COMMUNITY LEVEL ECONOMIC IMPACTS AND OUTLOOK FOR COTTON GINNING FROM STRUCTURAL CHANGE IN THE COTTON INDUSTRY

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Abstract

Cotton ginning is an important economic activity in the cotton producing areas. This study estimates the economic impact of ginning on the economy of the Mid-South and individual states in this region. Data for the study was obtained from a survey of gins in the Mid-South and personal interviews with selected individual gin operators. These data were used in a Mid-South wide and state-specific input-output model to measure the total economic impacts of the ginning activity. Results of the study indicated that the cotton ginning activity in the Mid-South States generated over $258 million in direct output effects during 2007. If multiplier effects are included, the total economic output effect exceeds $438 million. Total cotton ginning output multiplier for the Mid-South was estimated to be 2.39.

Introduction

The cotton ginning industry has undergone a series of changes since its beginning. The pace of these changes increased with the widespread adoption of mechanization for cotton production. In particular, the invention and adoption of the cotton picker in the 1950-60's, greatly accelerated change in the ginning industry. Adoption of the mechanical cotton picker greatly accelerated the rate at which the crop was harvested and thereby increased pressure on gins to process cotton more quickly. In response to this pressure, gins began adopting various technologies to increase the rate at which they were able to process seedcotton. Gins were not able to increase processing capacity sufficiently to keep pace with available harvest capacity. The bottleneck in the process was the cotton trailers used to transport cotton from the field to the gin. Availability of cotton trailers limited the harvest/ginning process. There was a physical limit, defined by the number of trailers in a gin community and a restricted area from which cotton could be transported to the gin.

These restrictions were removed with the widespread adoption of the module builder. Module builder technology was introduced in the early to mid 1970's and was widely adopted by the mid 1980's. Currently, virtually all cotton is transported to the gin in a module. The module builder and the associated module transport unit provided expandable storage for the harvested cotton and facilitated transporting seedcotton greater distances to the gin. The module builder essentially decoupled ginning capacity and harvest capacity, because the harvested cotton could safely be stored in the module for an indefinite time period until it was ginned. Safe storage of the module required that the module be adequately covered and placed in an area not subject to flooding. Since the module is compacted to a relatively uniform density, it is possible to use automated technology to take seedcotton from the module and place it in the ginning process. This has contributed to increased efficiency in the ginning process.

The ability to transport cotton greater distances with the module hauler has greatly expanded the area from which gins obtain seedcotton. With conventional cotton trailers, seedcotton was typically hauled 5-10 miles to the gin. Using the module, cotton is hauled an average of 20 miles or more to the gin. The ability to transport seedcotton greater distances has contributed to the continued decline in gin numbers.

Cotton Production and Ginning Trends

As noted above, the ginning industry has undergone tremendous change in the recent past. These changes have occurred while there has been significant change in the cotton production sector. Historically, cotton acreage has been declining in the United States since 1900, when there were about 25,000,000 acres of cotton. Cotton was yielding less than 200 pounds per acre, so total production in 1900, was just over 10 million bales. As shown in Figure 1, harvested cotton acreage reached a peak in the late 1920's and has declined since that time. On the other hand, cotton production has generally increased over the same period. This has been possible with increased productivity per acre. Currently, cotton production in the United States has averaged approximately 845 pounds of lint per acre during the last five years. Figure 2 illustrates the change in per acre lint yields in the United States. Note

that per acre yields were relatively stable until the mid 1930's and since that time, the increase in per acre yield has been dramatic.

