
Cotton Gin Operating Costs in the Blacklands of Texas— 1970/71 and 1971/72

ABSTRACT

Gin plant capacity utilization and operating costs covering the 1970/71 and 1971/72 seasons were analyzed for a sample of 27 gins representing over 13 percent of the total ginning capacity for the Blacklands of Texas. Average rates of capacity utilization were about the same both years for plants with hourly capacities up through 11 bales (groups 1-3) but dropped off rather sharply in the larger plants (group 4) during 1971/72. Costs per bale were higher in 1971/72, reflecting general price increases, an appreciable increase in average per bale labor costs for group 3, and an average volume decline for group 4. The weighted average total cost per bale was \$23.37 for 1970/71 and \$24.90 for 1971/72. It is estimated that this cost would have been lowered by \$5.60 in 1970/71 and by \$6.12 in 1971/72 if average rates of capacity utilization could have been raised to 70 percent for each of the 2 crop years.

Keywords: Cotton, ginning, costs, rates, capacity, utilization.

PREFACE

This report is part of a series of studies of cotton gin operating costs being conducted for selected areas of the Cotton Belt. In this series, gin operating costs have been reported each year, commencing with the 1965/66 season in West Texas and with the 1968/69 season in the Midsouth. Similar studies have been started for the Lower Rio Grande Valley, Tex., and for the San Joaquin Valley, Calif. Findings in these reports are derived from gin operating cost records which are received annually by mail. Area ginners use these findings as benchmarks or guides in evaluating the efficiencies of their own operations.

COTTON GIN OPERATING COSTS IN THE BLACKLANDS
OF TEXAS--1970/71 AND 1971/72

by

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INTRODUCTION

The main body of the Blacklands consists of a triangular area bounded by Grayson and Red River Counties on the north and extending to the vicinity of San Antonio in the south central part of Texas. Although this area encompasses part or all of 46 counties, only 27 counties contain the area's 209 active gins, which make up the study universe. These gins were classified by rated capacities in bales per hour and stratified into four size groups as follows: Group 1--6 bales or less; group 2--7 and 8 bales; group 3--9 to 11 bales; and group 4--12 bales or more. A random sample was taken from each group based on the group's percentage of total ginning capacity in the Blacklands. Twenty-seven plants, accounting for over 13 percent of the area's total ginning capacity, comprised the sample.

Objectives of this research were to (1) determine the current costs of ginning in the Blacklands of Texas and observe trends over time, (2) analyze the effects of changes in ginning volumes on ginning costs, and (3) consider the possibilities of reducing operating costs through more efficient ginning.

RESULTS

During the 1971/72 season, total volumes ginned by the sample gins ranged from 768 to 4,467 bales (table 1). In comparison, volumes among these same gins during the previous season ranged from 1,169 to 4,856 bales.

Based on a study of ginning distributions by the Bureau of the Census, it has been estimated that gins operate up to 906 hours during a normal ginning season. 2/ Taking the product derived from multiplying 906 by the rated hourly ginning capacity and reducing it to 85 percent capacity utilization (estimated level of ginning efficiency which can be maintained throughout the season) gives

1/ Wilmot and Shaw are agricultural economists and Heron is an economic assistant.

2/ Assuming no seed cotton storage to extend the ginning season other than that provided through normal trailer usage.

Table 1 --Rated hourly capacities, volumes ginned, and capacity utilization, by ranges and averages for sample gins, Blacklands of Texas, 1970/71 and 1971/72

Gin size group and season	Rated hourly capacity ^{1/}		Annual volume ginned		Rate of capacity utilization ^{2/}	
	Range	Average	Range	Average	Range	Average
	----- Bales -----				-- Percent --	
1970/71:						
Group 1.....	5- 6	5.8	1,643-2,269	1,887	36-49	43
Group 2.....	7- 8	7.4	1,169-3,813	2,325	22-71	41
Group 3.....	9-11	9.4	1,204-3,399	2,384	16-45	33
Group 4.....	12-15	13.0	1,914-4,856	3,027	21-42	30
Combined....	5-15	8.2	1,169-4,856	2,349	16-71	37
1971/72:						
Group 1.....	5- 6	5.8	1,336-2,478	1,860	35-54	42
Group 2.....	7- 8	7.4	768-4,467	2,353	14-83	41
Group 3.....	9-11	9.4	1,315-3,692	2,292	17-48	32
Group 4.....	12-15	13.0	1,635-2,917	2,193	18-25	22
Combined....	5-15	8.2	768-4,467	2,251	14-83	36

^{1/} Based on observations in plants operating under normal conditions.

