

**COST OF STORING,  
HANDLING, MERCHANDISING GRAIN  
AT OHIO COUNTRY ELEVATORS**

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# CONTENTS

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|   |    |
|---|----|
| Introduction.....                                     | 3  |
| Method and Procedure.....                             | 4  |
| Grain, Storage, Handling and Merchandising Costs..... | 5  |
| Summary and Conclusions.....                          | 10 |

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## **INTRODUCTION**

The storage of grain has been a major function of country elevators in Ohio for many years. Since World War II, increased importance has been placed on this function and more and more country elevators have expanded their facilities to provide storage for the farmers and the government.

In the early 1950's the Federal government offered the incentive of fast depreciation and guaranteed occupancy to stimulate the elevator industry to provide storage space for their growing stocks of Commodity Credit owned grain. These inducements resulted in a rapid expansion of storage facilities without too much concern for the costs of providing the function. Storage experience at the country elevator level at that time provided the industry with very little guidance concerning cost of storage, handling or merchandising grains.

The rapid expansion of grain storage facilities soon resulted in over capacity in some areas. In addition, competition for grain to fill the expanded facilities began to show its effects in lower rates being offered by the trade. This resulted in hardships on the less efficient storage facilities and caused additional pressure to reduce storage rates even further. Even with this pressure, in some areas, there continued to be a basic need for low cost storage facilities to service the farmer.

This condition which existed in the late 1950's made it important for the firm to be more exact in estimating costs of providing the services of storage, handling and merchandising to guide their investments in further expanding facilities. Cost data was also needed to aid those firms in setting rates to cover the total cost of providing each service.

In Ohio country elevators provide many services in addition to storage, handling or merchandising grain. Some offer complete feed service, fertilizer service, farm supplies, hardware, gas and oil, farm machinery and other services. In most instances these services are complementary in nature and much of the labor and machinery required for one can be used for another service. The nature of the institution in Ohio makes it practically mandatory for a firm to offer most of these services or suffer in their profit position.

This study is an effort to establish detailed costs on the services of storage, handling and merchandising grain at country elevators.

### Method and Procedure

The objective of the study is to determine the fixed and variable costs of storing, handling and merchandising grain in country elevators in Ohio. These costs will be calculated using data as provided by the allocations as observed in most accounting procedures.

A sample of 27 country elevators was selected in the state and the selection of these elevators was made so that the sample represented the costs incurred by those elevators who recently have constructed or added storage space.

When comparing the 27 elevators to the known universe it was found that the sample facilities were more modern than the average country elevator in Ohio. The average profit level of the 27 elevators fell in the second lowest quartile of profit based on a sample of 144 country elevators used in another phase of this project.<sup>1</sup> Thus the average profit (before federal income tax) was lower than would be expected for the modern elevators with excellent storage facilities, and lower than the average elevator in Ohio.

During the first years of study (1958-60) there were 140 country elevators in Ohio holding storage and handling contracts with Commodity Credit Corporation. The total capacity of these elevators was 29,826,000 bushels. The sample of 27 elevators used in this analysis accounts for 9,560,564 bushels of capacity or 32.1 percent of the total country elevator capacity under contract in Ohio. The average capacity of the 140 elevators under contract was 213,043 bushels while the average capacity of the 27 elevators in the study was 354,095 bushels.

A complete enumeration of the universe was made in 1958 and it was found that flat or quonset type storage accounted for approximately 16 percent of the total country elevator space. During 1959 flat or quonset additions accounted for slightly over 20 percent of the storage space added in Ohio. In order to prevent any bias as a result of differences in cost between types of storage, a total of 22.5 percent of the elevator space in the sample was the flat or quonset type of storage.

The data were taken by personnel interview from each of the 27 elevators in the sample for the years 1956-59. Data were again obtained for the years 1961-62 so that variations in volume and costs could be evaluated on similar firms. Each elevator made available all financial and operational records. Other data were obtained from the manager and employees. A very detailed study was made of each firm before the allocations of costs were made.

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<sup>1</sup>Sharp, John W., Baumel, Phil, A Financial Analysis of Country Elevators in Ohio, O.A.E.S., 1957 and 1958 Research Bulletin.

When calculating such items as depreciation, actual costs of construction were used and a standardized and uniform method of depreciation was applied. This was necessary for comparative purposes because of the wide variation in depreciation schedules.

The labor was allocated on the basis of actual time devoted to the function. Time allocation records were developed for each worker. In most instances each worker had from 10 to 40 percent unproductive time. This unproductive time was then prorated in proportion to the amount of productive time which each employee spent in each function.

The allocation of the various costs were made on the basis of the function performed by each of the cost factors. For example some of the cost items were allocated on the basis of the volume of grain for each area such as merchandising, storage and custom services. Other allocations were made on the basis of the importance of each function to the revenue of the business. Other allocations were made on the basis of the actual use of the equipment by the various functions. In all cases the assumption was made that all functions performed by the elevator were part of a group of services that were necessary to service the farmer and none were considered as "tacked on." In this manner each of the functions must bear their share of any unused capacity of the cost factors involved in providing this package of services normally performed by the average country elevator.

