Aggregation of Normative Microsupply Relationships for Dryland Crop Farms in the Rolling Plains of Oklahoma and Texas

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PREFACE

The study, upon which this publication is based, is part of a Regional Research Project S-42, "An Economic Appraisal of Farming Adjustment Opportunities in the Southern Region to Meet Changing Conditions." This Regional Project is financed in part from Research and Marketing Act funds. It is a cooperative effort of the Departments of Agricultural Economics of the following State Agricultural Experiment Stations: Alabama, Arkansas, Georgia, Kentucky, Louisiana, Mississippi, North Carolina, Oklahoma, South Carolina, Tennessee, Texas, and Virginia, the Farm Production Economics Division, Economic Research Service, and Cooperative State Experiment Station Service of the United States Department of Agriculture. Dr. John W. White, Vice-president for Agriculture, University of Arkansas, is the administrative advisor, and Dr. J. H. White, University of Arkansas, is chairman of the Regional Technical Committee.

The Southern Farm Management Research Committee, sponsored by the Farm Foundation and the Southern Agricultural Experiment Stations, was helpful in the development of this Regional Project.

The overall purposes of this project are: (1) to provide guides to farmers choosing among alternative production opportunities, especially as those opportunities are affected by changes in prices and technology, and (2) to provide guides to farmers and other persons engaged in developing and administering public agricultural programs.

This publication was developed from a dissertation submitted in partial fulfillment of the requirements for the Doctor of Philosophy degree by John W. Goodwin, Oklahoma State University.

ACKNOWLEDGEMENT

The results presented in this publication are from Oklahoma Agricultural Experiment Station Project 1040, "An Economic Appraisal of Farming Adjustment Opportunities in Selected Areas of Oklahoma to Meet Changing Conditions." The work was done in cooperation with the Texas Agricultural Experiment Station under their Project 1181. The Rolling Plains Subcommittee members from Texas who aided in the collection of information and the formulation of the conceptual framework are Dr. Don S. Moore, and Dr. Kenneth R. Tefertiller of the A. and M. College of Texas, Department of Agricultural Economics, and Ralph H. Rogers, and James R. Martin, Farm Production Economics Division, Economic Research Service, U. S. Department of Agriculture.

AGGREGATION OF NORMATIVE MICROSUPPLY RELATIONSHIPS FOR DRYLAND CROP FARMS IN THE ROLLING PLAINS OF OKLAHOMA AND TEXAS

John W. Goodwin,* James S. Plaxico,** and William F. Lagrone***

This bulletin reports results of a study made to determine the effect of certain production alternatives on the normative aggregate supply and net income for dryland crop farms in a 40-county area of the Rolling Plains of Oklahoma and Texas. This is approximately that region designated as Economic Subregion 83 in the 1959 Census of Agriculture (see Figure 1).

The purpose of this analysis was to aggregate normative microsupply relationships into a compatible set of macrosupply estimates. The aggregative phase of the project provides information regarding effects of price changes on total agricultural production, farm income, and farm labor needs in the Rolling Plains. The objectives of this analysis are threefold:

(1) To develop and analyze alternative aggregation models consistent with the assumptions of the normative microsupply relationships.

(2) To estimate aggregate supply response for dryland crop farms under specified assumptions.

a. Total production of major commodities on dryland crop farms.

b. Net returns to factors of production on dryland crop farms.

(3) To estimate the aggregate quantities of specified inputs.

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Research reported herein was done under Station Project 1040.

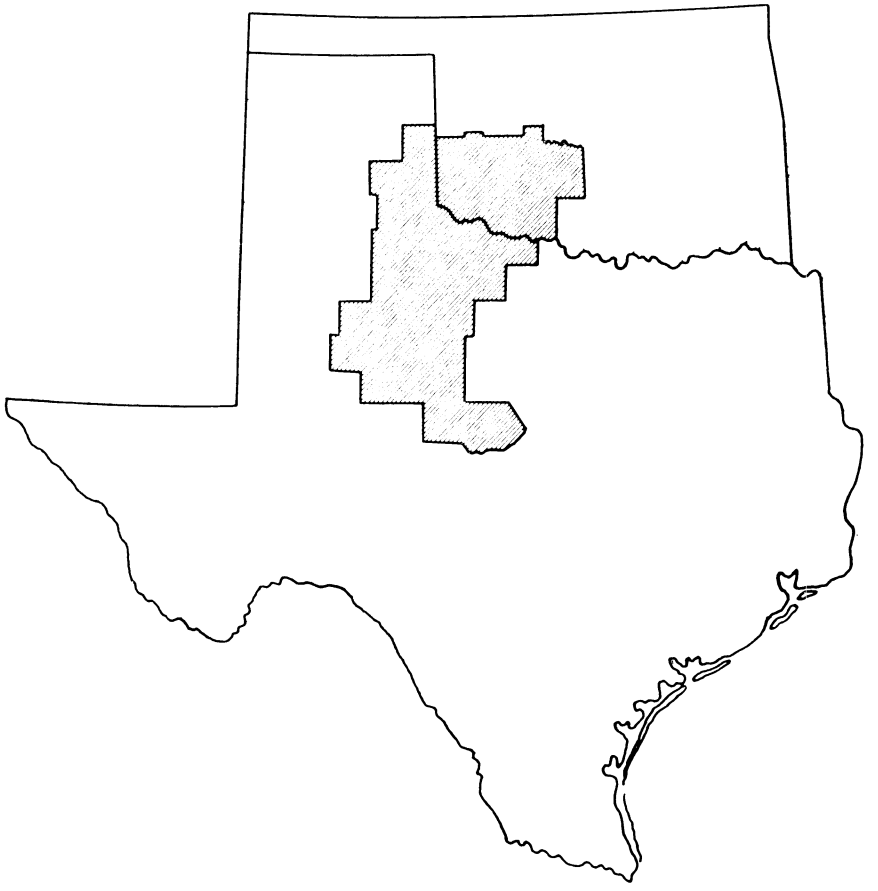

Figure 1. Shaded area shows Oklahoma and Texas counties in general area of study. This is approximate region designated Econ. Subregion 83, 1959 Census.

MICROSUPPLY ESTIMATES

Representative Situations

The Rolling Plains study area is characterized by three broad groups of soil resources: (1) clay soils, (2) loam soils, and (3) sandy soils. Each of these three soil resource groups occurs in relatively homogeneous blocks over extensive areas. Each group has been divided into cropland productivity classes. The acreages of the various soil resources were specified with the aid of Soil Conservation Service personnel in Oklahoma and Texas.

The distribution of dry cropland acreage by resource types is shown in Table 1. There are 301,610 acres of other dryland soils in the extreme southwestern portion of the study area not included in this report.

Table 1.—Cropland Acreage by Major Soil Groups

Soil Group	Dry Land		Irrigated		Total	
	Acres	Percent	Acres	Percent	Acres	Percent
Clay Soils:						
Oklahoma Clay (OC)	1,090,572	13	9,581	3	1,100,153	12
Texas Clay (TC)	866,463	10	8,768	3	875,231	10
Level Loam:						
Oklahoma Level Loam (OL_1)	844,974	10	86,259	27	931,233	10
Texas Level Loam (TL_1)	1,578,145	18	65,359	21	1,643,504	19
Rolling Loam:						
Oklahoma Rolling Loam (OL_2)	510,168	6	8,416	3	518,584	6
Texas Rolling Loam (TL_2)	1,219,977	14	22,964	7	1,242,941	14
Sandy Soils:						
Oklahoma Sandy (OS)	965,368	11	38,896	12	1,004,264	11
Texas Sandy (TS)	1,182,759	14	56,857	18	1,239,616	14
Other Soils:	301,610	4	19,816	6	321,426	4
Total	8,560,036	100	316,916	100	8,876,952	100

Source: *Land Use—Present and Expected Changes, Form N-1,* Budget Bureau No. 40-5759, Soil Conservation Service, Oklahoma and Texas
From the *National Inventory of Soil and Water Conservation Needs.*

Table 2 shows the distribution of Rolling Plains dry cropland soils within the study region, and the productivity class acreages within resource situations as shown by the National Inventory of Soil and Water Conservation Needs. The estimates of total acreage from this source exceed the figures included in the 1959 Census of Agriculture. Therefore, the percentage distributions of dry cropland (Table 3) were used to adjust the figures to the census levels. Table 4 indicates the percentage distribution of cropland capability classes for the total dry and irrigated bases for all resource situations.

If two soils could be expected to react similarly to economic stimuli, if their yield potentials were the same, and if they presented similar managerial problems, then these soils were considered to be the same for purposes of the analysis.

Ten resource situations were selected to represent farms within the

Table 2.—Distribution of Dry Cropland by Physical Resource Situations and Land Capability Classes

Physical Resource Situation	Land Capability Class					Total
	I or (a)	II or (b)	III or (c)	IV or (d)	V-VIII or (e)	
			— Acres —			
Clay Soils:						
Oklahoma Clay (OC)	0	359,647	416,060	180,666	134,199	1,090,572
Texas Clay (TC)	0	145,018	380,392	315,557	24,956	865,923
Loam Soils:						
Oklahoma Level Loam (OL_1)	469,193	289,565	79,881	188	6,147	844,974
Texas Level Loam (TL_1)	73,553	1,422,600	81,992	0	0	1,578,145
Oklahoma Rolling Loam (OL_2)	67,323	128,330	150,921	103,909	59,685	510,168
Texas Rolling Loam (TL_2)	0	346,313	601,290	229,697	42,639	1,219,939
Sandy Soils:						
Oklahoma Sandy (OS)	0	225,671	452,960	246,283	40,454	965,368
Texas Sandy (TS)	0	128,921	645,786	332,355	75,697	1,182,759
Total	610,069	3,046,065	2,809,282	1,408,655	383,777	8,257,848

Source: *Land Use—Present and Expected Changes, Form N-1*, Budget Bureau No. 40-5759, Soil Conservation Service, Oklahoma and Texas. From *National Inventory of Soil and Water Conservation Needs.*

Table 3.—Percentage Distribution of Dry Cropland by Physical Resource Situations and Land Capability Classes

Physical Resource Situation	Land Capability Class					Total	Percent of Total Dry Cropland
	a	b	c	d	e		
				— Percent of Cropland —			
Clay Soils:							
Oklahoma Clay (OC)	0.0	33.0	38.2	16.5	12.3	100.0	13.2
Texas Clay (TC)	0.0	16.7	44.0	36.4	2.9	100.0	10.5
Loam Soils:							
Oklahoma Level Loam (OL_1)	55.5	34.3	9.5	0.0	0.7	100.0	10.2
Texas Level Loam (TL_1)	4.7	90.1	5.2	0.0	0.0	100.0	19.1
Oklahoma Rolling Loam (OL_2)	13.2	25.1	29.5	20.4	11.8	100.0	6.2
Texas Rolling Loam (TL_2)	0.0	28.4	49.3	18.8	3.5	100.0	14.8
Sandy Soils:							
Oklahoma Sandy (OS)	0.0	23.4	46.9	25.5	4.2	100.0	11.7
Texas Sandy (TS)	0.0	10.9	54.6	28.1	6.4	100.0	14.3

Source: *Land Use—Present and Expected Changes, Form N-1*, Budget Bureau No. 40-5759, Soil Conservation Service, Oklahoma and Texas. From *National Inventory of Soil and Conservation Needs.*

Table 4.—Distribution of Cropland Capability Classes Within Resource Situations

Resource Situation	Cropland Capability Class and (Productivity Subscript) I (a)	II (b)	III (c)	IV (d)	V-VIII (e)	Total
			— Percent of Total —			
Clay Soils:						
Oklahoma (OC)	0.0	36.0	36.8	16.0	11.2	100.0
Texas (TC)	0.0	25.8	40.7	25.4	8.1	100.0
Level Loam Soils:						
Oklahoma (OL_1)						
Small Farm	56.0	34.7	8.0	0.0	1.3	100.0
Large Farm	56.0	34.7	8.0	0.0	1.3	100.0
Texas (TL_1)	4.7	90.1	5.2	0.0	0.0	100.0
Rolling Loam Soils:						
Oklahoma (OL_2)						
Small Farm	13.3	24.7	30.0	20.0	12.0	100.0
Large Farm	13.3	24.7	30.0	20.0	12.0	100.0
Texas (TL_2)	0.0	28.4	49.3	18.8	3.5	100.0
Sandy Soils:						
Oklahoma (OS)	0.0	25.0	46.0	25.0	4.0	100.0
Texas (TS)	0.0	11.0	57.0	27.0	5.0	100.0

area. The acreages of the various cropland capability classes, native pasture, farmstead, etc., and the total acreages assumed for each of the ten representative farms are shown in Table 5. An analysis of farms in sample communities provided estimates of current differences in the size distributions within resource situations and the relative importance —in terms of resources controlled—of farm size groups. Therefore, the situations are considered representative with respect to organizational responses to price changes and adjustment opportunities.

