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Input-Output Analysis with Public Policy Objectives: A Case Study of the Georgia Cotton Industry

Archie Flanders, Nathan B. Smith, and John C. McKissick

Farm bill legislation directed at agricultural commodities contributes to economies of rural areas. This research quantifies the economic impacts of the Georgia cotton industry for the U.S. economy. A cotton industry model with cotton and peanut acreage is utilized with IMPLAN to estimate impacts. The Georgia cotton industry creates 4% more tax revenues for federal, state, and local governments than it receives in commodity support payments. Stochastic simulation analysis indicates that the Georgia cotton industry is not likely to remain viable without government payments.

Key Words: economic impact, FSRI, IMPLAN, industry model, multivariate empirical distribution, Simetar, social welfare analysis, stochastic simulation

Georgia cotton production has steadily increased since 1990, and now ranks second in farm gate value among all Georgia agricultural commodities. The 2005 farm gate value for cotton totaled more than $723 million, which was first among row crops, followed by peanuts at $423 million (Boatwright and McKissick, 2006). Data from the USDA's National Agricultural Statistics Service (NASS) show that in 2006, Georgia planted 1.4 million acres of upland cotton and ranks second after the 6.4 million acres planted in Texas. Georgia's 2006 peanut acreage planted of 580,000 acres leads the nation and represents 45% of the U.S. total.

Government payments in the form of marketing assistance payments set forth by the commodity provisions of the Farm Security and Rural Investment (FSRI) Act of 2002 are included in the farm gate value. Additional income support known as direct and countercyclical payments (DCP) can also be attributed to cotton and peanuts, though these are not included in the individual commodity farm gate values. These payments are decoupled from production in the sense that historical base acres and program yields are used to calculate support levels. Direct payments are guaranteed

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Archie Flanders is public service assistant, Center for Agribusiness and Economic Development, The University of Georgia, Athens; Nathan B. Smith is assistant professor and extension economist, Department of Agricultural and Applied Economics, The University of Georgia, Tifton; and John C. McKissick is director, Center for Agribusiness and Economic Development and professor, Department of Agricultural and Applied Economics, The University of Georgia, Athens.

at a fixed rate through the duration of the six-year farm bill, while countercyclical payments vary according to commodity market prices.

Title 1 of FSRI provides income support through commodity programs featuring new approaches to issues that have been addressed by farm policy since the 1930s. With most FSRI funding directed toward Title 1 [USDA/Economic Research Service (ERS), 2006], initiatives for commodity programs have potential for enhancing the overall economic vitality of rural areas. Commodity programs are commonly regarded as farm income support and not as rural economic development programs. However, commodity programs do have an economic impact in rural communities, especially those that are largely dependent on agriculture.

The objective of this research is to quantify the economic impacts of the Georgia cotton industry under FSRI commodity programs. Designations by the North American Industrial Classification System (NAICS) classify cotton farming as farms primarily engaged in cotton production, but cotton farms typically receive revenue from activities other than cotton production (U.S. Census Bureau, 2002). Although NAICS nomenclature uses the term "cotton farming," peanuts are an integral component of the Georgia cotton production system due to the agronomic benefits of crop rotation. A cotton industry model with peanuts included is evaluated for expected yields, commodity prices, costs, and net farm income, as well as the relationship between economic impacts and government payments received by the industry.

Social Welfare and Public Policy

According to Tresch (2002), the goal of public policy is to promote the economic well-being of a nation's citizens. Scarce resources make it impossible for public policy to maximize each individual's economic well-being or to allow all individuals to reach their full economic potential. Limited national resources lead to public policy objectives that find a balance between efficiency and equity in a national economic system.

The public choice theory advanced by Buchanan (1987) regards government as a sector where individuals conduct fiscal exchanges. Individuals do not regard government as acting in pursuit of idealized social objectives deriving from normative considerations. Rather than idealized objectives, interactions between government and individuals have motivations equivalent to those observed in standard market exchanges. Buchanan argues that government policy should be evaluated under positive criteria in meeting individual self-interest.

