95	94	93	92
34	235	98	97	96	95	94	93	92	91

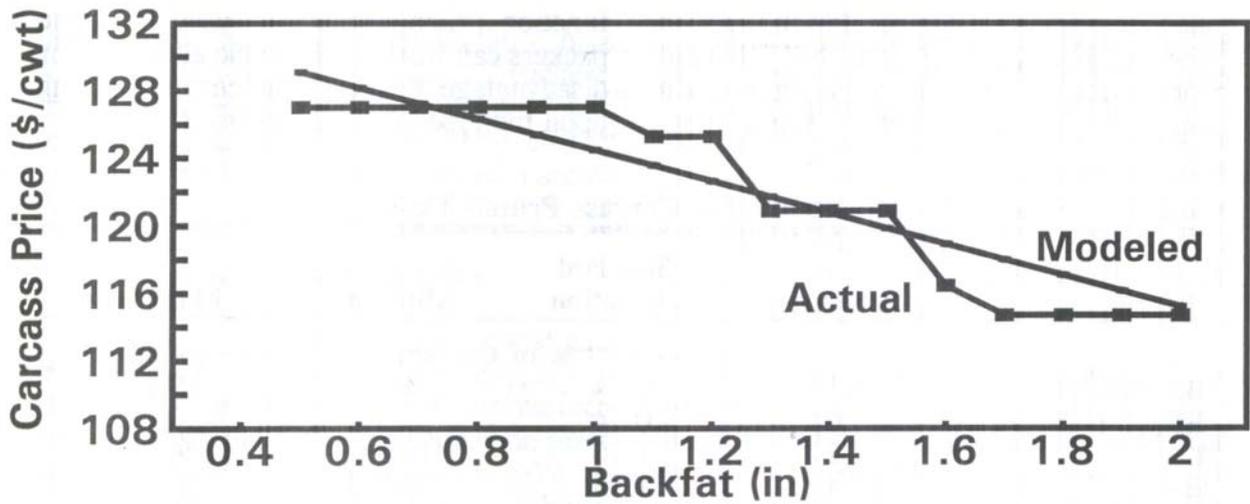


Figure 1. Comparison of Actual and Modeled Hog Carcass Pricing Structure, Packer One

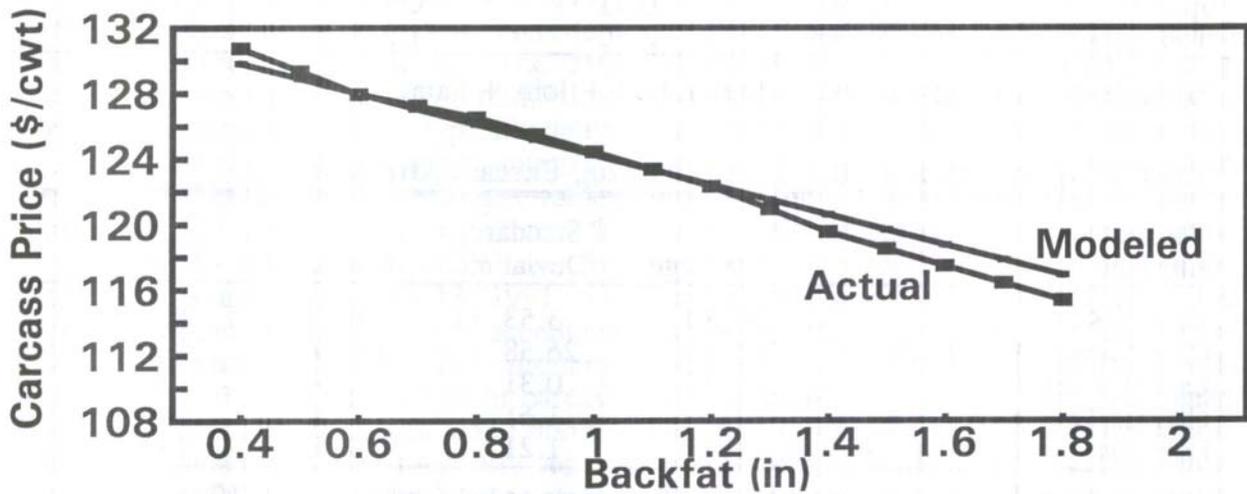


Figure 2. Comparison of Actual and Modeled Hog Carcass Pricing Structure, Packer Two

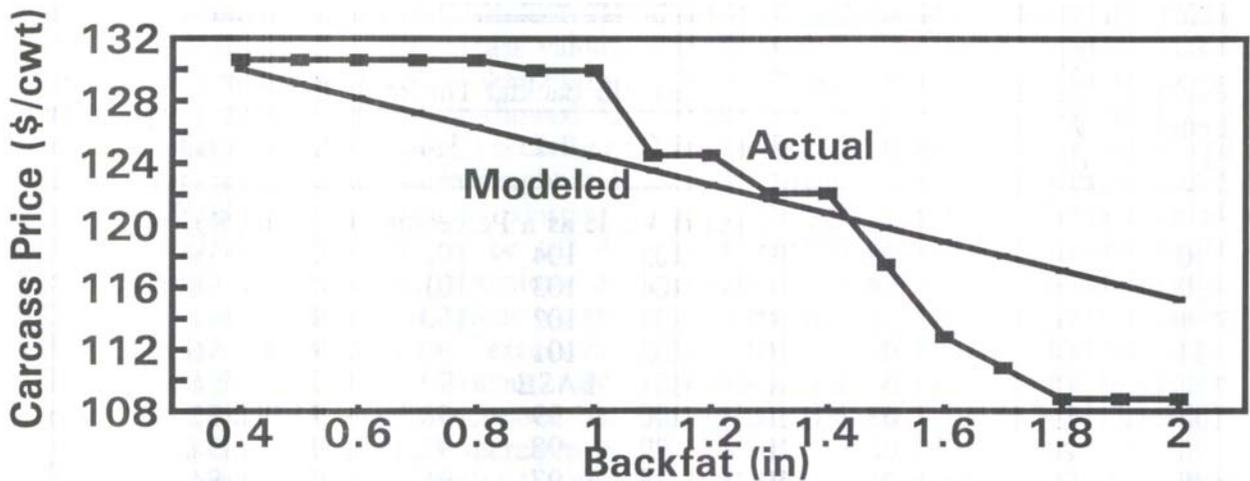


Figure 3. Comparison of Actual and Modeled Hog Carcass Pricing Structure, Packer Three