Microsupply relationships for the individual farms are represented by linear programming results. If farm supply relationships for farms in a given resource situation fall within a given range of linearity—that is, if the resources controlled by all farms, and if the organization of those resources and the production of enterprises are in the same proportions—then a single farm may be used to represent this range of linearity. If some factor such as farm size causes the relationship between any two limiting resources to be curvalinear, then line segments represented by two or more representative farms may be used to approximate the nonlinear relationship.

The resident farm labor force has been assumed to be the farm

Table 5.—Resource Assumptions for 10 Representative Farm Situations

Resource[1]	Unit	Resource Situation: Clay Soils — Oklahoma	Clay Soils — Texas	Loam Soils — Level Phase — Oklahoma — Small	Loam Soils — Level Phase — Oklahoma — Large	Loam Soils — Level Phase — Texas	Loam Soils — Rolling Phase — Oklahoma — Small	Loam Soils — Rolling Phase — Oklahoma — Large	Loam Soils — Rolling Phase — Texas	Sandy Soils — Oklahoma	Sandy Soils — Texas
Total Land	Acre	1,280	1,280	430	960	960	240	960	960	640	640
Cropland:											
Class a	"	0	0	210	420	35	25	100	0	0	0
Class b	"	360	258	130	260	676	50	185	213	125	55
Class c	"	368	407	30	60	39	55	225	370	230	285
Class d	"	160	254	0	0	0	35	150	141	125	135
Class e	"	112	81	5	10	0	23	90	26	20	25
Total Cropland	"	1,000	1,000	375	750	750	188	750	750	500	500
Native Pasture	"	235	235	85	175	175	37	175	175	115	115
Farmstead, etc.	"	45	45	20	35	35	15	35	35	25	25
Operator Labor[2]											
Jan-Apr	Hour	538	538	667	581	581	710	581	581	624	624
May-July	"	506	506	605	539	539	638	539	539	572	572
Aug-Sept	"	352	352	418	374	374	440	374	374	396	396
Oct-Dec	"	462	462	561	495	495	594	495	495	528	528
Total	"	1,858	1,858	2,251	1,989	1,989	2,382	1,989	1,989	2,120	2,120

[1] Additional available resources include hired labor and capital. Hired labor is restricted to a level which is profitably used at a cost of $1.00 per hour. Capital is restricted to an amount that can be used in combination with other resources such that returns are at least 6 or 18 percent (whichever is specified) for each unit of capital used (see text).

[2] Assumes 22 working days per month except February in which there are 20 working days. Allows 8 hours per day Dec.-March; 9 hours per day in April, May, and November; and 10 hours per day in June-October for the 240-acre farm exclusive of management time. Subtract ½ hour per day for the 480-acre size, 1 hour per day for the 640-acre size, 1½ hours per day for the 960-acre size, and 2 hours per day for the 1,280-acre size to determine hours of operator labor available.

operator only, with allowance made for overhead and management functions. It is assumed that all other labor must be hired. Operator labor has been distributed over the year to account for differences in labor availability due to differences in overhead labor requirements and managerial functions.

The firm's adjustment may depend upon the temporal relationship between the firm's actual position—usually nonoptimal—and the position which would be optimal given present or expected price relationships and technological possibilities. In this analysis, it is assumed that farmers of the Rolling Plains use the most advanced technology presently available.

Production Alternatives

Factors endogenous to the overall economy, but exogenous to the individual farm, may restrict the general applicability of any enterprise. Inclusion of such enterprises may lead to microestimates which are incompatible—when aggregated—with the aggregate economic conditions assumed.

Alternatives which have been excluded from this analysis include dairy, beef cattle ranching, poultry and livestock-feeder operations, and irrigation. Acreages presently employed in these uses are removed from the resource base and assumed to remain constant. Dairy and poultry have been eliminated from consideration because the market situation for these products is such that relatively small acreages could produce enough of these products to satisfy the current demand. This figure does not account for interarea competition from areas adjacent to the study region. Resources which are presently in cattle ranches are assumed to remain in ranches. Only those livestock enterprises which are land-based may be produced on crop farms. Because of the very small present irrigated acreage, (approximately three percent of total cropland,) and the lack of adequate data concerning yield possibilities on irrigated land, production on irrigated cropland has been excluded from the analysis.

Resources included in the base for analysis are those resources which are currently in dryland crop farms. The enterprises which these resources are allowed to produce are those which face market and production conditions that indicate general adjustment alternatives. Thus, the enterprises included for all resource situations are cotton, wheat and other small grains, forage, and a variety of land-based feeder steer and cow-calf operations. Sandy and loam soils have the additional alternatives of grain sorghums and alfalfa hay.

Prices, Costs, and Institutions

Data on prices paid and received by farmers are shown in Table 6. Since cotton obviously competes with other enterprises for resources, meaningful answers can be derived only when the prices received for all major products are varied. In the Rolling Plains, cotton, wheat, feed grains, and beef are the major products. For purposes of this analysis, wheat is assumed to be priced essentially on a feed grain basis. Beef production is dependent upon feed grain and forage production. Thus, feed grains and beef have been aggregated in the sense that their prices have been simultaneously varied by the same magnitude and in the same direction. In this study, the assumed base price for cotton (Table 6) has been varied ±20 and ±40 percent. Assumed prices for wheat, feed grains, and beef cattle have been varied ±30 percent for a total of 15 price combinations—five prices of cotton and three prices of wheat, feed grains, and beef cattle.

The supply functions for resource inputs are assumed to be perfectly elastic since agriculture uses a small proportion of these resources. Changes in agricultural demand for inputs specified are unlikely to affect their prices. Resource costs are assumed to be at 1958 levels as estimated from a field survey of machinery, feed and seed, and fertilizer dealers in the study area. The averages of the prices estimated by these dealers are used throughout the analysis. In the case of machinery, allowance is made for the average discount allowed for trade-in, and in the case of feed, seed, and fertilizer, adjustments are made for bulk purchases. Fencing and specialized building equipment costs are estimated for the livestock enterprises, based on engineering estimates. Custom farm wage rates were derived from a recent survey of farm operators. Hourly wage rates are assumed to be $1.00 per hour—a figure currently observed in the northern portion of the area, but somewhat higher than in the southern and central portions.

No allotments or other restraints upon crop acreages or production are assumed as a major institutional framework. However, only the land-based beef-type enterprises were considered. Firms are assumed to behave within this framework so as to maximize profits under the assumptions of perfect competition.

MICROESTIMATES Using the land resources on representative farms as restrictions, programming models were constructed to determine the optimum farm organizations through linear programming techniques. The programmed optima include estimates of commodity production, labor hired, and net income received. The net income figures estimate

Table 6.—Assumed Prices Paid and Received by Farmers

Item	Unit	Assumed Price
Prices Paid		
Seed		
Alfalfa, improved	cwt.	$30.00
Sudan grass, sweet	cwt.	6.00
Seed oats	bu.	1.10
Cotton seed	bu.	2.50
Seed wheat	bu.	2.25
Grain Sorghum	cwt.	7.00
Blue panic grass	lb.	.75
Feeds		
Alfalfa hay	ton	25.00
Cottonseed cake	ton	76.00
Custom Rates		
Small grain combining	acre	3.00
Cotton stripping	cwt. seed cotton	.75
Hay baling	bale	.16
Combining alfalfa	acre	5.00
Spraying and dusting		
Cotton insecticide	acre	2.00
Cotton desiccant	acre	2.00
Cotton hoeing	acre	2.50
Hand cotton harvest	cwt. seed cotton	2.00
Cotton hauling	cwt. seed cotton	.25
Cotton ginning	cwt. seed cotton	.65+ 4.00 for wrapping and ties
Fuel and Lubricants		
LP gas	gal.	.09
Gasoline (regular)	gal.	.20
Diesel oil	gal.	.16
Kerosene	gal.	.15
Motor oil	gal.	1.00
Grease	lb.	.20
Labor	hour	1.00
Machinery	item	(1958 costs)
Livestock		
Stockers	cwt.	*
Prices Received		
Wheat	bu.	1.25
Oats	bu.	.65
Grain sorghum	cwt.	1.70
Cotton lint	lb.	.22
Cotton seed	ton	50.00
Alfalfa hay	ton	20.00
Alfalfa seed	lb.	.21
Milk	cwt.	4.25
Beef cattle	cwt.	*

* See Okla. Agr. Exp. Sta. Processed Series P-369, Feb. 1961, Appendix Table 3, p. 44.

returns to land, operator labor, risk, and management. These are the microsupply relationships which are to be aggregated for the entire study region. Detailed figures concerning the microsupply estimates are in the process of publication.

AGGREGATIVE PROCEDURES

Resources Available for Adjustment

As Boulding points out, individuals can profit from certain actions only because most other individuals refrain from similar actions. Similarly, because of the atomistically competitive nature of the agricultural industry, an enterprise which may appear to be a profitable alternative at the firm level may not be an acceptable alternative in the aggregate.

Through analysis based on the 1959 Census of Agriculture, it has been determined that the relative importance of the excluded alternative resource uses has been relatively constant since 1945. Therefore, it is assumed that the relative acreages employed in these alternative uses will tend to be constant in the future. Further, it is assumed that these resource uses are proportionally distributed among the various resource situations.

AGGREGATIVE RESOURCE BASES Three primary resource bases have been estimated. Estimated acreages for each of these bases are found in Table 7. All resource bases exclude the acreage in the excluded alternatives. Base Number I includes all land in included resource uses, and refers to a full adjustment aggregation. Base II indicates the distribution of responsive and limited response (or nonresponsive) resources for the current observation of resource use, with part-time, semiretired, and Commercial Class VI farms being designated as nonresponsive. Base III shows the distribution of included resources between the responsive and nonresponsive groups, with resources controlled by individuals older than 55 years of age being added to the nonresponsive base.

Aggregative Weights

In a normative analysis such as this study, the model for aggregation is simple addition within cells (or resource situations) and then addition across cells. Resource costs have been assumed constant. Therefore,

Table 7.—Aggregative Resource Bases for Alternative Aggregative Models

Item	Aggregative Resource Base Number		
	Base I	Base II	Base III
		— Acreage —	
Total Farm Land	21,564,099	21,564,099	21,564,099
Excluded Alternatives			
Irrigated Cropland	309,976	309,976	309,976
Dry Cropland	2,444,391	2,444,391	2,444,391
Native Range	10,592,611	10,592,611	10,592,611
Other Land	225,373	225,373	225,373
Total Exclusions	13,572,351	13,572,351	13,572,351
Included Resources			
Fully Responsive Included Land			
Dry Cropland	5,510,802	5,225,532	3,749,483
Native Range	2,290,831	2,143,127	1,481,600
Other Land	190,115	183,578	51,495
Total	7,991,748	7,552,237	5,282,578
Nonresponsive, or Limited Responsive Land			
Dry Cropland	0	285,270	1,761,319
Native Range	0	147,704	809,231
Other Land	0	6,537	138,620
Total	0	439,511[1]	2,709,170[2]

Source: U. S. Department of Commerce, Bureau of the Census, *U. S. Census of Agriculture, 1959 and 1954*.

[1] Includes land currently in part-time, semiretired, and Commercial Class VI farms.

[2] Includes land in farms whose operators are 55 years old or over, and land in part-time, semiretired and Commercial Class VI farms.

addition of the firm supply curves (which are the firm marginal cost curves) is consistent with economic theory. If a given set of conditions are in force, then similar firms should react to those conditions in a similar manner. Aggregative relationships, if they are to be consistent with the generated microrelationships, must then reflect the summation of these individual firm reactions. Summation within cells and then across cells is consistent with Theil's criteria for perfect aggregation. The normative macrorelationships will reflect and be consistent with the normative microrelationships.

Each of the models used in this analysis employs the simple weighted average summation technique of aggregation. The primary differences in these models are differences arising from assumptions in regard to response patterns for individuals, and the manner and rate at which they adjust their operations in response to economic stimuli.