No effort was made to determine such indirect costs as quality deterioration or shrinkage of the grain while in storage. Many of the firms held the grain more than one year and sufficient data were not available to determine the costs of these factors. It is important to recognize that these factors are certainly costs of storage, handling and merchandising and any cost would be incomplete unless they were included.

#### **Grain, Storage, Handling and Merchandising Costs**

All of the 27 elevators performed the three functions of storage, handling and merchandising grain. Only one did not sell feed or fertilizer but this elevator had a limited amount of farm supplies. The size of the elevators in the sample ranged from 100,000 to 845,000 bushels in total capacity.

The weighted average costs<sup>2</sup> of storing grain at the sample of 27 elevators was 12.369 cents per bushel for the 1958-59 period and

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<sup>2</sup>Cost was weighted on the volume of grain stored, handled or merchandised by the elevator.

13.03<sup>3</sup> cents per bushel in the 1961-62 period. The weighted average handling costs<sup>2</sup> for the 1958-59 period was 6.664 cents per bushel and for the period of 1961-62 the handling costs was 4.913 cents per bushel. The weighted average merchandising costs<sup>2</sup> were 8.706 cents per bushel in 1958-59 and 9.336 cents per bushel in 1961-62.

A wide range of storage, handling and merchandising costs existed within the sample of 27 elevators. For the period 1958-59 the lowest storage cost was 7.7 cents per bushel while the highest was 29.2 cents per bushel. The lowest handling cost was 2.4 cents per bushel and the highest 19.1 cents per bushel. The lowest merchandising cost was 3.7 cents per bushel while the highest was 16.9 cents per bushel.

A complete breakdown of the various fixed and variable costs for all three functions are shown in Table 1.

For the storage function fixed and variable costs were almost equal in amount. The largest item in fixed storage costs was depreciation which accounted for over one-half of the total fixed costs during both periods. For the functions of handling and merchandising, variable costs were considerably higher than fixed costs in both periods. Labor accounted for approximately one-third of the variable costs of each of the three.

Storage and merchandising costs increased 5.3 percent and 7.2 percent respectively from the period 1958-59 to 1961-62 while handling costs decreased 35.7 percent. Elevator managers indicated that improved machinery and equipment decreased the amount of handling thus decreasing the per unit costs. Labor and depreciation accounted for approximately 50 percent of the storage and handling costs for the two periods.

Analysis was made of the data on the 1958-59 period to determine the relationship between percent of occupancy and storage, handling and merchandising costs. For purposes of definition, percent of occupancy means the percent of space actually used of the total space available for the storage function. The percent of occupancy varied from a high of 92.1 percent to a low of 23.7 percent with the average being 68.7 percent in 1958-59 and 66.4 percent in 1961.62. For the 27 elevators the space allocated for storage was slightly over 76 percent of the total space of each elevator. Table 2 shows an array of the occupancy ratio for elevators in the sample and their corresponding storage, handling and merchandising costs.

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<sup>3</sup>The two periods are comparable in input factor cost as evidenced by the U.S. Bureau of Labor Statistics Wholesale Price Index of 1958-59 averaged 100.50 and for 1961-62 the average was 100.45 (1957-59=100).

**TABLE 1.—Weighted Average Cost of Handling, Storage and Merchandising Grain at 27 Elevators in Ohio, 1958-59 — 1961-62<sup>1</sup>.**