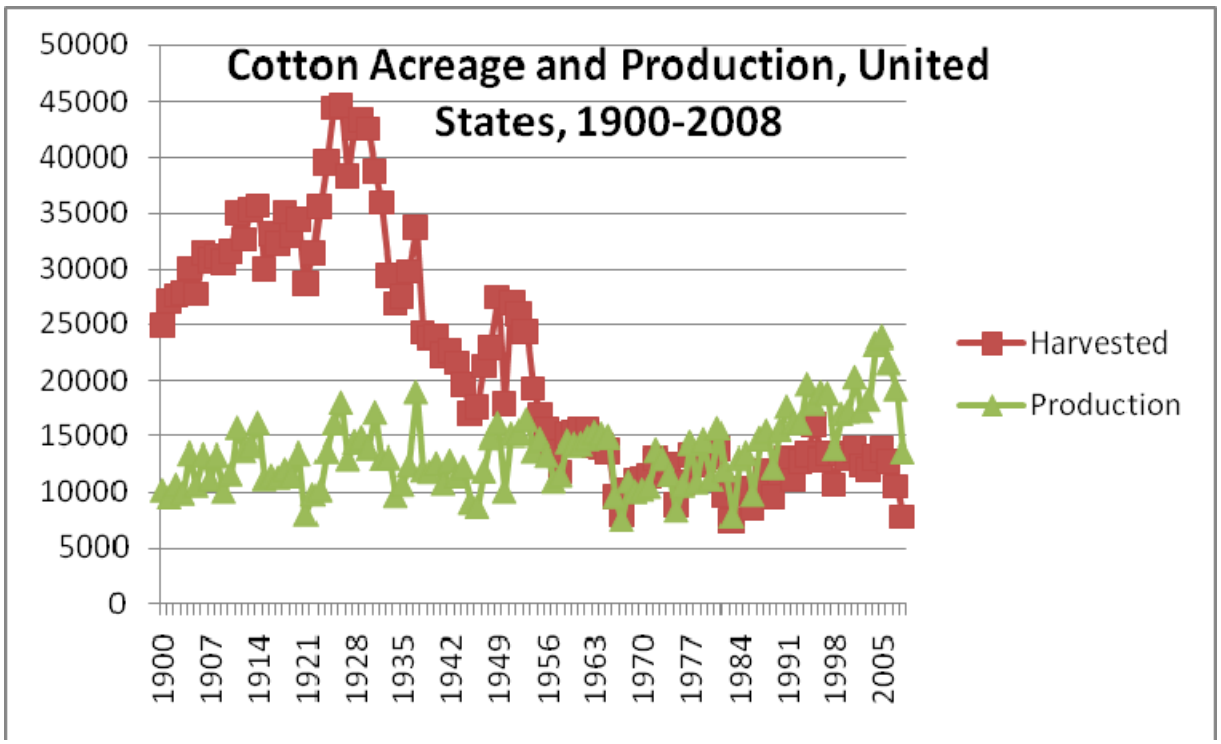

Figure 1. United States Cotton Harvested Acreage and Production, 1900-2008.
Source: National Agricultural Statistics Service 2008.

Generally speaking, cotton production has been increasing since the low mark of the payment in kind (PIK) program year of 1983. In 1983, there were approximately 7.3 million acres of cotton, producing just over 7.4 million bales of cotton. Since 1983, cotton acreage has increased, but as illustrated in Figure 1, production has increased more rapidly. This production increase was made possible by increased per acre lint yields as illustrated in Figure 2.

While cotton production has been increasing in recent years, the number of gins available to process that cotton has decreased. The number of gins in the United States and in the Mid South is illustrated in Figure 3. During the period 1997-2007, the number of gins have declined from 1,153 in 1997, to 806 in 2007. This represents a decline of 30 percent. In the Mid South, the decline in numbers has been slightly greater than the national trend. Gin numbers in the Mid South declined from 366 in 1997, to 244 in 2007, or a decline of 33 percent.

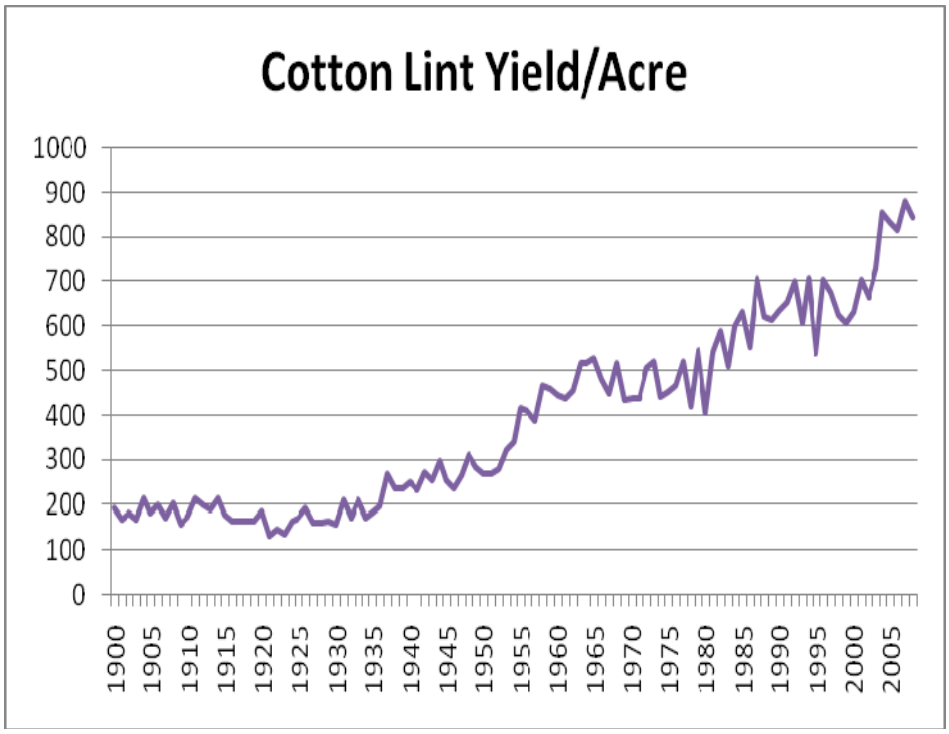

Figure 2. Average Per Acre Cotton Lint Yields, United States, 1900-2008.
Source: National Agricultural Statistics Service 2008.