Although a perfectly competitive market economy results in an efficient allocation of resources, the allocation may not be consistent with society's view of equity. Shortcomings in distributional equity can only be rectified through government policy that addresses market failure. Tresch (2002) states that society's goals of equity can be represented by a social welfare function, W, which has a single argument, U. The utility function for each individual is U^i and is a function of income, Y^i. Consider an economy with N industries, n, and designate one of the industries as representing households for individuals who are not members of any other industry, so that all individuals are members of some *n*. Governments sponsor diverse programs that impact individuals either directly or through their membership in a specified industrial sector. The effect of programs that impact individuals through an industry effect is represented by $U^i = f(U^n)$. Since $U^i = f(Y^i)$, utility obtained from membership in an industrial sector is $f(U^n) = f(Y^n)$, where Y^n is average income in a sector.

Government programs directed at sectors have the objective to maximize social welfare, and this is expressed as:

$$\text{(1)} \quad \max W[f(U^n)], \qquad \text{s.t.: } \sum_{n=1}^{N} Y^n \leq M,$$

where *M* is total available income in the economy. The Lagrangian function is given by:

$$\text{(2)} \quad L = W[f(U^n)] + \lambda\left(\sum_{n=1}^{N} Y^n - M\right).$$

First-order conditions for maximizing equation (2) are:

$$\text{(3)} \quad \frac{\partial L}{\partial Y^n} = \frac{\partial W}{\partial f(U^n)} \frac{\partial f(U^n)}{\partial Y^n} + \lambda = 0.$$

Solving and rearranging terms gives:

$$\text{(4)} \quad \frac{\partial W}{\partial f(U^n)} \frac{\partial f(U^n)}{\partial Y^n} = -\lambda, \qquad \forall n = 1, \ldots, N.$$

The constant term on the right-hand side of equation (4) is the marginal utility of income for membership in industry *n*. The partial derivative, $\partial W/\partial f(U^n)$, is the marginal social welfare weight and is determined by society's collective judgment (Tresch, 2002). Society's equity conditions are met at the point in equation (4) where increases in the social welfare function resulting from a change in income are identical for each industry.

Equation (4) provides a basis for society to evaluate income support programs under Title 1 of FSRI. Expected farm income can be considered in conjunction with society's marginal social welfare weight for agriculture to facilitate comparisons with other economic sectors. In addition to evaluating agricultural programs with the relationships of equation (4), commodity programs have economic impacts extending beyond farm income. Agriculture has economic impacts on industries that provide inputs and services to production and marketing. These economic impacts can be quantified with input-output analysis which includes all industrial sectors of the U.S. economy.

Input-Output Models and Economic Impact Analysis

An economy with N industries is depicted by Chiang and Wainwright (2005) as follows:

$$(\mathbf{I} - \mathbf{A})\mathbf{X} = \mathbf{D}, \tag{5}$$

where $\mathbf{X}$ is an $N \times 1$ vector of output from each industry used as an input by another industry, $\mathbf{A}$ is an $N \times N$ matrix with elements a_{ij} indicating the input requirement from industry i to produce a unit of output in industry j. Identity matrix $\mathbf{I}$ is an $N \times N$ matrix, and $\mathbf{D}$ is an $N \times 1$ vector of final demands, or output not used for further production. Final demand is consumption of goods and services by households, government, and capital. Equation (5) can be rearranged as follows:

$$\mathbf{X} = (\mathbf{I} - \mathbf{A})^{-1}\mathbf{D}. \tag{6}$$

Output in the first industry is expressed as:

$$x_1 = a_{11}x_1 + a_{12}x_2 + \ldots + a_{1n}x_n + d_1, \tag{7}$$

where technical coefficient $a_{11} = 0$ only under the condition that the industry uses none of its output as an input for further production.