|   | cents per bu.           |         |                          |         |                               |         |
|---|-------------------------|---------|--------------------------|---------|-------------------------------|---------|
|   | Cost of Storage per bu. |         | Cost of Handling per bu. |         | Cost of Merchandising per bu. |         |
|   | 1958-59                 | 1961-62 | 1958-59                  | 1961-62 | 1958-59                       | 1961-62 |
| 1. Depr. on Bldg. & Equip.                    | 3.837                   | 3.81    | 1.111                    | 1.21    | 1.434                         | 1.564   |
| 2. Interest pd. on Cap. Inv.                  | 0.714                   | .78     | 0.461                    | .44     | .518                          | .621    |
| 3. Ins. on Plant & Equip.                     | 0.405                   | .51     | 0.103                    | .12     | .138                          | .172    |
| 4. Taxes on Plant & Equip.                    | 0.691                   | .76     | 0.184                    | .26     | .239                          | .319    |
| 5. Licenses & Bonds                           | 0.138                   | .12     | -----                    | -----   | -----                         | -----   |
| 6. Leases & Rental                            | 0.283                   | .21     | 0.034                    | .02     | .080                          | .021    |
| 7. Other                                      | -----                   | -----   | -----                    | -----   | -----                         | -----   |
| 8. Total Fixed Costs                          | 6.068                   | 6.19    | 1.893                    | 2.05    | 2.408                         | 2.697   |
| 9. Personnel Expense                          |                         |         |                          |         |                               |         |
| a. Exec. salaries                             | 0.258                   | 0.28    | 0.127                    | 0.10    | .295                          | .241    |
| b. Management                                 | 0.577                   | 0.69    | 0.383                    | 0.25    | .872                          | .865    |
| c. Clerical                                   | 0.456                   | 0.59    | 0.274                    | 0.16    | .553                          | .512    |
| d. Labor                                      | 1.947                   | 2.24    | 2.177                    | 0.94    | 2.439                         | 2.968   |
| 10. Utilities                                 | 0.346                   | 0.47    | 0.687                    | 0.41    | .474                          | .561    |
| 11. Interest paid on Working Cap.             | -----                   | -----   | -----                    | -----   | .194                          | .221    |
| 12. Taxes on Inventories                      | 0.113                   | 0.12    | -----                    | 0.01    | .052                          | .064    |
| 13. Insurance on Gr. & Hdse.                  | 0.588                   | 0.74    | -----                    | 0.06    | .047                          | .053    |
| 14. Repairs & Maintenance -<br>Bldg. & Equip. | 0.419                   | 0.37    | 0.384                    | 0.21    | .378                          | .476    |
| 15. Fundants                                  | 0.548                   | 0.21    | -----                    | 0.08    | .003                          | -----   |
| 16. Cost Apport. by Home Office               | 0.455                   | 0.45    | 0.279                    | 0.23    | .121                          | .024    |
| 17. Other                                     | 0.604                   | 0.68    | 0.460                    | 0.41    | .873                          | .654    |
| 18. Total Variable Costs                      | 6.301                   | 6.84    | 4.771                    | 2.86    | 6.301                         | 6.639   |
| 19. Grand Total                               | 12.369                  | 13.03   | 6.664                    | 4.91    | 8.706                         | 9.336   |

<sup>1</sup>These costs do not include costs of shrinkage or quality deterioration.

When correlating the two factors percent of occupancy and storage cost per bushel, the  $r^2$  value was .50599.<sup>4</sup> The  $r^2$  value resulting from the correlation of percent of occupancy and handling costs per bushel was 0.07528<sup>5</sup> while merchandising costs per bushel and percent of occupancy resulted in a  $r^2$  value of .04661.<sup>6</sup> Although the  $r^2$  value for storage costs is higher than for merchandising and handling costs the value does not indicate a relationship that is sufficiently significant to merit any degree of reliability for predictive purposes. One might expect a high degree of correlation between the two factors of percent of occupancy and storage costs per bushel, if an elevator performed only the one function of storage. Since all but one of the sample of 27 elevators merchandised grain, feed, fertilizer, seed and farm supplies

<sup>4</sup>According to the relationship obtained as occupancy goes up 10 percentage points, storage costs would decrease 0.5 cent per bushel.

<sup>5</sup>The relationship is so small that occupancy has little or no effect on handling costs.

<sup>6</sup>The relationship is so small that occupancy has little or no effect on merchandising costs.

**TABLE 2.—Percent Occupancy, Storage Costs, Handling Costs, and Merchandising Costs of 27 Country Elevators in Ohio, 1958-59.**

| Elevator No. | Percent Occupancy<br>cents per bu. | Storage Costs<br>¢ per bu. | Handling Costs<br>¢ per bu. | Merchandising Costs<br>¢ per bu. |
|--------------|------------------------------------|----------------------------|-----------------------------|----------------------------------|
| 20           | 92.1                               | 9.1                        | 8.7                         | 15.1                             |
| 16           | 90.8                               | 8.7                        | 11.0                        | 10.3                             |
| 7            | 84.9                               | 12.9                       | 19.6                        | 11.1                             |
| 24           | 83.7                               | 10.2                       | 8.2                         | 9.7                              |
| 17           | 81.6                               | 7.7                        | 6.5                         | 8.6                              |
| 25           | 77.0                               | 17.4                       | 10.3                        | 9.6                              |
| 18           | 72.6                               | 10.6                       | 4.6                         | 3.7                              |
| 1            | 72.5                               | 15.4                       | 7.5                         | 16.9                             |
| 3            | 70.9                               | 14.3                       | 12.3                        | 11.3                             |
| 13           | 70.7                               | 14.1                       | 4.2                         | 9.9                              |
| 11           | 70.6                               | 14.2                       | 6.2                         | 7.5                              |
| 9            | 69.9                               | 11.5                       | 2.4                         | 4.1                              |
| 27           | 68.3                               | 17.7                       | 7.0                         | 7.4                              |
| 14           | 68.2                               | 14.0                       | 13.9                        | 5.9                              |
| 2            | 67.8                               | 15.9                       | 8.2                         | 4.2                              |
| 19           | 65.8                               | 22.9                       | 19.1                        | 5.7                              |
| 10           | 64.9                               | 10.7                       | 6.4                         | 4.9                              |
| 4            | 64.8                               | 12.3                       | 8.5                         | 7.8                              |
| 8            | 62.6                               | 19.5                       | 14.2                        | 10.3                             |
| 21           | 61.7                               | 11.8                       | 4.3                         | 6.5                              |
| 6            | 52.9                               | 13.5                       | 4.0                         | 6.7                              |
| 26           | 52.6                               | 14.9                       | 15.2                        | 10.8                             |
| 22           | 50.1                               | 22.3                       | 8.6                         | 5.4                              |
| 12           | 38.1                               | 18.4                       | 7.1                         | 9.2                              |
| 5            | 36.1                               | 29.2                       | 5.0                         | 6.2                              |
| 15           | 34.9                               | 17.3                       | 5.2                         | 6.1                              |
| 23           | 23.7                               | 23.7                       | 18.9                        | 5.5                              |

