GINNING COTTON VS DRYING CORN: MEASURING THE ECONOMIC IMPACT

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Abstract

This study evaluates the economic impact of the dramatic reduction in cotton acreage on the Louisiana economy. Virtually all the displaced cotton acreage was used to produce corn for grain. Input-output software (Minnesota IMPLAN Group 2004) was used to estimate the value added processing impact on the state's economy of this switch in acreage. The dramatic shift in crop production means that existing gins will likely process less than half the cotton they did in 2006. Results of the analysis indicate that the direct net effect is approximately a $6.1 million dollar loss in output on the state economy. When indirect and induced effects are included, the loss exceeds $10 million from these value added processing effects.

Introduction

Cotton has traditionally been an important crop in Louisiana not only in terms of acreage but also in terms of contribution to the local economy. However, in 2007, the traditional relationship between cotton and corn acreage changed dramatically. Louisiana farmers planted an estimated 340,000 acres of cotton, a record low for the state (National Agricultural Statistics Service 2007). Conversely, farmers planted an estimated 700,000 acres of corn, the largest acreage in recent history.

These shifts in acreage were a response to changes in product prices and the resulting profit potential for cotton, soybeans and corn. Since the implementation of the 1996 Farm Bill, producers have had more flexibility in planting decisions because program payments have been decoupled from planting decisions. At planting time in 2007, corn prices were near record levels while cotton prices were near modern record lows. Given the price relationship between cotton and corn, producers elected to plant corn instead of cotton. This shift in acreage will leave a considerable amount of excess capacity in the single-use infrastructure supporting the cotton industry. At the same time, additional grain will place a burden on the existing infrastructure for grain handling in the state.

This dramatic shift in acreage away from a crop traditionally grown in many areas of the state raises a question regarding the impact of such a shift on local economies. Conventional wisdom holds that**,** since cotton is a more expensive crop to produce than corn, the shift to corn will mean fewer dollars spent in the local economy. Therefore, the shift to corn in place of cotton will have a negative impact on the economy of the state.

This study was designed to estimate the economic impact of the shift in acreage from cotton to corn. In particular, this portion of research focuses on the value added processing side of corn and cotton production in the state. If conventional wisdom is correct, the shift will have a negative impact on the economy of the state. However, as stated above**,** conventional wisdom generally considers differences in expenditures and ignores the revenue side of the equation. Expenditures for production inputs have "ripple" effects through the economy. Similarly, income earned from agriculture production and processing have an impact on the economy as it is spent for goods and services within the state.

Methods and Procedures

The dramatic switch in planted acreage from cotton to corn was expected to have economic consequences throughout the Louisiana economy. This paper focuses on the impact of these changes in the "value-added" sectors for cotton and corn. The basic approach used here is to estimate the change in volume of cotton processed through the gins and the change in volume of corn processed through elevators. These changes in volumes were used in conjunction with budgets for ginning and elevators to estimate the change in flows to various sectors of the economy. Changes in flows were evaluated using input-output software to estimate the economic impacts on various sectors of the economy. The software provided an estimate of total impacts of the switch from corn to cotton on the

economy of the state of Louisiana. Economic impacts included not only direct losses from the ginning industry, but the additional losses to the economy as money that would have flowed to input suppliers for the ginning industry is reduced. It should be noted that this analysis focuses only on the acreage switched from cotton to corn (approximately 300,000 acres).

While it is difficult to identify exactly in the post-production process equivalent processing points across the two commodities, it was assumed that ginning of cotton and the drying and handling of corn by the elevator to be equivalent in the processing supply chain. For cotton, input demands required to gin cotton were identified (Table 2). One hundred percent of material inputs and services for ginning cotton were assumed to occur within Louisiana. Since a portion of the employees hired to work in Louisiana gins are non-resident transient workers, it was assumed that 80% of the wages and salaries earned would be spent by Louisiana employees according to a $15,000 - $25,000 annual household income profile. Gross operating margins for ginning were assumed to be spent according to $75,000 - $100,000 annual spending profiles. Similarly for corn, elevator costs for drying were distributed across multiple input categories (Table 2), and gross operating margins were spent in a similar fashion to operating margins for gins.