An input-output model in its static form determines the output of each industry to meet final demand in an economy with technical requirements represented by $\mathbf{A}$. Output of each industry, x_j, is the industry's contribution to total output in the economy. Impact analysis quantifies how a direct change in x_1 affects overall economic activity through changes in the right-hand side of equation (7). There are three assumptions of input-output models: (*a*) industries use a fixed input ratio for production, (*b*) production technology represents constant returns to scale, and (*c*) inputs for production in an industry are available and are not obtained from inputs required by other industries. Resource availability implies input-output models represent an economy with less than full employment of labor.

A model for application in economic impact analysis of a firm or industry is represented by:

$$\begin{aligned} \textit{Profit}\ (P) = {} & \textit{Total Revenue}\ (TR) - \textit{Variable Costs}\ (VC) \\ & - \textit{Fixed Costs}\ (FC). \end{aligned} \tag{8}$$

Items for elements of *VC* and *FC* are listed in table 1. Costs of an industry average farm with 700 acres of cotton and 350 acres of peanuts are determined by enterprise budgets developed for production in 2006 of cotton (Shurley, 2006) and peanuts (Smith, 2005). Insurance and business support services in *FC* are combined with *VC* (less operating interest) to form operating costs (*OC*). Payments for capital, land rent, and interest (operating and capital) are wealth transfers that increase net equity

Table 1. Average Georgia Cotton Industry Costs

Variable Costs	Amount ($)	Fixed Costs	Amount ($)
Repairs	28,531	Indirect Business Taxes	6,725
Labor	25,776	Capital Interest	36,820
Peanut Seed	20,930	Capital Recovery	66,277
Cotton Seed	40,806	Insurance	7,364
Nitrogen	22,109	Overhead	18,860
Phosphate	12,550	**Total Fixed Costs:**	**136,046**
Other Nutrients	35,104		
Chemicals	117,054		
Fuel & Lube	39,726		
Irrigation	13,090		
Ag Support Activities	84,058		
Crop Insurance	16,408		
Operating Interest	14,163		
Land Rent	22,575		
Total Variable Costs:	**492,880**		

Note: Data derived from University of Georgia crop enterprise budgets developed for production in 2006 of cotton (Shurley, 2006) and peanuts (Smith, 2005).

and, along with profit, are designated as other property income (*OPI*). With indirect business taxes (*IBT*), the model for estimating annual economic impacts is given by:

$$(9) \qquad Impact = f(OC, OPI, IBT).$$

The right-hand side of equation (7) is equivalent to the right-hand side of equation (9) which is applied in an input-output model.

Input-output models have been widely applied in business, agricultural, natural resource, and economic development analysis utilizing IMPLAN (Minnesota IMPLAN Group, Inc., 2004). Hughes and Litz (1996) used an input-output model to assess economic linkages between agriculture and an urban area. Agriculture in a rural area was observed as making a substantial contribution to total economic activity in an urban area. Agricultural exports impact the entire Louisiana economy according to a study by Bairak and Hughes (1996). Their results suggest increased export of processed agricultural products would enhance economic activity.

Mon and Holland (2005) report input-output results that show organic apple production is more labor intensive than conventional apple production. Greater impacts due to conventional production using more intermediate inputs than organic production are offset by organic production, generating more labor income than conventional production. With premium prices for organic apples, the total economic impact is greater for organic production than conventional production. McKean and

Spencer (2003) project the economic impacts of a major drought to the agricultural and nursery production industries in Colorado. A major drought affecting Colorado irrigated agricultural and nursery production would have negative impacts for the $1.779 billion of personal income typically generated by these industries.

Impacts of visitors to state parks in North Carolina, South Carolina, Georgia, and Tennessee are reported by Bergstrom et al. (1990). The authors conclude that current economic impacts are largely determined by total annual visits and the percentage of out-of-state visitors. States may be able to increase economic impacts by increasing state park total visitation and the percentage of out-of-state visitors. Research related to public policy of government support for agriculture was conducted by Tanjuakio, Hastings, and Tytus (1996). Results showing that agriculture is a small part of the Delaware economy are presented as objective information which can serve as a base for discussing agricultural issues. Payback periods for government incentive packages to an automobile manufacturing plant in Alabama were estimated by Kebede and Ngandu (1999). By investigating four different scenarios, they determined payback periods ranging from four to seven years.

