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# Operational and Cost Characteristics of the Cotton Ginning Industry in Mississippi

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## Introduction

Cotton plays a vital role in the United States agricultural economy. U.S. cotton producers grew about 20% of the world's 88-million-bale crop in 1995 (Smith et al.). Cotton plays an even larger role in Mississippi's economy. Cotton led all row crops in Mississippi in 1996 with cash receipts of \$649 million, and Mississippi was the fourth leading cotton producer in the U.S. that year. Cash receipts from cottonseed produced in Mississippi totaled \$77.1 million in 1996 (Mississippi Department of Agriculture and Commerce-NASS 1996).

The amount of cotton produced in Mississippi affects more than just cotton producers. Cotton requires an extensive infrastructure and provides a stimulus to the Mississippi economy. There are approximately 4,044 cotton-related businesses in Mississippi, and these firms employ more than 22,000 Mississippians (Mississippi Department of Agriculture and Commerce-NASS 1996). The ginning industry is an example of such a business that is almost completely dependent on cotton production. In 1997, there were 127 active gins in the state, most of which are concentrated in the Mississippi Delta. The remaining gins and cotton acreage are spread across the central and the northeastern regions of the state (Robinson and Mancill).

In recent years, there has been little information reported on the operational and cost characteristics of the ginning industry in Mississippi. The purpose of this report is to gather, document, and report data gathered concerning Mississippi's cotton ginning industry. Gins were grouped by agricultural statistical districts used by the Mississippi Department of Agriculture and Commerce; however, some modifications were made to keep all responses confidential. Figure 1 illustrates these regions and presents the names used to identify them in this report.

## Methods and Procedures

A survey was mailed to 120 Mississippi cotton gins during the summer of 1998. The location, phone number, and mailing addresses of these gins were obtained from the Southern Cotton Ginners Association. The survey's primary objective was to determine the operational structure and the processing capacity of Mississippi cotton gins. Ginners were asked questions that pertained to gin capacity (both hourly and seasonal capacity of the gin); total cost of ginning per bale; transportation costs, including both trailer and

module; the percentage of module-hauled cotton versus trailer-hauled cotton; the amount of computer use in the ginning process; and the ownership structure of the gin. Responses from the questions concerning gin capacity were used to calculate rated capacity, processing capacity, and maximum seasonal capacity for both the industry and for gins in various size groups. Rated capacity refers to the number of bales per hour a ginner could process under ideal conditions. Maximum seasonal capacity is also a measure of the number of bales processed under ideal conditions; except in this case, it refers to the maximum number of bales a gin can process in one season under ideal conditions. Processing capacity refers to the actual number of bales per hour a ginner processed during the 1997 crop year. Survey respondents were asked to provide data reflecting the 1997 crop year.

Responses to some questions in the survey were classified into four different size groups, similar to a study of the ginning industry in the Texas High Plains (Misra et al.). These four size groups were based on the average bales per hour (bph) processing capacity:

- (Size 1) Up to 14 bph,**
- (Size 2) 15-21 bph,**
- (Size 3) 22-28 bph, and**
- (Size 4) Greater than 28 bph.**

Average ginning cost per bale, total ginning cost, and seed cotton transportation cost were calculated for each size group and for the overall Mississippi ginning industry. Using the responses on the surveys and data from the National Agricultural Statistics Service (NASS), gin distribution and the processing volume by size group were determined for the Mississippi ginning industry. An estimate of the total number of gins in each size category was made based on NASS data. Survey responses were used to determine the average number of bales processed per gin for each size group. These averages were multiplied by the estimated number of gins in each size group to calculate the total number of bales processed in 1997. To determine average transportation cost, the average transportation cost per bale for each respective size group was multiplied by the average number of bales ginned for that size category. The average ginning cost per bale for each group was multiplied by the average number of bales ginned to derive total ginning cost for each group. By looking at these types of costs (both industry wide and within each size group), ginner can gain a better perspective of the operational and cost characteristics of the cotton ginning industry in Mississippi.

