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ECONOMIC CONTRIBUTIONS OF THE US COTTON INDUSTRY TO THE US ECONOMY





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Introduction

The upland cotton industry provides a significant benefit across the Southern United States. Both cotton farming and ginning contribute to U.S. economic activity by providing jobs and direct stimulus to input and product markets. Periodically, it is useful to review the data to quantify the economic impact an industry has on the state and national economy. The purpose of this report is to estimate the economic impact of the cotton farming and ginning impacts on state and national economic activity in 2012.

Methodology

The latest version of the Minnesota IMPLAN Group, Inc. model, IMPLAN 3.1.1001.12, was used for the analysis. IMPLAN is an input/output model that traces the economic contributions of an industry's production, costs and receipts on 440 other industries in the U.S. economy. By summing the contributions of the cotton industry to all other U.S. industries one can estimate cotton's impacts on the U.S. economy and a state's economy.

IMPLAN uses data from the latest (2010) Survey of Manufacturers to develop the necessary multipliers for the 440 industries at the state and U.S. levels. For the present study we coupled the state and national multipliers in IMPLAN with the 2012 economic activity for the U.S. cotton industry. This combination of model, multipliers, and economic activity gives one the most current estimate of economic contributions for the U.S. cotton industry.



U.S. Department of Agriculture, National Agricultural Statistics Service

Figure 1: Planted Acres of Cotton in 2012.

Table 1. US Cotton Industry Summary Statistics, 2010-2012.