The aggregative weights for each aggregation are computed in the following manner. The aggregative resource bases as shown in Table 7 are distributed among resource situations in the same proportions as the resources occur in the area. The cropland acreages of the representative farms are then divided into the corresponding aggregate cropland acreages to gain estimates of the weights to be used in estimating aggregates for that resource base.

MODEL A AGGREGATIVE RESULTS

All Model A aggregations have been formulated by identical aggregative methods. However, the resource bases and assumptions vary as one moves from aggregation to aggregation. The basic variation is due to the level of adjustment to changing prices.

Cropland acreages of responsive resources by resource situations are shown in Table 8, while Table 9 indicates the numbers of representative farms which are consistent with these cropland acreages. The representative farm numbers then become the aggregative weights to be applied to the microsupply estimates in the computation of totals for responsive

Table 8.—Distribution of Cropland Acreage Among Resource Situations; Resource Bases for Model A Aggregations

Resource Situation	Percentage of Total Acres	Aggregation Number		
		A-I	A-II	A-III
			— Acres of Cropland —	
Clay Soils				
Oklahoma (OC)	13.2	727,426	689,770	494,932
Texas (TC)	10.5	578,634	548,681	393,696
Level Loam Soils				
Oklahoma (OL_1)				
Small Farm	6.1	337,261	318,757	228,718
Large Farm	4.1	224,840	214,247	153,729
Texas (TL_1)	19.1	1,052,564	998,077	716,151
Rolling Loam Soils				
Oklahoma (OL_2)				
Small Farm	3.3	181,856	172,443	123,733
Large Farm	2.9	159,813	151,540	108,735
Texas (TL_2)	14.8	815,599	773,379	554,923
Sandy Soils				
Oklahoma (OS)	11.7	644,764	611,387	438,690
Texas (TS)	14.3	788,045	747,251	536,176
Total	100.0	5,510,802	5,225,532[1]	3,749,483[2]

[1] A-I base less cropland in part-time, semiretired, and Commercial Class VI farms.

[2] A-II base less cropland in Commercial Class IV farms whose operators are 55 years old or over.

Table 9.—Number of Representative Farms Consistent with Total Aggregative Cropland Bases for Model A Aggregations by Resource Situations

Resource Situation	Representative Farm Cropland Acreage	Aggregation Number A-I	A-II	A-III
Clay Soils:				
Oklahoma (OC)	1,000	727.4	689.7	494.9
Texas (TC)	1,000	578.6	548.7	393.7
Level Loam Soils:				
Oklahoma (OL_1)				
Small Farm	375	896.4	850.0	609.9
Large Farm	750	301.3	285.7	205.0
Texas (TL_1)	750	1,403.4	1,330.8	954.9
Rolling Loam Soils:				
Oklahoma (OL_2)				
Small Farm	188	967.3	917.2	658.2
Large Farm	750	213.1	202.1	145.0
Texas (TL_2)	750	1,087.5	1,031.2	739.9
Sandy Soils:				
Oklahoma (OS)	500	1,289.5	1,222.8	877.4
Texas (TS)	500	1,576.1	1,494.5	1,072.4
Total		9,040.6	8,572.7	6,151.3

resources under the assumptions of the various Model A aggregations. It is to be emphasized that representative farm numbers used as aggregative weights do not represent the actual number of farms.

For discussion purposes, the analysis will be restricted to general relationships which may be observed in the Model A aggregates.

Aggregation A-I

Aggregation A-I represents the full adjustment assumption. Figure 2 indicates the effects of changing cotton and feed grain-livestock prices, and capital costs upon the total net return and the total production of cotton. As would be expected, as cotton prices increase, cotton production and income also increase. As the feed grain-livestock prices increase, cotton production is reduced, but income increases. Increasing capital cost from six to 18 percent reduces income, and generally causes cotton production to increase.

An exception to this generalization may be observed at cotton priced at $26.40 per hundredweight, when the feed grain-livestock price is held constant at 70 percent of the base price. In this case, cotton pro-

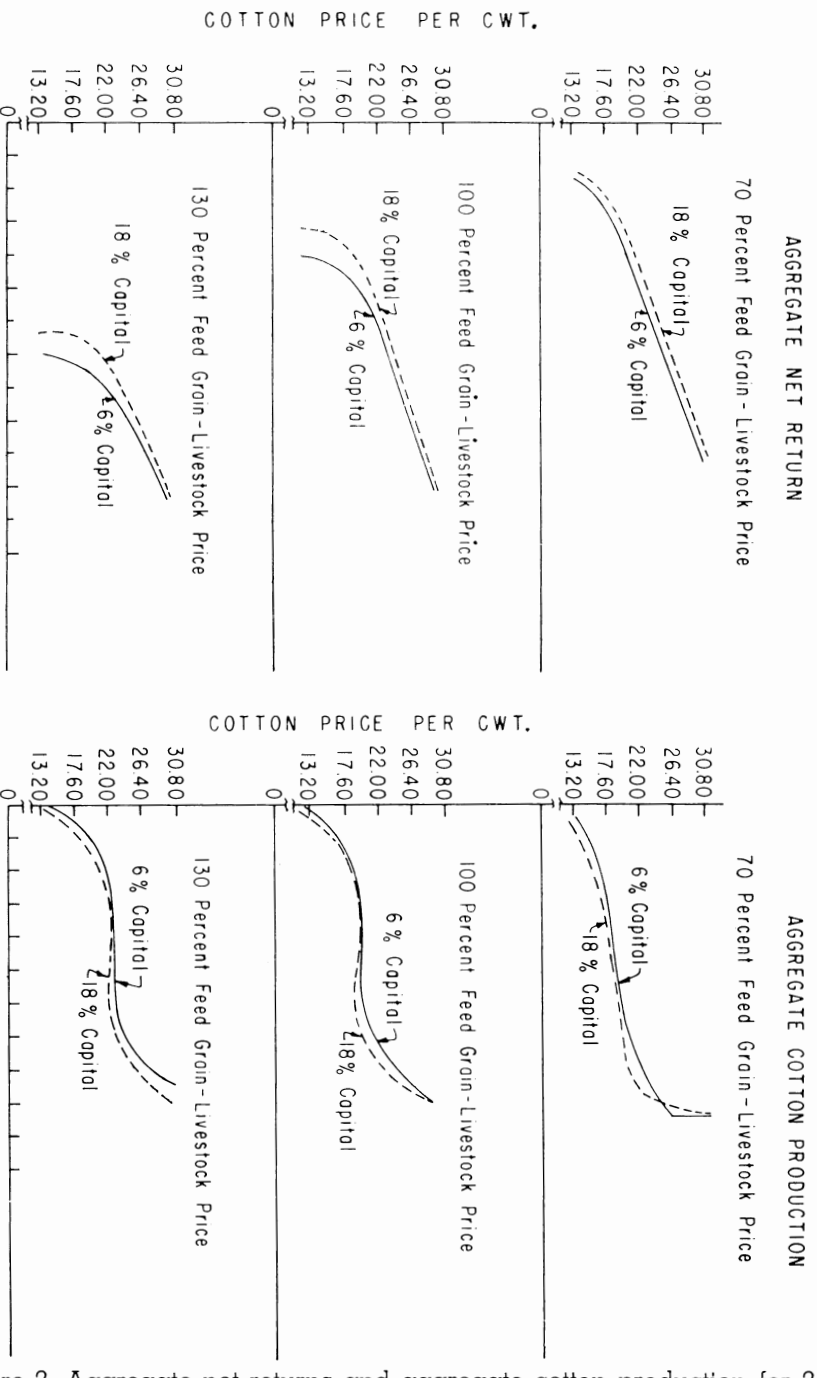

Figure 2. Aggregate net returns and aggregate cotton production for 2 capital cost levels, by feed grain-livestock and cotton price levels, Aggregation A-I.

duction is less at 18 percent capital cost than at six percent. This may be explained by the fact that cotton supply is in general rendered more elastic when capital cost increases at low feed grain-livestock prices. Thus, cotton production reaches a physical maximum with the cheaper capital at a lower cotton price than with the relatively more expensive capital, and then is completely inelastic as price increases. In either case, when cotton price is $30.80 per hundredweight of lint, Rolling Plains cotton production is at full capacity of 9.5 million hundredweights, or about two million bales.

Cotton production increases with increased restriction upon capital. This may be explained by the fact that cotton tends to be a capital-extensive, labor-intensive enterprise, relative to the other programmed alternatives. As the price of a factor is increased, the entrepreneur attempts to equalize marginal cost and marginal returns for all resources within and between enterprises. Thus, he would combine relatively less of the more expensive factor and relatively more of the less expensive factor as the price of any factor increased. Since hired labor cost is assumed to remain constant at $1.00 per hour, as capital cost increases, the manager restores equilibrium in his firm by increasing the use of labor and reducing the use of capital. Since cotton extends capital over a larger group of other resources, it is the enterprise chosen to restore equilibrium.

Livestock numbers behave in precisely a reverse manner from cotton in reacting to changing capital cost levels (see Figure 3). As would be expected, cattle numbers increase as livestock prices increase, but increased capital cost restricts livestock enterprises. This results from the relatively very high capital investment these enterprises require (that is, livestock is a capital-intensive, labor-extensive enterprise). Further, as capital cost increases from six to 18 percent, cows are relatively much more important, since a cow-calf operation is less capital-intensive than a land-based stocker steer operation.

The reaction of feed grain production to capital restriction is dependent upon the cotton price level. Feed grains and cotton compete for land resources; therefore, at low cotton prices, feed grain production is very high. Much land is used for forage production. As capital cost is increased feed grain production is reduced at low feed grain prices. This results from the "intermediately" capital-extensive character of the feed grain enterprise. Cotton replaces both livestock and feed grains at low livestock-feed grain prices as a result of capital restriction, since it is relatively more capital extensive. At high feed grain prices and low cotton prices, feed grains have a relatively more favorable profit position.

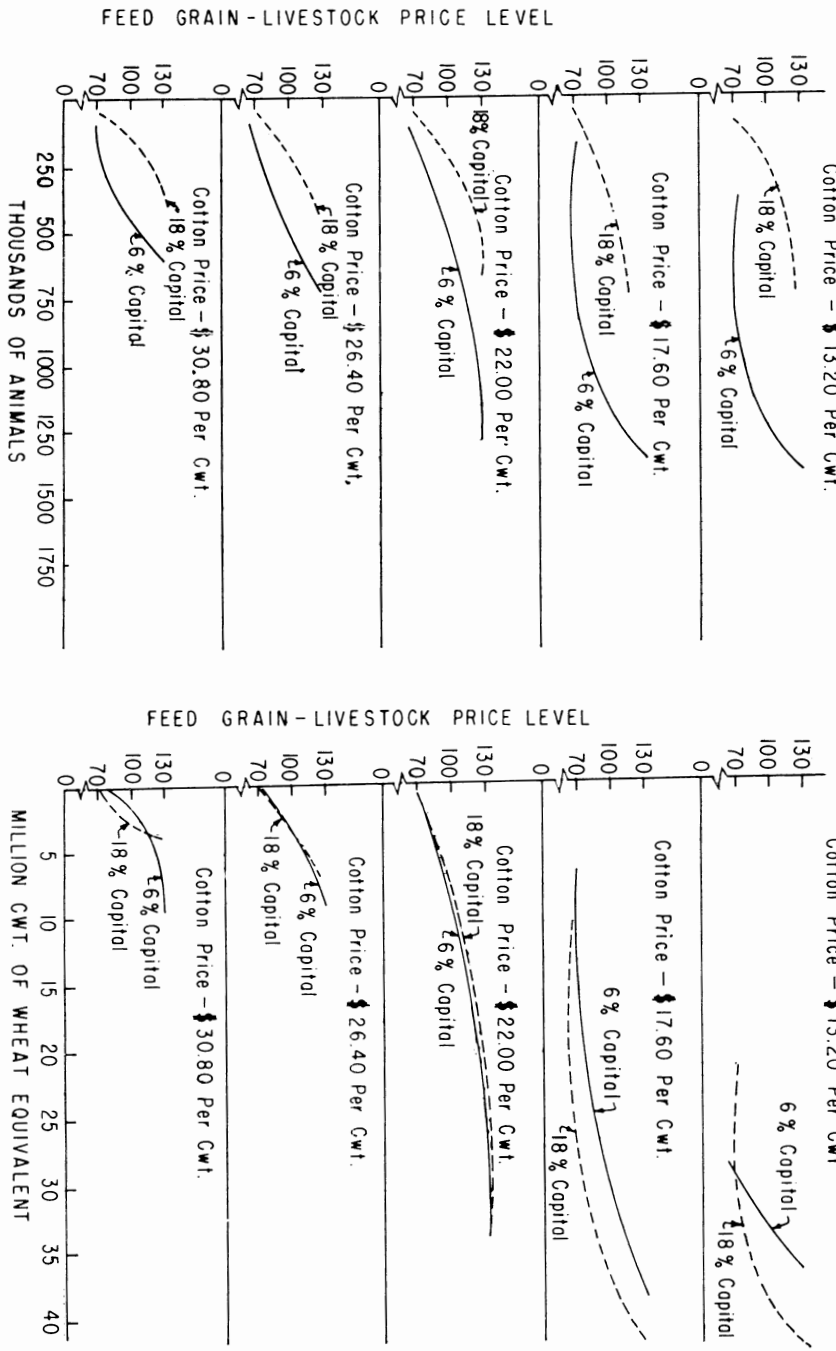

Figure 3. Total livestock numbers and aggregate feed grain production for 2 capital cost levels by feed grain-livestock and cotton prices, aggregation A-I.

