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## Livestock Auctions in South Dakota: An Economic Analysis

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Livestock  
**AUCTIONS**  
in South Dakota

An Economic Analysis

Agricultural Experiment Station  
South Dakota State University  
Brookings

# An Economic Analysis . . .

## *Livestock Auctions in*

### HIGHLIGHTS

- Livestock auctions handled approximately 48% of the cattle, 23% of the hogs and 34% of the sheep marketed in South Dakota in 1964 compared to 34%, 20% and 19%, respectively, in 1957.
- In 1964, livestock auctions handled an average of 33,983 marketing units per auction—an increase of 8,017 units over the number handled in 1956. (One marketing unit consists of one head of cattle; three head of hogs, or five head of sheep.)
- More than half (55%) of the auctions handled less than 30,000 marketing units in 1964. Twenty-two percent handled between 30,000 and 49,999 units with the remainder handling more than 50,000 marketing units.
- The average per-marketing unit fixed investment in facilities and equipment was \$1.58, \$1.74, and \$2.29 for large, medium, and small auctions, respectively.
- Approximately 72% of the livestock was received from within a 50-mile radius with the proportion originating beyond this distance increasing with auction size.
- The average cost per marketing unit was \$2.32 for small auctions, \$2.17 for medium auctions and \$2.02 for large auctions. However, variation was greater within size categories than between size categories. Per-marketing unit average costs ranged from \$1.78 to \$2.30 for large auctions, \$1.95 to \$2.76 for medium auctions and \$2.08 to \$2.77 for small auctions.
- Marketing charges varied widely among auctions with average rates for all auctions of \$2.50 per head for cattle, \$2.77 per head for hogs and \$2.60 per head for sheep.

# South Dakota

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## IMPLICATIONS

- Wide variations of costs within auction size groups suggests need for extensive efforts in management training to improve internal operational efficiencies.
- High capital investment and low capacity use of facilities warrants investigation of alternative uses of facilities as a means of supplementing income and reducing fixed costs allocated to the auction.
- The extreme competition between auctions as evidenced by the overlapping procurement areas and the increasing expenditures for advertising and promotion suggests the need for carefully considering the merger of some auction markets. Close proximity of auction markets, especially in Eastern South Dakota, along with improved trans-

portation systems suggest that in some localities all concerned could be better served with fewer, more efficient auctions.

- Auction markets in the past have been a strong competitive force in marketing of livestock. They have provided a nearby competitive market for the livestock producer. However, there is need to constantly appraise the changes which are taking place in agriculture as these affect the methods of marketing livestock. To remain competitive, auctions must adjust in order to provide the services desired by consignors. The trends toward larger operating farm units, contracting the sale of livestock, and direct selling influence the type of service required and thus have an impact upon livestock auctions.

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## CONTENTS

Highlights .....	2
Implications .....	3
Introduction .....	5
Source of Data—Procedure .....	
Livestock Auctions in South Dakota .....	7
Growth of Auctions—Volume—Utilization of Facilities—Procurement Area .....	
Cost of Operation .....	11
Variable Costs—Labor—Publicity, Public Relations—Utilities—Supplies— Repair, Maintenance—Miscellaneous Variable Expenses .....	
Fixed Costs .....	17
Total Costs—Cost Variation Within Auction Size Categories—Economies of Scale in Operation .....	
Marketing Charges .....	22
Effect of Specialization on Marketing Charges—Profitability of Auction Operations—Break-Even Points .....	
Summary and Conclusions .....	27
Selected References .....	29
Appendix Tables .....	30

## Introduction

Auctions have become increasingly important outlets for marketing livestock in South Dakota. Since first established at Yankton in 1930, livestock auctions have increased both in number and volume of livestock handled.

In the early stages of development of livestock auctions, transportation and production conditions largely limited the distance from which firms could procure livestock. As a result, most auctions were too small to attain any significant degree of efficiency in operations. In recent years, the continual development and improvement in roads and truck transportation, along with the trend toward larger producers, have reduced the time and cost of transporting livestock. As a result, procurement areas for auction firms have increased. With larger supply areas, the potential volume of auction firms has increased. With this increase in volume should come greater operational efficiency and, ultimately, lower marketing charges and costs. Thus, the primary objective of this study was to examine the cost structure of the livestock auctions in South Dakota to determine if there is any relationship between cost, volume and marketing charges.

### Source of Data

Data for the analysis were obtained from two sources. Managers of the 58 auctions in South Dakota were contacted personally and asked to supply information pertaining to volume, operating costs and marketing charges. Usable schedules were obtained from 50 auctions. In

addition, cost data grouped by auction size and geographic area were supplied by the regional office of the Packers and Stockyards Division of USDA. The cost analysis part of this study is based primarily on these grouped data.

### Procedure

To make size comparisons, auctions were divided into three categories on the basis of the number of livestock marketing units handled in 1964. To be consistent with previous North Central Regional studies, a marketing unit was defined as one head of cattle, three hogs or five sheep.<sup>1</sup> Auctions were grouped as follows:

#### Marketing Units

Large auctions: 50,000 or more.

Medium auctions: 30,000 -49,999.

Small auctions: less than 30,000.

Because of differences in both type of livestock marketed and proportion which each species makes up of the total volume in various areas of the state, the auctions were also grouped by geographic area. It was believed that such differences might have an effect on operational costs. The auctions were grouped into the five geographic areas shown in figure 1. These areas were delineated on the basis of similarity in both class and species of livestock marketed.

Average costs were classified into variable and fixed costs for each size

<sup>1</sup>Richard R. Newberg, "Livestock Marketing in the North Central Region, III: Auction Markets," Ohio Agricultural Experiment Station Research Bulletin 932 and North Central Regional Research Publication 149, December 1963, p. 19.

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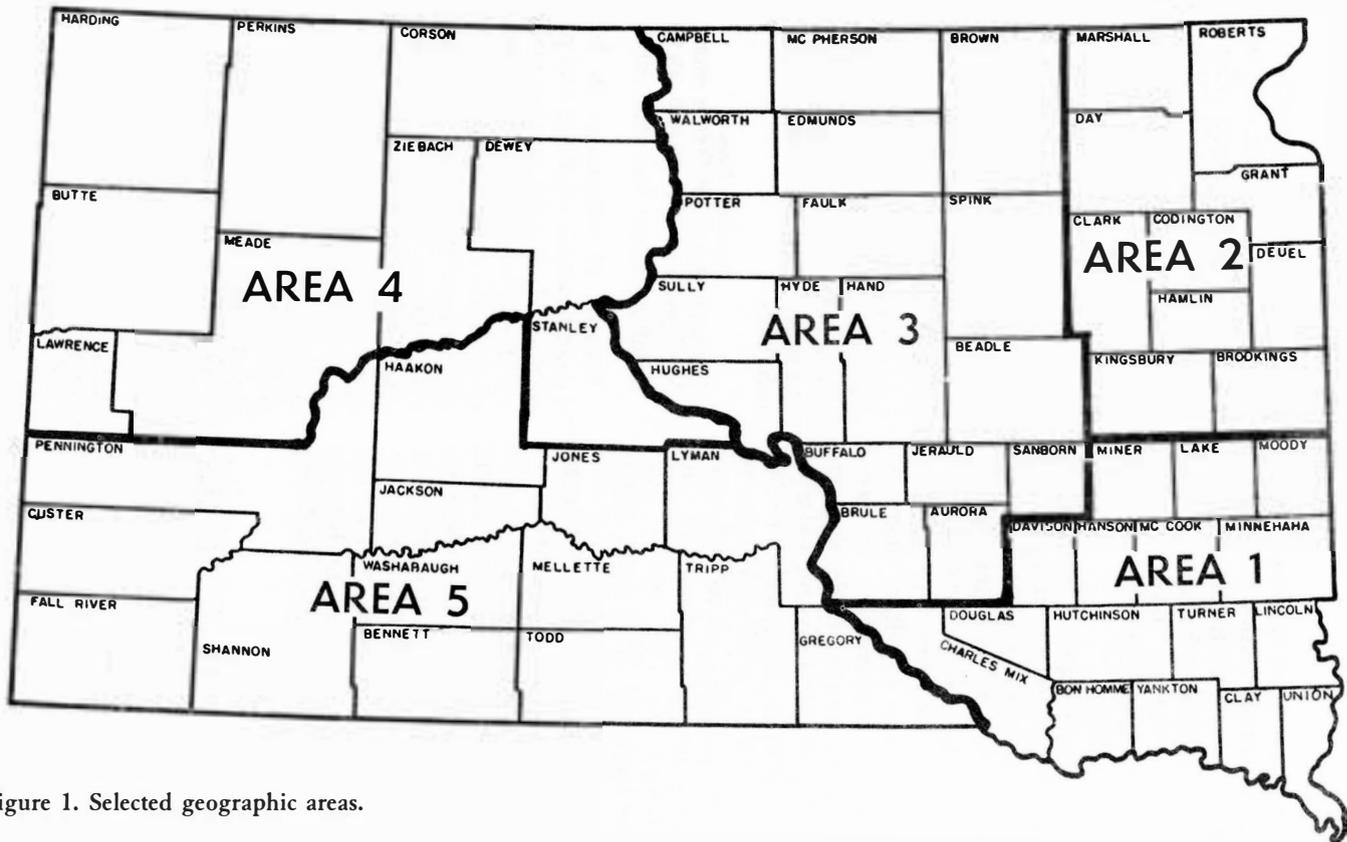


Figure 1. Selected geographic areas.

group. Costs were computed on a per-marketing unit basis. Because of different methods used by auctions in assessing marketing charges, it was necessary to base these on specific classes of livestock. While most auctions assess charges on a per-head basis, a substantial number assess charges, especially for cattle, on the value of the livestock. Thus, in this study, marketing charges were

based upon the following classes of livestock with what is considered to be reasonable estimates of the prices during 1964:

Cattle: 500 lb. feeder at \$24 cwt.  
 Hogs: 200 lb. slaughter at \$20 cwt.  
 Sheep: 100 lb. slaughter at \$20 cwt.