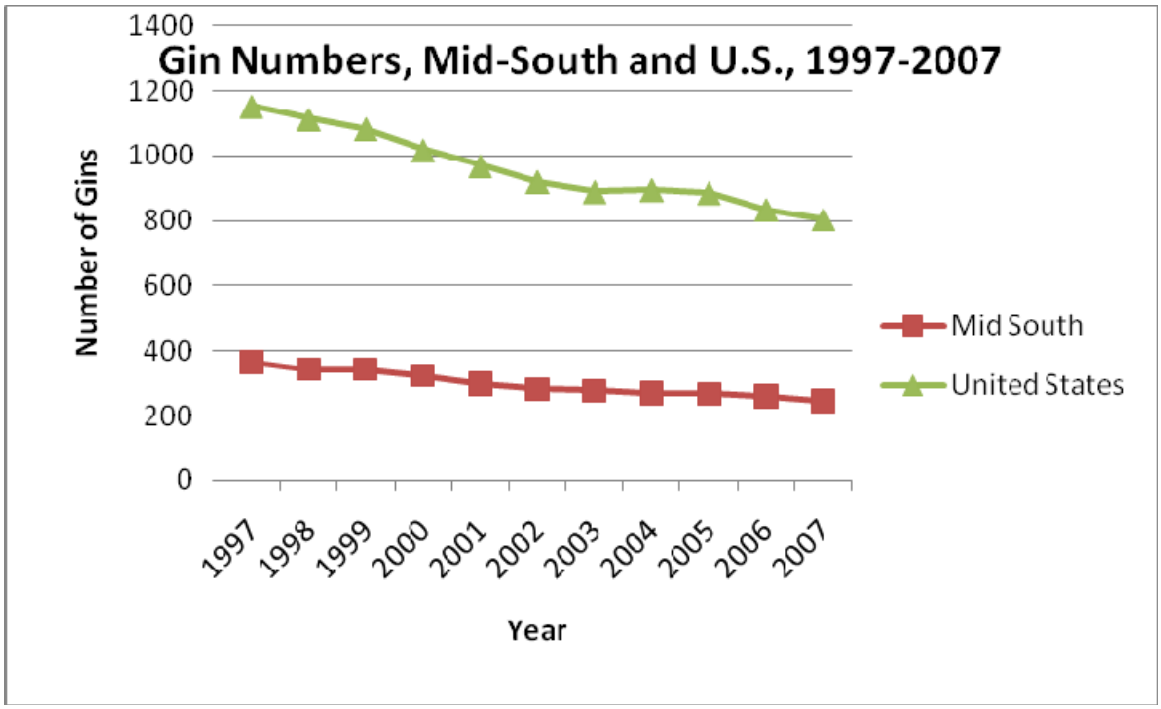

Figure 3. Total number of Cotton Gins in Mid South and United States, 1997-2007.
Source: National Agricultural Statistics Service 2008.

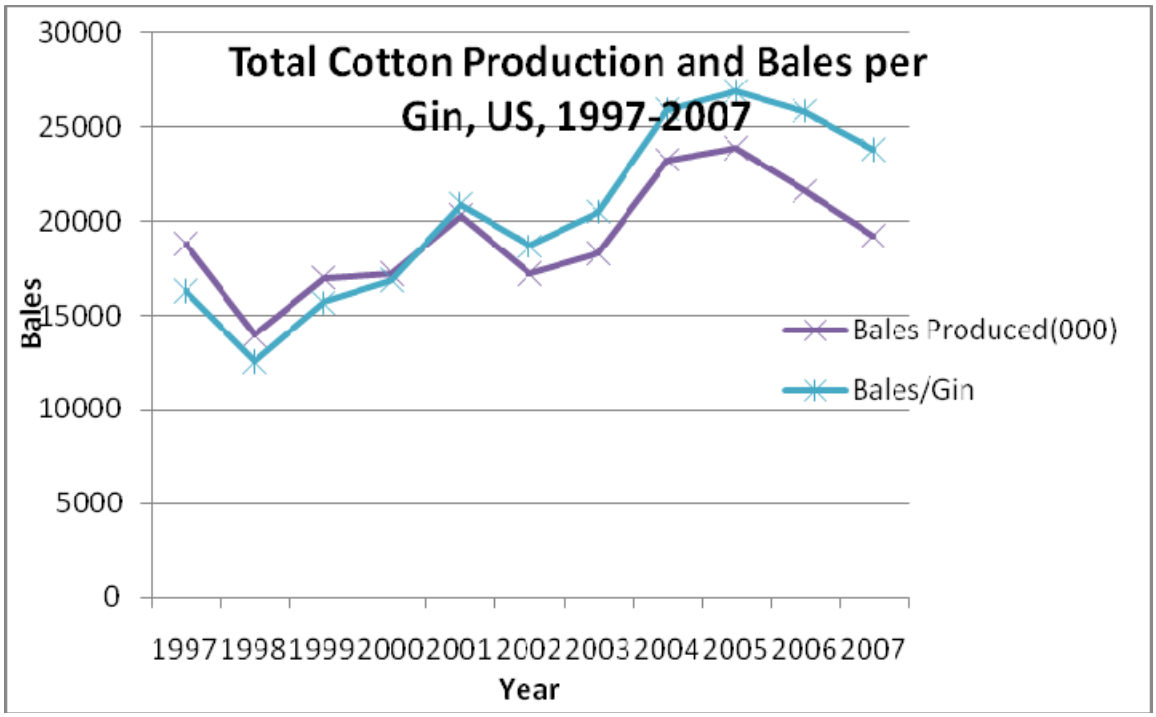

Figure 4. Total Cotton Production and Bales Per Gin, United States, 1997-2007.
Source: National Agricultural Statistics Service 2008.

The continued decline in gin numbers and continued increase in production has led to increased volume per gin. This increased volume is illustrated in Figure 4. In 1997, total cotton production was just under 20 million bales. Gin numbers totaled 1,153, so the volume per gin was about 16,000 bales. As the number of gins continued to decline, the volume per gin increased to a maximum in 2005. At this time, total production was almost 24 million bales and there were less than 900 active gins in the United States. This led to a volume per gin of almost 27,000 bales. As production declined in 2006 and 2007, the number of active gins declined even more resulting in a volume per gin of almost 24,000 bales in 2007.

Materials and Methods

To measure the economic impact of the cotton ginning, one has to identify the scenario under which the impact is to be measured. One approach to identifying the impact scenario is to ask the following question, what would happen if the cotton ginning industry did not exist?