IMPLAN™ Pro Input-Output modeling software (Minnesota IMPLAN Group 2004) was used to calculate indirect and induced effects. Post-production processing was mapped to specific IMPLAN sectors. All household and proprietor income spending profiles were applied to IMPLAN, and the proportion of these incomes that were spent in Louisiana was calculated based on IMPLAN household regional purchase coefficients

Switch from Cotton to Corn

Cotton acreage in the state changed from 635,000 acres in 2006 to 330,000 acres planted in 2007, or a decrease of over 300,000 acres. Virtually all of this acreage was placed in corn production. Corn acreage increased from 300,000 in 2006 to 730,000 acres planted in 2007. To illustrate the impact of this dramatic shift in crop acreage on individual gins, Table 1 shows a comparison of cotton acreage within a 10 mile radius of gins for 2006 and 2007. While there was almost a 50% decline in cotton acreage for the state as a whole, individual gins may have experienced a wider range of reduction in volume of cotton processed. The data in Table 1 were developed estimating the acreage of cotton located within a 10 mile radius of the gin in 2006 and 2007. These estimates were based on geographically referenced cotton field locations and gin locations. Functions available within the geographical information systems software allowed for the calculation of acreage within the 10 mile radius of the gin. These estimates do not necessarily reflect the actual volume of any gin, but are used to illustrate the change in potential volume of cotton available to a gin within a given distance.

As shown in Table 1, the acreage of cotton within a 10 mile radius of a gin varied across Northeast Louisiana. Some gins had relatively little change from 2006 to 2007, while others experienced dramatic changes. For some gins, the 2007 acreage was less than 25% of the 2007 cotton acreage, while for others, 2007 was almost 90% of the 2006 acreage. This table simply illustrates that the impact of the dramatic shift in cotton acreage on individual gins was not uniform across the state.

Economic Impacts of the Switch on Gins

Switching the acreage planted between cotton and corn impacts the regional value added processing industries associated with these two crops. Table 2 compares the estimated costs of ginning an acre of harvested cotton to the estimated costs of drying an acre of harvested corn. As the table shows, the total input cost of ginning an acre of cotton ($32.58) is 50% more than the total input cost for drying an acre of corn ($20.48). Most of the cost categories cannot be directly compared; however, three categories exist in both industries. Repairs and maintenance is approximately the same for both, but the categories of electricity and of wages and salaries show a significant difference between the two. For both of these categories, cotton has associated costs that are more than those of corn.

Table 1. Cotton acreage within 10 mile radius of gins, Louisiana, 2006 and 2007.

Gin (No.)	2006 (acres)	2007 (acres)	Change (acres)	2007 as % of 2006
1	8188	4731	-3457	57.8
2	34224	23130	-11095	67.6
3	37442	26314	-11128	70.3
4	29313	20934	-8379	71.4
5	31795	24248	-7547	76.3
6	26196	18143	-8053	69.3
7	32227	21747	-10480	67.5
8	17010	9176	-7833	53.9
9	19889	9813	-10076	49.3
10	21435	10143	-11292	47.3
11	24186	8676	-15510	35.9
12	18160	9188	-8973	50.6
13	36627	17145	-19482	46.8
14	22930	8206	-14724	35.8
15	39589	20789	-18800	52.5
16	26601	10648	-15952	40.0
17	26678	10980	-15697	41.2
18	28570	11687	-16883	40.9
19	21058	8125	-12934	38.6
20	10713	4500	-6212	42.0
21	37971	9584	-28387	25.2
22	20456	8297	-12159	40.6
23	37826	9434	-28392	24.9
24	40800	10950	-29850	26.8
25	20887	6182	-14705	29.6
26	38114	11458	-26656	30.1
27	26265	13706	-12559	52.2
28	20989	4948	-16042	23.6
29	9833	7251	-2582	73.7
30	15169	8909	-6260	58.7
31	27605	7405	-20200	26.8
32	60118	37553	-22565	62.5
33	29450	24645	-4805	83.7
34	28033	24552	-3481	87.6
35	39862	25499	-14363	64.0
36	14526	5073	-9453	34.9
37	29054	24863	-4191	85.6

Table 2. Elevator Variable Costs for Drying an Acre's Corn Harvest and Ginning Variable Costs on an Acre's Cotton Harvest, Louisiana 2007.

Input Item	Corn Elevator	Cotton Gin
Bagging and Ties	0.00	6.44
Electricity	1.42	5.67
Fuel (Natural Gas and LPG)	4.94	2.93
Repairs and Maintenance	6.25	6.68
Insurance	0.21	0.00
Inspection	0.63	0.00
Interest on Working Capital	0.89	0.00
Miscellaneous	1.68	0.00
Wages and Salaries	4.46	10.83
Total	20.48	32.58

Value Added Processing Impacts

The next table, Table 3, displays the estimated net effects on additional commodity processing due to the switching of cotton acreage to corn. For non-labor inputs, the losses from a decrease in cotton ginning exceed the positive impacts that would come from an increase in elevator drying and handling. There would be a net loss of almost $1.7 million in output in the state economy from direct net effects, and a total output loss of nearly $3.6 million when additional indirect and induced effects are considered. The effect of the output loss on the economy would also result in decreases of $880,000 to total value added and $250,000 to labor income.