It is assumed that these are representative of marketing charges for other classes of livestock.

## Livestock Auctions in South Dakota

### Growth of Auctions

The livestock auction industry in South Dakota has undergone significant change in recent years. The number of livestock marketed through auctions has increased (fig-

Table 1. Number of cattle, hogs and sheep marketed at auctions, 1956 and 1964

	Cattle	Hogs	Sheep	Marketing units
			(thousands)	
1956 .....	1,253	606	384	1,532
1964 ....	1,584	930	384	1,971

Source: South Dakota Livestock Sanitary Board, Annual Report of the South Dakota Livestock Sanitary Board, State Office Building, Pierre, South Dakota, 1957 and 1965.

ure 2). In fiscal 1964 over 1.5 million cattle, 930,000 hogs and 384,000 sheep were sold through auctions (table 1). For each species of livestock this represented increases of 26%, 53%, and 0%, respectively, over the 1956 volume.

Not only has total number of livestock marketed through auctions increased, but proportion of all livestock marketed through auctions has increased. The proportion of South Dakota livestock marketed through auctions in 1964 showed an increase over 1957 of 14% for cattle, 3% for hogs and 15% for sheep (table 2).

Table 2. Methods of marketing livestock in South Dakota, 1957 and 1964

	Terminal		Auctions		Packers		Other farmers		Other	
	'57	'64	'57	'64	'57	'64	'57	'64	'57	'64
	(Percent)									
Cattle .....	38	29	34	48	6	11	18	9	4	3
Hogs .....	50	42	20	23	26	28	2	3	2	4
Sheep .....	28	31	19	34	17	14	30	15	6	6

Source: South Dakota Crop and Livestock Reporting Service, South Dakota Agriculture 1965, Sioux Falls, South Dakota, 1965, pp. 46-48.

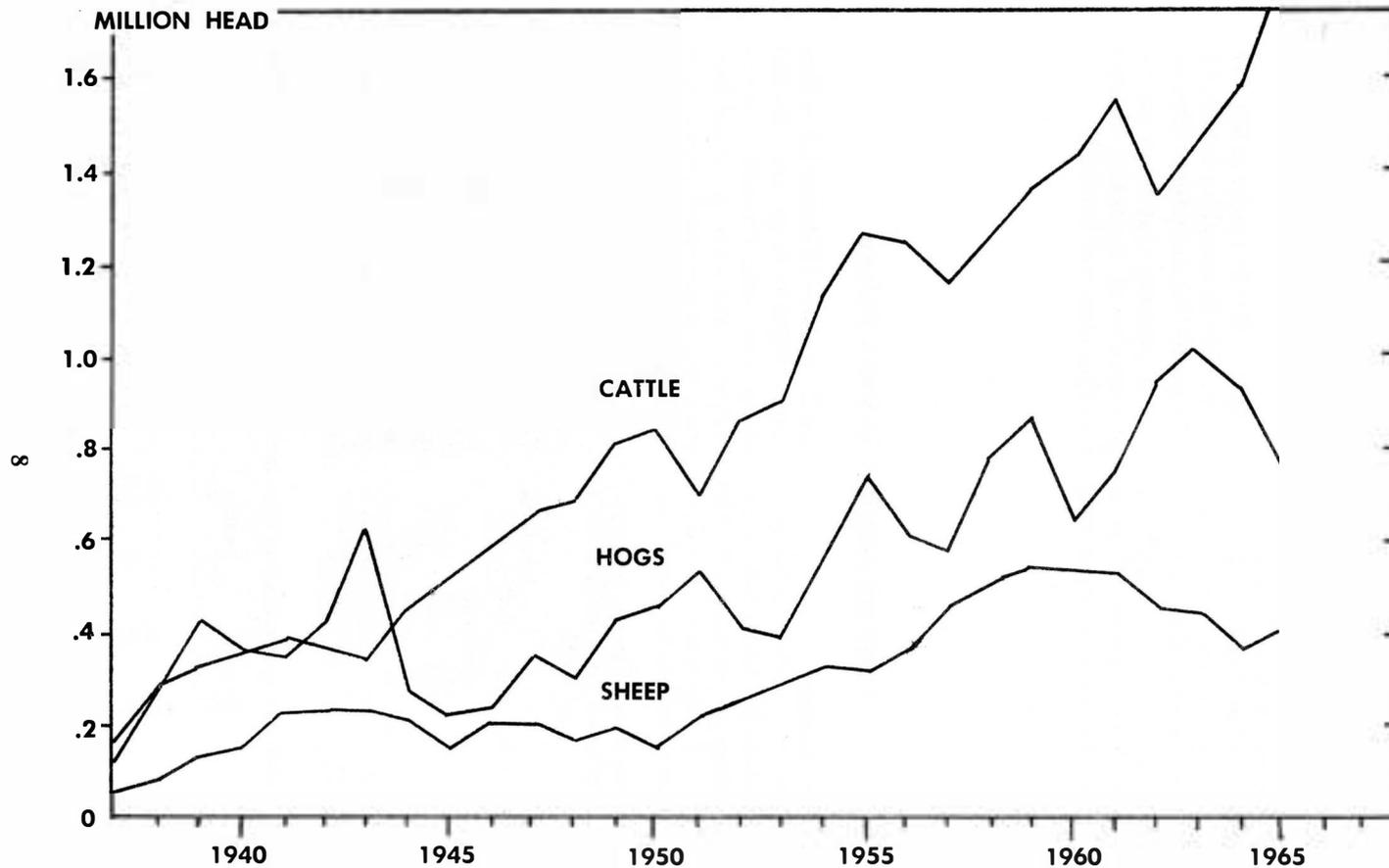


Figure 2. Number of cattle, hogs and sheep marketed through livestock auctions, South Dakota, 1937-1965. (See Appendix, table 2)

## Volume

While number of auctions in operation in South Dakota has remained constant during the 1956-1964 period, some firms have left the industry and new ones have taken their place. There were 59 auctions operating in 1956 and 58 in 1964. The firms in 1964, however, handled a much larger volume of livestock.

In 1956 more than two-thirds (68%) of the firms handled less than 30,000 marketing units of livestock. By 1964 only 55% of the auctions fell in this category (table 3). The per-

Table 3. Number of auctions in each size category and by geographic areas, South Dakota, 1956 and 1964

Geographic area*	Small		Medium		Large	
	1956	1964	1956	1964	1956	1964
1	10	8	3	2	1	3
2	8	6	1	1	1	2
3	11	8	5	4	2	5
4	4	4	1	4	3	2
5	7	6	1	2	1	1
Total	40	32	11	13	8	13

\*See figure 1.

Table 4. Average number of animals handled per auction, 1956 and 1964

	Cattle	Hogs	Sheep	Marketing units
1956	21,237	10,265	6,508	25,961
1964	27,309	16,030	6,615	33,976

Table 5. Percent of livestock auctions expanding facilities during the period, 1956-1964

Type of Expansion	(Auction size)			All Auctions
	Large	Medium	Small	
	(Per Cent)			
Yards	75	93	83	82
Barns	25	36	7	16

centage of firms handling over 50,000 marketing units during this period increased, with 22% of the firms qualifying in this category in 1964. The average marketing units per auction increased from 25,961 units in 1956 to 33,976 in 1964. The largest increase was in the sale of cattle. Cattle sales averaged 21,237 head per auction in 1956 compared to 27,309 head in 1964. A similar, but smaller, increase is also shown for hogs and sheep (table 4).

## Utilization of Facilities

In order to handle increasing volumes, many auctions expanded facilities. Since 1956, firms have substantially increased investments in facilities and equipment. In 1964 the average investment in fixed facilities and equipment was \$108,925 for large auctions, \$70,572 for medium auctions and \$40,498 for small auctions (after accumulated depreciation). This represented an investment of \$1.58, \$1.74 and \$2.29 per marketing unit for large, medium and small auctions, respectively.

Between 1956 and 1964, 41 auctions expanded facilities to handle larger volumes of livestock. Over 80% of the auctions increased the capacity of their yards and 16% added additional barns (table 5). One auction increased its yard facilities to handle three times as large a volume. Two auctions built additional rings while several added overhead walkways. Many auctions made major improvements in existing facilities.