Therefore, it joins cotton in replacing livestock enterprises. But as cotton prices increase, feed grain production becomes sensitive to capital limitation. That is, it is replaced by cotton, rather than joining cotton in replacing livestock.

The functions graphed in Figure 3 are not true supply response functions, since the necessary *ceteris paribus* conditions are absent (that is, feed grain and livestock prices are varied simultaneously). It is impossible from the information given to separate the complementary relationships—assuming that they do in fact exist—in estimating the responsiveness of the two products.

Labor hired for all aggregations is highly correlated with cotton acreage. In Aggregation A-I, the lowest labor requirement occurs at the highest feed grain-livestock price, with capital at 18 percent and cotton priced at $13.20 per hundredweight. This combination also produces the smallest quantity of cotton. The lower the feed grain-livestock price, the more cotton is apt to be produced, and hence, the more labor required. High labor requirements are normally associated with high cotton prices, since cotton is the most labor-intensive enterprise.

Aggregations A-II and A-III

As mentioned earlier, Aggregations A-II and A-III assume that certain resources included in A-I are nonresponsive. These resources are assumed to maintain current resource organization and production. The magnitudes of these resources and their production are listed in Table 10. Since current organization and production are assumed, the magnitudes of these resources and their production remain constant regardless of the farm size distribution.

Total production for all included resources would be obtained simply by shifting the curves to the right by the quantities of the products indicated for Aggregation A-II in Table 10. For Aggregation A-II, these quantities are so small that they have been ignored.

It is not feasible to estimate income for the nonresponsive resources organized for current conditions. Likewise total labor and capital requirements could not be estimated for the nonresponsive resources.

Aggregate production and income for responsive resources for Aggregations A-II and A-III react in precisely the same manner as for Aggregation A-I. Primary differences are those of magnitude. Of particular significance in Aggregation A-III is the size of the nonresponsive resource base. Approximately a third of all cropland resources are in this classi-

Table 10.—Aggregate Estimates of Specified Items, Nonresponsive Resources in Aggregations A-II and A-III

Item	Unit	Quantity
Resources designated nonresponsive for Aggregation A-II: Commercial Class VI, part-time and semiretired farms		
Total land	acres	439,511
Cropland	acres	285,270
Native Range	acres	147,704
Cotton acreage	acres	37,629
Cotton production	cwt lint	47,510
Feed Grain acreage	acres	84,837
Feed Grain production	cwt, wheat equivalent[1]	535,563
Cows	each[2]	10,990
Designated Nonresponsive for Aggregation A-III: Commercial Class VI, part-time and semiretired farms plus those farms operated by individuals older than 55 years of age		
Total land	acres	2,709,170
Cropland	acres	1,761,319
Native Range	acres	809,231
Cotton acreage	acres	437,638
Cotton production	cwt lint	1,045,319
Feed Grain acreage	acres	685,589
Feed Grain production	cwt wheat equivalent[1]	5,749,211
Cows	each[2]	60,211

[1] All grain production has been estimated on hundredweight of wheat equivalent, adjustments having been made for price differences and weight differences.

[2] Cow numbers have been budgeted from John W. Goodwin, et al., *Resource Requirements; Costs and Expected Returns, Alternative Crop and Livestock Enterprises, Clay Soils of the Rolling Plains of Southwestern Oklahoma*, p. 32.

Source: U. S. Department of Commerce, Bureau of the Census, *U. S. Census of Agriculture, 1959.*

fication, compared with only 5 percent in Aggregation A-II. When the current production coefficients for these resources are added to the aggregate figures for the responsive resources, a rather noticeable difference is observed.

Aggregation A-III allows much less of all products to be supplied. Total income under the stated price assumptions would be apt to be reduced more than the production of all crops, compared with Aggregation A-I, since that aggregation represents optimal organization of all resources.

With all Type "A" aggregations, there is a range within which cotton supply approaches perfect elasticity. This range occurs between cotton prices of $17.60 and $22.00 per hundredweight of lint, if feed grain and livestock prices are at or below the base levels. If feed grain-livestock prices rise above the base, the range is between $22.00 and

$26.40 per hundredweight. The assumptions of Aggregation A-III considerably reduce the extent of this range.

Cropland Reseeding Alternatives

In all Type "A" aggregations, the maximum acreage of cropland reseeded to permanent pasture occurred for the full adjustment aggregations when capital cost was six percent, livestock and feed grains were priced at 100 percent of the base price, and cotton was priced at $13.20 per hundredweight. In no case did the cropland reseeding alternative exceed nine percent of the total included cropland base. If interest rates were increased, then the resulting capital restriction limited reseeding to pasture to a maximum of one percent of the total cropland. If cotton prices were increased, reseeding was decreased. If livestock-feed grain prices were increased, then feed grains and cultivated pasture replaced much of the reseeded land. If livestock-feed grain prices were reduced, then revenue from the cattle which used the reseeded land was so low that reseeding lost its attraction, and much land was left idle.

In all cases, cropland reseeded to pasture was restricted to the lower productivity classes of land (that is, the class "d" and "e" soils).

Summary

The assumptions of the Type "A" models present a type of hybrid relationship with respect to time. The responsive resources have been assumed to adjust completely to the changing conditions—without institutional restraints—while nonresponsive resources do not adjust from their current positions. This situation implicitly assumes that the nonresponsive resources are subject to restraints, personal or other, similar to the current institutional restraints of acreage controls and price supports, while the responsive resources are free of them.

If it can be shown that the nonresponsive resources are in fact optimally organized within the framework of present prices—with the institutional restrictions removed—then Aggregations A-II and A-III may be shown to have some validity. If, on the other hand, these nonresponders would operate differently if free of all institutional restraints, A-II and A-III are of limited usefulness. The full adjustment aggregation (A-I) is, of course, still relevant.

Other shortcomings of the Type "A" models include the difficult task of estimating such things as net returns, labor hired, etc., for nonresponsive resources.

Despite its shortcomings, several useful facts may be drawn from

the Type "A" model. Under optimum resource organization, there is a broad range of output within which cotton supply approaches perfect elasticity. When resources become nonresponsive to price changes, the length of this range is shortened, and the entire supply function in general becomes less elastic.

MODEL B AGGREGATIVE RESULTS

Model B aggregations have been formulated by the simple summation method, the same as Model A. Aggregation B-I—the full adjustment aggregation—is identical with the six percent capital cost level of A-I.

The primary difference in the Model A and Model B aggregations lies in the assumptions made with regard to the nonresponsive resources. In Model A, these resources were assumed to remain at their present levels of production and organization; whereas, in Model B, these resources are assumed to make a limited adjustment. Responsive resources are assumed to react as if a six percent return on capital were required, while limited response resources are assumed to require an 18 percent return.

Cropland acreages and aggregative weights for responsive resources in the Model B aggregations are the same as for responsive resources in Model A. While the Model B limited response resources are of the same magnitudes as for the corresponding Model A aggregations, they have been distributed according to cropland ratios and aggregative weights. The cropland distribution for Model B responsive resources is identical with Model A (Table 8), while that for nonresponsive resources is shown in Table 11. The numbers of representative farms consistent with nonresponsive acreages (that is, the aggregative weights) are shown in Table 12.

Aggregation B-II

Even though only five percent of cropland resources are limited by the increased capital return requirement for B-II, there is a difference in aggregative response, compared with results of Aggregation A-II. Overall cotton production tends to be greater at high cotton prices and lower at low cotton prices. Overall livestock numbers behave in the same general manner, and overall grain production tends to be greater than the six percent capital cost level of production for A-II, in both the position and slope of the function. As in Model A, labor requirements are correlated with the acreage of cotton.

Table 11.—Distribution of Cropland Acreage Among Resource Situations; Limited Response Resource Bases for Model B Aggregations

Resource Situation	Percentage of Total Acreage	Aggregation Number		
		B-I	B-II[1]	B-III[2]
Clay Soils:				
Oklahoma (OC)	13.2	0	37,656	232,494
Texas (TC)	10.5	0	29,953	184,938
Level Loam Soils:				
Oklahoma (OL_1)				
Small Farm	6.1	0	18,504	108,543
Large Farm	4.1	0	10,593	71,111
Texas (TL_1)	19.1	0	54,487	336,413
Rolling Loam Soils:				
Oklahoma (OL_2)				
Small Farm	3.3	0	9,413	58,123
Large Farm	2.9	0	8,273	51,078
Texas (TL_2)	14.8	0	42,220	260,676
Sandy Soils				
Oklahoma (OS)	11.7	0	33,377	206,074
Texas (TS)	14.3	0	40,794	251,869
Total	100.0	0	285,270	1,761,319

[1] Includes resources currently controlled by Commercial Class VI, part-time and semiretired farms

[2] Includes resources currently controlled by Commercial Class VI, part-time and semiretired farms, and those controlled by operators older than 55 years.

Since limited response resources require a higher capital return, cotton production is increased at high cotton prices because of the combination. This is due to absence of the acreage allotment restriction upon the limited response resources and the capital-extensive nature of the cotton enterprise. For example, at the 100 percent price level for feed grains and livestock, and at a cotton price level of $30.80 per hundredweight of lint, total cotton production for B-II is 9,329,631 hundredweights. Total production under the corresponding full adjustment models (A-I and/or B-I) is 9,326,195 hundredweights. At a six percent capital cost, responsive A-II resources show 8,843,571 hundredweights. Nonresponsive A-II resources produce 47,510 hundredweights of cotton lint, for a total of 8,891,081 hundredweights.

Given the circumstances cited above, the difference between cotton production for Aggregations A-II and B-II is 438,550 hundredweights. Of this, 3,436 hundredweights may be attributed to the capital-extensive nature of the cotton enterprise, while the remainder of 435,114 hundred-

Table 12.—Number of Representative Farms Consistent with Limited Response Cropland Bases for Model B Aggregations by Resource Situations

Resource Situation	Representative Farm Cropland Acreage	Aggregation Number		
		B-I	B-II	B-III
Clay Soils:				
Oklahoma (OC)	1,000	0	37.7	232.5
Texas (TC)	1,000	0	30.0	184.9
Level Loam Soils:				
Oklahoma (OL_1)				
Small Farm	375	0	49.3	289.4
Large Farm	750	0	14.1	94.8
Texas (TL_1)	750	0	72.6	448.6
Rolling Loam Soils:				
Oklahoma (OL_2)				
Small Farm	188	0	50.1	309.2
Large Farm	750	0	11.0	68.1
Texas (TL_2)	750	0	56.3	347.6
Sandy Soils				
Oklahoma (OS)	500	0	66.8	412.1
Texas (TS)	500	0	81.6	503.7
Total		0	469.5	2,890.9

weights may be credited to the absence of the allotment restriction upon the limited response resources.

