SIMULATION ANALYSIS AND OUTLOOK FOR GEORGIA COTTON PRODUCTION

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Abstract

Increasing production costs with stable commodity prices have diminished profit potential for Georgia cotton producers. Increasing cotton yields have mitigated some of the reduction in farm income. Simulation analysis comparing a whole farm situation for 2008 and 2009 indicates significant financial stress for cotton production in 2009. Projected returns to variable costs indicate that cotton is greater than any other Georgia field crop in 2009. Results from this research indicate downward pressure should exists on input prices for a viable agricultural industry that includes both producers and input suppliers.

Introduction

Increasing input costs for cotton production are diminishing profit potential for producers. Most field crops have benefitted from increasing commodity prices during the recent period of increased production costs. However, cotton fiber is part a global textile industry having economic conditions that has prevented cotton from achieving increased prices. U.S. cotton farmers have responded to increased prices for corn, soybeans, and wheat by greatly reducing cotton acreage and planting higher priced crops. In contrast, government policies in other cotton producing countries have maintained acreage at high levels that has contributed to a supply surplus at a time when there is a reduced quantity demanded for cotton.

Cotton fiber has unique qualities that give it good long-term prospects for maintaining consumer demand. Recent declines in all commodity prices indicate a return to relative costs and returns among field crops that existed before biofuels induced relationships that were not favorable to cotton. Knowledge of changes in prevailing trends related to crop production is important for farm management decisions.

The objective of this report is to develop a whole farm simulation model for a typical farm in the Georgia cotton production industry. Data utilized in a farm simulation model will be presented for indicating prevailing trends in the cotton industry. Simulation results will compare the 2008 production year with an outlook for the 2009 year.

Data Trends

Figure 1 presents an increasing trend in Georgia cotton yields (NASS 2008). Increasing yields are a means of increasing farm income and are a counter to increased input prices and low commodity prices. Cotton market prices are presented in Figure 2 (NASS 2008). Prices have trended at approximately $0.45/lb. since 1999. There is less price volatility in recent years with a trend above $0.45/lb.
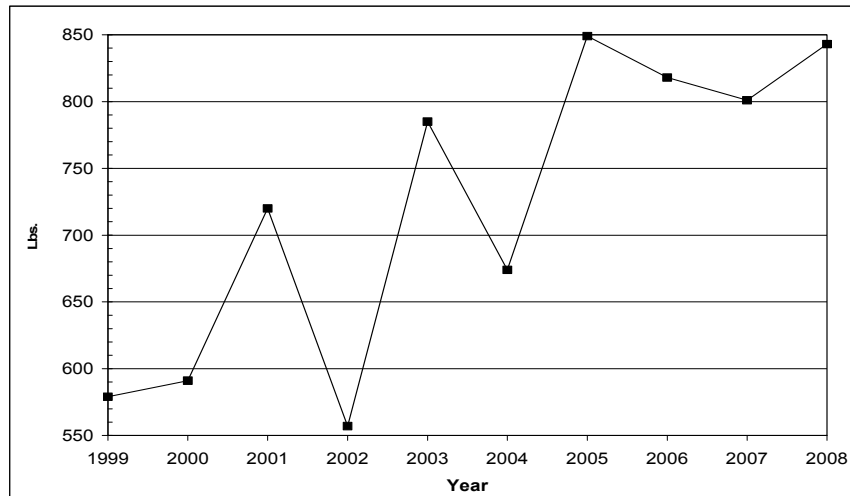
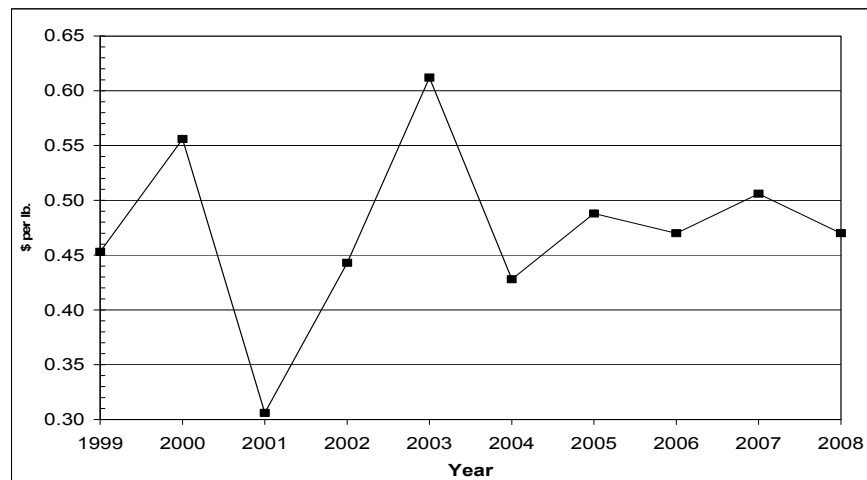Figure 1. Cotton Yield, Georgia, 1999-2008. Source: NASS