and many other services, a decrease in capacity use or storage occupancy often causes a shift of variable costs to other functions. This is important when the variable input factors are rather lumpy and part of a unit of input can be used efficiently in performing other functions.

A multiple regression model was developed to measure the effect of some cost factors and other related variables to storage cost per bushel. The following factors were used:

dependent variable

y = storage cost per bu.

independent variables

1. percent of occupancy
2. merchandising costs per bushel
3. handling costs per bushel
4. depreciation cost per bushel
5. labor costs per bushel
6. elevator capacity in bushels
7. percent of revenue from storage



**TABLE 3.—Selected Per Bushel Costs and Percentage Ratios for Various Functions at Country Elevators in Ohio 1958-59 — 1961-62.**

| Elev. No. | Storage Cost/bu. \$per bu. | Occupancy % | Merch. Cost/bu. \$per bu. | \$per bu. Handling Cost/bu. | \$per bu. Storage Depr. Cost/bu. | \$per bu. Storage Labor Cost/bu. | Elevator Size in Thousands bu. | % Revenue for Storage | % Revenue for Merch. | % Storage Cost/bu. That Were Fixed Costs |
|-----------|----------------------------|-------------|---------------------------|-----------------------------|----------------------------------|----------------------------------|--------------------------------|-----------------------|----------------------|--|
| 1         | 15.4                       | 72.5        | 16.9                      | 7.5                         | 6.2                              | 1.9                              | 354                            | 18.4                  | 25.4                 | 54.5                                     |
| 2         | 15.9                       | 67.8        | 4.2                       | 8.2                         | 4.3                              | 4.4                              | 171                            | 12.5                  | 84.9                 | 38.4                                     |
| 3         | 14.3                       | 70.9        | 11.3                      | 12.3                        | 2.4                              | 4.5                              | 310                            | 11.7                  | 16.1                 | 40.7                                     |
| 4         | 12.3                       | 64.8        | 7.8                       | 8.5                         | 4.0                              | 1.7                              | 545                            | 10.5                  | 35.0                 | 60.5                                     |
| 5         | 29.2                       | 36.1        | 6.2                       | 5.0                         | 10.1                             | 4.2                              | 100                            | 3.1                   | 54.8                 | 53.4                                     |
| 6         | 13.5                       | 52.9        | 6.7                       | 4.0                         | 3.0                              | 3.7                              | 347                            | 7.8                   | 61.4                 | 39.6                                     |
| 7         | 12.9                       | 84.9        | 11.1                      | 19.6                        | 3.9                              | 2.7                              | 253                            | 38.5                  | 34.6                 | 40.2                                     |
| 8         | 19.5                       | 62.6        | 10.3                      | 14.2                        | 7.6                              | 3.1                              | 281                            | 21.2                  | 32.3                 | 62.2                                     |
| 9         | 11.5                       | 69.9        | 4.1                       | 2.4                         | 5.2                              | 0.7                              | 334                            | 41.2                  | 32.8                 | 63.2                                     |
| 10        | 10.7                       | 64.9        | 4.9                       | 6.4                         | 5.2                              | 1.7                              | 376                            | 22.4                  | 29.6                 | 62.6                                     |
| 11        | 14.2                       | 70.6        | 7.5                       | 6.2                         | 4.4                              | 1.3                              | 750                            | 18.7                  | 20.3                 | 62.0                                     |
| 12        | 18.4                       | 38.1        | 9.2                       | 7.1                         | 5.8                              | 2.9                              | 271                            | 19.0                  | 17.7                 | 60.4                                     |
| 13        | 14.1                       | 70.7        | 9.9                       | 4.2                         | 4.6                              | 2.3                              | 220                            | 18.8                  | 30.5                 | 59.9                                     |
| 14        | 14.0                       | 68.2        | 5.9                       | 13.9                        | 2.4                              | 4.6                              | 192                            | 25.3                  | 37.2                 | 37.9                                     |
| 15        | 17.3                       | 34.9        | 6.1                       | 5.2                         | 5.9                              | 2.1                              | 430                            | 28.8                  | 41.9                 | 47.4                                     |
| 16        | 8.7                        | 90.8        | 10.3                      | 11.0                        | 2.4                              | 1.6                              | 845                            | 37.8                  | 23.6                 | 40.4                                     |
| 17        | 7.7                        | 81.6        | 8.6                       | 6.5                         | 2.3                              | 0.8                              | 792                            | 60.0                  | 14.2                 | 40.5                                     |
| 18        | 10.6                       | 72.6        | 3.7                       | 4.6                         | 3.1                              | 1.8                              | 310                            | 23.4                  | 33.6                 | 33.0                                     |
| 19        | 22.9                       | 65.8        | 5.7                       | 19.1                        | 2.4                              | 13.5                             | 109                            | 4.4                   | 53.1                 | 18.3                                     |
| 20        | 9.9                        | 92.1        | 15.1                      | 8.7                         | 2.4                              | 1.1                              | 251                            | 42.0                  | 20.8                 | 37.0                                     |
| 21        | 11.8                       | 61.7        | 6.5                       | 4.3                         | 3.0                              | 0.9                              | 600                            | 45.1                  | 16.0                 | 32.8                                     |
| 22        | 22.3                       | 50.1        | 5.4                       | 8.6                         | 5.5                              | 3.9                              | 125                            | 7.8                   | 44.9                 | 35.9                                     |
| 23        | 23.7                       | 23.7        | 5.5                       | 18.9                        | 8.2                              | 2.6                              | 266                            | 54.8                  | 00.0                 | 67.1                                     |
| 24        | 10.2                       | 83.7        | 9.7                       | 8.2                         | 4.6                              | 0.9                              | 540                            | 39.7                  | 16.6                 | 67.6                                     |
| 25        | 17.4                       | 77.0        | 9.6                       | 10.3                        | 4.1                              | 2.7                              | 257                            | 13.2                  | 38.2                 | 50.0                                     |
| 26        | 14.9                       | 52.6        | 10.8                      | 15.2                        | 3.6                              | 3.2                              | 273                            | 4.4                   | 78.3                 | 29.2                                     |
| 27        | 17.7                       | 68.3        | 7.4                       | 7.0                         | 2.6                              | 4.0                              | 258                            | 10.4                  | 35.7                 | 35.3                                     |