Auction managers estimated number of marketing units that could be handled in their yards at any given time and this amount was multiplied by 52 (one sale per week) to

determine potential capacity. There is some subjectivity in basing potential capacity on one sale per week because some auctions hold two or more sales each week. However, the yards and facilities are available for use each day of the week whether they are used or not.<sup>2</sup> Auctions with limited yard space have the alternative of either expanding or more fully using existing yards by holding additional sales.

The degree to which auctions used their yard capacity was computed by dividing the number of marketing units sold in 1964 by the potential number that could have been handled. On this basis auctions used their yards an average of only 22% of capacity (table 6).

The facilities of large auctions were more fully used than those of medium and small auctions. One reason for this may be that a greater percentage of large auctions held two or more sales per week. All large auctions in Area I held two sales per week which partially accounts for the higher degree of capacity utilization. However, all size groups of auctions in Area I used yard capacity more than auctions in

other areas, especially in Areas IV and V.

Differences in yard capacity use in the various areas probably reflects the varying degrees of seasonality in marketing. Seasonal marketing pattern affects the auctions in Areas IV and V more than in other areas because a major portion of the volume consists of feeder cattle which are usually marketed in the fall or early winter. Auctions in other areas are not as dependent upon any one type of livestock. Auctions in Area I are less affected by seasonality because they handle substantial volumes of both cattle and hogs.<sup>3</sup> This probably explains their high utilization of facilities.

#### Procurement Area

Changes in size of the supply area served by auctions indicate that competition for livestock consignments is increasing. Half of the auction managers interviewed said the average distance livestock was transported for their particular auction had increased since 1956. More than a third (36%) indicated there had been no change in distance, while the remaining managers reported a decrease.

Several reasons were given for the expanded supply areas. In order of frequency they were: (1) fewer but larger producers, (2) improved or new facilities, (3) new manage-

Table 6. Percent of yard capacity utilized by auctions, by size and area, South Dakota, 1964

Area	(Auction size)			All auctions
	Large	Medium	Small	
	(Percent)			
I .....	44	30	25	31
II .....	30	7	23	20
III .....	29	20	21	24
IV .....	25	18	11	18
V .....	23	17	13	18
Average	29	18	18	22

<sup>2</sup>On this basis the potential capacity could be based on six sales per week. This would decrease the percent of utilization but would not change the relationship between auctions. However, the market supply available each week would not warrant daily sales.

<sup>3</sup>Auctions in Area I accounted for over half of the total hog receipts of auctions in 1964.

ment, and (4) better transportation. The managers of auctions for which the average distance has decreased attributed this primarily to increased competition from other auctions.

Livestock auctions are generally located near producers in contrast to terminal markets which, because they were originally established at rail centers, are near concentrations of consumers. This locational aspect of auctions, coupled with the development of the motor truck method of transportation, has been a contributing factor in the growth and popularity of auctions.

All of the livestock received at auctions in South Dakota are transported either by commercial or farm trucks. Commercial trucks are used more as hauling distance becomes greater. Two auctions indicated that livestock was sometimes transported from the auction by rail.

Generally, South Dakota auctions are so distributed that it is unnecessary for consignors to transport their livestock more than 50 miles.

The only exception is in the West River areas (figure 3). In 1964, approximately 72% of the livestock marketed through auctions originated within a 50-mile radius. Only 8% was received from distances greater than 100 miles. A direct relationship was found between auction size and size of procurement area. Only about 15% of the livestock received by auctions in the small size category was transported more than 50 miles. Large auctions received about a third of the livestock from over 50 miles (table 7). About 10% of this volume was received from over 100 miles.

Table 7. Percentage of livestock transported 49 miles or less, 50-99 miles, and over 100 miles to South Dakota auctions, 1964

Distance	(Auction size)			All auctions
	Large	Medium	Small	
	(Percent)			
0-49 miles	66	72	84	72
50-99 miles	24	21	13	20
100 miles or over	10	7	3	8
Total	100.0	100.0	100.0	100.0

## Costs of Operation

Operating costs tend to vary by size of auction, types of livestock handled and efficiency of management. Data show a tremendous variation in costs per animal unit handled. These differences are caused by a variety of circumstances. To facilitate the analysis, costs were divided into fixed and variable costs.

### Variable Costs<sup>1</sup>

Variable costs averaged \$1.65 per marketing unit for all auctions in-

cluded in the study. This represented 77% of the total operating cost. These costs decreased, however, with increases in auction size, averaging \$1.54 for large auctions (table 8).

Labor was the largest single cost item and accounted for 56% of the variable costs. Other major cost items included publicity and miscellaneous expense. Expenditures

<sup>1</sup>Includes payments for labor, publicity and public relations, supplies, utilities, repair and maintenance, and miscellaneous expenses.



for publicity and public relations represented 15% of the variable costs while miscellaneous items accounted for 16%. Supplies, utilities, and maintenance and repair were relatively minor costs making up only 13% of variable costs. Figure 4 shows the average per unit cost of these items for each auction size category.

### Labor

Labor costs at livestock auctions are influenced by rate of payment and efficiency in performing required tasks. Maximum labor efficiency is somewhat difficult to attain for a business requiring specific types of labor only 1 day per week. In addition, most auctions operate with variable volume from week to week. As a result, many auctions hire more

labor than is needed during periods of low volume.

Average unit costs for labor decreased with increasing size of auctions. Labor costs for large auctions were 7 cents per unit lower than for small auctions. This was not true for all components of labor, however.

Labor expenditures consist of payments to owners and officers, yard labor, office labor and auctioneers. Yard labor (included yardmen, starters, weighmen and ringmasters) was the largest labor cost item and accounted for about half of the total labor costs (table 9). This cost remained relatively constant for all size categories, averaging \$0.45 per unit.

Large auctions had lower per unit costs for office labor and auctioneers than did the small auctions.

Table 8. Variable costs per marketing unit for South Dakota livestock auctions, by cost items, 1964

Cost Item	(Auction size)							
	Large		Medium		Small		All Auctions	
	Avg. cost of total	Percent of total	Avg. cost of total	Percent of total	Avg. cost of total	Percent of total	Avg. cost of total	Percent of total
Labor .....	\$.90	58.4	\$.92	54.1	\$.97	52.7	\$.92	55.8
Publicity .....	.21	13.6	.31	18.2	.25	13.6	.25	15.1
Supplies .....	.05	3.3	.05	3.0	.06	3.2	.05	3.0
Utilities .....	.07	4.6	.12	7.1	.13	7.1	.10	6.1
Repair and Maintenance .....	.06	3.9	.08	4.7	.07	3.8	.06	3.6
Miscellaneous .....	.25	16.2	.22	12.9	.36	19.6	.27	16.4
Total .....	\$1.54	100.0	\$1.70	100.0	\$1.84	100.0	\$1.65	100.0

Table 9. Labor cost per marketing unit for South Dakota livestock auctions, by cost items, 1964

Cost Item	(Auction size)							
	Large		Medium		Small		All auctions	
	Ave. Cost	Percent of total	Ave. Cost	Percent of total	Ave. Cost	Percent of total	Ave. Cost	Percent of total
Yard labor .....	\$.45	50.0	\$.48	52.2	\$.44	45.4	\$.45	49.0
Office labor .....	.15	16.7	.17	18.5	.23	23.7	.18	19.5
Auctioneer .....	.08	8.9	.07	7.6	.14	14.4	.09	9.8
Owners and officers .....	.22	24.4	.20	21.7	.16	16.5	.20	21.7
Total .....	\$.90	100.0	\$.92	100.0	\$.97	100.0	\$.92	100.0