	Planted	Harvested	Average		Average	Number of	Base	Number of	Milled	Average Price
States	Acres (1)	Acres (1)	Yield (1)	Production (1)	Price (1)	Farms (2)*	Acres (3)	Cotton Gins (4)	Cottonseed (1)	Cottonseed (1)
	(Acres)	(Acres)	(lb/Acre)	(Bales)	(\$/lb)	(No.)	(Acres)	(No.)	(Tons)	(\$/Ton)
2010										
Alabama	340,000	338,000	682	745,000	\$0.866	409			149,000	\$132.00
Arizona	197,500	195,500	1,509	612,300	\$0.855	173			219,500	\$220.00
Arkansas	545,000	540,000	1,045	1,297,000	\$0.735	527			404,000	\$175.00
California	306,000	303,000	1,337	1,261,000	\$1.050	285			330,000	\$252.00
Florida	92,000	89,000	766	200,000	\$0.779	81			40,000	\$130.00
Georgia	1,330,000	1,315,000	821	2,910,000	\$0.908	1,142			704,000	\$136.00
Kansas	51,000	50,000	787	70,000	\$1.040	16			30,000	\$128.00
Louisiana	255,000	249,000	842	478,000	\$0.810	291			138,000	\$168.00
Mississippi	420,000	410,000	993	993,000	\$0.791	528			291,000	\$156.00
Missouri	310,000	308,000	1,068	731,000	\$0.686	283			237,000	\$170.00
New Mexico	50,700	49,700	1,156	89,000	\$1.000	61			41,600	\$195.00
North Carolina	550,000	545,000	838	1,225,000	\$0.739	457			287,000	\$148.00
Okianoma	285,000	270,000	/50	155,000	\$1.030	107			146,000	\$141.00
South Carolina	202,000	201,000	898	593,000	\$0.780 \$0.943	124			123,000	\$140.00
Termessee	590,000	567,000	040 704	743,000	\$0.043 \$0.700	420			235,000	\$190.00
Virginia	3,507,000	5,500,500 82,000	704	198.000	\$0.799	4,920			2,085,000	\$154.00
Total	10 974 200	10 698 700	152	17 314 800	φ0.715	0 068			6 098 100	ψ175.00
Iotal	10,374,200	10,030,700		17,514,000		3,300			0,030,100	
2011										
Alabama	460,000	443,000	742	685,000	\$0.923				215,000	\$204.00
Arizona	260,000	258,000	1,526	820,000	\$0.876				299,000	\$309.00
Arkansas	680,000	660,000	929	1,277,000	\$0.947				437,000	\$267.00
California	456,000	454,000	1,418	1,341,000	\$1.040				565,000	\$341.00
Florida	122,000	118,000	744	183,000	\$0.978				53,000	\$218.00
Georgia	1,600,000	1,495,000	/91	2,465,000	\$0.944				756,000	\$207.00
Kansas	80,000	65,000	510	69,000	\$0.820 ¢0.000				26,000	\$208.00
Louisiaria	295,000	290,000	840	511,000	\$0.930 ¢0.077				166,000	\$255.00
Mississippi	275,000	267,000	902	741 000	\$0.977 ¢0.956				421,000	\$249.00 \$260.00
New Mexico	73 400	61 400	1 049	134 200	\$0.850				45 000	\$200.00
North Carolina	805.000	800,000	616	1 026 000	40.04 908.02				313,000	\$203.00
Oklahoma	415,000	70,000	597	87 000	\$0.819				31,000	\$308.00
South Carolina	303 000	301 000	828	519,000	\$0.920				154 000	\$199.00
Tennessee	495,000	490.000	796	813.000	\$0.937				272.000	\$260.00
Texas	7,570,000	2,868,500	592	3,540,000	\$0.819				1,228,000	\$289.00
Virginia	116,000	115,000	676	162,000	\$0.890				48,000	\$230.00
Total	14,735,400	9,460,900		15,573,200					5,370,000	
2012										
Alabama	380,000	378,000	682	480,000	\$0.726		603,173	30	227,000	\$200.00
Arizona	203,000	200,000	1,509	614,400	\$0.768		442,027	22	205,000	\$288.00
Arkansas	595,000	585,000	1,045	1,176,000	\$0.715		1,145,175	54	450,000	\$253.00
California	367,000	365,000	1,337	844,000	\$0.892		1,256,410	42	469,000	\$366.00
Florida	108,000	107,000	766	142,000	\$0.763		105,349	4	61,000	\$211.00
Georgia	1,290,000	1,280,000	821	2,250,000	\$0.768		1,371,575	62	875,000	\$212.00
Kansas	56,000	54,000	787	82,000	\$0.707		3,758	4	25,000	Withheld
Louisiana	230,000	225,000	842	437,000	\$0.693		874,761	28	158,000	\$259.00
Mississippi	475,000	470,000	993	848,000	\$0.761		1,473,111	55	335,000	\$266.00
Missouri	350,000	330,000	1,068	685,000	\$0.731		424,907	29	256,000	\$280.00
New Wexico	47,400	40,300	1,156	119,700	\$0.717		67,919	9	31,000	\$302.00
Oklahoma	205,000	580,000	838	951,000	\$U./29		835,635	40	379,000	\$229.00
South Carolina	200,000	200 000	100	422,000	ΦU./ 11 ΦΩ 757		320,023	10	34,000 175,000	7249.00 ¢ane aa
Tennessee	299,000	290,000	090 815	681 000	JU.131 40 722		339,023 748 084	20 97	220 000	¢200.00 ¢256.00
Texas	6 558 000	3 857 500	704	7 871 000	φ0.730 \$0 602		7 197 649	27	1 669 000	\$265 00
Virginia	86.000	85.000	732	125.000	\$0.735		88.820	4	58.000	Withheld
Total	12.314.400	9.371.800	. 52	18,104,100	<i>40.100</i>		17,444,691	671	5,666.000	
	,,	0,01,000		,			,,	571	0,000,000	

Sources:

(1) Values come from various NASS-USDA reports

(2) Values come from 2007 Census of Agriculture

(3) Values come from USDA-FSA

(4) Values come from National Cotton Council

* Values are for 2007

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Scope of the Industry

The USDA census reports that in 2007 there were 9,968 cotton farmers with about 50% located in Texas (Table 1). Figure 1 shows the concentration and planted acres for upland cotton in 2012 and Table 1 reports state acreage for 2010-2012. Upland cotton production (Figure 2) closely follows planted acres (Figure 1) and base acres (Figure 3). The USDA annual ginning report for the 2012 crop shows 671 gins across the cotton belt (Table 1).

Economic Contributions

The economic contributions of the U.S. upland cotton industry are presented in two parts: farmers and ginners. For both sectors of the industry, we reported estimates for: output, value added, and number of jobs supported. To provide further detail, the contributions are disaggregated into four types of effects: direct, indirect, induced, and total.

Direct effects amount to the sum of contributions that are directly attributable to farmers and ginners. In the case of employment, the direct effect is the number of jobs supported by farmers and ginners. The indirect effects are the economic activity and jobs supported by businesses that supply inputs to farmers and ginners. The induced effect is the economic activity created through purchases and jobs created by the employees of input suppliers and their suppliers.

The three main economic contribution categories (output, value added, and jobs) are defined on the next page.



U.S. Department of Agriculture, National Agricultural Statistics Service

Figure 2: Cotton Production in 2012.