8. percent of revenue from merchandising

9. percent of storage cost per bushel that is fixed cost

Using the nine independent variables an  $r^2$  value of .918 was found. This means that almost 92 percent of the variation in storage costs per bushel can be explained by these nine variables.

Through a process of elimination an effort was made to delete those variables in the model that had the least influence on storage costs. Of the nine independent variables only four were found to be significant.<sup>7</sup> These are (1) depreciation cost per bu., (2) labor cost per bushel, (3) percent of revenue from merchandising, and (4) percent of cost per bushel that was fixed cost. The other five factors were not significant in their influence and thus were eliminated in the final

<sup>7</sup>The method used for determination of insignificant factors is based on the contribution of the individual factor to the reduction of the unexplained variation in the dependent variable, storage costs. Using analysis of variance the statistic, having one and (N-1-1) degrees of freedom,

$$F = \frac{SSR (N-1-1)}{SSE}$$

is computed, where SSR is the reduction in the sums of squares of unexplained deviations as a result of the addition of the variable of interest, SSE is the sums of squares of the unexplained deviations with the variable included, N is number of observations, and 1 is the total number of independent variables in the model.

analysis. These four factors explained 87.1 percent of the variation in storage costs per bushel.

According to the relationship obtained from the model using the four above significant factors it was found that with a 1 cent per bushel higher depreciation costs it could be expected that storage costs would increase by 2.3 cents per bushel. Where labor cost per bushel raise 1 cent per bushel, storage cost would increase 1.1 cents per bushel. With a one percentage point increase in the percentage of revenue from merchandising, a decrease in storage costs of 0.023 cents per bushel would result. And likewise with a 1 percentage point increase in the percentage of the costs that were fixed cost, storage cost would decrease .12 cent per bushel.

These results imply that storage costs may be minimized by keeping depreciation and labor costs as low as possible, employing higher than averaging merchandising operations as a share of total business and higher than average fixed cost as a portion of all costs. This suggests that a large diversified operation using equipment in place of labor when possible would be consistent with efficient storage.

With simple correlation the first independent variable, percent of occupancy, explained 50.6 percent of the variation in storage costs and yet when this factor was deleted from the multiple regression model only a 1.58 percentage point decrease in the explained variation of storage costs was noted. This would indicate that percent of occupancy was highly related to the other factors and as long as the others were available, data on occupancy would not be needed to explain variation in storage costs.

No attempt was made to measure the statistical variations between the cost factors between the two periods for any of the three functions. Most of the increase in costs were variable costs since very few of the elevators in the sample made any storage or capital additions during the period. In addition, occupancy decreased 2.3 percent from 1958-59 to 1961-62 and since percent of occupancy explained slightly over 50 percent of the variation in storage costs one could expect these costs to show some increase as a result of this lower utilization of space.