Cotton ginning represents a necessary infrastructure element in the cotton supply chain. At one extreme, one could argue if we had no gins, there would be no capacity to grow cotton and therefore the losses to the economy would be the sum of losses from cotton production, ginning, warehousing and marketing. At the other extreme, we could simply argue that the physical, human and financial resources would be re-allocated to their next best use, if cotton gins no longer existed. We attempted to address this issue in Fannin, Paxton and Barreca (2008) for Louisiana. There, we summed the impacts of lost cotton acreage and the resulting reduction in bales ginned, against the impacts gained from increased corn acreage planted and the resulting bushels processed by elevators. In that study, the net effects were almost neglible. However, those effects were not distributed evenly. That is, most of the gains came from proprietary income of farmers at the expense of reduced usage of hired farm labor, contract labor, input supply purchases, and ginning revenue.

The focus of the cotton ginning sector in that study was very narrow – only on Lousisiana assuming 2004 ginning cost per bale data for the 2006 ginning season. The Southern Cotton Ginner's Association, after reviewing some of our initial results from this study, approached us to evaluate the entire Mid-South ginning industry. Hence, in this study, the focus is broader for the ginning industry. In particular, we focus our impact analysis on five southern states – Arkansas, Louisiana, Missouri, Mississippi, and Tennessee. However, we keep our focus strictly on

"ginning" impacts, those economic impacts direclty associated with cotton ginning. They are primarily identified in three main areas – impacts from material and service input spending by the ginning industry, impacts from full-time and seasonal labor income spending, and proprietary income spending earned by the gin ownership.

To assist in measuring the gin impact, we worked with the Southern Cotton Ginning Association in the development of its tri-annual ginning cost survey. We embellished on the existing survey questions and added a second page of questions. Specifically, we asked questions concerning the location of specific variable input ginning costs. We asked what percentage of total spending for each of these inputs was in-county, in-state, and out-of-state. Second we asked a set of questions regarding ownership structure, to better understand the relationship of ownership to the local communities and to local cotton farmers. We finally asked additional questions concerning affiliated activities and plans for the future. A total of 61 surveys were returned for a response rate of approximately 25%. This resulted in a sampling error rate of approximately 10%, given the Mid-South gin population (Dillman, 1999).

Data were coded by both investigators as well as Agricultural Research Service employees for consistency in tabulation (1). Cost data were multiplied by average percent of in-state purchases, to obtain total cost per bale for a particular category spent in a given state. Since over 95% of gins ginned for seed, proprietary income for gins was based on revenue from a market average price of cottonseed for 2007, the first three quarters of 2008, and a mote sales price from Oliver and Paris (2008). Gross revenue was calculated on a per bale basis and subtracted from total per bale costs, to estimate net revenue per bale. Per bale estimates were calculated for both Mid-South wide, as well as state-specific per bale cost and returns data.

The per-bale costs and income data were then multiplied by the total number of bales ginned in the Mid-South and respective states, to generate what we called total final demand. This final demand was used as the major input in an input-output model called IMPLAN™ (Minnesota IMPLAN Group, 2004). In this input-output model, the local final demand results in the creation of additional demand for material and service inputs as well as labor demand in order to replenish the inventories of vendors from whom the cotton ginners are purchasing inputs. The additional demand also includes additional spending created when employees are hired to fill demand in grocery stores, clothing stores, car dealerships, etc., that are created by the spending of cotton gin employees, as well as by the income spent from the owners of the gin. This additional spending is known as the indirect effect. The sum of the direct effect (initial local effect spending) and indirect effect spending results in the total output effect.

In addition to direct, indirect, and total output effects, we also calculate similar value-added effects and labor income effects. Value-added, represents the difference between the value of output sold and material and service inputs purchased. In particular, it includes such items as employee compensation, corporate and non-corporate proprietor earnings, other property-type income and indirect business taxes (sales taxes, excise taxes, etc.). Labor income, represents a subset of value-added that includes employee compensation and non-corporate proprietor income.

In the following section we present descriptive statistics on ginning costs. This includes both Mid-South wide as well as state-specific costs. We then present Mid-South ginning impacts, followed by state-specific impacts.

Results and Discussion

Descriptive Statistics

Key descriptive statistics including production and ginning costs are presented in Table 1. We provide 2007 and 2008, ginned bales by state to give a backdrop for the relative size of each state's production against their gin costs. If we look first at the ginning cost data for the Mid-South, we see that total cost is estimated to be just over $39 per bale. Variable non-labor costs were the largest aggregate cost category with just under $19 spent per bale. The largest individual cost categories included repair and maintenance, module hauling and electricity. Two of these input categories (module hauling and electricity) were measurably influenced by the increasing energy prices – particularly diesel for module hauling and natural gas for electricity. In percentage terms, non-labor variable inputs were approximately 49% of all gin costs.

Table 1. Cotton Production and Gin Costs Statistics, 2007.