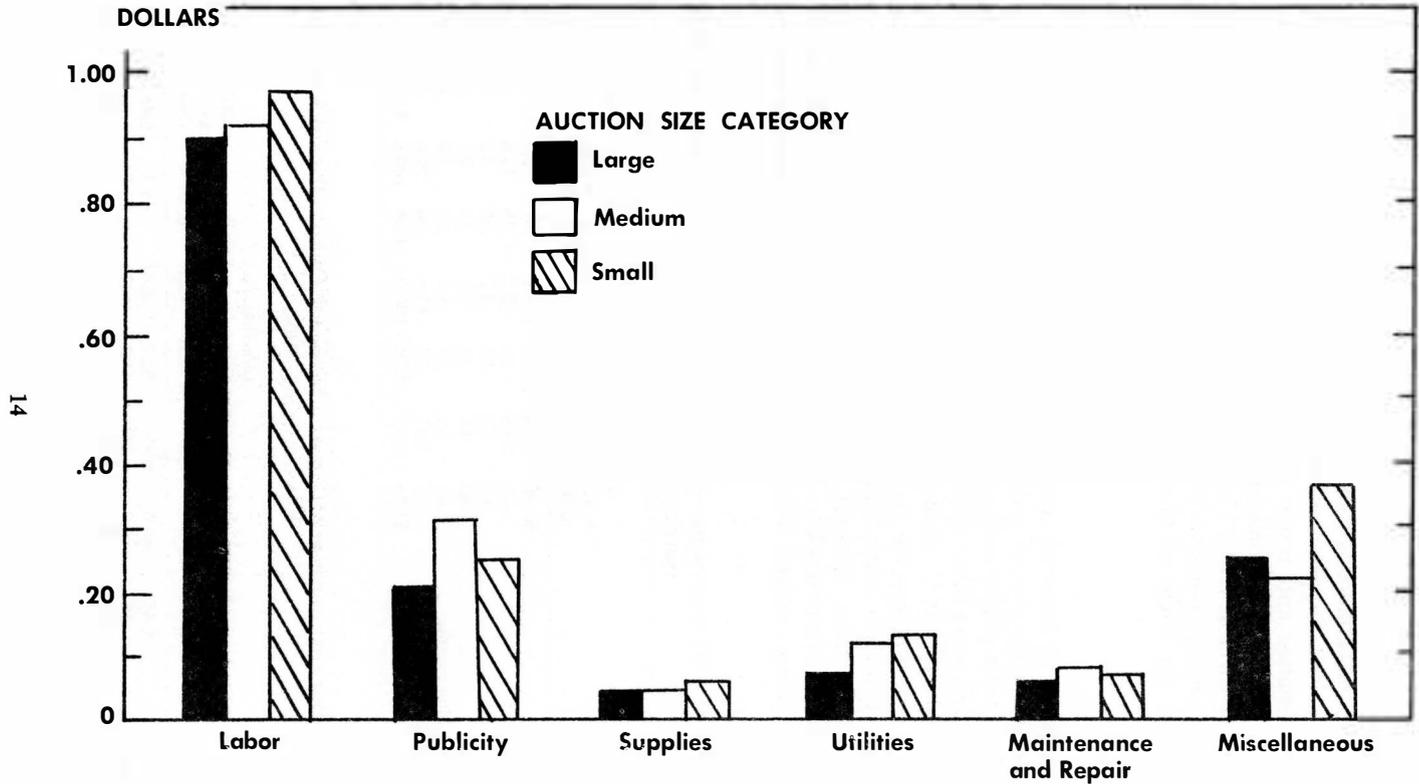


Figure 4. Average variable costs per marketing unit for South Dakota livestock auctions, by cost items, 1964. (See table 8.)

Office labor decreased from \$0.23 per unit at small auctions to \$0.15 per unit at large auctions. Auctioneer costs followed the same pattern, decreasing from \$0.14 per unit at small auctions to \$0.08 per unit at large auctions.

The salary of owners and officers was the only labor item in which per unit costs were lower for small auctions than for large auctions. Higher per unit costs at large auctions for this item may result from differences in ownership arrangements. Over half of the small auctions are individually owned compared to 17% of the large auctions and 23% of the medium auctions. Auctions owned under a partnership or corporate arrangement usually have two or more owners or officers on salary while single proprietorships have only one.

**Publicity, Public Relations**

Expenditures for publicity and public relations do not necessarily vary directly with increases in volume. Many auction managers indicated that expenditures for this item were based on a specific percentage of expected cash receipts. The amount which a particular auction spends on publicity and public relations depends upon the firm's goals and competition for livestock. Firms which face a high degree of competition or have goals of substantially expanding their volume probably spend more for publicity and public relations than do other auctions of the same size.

Medium size auctions in 1964 spent proportionally more on publicity and public relations than either the large or small auctions. About 18% of the variable costs at medium

auctions was for publicity compared to less than 14% at large and small auctions. The average cost for this item was 10 cents per unit higher for medium auctions than for large auctions.

About two-thirds of the publicity costs for all auction groups was for direct radio, television and newspaper advertising. Most of the remaining cost was from publicizing auction services through personal contact. This included expenditures for travel, entertainment and auto expense. Other methods of advertising, such as donations, gifts of pencils, calendars, were minor costs for all size categories. Medium auctions had the highest per unit cost for both direct advertising and personal contact (table 10).

**Utilities**

Utilities included expenditures for heat, lights, water and telephone. Total utility costs increased as the volume of livestock handled increased. These costs increased proportionally with increases in volume until auctions reached a volume of about 50,000 marketing units. However, after attaining this volume, much larger volumes could be handled with relatively small increases in utility costs. Utility costs

**Table 10. Publicity and Public Relations cost per marketing unit for South Dakota auctions, by cost items, 1964**

Cost item	(Auction size)		
	Large	Medium	Small
	(Dollars)		
Direct advertising	.13	.19	.17
Personal contact	.07	.11	.07
Other	.01	.01	.01
Total	.21	.31	.25

for auctions in the large size category averaged \$0.05 per marketing unit compared to \$0.12 and \$0.13, respectively, for auctions in the medium and small size categories.

**Supplies**

Supplies included both office and yard supplies. This cost averaged about \$0.05 per unit for all auction size categories and represented about 3% of the variable costs.

**Repair, Maintenance**

The cost required to maintain equipment and facilities depends primarily upon the age, size, and degree of use. These expenditures were about the same for all size categories, averaging \$0.06, \$0.08 and \$0.07 per unit for large, medium and small auctions, respectively.

**Miscellaneous Variable Expenses**

Miscellaneous variable costs included items not classified in any of the other variable cost categories. In this category were such items as legal and accounting fees, unemployment insurance, bad debts, trucking and hauling, bank service charges, veterinary fees and other minor or infrequent items. These represented about 20% of the variable costs for small auctions, 16% for large auctions and 13% for medium auctions. Small auctions spent an average of \$0.36 per unit on these items, large auctions \$0.25 and medium auctions \$0.22.

The variation found in miscellaneous costs was greater than for any other category of cost items. This may be due to differences in the composition of this category. Unemployment insurance, legal costs and accounting fees were generally minor costs at all auctions. Bad debts,

while negligible or non-existent at many auctions, were relatively large at others. These usually resulted from receiving bad checks for the purchase of livestock. Large auctions are more subject to receiving bad checks than small auctions because of the greater number of buyers at sales and less knowledge of the buyers' financial status. The amount of a bad check, when incurred, was usually larger at large auctions than at small auctions.

Expenditures for bank service charges varied considerably among auctions. Much of this variation may have been due to differences in check writing policies of banks. The higher per unit costs for bank service at small auctions probably results from the receipt of smaller consignments of livestock which necessitated the writing of more checks.

Most difference in miscellaneous expenses between large and small auctions resulted from the difference in trucking and hauling expenses. Auction managers frequently buy livestock to be sold at a later sale when the expected volume will be too small to attract a sufficient number of buyers. Some managers

**Table 11. Miscellaneous variable costs per marketing unit for South Dakota auctions, by cost items, 1964**

Cost item	(Auction size)		
	Large	Medium	Small
	(dollars)		
Unemployment insurance .....	.01	.01	.03
Legal and accounting fees .....	.02	.03	.02
Bad debts .....	.04	*	.02
Bank charges .....	.02	.03	.05
Trucking and hauling .....	.05	.02	.11
Other .....	.11	.13	.13
<b>Total .....</b>	<b>.25</b>	<b>.22</b>	<b>.36</b>

\*Less than one cent per unit.

also have a policy of buying livestock to protect prices. Five auctions did provide trucking services to their consignors.

Expenses classified as "other" in this category included trading losses, Social Security payments, veterinary fees and public liability in-

urance. With the exception of trading losses, most of these items were minor. Trading losses at some auctions amounted to as much as \$4,000. These losses resulted from the policy of buying livestock when no bid higher than the starting bid was received.

### Fixed Costs<sup>5</sup>

Fixed costs represented 23% of the total operating cost for auctions, averaging \$0.48 per unit (table 12). The average of all fixed costs was about the same for all size categories (figure 5). With exception of rent, the average of all fixed cost items was slightly lower for large auctions than for small auctions.<sup>6</sup>

Rent costs increased with auction size from an average of \$0.02 per unit at small auctions to \$0.06 per unit at medium auctions and \$0.11 per unit at large auctions. Most auctions of large and medium size with substantial rent expenses leased part of their facilities from one or more members of the corporation. One leased the facilities from a private owner. The practice of renting facilities from members of the

corporation may be an insurance measure against total loss to the owners in case of a law suit against the corporation.

Although no substantial variation was found in average fixed costs for the different size categories, there is reason for thinking that these costs should vary inversely with auction size. First, the amount of fixed investment per marketing unit decreased substantially with in-

<sup>5</sup>Includes items such as depreciation, insurance, cost of capital investment, rent and miscellaneous. Miscellaneous fixed costs were expenditures for taxes, licenses, bonding and interest paid.

<sup>6</sup>Cost of capital investment was the cost of the capital invested in land, buildings and equipment because it cannot yield a return from an alternative use. Costs were assessed at a rate of 5% per annum.