Figure 2. Cotton Price, Georgia, 1999-2008. Source: NASS

Variable costs for cotton, as well as peanuts, corn, soybeans, and wheat are presented in Figure 3. Variable costs for 2008 are derived from crop enterprise budgets developed by the University of Georgia (Shurley and Ziehl 2007; Smith and Ziehl 2007a; Smith and Ziehl 2007b). Variable costs for 2004-2007 are 2008 costs adjusted with input price indexes (NASS 2008). Variable costs are increasing for all crops during 2004-2008. Cotton variable costs include value of cottonseed sold deducted from ginning cost. Figure 4 shows a steady increase in ginning charges from $0.07/lb. to $0.09/lb. Increasing cottonseed value leads to an overall decline in net ginning costs, and farmers receive cash payments from ginners in 2007 and 2008. Thus, total cotton variable costs in Figure 3 have an increasing trend that is dampened by higher cottonseed values. Increasing nitrogen costs for corn, coupled with increased cottonseed values, have resulted in corn variable costs increasing to equivalence with cotton for 2008 in Figure 3.
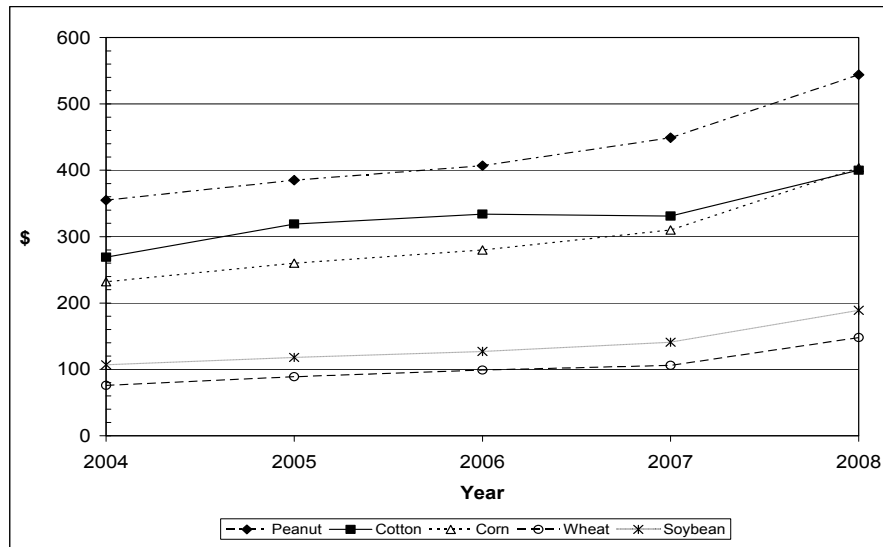
Figure 3. Variable Costs per Acre, Georgia Average, 2004-2008. Note: Cottonseed Sold Deducted from Cotton Ginning Cost. Source: UGA, NASS
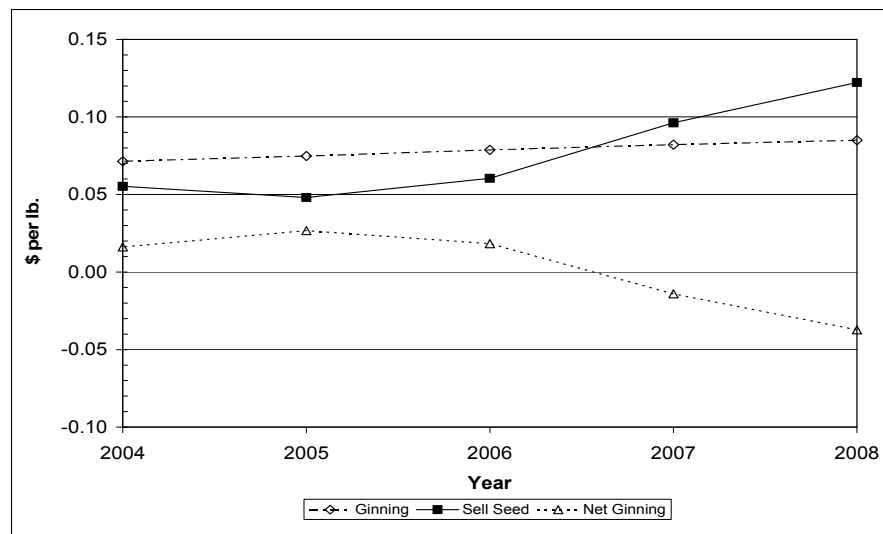

