Beltwide Cotton Conferences

January 9-12, 2007
New Orleans, LA
Simulation Analysis and Economic Impact of Georgia Cotton Production

Archie Flanders

Center for Agribusiness and Economic Development

University of Georgia
Production Background

• Cotton is largest field crop in Georgia in terms of acreage and revenue.
• 1.4 million acres were planted in 2006.
• Cotton is an important rotation crop with other crops, especially peanuts.
Financial Background

- Cotton has high variable costs per acre.
- Expensive harvesting equipment leads to high fixed costs.
- FAPRI data indicate that US cotton production derives 20% to 30% of revenue from government payments.
Georgia Rural Economies

- Many rural economies are dependent on agriculture.
- Georgia derives 8.6% of economy from agricultural production and directly related manufacturing.
- Many GA rural counties derive over 50% of economy from agricultural production and directly related manufacturing.
Economic Development

- High costs to cotton industry represent economic activity to other industrial sectors.
- DP, CCP, and LDP are utilized for input purchases.
- Government payments flow into industrial sectors outside of agriculture.
Empirical Analysis
Methodology

• Industry simulation model (Net Returns)
• Input-output model (Economic Impact)
Industry Simulation

• Average production unit is 700 acres.
• Model costs derived from UGA crop enterprise budgets and NASS.
• Georgia yields and prices are from NASS aggregate data.
Simulation Model

- NR = Revenue - VC – FC
- Revenue = (Price * Yield * 700 acres) + DP + CCP + LDP
- DP & CCP (GA base yield (FSA), 700 acres)
- VC = 2006 Baseline (Harvesting costs change with yield)
Costs Data

- VC = $429 per acre
  - (sell seed to gin)
  = $390 per acre
- Fixed costs are $70,687 for 700 acres.
- Costs are industry average, weighted for irrigated : nonirrigated acreages and cotton seed technologies.
Average GA Yield and Price Data

• NASS yield 2001 : 2006 (Dec. estimate) 726 lbs./acre
• FAPRI US price for 2007-2011 is above $0.53/lb.
• Current simulation applies $0.529/lb. (10 year GA average)
• AWP: 2002-2005 averages $0.048 less than GA market price (Average = $0.481).
### Stochastic Simulation Covariance: Normal Distribution in Simetar

<table>
<thead>
<tr>
<th></th>
<th>Price</th>
<th>Yield</th>
<th>AWP</th>
</tr>
</thead>
<tbody>
<tr>
<td>Price</td>
<td>0.0053</td>
<td>4.8283</td>
<td>0.0043</td>
</tr>
<tr>
<td>Yield</td>
<td>12,963</td>
<td>1.9705</td>
<td></td>
</tr>
<tr>
<td>AWP</td>
<td></td>
<td></td>
<td>0.0039</td>
</tr>
</tbody>
</table>
Average of 500 Iterations

$26,624 NR to land & unpaid labor
$99,014 GP

GP is 25.0% of revenue
(Market lint & seed sold + GP)
Distribution of GP

- 27% goes to farmers and landlords.
- 73% goes to input suppliers.
  Examples: Seed, chemicals, fertilizer, equipment manufacturers and dealers, fuel, electricity, and labor.
Economic Impact: Input-Output Model

- Itemized cotton industry direct costs are entered into 18 US industrial sectors. **IMPLAN** (software)
- Farm expenditures are direct impacts.
- Direct impacts lead to indirect impacts (businesses purchasing from businesses and employees spending income).
### Direct and Indirect Impacts to US Economy

<table>
<thead>
<tr>
<th></th>
<th>Direct</th>
<th>Indirect</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Output ($)</td>
<td>397,423</td>
<td>919,470</td>
<td>1,316,893</td>
</tr>
<tr>
<td>Labor Income ($)</td>
<td>10,021</td>
<td>272,079</td>
<td>282,100</td>
</tr>
<tr>
<td>Employment</td>
<td>2</td>
<td>7</td>
<td>9</td>
</tr>
</tbody>
</table>
Labor Income is Wealth Created

$72,390 (GP-NR) of industry average
$99,014 GP leads to $282,100 in labor income to employees and proprietors in US economy. (3.9 Multiple)

This does not include income to farmers and landlords.
### Impacts to US Industrial Sectors

<table>
<thead>
<tr>
<th>Sector</th>
<th>Output ($)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Agriculture</td>
<td>527,882</td>
</tr>
<tr>
<td>Mining &amp; Construction</td>
<td>30,175</td>
</tr>
<tr>
<td>Utilities</td>
<td>22,925</td>
</tr>
<tr>
<td>Manufacturing</td>
<td>293,165</td>
</tr>
<tr>
<td>Transportation, Warehousing</td>
<td>32,390</td>
</tr>
<tr>
<td>Trade</td>
<td>63,559</td>
</tr>
<tr>
<td>Finance, Insurance, &amp; Real Estate</td>
<td>97,906</td>
</tr>
<tr>
<td>Services</td>
<td>212,767</td>
</tr>
<tr>
<td>Government and non-NAICS</td>
<td>36,124</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>1,316,893</strong></td>
</tr>
</tbody>
</table>
Taxes Generated in US Economy by GA Cotton Production

Federal Taxes ($)  62,989

State/Local Taxes ($)  45,774

Sum of Taxes ($)  108,763
Compare GP to Taxes Generated

$99,014 GP to industry average farm
$108,763 Taxes generated by farm
$9,749 more taxes generated than received

For each tax dollar that the GA cotton industry receives in GP, it generates $1.10 in tax revenues for federal, state, and local governments in the U.S.
US Federalist System

• Each level of government does what is most appropriate for it to undertake.
• Federal government is best suited to sponsor programs for US agricultural commodities.
• 58% of taxes generated go back to federal government as new tax revenue.
• Remaining 42% goes to state and local treasuries to apply for programs best undertaken by these levels of government.
GA Cotton Industry without GP

- Average NR with GP is $26,624
- Average NR without GP is -$72,390
Probability of NR < 0 and Greater than $30,000 with GP

- 100%: 0.45
- 80%: 0.27
- 60%: 0.28

NR
Probability of NR < 0 and Greater than $30,000 without GP

NR Mkt

100%  80%  60%  40%  20%  0%

0.06  0.88
Summary

- 73% of GP goes to input suppliers, 23% goes to farmers and landlords.
- Each dollar received by GA cotton industry as GP leads to $1.10 in tax revenue.
Conclusion

• GA cotton industry is not financially viable without GP.
• Economic impacts throughout US economy would be lost without GP.
• Rural economies have few alternatives to agriculture.
Comments and Questions