Definitions for IMPLAN Economic Contribution Categories

Output is a measure of the value of goods and services produced in the State as a result of the increased demand created by expenditures by cotton farms and gins. Output is measured by purchases of all intermediate production inputs and value added.

Value Added is the total wages and salaries plus business profits generated by the economic activities of a particular industry. In this case value added is the direct and indirect wages, salaries and profits generated in a state by the activities of buying inputs and production products by cotton farmers and gins.

Number of Jobs is the number of all wage and salary employees as well as self-employed jobs resulting from total expenditures by cotton farmers and gins. The number of jobs does not accumulate, because it is an annual measure.



U.S. Department of Agriculture, National Agricultural Statistics Service

Figure 3: Cotton Base Acres in 2012.

Farmer Contributions

The economic contributions for upland cotton farming were estimated using the cotton sector in the IMPLAN model. The level of direct economic activity used as input in the model was the state total revenues for cotton lint and cottonseed. State level cotton production was calculated as the sum of lint and cottonseed receipts plus government payments plus insurance indemnities. All prices, acres, yields, and production used to calculate receipts are reported by USDA-NASS for 2012. Insurance indemnities for 2012 are from the USDA-RMA-FCIC Nationwide Summary by Crop/State.

The economic contributions by state are summarized in Table 2. The state with the largest economic contribution from cotton farming is Texas (\$6.8 billion output). In Texas, the indirect impact on the State's output is \$2.67 billion and the induced effect is \$1.11 million. In terms of employment, Texas cotton farming contributes over 22,190 jobs directly plus 18,675 indirect jobs and 8,439 induced jobs for a total of 49,310 jobs.

Georgia is second in terms of cotton farming contributing to the State's economy. Total output attributed to cotton farming is \$2.6 billion with 19,337 jobs generated by the sector (Table 2). Labor income supported by cotton farming in Georgia is \$878 million. The North Carolina cotton farming sector contribution to the state's economy is estimated at \$1.04 billion, ranking it third. Mississippi, Arkansas, and California contributed an average of \$950 million to their state's output in 2012.

The IMPLAN model accounts for slippage because cotton farms buy inputs that are not produced within their state's boundaries. Therefore total economic impacts on the U.S. economy from cotton farming are best estimated using the U.S. IMPLAN model rather than summing the values for the 17 cotton producing states. The total U.S. impacts are presented in the last section of the report.

Ginning Contributions

The ag support and input sector in IMPLAN was used to model the economic impacts of cotton ginners. The IMPLAN sector was updated to approximately match the output and output per worker for cotton ginning, by state, reported in the USDA/NASS annual ginnings report for 2012. The economic impact is calculated using the value of ginning services as the output for cotton gins. The receipts from ginning services is estimated by multiplying the pounds of lint sold in 2012 by \$0.105 for each state. The \$0.105 per pound revenue is the average ginning cost reported by AFPC panel farm members for their 2012 crop if the farmers retained their cottonseed. Because the cotton farming sector analysis assumed farmers sold both cotton lint and seed, the value of cotton-seed was not added to the ginner's receipts.

The economic impacts for cotton ginning are also reported in Table 2. The total economic impacts for Texas ginners totals about \$494 million and about 5,250 jobs. The employment impacts in Texas for 2012 are estimated at 3,437 jobs directly sustained by cotton ginners, 215 indirect jobs, and 1,623 jobs sustained through induced effects that permeate the state's economy. Georgia cotton ginners have the second largest economic impact on their state's economy with a total output contribution of \$278 million and 2,663 jobs. North Carolina, Arkansas, and Mississippi are ranked third, fourth, and fifth, respectively, in terms of their contributions to total economic output (Table 2).

Table 2. Economic Contributions of Cotton	Farming and Ginning by State, 2010-2012.
Cotton Production	Cotton Ginning