Similarly, the differences in livestock numbers may be attributed to the assumption that the nonresponsive alternatives include only the cow-calf sort of livestock enterprise. Grain production in Aggregation B-II is subject to two conflicting forces operating in different directions, depending upon the price ratio for grain and cotton. If the price ratio is high—that is, if the grain price is high and cotton price is low—then the relaxed assumption of the acreage restriction has a tendency to cause the estimate of grain production to be higher in B-II than in the six percent capital cost estimate for A-II. Further, if cotton prices are low, then the grain enterprise is relatively more profitable, so the higher capital requirement of the limited response resources is satisfied with increased grain production. On the other hand, if the cotton price is high, cotton tends to replace grain because of the relatively more capital-extensive property of cotton. Therefore, while the capital restriction on limited response resources increases grain production at low cotton prices, it reduces it at high cotton prices.

Aggregation B-III

The same relationships observed in Aggregation B-II prevail in Aggregation B-III, except that they are much more apparent as a result of the increased acreage included in the limited response resources. The dual effect of capital extension and absence of acreage restrictions upon cotton production as compared with A-III is much clearer in this case. Postulating the same conditions ($30.80 cotton price, and 100 percent feed grain-livestock prices), cotton production at six percent capital cost for Aggregation A-III is 6,345,587 hundredweights of lint. Non-responsive resources for A-III produce 1,045,319 hundredweights, for a total of 7,390,906 for the entire aggregation.

Aggregation B-III estimates total cotton production at 9,346,950 hundredweights. Total production under the full adjustment aggregation for six percent capital cost is 9,326,195 hundredweights, a difference of 20,755 less than Aggregation B-III's estimate. This difference indicates the influence of the increased capital return requirement for the limited response resources of Aggregation B-III. The total difference between Aggregations A-III and B-III is 1,956,044 hundredweights. Removing the effect of the capital limitation upon the limited response resources, it is clear that the effect of the assumption that limited response resources maintain current organization and production (and hence are subject to acreage allotment restrictions) is 1,935,289 hundredweights.

Cropland Reseeding

As in the Model A aggregations, the incidence of the cropland reseeding alternative is quite small. Since no land is reseeded to permanent pasture on limited response resources with 70 percent feed grain-livestock prices, the reseeding estimates for this price level are the same for all comparable A and B aggregations. But as the livestock-feed grain price level increases, reseeded acreages for Aggregations B-II and B-III slightly exceed estimates of Aggregations A-II and A-III. The relationships involving reseeded cropland in the Model B aggregations are the same as in the Model A aggregations, except for slightly larger estimates for Aggregations B-II and B-III when the livestock-feed grain price is 100 percent or more of the base.

Summary

Model B abstracts from tying farm production and organization to any specified point in time. If the postulated conditions were to occur at any time, the results estimated by the B models would be the same.

With Model A, the resulting estimates would be dependent upon the institutions prevailing at the time the assumptions were made.

Compared with Model A, the estimates of total cotton production with Model B tend to broaden the range of near-perfect elasticity of cotton supply for the aggregations assuming something less than full adjustment. This arises from the assumption that limited response resources react as if an 18 percent capital return were required, rather than making no reaction or adjustment from their current positions.

Cropland reseeding is of minor importance as an individual adjustment. As with Model A, the greatest reseeded acreage occurs at the base prices for feed grain and livestock, and at very low cotton prices. As cotton prices rise, increased cotton production causes reseeded acreage to be reduced. If feed grain-livestock prices fall below the base, the profitability of reseeding is curtailed as a result of reduced profitability of livestock. If these prices rise above the base, then increased feed grain production reduces reseeded acreage.

MODEL C AGGREGATIVE RESULTS

Model C depends upon the level of operator expectations for determination of the adjustment level. Three alternative sets of assumptions have been advanced:

(1) All farmers expect changes to be permanent—or long run—and hence make proper adjustments, thus tending to restore equilibrium. This would be a full adjustment aggregation and identical to the Models A and B full adjustment estimates.

(2) Eighty percent of farmers view any changes as permanent and make adjustments, while 20 percent expect them to be of a temporary nature and do not adjust, (Aggregation C-II).

(3) Fifty percent of farmers expect changes to be permanent, while the remaining 50 percent view them as short-term variations that do not justify reorganization and adjustment, (Aggregation C-III).

The method used in making the "C" aggregate estimates was again the simple summation procedure. Initially, all farms are assumed to be at equilibrium with all prices received at the base prices assumed in Table 6. Then as prices change, the responsive resources adjust, while nonrespondents remain at the base price equilibrium organization and production.

Table 13 shows the distribution of cropland acreage for responsive

Table 13.—Distribution of Cropland Acreage Among Resource Situations; Responsive Resource Bases for Model C Aggregations

Resource Situation	Percentage of Total Acreage	Level of Adjustment and Aggregation Number		
		Full 100 Percent Adjustment C-I	80 Percent Adjustment C-II	50 Percent Adjustment C-III
			— Acres of Cropland —	
Clay Soils:				
Oklahoma (OC)	13.2		581,941	363,713
Texas (TC)	10.5		462,907	289,317
Level Loam Soils:				
Oklahoma (OL_1)				
Small Farm	6.1		269,809	168,630
Large Farm	4.1		179,872	112,420
Texas (TL_1)	19.1		842,051	526,282
Rolling Loam Soils:				
Oklahoma (OL_2)				
Small Farm	3.3		145,485	90,928
Large Farm	2.9		127,850	79,907
Texas (TL_2)	14.8		652,479	407,799
Sandy Soils:				
Oklahoma (OS)	11.7		515,811	322,382
Texas (TS)	14.3		630,436	394,023
Total	100.0	5,510,802	4,408,641	2,755,401

Identical with A-I, Table 8

resources, by soil resource situations, and adjustment level. Table 14 presents similar information for the nonresponsive cropland resources. Dividing these acreages by the average cropland acreage on the corresponding representative farms (Table 5) gives the total numbers of representative farms consistent with the cropland resource base, or the aggregative weights shown in Tables 15 and 16.

Aggregation C-II

Cotton supply becomes relatively inelastic, in Aggregation C-II, as cotton prices rise above the assumed equilibrium level and relatively elastic as price falls below this level. The feed grain-livestock price level apparently has little effect upon the shape of the cotton supply function. It does affect the position of the function. As the feed grain-livestock price level rises, the cotton supply function shifts to the left. As the feed grain-livestock price level falls, the cotton supply function shifts to the right. The effect of cotton price shifting from the equilibrium level has precisely the same effect upon feed grain and livestock production, but is proportionally much larger. At low cotton prices, feed grain

Table 14.—Distribution of Cropland Acreage Among Resource Situations; Nonresponsive Resource Bases for Model C Aggregations

Resource Situation	Percentage of Total Acreage	Level of Adjustment and Aggregation Number		
		Full 100 Percent Adjustment C-I	80 Percent Adjustment C-II	50 Percent Adjustment C-III
			— Acres of Cropland —	
Clay Soils:				
Oklahoma (OC)	13.2	0	145,485	363,713
Texas (TC)	10.5	0	115,727	289,317
Level Loam Soils:				
Oklahoma (OL_1)				
Small Farm	6.1	0	67,452	168,630
Large Farm	4.1	0	44,968	112,420
Texas (TL_1)	19.1	0	210,513	526,282
Rolling Loam Soils:				
Oklahoma (OL_2)				
Small Farm	3.3	0	36,371	90,928
Large Farm	2.9	0	31,963	79,907
Texas (TL_2)	14.8	0	163,120	407,799
Sandy Soils:				
Oklahoma (OS)	11.7	0	123,953	322,382
Texas (TS)	14.3	0	157,609	394,023
Total	100.0	0	1,102,161	2,755,401

supply tends to be relatively inelastic. As cotton prices rise, the production of feed grains becomes elastic, until cotton price rises above the equilibrium level. At cotton prices above the equilibrium level, feed grain production becomes progressively more inelastic. Increased capital costs also tend to make feed grain production less elastic.

The enterprise most sensitive to capital limitation is the livestock alternative. As capital cost is increased, livestock production not only becomes more inelastic, but also is absolutely reduced by almost one-half under all conditions. Under many price and capital cost combinations, livestock production is reduced by more than one-half.

As the full adjustment assumption is relaxed and 20 percent of farmers are assumed to remain at the equilibrium (base price) level of production and organization, aggregate income is less than the full adjustment assumption under all combinations of prices except at the base price. If the feed grain-livestock price is at 70 percent of base, and if the change is permanent, the cost in sacrificed income for wrong expectations at 18 percent capital cost is less with high cotton prices than is

Table 15.—Number of Representative Farms Consistent with Responsive Cropland Bases for Model C Aggregations by Resource Situations

Resource Situation	Representative Farm Cropland Acreage	Level of Adjustment and Aggregation Number		
		100 Percent Adjustment C-I	80 Percent Adjustment C-II	50 Percent Adjustment C-III
Clay Soils:				
Oklahoma (OC)	1,000		581.9	363.7
Texas (TC)	1,000		462.9	289.3
Level Loam Soils:				
Oklahoma (OL_1)				
Small Farm	375		717.1	448.2
Large Farm	750		241.0	150.6
Texas (TL_1)	750		1,122.7	701.7
Rolling Loam Soils:				
Oklahoma (OL_2)				
Small Farm	188		773.8	483.7
Large Farm	750		170.5	106.5
Texas (TL_2)	750		870.0	543.8
Sandy Soils:				
Oklahoma (OS)	500		1,031.6	644.7
Texas (TS)	500		1,260.9	788.1
Total		9,040.6	7,232.4	4,520.3

Identical with A-1, Table 9

the cost with six percent capital. However, if cotton price is below the equilibrium, the cost is greater with 18 percent capital cost. At the equilibrium feed grain-livestock price—or higher—the cost for wrong expectations is in all cases higher for 18 percent capital. This may be explained by the large production of cotton at equilibrium. If cotton prices fall, the adjusting farmers reduce cotton production greatly. If these prices rise, production is increased only moderately. Since there is a tendency to produce more cotton at higher capital costs, the cost for incorrect expectations is relatively less at an 18-percent capital cost than at a six percent cost. As cotton prices fall the loss in income at 18 percent capital applies to a larger base of cotton production and is therefore larger in the aggregate.

As the feed grain-livestock price level rises, the six percent and 18 percent capital cost income functions no longer intersect within the range of the prices considered. This may be explained by the fact that the income reduction due to decreased livestock numbers at 18 percent capital overshadows any relative income increase due to increased cotton price received for equilibrium levels of cotton production.

Table 16.—Number of Representative Farms Consistent with Nonresponsive Cropland Bases for Model C Aggregations

Resource Situation	Representative Farm Cropland Acreage	Level of Adjustment and Aggregation Number: 100 Percent Adjustment C-I	80 Percent Adjustment C-II	50 Percent Adjustment C-III
Clay Soils:				
Oklahoma (OC)	1,000	0	145.5	363.7
Texas (TC)	1,000	0	115.7	289.3
Level Loam Soi's:				
Oklahoma (OL_1)				
Small Farm	375	0	179.3	448.2
Large Farm	750	0	60.3	150.6
Texas (TL_1)	750	0	230.7	701.7
Rolling Loam Soils:				
Oklahoma (OL_2)				
Small Farm	188	0	193.5	483.7
Large Farm	750	0	42.6	106.5
Texas (TL_2)	750	0	217.5	543.8
Sandy Soils:				
Oklahoma (OS)	500	0	257.9	644.7
Texas (TS)	500	0	315.2	788.1
Total		0	1,808.2	4,520.3

Aggregation C-III

Aggregation C-III represents a 50 percent adjustment when prices depart from those effective at the assumed equilibrium position. With one-half the total resources maintaining the initial equilibrium (base price) production and organization, the range of near-perfect elasticity of cotton supply is greatly reduced. The shape of the cotton supply function is essentially the same, but it is compressed into much more narrow limits than in Aggregation C-II. The "compressing" of the cotton supply function occurs primarily at low cotton prices. For example, the minimum cotton production for C-II at 70 percent feed grain-livestock prices with six percent capital costs, was 1,866,847 hundredweights. The maximum cotton production under these conditions was 9,151,342 hundredweights. For aggregation C-III, the corresponding estimates were 4,071,316 and 8,624,124 hundredweights, respectively. This is explained by the relatively large quantity of cotton produced at the assumed position of equilibrium, plus the fact that only one-half of the resources adjust. With full adjustment, the range is from 0.4

million hundredweights to 9.5 million, with 8.45 million hundredweights at the assumed position of equilibrium. When one-half of the resources fail to adjust cotton production to prices higher than the base price, the maximum difference in cotton production from the position approximating the new equilibrium (as shown by the full adjustment estimates) is less than a million hundredweights. But if half of resources fail to adjust to lower-than-equilibrium cotton prices, the difference is more than quadrupled. In this manner, the elasticity of the entire cotton supply function is in general reduced.