## Results

### Responding Gin Characteristics

Of the 120 ginner mailed surveys, 48 returned usable questionnaires. This represents a usable response rate of approximately 40%. Active gins are in 36 counties throughout the state, and gins in 23 of these counties returned usable surveys. [Table 1](#) shows that the Lower Delta and the Upper Delta regions had the highest number of surveys returned, with 27 and 15 surveys returned, respectively. Gins responding from the Central region reported the highest average rated capacity at 29.5 bales per hour (bph). However, the Lower Delta region reported the highest actual processing capacity at 21.95 bph, which suggests that gins in the Delta are more fully utilizing their capacity. Responding gins in the Northeast region averaged the lowest rated capacity (12.5 bph) and actual processing capacity (12 bph). The gins in this region also had the lowest maximum seasonal capacity at 2,250 bales per gin. Results of this survey suggest that the gins in the Northeast are operating near capacity. The Central region reported the highest maximum seasonal capacity per gin with 36,300 bales. [Table 1](#) provides a summary of the characteristics of the gins that participated in the survey.

<b>Table 1. Responding Mississippi Gin Characteristics in each Region, 1997.</b>						
<b>Region</b>	<b>Gins in each region</b>	<b>Total surveys returned</b>	<b>Useable surveys returned</b>	<b>Avg. rated capacity<sup>1</sup></b>	<b>Avg. processing capacity per gin<sup>1</sup></b>	<b>Seasonal capacity per gin</b>

	no.	no.	no.	bph	bph	bales
Region 1 Upper Delta	33	15	14	22.91	19.12	26,590
Region 2 North Central	13	6	4	18.42	15.28	19,131
Region 3 Northeast	6	2	1	12.50	12	2,250
Region 4 Lower Delta, Southwest	52	27	22	27.46	21.95	26,563
Region 5 Central	13	7	5	29.50	20.60	36,300
Region 6 East Central	3	2	2	24.10	14.50	19,870
Region 7 South Central	no gins	no gins	no gins	no gins	no gins	no gins
Region 8 Southeast	no gins	no gins	no gins	no gins	no gins	no gins

<sup>1</sup>bph=bales per hour.

## Gin Operation Characteristics

[Table 2](#) provides a summary of operational characteristics as determined from the survey responses of the Mississippi ginning industry, including gin capacity, season length, and the amount of cotton processed by responding gins.

Survey responses indicate that the average rated hourly capacity of the responding gins was approximately 25 bph in 1997. However, the average processing rate was approximately 20 bph. This finding suggests that, on average, Mississippi gins have an excess capacity of 5 bph. Often, the lack of cotton available (due to variable cotton acreage and/or variable yields) for ginning explains the difference found in the rated capacity and the actual capacity of the gins. To a lesser extent, factors such as downtime for shift change and cleanup may also play a role in explaining this difference.

Responding ginners reported that the ginning season for Mississippi gins in 1997 ranged between 30 and 91 days, with an average ginning season of 60 days. There was no definable relationship between season length and gin size. The average ginning season for gins processing up to 14 bph was 61 days (size 1). For size 2 gins, the average ginning season was 57 days; size 3, 57 days; and size 4, 62 days. Mississippi gins operated approximately 17 hours per day, on average, with an average downtime of about 2 hours.

**Table 2. Estimated Gin Characteristics of the Mississippi Ginning Industry Based on Survey Data, 1997.**

Characteristics <sup>1</sup>	Mean	Standard deviation	Minimum	Maximum
Rated Capacity (bph)	25.15	8.93	10.90	54.50
Processing Rate (bph)	19.90	6.23	8.10	40
Season Length (days)	59.13	14.92	30	91
Hours Ginned Daily	17.38	5.04	6	24
Daily Downtime Hours	2.12	1.76	0	8
Max. Seasonal Capacity (bales)	26,757	15,136	2,250	65,465

<sup>1</sup>bph=bales per hour.

## Processing Volume and Seasonal Capacity

[Table 3](#) is a summary of the processing volume by gin size as determined from the survey responses. Breaking down the processing volume by gin sizes revealed that gins in the size 1 group (up to 14 bph) processed an average of 10,027 bales per gin during 1997; size 2 (15-21 bph), 15,001 bales; size 3 (22-28 bph), 20,611 bales; and size 4 (more than 28 bph), 29,363 bales.

