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ECONOMIC IMPLICATIONS OF DELAYED COTTON GINNING

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Abstract

Results indicate that ginning costs increased significantly, and producer income was reduced by $18 to $23 per bale when cotton was stored on modules in the field for an extended period. This case study analysis provides information for ginners and producers, and it points to a future need to increase crushing and cottonseed storage capacity in the Mid-South.

Introduction

With cotton prices at their lowest level in many years, producers are looking at every opportunity to reduce costs and increase net returns. Farm-level research in recent years has provided results which have yielded significant producer benefits. Improvements in current practices, and development of new production and harvesting technologies such as Integrated Pest Management, row spacing and irrigation studies, and cotton module systems have all demonstrated increases in producer returns.

Also, recent studies have shown the benefits of timely harvest, and the impacts of earliness on farm income. Research at Mississippi State and elsewhere, has shown that a delay in the harvest initiation date can reduce

returns by as much as 3-4 cents a pound for each week beyond the optimum initiation date.

When harvest is delayed beyond an optimum date, losses can occur in fiber quality of the cotton on the stalk, increased harvesting costs due to the probability of adverse weather, and the usual decline in farm prices just after peak harvest.

However, very little data has been developed, or research conducted on the economic implication of delayed cotton ginning--that is, ginning cotton which has been harvested, and then for one reason or another stored in modules in the field or gin yard for an extended period of time. During the 1991 season, over 63 percent of the U.S. cotton crop was ginned from modules, with the percentage in California and Texas exceeding 80 percent. Therefore, it is important to begin to develop some economic information on impacts of delayed cotton ginning on gin operating costs, and producer returns.

An unusual phenomenon occurred in many areas of the Mid-South during 1991. Due to a severe shortage of cottonseed crushing and seed storage capacity at oil mills, ginning activity was significantly delayed in many areas, including complete temporary shut-downs. For the last part of the 1991 ginning season, ginning was delayed 8 weeks and seed cotton had to be stored in modules in the fields.

This acute shortage of crushing and storage facilities was, of course, a function of the unusually high-yielding 1991 crop, as well as the expanded acreage in recent years. Prospects are for continued large cotton crops in many areas of the Mid-South.

The Economic Research Service, USDA, was contacted by Fred Cooke and Dewitt Caillavet of Mississippi State University and made aware of a unique opportunity to measure the economic impacts of this situation. A large Mississippi cotton gin with a very advanced computer system was willing to cooperate in this unique case study. Unique in the sense that very few gins had similar advanced systems, and were also subjected to the delayed ginning conditions.

The system allows the gin to keep up with bale records, ginning costs and the quality factors associated with each bale of cotton. These very detailed records allowed us to look at ginning costs and cotton grades for bales ginned during the normal part of the harvest season and to compare them with the records for bales which were ginning later.

Data were available on 19,404 bales ginned during the regular season, and 623 bales ginned from 54 modules subjected to the delay.

All cotton ginned was harvested from very similar local acreage. It was also determined that cultural practices and seed variety (DPL-50) were the same for all bales processed through the gin.

Objectives

The three primary objectives of this study were to:

1. Identify the primary economic variables associated with the delayed ginning scenario.

2. Estimate gin operating costs under normal conditions versus costs for ginning the special modules.

3. Estimate the impacts on producer income of delayed ginning in this case study.

4. Draw some conclusions or implications from the analysis.

Method of Analysis

In order to accomplish the above objectives, a number of visits to the gin were made, and key operating personnel were interviewed.

Computer records were obtained and analyzed for both cotton ginned during the normal operating season (October 1 to December 1, 1991), and for bales ginned from the special modules under study (December 6 to December 18).

Data were obtained on seed cotton weights, gin processing times (in BPH), and other physical factors. Gin operating costs during the regular season, and those associated the special modules were developed from the gins' accounting records.

Total variable operating costs--labor, electricity, dryer fuel, repairs, bagging and ties, and insurance and miscellaneous costs were measured. Fixed costs were not considered in the analysis because they essentially would be unchanged.

To measure impacts on producer income, four areas were investigated:

1. Changes in fiber quality as a result of the extended field storage,

2. Changes in cottonseed quality after ginning.

3. The quantity and value of any seed cotton which was unginnable.

4. The estimated income lost from delayed sale.

The computer records at the gin allowed us to match the processing data for each bale, with that bales' official USDA classification report from the Greenwood Office. Fiber quality data were analyzed to determine any differences in average grade (color and trash) staple length, strength, and micronnaire. The USDA 1991 schedule of premiums and discounts were used to value any differences.

As far as cotton seed quality is concerned, some literature has suggested that extended storage may have some impact on cottonseed grade. Therefore, we obtained a sample of the grade certificates from laboratory analysis of the cottonseed produced during the regular ginning period. These were compared with all certificates associated with the special modules.