Figure 4. Ginning Cost and Seed Sold Value per Lb., Georgia, 2004-2008. Source: UGA, NASS

Figure 5 presents components of cotton costs during 2004-2008. Similar to variable costs, fixed costs for 2008 are derived from UGA crop enterprise budgets, and 2004-2007 fixed costs are 2008 costs adjusted with input price indexes. Land costs are represented by cropland rental rates that have been slightly less than $0.10/lb. (NASS 2008). Fixed costs are slightly above $0.10/lb. Variable costs are approximately $0.40/lb. from 2004-2007 and increase to a level above $0.47/lb. in 2008. Total costs were approximately $0.60/lb. during 2004-2007 and increased to $0.68/lb. in 2008. Figure 6 indicates that cotton market prices are above variable cost during 2004-2007, but variable costs increase to a level equal to market price in 2008.
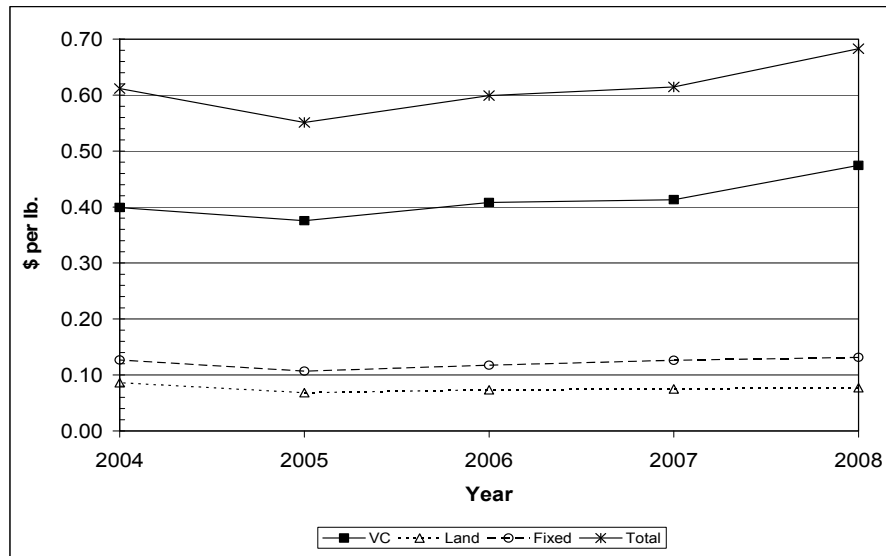
Figure 5. Cotton Production Cost per Lb., Georgia, 2004-2008. Note: VC has Cottonseed Sold Deducted from Cotton Ginning Cost. Source: UGA, NASS
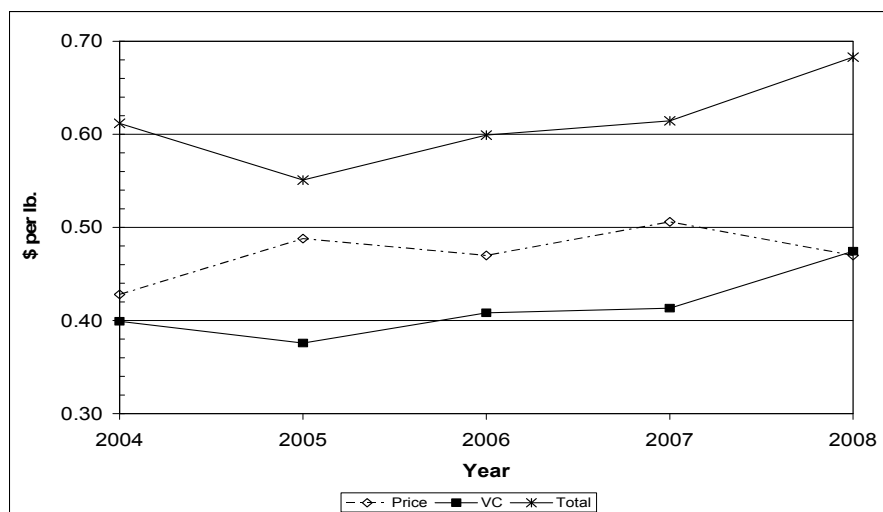