Table 12. Fixed costs per marketing unit for South Dakota livestock auctions, by cost items, 1964

Cost item	(Auction size)							
	Large		Medium		Small		All auctions	
	Avg. cost	Percent of total	Avg. cost	Percent of total	Avg. cost	Percent of total	Avg. cost	Percent of total
Depreciation .....	\$.12	25.0	\$.10	21.2	\$.13	27.0	\$.12	25.0
Insurance .....	.07	14.6	.09	19.2	.10	20.8	.08	16.7
Interest on investment ..	.08	16.7	.09	19.2	.12	25.0	.09	18.7
Rent .....	.11	22.9	.06	12.8	.02	4.3	.08	16.7
Miscellaneous .....	.10	20.8	.13	27.6	.11	22.9	.11	22.9
Total .....	\$.48	100.0	\$.47	100.0	\$.48	100.0	\$.48	100.0

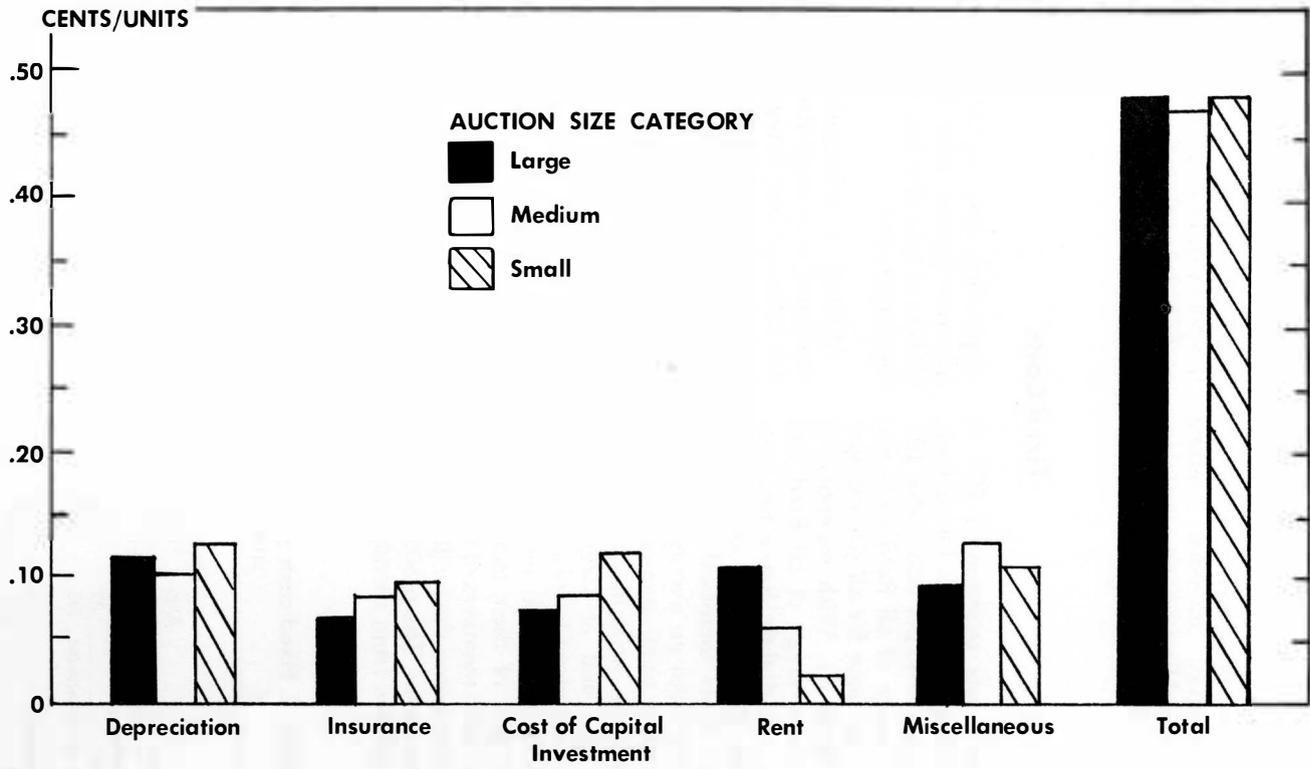


Figure 5. Average fixed cost per marketing unit for South Dakota livestock auctions, by cost items, 1964. (See table 12.)

creases in auction size. This should result in lower per-unit costs for depreciation, insurance and cost of capital investment for large auctions. Second, large auctions used their facilities more than medium and small auctions. As total fixed costs are spread over a larger volume, average fixed costs should decrease. Further, large auctions rented part of their facilities and equipment which should result in other fixed cost items being lower than at auctions which do not rent.

Some explanation for the lack of difference in average fixed costs between auction size categories may lie in the methods used in computing depreciation and in the amount of risk assumed by the firm. Small auctions may depreciate their facilities and equipment over a longer period of time than large auctions. Small firms may also be assuming more of the risk themselves than larger auctions thereby reducing total insurance costs.

#### **Total Costs**

The average total cost for all auctions was \$2.13 per marketing unit. Total per unit costs decreased as auction size increased. Small auctions had total costs of \$2.32 per unit, medium auctions \$2.17 and large auctions \$2.02 per unit. These were due almost entirely to differences in average variable costs as shown in figure 6.

An attempt was made to determine if there was any association between costs and specialization in species of livestock handled. A comparison of the average total costs of 21 auctions, from which usable cost data were obtained, did not reveal any such relationship.

#### **Cost Variation Within Auction Size Categories**

When auctions were grouped by size and area it was found that the differences in per-unit costs were greater within each size category than between them. Average total costs ranged from \$1.78 to \$2.30 per unit among large auctions, \$1.95 to \$2.76 among medium auctions and \$2.08 to \$2.77 among small auctions. Extensive differences existed in both average variable and average fixed costs. The differences in variable and fixed per-unit costs within each size category are shown in table 13 and 14.

An examination of auctions by geographic area suggests that location does affect fixed costs. In Area I, the auctions of each size category had lower average fixed costs than auctions of other areas in the same category. The lower fixed costs of auctions in this area may result from a greater use of facilities. The absence of consistently high or low average variable costs of auctions of all size categories in any one area suggests, however, that geographic location has little effect on variable costs.

The larger differences in average operating costs within auction size categories than between them indicate that greater cost advantages might be obtained by auctions through greater internal operational efficiency than through increased volume.

#### **Economies of Scale in Operation**

A major objective of this study was to examine the cost-volume relationship to determine if auctions with greater volumes experienced lower per-unit operating costs than

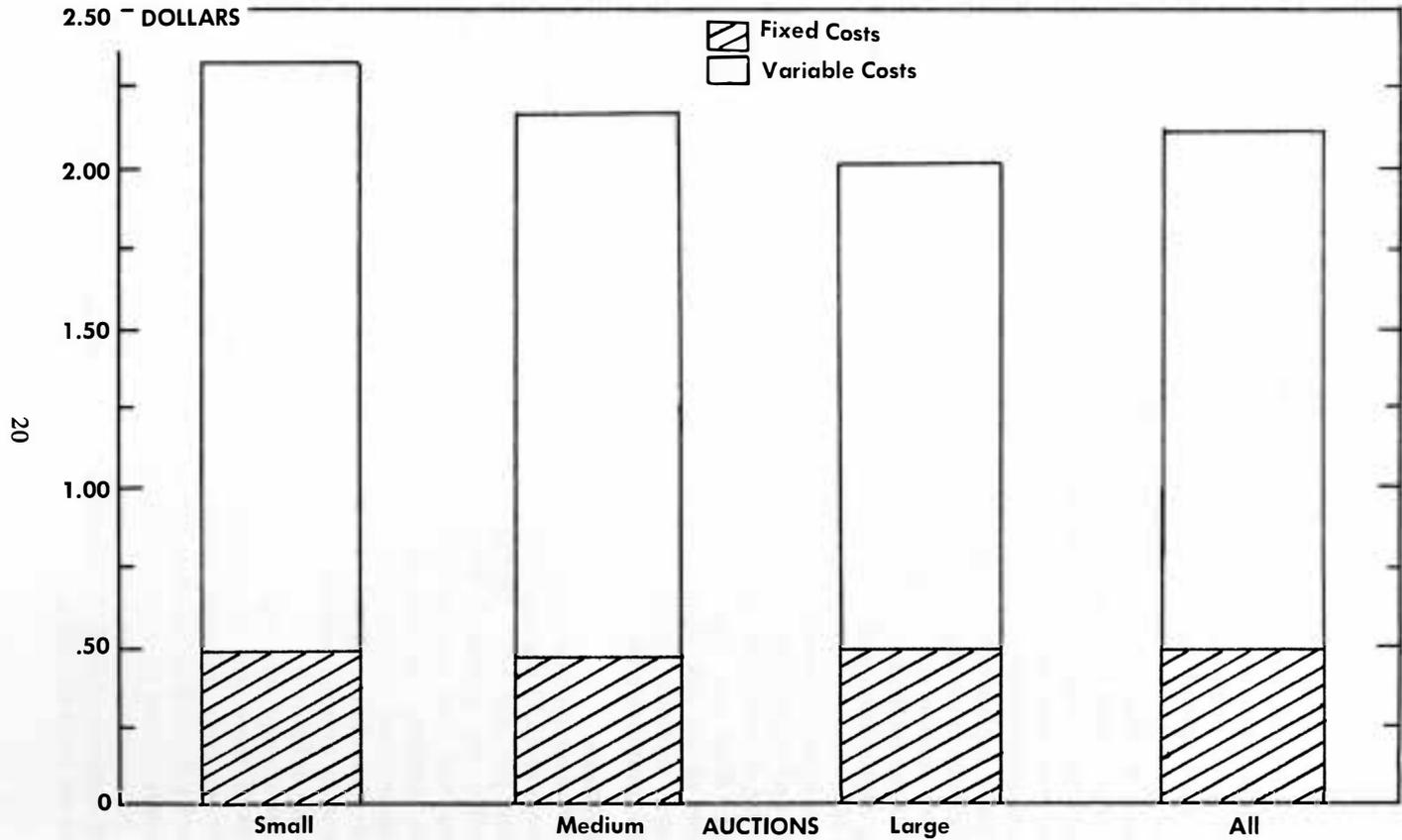


Figure 6. Per unit fixed and variable costs for South Dakota auctions, by size category, 1964.

those with smaller volumes. The evidence tends to indicate there is a scale effect.