A major loss of income can occur when seed cotton stored in modules is so damaged that it is unginnable and must be discarded. Weight data from the electronic scale was analyzed. For each special or study module, gross incoming weight of the module was determined, along with the corresponding weight of the seed cotton actually processed through the gin; the difference between the two weights give us an estimate of the volume of seed cotton lost. The value of the loss was calculated using gin records of lint and seed outturn, and prices during December 1991 in the Greenwood, Mississippi market.

A simple estimate of the lost income from delayed sale was made by calculating the opportunity cost of the money which would have been received for lint and seed eight weeks earlier. Differences between market prices in the two time periods were not significant.

Results

Results presented here are based on this case-study analysis, and should not be extended to another particular gin situation. However, the study-gin is very similar (except for computer system) to most large gins (20,000 bale annual volume), and therefore, results may to provide basic information on the impacts of similar delayed-ginning conditions.

Ginning Costs

Higher costs were expected for ginning the special modules because of their condition and slower ginning rates required. Figure 1 compares the average ginning rate during the regular season, with the rates for ginning 12 of the special modules during one eight-hour shift. The regular season rate averaged 27 bales per hour (BPH), and ranged from 24-30 BPH. As shown here, the special modules required considerably more time to gin. The ginning rate ranged from 13-28 BPH in this example, but averaged only 21.3 BPH for all special modules.

From a cost standpoint, a slower ginning rate generally means increased labor costs, more electricity used, and more dryer fuel required. These cost impacts are summarized in Table 1. As mentioned earlier, operating costs for the 19,404 bales ginned in the regular season, and costs associated with the 623 bales ginned from the special modules were obtained from computer records.

Labor costs average $4.33 per bale during the regular season, but increased to $9.36 per bale to gin the special modules -- an increase of $5.03 a bale. The sharply higher labor costs reflects the slower ginning rate, but also the substantial extra time required to

handle and unload the damaged seed cotton.

Electricity use also increased from an average of $4.60 a bale, to $5.62, as the number of kilowatt hours required per bale rose by about 25 percent.

The per-bale cost of natural gas for the dryer changed by only 8-cents, increasing from 82 to 90 cents a bale. But, this still represents a 10-percent increase in cost to dry the higher-moisture cotton.

The remaining variable cost items shown in Table 1 would primarily remain unchanged under this situation. They were obtained from a survey by Bill Mayfield of the USDA Extension Service.

Overall, we found that the total variable cost of ginning increased about $6.13 per bale -- $20.75 a bale during the regular season compared with an estimated $26.88 for ginning the special modules.

Producer Returns

Results of the fiber quality analysis indicated that some loss in quality did occur. Table 2 summarizes these findings. In general, grade was the primary quality factor affected by the delayed ginning. Staple length, strength, and micronnaire were essentially unchanged.

During the regular ginning season, nearly 88 percent of all bales received a white grade, with 11.8 percent discounted for "light spot". Average grade for bale from the special modules showed a sharp decline--with only 61 percent graded white and nearly 32 percent discounted, and grading "light spot"; about 7-percent of the bales were discounted even heavier.

Using the December 1991 spot prices, and schedule of premiums and discounts, there was an average of $2.50 per bale reduction in price because of quality differences, or about 1/2 a cent a pound.

In the case study, the loss of seed cotton which was unginnable was considered significant. Although efforts were made to cover modules properly, seed cotton loss approached 5 percent. Gin records indicate that 903,350 pounds of seed cotton were transported to the gin, of which 45,167 pounds were discarded as unginnable. Based on normal lint/seed outturn, this quantity would yield about 14,952 pounds of lint and 21,611 pounds of cottonseed.

The estimated value of the loss--using 61 cents a pound for lint, and 33 cents a pound for seed--would be approximately $9,769. This was the equivalent of the income from an additional 30 bales of cotton.

Cottonseed quality was not affected by the delayed ginning conditions. Results of laboratory analysis showed that the quality and quantity indexes and grade averaged about the same for the cottonseed from the special modules, as for cottonseed during the regular season.

Finally, the 8-week delay in selling the ginned lint and seed could cost the producer a potential $3.40 a bale in lost interest. A 6-1/2 percent interest rate was used for the 2-month period.

Summary and Conclusions

In summary, we found that the cost of ginning increased when modules were stored over an extended period. Farm income was reduced by lower lint grades, and the loss of lint and seed. Income was also reduced because of the delayed sale of baled lint.

Cottonseed quality, however, did not appear to be affected by delayed ginning, and the fiber properties of average length, strength, and micronnaire were also not affected.

This case study may begin to provide useful information to cotton ginners and producers on the magnitude of potential impacts of delayed cotton ginning. Storing modules in the backs of fields or in wet areas may be costly if ginning is delayed or stopped for extended periods. In the Mid-South, there may be an increasing need for more cottonseed storage capacity at gins and at oil mills in the future.