As was observed with the cotton supply function, the production of both feed grain and livestock is much less elastic when increasing portions of resources do not adjust to changes in price. The range of these functions is compressed. The general shape of the curves remains unchanged, except for the "compression."

The behavior of the income functions is much the same as was discussed in Aggregation C-II. However, aggregate income is not affected as much by nonadjustment as is production of the various products. At 70 percent feed grain-livestock prices and six percent capital costs, the minimum income estimated for Aggregation C-II was $23,643,715, while the maximum was $153,381,873. Corresponding estimates for Aggregation C-III were $15,641,769 and $147,847,951. As would be expected, the most severe income effect would occur at the lowest cotton price. An increase of 30 percent in nonadjusting resources reduces income at cotton prices of $13.20 per hundredweight by about a third (or by about $8 millions). At a cotton price of $30.80 per hundredweight, the income reduction due to the 30 percent increase in nonadjustors is less than four percent (or about $5.5 millions). Thus, it is evident that aggregate income is reduced more—both relatively and absolutely—at lower-than-equilibrium prices than at higher-than-equilibrium prices when some resources fail to adjust to the new prices.

Cropland Reseeding

The incidence of the cropland reseeding alternative in the Model C aggregations was quite small, behaving in much the same manner as was observed in Models A and B. In no case did reseeded acreage fall outside the range of from one to nine percent of total cropland acreage. Because of the assumptions regarding adjustment levels, as more acreage was designated nonrespondent to price changes, the reseeded acreage became less responsive and tended to remain much closer to the equilibrium level as responsiveness departed from the full adjustment level.

Summary

Model C full adjustment aggregations are identical with the corresponding estimates for the other two models. As one departs from the full adjustment assumption, the general effect upon the supply for cotton is that the elasticity of the function is reduced throughout the ranges of prices considered, the degree of that reduction being dependent upon the adjustment level in question. The effect of changing capital cost from six percent to 18 percent is much the same within adjustment levels for the Model C aggregations as for Model A aggregations. As cotton prices rise above the assumed equilibrium price, cotton supply tends to be quite inelastic, while at prices below the equilibrium level, supply approaches perfect elasticity until the price falls below $17.60 per hundredweight. At that point, supply again becomes inelastic. The breadth of the near-perfect elasticity range is dependent upon the level of adjustment under discussion. Compression of this range as a result of designating greater acreages nonresponsive occurs primarily in the low cotton prices.

In general, the effect of reduced levels of adjustment to price changes from equilibrium (base price), is to reduce the elasticity of supply of all products. If such products are limited by capital restrictions, then any reduction in the level of adjustment would tend to cause such function to be relatively more inelastic. Income is normally affected less than production under the assumptions of Model C, and will be affected more at low prices than at high prices—in both an absolute and relative sense.

SUMMARY AND CONCLUSIONS

The objectives of the analysis are to develop and analyze alternative aggregation models consistent with the assumptions of the normative microsupply relationships; to estimate aggregate supply response for dryland crop farms under specified assumptions; and, to estimate the aggregate quantities of specified inputs.

Dryland crop resources were separated into eight soil resource situations based on soil texture and productivity, climate, and land capability class distributions. Two soil resource situations were divided because of the bimodal character of the farm-size distribution within the situation, giving a total of ten units for microanalysis. Representative farms were formulated for each of the ten microunits, and linear programming techniques were employed to estimate normative microsupply relation-

ships for each of the ten units under the thirty possible combinations of cotton prices, feed grain and livestock prices, and capital cost. Thus a total of 300 microsupply estimates were made. The method chosen for aggregation of the microsupply estimates was weighted average summation, the weights being determined by the numbers of the various representative farms which were consistent with the corresponding cropland base.

Three alternative aggregative models were designed and used in the estimation of the normative aggregate supply response and net income. All three models assumed three levels of adjustment, Models A and B being identical. The criteria for the assumed levels of adjustment for Models A and B are: Level 1, full response of all resources; Level 2, full response of all resources included in commercial farms of the census classes I through V; and Level 3, full response of resources in commercial farms of classes I through V operated by farmers presently younger than 55 years of age. Resources not included in the full response group (that is, the nonresponsive resources) were assumed to maintain current organization and production with Model A. With Model B, these resources were assumed to require 18 percent capital return, while the responsive resources were assumed to require a return of only six percent.

Model C assumes three levels of aggregate response, but unlike the other two models, nonresponsiveness is not tied to any specific group of farmers or farm resources. Rather, the response level is dependent upon the level of expectations. If an individual expects a change to be permanent, he adjusts. If he expects the change to be temporary, the "equilibrium" level of organization and production is maintained. Equilibrium has been assumed, for this purpose, to occur initially at the assumed base prices ($22.00 per hundredweight of cotton lint, $1.25 per bushel of wheat, and so on, Table 6). With the three levels of response, the assumed levels of expectations are 100 percent adjustment, 80 percent adjustment, and 50 percent adjustment.

The effect of the nonresponsive resources upon the aggregate estimates was significant. When these resources maintain current organization and production, the resulting estimate of the aggregate supply function is less elastic than when response from these resources is limited by an increased capital return requirement.

Model A is inconsistent within itself, in that it assumes absence of institutional restraints. Yet, it binds some resources to organizations which may have been largely determined by institutional limitations. Model B recognizes that some farmers may be less likely to adjust, but

reluctance to adjust is taken into account by the higher capital cost imposed upon their resources. Model C reflects assumed differences in expectations, and hence differing levels of adjustment in response to these differing expectations.

Models B and C are considered to be superior to Model A, since these models are valid in any time period. The Model A results depend upon the point in time assumptions are made regarding the nonresponsive resources. Normative qualities of these results cease when the supply produced by the responsive resources has been estimated. Further, net income cannot be estimated for the nonresponsive resources. Models B and C, on the other hand, remain normative throughout the range of quantities estimated, and for all resources considered. Estimates of aggregate net income are possible since both costs of production and returns under the assumptions used are specified.

Several general conclusions may be drawn from any of the three models. At prices of cotton lower than the base price, the supply of cotton in the Rolling Plains has a broad range of almost perfect elasticity, provided that feed grains and livestock are priced at or below the base levels. This range may be narrowed by assumptions regarding the aggregate level of adjustment. It is functionally broadened by increased prices of other products, and by increasing the rates of capital cost. At cotton prices above the base price, cotton supply becomes relatively inelastic. Therefore, as cotton prices fall to or below the base price, assuming other factors to remain constant, the total gross receipts from cotton production will be reduced relatively more than price. Since production costs are assumed to be constant, total net receipts will be reduced even more than gross receipts, so long as cotton prices fall within the inelastic price range.

If feed grain-livestock prices are above the base levels, and then begin to decline, production of both feed grains and livestock declines more slowly than price, so long as prices do not fall below the base level. After prices have declined below this level, production declines faster than does price, except when cotton prices are very low. Under the latter circumstances, livestock production does decline faster than price, but feed grain production remains inelastic and much cropland remains idle.

The above is apparent from the nature of the cotton supply function. The aggregate supply function for cotton is observed to have an "inverted S" shape under the assumptions of all three aggregative models. Figure 4 illustrates the effect of producer miscalculation of price

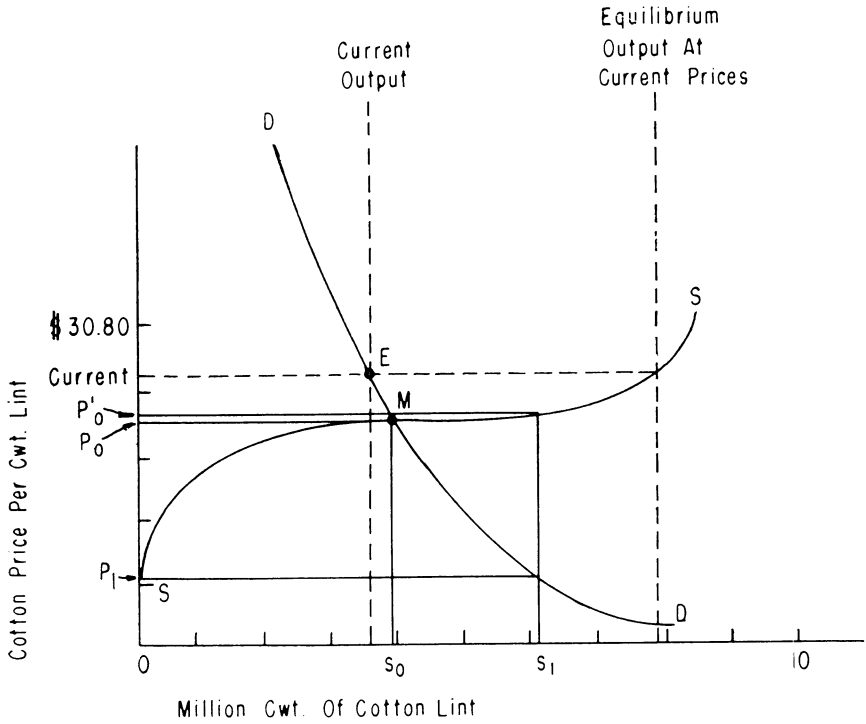

Figure 4. Effects of producer miscalculation of prices of cotton with "Inverted S" supply curve and conventional demand curve. Feed grain and livestock prices are assumed to be at 130 percent of base levels.

in a perfectly competitive situation. The supply function postulated in Figure 4 is the supply function of Aggregation B-III for feed grain-livestock prices of 130 percent of base—approximately the current price level for feed grains. The current situation for cotton occurs approximately at point E—that point at which current price (about $28.00 per hundredweight) of cotton and the current restricted output of cotton in the Rolling Plains occur.

If the true aggregate demand faced by Rolling Plains farmers is a function such as DD, Rolling Plains equilibrium would occur at point M. If producers had perfect knowledge of this function, they would produce a supply of s_0 and receive a price of p_0. If however, producers were forced to estimate price because of imperfect knowledge, a very small miscalculation of price (such as p'_0) could call forth an enormous increase in cotton output (s_1) and aggregate net revenue from cotton sales would be severely reduced.

Capital limitation tends to cause increased crop production and reduced livestock production. The crops which are increased the most depend upon the relative degree of capital extension held by the various crops under the prevailing price ratios. Cotton is relatively the most capital-extensive enterprise, and will therefore have the greatest increase in production as a result of increased capital cost, provided that cotton is not less profitable than other enterprises.

Labor requirements tend to be highly correlated with the acreage of cotton, since the cotton enterprise normally requires more labor than other productive alternatives in the Rolling Plains including labor for cultivating and planting.

Cropland reseeding generally is not economically feasible on a private and individual basis. Under the most favorable circumstances, the maximum quantity of cropland reseeded to pasture was nine percent of total cropland acreage. Reseeding was very sensitive to changes in all product prices and in the cost of capital. As feed grain-livestock prices decline from the base levels, reseeding is sharply reduced because the livestock alternative is much less profitable. As feed grain-livestock prices increase, feed grains are more profitable than reseeding. As cotton prices rise, cotton production causes the reseeding alternative to be reduced. Increasing capital cost from six percent to 18 percent causes the maximum reseeded acreage to decline by almost 90 percent.

Even if cotton prices in the Rolling Plains area were $22.00 per hundredweight ($6.17 or 22 percent below the 1960 support level) given current costs of production, the incentive for Rolling Plains farmers to produce cotton would likely exceed present acreages, provided institutional and personal restrictions were ineffective. If alternative product prices were not reduced, the increased production of cotton would be restrained by a corresponding increase in the present wheat acreage.

The sensitivity of the cotton supply function to price illustrates the dilemma in Rolling Plains cotton production. If all controls were removed from cotton production, a considerable increase in cotton production could result—probably within a very short time. If the increased cotton production resulted in lower cotton prices, farmers likely would reduce production less than the original increase (even with the same relative change in prices) because of probable differences in costs of asset acquisition, depreciation, and salvage values.