State	AR	LA	MO	MS	TN	Mid-South
Observations	19	11	10	12	8	60
Bales Ginned Per Sampled Gin	30,142.0	16,787.0	27,858.0	20,034.0	21,644.0	24,353.0
Bales Ginned 07 (All Gins)	1,806,050	695,800	783,100	1,270,050	586,400	5,141,400
Bales Ginned 08 (All Gins	1,226,650	279,500	698,600	654,350	520,950	3,380,050
Gin Costs	**$/bale**	**$/bale**	**$/bale**	**$/bale**	**$/bale**	**$/bale**
Electricity	3.26	3.84	2.25	4.54	3.97	3.55
Dryer Fuel	1.48	1.61	1.52	1.74	2.28	1.67
Bags/Ties	4.06	4.47	3.89	4.07	4.26	4.13
Repair & Maintenance	4.60	5.25	4.37	3.58	4.32	4.42
Module	4.06	3.52	4.72	4.61	4.98	4.32
Tarp	0.76	0.66	1.03	0.49	1.62	0.9
Variable Non-Labor Costs	*18.22*	*19.35*	*17.78*	*19.03*	*21.43*	*18.99*
Seasonal Labor	5.19	6.53	5.43	5.90	7.45	5.88
Total Variable Costs	*23.41*	*25.88*	*23.21*	*24.93*	*28.88*	*24.87*
Insurance	2.42	2.42	2.42	2.42	2.42	2.42
Office	0.35	0.35	0.35	0.35	0.35	0.35
Capital Improvements	3.14	4.91	5.55	3.36	8.56	4.87
Total Fixed Costs	6.41	6.73	7.81	5.97	5.42	6.51
Total Costs	35.73	40.29	39.34	37.03	45.63	39.02

Note: Insurance and office costs were not included in the ginning costs survey. Estimates were applied from Oliver and Paris (2008). Bales ginned in 2007 and 2008 include all gins in a respective state, not the sampled gins only.

For the Mid-South as a whole, full-time labor costs exceeded seasonal labor costs. Full-time labor costs were $6.51 per bale, compared to $5.88 per bale for seasonal labor. Combined, labor represented 32% of total gin costs.

Comparing state averages, the highest cost state is Tennessee, with total costs just over $45 per bale. The low costs state appears to be Arkansas, with a per bale cost of almost $36. Tennessee's higher total costs are primarily driven by higher capital improvement costs and seasonal labor costs. Arkansas's lower costs can be attributed to lower energy and seasonal labor costs. (2)

Total Economic Impacts

In Table 2, aggregate economic impacts are presented for the cotton ginning sector in the Mid-South. Non-labor impacts include all non-labor material and service inputs including contract labor. Labor and proprietor income impacts include impacts from seasonal labor, full-time labor, and net revenue returning to gin ownership. In the impact analysis, we assumed two thirds of seasonal labor was migrant labor and that 50% of that labor income was spent according to spending patterns of households earning $10,000 to $15,000 per year. One-third of seasonal labor was assumed to be in-state residents and 100% of their incomes were assumed to be spent according to patterns of $10,000 - $15,000 per year households. We assumed that 100% of full-time labor were in-state residents and assumed they spent according to household spending patterns of $25,000 - $35,000 per year. Since over 95% of Mid-South cotton gin ownership was from in-state residents, we assumed that 100% of proprietary income earned from gins went to in-state residents with household spending patterns of households earning $75,000 - $100,000 per year.

Table 2. Aggregate Economic Impacts by Selected Category, Mid-South Cotton Ginning, 2007.

Category	Direct ($)	Total ($)	Spending Multiplier
Output			
Non-Labor	112,181,887	189,761,207	1.69
Labor & Proprietor	146,177,556	249,160,842	1.70
Total	258,359,443	438,922,049	1.70
Value-Added			
Non-Labor	55,779,657	95,854,499	1.72
Labor & Proprietor	77,442,607	131,469,308	1.70
Total	133,222,264	227,323,807	
Labor Income			
Non-Labor	33,407,834	57,399,293	1.72
Labor & Proprietor	42,682,902	73,795,907	1.73

Spending over all categories resulted in over $258 million of Mid-South direct economic impact. When including the additional spin-off, or multiplier effect spending, the total economic output effects exceeded $438 million. Over $249 million or 57% of the total output effects, were generated by employee and gin ownership spending. Total value added effects exceeded $227 million and labor income effects totaled almost $74 million from initial spending by gins, their employees, and gin ownership.

As can be seen in Table 2, spending multipliers varied over a very narrow range of 1.69 to 1.73. These multipliers are specific to the category (output, value added, or labor income), region (Mid-South) and year (2007). For example, the output spending multiplier is interpreted as follows: for a one dollar increase cotton gin-related spending that occurs within the five Mid-South states, the total change in output across all sectors of the Mid-South economy is $1.67. This includes the original $1 in spending by cotton gins to locations within the five state region, plus an additional $0.67 of local spending in all other sectors of the economy. It should be noted that the local spending multiplier is not the entire cotton supply chain multiplier. A discussion of the cotton supply chain multiplier will be discussed in the conclusion section. Further, the local spending multiplier does not represent the multiplier for total spending.

The total cotton ginning output multiplier for the Mid-South is $2.39. It is interpreted for a one dollar increase in demand for cotton ginning services; there is a total increase in output across all sectors of the five-state Mid-South economy of $2.39. The first dollar of output goes to meet the initial cotton ginning service demand. The remaining $1.39 is the result of additional spending across all other sectors of the Mid-South economy. It should be noted that the difference between the local spending multiplier (1.70) and the additional spending effects in the total cotton ginning multiplier (1.39), represents the average lost multiplier effects from out-of-region spending of gin inputs. If one has no information to transform total gin spending into local (state or region) spending, then one can use the additional spending effects from the total multiplier as an approximation for estimating total effects from a gin's input spending.