Per-unit total costs varied from a high of \$2.78 for one group of small

auctions to a low of \$1.78 for one group of large auctions. The average for the size groups decreased from \$2.32 for small auctions to \$2.02 for large auctions.

Table 13. Average cost per marketing unit of variable cost items for South Dakota auctions, by area, 1964

Size and area	Labor	Publicity	Supplies	Utilities	Repair, Maint.	Misc.	Total Var. Cost
(dollars)							
<b>LARGE</b>							
I .....	.95	.18	.05	.06	.09	.11	1.44
II .....	.96	.20	.05	.04	.04	.14	1.43
III .....	.80	.21	.04	.06	.04	.31	1.46
IV .....	1.10	.29	.05	.09	.13	.16	1.82
V .....	.85	.18	.06	.09	.04	.52	1.74
<b>MEDIUM</b>							
I .....	.82	.27	.03	.10	.13	.51	1.86
II .....	1.21	.38	.03	.12	.02	.16	1.92
III .....	1.07	.29	.06	.14	.06	.19	1.81
IV .....	.79	.33	.05	.12	.08	.13	1.50
V .....	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.
<b>SMALL</b>							
I .....	.92	.19	.06	.11	.07	.34	1.68
II .....	.80	.31	.04	.15	.11	.49	1.90
III .....	.97	.21	.04	.10	.05	.39	1.76
IV .....	1.32	.35	.05	.17	.10	.21	2.20
V .....	.93	.26	.08	.12	.08	.35	1.82

n.a.—Cost data not available.

Table 14. Average cost per marketing unit of fixed cost items for South Dakota auctions, by area, 1964

Subgroup size and area	Depreciation	Insurance	Cost of capital investment	Rent	Misc.	Total Fixed costs
(dollars)						
<b>LARGE</b>						
I .....	.09	.09	.04	*	.12	.34
II .....	.11	.06	.08	—	.13	.38
III .....	.14	.06	.12	.17	.10	.59
IV .....	.13	.08	.07	.01	.07	.41
V .....	.07	.07	.03	.34	.05	.56
<b>MEDIUM</b>						
I .....	.03	.15	.08	.01	.07	.34
II .....	.12	.17	.30	—	.26	.85
III .....	.10	.06	.08	.07	.14	.45
IV .....	.11	.08	.07	.10	.11	.47
V .....	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.
<b>SMALL</b>						
I .....	.12	.08	.10	.01	.10	.41
II .....	.15	.13	.13	—	.17	.58
III .....	.10	.08	.12	.02	.13	.45
IV .....	.22	.12	.18	—	.06	.58
V .....	.13	.10	.12	.05	.11	.51

\*Denotes less than one cent per marketing unit.

n.a.—Cost data not available.

This scale effect is illustrated in the scatter diagram of the average total per-unit costs of 21 selected auctions, (figure 7). It should be pointed out that the average total costs for this group are lower than those presented previously. There are, however, two possible explanations for these differences. First, this group of auctions was selected on the basis of the availability of rele-

vant cost data and therefore might not be representative of all auctions in the state. Second, the cost data obtained from the Packers and Stockyard Division are not exactly comparable to cost data obtained from the questionnaires because of different reporting procedures. However, the latter seems sufficient for illustrative purposes.

## Marketing Charges

The principal source of income for most livestock auctions consists of charges assessed against consignors. The charges most commonly assessed are commission, yardage, feed and veterinary inspection. Some auctions also assess fees for livestock insurance and brand inspection.<sup>7</sup>

Most auctions list a separate charge for each service. Some, however, combine charges for one or more services under the commission or yardage charge. This practice was frequently followed by auctions in the small size category. All auctions listed fees for commission and veterinary inspection. Only four auctions did not list a charge for yardage. Most auctions listed a feed charge for cattle only.<sup>8</sup>

Three methods were used to assess commission fees. These methods were: (1) per head, (2) percent of gross value of livestock consignment and (3) value per head. Assessing commission charges on a per-head basis for all species of livestock was found to be the most commonly used method. However, the other methods were used more frequently to assess commission for

cattle than for hogs and sheep.<sup>9</sup> Because of the numerous differences in the type, size, and quality of livestock consignments and because of the different methods used in assessing commission, it was necessary to standardize the charges for specific classes of livestock as explained earlier. Some auctions quote discounts for consignments of a specified number of head or value. For such consignments, the rates would be lower than those computed in this study.

The total charges assessed by auctions varied widely. Rates for cattle were higher and varied more than rates for hogs and sheep. The average charge for cattle was \$2.50 per head with a range from \$1.90 to \$3.73. Rates for hogs and sheep averaged \$0.77 and \$0.60 per head, respectively (table 15).

<sup>7</sup>Livestock insurance, when listed, was usually \$0.10 per head for cattle and \$0.02 to \$0.03 per head for hogs and sheep.

<sup>8</sup>Eight auctions did not assess a feed charge for cattle, 31 did not list this charge for hogs while 28 did not list a feed charge for sheep.

<sup>9</sup>Thirty auctions used the per-head method for cattle, 42 for hogs and 52 for sheep.

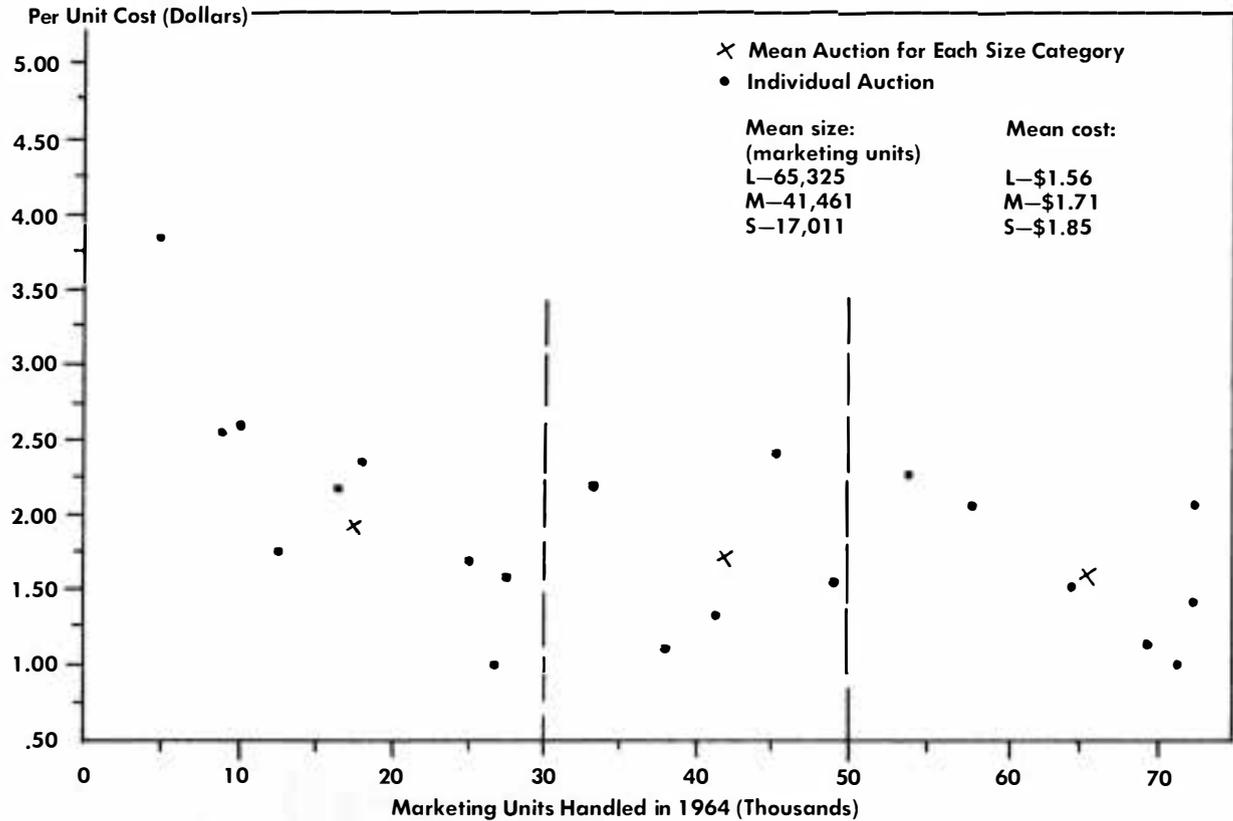


Figure 7. Scatter diagram of total cost per marketing unit of 21 selected auctions in 1964.