The slope of the representative cotton supply function is illustrated in Fig. 5. Point "A" is essentially that point at which all costs of production are covered for the land best adapted to cotton production. Point

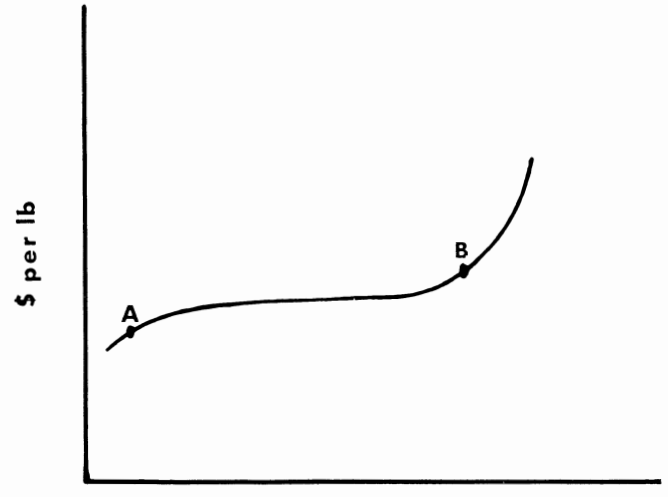

Figure 5. Representative cotton supply function.

"B" represents that price at which essentially all acreage adapted to cotton is devoted to cotton production. The slope of the function between Points "A" and "B" arises from increasing per-unit costs as more and more marginal resources are employed in cotton production. The degree of slope reflects the adaptability of resources. The position (or level) of the entire supply function is determined by the opportunity cost (that is, the cotton supply function will have different positions when wheat is priced at $1.62 and $1.25 per bushel, since cotton and wheat compete for resources).

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APPENDIX TABLES

Appendix A

Appendix B

Appendix C

Appendix A, Table 1.—Production of Cotton and Feed Grains, by Feed Grain-livestock and Cotton Price Levels and Relevant Elasticity Estimates, Six Percent Capital Cost, Aggregation A-I

Item	Price of Cotton Per Hundredweight Lint				
	$13.20	$17.60	$22.00	$26.40	$30.80
70 Percent Feed Grain-Livestock					
Cotton					
Acres	146,590	2,489,561	4,265,015	4,793,565	4,793,565
Cwt of Lint	397,203	6,157,620	8,454,240	9,503,720	9,503,720
Elasticity of Supply	6.152	1.415	0.642	0.0	
Feed Grain					
Acres	3,301,635	878,261	83,716	0	0
Cwt	30,737,459	6,879,546	704,413	0	0
Net Revenue	29,113,426	39,200,402	75,109,061	115,359,401	157,206,254
Income Flexibility	1.034	2.827	2.379	2.253	
100 Percent Feed Grain-Livestock					
Cotton					
Acres	40,945	419,643	3,595,334	4,338,445	4,641,441
Cwt of Lint	125,091	1,186,609	7,745,428	8,925,556	9,326,195
Elasticity of Supply	5.665	6.609	0.779	0.285	
Feed Grain					
Acres	3,656,567	3,334,505	1,051,626	337,061	121,903
Cwt	35,515,724	31,807,958	7,920,292	2,673,790	790,168
Net Revenue	65,775,495	67,600,010	86,337,770	123,615,798	163,946,294
Income Flexibility	0.089	1.095	1.953	1.823	
130 Percent Feed Grain-Livestock					
Cotton					
Acres	12,895	67,353	742,644	3,594,605	4,075,434
Cwt of Lint	42,554	173,382	1,775,514	7,883,862	8,609,903
Elasticity of Supply	4.254	7.399	6.956	0.572	
Feed Grain					
Acres	3,920,002	3,965,447	3,504,994	1,129,069	715,891
Cwt	38,187,654	38,523,616	33,529,941	8,643,826	5,245,713
Net Revenue	109,723,646	110,067,087	115,369,540	137,998,668	174,928,045
Income Flexibility	0.011	0.212	0.982	1.534	

Appendix A, Table 2.—Production of Cotton and Feed Grains, by Feed Grain-livestock and Cotton Price Levels and Relevant Elasticity Estimates, 18 Percent Capital Cost, Aggregation A-I

Item	Price of Cotton Per Hundredweight Lint									
	$13.20		$17.60		$22.00		$26.40		$30.80	
70 Percent Feed Grain-Livestock										
Cotton										
Acres	188,646		2,015,768		4,301,017		4,447,074		4,793,564	
Cwt of Lint	483,446		4,280,725		8,835,373		9,077,469		9,503,720	
Elasticity of Supply		5.802		3.125		0.149		0.298		
Feed Grain										
Acres	2,253,055		1,084,746		83,716		0		0	
Cwt	21,771,703		10,499,603		704,413		0		0	
Net Revenue	25,882,993		34,760,443		74,439,886		114,302,035		156,618,741	
Income Flexibility		1.025		3.273		2.323		2.030		
100 Percent Feed Grain-Livestock										
Cotton										
Acres	126,305		407,166		3,909,382		4,380,186		4,681,947	
Cwt of Lint	408,170		1,004,814		8,311,631		8,995,097		9,390,526	
Elasticity of Supply		2.956		7.059		0.434		0.286		
Feed Grain										
Acres	3,907,658		3,671,941		834,076		413,280		211,711	
Cwt	37,868,480		39,170,275		5,932,664		2,721,145		2,084,198	
Net Revenue	54,656,761		56,830,107		82,306,747		119,666,390		160,865,338	
Income Flexibility		0.136		1.648		2.035		1.909		
130 Percent Feed Grain-Livestock										
Cotton										
Acres	28,050		118,056		880,078		3,990,094		4,423,002	
Cwt of Lint	81,249		317,190		2,095,787		8,474,373		8,990,934	
Elasticity of Supply		4.145		6.634		6.638		0.384		
Feed Grains										
Acres	5,053,983		4,463,181		3,845,836		963,379		435,513	
Cwt	42,433,809		41,630,722		35,999,779		6,914,028		3,568,160	
Net Revenue	100,077,845		99,606,234		105,165,018		134,991,179		172,275,495	
Income Flexibility		—0.017		0.244		1.366		1.578		

Appendix A, Table 3.—Cattle Numbers by Crop and Livestock Prices for Two Capital Cost Levels, Aggregation A-I

Capital Cost and Feed Grain-Livestock Price Level	Price of Cotton Per Hundredweight Lint				
	$13.20	$17.60	$22.00	$26.40	$30.80
	— Number of Animals —				
Six Percent Capital Cost					
Cows					
70 Percent Grain and Livestock	83,302	92,711	96,629	96,629	96,629
100 Percent Grain and Livestock	44,939	42,360	80,656	77,433	77,646
130 Percent Grain and Livestock	23,971	27,840	27,840	50,892	68,724
Feeders					
70 Percent Grain and Livestock	302,095	68,376	9,456	0	0
100 Percent Grain and Livestock	1,242,525	1,224,585	535,087	438,989	399,606
130 Percent Grain and Livestock	1,423,158	1,363,828	1,259,603	659,183	520,135
18 Percent Capital Cost					
Cows					
70 Percent Grain and Livestock	92,271	83,235	69,139	69,139	69,139
100 Percent Grain and Livestock	88,793	88,793	91,405	95,323	96,051
130 Percent Grain and Livestock	58,933	59,933	60,846	69,269	69,269
Feeders					
70 Percent Grain and Livestock	0	0	0	0	0
100 Percent Grain and Livestock	228,550	228,550	152,769	57,580	41,329
130 Percent Grain and Livestock	722,490	701,166	644,621	364,855	324,088

Appendix Table 4.—Total Labor Hired with F. otton Prices, by Capital Cost and re. ain-livestock Price Levels, Aggregation A-I

Capital Cost and Feed Grain-Livestock Price Level	Price of Cotton Per Hundredweight Lint				
	$13.20	$17.60	$22.00	$26.40	$30.80
	— Hours of Labor —				
Six Percent Capital Cost					
70 Percent Feed Grain-Livestock					
Hourly Labor	2,905,682	4,591,526	4,386,557	6,754,193	6,754,407
Custom Cotton Hoeing	344,760	7,456,884	10,942,870	12,322,346	12,322,346
Custom Cotton Harvest	293,180	5,699,122	8,530,030	9,587,130	9,587,130
Total	3,543,622	17,747,532	23,859,457	28,663,669	28,663,883
100 Percent Feed Grain-Livestock					
Hourly Labor	3,101,376	3,536,239	5,969,283	6,366,115	7,714,047
Custom Cotton Hoeing	123,204	1,522,732	9,063,608	11,190,312	11,889,148
Custom Cotton Harvest	81,890	839,296	7,190,768	8,676,890	9,282,882
Total	3,306,470	5,898,267	22,223,659	26,233,317	28,886,077
130 Percent Feed Grain-Livestock					
Hourly Labor	3,094,212	3,064,955	3,376,179	5,922,221	6,204,130
Custom Cotton Hoeing	51,580	173,390	2,826,420	9,504,330	10,759,712
Custom Cotton Harvest	25,790	134,706	1,485,328	7,189,210	8,150,848
Total	3,171,582	3,373,051	7,687,927	22,615,761	25,114,690
18 Percent Capital Cost					
70 Percent Feed Grain-Livestock					
Hourly Labor	1,291,722	1,659,206	3,990,828	4,142,363	5,121,378
Custom Cotton Hoeing	436,608	5,410,184	11,014,874	11,306,988	12,322,346
Custom Cotton Harvest	377,292	4,031,536	8,602,034	8,894,148	9,587,130
Total	2,105,622	11,100,926	23,607,736	24,343,499	27,030,854
100 Percent Feed Grain-Livestock					
Hourly Labor	2,009,303	2,706,199	4,918,574	4,976,923	5,731,072
Custom Cotton Hoeing	304,190	1,306,920	10,231,604	11,173,212	12,099,110
Custom Cotton Harvest	252,610	814,332	7,818,764	8,760,372	9,363,894
Total	2,566,103	4,827,451	22,968,942	24,910,507	27,194,076
130 Percent Feed Grain-Livestock					
Hourly Labor	2,354,166	2,531,536	2,807,342	5,543,518	5,789,368
Custom Cotton Hoeing	71,574	274,806	3,101,248	10,393,028	11,359,426
Custom Cotton Harvest	56,100	236,112	1,760,156	7,980,156	8,846,004
Total	2,481,840	3,042,454	7,668,746	23,916,702	25,994,798

Appendix A, Table 5.—Production of Cotton and Feed Grains, by Feed Grain-livestock and Cotton Price Levels and Relevant Elasticity Estimates, Six Percent Capital Cost, Aggregation A-II

Item	Price of Cotton Per Hundredweight Lint				
	$13.20	$17.60	$22.00	$26.40	$30.80
70 Percent Feed Grain-livestock					
Cotton					
Acres	138,955	2,702,013	4,044,532	4,545,503	4,545,503
Cwt of Lint	376,520	5,838,866	8,301,827	9,011,060	9,011,060
Elasticity of Supply	6.152	1.568	0.451	0.0	
Feed Grain					
Acres	3,130,793	832,847	79,384	0	0
Cwt	29,147,088	6,523,709	667,955	0	0
Net Revenue	27,606,170	37,170,907	71,221,900	109,389,717	149,029,781
Income Flexibility	1.476	2.827	2.325	1.994	
100 Percent Feed Grain-livestock					
Cotton					
Acres	38,826	397,887	3,409,563	4,113,887	4,401,202
Cwt of Lint	118,617	1,125,086	7,345,237	8,463,668	8,843,571
Elasticity of Supply	5.665	6.609	0.778	0.285	
Feed Grain					
Acres	3,467,239	3,162,049	997,196	319,619	115,598
Cwt	33,677,772	30,163,246	7,510,343	2,535,426	749,278
Net Revenue	62,370,761	64,100,320	81,869,563	117,218,910	155,462,325
Income Flexibility	0.096	1.096	1.953	1.823	
130 Percent Feed Grain-livestock					
Cotton					
Acres	12,228	63,935	704,170	3,408,671	3,864,489
Cwt of Lint	40,352	164,353	1,683,519	7,476,083	8,164,352
Elasticity of Supply	4.240	7.399	6.956	0.572	
Feed Grain					
Acres	3,717,141	3,760,257	3,323,636	1,070,550	678,844
Cwt	36,211,444	36,615,597	31,795,265	8,195,572	4,974,239
Net Revenue	104,044,121	104,370,635	109,398,164	130,871,538	165,875,787
Income Flexibility	0.011	0.212	0.983	1.533	