^{2/} Ratio of volume ginned to estimated total seasonal ginning capacity without seed cotton storage. Based on typical ginning season of 906 operating hours and a sustained seasonal capability estimated at 85 percent of rated hourly capacities.

the rated annual capacity for any given plant. ^{3/} On this basis, full utilization of a plant with a rated hourly capacity equal to the average for size group 1 (5.8 bales) would provide an annual volume capability of 4,467 bales. However, the group 1 average volume ginned during the 1971/72 season was 1,860 bales, a capacity utilization of 42 percent. Likewise, full utilization of a plant with a rated hourly capacity equal to the average for size group 4 (13.0 bales) would give an annual volume potential of 10,011 bales. However, the 1971/72 average volume ginned by group 4 was 2,193 bales, a capacity utilization rate of 22 percent. Average capacity utilization rates during the 1971/72 season for size groups 2 and 3 were 41 and 32 percent, respectively.

Average rates of plant capacity utilization remained essentially unchanged both years for groups 1-3, but dropped off appreciably--from 30 to 22 percent--in 1971/72 for group 4. This resulted in a slight decline, from 37 to 36 percent, in the overall weighted average.

^{3/} Zolon M. Looney and Charles A. Wilmot, Economic Models for Cotton Ginning. U.S. Dept. Agr., Econ. Res. Serv., Agr. Econ. Rpt. 214, Oct. 1971.

Operating Costs at Existing Rates of Plant Capacity Utilization

Total per bale costs ^{4/} were up in 1971/72 from the previous season for all four size groups (tables 2 and 3). Total cost averages ranged from \$23.25 to \$32.46 per bale in 1971/72 for groups 1 and 4, respectively. For 1970/71, this range was \$22.05 to \$27.28 per bale for the two respective size groups. Group 4, which suffered the largest drop in average rate of plant capacity utilization in 1971/72, showed the greatest increase in average operating cost. This emphasizes the adverse effect a decline in volume can have on per unit ginning costs.

When depreciation and interest were standardized, ^{5/} the resulting total cost figures were raised appreciably. Total standardized costs ranged from an average of \$27.55 per bale for group 1 to \$35.96 per bale for group 4 in 1971/72, and from \$26.15 to \$29.19 per bale for the same size groups in 1970/71. Standardization of weighted average costs added \$4.01 per bale in 1971/72 and \$3.61 per bale in 1970/71.

Out-of-pocket cost averages per bale for 1971/72 ranged from \$21.06 for group 2 to \$24.77 for group 3, with a weighted average of \$22. These totals were \$1.09, \$3.78, and \$1.71 per bale higher, respectively, than in 1970/71.

Operating Costs at an Assumed Rate of 70 Percent Plant Capacity Utilization

To allow cost comparisons at the same relative ginning volume levels, each group average cost and the weighted average were adjusted to 70 percent capacity utilization (table 4). ^{6/} Spreading such fixed and semifixed costs as insurance, taxes, interest, depreciation, and management and office labor over more bales obviously reduces total ginning costs per bale. Also, increasing annual ginning volumes may reduce some per bale variable costs such as ginning labor and energy. For example, if capacity utilization for the 1971/72 season could have been raised from 36 to 70 percent, the estimated weighted average total cost would have been \$18.78 per bale, compared with \$24.90 shown for the actual weighted average for all four groups (table 3). In this case, a 34-percent increase in annual plant capacity utilization rate would have resulted in a 25-percent reduction in per bale operating costs. Comparable savings would have been realized for the 1970/71 season with a similar boost in plant capacity utilization for that year.

A consistent pattern for economies of scale was evident only in 1970/71 cost figures for out-of-pocket costs at 70 percent capacity utilization. Per bale costs ranged downward from \$16.98 for group 1 to \$14.69 for group 4. The greater increase in 1971/72 in the per bale labor cost average for group 3, compared with the other size groups, brought out-of-pocket costs for this group up almost equal to those for group 1. During both years, per bale costs for depreciation and interest were highest in group 4 and lowest in group 1. This reflects the newer, larger, more expensive gins which make up group 4 compared with the much older, more fully owned, highly depreciated plants in group 1.

^{4/} See Costing Methods in appendix.

^{5/} Ibid.

^{6/} See Cost Adjustments in appendix.