Economic Impact Results

An input-output model for the Georgia cotton industry is estimated with IMPLAN. The input-output model calculates how a change in one industry changes output, income, and employment in other industries. These changes, or impacts, are expressed in terms of direct, indirect, and induced effects. Impacts are interpreted as the contribution of the enterprise to the total economy. Direct effects represent the initial impact on the economy of some feature (i.e., construction or operations) of an enterprise. Indirect effects are changes in other industries caused by direct effects of an enterprise. Induced effects are changes in household spending due to changes in economic activity generated by both direct and indirect effects. Thus, the total economic impact is the sum of direct, indirect, and induced effects. Input-output analysis can interpret the effects of an enterprise in a number of ways including output (sales), labor income (employee compensation and proprietary income), employment (jobs), and tax revenue.

Output impacts are a measure of economic activity resulting from enterprise expenditures in a specific industrial sector. Output is equivalent to sales, and the output multiplier quantifies how initial economic activity in one sector leads to additional sales in other sectors. Personal income impacts measure purchasing power that is created due to the output impacts. This impact provides the best measure of how standards of living are affected for residents in the impact area (Crompton, Lee, and Shuster, 2001).

Direct output for the industry average cotton farm of $629,276 (table 2) is the summation of all farm expenses. Labor income includes labor expenses for three farm employees in table 1 ($25,776) and proprietary income of $22,783 paid to the operator. Proprietary income is estimated following methods proposed by Shurley (2006) as 5% of variable costs (VC) after subtracting $24,388 for selling cotton seed.

Table 2. Georgia Cotton Industry: Average Annual Economic Benefits to U.S.

Description	Direct Effect	Indirect Effect	Induced Effect	Total Effect
Output ($)	629,276	873,110	477,908	1,980,294
Labor Income ($)	48,559	283,892	156,814	489,265
Employment (jobs)	3	9	4	16
Federal Taxes ($)				99,280
State/Local Taxes ($)				70,621
Sum of Taxes ($)				169,901

Table 3. Georgia Cotton Industry: Average Annual Economic Benefits to Major U.S. Sectors

Sector	Output ($)	Labor Income ($)	Employment (jobs)
Agriculture	798,234	159,122	8
Mining & Construction	43,358	10,638	0
Utilities	33,889	6,901	0
Manufacturing	427,254	54,323	1
Transportation, Warehousing	46,923	19,179	0
Trade	96,420	42,825	1
Finance, Insurance & Real Estate (FIRE)	149,521	46,033	1
Services	330,928	144,296	4
Government	53,765	5,949	0
Total	1,980,294	489,265	16

Indirect and induced output impacts of $1.351 million lead to a total output impact of $1.980 million in the U.S. economy (table 2). Output beyond the direct impact at the farm level creates additional indirect labor income of $283,892 and induced labor income of $156,814. An additional 13 full-time and part-time jobs are involved with indirect and induced output. Total labor income of $489,265 and 16 jobs are associated with the industry average Georgia cotton farm. Output and income stimulated by the industry generates tax revenue for federal, state, and local governments. Total tax revenues are $169,901 of which $99,280 goes to the federal government, and $70,621 to state and local governments.

Impacts of cotton and peanut production extend beyond the agricultural sector into industries providing inputs and services for farming. Table 3 shows that while the agricultural sector has the greatest impact from the cotton industry, manufacturing and a broad range of services, including finance, insurance, and real estate (FIRE) are greatly impacted. Services and FIRE in table 3 have a combined $480,449 in output, generate $190,329 in labor income, and involve five jobs. Manufacturing has $427,254 in output and generates $54,323 in labor income.