Table 15. Total per-head marketing charges assessed by South Dakota auctions for cattle, hogs and sheep, 1964

Species of livestock	(Auction size)			
	Large	Medium	Small	All auctions
	(dollars)			
Cattle: Average	2.47	2.50	2.50	2.50
Range	2.10-2.95	2.06-3.40	1.90-3.73	1.90-3.73
Hogs: Average	.75	.75	.78	.77
Range	.58-.93	.40-.97	.56-1.18	.40-1.18
Sheep: Average	.61	.57	.61	.60
Range	.47-.79	.20-1.00	.43-.75	.20-1.00

Table 16. Per - head marketing charges assessed for cattle by South Dakota auctions, by specific charge, 1964

Charge	(Auction size)		
	Large	Medium	Small
	(dollars)		
Commission			
Average	1.64	1.66	1.77
Range	1.25-2.30	1.25-2.30	1.15-2.88
Yardage			
Average	.41	.48	.40
Range	.15-.60	.15-.60	.00-.76
Feed			
Average	.37	.30	.26
Range	.20-.50	.00-.60	.00-.50
Inspection			
Average	.05	.06	.07
Range	.05-.10	.05-.10	.05-.10

Table 17. Per - head marketing charges assessed for hogs by South Dakota auctions, by specific charge, 1964

Charge	(Auction size)		
	Large	Medium	Small
	(dollars)		
Commission			
Average	.53	.55	.59
Range	.40-.80	.40-.80	.40-1.00
Yardage			
Average	.11	.15	.12
Range	.09-.15	.00-.20	.00-.25
Feed			
Average	.08	.02	.03
Range	.00-.20	.02-.20	.00-.25
Inspection			
Average	.03	.03	.04
Range	.02-.03	.02-.05	.02-.06

Table 18. Per - head marketing charges assessed for sheep by South Dakota auctions, by specific charge, 1964

Charge	(Auction size)		
	Large	Medium	Small
	(dollars)		
Commission			
Average	.40	.40	.42
Range	.25-.50	.20-.75	.25-.50
Yardage			
Average	.13	.11	.12
Range	.09-.25	.00-.20	.00-.25
Feed			
Average	.05	.04	.03
Range	.00-.10	.00-.10	.00-.10
Inspection			
Average	.03	.03	.04
Range	.02-.04	.02-.05	.02-.06

Table 19. Average marketing charges per head for cattle, hogs and sheep by South Dakota auctions based on the proportion of each species handled per auction, 1964

Species of livestock	All auctions			
	Large	Medium	Small	All auctions
	(dollars)			
Cattle	2.43	2.54	2.54	2.49
Hogs	.66	.75	.78	.72
Sheep	.49	.60	.59	.56

Table 20. Average net returns from operation of South Dakota auctions, by size categories, 1964

Size category	Avg. total revenue	Avg. total cost	Avg. net return
	(dollars)		
Large	163,311	151,438	11,873
Medium	95,883	86,672	9,211
Small	42,788	38,101	4,687

The average rates charged were not significantly different for the various size categories. Charges for cattle and hogs averaged \$0.03 per head less at large auctions. The average rates for sheep were the same for large and small auctions while charges averaged \$0.04 per head less at medium auctions. The average marketing charge for cattle and hogs tended to increase with the decreasing auction size.

The average and range of individual charges for cattle, hogs and sheep are listed in tables 16 through 18 for the three size categories of auctions. Use caution in comparing rates of individual charges between size categories because of the practice by some auctions of combining two or more services under one charge. This may partially account for higher commission charges assessed by small auctions for cattle and hogs.<sup>10</sup>

#### **Effect of Specialization on Marketing Charges**

Many of the auctions sell primarily one or two species of livestock. To determine whether the level of marketing charges assessed is affected by the volume of a species sold, average charges were weighted on the basis of the proportion of each species sold by each auction. The average charges on this basis are shown in table 19.

A comparison of average charges for large auctions (tables 15 and 19) shows that auctions handling a large volume of one species of livestock have lower charges for that species than other large auctions which handle a smaller volume. A similar comparison of average charges for medium and small auctions did not

show this same relationship. On the basis of proportion, the average charges of large auctions in 1964 were from 10 cents to 12 cents per head lower than the average charges of medium and small auctions.

#### **Profitability of Auction Operations**

To get some idea of the profitability of auction firms, an attempt was made to estimate the average net returns for auctions of different size categories. Total revenue was computed by multiplying the average marketing charges for cattle, hogs and sheep of each size category (table 15) by the volume handled. Total costs obtained from the Packers and Stockyards Division for each size category of auctions were adjusted to account for any discrepancy in feed costs.<sup>11</sup>

As might be expected average net returns increased with size (table 20). It should be noted that salaries of owners and officers, and a 5% return on investment are included in total costs.

#### **Break-Even Points**

Usable estimates of operational costs were obtained from 21 livestock auctions. Using these cost estimates and the marketing charges assessed by each auction, break-even points were estimated. These

<sup>10</sup>Six small auctions do not assess a feed charge for cattle. Twenty-one do not assess this charge for hogs.

<sup>11</sup>While total revenue included total revenue from feed, total cost data obtained from the Packers and Stockyards Commission included only net feed costs. Therefore, to adjust total costs, the estimates of total feed costs furnished by auction managers on the questionnaires were added to the total costs provided by the Packers and Stockyards Commission less net feed costs.

are shown in figure 8. Most of the 21 auctions operated with volumes above their respective break-even point. However, the break-even points for auctions which handled less than 10,000 marketing units suggest that firms of this size would have difficulty in maintaining profitable operations. An auction which incurs the costs required to handle 10,000 marketing units of livestock

annually would have a break-even point of 8,300 units whereas an auction of 60,000 marketing units would have a break-even point of 46,000 units. The line, derived by the "least squares" method, shows the number of marketing units required to break even for various size categories based upon per-unit charges and costs incurred during the 1964 marketing year.

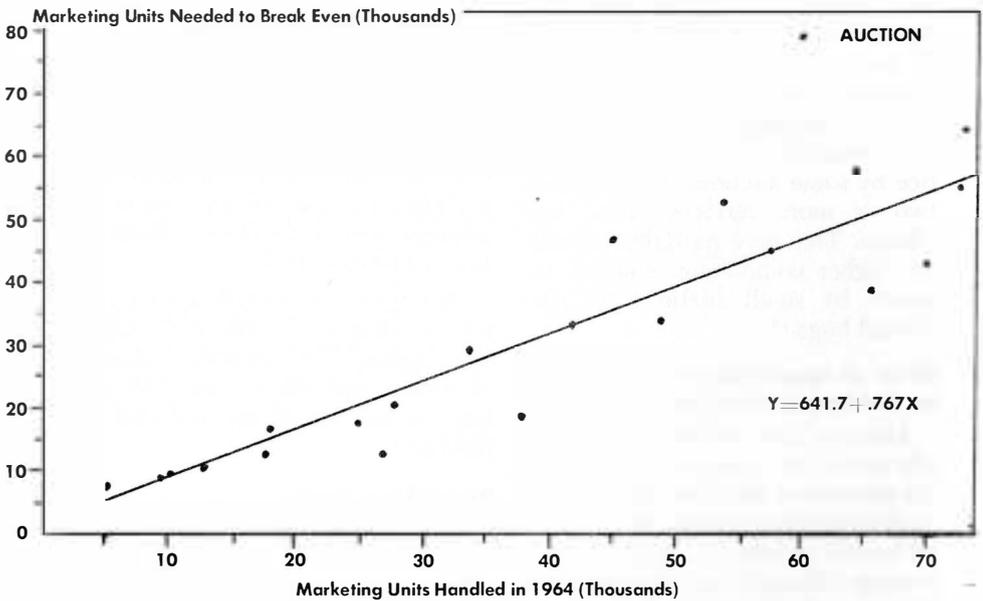


Figure 8. Break-even points of 21 selected auctions, 1964.

## Summary and Conclusions

### Summary

Since first established at Yankton in 1930, livestock auctions have become increasingly important outlets for marketing South Dakota livestock. If present trends continue, auctions in South Dakota can be expected to be even more important in the years ahead.

Size of both the auction industry and firms within the industry has increased considerably during the past decade. In 1964, livestock auctions marketed 331,000 more cattle and 324,000 more hogs than in 1956. Sheep receipts remained unchanged.

Auctions handled about 48% of the cattle, 23% of the hogs and 34% of the sheep marketed in the state in 1964. This represented increases of 14% for cattle, 3% for hogs and 15% for sheep since 1957.

Fifty-nine auctions were operating in the state in 1956 and 58 in 1964. However, the auctions in 1964 handled an average of 8,017 more marketing units per auction. In 1956, more than two-thirds (69%) of the auctions handled fewer than 30,000 marketing units annually compared to 52% in 1964.

During this period, many auctions expanded facilities and operations. Over 80% of the auctions expanded yard capacity, about two-thirds expanded advertising programs and half increased the distance from which they procure livestock.

Large auctions have higher fixed investment in facilities and equipment than small auctions. Small auctions, however, have a higher fix-

ed investment per marketing unit. The average investment per unit was \$1.58, \$1.74, and \$2.29 for large, medium, and small auctions, respectively.