Figure 6. Cotton Price, VC, Total Production Cost per Lb., Georgia, 2004-2008. Note: VC has Cottonseed Sold Deducted from Cotton Ginning Cost. Source: UGA, NASS

Loan deficiency payments (LDP) available to cotton producers are determined by the difference in the Adjusted World Price (AWP) and the loan rate of $0.52/lb. Differences in market prices and the AWP determine the realized LDP received on cotton produced. The five-year moving average for the difference in the U.S. market cotton price and the AWP is presented in Figure 7 (FAS 2008; NASS 2008). A difference of $0.038/lb. in 2008 is the expected level for AWP below the U.S. market price. Thus, the effective price floor for cotton is $0.56/lb. ($0.520 + $0.038).
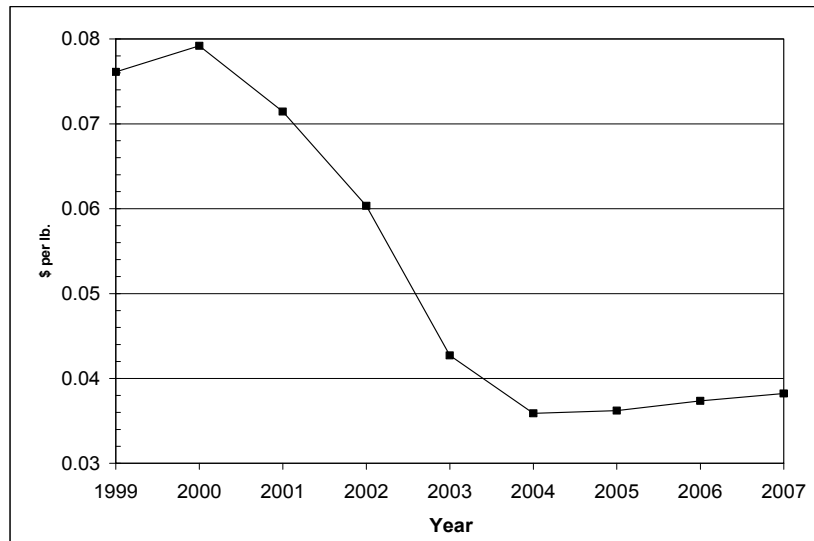
Figure 7. Five-Year Moving Average, Difference in US Cotton Price and AWP, 1999-2007. Source: NASS, FAS

Simulation Analysis

Data in Figure 1 through Figure 7 are applied to simulation analysis for a whole farm producing cotton, peanuts, and corn. Commodity prices, yields, planted acres, and base acres for direct payments and countercyclical payments are in Table 1. Due to recent acreage shifts, 2008 simulated acreage for cotton is 100 acres less than base acres while corn simulated acreage is 100 acres greater than base acres. Georgia commodity prices applied in simulation are derived from U.S. prices (Richardson et al 2008). Base yields for calculating direct payments and countercyclical payments are Georgia averages (FSA 2003). Net returns in Table 2 are $82,488. Land rented at a rate of $65/acre is estimated as 50% of total acreage for total land rent of $37,375. Resulting farm income is $45,113. Government payments from LDP, direct payments, and countercyclical payments total $169,557.