Table 4. Georgia Cotton Industry: Economic Benefits to U.S., per Acre and Aggregate Total

Description	Per Acre	Total
Output ($)	1,886	3,562,171,707
Labor Income ($)	466	880,094,542
Employment (jobs)	0.01524	28,781
Federal Taxes ($)	95	178,585,810
State/Local Taxes ($)	67	127,033,727
Sum of Taxes ($)	162	305,619,537

Results in table 2 are reported for an industry average farm. Data for Georgia cotton and peanuts harvested indicate an average of 1,288,000 cotton acres and 601,000 peanut acres for 2002–2005 (USDA/NASS, 2006). Total impacts in table 2 are divided by 1,050, representing the model acres resulting in per acre averages in table 4. Per acreage averages are then multiplied by Georgia average aggregate cotton and peanut acreage of 1,889,000 acres to calculate aggregate U.S. impacts in table 4. Total U.S. output due to the Georgia industry is $3.562 billion. Labor income for employees and proprietors equals $880.095 million for a total of 28,781 full-time and part-time jobs. A total of $305.620 million in nationwide tax revenues are attributable to the Georgia cotton industry.

Simulation Model for the Georgia Cotton Industry

A model for simulation of the Georgia cotton industry can be conceptualized similarly to an optimization model that includes relevant variables depicting farm decision making (Richardson, 2004). An optimization model for the industry is specified as:

(10) $$\max NFI = \sum_i \left(R_i + G_i - VC_i\right) - FC,$$

where *NFI* is net farm income, *R* is market receipts for crop *i*, *G* is government payments received, *VC* is variable costs, and *FC* is fixed costs. Rather than identifying choice variables and technology constraints for maximizing the optimization model, simulation analysis applies reported data in determining *NFI*.

An alternative to typical normality assumptions in simulating stochastic commodity prices and yields is application of a multivariate empirical (MVE) distribution. The MVE distribution accounts for interrelationships occurring in the data and avoids enforcing a specific distribution on the variables. Simulating commodity prices and yields with an MVE distribution includes a correlation matrix that generates correlated stochastic variables (Richardson, Klose, and Gray, 2001). Simulation with MVE results in simulated random variables that are bounded by historical minimums and maximums of the original data. In contrast, simulation with normal distributions can result in simulated random variables that are outside of historical bounds. A procedure for simulating random variables with an MVE distribution utilizing Simetar is provided by Richardson, Schumann, and Feldman (2006).

Prices and yields (USDA/NASS, 2006) for 1996 through 2005 are applied in a simulation model representing the Georgia cotton industry. Average yields and prices from 500 iterations indicate Georgia cotton prices of $0.534/lb. with 670 lbs./acre for yield. The expected adjusted world price (AWP) for cotton is $0.457/lb. [USDA/Foreign Agricultural Service (FAS), 2006]. Average Georgia peanut prices are $365/ton with 2,832 lbs./acre for yield. Base acreages for calculation of direct payments (DP) and countercyclical payments (CCP) are equal to average industry acreages of 700 acres of cotton and 350 acres of peanuts. Base yields for cotton are 688 lbs./acre for DP and 717 lbs./acre for CCP. Peanuts have base yields of 3,160 lbs./acre for both DP and CCP [USDA/Farm Service Agency (FSA), 2003]. Georgia loan rates for cotton and peanuts are established by the Farm Service Agency (USDA/FSA, 2006).

Cost data for variables in equation (10) are derived from University of Georgia crop enterprise budgets developed for production in 2006 of cotton (Shurley, 2006) and peanuts (Smith, 2005) (as presented earlier in table 1). University of Georgia cotton budget data for 2006 include a whole-farm component based upon 700 acres of cotton. This acreage represents annual acreage that a single cotton harvesting unit (four-row picker) can manage assuming 25 eight-hour days suitable for fieldwork during the harvest period. Considering the whole-farm component, cotton is most often rotated with peanuts in Georgia for agronomic as well as economic reasons. The University of Georgia Cooperative Extension recommendation for rotation is to plant peanuts in a field once out of three years (Beasley, 1997). Research at the National Peanut Research Laboratory in Dawson, Georgia, indicates that a rotation of cotton-cotton-peanuts consistently returns higher profits than other rotations [USDA/Agricultural Research Service (ARS), 2005]. Data for 2002–2005 show that comparing Georgia harvested acreage of cotton to peanuts forms a 2.1-to-1 ratio, consistent with multiyear allocations in the most profitable rotation (USDA/NASS, 2006). Using this ratio, the average farm representing the Georgia cotton industry consists of 700 acres of cotton and 350 acres of peanuts. The peanut acreage is a reasonable estimate where a four-row peanut combine would require 160 hours suitable for fieldwork.