In Table 3, we disaggregate the output effects on the Mid-South by detailed economic sector. In terms of output, the sector that is most impacted by the cotton ginning industry is the manufacturing sector. Direct effects exceed $153 million of the total $258 million, or 59%. This is not surprising, given the amount of manufactured goods that are purchased in both capital improvements and repair and maintenance of gins. The next largest category is transportation and warehousing with just over $30 million, or 11.62% of total direct output effects. This number is measurably large due to the amount of transportation costs of shipping manufactured goods purchased by gins, either direct to the gin or to wholesale and retail outlets, as well as transportation costs incurred by employee and gin owner households spending their disposable incomes. We see similar relationships occurring in total output effects as well as value added and labor income effects.

State-Level Effects

In addition to the Mid-South wide impact analysis, we estimated impacts on output, value added and labor income for each of the representative Mid-South states. Output, value added and labor income effects for each of the five states are presented in Table 4 through Table 6.

Sector–specific effects by detailed category are provided in Appendix A1-A5. When we evaluate the state-specific effects, the first finding that is most obvious is the state with the largest impacts is also the state with the greatest amount of ginned bales, Arkansas. This occurs not just in direct output effects, but also in the total effects as well as value added effects. The second major finding is that the local spending multiplier, calculated as the total effect divided by the direct effect, varies by state. For example, while the direct output effect for Mississippi is over $56 million, its indirect (or spinoff/multiplier spending) is only $25 million. Missouri, on the other hand, has $20 million less in direct output effects ($36 million), but only $2 million less in indirect effects ($23 million). This difference shows up when we compare the multipliers.

The state spending multiplier for Missouri was 1.65, compared to only a 1.45 spending multiplier for Mississippi. For example, the Missouri multiplier is interpreted for every one dollar increase in spending by Missouri cotton ginning on local inputs within the state, there is a total increase in spending across all sectors of Missouri of $1.65. This includes the $1 of initial local spending, plus an additional $0.65 of additional (spinoff/multiplier) spending in all other sectors of the Missouri economy. Other spending multipliers include 1.50 for Arkansas, 1.52 for Louisiana, and 1.61 for Tennessee.

Table 3. Detailed Economic Impacts by Detailed Industry Sector, Mid-South Cotton Ginning, 2007.

Sector	Output ($)		Value Added ($)		Labor Income ($)	
	Direct	Total	Direct	Total	Direct	Total
Ag, Forestry, Fish & Hunting	538,859	3,240,097	269,264	1,162,963	123,548	433,108
Mining	430,518	4,641,991	221,128	2,603,874	117,224	1,177,628
Utilities	21,091,894	24,544,747	12,897,868	15,021,355	3,818,939	4,446,667
Construction	11,946,895	16,101,016	5,436,730	7,296,233	5,177,814	6,649,730
Manufacturing	153,552,104	287,266,104	78,259,988	147,075,400	39,077,312	76,461,208
Wholesale Trade	227,689	886,051	104,337	406,029	65,246	253,905
Transportation & Warehousing	30,182,212	42,950,718	18,247,352	26,017,782	15,773,401	22,404,690
Retail Trade	4,911,707	8,007,419	2,934,912	4,081,279	1,816,362	3,005,435
Information	20,700,440	30,831,827	10,057,054	14,904,992	6,913,772	10,220,716
Finance & Insurance	4,721,926	8,632,233	2,941,329	5,460,667	1,899,346	4,311,008
Real Estate & Rental	3,568,713	5,333,362	1,852,302	2,583,234	1,307,773	1,821,106
Professional-Scientific svcs	0	0	0	0	0	0
Institutions	6,486,486	6,486,486	0	0	0	0
Total	258,359,443	438,922,049	133,222,264	227,323,807	76,090,736	131,195,200

Table 4. State-Specific Output Effects, Cotton Ginning 2007 (Dollars).

State	Direct	Indirect	Total
Arkansas	85,452,727	42,915,861	128,368,585
Louisiana	32,040,908	16,528,282	48,569,191
Missouri	36,317,367	23,436,428	59,753,794
Mississippi	56,412,007	25,376,068	81,788,078
Tennessee	28,154,422	17,066,409	45,220,831
Mid-South	258,359,443	180,562,614	438,922,049

Table 5. State-Specific Value Added Effects, Cotton Ginning 2007 (Dollars).

State	Direct	Indirect	Total
Arkansas	42,163,088	21,849,004	64,012,090
Louisiana	16,218,495	8,422,326	24,640,822
Missouri	18,635,236	12,659,217	31,294,452
Mississippi	27,788,858	12,578,739	40,367,596
Tennessee	14,819,556	9,396,654	24,216,209

Table 6. State-Specific Labor Income Effects, Cotton Ginning 2007 (Dollars).

State	Direct	Indirect	Total
Arkansas	23,826,215	12,544,124	36,370,388
Louisiana	9,370,368	5,046,835	14,417,203
Missouri	10,635,857	7,370,328	18,006,185
Mississippi	15,033,288	7,379,620	22,412,908
Tennessee	8,534,780	5,540,376	14,075,156

Why might we see the diversity in multipliers across the states? First, some states have in-state suppliers for a large number of gin input categories. The gin supply industry is concentrated in the Mid-South, with a large proportion of their suppliers located around Memphis. This concentration results in an in-state purchase for Tennessee gins, thereby increasing the total number of linkages for the Tennessee ginning industry and their multiplier. Likewise, Missouri gins purchase most of their natural gas from an in-state supplier, resulting in increased multipliers. A state such as Mississippi, while having a historically large ginning industry, may have a slightly smaller multiplier because those gins (especially those in the northern third of the state) purchase supplies from some of the same Memphis gin suppliers, resulting in a leakage and reduced multiplier for their state. Likewise, Mississippi's multiplier is also dampened by the incomes earned by gin owners being spent on household goods and services in the Memphis area.