South Dakota auctions receive about 72% of their livestock from within a 50-mile radius. As auction size increases, the proportion of total volume originating from beyond this distance becomes greater.

Operating costs for all auctions averaged \$2.13 per marketing unit. Variable costs represented about three-fourths of total costs and fixed costs one-fourth. Labor was the largest single cost item and accounted for almost 45% of the total. Publicity and miscellaneous variable expenses were the next largest cost items.

A major objective of this study was to determine if auctions with greater volumes have lower per-unit costs than those with smaller annual volumes. This study indicates a "scale effect" and that small auctions do have higher operating costs than large auctions. These differences, however, are not large. The total cost per marketing unit averaged \$2.32 for small auctions, \$2.17 for medium auctions and \$2.02 for large auctions.

Differences in average total costs between size categories were due primarily to lower variable costs. Large auctions had the greatest cost advantages in labor, utilities and miscellaneous variable cost items. For large auctions, per unit cost for labor averaged \$0.07, utilities \$0.06, and miscellaneous variable expense \$0.11 less than at small auctions.

Lower labor costs for larger operations were due primarily to more efficient use of office personnel and auctioneers.

Although the differences in average operating costs between auction size categories were not large, there were relatively large cost differences within size categories. Average total costs ranged from \$1.78 to \$2.30 per unit for large auctions, \$1.95 to \$2.76 for medium auctions and \$2.08 to \$2.77 for small auctions. Large differences in both average variable and average fixed costs were found among the auctions within each category. Differences in labor, miscellaneous variable expenses and rent costs were larger than differences of other individual cost items.

The results of this study showed that auction owners can probably reduce costs more by increasing the internal efficiency of their operations than by increasing volume.

Marketing charges varied widely among auctions. Average rates for all auctions were \$2.50 per head for cattle, \$0.77 per head for hogs and \$0.60 per head for sheep. Average rates for all species of livestock were about the same for all size categories.

Among medium and small auctions little relationship was found between the volume of a species handled and the rate assessed. However, large auctions which handled a large volume of one species of livestock had lower rates for that species than other large auctions which handled a smaller volume. For the total volume of livestock marketed through auctions in 1964, the average charges for the livestock sold through large auctions were from

\$0.10 to \$0.12 per head less than the average charges for livestock sold through medium and small auctions.

Some evidence was found which indicated that auction firms must handle over 10,000 marketing units annually to be profitable.

### **Conclusions**

Growth in volume of livestock marketed through South Dakota auctions indicates a trend toward decentralization of livestock marketing and also an increasing acceptance of this method of selling by livestock consignors.

This study found that average marketing charges of large auctions were only slightly lower than the charges of small auctions while the charges for medium auctions were about the same as small auctions. Yet, both large and medium auctions procured a much larger proportion of their livestock from over 50 miles than did small auctions. This suggests that factors such as: (1) condition and adequacy of the firm's facilities, (2) average volume handled per sale, (3) number of buyers present, and (4) operational policies and practices of the firms are becoming increasingly important in attracting consignments of livestock and thus a tendency toward nonprice competition in the auction industry.

Evidence indicates that auctions which handle a volume of more than 10,000 marketing units of livestock annually should be able to compete successfully if the firms are operated efficiently. Firms handling less than 10,000 marketing units required about 8,300 units to reach

the break-even point. Proportion of total units needed to break even decreased with an increase in size of firm. Thus, auction firms which handle volumes of less than 10,000 marketing units will probably encounter some difficulty in continuing their operations.

On the basis of this study, the greatest opportunity for livestock auctions to reduce unit costs probably lies in increasing their operational efficiency. The economies which auctions can obtain through increased scale are limited. A large

increase in volume is necessary for firms to obtain even small reductions in per-unit costs. The wide variations in per-unit costs among auctions within each size category shows the need for improvement in operational efficiency.

In general, if costs can be kept low and if quantity and quality of services demanded by buyers and consignors can be maintained, livestock auctions will probably continue to play an important role in the marketing of livestock in South Dakota.

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## APPENDIX

### Tables

Appendix Table 1. Distribution of auction markets and volume of sales by size categories, South Dakota, 1964

Size category	Number of auctions	Volume of sales			Percent of total volume
		Total marketing units	Average marketing units per auction	Range in volume (1,000)	
Large (50,000 marketing units or more) .....	14	968,807	69,200	53.8-117.3	49.2
Medium (30,000-49,999 marketing units) .....	14	529,109	37,794	30.0- 48.6	26.9
Small (less than 30,000 marketing units) .....	30	472,671	15,756	4.6-29.7	24.0
Total .....	58	1,970,587	33,976	4.6-117.3	100.0

Appendix Table 2. Total cattle, hog and sheep receipts for South Dakota auctions, 1937-65

Fiscal year	Cattle	Hogs	Sheep
		(1,000)	
1937 .....	134.5	178.7	47.0
1938 .....	287.2	287.0	69.0
1939 .....	326.5	422.2	129.7
1940 .....	352.1	374.8	148.4
1941 .....	391.5	358.7	220.4
1942 .....	384.8	411.1	237.8
1943 .....	338.4	618.8	232.6
1944 .....	422.6	286.3	208.6
1945 .....	510.7	215.3	141.9
1946 .....	584.6	246.7	206.1
1947 .....	616.6	355.9	207.8
1948 .....	668.0	298.5	179.6
1949 .....	801.6	429.0	194.8

Appendix Table 2—Continued.

1950 .....	813.6	458.2	165.3
1951 .....	703.8	516.0	212.5
1952 .....	818.7	407.0	255.2
1953 .....	893.2	395.4	289.7
1954 .....	1,111.3	547.7	311.4
1955 .....	1,283.4	724.4	312.5
1956 .....	1,252.9	605.6	384.0
1957 .....	1,175.2	582.2	453.4
1958 .....	1,281.0	780.0	520.7
1959 .....	1,374.3	867.9	542.3
1960 .....	1,404.6	652.8	541.3
1961 .....	1,556.5	776.3	531.5
1962 .....	1,335.5	926.6	464.8
1963 .....	1,467.1	1,005.1	457.8
1964 .....	1,583.9	929.7	383.7
1965 .....	1,783.3	761.2	401.9

Source: South Dakota Livestock Sanitary Board

Appendix Table 3. Name and location of livestock auction markets operating in South Dakota, 1964

Name of Auction	Location
Aberdeen Livestock Sales Co.	Aberdeen
Avon Livestock Sale	Avon
Belle Fourche Livestock Exchange	Belle Fourche
Bowdle Livestock Auction	Bowdle
Britton Sales Pavilion	Britton
Brookings Livestock Auction	Brookings
Burke Livestock Auction Co.	Burke
Campbell County Livestock Auction	Herreid
Canton Livestock Sales Co.	Canton
Centerville Livestock Sale	Centerville

Appendix Table 3—Continued.

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Chamberlain Livestock Sales	Chamberlain
Cheyenne River Sales Pavilion	Eagle Butte
Clark Livestock Sales Co.	Clark
Corsica Sales Company	Corsica
DeSmet Livestock Exchange	DeSmet
Edgemont Livestock Commission Co.	Edgemont
Eureka Livestock Sales Co.	Eureka
Faith Livestock Commission Co.	Faith
Fort Pierre Livestock Commission Co.	Fort Pierre
Gettysburg Livestock Sales Co.	Gettysburg
Gregory Livestock Auction Co.	Gregory
Highmore Livestock Exchange	Highmore
Hub City Livestock Sales Pavilion	Aberdeen
Kimball Livestock Exchange	Kimball
Lemmon Livestock Sales	Lemmon
Leola Livestock Sales	Leola
Livestock Auction Management, Inc.	Philip
Loken's Watertown Sales Pavilion	Watertown
Madison Livestock Auction Co.	Madison
Madden's Livestock Auction Market	St. Onge
Magness-Faulkton Livestock Exchange	Faulkton
Magness-Huron Livestock Exchange	Huron
Martin Livestock Sales	Martin
McLaughlin Sales Company	McLaughlin
Menno Livestock Auction Co.	Menno
Miller Livestock Auction Co.	Miller
Mitchell Livestock Sales Co.	Mitchell
Mobridge Livestock Commission	Mobridge
Palace City Auction Co.	Mitchell
Platte Livestock Auction Co.	Platte
Presho Livestock Auction Co.	Presho
Rapid City Livestock Commission Co.	Rapid City
Redfield Livestock Sales Co.	Redfield
Schnell Livestock Auction	Lemmon
Sioux Falls Livestock Auction Co.	Sioux Falls
Sisseton Livestock Sales Pavilion	Sisseton
South Dakota Livestock Sales	Watertown
Stockman's Auction Company	Huron
Stockmen's Livestock Auction	Yankton
Sturgis Livestock Exchange	Sturgis
Timber Lake Livestock Company	Timber Lake
Wagner Livestock Sales Co.	Wagner
Webster Livestock Exchange	Webster
Wall Livestock Auction	Wall
Wessington Springs Auction	Wessington Springs
Willow Lake Sales	Willow Lake
Winner Livestock Auction Co.	Winner
Yankton Livestock Sales	Yankton

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