Table 1. Average GA Farm Data, 2008

Crop	Price	Yield	Planted Acres	Base Acres
Peanut	0.193	3,300	350	350
Cotton	0.469	843	600	700
Corn	3.97	125	200	100

Table 2. Average GA Farm Simulation Results, 2008

	$
Net Returns	82,448
Land Rent	37,375
Farm Income	45,113
Govt. Payments	169,557

Simulation analysis for 2009 is with costs derived from updated crop enterprise budgets (Shurley and Smith 2008; Smith and Smith 2008a; Smith and Smith 2008b). Commodity prices, yields, planted acres, and base acres for direct payments and countercyclical payments are in Table 3. Expected returns to variable costs are greater for cotton than corn in 2009. Therefore, planted acreage for cotton and corn corresponds to base acreage in Table 3. Yields for 2009 are trend adjusted moving averages. Yields for 2008 reported by NASS for peanuts and cotton are higher than historical averages, and yields applied for 2008 simulation are greater than expected yields applied in 2009 simulation. Net returns in Table 4 are $3,708. Land rented at a rate of $65/acre is estimated as 50% of total acreage

for total land rent of $37,375. Resulting farm income is -$33,667. Government payments from LDP, direct payments, and countercyclical payments total $131,746.

Table 3. Average GA Farm Data, 2009

Crop	Price	Yield	Planted Acres	Base Acres
Peanut	0.208	3,026	350	350
Cotton	0.519	827	700	700
Corn	3.97	127	100	100

Table 4. Average GA Farm Simulation Results, 2009

	$
Net Returns	3,708
Land Rent	37,375
Farm Income	-33,667
Govt. Payments	131,746

Table 5 shows a comparison in 2008 and 2009 farm incomes, as well as return to variable costs that includes LDP. Expected farm is negative for 2009, and there is a total difference of $78,780 in farm income between 2008 and 2009. For 2008, peanut and corn have returns to variable costs of $93/acre while cotton has $76/acre. For 2009, all crops have reduced returns to variable costs, but cotton ($55/acre) significantly exceeds both peanuts (-$1/acre) and corn ($10/acre). Although not included in Table 5, comparative analysis indicates 2009 returns to variable costs for soybeans are $13/acre and $45/acre for wheat.

Table 5. Average GA Farm Income and Returns to Variable Costs per Acre

	2008	2009
	$	
Farm Income	45,113	-33,667
Peanut RVC	93	-1
Cotton RVC	76	55
Corn RVC	93	10

Summary and Conclusions

Increasing production costs with stable commodity prices have diminished profit potential for Georgia cotton producers. Increasing cotton yields have mitigated some of the reduction in farm income. Simulation analysis comparing a whole farm situation for 2008 and 2009 indicates significant stress for cotton production in 2009. Projected returns to variable costs indicate that cotton is greater than any other Georgia field crop in 2009.

Research results indicate potential implications for agricultural production in 2009. Input costs in this analysis are based on input prices prevailing during late 2008. Increasing input costs since 2004 are largely attributable to increasing petroleum and related prices. Declines in these prices during recent months could lead to decreases in agricultural input prices before 2009 spring planting. Results from this research indicate downward pressure should exists on input prices for a viable agricultural industry that includes both producers and input suppliers.

Government programs based on target pricing ensure a correspondence between production costs and revenue. Reforms contained in the 2008 farm bill decrease cotton target price at time when input costs are increasing and market prices are not increasing. Future public policy discussions related to agriculture should include comparisons of U.S. programs and support programs of other cotton producing countries. A thorough analysis of commodity support programs for agriculture should include principles of economic theory in the realms of public finance and public welfare analysis.

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