The final, and most subtle, characteristic of the state-specific effects is the comparison between the Mid-South effects and the state-specific effects. For example, when we sum the state-specific total output effects, we obtain a value of $364 million. This value is only 83% of the $439 million in Mid-South wide effects. This discrepancy is a function of the differences in how the Mid-South wide and state-specific models estimate linkages. If we go back to the example of Mississippi ginners purchasing gin supplies from Memphis suppliers, this purchase would be considered a leakage for the state of Mississippi. Since state-specific models don't count spending from out-of-state ginners in their respective states, then any out-of-state gin spending is considered a leakage on the whole region and would evaporate entirely from the state-specific totals. As a result, the 17% difference between the state-specific total and the Mid-South wide total output effects is that out-of-state spending to other Mid-South states is considered a linkage, not a leakage, and adds to the overall Mid-South multiplier.

Conclusions

This study estimated the overall economic impacts that cotton ginning has on the five state Mid-South region of Arkansas, Louisiana, Missouri, Mississippi, and Tennessee. This study cooperated with the Southern Cotton Ginning Association and Agricultural Research Service, to collect ginning cost data for all Mid-South states. These data combined with specific data on location of spending and ownership structure were used to identify local spending demands. These demands were applied to a Mid-South wide and state-specific input-output model to measure total economic impacts.

Cotton ginning created over $258 million in direct output effects in 2007. When adding the additional indirect effects from this initial spending, the total output effect on the Mid-South region generated almost $439 million. In addition, $227 million in value added and $74 million in labor income was created from Mid-South cotton ginning activities in the same year.

Arkansas's ginning sector generated the most economic activity of the five Mid-South states, creating over $128 million in total output. Tennessee had the smallest economic impacts with just over $45 million in total output created. The state with the largest spending multiplier was Missouri at 1.65 and Mississippi had the smallest at 1.45.

There are numerous opportunities for future research that came from this study. First, as the number of cotton gins continue to decline, it would be helpful to construct geographic economic margins that identify how far out cotton gins can profitably transport modules from field to gin. Sensitivity analysis can be applied to see how these economic margins adjust to changes in fuel price and whether or not adjusting gin seed rebates, based on distance from gin, may be an alternative for administering seed rebates. In a similar vein, it would be helpful to better understand spatial supply of cotton relative to demand by the gin. Research developing this geographic model would better identify overcapacity/undercapacity regions relative to gin capacity. Also, more research needs to uncover the different decision making patterns of family owned and managed gins vs multi-stockholder owned gins. Such an analysis would identify whether separation of ownership and management increases or decreases gin efficiency.

Cotton ginning is one of the oldest processing industries in the United States. The sector has adjusted to major changes both upstream and downstream in the cotton supply chain over its history. With continual evaluation and re-adjustment, the sector should continue to be sustainable in the long-term.

Endnotes

(1) Descriptive statistics, such as ginning costs per bale, differ between statistics reported by long-running panel data series for the entire beltwide region as Valco et al., (2009). These differences lie primarily in different procedures using to eliminate outlying observations and the differing purposes for the dataset.

(2) When comparing state averages, it should be noted that smaller sample sizes can create greater sampling error. Consequently, a state with a small number of responses (e.g. Tennessee), when an increase in one response (from 8 to 9) occurs, it can impact the state average much greater than an increase of one response for a state with a larger number of responses (e.g. Arkansas (from 20 to 21)).

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Appendix

Appendix Table A1. Detailed Impacts to Arkansas Economy, Arkansas Cotton Ginning, 2007.

Sector	Output ($)		Value Added ($)		Labor Income ($)	
	Direct	Total	Direct	Total	Direct	Total
Ag, Forestry, Fish & Hunting	177,613	1,077,140	79,286	352,415	36,092	132,499
Mining	203,875	2,042,409	108,952	1,139,940	51,907	511,623
Utilities	7,887,351	9,292,159	5,039,522	5,932,137	1,461,650	1,720,943
Construction	3,851,303	5,084,930	1,554,787	2,061,174	1,481,275	1,872,903
Manufacturing	50,595,164	80,242,616	24,575,910	39,545,588	12,074,146	20,038,136
Wholesale Trade	49,206	156,178	20,430	64,844	12,766	40,518
Transportation & Warehousing	10,363,547	13,617,427	6,043,857	7,958,178	5,239,313	6,879,510
Retail Trade	1,231,076	1,777,262	636,031	919,555	486,332	689,950
Information	7,160,728	9,828,388	3,302,384	4,505,821	2,282,222	3,106,490
Finance & Insurance	616,568	1,412,894	380,848	912,172	404,376	942,002
Real Estate & Rental	971,439	1,492,324	421,081	620,268	296,138	435,765
Professional-Scientific svcs	0	0	0	0	0	0
Institutions	2,344,859	2,344,859	0	0	0	0
Total	85,452,727	128,368,585	42,163,088	64,012,090	23,826,215	36,370,338

Appendix Table A2. Detailed Impacts to Louisiana Economy, Louisiana Cotton Ginning, 2007.