#### **Summary and Conclusions**

Storage and merchandising costs at country elevators in Ohio have increased from the 1958-59 period to a similar period in 1961-62. The cost of storing grain at the sample of 27 elevators in 1958-59 was 12.369 cents per bushel and in 1961-62 13.03 cents per bushel. Merchandising costs increased from 8.706 cents per bushel to 9.336 cents per bushel. Handling costs, however, decreased from 6.664 cents per bushel in 1958-59 to 4.91 cents per bushel in 1961-62.

The most important factors for explaining variations in storage costs are (1) depreciation costs per bushel, (2) labor costs per bushel, (3) percent revenue from merchandising, and (4) percentage of costs per bushel that were fixed costs. Factors that proved not significant or important in explaining additional variation in storage costs were (1) merchandising costs per bushel, (2) handling cost per bushel, (3) percent of total revenue from storage (4) elevator capacity, and (5) percent of occupancy.

The analysis would indicate that storage costs could be minimized when labor and depreciation costs per bushel were as low as possible. This would indicate that larger storage units with low cost storage would be most economical in storage of grain at country elevators.

Further study is needed to determine the substitutability of the cost inputs in the various functions of the elevator operation since there are a large amount of complementary functions performed.

**TABLE 4.—Weighted Average of Storage Costs Per Bushel by Fixed and Variable Operating Costs and Degree of Occupancy for 27 Elevators in Ohio, 1958-59 — 1961-62.**

| Operating Costs       | cents per bu. |                       |             |             |
|-----------------------|---------------|-----------------------|-------------|-------------|
|                       | Under<br>59%  | Per Cent of Occupancy |             | Over<br>80% |
|                       |               | 60%—<br>69%           | 70%—<br>79% |             |
| <u>Fixed Costs</u>    |               |                       |             |             |
| 1. Depreciation       | 5.053         | 4.244                 | 4.239       | 2.918       |
| 2. Interest           | 1.187         | .845                  | .572        | .556        |
| 3. Insurance          | .983          | .421                  | .323        | .264        |
| 4. Taxes              | .858          | .865                  | .903        | .382        |
| 5. Licenses           | .179          | .161                  | .166        | .092        |
| 6. Leases             | .011          | .016                  | 1.237       | ----        |
| Total Fixed Costs     | 8.271         | 6.552                 | 7.440       | 4.212       |
| <u>Variable Costs</u> |               |                       |             |             |
| 1. Executive Salary   | .506          | .152                  | .338        | .193        |
| 2. Management         | .876          | .713                  | .549        | .428        |
| 3. Clerical           | 1.015         | .281                  | .465        | .412        |
| 4. Labor              | 2.907         | 2.230                 | 2.258       | 1.252       |
| 5. Utilities          | .899          | .306                  | .185        | .303        |
| 6. Interest           | ----          | ----                  | ----        | ----        |
| 7. Taxes              | .067          | .104                  | .183        | .107        |
| 8. Insurance          | .677          | .591                  | .689        | .497        |
| 9. Repairs            | .570          | .241                  | .751        | .309        |
| 10. Fumigants         | .469          | .443                  | .750        | .532        |
| 11. Cost Apportion    | .258          | 1.196                 | .272        | .061        |
| 12. Other             | 1.300         | .346                  | .379        | .721        |
| Total Variable Costs  | 9.543         | 6.602                 | 6.819       | 4.815       |
| Total Costs           | 17.814        | 13.154                | 14.259      | 9.027       |

**TABLE 5.—Weighted Average of Handling Costs Per Bushel by Fixed and Variable Operating Costs and Degree of Occupancy for 27 Elevators in Ohio, 1958-59 — 1961-62.**

| Operating Costs       | Under<br>59% | Per Cent of Occupancy |            | Over<br>80% |
|-----------------------|--------------|-----------------------|------------|-------------|
|                       |              | 60%<br>69%            | 70%<br>79% |             |
| cents per bu.         |              |                       |            |             |
| <u>Fixed Costs</u>    |              |                       |            |             |
| 1. Depreciation       | 1.101        | .992                  | .995       | 1.578       |
| 2. Interest           | .533         | .369                  | .803       | 1.021       |
| 3. Insurance          | .149         | .089                  | .068       | .131        |
| 4. Taxes              | .172         | .190                  | .186       | .180        |
| 5. Licenses           | -----        | -----                 | -----      | -----       |
| 6. Leases             | .006         | -----                 | .085       | .049        |
| Total Fixed Costs     | 1.961        | 1.640                 | 2.137      | 2.959       |
| <u>Variable Costs</u> |              |                       |            |             |
| 1. Executive          | .188         | .074                  | .125       | .172        |
| 2. Management         | .455         | .387                  | .328       | .440        |
| 3. Clerical           | .447         | .147                  | .223       | .419        |
| 4. Labor              | 1.712        | 1.613                 | 3.359      | 1.889       |
| 5. Utilities          | .851         | .389                  | .901       | .869        |
| 6. Interest           | -----        | -----                 | -----      | -----       |
| 7. Taxes              | -----        | -----                 | -----      | -----       |
| 8. Insurance          | -----        | -----                 | -----      | -----       |
| 9. Repairs            | .245         | .229                  | .417       | .825        |
| 10. Fumigants         | .002         | -----                 | -----      | -----       |
| 11. Cost Apportion    | .167         | .586                  | .136       | .017        |
| 12. Other             | .613         | .160                  | .354       | 1.091       |
| Total Variable Costs  | 4.680        | 3.585                 | 5.843      | 5.722       |
| Total Costs           | 6.641        | 5.225                 | 7.980      | 8.691       |