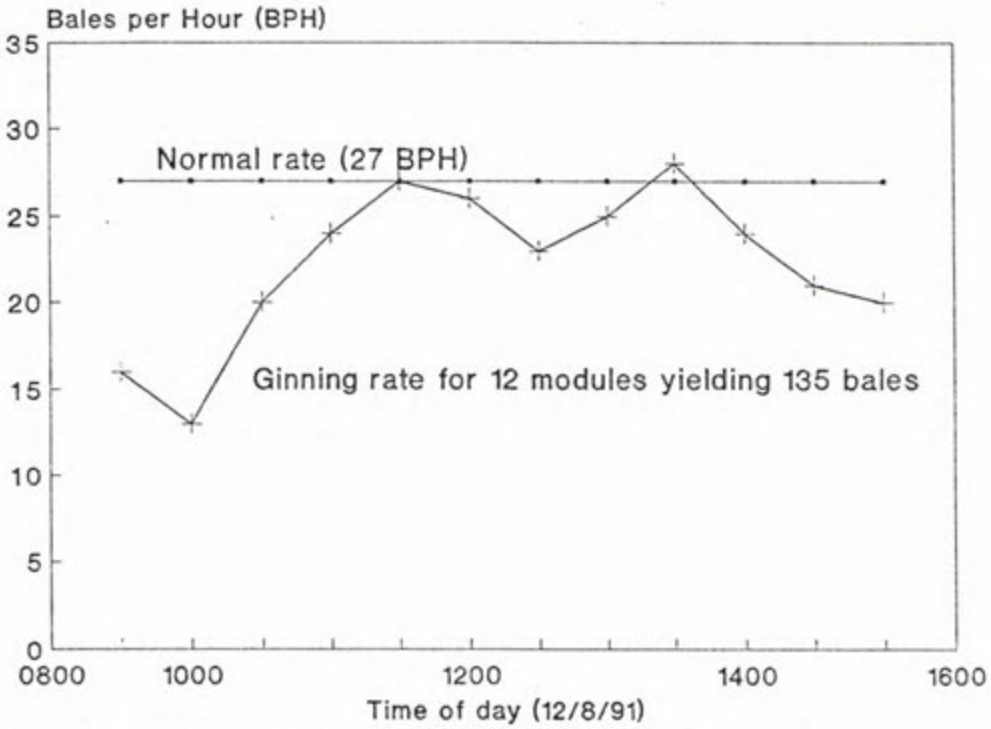

Figure 1. Ginning rate: Regular season and special modules

Table 1. Variable Costs of Ginning Cotton During Regular Season, and for Special Modules.

	Regular Season Activity[1]	Special Modules Activity[2]	Cost Difference
Bales Ginned	19,404	623	
Ginning Rate (BPH)[3]	27.0	21.3	
Labor Cost			
Total	$84,028	$5,831	
Per bale	$4.33	$9.36	+$5.03
Electricity Use			
Total kwh	812,250	31,500	
Total cost	$89,245	$3,500	
Per bale	$4.60	$5.62	+$1.02
Natural Gas			
Total CCF	43,700	1,543	
Total cost	$15,806	$558	
Per bale	$0.82	$0.90	$0.08
Repair Costs[4]	$4.56	$4.56	0
Bagging and Ties[4]	$3.44	$3.44	0
Insurance and Miscellaneous[4]	$3.00	$3.00	0
Total Variable Cost Per bale	$20.75	$26.88	+$6.13

[1]Reflects regular season ginning activity between October 1 through December 2, 1991.
[2]Reflects data associated with ginning of special modules, December 6-18, 1991.
[3]Regular season rate based on 85% of rated capacity, rate for special modules from actual processing records.
[4]Average cost for the Midsouth region based on survey by USDA Extension Service in 1990.

Fig. 4

ESTIMATED VALUE OF LINT AND SEED LOSS

- SEED COTTON TRANSPORTED TO GIN — 903,350 Pounds

- SEED COTTON DISCARDED AS UNGINNABLE — 45,167 Pounds

- LINT AND SEED POTENTIAL OF UNGINNABLE PORTION:

  LINT- 14,952 Pounds
  SEED- 21,611 Pounds

- ESTIMATED LINT AND SEED VALUE:

  LINT: 14,952 lbs. x $0.61 lb. = $9,121

  SEED: 21,611 lbs. x $0.03 lb. = 648

  TOTAL LOSS-- $9,769

Table 2. Cotton Quality Analysis: Regular Season and Special Modules*

Quality Factor	Regular Season	Special Modules
Grade:		
White	87.6%	61.4%
Light spot	11.8%	31.7%
Other	0.6%	6.9%
Staple length average	36.34	36.32
Strength average	27.30	26.94
Micronnaire average	42.67	43.31

*Based on official AMS classing results from Greenwood, MS office.

Fig. 5

SUMMARY RESULTS

- **Increase in Ginning Cost --- $6.13 bale**
- **Fiber Quality Loss:**
  - **Grade ----- $2.50 bale**
  - **Staple length ---- -0-**
  - **Strength ---- -0-**
  - **Micronnaire ---- -0-**
- **Lint and Seed Loss (Unginnable) -$9,769 ($181 module)**
- **Cottonseed Quality Loss -- -0-**
- **Delayed Sale -- $3.40 bale**