Sector	Output ($)		Value Added ($)		Labor Income ($)	
	Direct	Total	Direct	Total	Direct	Total
Ag, Forestry, Fish & Hunting	57,760	241,653	28,177	92,259	14,938	40,573
Mining	91,020	579,843	43,693	336,130	27,274	155,096
Utilities	3,446,050	3,887,239	2,231,012	2,517,549	657,824	742,237
Construction	1,818,837	2,250,242	881,589	1,088,100	840,506	998,782
Manufacturing	18,919,524	30,744,982	9,177,621	15,027,948	4,810,632	8,100,835
Wholesale Trade	26,670	91,864	12,479	42,0985	7,812	26,909
Transportation & Warehousing	3,474,970	4,758,564	2,063,509	2,830,909	1,787,706	2,444,081
Retail Trade	546,885	852,767	325,803	506,817	190,049	301,206
Information	2,509,533	3,568,719	1,236,872	1,745,950	824,295	1,168,374
Finance & Insurance	222,121	511,150	121,008	300,060	141,477	332,485
Real Estate & Rental	251,298	405,929	96,730	152,114	67,855	106,627
Professional-Scientific svcs	0	0	0	0	0	0
Institutions	676,239	676,239	0	0	0	0
Total	32,040,908	48,569,191	16,218,495	24,640,822	9,370,368	14,417,203

Appendix Table A3. Detailed Impacts to Missouri Economy, Missouri Cotton Ginning, 2007.

Sector	Output ($)		Value Added ($)		Labor Income ($)	
	Direct	Total	Direct	Total	Direct	Total
Ag, Forestry, Fish & Hunting	54,283	378,896	25,235	122,456	8,928	36,485
Mining	147,048	539,792	17,209	80,352	7,989	40,519
Utilities	2,613,644	3,184,707	1,513,937	1,848,441	454,647	554,730
Construction	679,829	1,237,689	324,473	586,868	306,329	514,869
Manufacturing	23,427,458	40,762,788	12,019,429	21,558,276	6,085,570	11,187,702
Wholesale Trade	29,444	111,678	12,909	48,964	8,075	30,627
Transportation & Warehousing	4,151,855	5,871,451	2,492,900	3,532,445	2,160,272	3,049,629
Retail Trade	612,481	979,944	358,133	572,470	222,187	359,345
Information	2,970,576	4,315,358	1,465,515	2,115,658	1,020,345	1,465,266
Finance & Insurance	303,132	792,255	166,608	476,218	192,895	518,703
Real Estate & Rental	442,371	693,990	238,889	352,335	168,612	248,311
Professional-Scientific svcs	0	0	0	0	0	0
Institutions	885,247	885,247	0	0	0	0
Total	36,317,367	59,753,794	18,635,236	31,294,452	10,635,857	18,006,185

Appendix Table A4. Detailed Impacts to Mississippi Economy, Mississippi Cotton Ginning, 2007.

Sector	Output ($)		Value Added ($)		Labor Income ($)	
	Direct	Total	Direct	Total	Direct	Total
Ag, Forestry, Fish & Hunting	143,534	603,418	61,310	214,075	46,731	108,998
Mining	90,731	902,479	47,689	535,033	24,987	246,353
Utilities	7,396,249	8,202,881	4,739,338	5,270,184	1,355,518	1,506,586
Construction	700,626	1,502,370	299,867	645,437	276,392	543,831
Manufacturing	33,912,028	51,820,370	15,960,869	24,504,112	8,094,715	12,764,001
Wholesale Trade	24,862	74,112	10,519	31,356	6,574	19,597
Transportation & Warehousing	5,612,776	7,336,258	3,399,791	4,451,913	2,926,209	3,824,388
Retail Trade	1,006,422	1,484,104	596,184	876,460	345,271	511,639
Information	4,467,110	6,022,832	2,067,321	2,769,210	1,449,133	1,944,842
Finance & Insurance	555,794	1,116,405	384,805	773,694	352,049	734,407
Real Estate & Rental	543,661	764,589	221,164	296,125	155,710	208,266
Professional-Scientific svcs	0	0	0	0	0	0
Institutions	1,958,216	1,958,216	0	0	0	0
Total	56,412,007	81,788,078	27,788,858	40,367,596	15,033,288	22,412,908

Appendix Table A5. Detailed Impacts to Mississippi Economy, Mississippi Cotton Ginning, 2007.

Sector	Output ($)		Value Added ($)		Labor Income ($)	
	Direct	Total	Direct	Total	Direct	Total
Ag, Forestry, Fish & Hunting	40,667	214,375	22,884	80,965	9,200	27,333
Mining	25,830	273,822	7,039	78,204	3,242	35,842
Utilities	1,425,072	1,549,385	724,062	797,039	230,960	253,219
Construction	763,050	1,233,151	339,036	547,572	323,342	497,114
Manufacturing	18,044,220	30,655,516	9,400,940	16t,401,190	4,980,258	8,735,705
Wholesale Trade	16,884	75,356	8,169	36,461	5,104	22,781
Transportation & Warehousing	2,613,029	3,967,306	1,638,456	2,491,251	1,416,403	2,146,035
Retail Trade	370,367	666,229	225,155	408,762	162,474	291,219
Information	2,062,880	3,111,209	1,036,638	1,549,095	716,809	1,067,599
Finance & Insurance	1,447,266	1,911,759	962,040	1,273,237	365,075	607,906
Real Estate & Rental	809,809	1,027,376	455,137	552,433	321,915	390,404
Professional-Scientific & tech svcs	0	0	0	0	0	0
Institutions	535,347	535,347	0	0	0	0
Total	28,154,422	45,220,831	14,819,556	24,216,209	8,534,780	14,075,156