**TABLE 6.—Weighted Average of Merchandising Costs Per Bushel by Fixed and Variable Operating Costs and Degree of Occupancy for 27 Elevators in Ohio, 1958-59 — 1961-62.**

cents per bu.

| Operating Costs       | Under<br>59% | Per Cent of Occupancy |             | Over<br>80% |
|-----------------------|--------------|-----------------------|-------------|-------------|
|                       |              | 60%-<br>69%           | 70%-<br>79% |             |
| <u>Fixed Costs</u>    |              |                       |             |             |
| 1. Depreciation       | 1.733        | .986                  | 1.298       | 2.329       |
| 2. Interest           | .700         | .426                  | .258        | .896        |
| 3. Insurance          | .201         | .111                  | .095        | .141        |
| 4. Taxes              | .305         | .215                  | .240        | .182        |
| 5. Licenses           | -----        | -----                 | -----       | -----       |
| 6. Leases             | .038         | .002                  | .285        | -----       |
| Total Fixed Costs     | 2.977        | 1.740                 | 2.176       | 3.548       |
| <u>Variable Costs</u> |              |                       |             |             |
| 1. Executive Salary   | .638         | .029                  | .241        | .473        |
| 2. Management         | 1.067        | .817                  | .726        | 1.062       |
| 3. Clerical           | .746         | .360                  | .498        | .763        |
| 4. Labor              | 2.335        | 2.109                 | 2.736       | 3.149       |
| 5. Utilities          | .393         | .951                  | .464        | .628        |
| 6. Interest           | .169         | .113                  | .210        | .119        |
| 7. Tax                | .078         | .020                  | .059        | .074        |
| 8. Insurance          | .076         | .030                  | .054        | .028        |
| 9. Repairs            | .371         | .269                  | .485        | .492        |
| 10. Fumigants         | .004         | -----                 | .098        | -----       |
| 11. Cost Apportion    | .074         | .229                  | .056        | .028        |
| 12. Other             | 1.045        | .577                  | .084        | 1.404       |
| Total Variable Costs  | 6.996        | 5.540                 | 6.472       | 8.420       |
| Total Costs           | 9.973        | 7.280                 | 8.648       | 11.968      |

**TABLE 7.—Weighted Average of Storage Costs Per Bushel by Fixed and Variable Operating Costs and Volume of Capacity for 27 Elevators in Ohio, 1958-59 — 1961-62.**

cents per bu.

| Operating Costs       | Capacity             |                         |                         |                     |
|-----------------------|----------------------|-------------------------|-------------------------|---------------------|
|                       | Under<br>199,999 bu. | 200,000-<br>299,999 bu. | 300,000-<br>499,999 bu. | Over<br>500,000 bu. |
| <u>Fixed Costs</u>    |                      |                         |                         |                     |
| 1. Depreciation       | 4.050                | 4.415                   | 4.509                   | 3.227               |
| 2. Interest           | .663                 | 1.157                   | .569                    | .592                |
| 3. Insurance          | .718                 | .615                    | .421                    | .271                |
| 4. Taxes              | .855                 | .899                    | .746                    | .555                |
| 5. Licenses           | .335                 | .197                    | .138                    | .093                |
| 6. Leases             | -----                | .287                    | .104                    | .387                |
| Total Fixed Costs     | 6.621                | 7.569                   | 6.487                   | 5.135               |
| <u>Variable Costs</u> |                      |                         |                         |                     |
| 1. Executive Salary   | .037                 | .388                    | .155                    | .255                |
| 2. Management         | 1.635                | .897                    | .620                    | .332                |
| 3. Clerical           | .629                 | .741                    | .435                    | .321                |
| 4. Labor              | 5.479                | 2.524                   | 2.255                   | 1.194               |
| 5. Utilities          | .581                 | .454                    | .421                    | .238                |
| 6. Interest           | -----                | -----                   | -----                   | -----               |
| 7. Taxes              | .228                 | .159                    | .007                    | .138                |
| 8. Insurance          | .822                 | .596                    | .594                    | .558                |
| 9. Repairs            | .812                 | .618                    | .582                    | .211                |
| 10. Fumigants         | .472                 | .586                    | .495                    | .565                |
| 11. Apportion         | -----                | -----                   | .552                    | .655                |
| 12. Other             | 1.037                | .809                    | .409                    | .565                |
| Total Variable Costs  | 11.732               | 7.772                   | 6.525                   | 5.027               |
| Total Costs           | 18.353               | 15.341                  | 13.012                  | 10.162              |