		Cotton P	roduction		0	Cotton	Ginning	
	Employment	(Million \$s)	Total Value Added	Output (Million \$s)	Employment (No. Jobs)	(Million \$s)	Total Value Added	Output (Million \$s)
Alabama	(110:0003)	(141111011 \$\$3)	(ivillion ¢3)	(Willion \$3)	(10.0003)	(141111011 @3)	(141111011 43)	(141111011 \$\$3)
Direct Effect	3,092	45 59	70.33	307.54	755	29.21	28.59	35.76
Induced Effect	1,156	41.13	75.55	123.28	222	7.94	14.53	23.75
Total Effect	5,477	197.46	227.36	573.61	1,001	38.29	44.87	62.73
Arizona								
Direct Effect	1,593	34.67	66.29 112.42	307.35	244	23.51	23.01	29.04
Induced Effect	761	31.99	58.48	92.35	206	8.71	15.92	25.14
Total Effect	3,854	122.56	237.18	585.10	470	33.31	40.70	57.35
Arkansas								
Direct Effect	2,194	147.30	106.39	466.84	716	42.27	41.37	51.18
Induced Effect	1,990	53.32	98.07	229.25	20	10.27	18.85	31.13
Total Effect	5,735	278.17	327.79	857.86	1,039	53.71	62.09	85.90
California								
Direct Effect	1,171	72.33	87.44	389.41	173	19.80	19.38	24.38
Indirect Effect	2,556	112.64	194.80 132.83	353.42 215.79	22	1.57	2.45	5.36 24.86
Total Effect	5,180	257.66	415.08	958.61	361	29.73	37.12	54.61
Florida								
Direct Effect	414	11.38	16.96	77.16	91	6.66	6.52	8.40
Indirect Effect	609 283	19.84 11.58	34.54 21.21	60.03 33.93	10 65	0.54	0.86	2.04
Total Effect	1,306	42.80	72.71	171.12	165	9.87	12.27	18.26
Georgia								
Direct Effect	7,910	417.46	283.76	1,229.64	1,567	111.69	109.31	138.70
Indirect Effect	5,918	233.83	440.80	734.77	111	6.48	10.00 75.46	20.17
Total Effect	19,337	878.46	1,142.36	2,624.30	2,663	159.23	194.77	278.14
Kansas								
Direct Effect	56	6.67	6.43	27.75	64	2.59	2.53	3.09
Indirect Effect	77	3.28	6.13	10.95	1	0.07	0.11	0.20
Total Effect	200	12.35	4.45	46.00	18 84	3.30	3.83	1.95
Direct Effect	930	78.55	47.41	210.06	456	17.71	17.33	21.72
Indirect Effect	1,125	46.10	73.11	156.46	22	1.16	1.94	4.99
Induced Effect Total Effect	893 2 947	33.64 158.29	60.60 181 11	99.91 466.42	137 613	5.13 24.00	9.23 28.50	15.24 41.95
	2,011	100.20	101111	100.12	010	21.00	20.00	11.00
Mississippi Direct Effect	2,930	169.08	107.18	469.94	875	38.15	37.33	46.78
Indirect Effect	2,320	82.95	128.39	263.51	37	1.58	2.56	7.05
Induced Effect	1,745	57.87	107.23	178.82	271	9.04	16.68	27.88
Total Ellect	6,995	309.90	342.60	912.27	1,103	40.70	56.57	81.70
Missouri Direct Effect	1 708	78.95	72 73	314 54	386	28.70	28.10	35.00
Indirect Effect	1,333	51.89	93.28	172.25	32	1.58	2.61	5.91
Induced Effect	1,072	41.94	75.35	122.53	249	9.77	17.55	28.56
Iotal Effect	4,204	1/2./8	241.36	609.32	667	40.14	48.35	69.56
New Mexico	134	7.61	7.68	33.38	59	2 30	2.25	2.00
Indirect Effect	107	3.30	6.70	11.56	1	0.08	0.11	0.19
Induced Effect	74	2.60	4.85	7.80	16	0.57	1.05	1.69
Iotal Effect	316	13.51	19.23	52.74	76	2.94	3.42	4.87
North Carolina	4 404	110.57	445.04	500 50	057	40.00	17.00	50.00
Indirect Effect	1,481	146.57	115.91	502.50 303.28	957	48.08	47.06	58.36
Induced Effect	2,048	79.40	143.79	231.53	414	16.10	29.13	46.96
Total Effect	6,060	328.92	435.67	1,037.31	1,424	67.04	80.81	116.04
Oklahoma					100			
Direct Effect	863 484	7.98 16.89	26.47 33.28	123.51 61.65	129	3.75	3.67	4.64
Induced Effect	171	6.19	11.47	18.91	27	0.96	1.80	2.95
Total Effect	1,518	31.06	71.22	204.06	160	4.87	5.75	8.12
South Carolina			50.00					
Indirect Effect	2,201	39.71	56.30 73.33	246.60	520	22.76	22.28	27.97
Induced Effect	799	26.21	49.14	78.78	196	6.44	12.07	19.35
Total Effect	4,189	121.99	178.77	444.97	733	30.06	35.61	49.68
Tennessee				007				····
Direct Effect	4,112 1.668	39.91 55.93	66.73 104.09	307.75 184.09	406 27	27.68	27.10 2.10	34.10 3.96
Induced Effect	796	34.12	60.03	97.13	242	10.31	18.14	29.34
Total Effect	6,576	129.97	230.85	588.96	672	39.27	47.34	67.40
Texas	00.400	047 -0	0.45 60	0.000.00	0.407	100 11	100.00	000.00
Indirect Effect	22,196 18.675	317.73 750.07	645.68 1.445.13	3,006.63	3,437 215	193.11 12.21	189.03 21.19	238.68 42.95
Induced Effect	8,439	372.57	688.19	1,111.71	1,623	71.36	131.87	212.94
Iotal Effect	49,310	1,440.37	2,778.99	6,785.62	5,251	276.68	342.09	494.57
Virginia		-				_		-
Direct Effect	759 348	8.09 12.49	16.54 24.98	76.76 40.50	101 6	7.31 0.33	7.15 0.51	9.18 1.00
Induced Effect	135	5.84	11.01	17.16	51	2.17	4.10	6.39
Total Effect	1,243	26.42	52.54	134.42	158	9.81	11.76	16.56