Table 2 --Sample ginning costs per bale, groups 1-4 and weighted average for gin universe, Blacklands of Texas, 1970/71 season ^{1/}

Cost items ^{2/}	Group 1		Group 2		Group 3		Group 4		Weighted average ^{4/}
	Range ^{3/}	Average	Range ^{3/}	Average	Range ^{3/}	Average	Range ^{3/}	Average	
Dollars									
Management.....	2.73- 4.36	3.54	1.00- 6.57	3.29	1.66- 4.98	3.72	2.43- 7.22	3.79	3.46
Insurance.....	.63- .84	.77	.13- 1.92	.70	.45- 1.32	.84	.28- .72	.46	.70
Taxes.....	.20- .52	.32	.18- .60	.37	.28- .65	.53	.52- 1.19	.67	.42
Energy.....	2.04- 2.73	2.48	1.03- 3.23	2.04	.65- 3.19	1.97	1.84- 3.25	2.31	2.17
Labor.....	5.13- 7.19	6.31	3.73- 9.04	6.13	4.75- 9.54	6.97	4.94- 8.05	5.86	6.25
Bagging and ties..	^{5/}	3.42	^{5/}	3.42	^{5/}	3.42	^{5/}	3.42	3.42
Repairs.....	1.70- 4.53	2.66	1.05- 4.62	2.70	1.69- 3.08	2.37	1.98- 3.78	2.67	2.64
Miscellaneous.....	.31- 2.47	1.09	.26- 2.92	1.31	.80- 2.54	1.16	.83- 1.78	1.14	1.22
Out-of-pocket									
subtotal ^{6/}	18.06-22.62	20.59	14.39-29.11	19.97	18.34-24.71	20.99	16.81-24.66	20.31	20.29
Depreciation.....	.45- 2.68	1.26	.39- 5.35	2.55	.87- 3.86	2.40	3.18- 8.24	4.85	2.51
Interest.....	0 - .45	.20	.02- 1.90	.47	0 - .66	.21	1.12- 5.30	2.12	.57
Total.....	18.84-25.30	22.05	15.53-31.80	22.99	19.72-26.88	23.60	21.11-38.20	27.28	23.37
Standardized									
depreciation ^{7/}	1.76- 4.13	3.21	1.76- 7.19	3.94	2.44- 6.10	4.19	4.61- 7.01	5.41	3.98
Standardized									
interest ^{7/}	1.59- 2.79	2.34	1.48- 4.60	2.67	1.95- 4.42	2.85	2.90- 4.59	3.48	2.71
Total									
standardized ^{8/}	23.22-28.68	26.15	20.85-37.36	26.57	23.81-35.23	28.02	24.32-36.26	29.19	26.98

The sum of individual cost items may not equal total because of rounding.

^{1/} Group 1--rated capacity of 6 bales per hour or less; group 2--7 and 8 bales per hour; group 3--9 to 11 bales per hour; and group 4--12 bales or more per hour. The universe includes all active gins in the study area.
^{2/} Taken from gin records and subjected to uniform allocation procedures--see appendix. ^{3/} Low and high values shown for individual cost items indicate ranges among sample gins within a size group. Since the same gin was not consistently lowest or highest for all cost items, sums of individual costs will not add to totals shown. ^{4/} Sample averages across groups, weighted by each group's representative proportion of the total rated hourly ginning capacity in the study area gin universe. ^{5/} To eliminate the effect of inventory carryover on costs, a uniform unit cost for bagging and ties, based on current costs, was assumed for all sample gins. Hence, no range was available. ^{6/} Sample gin cost excluding depreciation and interest. ^{7/} Sample gin costs from which effects of variations in rates used in computing depreciation and interest have been eliminated--see appendix. ^{8/} Out-of-pocket costs plus standardized depreciation and standardized interest.

Table 4 --Estimated costs per bale at 70 percent capacity utilization, groups 1-4 and weighted averages for gin universe, Blacklands of Texas, 1970/71 and 1971 72 1/

Cost items <u>2/</u>	1970/71				1971/72					
	Group 1	Group 2	Group 3	Group 4	Weighted average	Group 1	Group 2	Group 3	Group 4	Weighted average
					Dollars					
Management.....	2.43	2.21	2.15	2.10	2.17	2.34	2.20	2.20	2.06	2.14
Insurance.....	.51	.45	.46	.26	.44	.51	.43	.48	.26	.43
Taxes.....	.19	.22	.25	.29	.23	.20	.27	.30	.28	.26
Energy.....	2.20	1.78	1.60	1.82	1.85	2.30	2.02	1.82	2.05	2.04
Labor.....	5.03	4.78	4.83	3.86	4.72	5.25	5.08	5.88	3.81	5.08
Bagging and ties <u>3/</u>	3.42	3.42	3.42	3.42	3.42	3.82	3.82	3.82	3.82	3.82
Repairs.....	2.22	2.25	1.81	2.00	2.18	2.53	2.32	2.17	1.33	2.27
Miscellaneous.....	.98	1.18	.98	.94	1.08	1.09	1.20	1.35	1.19	1.20
Out-of-pocket subtotal <u>4/</u>	16.98	16.29	15.50	14.69	16.08	18.04	17.34	18.01	14.80	17.25
Depreciation.....	.76	1.49	1.13	2.09	1.37	.77	1.35	1.13	1.94	1.28
Interest.....	.12	.28	.10	.92	.31	.04	.21	.12	.80	.25
Total.....	17.87	18.06	16.73	17.70	17.77	18.85	18.90	19.26	17.53	18.78
Standardized depreciation <u>5/</u>	1.96	2.29	1.97	2.33	2.18	1.96	2.29	1.92	2.33	2.17
Standardized interest <u>5/</u> :	1.43	1.55	1.34	1.50	1.49	1.43	1.55	1.31	1.50	1.48
Total standardized <u>6/</u>	20.36	20.14	18.81	18.52	19.75	21.43	21.18	21.25	18.63	20.90