Data show that there were 75 gins in size group 1 (up to 14 bph), 17 gins in size group 2 (15-21 bph), 31 gins in size group 3 (22-28 bph), and 4 gins in size group 4 (more than 28 bph) in Mississippi in 1997 (United States Department of Agriculture-NASS 1998). To calculate the total number of bales processed, the number of gins in each group (as reported by NASS) was multiplied by the average processing volume per gin for each group (as determined from survey responses). This resulted in a total processing volume of 1.7 million bales in the 1997 season ([Table 3](#)). By comparison, NASS reported the actual number of bales ginned in 1997 was 1,766,450 (United States Department of Agriculture). Given the similarity of the estimated and actual total bales processed, it can be concluded that the numbers generated from the survey responses are probably representative of the actual conditions in the Mississippi ginning industry. Based on survey responses, it was estimated that size 1 gins ginned about 43% of the total processing volume; size 2, about 14%; size 3, about 36%; and size 4, about 7% ([Table 3](#)).

Ginners were also asked to estimate their maximum daily capacity -- the maximum amount of cotton they could process in a 24-hour period under ideal conditions. This amount was divided by the numbers of hours spent on processing during 24 hours to derive a maximum hourly capacity. This maximum hourly capacity was multiplied by the hours of processing time per day during the average season to determine maximum seasonal capacity. Size 1 gins (up to 14 bph) were estimated to have a perceived average maximum seasonal capacity of 11,049 bales per gin; size 2 (15-21 bph), 16,991 bales; size 3 (22-28 bph), 24,812 bales; and size 4 (more than 28 bph), 40,796 bales ([Table 3](#)). Extrapolation of the reported total maximum seasonal capacities per gin by size groups for the Mississippi ginning industry showed a total maximum seasonal capacity of about 2 million bales for Mississippi in 1997 ([Table 3](#)).

Comparison of the actual processing volume to maximum seasonal capacity reveals that the ginning industry in Mississippi had an excess capacity of 286,443 bales in 1997, indicating approximately 14% of unused capacity. The smaller gins (size 1 and 2 gins) operated with an excess capacity of 9% and 12%, respectively, while the larger gins operated with excess capacities of 17% and 28%. It is likely that the larger gins have volumes that allow them to sustain more excess capacity. However, these gins may be in a more precarious position if cotton acreage continues to decline.

**Table 3. Estimated Processing Volume and Seasonal Capacity of the Mississippi Ginning Industry Based on Survey Data, 1997.**

Size <sup>1</sup>	No. gins	Avg. processing volume	Total bales processed	Seasonal capacity per gin	Total seasonal capacity
		bales/gin		bales	bales
Size 1 gins (<14 bph)	75	10,027	752,025	11,049	828,675
Size 2 gins (15-21 bph)	17	15,001	255,017	16,991	288,847
Size 3 gins (22-28 bph)	31	20,611	638,941	24,812	769,172
Size 4 gins (>28 bph)	4	29,363	117,452	40,796	163,184

<b>Total</b>	<b>1,763,435</b>	<b>2,049,878</b>
<sup>1</sup> bph = bales per hour.		

**Table 4. Estimated Transportation Costs and Characteristics of the Mississippi Ginning Industry Based on Survey Data, 1997.**

Costs and Characteristics	Mean	Standard deviation	Minimum	Maximum
Distance Hauled by Module (miles)	11.97	5.72	4	28
No. of Bales per Module	13.64	0.94	12	16
Transportation Cost per Module (\$)	43.95	25.09	3.00	100.00
Module Transportation Cost per Mile (\$)	0.27	NA	NA	NA
Distance Hauled by Trailer (miles)	7.57	3.36	0	14
No. of Bales per Trailer	6.75	2.32	0	11
Transportation Cost per Trailer (\$)	7.22	9.24	0	24.00
Trailer Transportation Cost per Mile	0.14	NA	NA	NA