	Employment	Labor Income	Total Value Added	Output
	(No. Jobs)	(Million \$s)	(Million \$s)	(Million \$s)
Cotton Farming				
Direct Effect	53,134	1,596.74	1,793.73	8,097.36
Indirect Effect	66,876	2,984.84	5,289.83	10,646.97
Induced Effect	51,319	2,408.73	4,308.61	7,390.64
Total Effect	171,329	6,990.31	11,392.17	26,134.98
Ginning Sector				
Direct Effect	10,396	624.78	611.52	770.05
Indirect Effect	1,309	81.62	136.68	319.46
Induced Effect	7,855	369.95	662.37	1,136.87
Total Effect	19,559	1,076.34	1,410.56	2,226.39
Total Effect				
Direct Effect	63,530	2,221.52	2,405.25	8,867.42
Indirect Effect	68,185	3,066.46	5,426.50	10,966.44
Induced Effect	59,173	2,778.68	4,970.98	8,527.51
Total Effect	190,888	8,066.65	12,802.73	28,361.37

Table 3. Ec	onomic	Contributions o	f Cotton	Farming a	and Ginning fo	r
the United	States,	2010-2012.		•	•	

National Contribution

The national IMPLAN model was used to value the economic contributions of cotton farming and ginning to eliminate slippage that is prevalent in the state models. The U.S. economic contributions are reported in Table 3. For the 2012 cotton crop total economic contribution from farming is estimated at \$26.1 billion and the total contribution for ginning is \$2.2 billion, for a total of \$28.4 billion. Cotton farming supported 171,329 jobs in the U.S. economy and ginning supported 19,559 jobs for a total of 190,888 jobs.

Summary

The economic impacts for cotton farming and ginning on the U.S. economy in 2012 can be summarized as follows:

- 190,888 jobs
- \$8.1 billion labor income
- \$12.8 billion value added
- \$28.4 billion economic output

References

USDA-Federal Crop Insurance Corporation. "Crop Year Statistics for 2012, Nationwide Summary By Crop/State." November 11, 2013. http://www3.rma.usda.gov/apps/sob/current_week/stcrop2012.pdf

USDA/NASS. "Annual Ginnings Report, 2012 Crop Year Summary – Number of Active Gins." May 2013. <u>http://usda01.library.cornell.edu/usda/current//CottGinnSu/CottGinnSu-05-10-2013.pdf</u>

USDA/NASS. "Cottonseed Price by State." http://quickstats.nass.usda.gov/results/C50EB9B0-37A6-3A55-8CC3-C237BCD4875F

USDA/NASS. "Cottonseed Yield by State." http://quickstats.nass.usda.gov/results/FB9C493D-3A43-3B8C-85EC-5783FE331D63

USDA/NASS. "County Acres and Production for Cotton." http://nass.usda.gov/Quick_Stats/Lite/result.php?2D1C9549-757C-3565-8787-627409A00441

USDA/NASS. "State Level Lint Prices." http://quickstats.nass.usda.gov/results/13E96FF4-4CCD-31F3-9DF2-5D95FE0DC244

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