**TABLE 8.—Weighted Average of Handling Costs Per Bushel by Fixed and Variable Operating Costs and Volume of Capacity for 27 Elevators in Ohio, 1958-59 — 1961-62.**

|                       | cents per bu.        |                        |                        |                     |
|-----------------------|----------------------|------------------------|------------------------|---------------------|
|                       | Capacity             |                        |                        |                     |
| Operating Costs       | Under<br>199,999 bu. | 200,000<br>299,999 bu. | 300,000<br>499,999 bu. | Over<br>500,000 bu. |
| <u>Fixed Costs</u>    |                      |                        |                        |                     |
| 1. Depreciation       | .728                 | 1.285                  | .971                   | 1.194               |
| 2. Interest           | .177                 | .699                   | .294                   | .503                |
| 3. Insurance          | .163                 | .144                   | .072                   | .093                |
| 4. Taxes              | .161                 | .205                   | .160                   | .196                |
| 5. Licenses           | -----                | -----                  | -----                  | -----               |
| 6. Leases             | -----                | .008                   | .068                   | .024                |
| Total Fixed Costs     | 1.249                | 2.341                  | 1.565                  | 2.010               |
| <u>Variable Costs</u> |                      |                        |                        |                     |
| 1. Executive Salary   | .013                 | .198                   | .042                   | .184                |
| 2. Management         | .963                 | .491                   | .303                   | .316                |
| 3. Clerical           | .379                 | .422                   | .186                   | .237                |
| 4. Labor              | 3.909                | 3.659                  | 1.049                  | 1.953               |
| 5. Utilities          | .718                 | 1.359                  | .407                   | .473                |
| 6. Interest           | -----                | -----                  | -----                  | -----               |
| 7. Taxes              | -----                | -----                  | -----                  | -----               |
| 8. Insurance          | -----                | -----                  | -----                  | -----               |
| 9. Repairs            | .378                 | .457                   | .298                   | .421                |
| 10. Fumigants         | -----                | .001                   | -----                  | -----               |
| 11. Cost Apportion    | -----                | -----                  | .318                   | .496                |
| 12. Other             | .604                 | .494                   | .255                   | .626                |
| Total Variable Costs  | 6.965                | 7.081                  | 2.858                  | 4.706               |
| Total Costs           | 8.214                | 9.422                  | 4.423                  | 6.716               |

**TABLE 9.—Weighted Average of Merchandising Costs Per Bushel by Fixed and Variable Operating Costs and Volume of Capacity for 27 Elevators in Ohio, 1958-59 — 1961-62.**

| cents per bu.         |             |             |             |             |
|-----------------------|-------------|-------------|-------------|-------------|
| Operating Costs       | Capacity    |             |             |             |
|                       | Under       | 200,000     | 300,000     | Over        |
|                       | 199,999 bu. | 299,999 bu. | 499,999 bu. | 500,000 bu. |
| <u>Fixed Costs</u>    |             |             |             |             |
| 1. Depreciation       | .810        | 1.581       | 1.113       | 1.713       |
| 2. Interest           | .348        | .716        | .288        | .539        |
| 3. Insurance          | .153        | .128        | .121        | .099        |
| 4. Tax                | .204        | .261        | .188        | .229        |
| 5. Licenses           | -----       | -----       | -----       | -----       |
| 6. Leases             | -----       | .052        | .169        | .037        |
| Total Fixed Costs     | 1.515       | 2.738       | 1.879       | 2.617       |
| <u>Variable Costs</u> |             |             |             |             |
| 1. Executive Salary   | .029        | .601        | .047        | .354        |
| 2. Management         | .911        | .854        | .735        | .845        |
| 3. Clerical           | .348        | .759        | .271        | .726        |
| 4. Labor              | 1.911       | 2.645       | 1.597       | 2.931       |
| 5. Utilities          | .289        | .367        | .482        | .599        |
| 6. Interest           | -----       | .177        | .217        | .282        |
| 7. Tax                | .022        | .066        | .023        | .078        |
| 8. Insurance          | .038        | .026        | .042        | .073        |
| 9. Repairs            | .233        | .358        | .338        | .452        |
| 10. Fumigants         | -----       | .011        | -----       | -----       |
| 11. Apportion         | -----       | -----       | .184        | .254        |
| 12. Other             | .327        | 1.587       | .314        | .845        |
| Total Variable Costs  | 4.103       | 7.451       | 4.250       | 7.439       |
| Total Costs           | 5.623       | 10.189      | 6.129       | 10.056      |