The sum of individual cost items may not equal total because of rounding.

1/, 2/ See footnotes 1/ and 2/ to table 2. 3/ To eliminate the effect of inventory carryover on costs, a uniform unit cost for bagging and ties, based on current costs, was assumed. 4/ Excludes depreciation and interest. 5/ Costs from which effects of variations in rates used in computing depreciation and interest have been eliminated-- see appendix. 6/ Out-of-pocket costs plus standardized depreciation and standardized interest.

APPENDIX: METHODOLOGY

Gins vary widely by type of organization, ownership structure, and accounting procedures used, and in many other ways. In analyzing costs reported by sample gins, uniform allocation procedures were employed to compensate for differences in accounting procedures.

Costs of hauling cottonseed and lint--such as truck drivers' wages, truck depreciation, insurance, road-use taxes, and associated truck-operating costs--and any other costs not directly related to gin processing were excluded.

Cost Allocations

Management: Where applicable, includes salaries, bonuses, commissions, expense allowances, house rent, and personal insurance policies for owners and managers; bookkeeping and other office salaries and home office cost (line companies); social security; and workmen's compensation insurance and any other insurance on management and office personnel.

Depreciation: Includes allowances for depreciation exactly as carried on gin records except for standardized costs. (See Standardized sample gin costs below.)

Interest: Includes interest exactly as carried on gin records except for standardized costs. (See Standardized sample gin costs below.)

Insurance: Includes cost of all forms of insurance on gin buildings, equipment, housing furnished management and labor, cotton products, and automotive equipment (except large trucks and trailers).

Taxes: Includes all taxes on real property only.

Energy: Includes cost of all utilities--electricity, gas, and water--used in ginning and directly related operations.

Labor: Includes cost of gin wages, social security, and workmen's compensation and any other insurance on gin labor borne by the gin; plus any rental housing furnished labor (excludes gin repair labor; see Repairs below).

Bagging and ties: Uniform unit cost, based on current costs, was assumed for all sample gins.

Repairs: Includes cost of gin repair wages, social security and workmen's compensation and other insurance on gin repair labor borne by the gin; plus the cost of repair materials and supplies.

Miscellaneous: Includes pickup, tractor, and other automotive expenses; telephone, telegraph, advertising, and promotion costs; legal and audit fees; dues, memberships, and subscriptions; annual meetings and director's

fees and expenses; conventions and travel expenses; donations and contributions; cotton losses from fire; sampling, compressing, and related charges; gin and office supply costs; and any other costs not included elsewhere.

Costing Methods

Sample gin costs: Gin costs which have been subjected to the above allocations are identified in this report as sample gin costs.

Standardized sample gin costs: Sample gin costs from which the effects of variations in rates used in computing depreciation and interest have been eliminated by adopting uniform rates. Depreciation was set at 7 percent of the initial purchase price of capital items carried on the depreciation schedule regardless of age or former method of depreciation. Interest was charged at 8 percent on the estimated average value of the land comprising the gin site and 8 percent on one-half the cost of buildings, machinery, and equipment.

Out-of-pocket costs: Sample gin costs from which depreciation and interest have been excluded.

Cost Adjustments

Estimates of ginning costs at other than existing levels of capacity utilization were based on relationships assumed in the development of a series of model gins. See: Zolon M. Looney and Charles A. Wilmot, Economic Models for Cotton Ginning, U.S. Dept. Agr., Agr. Econ. Rpt. 214, Oct. 1971.

Weighting

In computing weighted averages, the simple weighted average cost per bale for each group was further weighted by its representative proportion of the total rated hourly ginning capacity in the Blacklands. This was done to reflect more accurately the cost of ginning an "average" bale of cotton in that area.

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