## Transportation Cost Characteristics

Eighty-five percent of the usable responses indicated that the ginners transported seed cotton from the producer's field to the gin. Approximately 87% of the cotton coming to the gins was transported by module. Gins paid the cost of transporting the cotton to the gin by module 98% of the time. The remaining cotton was transported to gins using trailers, and producers incurred that cost 97% of the time. The average transport distance from the farmer's field to the gin was approximately 12 miles. The average transportation cost was \$43.95 per module. On average, 13.64 cotton bales were transported in one module. These data suggest an average module transportation cost of \$3.22 per bale or 27 cents per bale per mile. Gins using trailers to transport cotton from the field showed an average transportation cost of \$7.22 per trailer. Each trailer hauled an average of 6.75 bales, and the average trailer transport distance was 7.57 miles. These results indicate a cost of \$1.07 per bale or 14 cents per bale per mile for trailer-transported cotton ([Table 4](#)).

Size 3 gins experienced the highest transportation cost at \$3.82 per bale, while size 1 gins had the lowest cost at \$2.12 per bale. Size 2 and 4 gins incurred costs of \$2.39 and \$3.48 per bale, respectively ([Table 5](#)). The total module transportation cost for the ginning industry in Mississippi in 1997 was estimated at approximately \$5 million ([Table 5](#)). Transportation cost for trailer-hauled cotton was not analyzed in the same manner as cotton hauled by module. In most instances (97% of the time), producers incurred the cost of hauling seed cotton to the gin by trailer. Therefore, gins rarely have to account for this type of transportation cost.

**Table 5. Estimated Module Transportation Costs for the Mississippi Ginning Industry Based on Survey Data, 1997.**

Gin size <sup>1</sup>	Bales ginned	Transportation cost per bale	Total transportation cost
		\$	\$
Size 1 gins (<14 bph)	752,025	2.12	1,594,293.00
Size 2 gins (15-21 bph)	255,017	2.39	609,490.63
Size 3 gins (22-28 bph)	638,941	3.82	2,440,754.62

Size 4 gins (>28 bph)	117,452	3.48	408,732.96
<b>TOTAL</b>			
			5,053,271.21

## Ginning Cost Characteristics

Average ginning cost (variable and fixed) in the 1997 season for the responding gins was calculated at \$35.96 per bale. Size 1 gins had an average ginning cost of \$36.97 per bale; size 2, \$40.12 per bale; size 3, \$35.29 per bale; and size 4, \$33.85 per bale (Table 6). Overall, ginning volume is expected to be inversely related to average cost. In other words, as processing volume increases in a given plant size, average cost is expected to decrease. However, this was not what the survey data indicated for the gins in the size 2 group. The reason for this result is not completely clear. However, it could be that data for this group were misreported by the respondents. Alternatively, it could be that many small gins are older and fully depreciated. If this is the case, reported average cost could be much lower than expected for newer gins. Thus, it could be that the cost reported for size 1 is small compared to size 2 gins. The total cost of ginning in 1997 for the Mississippi ginning industry was calculated at about \$64.5 million (Table 6).

<b>Table 6. Estimated Ginning Costs for the Mississippi Ginning Industry Based on Survey Data, 1997.</b>			
<b>Gin size<sup>1</sup></b>	<b>Bales ginned</b>	<b>Ginning cost per bale</b>	<b>Total ginning ginned</b>
		\$	\$
Size 1 gins (<14 bph)	752,025	36.97	27,802,364.25
Size 2 gins (15-21 bph)	255,017	40.12	10,231,282.04
Size 3 gins (22-28 bph)	638,941	35.29	22,548,227.89
Size 4 gins (>28 bph)	117,452	33.85	3,975,750.20
<b>TOTAL</b>			<b>64,557,624.38</b>
<sup>1</sup> bph = bales per hour.			

## Gin Trash Disposal Methods

Ginners in Mississippi were asked how their gins disposed of the large volume of gin trash created during the ginning process. Table 7 is a summary of the disposal methods used by responding ginners. On-site composting and composting on farmers' fields are the preferred methods of gin trash disposal. However, a variety of methods are used, with some gin trash being used as flower-bed mulch.