When labor inputs are taken into account, there is a further reduction in processing impacts. According to Table 1, elevator drying of corn uses less labor than cotton ginning does per acre of output; therefore, both direct and total effects shrink. The switch from cotton to corn processing results in a direct loss to output of $1.1million and a total loss to output of nearly $1.8 million. The total losses to value added and to labor income are $1 million and $580,000, respectively.

An increase in corn prices is one of the primary reasons that farmers switched from planting cotton to planting corn in 2007. These increased margins should result in higher proprietary income for farmers (Paxton, Fannin, and Barreca, 2007). However, the switch will have a net negative impact on proprietary income associated with Louisiana's processing industries. The direct loss in output is approximately $3.3 million, and the total loss in output (including indirect and induced effects) is more than $5.1 million. Additionally, there will be a net loss in total value added of nearly $3 million, and a net loss in total labor income of just over $1.6 million.

Multipliers

To determine the effects of an industry or industries on an economy, it is often useful to develop a set of multipliers, which can easily show the total effects of the activity of an additional dollar in the economy. The output multiplier for cotton ginning in Louisiana was estimated to be 2.15 (Table 4). This value is interpreted as for each additional dollar ($1.00) of output from ginning, there will be a total increased impact on the economy of $2.15. It also means that a dollar loss would result in a total loss of $2.15. The output multiplier for corn drying/handling was estimated to be 1.88, which is 14.61% lower than the multiplier for ginning. This means that switching one dollar from ginning to drying will reduce the output in the economy by 14.61%. The switch also results in statewide net losses to the value added multiplier of 14.35% and to labor income multiplier of 19.43%.

Table 3. Projected Effects on the Louisiana Economy from Non-Labor Inputs Purchased, Labor Inputs Purchased, and Changes in Proprietary Income between Drying/Handling Corn and Ginning Cotton, Louisiana , 2007.

Activity	Output		Value Added		Labor Income	
	Direct	Total	Direct	Total	Direct	Total
Non-Labor Inputs						
Elevator Drying	$4,723,687	$7,420,079	$2,374,350	$3,871,046	$1,343,878	$2,195,576
Cotton Ginning	6,409,170	11,011,154	2,720,240	4,752,418	1,294,086	2,444,217
Difference	**-$1,685,483**	**-$3,591,075**	**-$345,890**	**-$881,372**	**-$49,792**	**-$248,641**
Labor Inputs						
Elevator Drying	$779,939	$1,246484	$448,707	$712,892	$253,118	$404,534
Cotton Ginning	1,897,020	3,031,783	1,091,375	1,733,944	615,651	983,936
Difference	**-$1,117,081**	**-$1,785,299**	**-$642,668**	**-$1,021,052**	**-$362,533**	**-$579,402**
Proprietary Income						
Elevator Drying	$1,258,633	$1,979,557	$734,034	$1,143,688	$385,000	$620,222
Cotton Ginning	4,531,076	7,126,402	2,642,523	4,117,274	1,386,001	2,232,800
Difference	-$3,272443	-$5,146,845	-$1,908,489	-$2,973,586	-$1,001,001	-$1,612,578

Table 4. Comparison of Multipliers for Cotton Ginning vs Corn Drying/Handling, Louisiana, 2007

Multiplier Category	Cotton Ginning	Corn Drying/Handling	Difference (%)
Output	2.15	1.88	14.61
Value Added	2.22	1.94	14.35
Labor Income	2.33	1.95	19.43

Conclusions

This study shows that cotton ginning has a greater effect on the Louisiana economy than corn drying/handling. Switching cropland from cotton to corn causes a net negative effect on the economy in the areas of output, value added, and labor income due to the reduced costs of non-labor and labor inputs in terms of value added processing. Proprietary income is also measurably reduced. Cotton processing has a higher multiplier than corn processing, so each dollar that goes from ginning to drying/handling has less of a total impact on the economy than if the same dollar was added to cotton ginning.

It should be noted, however, that these results only evaluate the economic impact of the switch to the Louisiana economy from contributions of value-added processors. A total assessment of the net effect should also include net impacts to farmers in terms of non-labor, labor, and proprietary income impacts on the state economy.

Cotton has historically been a staple of Louisiana's agricultural industry, but this crop and the industries that rely on it may be facing adversity in the future. Therefore, individuals that have a stake in cotton and in the rural economy overall should monitor the situation as it progresses.

References

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