Agricultural support services include charges for ginning, drying, cleaning, scouting, and marketing. Labor cost of $25,776 includes wages only involved in crop production for three employees. Due to the "lumpy" nature of farm labor costs, employees may earn wages that are not directly related to crop production. These labor charges are included in overhead as a component of fixed costs. Some charges for repairs may accrue as wages when farm employees perform functions related to repair and maintenance.

Methods for calculating government payments consisting of DP, CCP, and loan deficiency payments (LDP) are presented by the Economic Research Service (USDA/ERS, 2004). R in equation (10) is determined by the simulation process, while VC

and F are industry averages and are constant. G includes DP, CCP, and LDP. Calculation of DP is given by:

$$(11) \qquad DP = PR_{direct} \times PY \times BA \times 0.85,$$

and is constant. PR_{direct} is the payment rate that is constant and established by FSRI. Payment yield (PY) and base acres (BA) are determined by historical farm data that establish constant parameters. Calculation of CCP is identical to DP except the payment rate for CCP is not fixed, but varies with stochastic prices. Payment rate for CCP is calculated as:

$$(12) \qquad PR_{CC} = \max\left\{0,\, TP - PR_{direct} - \max(P, LR)\right\},$$

where PR_{direct} is from equation (11); TP is a target price and LR is a loan rate, both of which are numerical constants established by legislation contained in FSRI. National market price of the commodity is represented by P, indicating that CCP varies only with price, and a minus sign signifies an inverse relationship.

An alternative provision in programs for marketing assistance loans is an LDP. Instead of putting commodities in storage for later loan repayment, a farmer may choose to receive benefits directly when marketing the commodity. Rates for LDP are determined by shortfalls in P that result when posted county prices or the adjusted world price for cotton are below the loan rate. Loan rates for LDP calculation are identical to LR in equation (12). Marketing loan gains from crops under loan are equivalent to gains from the LDP alternative. All quantities marketed are eligible for LDP, and total receipts for a given rate vary with stochastic yields.

Simulation analysis of equation (10) results in industry market revenue of $455,567 with 60% from cotton sales of lint and seed. Average returns to variable cost (table 5) are −$2,560. Fixed costs of $136,046 and land rent of $22,575 result in net farm income (NFI) of −$161,181 derived from market receipts. Adding total government payments of $162,898, or 26% of total revenue, results in an industry average NFI of $1,717. Cumulative distribution functions (CDFs) for NFI including government payments, and NFI with only market receipts, are presented in figure 1. All points of the CDF with government payments are to the right of the CDF with only market receipts. NFI at $0 with government payments intersects the probability axis at a 52% level, while the intersection with market receipts only is at a greater than 99% probability level.

As reported in table 2, estimated U.S. tax revenues for federal, state, and local governments are $169,901. Thus, of the $162,898 in government payments received by the average farm (table 5), 104% is redistributed back to public treasuries as newly created tax receipts. These results are consistent with the system of federalism in the United States in which each level of government has functions that it is best suited to perform (Tresch, 2002). Federal programs are uniquely capable of redistributing income for agricultural commodities. In turn, this action of agricultural industry support creates additional federal revenue and generates state and local revenues for programs best undertaken by these levels of government.