<b>Table 7. Gin Trash Disposal Methods used by the Responding Mississippi Gins, 1997.</b>				
<b>Disposal method</b>	<b>Mean</b>	<b>Standard deviation</b>	<b>Minimum</b>	<b>Maximum</b>

Pct. gin trash taken directly to farmers field for composting	35.70	47.70	0	100
Pct. gin trash composting on-site	45.87	49.44	0	100
Pct. gin trash composting off-site	13.72	33.39	0	100
Pct. gin trash taken directly to feedlots and other livestock	2.34	14.59	0	100
Pct. gin trash used for other purposes	0.23	1.46	0	10

## Total Cost for Ginning in 1997

Ginning industry costs for Mississippi were calculated by adding total transportation costs and total ginning costs for each size group. Results indicate that the ginning industry incurred a combined cost of approximately \$69.6 million in 1997 (Table 8). Size 1 gins incurred costs of approximately \$29.3 million; size 2 gins, \$10.8 million; size 3 gins, \$24.9 million; and size 4 gins, \$4.3 million. As one might expect, ginning costs accounted for 93% of the combined industry cost. Given that the Mississippi ginning industry processed more than 1.7 million bales of cotton in 1997, results indicate that the ginning industry experienced a combined cost of about \$39.47 per bale, or 7.9 cents per pound of cotton. The most commonly reported gin charge was 8 cents per pound of cotton, indicating that the industry was covering variable and fixed costs.

**Table 8. Estimated Combined Cost to the Mississippi Ginning Industry Based on Survey Data, 1997.**

Gin size <sup>1</sup>	Total transportation cost	Total ginning cost	Total industry cost
Size 1 gins (<14 bph)	1,594,293.00	27,802,364.25	29,396,657.25
Size 2 gins (15-21 bph)	609,490.63	10,231,282.04	10,840,772.67
Size 3 gins (22-28 bph)	2,440,754.62	22,548,227.89	24,988,982.51
Size 4 gins (>28 bph)	408,732.96	3,975,750.20	4,384,483.16
<b>Total</b>	<b>5,053,271.21</b>	<b>64,557,624.38</b>	<b>69,610,895.59</b>

<sup>1</sup>bph=bales per hour.

## Computer Usage by the Ginning Industry

Approximately 42% of Mississippi ginners reported "Some" computer use in the ginning process. Other responses were split between "No Use" (30.19%) and "Extensive Use" (28.30%). Figure 2 provides a summary of the amount of computer use in the Mississippi ginning industry. Ownership Structure in the Ginning Industry Finally, ginners were asked to describe the ownership structure of their gins. Respondents could choose from one of five descriptions: sole proprietorship, cooperative, partnership, corporation, and other. By far, corporation was the preferred ownership method. Approximately 79% of Mississippi gins are set up as corporations. Other responses are summarized in Figure 3.

## Summary of Results



In the summer of 1998, a survey was mailed to 120 Mississippi cotton gins to determine the operational structure and processing capacity of the state's cotton industry. Forty-eight gins returned usable questionnaires, representing a usable response rate of approximately 40%. Gins from 23 of the 36 counties that have cotton gins participated in the survey. Important findings are presented in [Table 9](#). Eighty-five percent of the responding gins indicated that the gin transported seed cotton from the producer's field to the gin. Approximately 87% of the cotton coming to the gins was transported by module at an average cost of \$43.95 per module (\$3.22 per bale; 27 cents per bale per mile). The non-moduled cotton was transported to gins using trailers. Producers incurred the cost of transporting the cotton to the gin by trailer 97% of the time. The cost of hauling cotton to the gin by trailer was \$1.07 per bale or 14 cents per bale per mile. The transportation issue also relates indirectly to the issue of declining acreage. In a recent study, Parvin and Cleveland report that cotton acreage in Mississippi is on the decline. The authors cite several reasons for this decline, including recent changes in farm legislation and current relative future prices for cotton and alternative crops. This issue of declining cotton acreage in Mississippi concerns many in the agricultural sector, especially ginners. As small gins are forced to shut down (due to declining cotton acreage and/or declining cotton yields), the transportation costs will become higher for the remaining gins. During the 1997 season, the average rated hourly capacity of responding gins was approximately 25 bales per hour. However, the actual processing volume was approximately 20 bales per hour. The average length of the ginning season was about 60 days. Mississippi gins operated approximately 17 hours per day on average, with an average downtime of about 2 hours. Responding gins reported an average ginning cost (variable and fixed ) of about \$35.96 per bale. Combined cost (transportation cost plus ginning cost) was estimated at \$39.18 per bale. Based on the gin size distribution in the National Agricultural Statistics Service's May 1998 Cotton Ginnings Annual Reports, it was determined that Mississippi in 1997 had 75 gins with processing capacity up to 14 bph; 17 gins, 15 to 21 bph; 31 gins, 22 to 28 bph; 4 gins, more than 28 bph. It was estimated based on these data that the Mississippi ginning industry processed about 1.7 million bales of cotton in the 1997 season. However, the total maximum seasonal capacity for the Mississippi ginning industry was estimated at about 2 million for the same period. These results suggest that the Mississippi ginning industry had an excess capacity of 286,443 bales in 1997, or 14%. It was further observed that smaller gins operated with smaller amounts of excess capacity than larger-capacity gins. The total module transportation cost for the Mississippi ginning industry in 1997 was estimated at approximately \$5 million, and the total cost of ginning for the Mississippi ginning industry was calculated at about \$64.5 million. Combined ginning industry operational cost for Mississippi was calculated by adding total transportation costs and total ginning costs. Results indicate that the Mississippi ginning industry incurred a total combined cost of approximately \$69.6 million.

<b>Table 9. Summary Table of the Mississippi Ginning Industry Based on Survey Results, 1997.</b>					
	<b>Size 1 gins (&lt;14 bph)</b>	<b>Size 2 gins (15-21 bph)</b>	<b>Size 3 gins (22-28 bph)</b>	<b>Size 4 gins (&gt;28 bph)</b>	<b>Industry averages</b>
Number of gins	75	17	31	4	127
Processing volume per gin (bales)	10,027	15,001	20,611	29,363	20,451
Maximum seasonal capacity/gin (bales)	11,049	16,991	24,812	40,796	25,846
Transportation cost per bale (\$)	2.12	2.39	3.82	3.48	3.22
Ginning cost per bale (\$)	36.97	40.12	35.29	33.85	35.96
Combined operational cost per bale (\$)	39.09	42.51	39.11	37.33	39.18
<sup>1</sup> bph=bales per hour.					



## References

Misra, S.K., J.L. Phillips, and B.D. McPeck. 1997. Operational and Cost Characteristics of the Cotton Ginning Industry in the Southern High Plains of Texas. Bulletin T-1-464 (CER-97-23), Texas Tech University.

Mississippi Department of Agriculture and Commerce-NASS. 1998. Cotton. Internet Source: <http://www.mdac.state.ms.us/agcommodity/cotton.htm>.

Mississippi Department of Agriculture and Commerce-NASS. 1996. Mississippi Agricultural Statistics Supplement 31, Jackson, MS. pp. 1.

Parvin, D.W. and O.A. Cleveland. 1998. The Future Size of Mississippi's Cotton Acreage: A Preliminary Report. Agricultural Economics Research Report 206, Mississippi State University.

Robinson, J.R.C. and D. Mancill. 1997. The Effects of Planting Flexibility on Cotton Industry Infrastructure in Mississippi. 1997 Beltwide Cotton Conference, Proceedings. Cotton Economics and Marketing Conference, National Cotton Council, Memphis, TN. pp. 306-309.

Smith, E.G., C.G. Anderson, and A.W. Gray. 1996. Implications of the 1996 Farm Bill for Upland Cotton. Internet Source: <http://afpc1.tamu.edu/pubs/fb96/cotton/uplandtx.htm>.

United States Department of Agriculture-NASS. 1998. Cotton Ginnings: Annual Report. National Agricultural Statistics Service, Washington, D.C.

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