Table 5. Georgia Cotton Industry: Average Economic Returns and Government Payments

Description	Amount ($)	Description	Amount ($)
Returns to Variable Costs	!2,560	Government Payments	162,898
Fixed Costs	136,046	Net Farm Income	1,717
Land Rent	22,575	Net Farm Income w/o Gov't. Payments	!161,181

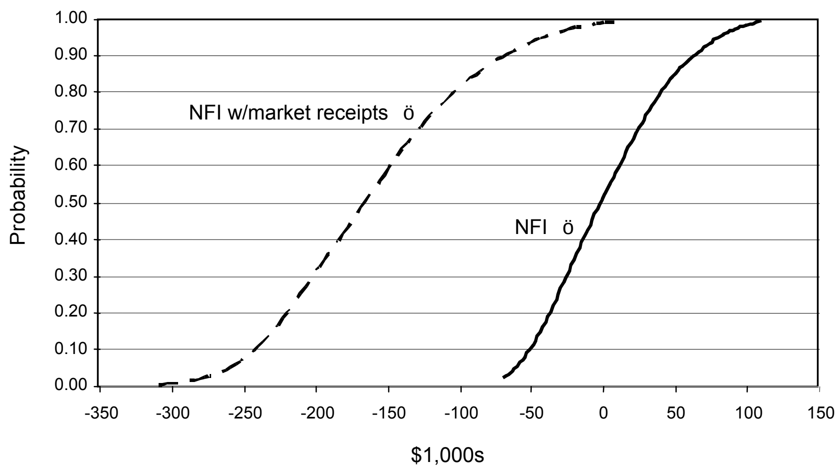

Figure 1. CDFs of net farm income (NFI) and net farm income with market receipts only

Net benefits to public treasuries in the United States average $7,003 per Georgia farm, while $489,265 of labor income is generated due to farm output. The Georgia cotton industry averages !$161,181 in net farm income without government payments. A negative result of this magnitude reveals that economic benefits from the cotton industry would not exist without commodity programs. The complete array of benefits for output, income, and employment (reported in tables 2 and 3) provides a basis for public choice outcomes regarding government support for the Georgia cotton industry.

Summary

The economic impact of the Georgia cotton industry to the U.S. economy is estimated using an input-output model. IMPLAN is applied to quantify industry economic impacts under Title 1 provisions of the Farm Security and Rural Investment Act of 2002. Simulation analysis is conducted to examine the importance of government payments to the cotton industry under conditions of stochastic yields and prices.

The results from the economic impact analysis give a measurement of the economic benefits and activity generated from the cotton industry. The total benefits suggest the economic viability of the industry is important not only for the agriculture sector, but for all major economic sectors. Average annual output of the industry average farm is $629,276, and the total annual economic benefit from output per farm is $1.980 million. Total labor income from 16 jobs is $489,265. Finally, the average cotton industry farm generates a state and federal tax revenue total of $169,901.

Nine major economic sectors benefit from cotton farm production ranging from $33,889 to $798,234 for output benefits, and $5,949 to $159,122 for labor income benefits. Agriculture has the largest economic sector output benefit of $798,234, labor income benefit of $159,122, and employment of eight jobs linked to the industry average farm. Manufacturing follows agriculture with the second largest output effect of $427,254. The services sector has the second largest labor income effect of $144,296 and employment of four jobs for each farm. When average farm impacts are aggregated to a state level, total U.S. output from Georgia production is $3.562 billion. Total labor income is $880.095 million associated with 28,781 jobs. Total tax revenues attributed to the Georgia cotton industry are $305.620 million.

Results from stochastic simulation of the industry average model farm show that cotton farms do not cover total costs with only market receipts. The average return above variable costs when considering only market receipts is ! $2,560. Any additional returns go to $136,046 in fixed costs. Government payments total $162,898, resulting in an average net farm income of $1,717.

The average amount of total government payments received by the industry average farm is $162,898. Total federal, state, and local taxes generated due to cotton farm production are $169,901, resulting in a net benefit to U.S. public treasuries of $7,003 per Georgia farm. Simulation results for the Georgia cotton industry suggest it is unlikely to remain economically viable without income support from government payments. Economic benefits attributed to the industry would be lost to the U.S. economy without commodity programs.

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