Appendix A, Table 6.—Production of Cotton and Feed Grains, by Feed Grain-livestock Price Levels and Relevant Elasticity Estimates, 18 Percent Capital Cost, Aggregation A-II

Item	Price of Cotton Per Hundredweight Lint									
	$13.20		$17.60		$22.00		$26.40		$30.80	
70 Percent Feed Grain-livestock										
Cotton										
Acres	178,837		1,911,347		4,078,543		4,216,889		4,545,453	
Cwt of Lint	458,300		4,059,009		8,378,553		8,607,713		9,011,910	
Elasticity of Supply		5.580		3.126		0.148		0.298		
Feed Grain										
Acres	2,136,473		1,028,661		79,384		0		0	
Cwt	20,645,298		9,956,753		667,955		0		0	
Net Revenue	24,542,894		32,960,214		70,587,438		108,387,059		148,513,920	
Income Flexibility		1.025		3.634		2.323		2.030		
100 Percent Feed Grain-livestock										
Cotton										
Acres	119,707		386,043		3,707,178		4,153,465		4,439,612	
Cwt of Lint	386,916		960,688		7,881,922		8,529,861		8,904,575	
Elasticity of Supply		2.980		7.044		0.434		0.279		
Feed Grain										
Acres	3,705,570		3,481,965		790,910		391,894		200,747	
Cwt	35,910,375		37,143,826		5,625,623		2,580,333		1,976,353	
Net Revenue	51,827,193		53,887,340		78,047,184		113,473,830		152,664,944	
Income Flexibility		0.136		1.648		2.035		1.914		
130 Percent Feed Grain-livestock										
Cotton										
Acres	26,598		111,907		834,497		3,783,564		4,194,069	
Cwt of Lint	77,052		300,655		1,987,230		8,035,834		8,524,811	
Elasticity of Supply		4.144		6.635		6.638		0.384		
Feed Grain										
Acres	4,280,370		4,232,205		3,646,804		913,523		412,972	
Cwt	40,237,987		39,476,971		34,137,351		6,556,220		3,383,498	
Net Revenue	94,897,148		94,449,919		97,221,402		128,005,590		163,164,024	
Income Flexibility		—0.017		0.130		1.503		1.570		

Appendix A, Table 7.—Cattle Numbers by Crop and Livestock Prices for Two Capital Cost Levels, Aggregation A-II

Capital Cost and Feed Grain-Livestock Price Level	Price of Cotton Per Hundredweight Lint				
	$13.20	$17.60	$22.00	$26.40	$30.80
	— Number of Animals —				
Six Percent Capital Cost					
Cows					
70 Percent Grain and Livestock	78,991	87,915	91,630	91,630	91,630
100 Percent Grain and Livestock	42,614	40,169	76,483	73,516	73,718
130 Percent Grain and Livestock	24,146	27,875	27,815	51,496	68,410
Feeders					
70 Percent Grain and Livestock	393,263	118,605	17,197	0	0
100 Percent Grain and Livestock	1,178,220	1,075,792	507,395	416,188	378,928
130 Percent Grain and Livestock	1,349,508	1,293,256	1,173,911	625,041	493,218
18 Percent Capital Cost					
Cows					
70 Percent Grain and Livestock	87,494	78,910	65,560	65,560	65,560
100 Percent Grain and Livestock	81,448	81,448	86,676	90,391	91,081
130 Percent Grain and Livestock	55,887	55,887	57,702	65,687	65,687
Feeders					
70 Percent Grain and Livestock	0	0	0	0	0
100 Percent Grain and Livestock	216,720	216,720	144,862	54,600	39,190
130 Percent Grain and Livestock	619,030	665,779	612,149	345,973	311,031

Appendix ble 8.—Total Labor Hired with Fi ton Prices, by Capital Cost and Fe ain-livestock Price Levels, Aggregation A-II

Capital Cost and Feed Grain-livestock Price Level	Price of Cotton Per Hundredweight Lint				
	$13.20	$17.60	$22.00	$26.40	$30.80
	— Hours of Labor —				
Six Percent Capital Cost					
70 Percent Feed Grain-Livestock					
Hourly Labor	2,655,446	4,354,184	4,237,881	6,405,533	6,405,735
Custom Cotton Hoeing	326,822	7,070,816	10,377,028	11,684,770	11,684,770
Custom Cotton Harvest	277,910	5,404,026	8,089,064	9,091,006	9,091,006
Total	3,260,178	16,829,026	22,703,973	27,181,309	27,181,511
100 Percent Feed Grain-Livestock					
Hourly Labor	2,941,000	3,353,392	5,660,819	6,037,114	7,315,447
Custom Cotton Hoeing	116,780	1,443,858	9,107,090	10,621,116	11,273,788
Custom Cotton Harvest	77,652	795,774	6,819,216	8,227,774	8,802,404
Total	3,135,432	5,593,024	21,587,125	24,886,004	27,391,639
130 Percent Feed Grain-Livestock					
Hourly Labor	2,934,230	2,906,496	3,201,617	5,616,164	5,883,586
Custom Cotton Hoeing	48,912	164,734	2,680,044	9,012,646	10,202,808
Custom Cotton Harvest	24,456	127,870	1.408,340	6,817,342	7,728,978
Total	3,007,598	3,199,100	7,290,001	21,446,152	23,815,372
18 Percent Capital Cost					
70 Percent Feed Grain-Livestock					
Hourly Labor	1,224,923	1,573,362	3,784,553	3,928,243	4,856,813
Custom Cotton Hoeing	413,922	5,129,980	10,445,050	10,721,742	11,684,570
Custom Cotton Harvest	357,674	3,822,694	8,157,086	8,433,778	9,090,906
Total	1,996,519	10,526,036	22,386,689	23,083,763	25,632,289
100 Percent Feed Grain-Livestock					
Hourly Labor	1,905,398	2,566,247	4,664,445	4,719,774	5,435,001
Custom Cotton Hoeing	288,326	1,239,196	9,702,320	10,594,894	11,472,888
Custom Cotton Harvest	239,414	772,086	7,414,356	8,306,930	8,879,224
Total	2,433,138	4,577,529	21,781,121	23,621,598	25,787,113
130 Percent Feed Grain-Livestock					
Hourly Labor	2,232,437	2,400,663	2,662,204	5,257,084	5,490,275
Custom Cotton Hoeing	67,870	260,498	2,940,698	9,855,092	10,771,480
Custom Cotton Harvest	53,196	223,814	1,668,994	7,567,128	8,388,138
Total	2,353,503	2,884,975	7,271,896	22,679,304	24,649,893

Appendix A, Table 9.—Production of Cotton and Feed Grains, by Feed Grain-livestock and Cotton Price Levels and Relevant Elasticity Estimates, Six Percent Capital Cost, Aggregation A-III

Item	Price of Cotton Per Hundredweight Lint				
	$13.20	$17.60	$22.00	$26.40	$30.80
70 Percent Feed Grain-Livestock					
Cotton					
Acres	99,711	1,938,794	2,902,108	3,261,527	3,261,527
Cwt of Lint	270,170	4,189,614	5,956,870	6,465,767	6,465,767
Elasticity of Supply	6.153	1.568	0.451	0.001	
Feed Grain					
Acres	2,246,458	597,593	56,961	0	0
Cwt	20,914,093	4,680,949	479,283	0	0
Net Revenue	19,808,427	26,671,534	51,104,392	78,491,222	106,934,422
Income Flexibility	1.034	2.827	2.325	1.994	
100 Percent Feed Grain-Livestock					
Cotton					
Acres	27,860	285,498	2,446,492	2,951,868	3,158,022
Cwt of Lint	85,116	807,290	5,270,478	6,072,998	6,345,587
Elasticity of Supply	5.665	6.609	0.778	0.285	
Feed Grain					
Acres	2,487,860	2,268,876	715,521	229,333	82,945
Cwt	24,164,931	21,643,147	5,388,928	1,819,228	537,633
Net Revenue	44,753,300	45,994,331	58,744,475	84,108,948	111,550,011
Income Flexibility	0.096	1.096	1.954	1.823	
130 Percent Feed Grain-Livestock					
Cotton					
Acres	8,774	45,812	505,273	2,445,852	2,772,913
Cwt of Lint	28,954	117,933	1,207,995	5,364,368	5,858,225
Elasticity of Supply	4.240	7.399	6.956	0.572	
Feed Grain					
Acres	2,667,175	2,698,112	2,384,822	768,155	487,089
Cwt	25,982,954	26,272,949	22,814,186	5,880,600	3,569,164
Net Revenue	74,655,463	74,889,758	78,497,199	93,905,203	119,013,266
Income Flexibility	0.011	0.212	0.983	1.533	

Appendix A, Table 10.—Production of Cotton and Feed Grains, by Feed Grain-livestock and Cotton Price Levels and Relevant Elasticity Estimates, 18 Percent Capital Cost, Aggregation A-III

Item	Price of Cotton Per Hundredweight Lint				
	$13.20	$17.60	$22.00	$26.40	$30.80
70 Percent Feed Grain-Livestock					
Cotton					
Acres	128,323	1,371,478	2,926,505	3,025,776	3,261,527
Cwt of Lint	328,851	2,912,512	6,011,925	6,176,358	6,466,376
Elasticity of Supply	5.580	3.126	0.148	0.298	
Feed Grain					
Acres	1,533,002	738,095	56,961	0	0
Cwt	14,813,198	7,144,265	479,283	0	0
Net Revenue	17,610,419	23,649,924	50,649,146	74,771,792	97,456,282
Income Flexibility	1.029	3.270	2.119	1.715	
100 Percent Feed Grain-Livestock					
Cotton					
Acres	85,896	277,003	2,660,036	2,980,267	3,185,585
Cwt of Lint	277,629	689,284	5,655,572	6,120,496	6,389,362
Elasticity of Supply	2.980	7.045	0.434	0.279	
Feed Grain					
Acres	2,658,879	2,498,428	567,504	281,195	144,043
Cwt	24,089,473	24,974,515	4,036,573	1,851,460	1,418,082
Net Revenue	36,887,880	38,666,158	56,001,575	81,421,716	109,542,781
Income Flexibility	0.165	1.648	2.035	1.914	
130 Percent Feed Grain-Livestock					
Cotton					
Acres	31,370	234,721	598,795	2,714,848	3,084,855
Cwt of Lint	55,284	215,733	1,425,934	5,788,012	6,117,477
Elasticity of Supply	4.144	6.635	6.651	0.360	
Feed Grain					
Acres	2,966,908	2,791,080	2,587,748	626,527	296,320
Cwt	28,872,185	28,326,137	24,494,743	4,704,295	2,427,762
Net Revenue	68,104,368	67,771,269	71,552,999	83,632,763	117,076,255
Income Flexibility	−0.017	0.244	0.856	2.166	

Appendix A, Table 11.—Cattle Numbers by Crop and Livestock Prices for Two Capital Cost Levels, Aggregation A-III

Capital Cost and Feed Grain-Livestock Price Level	Price of Cotton Per Hundredweight Lint				
	$13.20	$17.60	$22.00	$26.40	$30.80
	— Number of Animals —				
Six Percent Capital Cost					
Cows					
70 Percent Grain and Livestock	56,652	62,994	65,749	65,749	65,749
100 Percent Grain and Livestock	30,577	26,502	54,879	52,685	52,830
130 Percent Grain and Livestock	17,325	19,957	19,957	36,949	49,086
Feeders					
70 Percent Grain and Livestock	272,465	85,104	12,340	0	0
100 Percent Grain and Livestock	845,420	833,245	364,076	298,629	271,895
130 Percent Grain and Livestock	968,326	927,961	893,001	448,493	353,902
18 Percent Capital Cost					
Cows					
70 Percent Grain and Livestock	74,782	56,622	47,044	47,044	47,044
100 Percent Grain and Livestock	60,418	60,418	60,370	64,860	65,355
130 Percent Grain and Livestock	42,734	42,734	44,914	50,643	50,643
Feeders					
70 Percent Grain and Livestock	0	0	0	0	0
100 Percent Grain and Livestock	155,506	155,506	103,944	39,177	28,120
130 Percent Grain and Livestock	371,175	331,526	305,347	158,753	131,016

Appendix Table 12.—Total Labor Hired with Cotton Prices, by Capital Cost and Grain-livestock Price Levels, Aggregation A-III

Capital Cost and Feed Grain-livestock Price level	Price of Cotton Per Hundredweight Lint				
	$13.20	$17.60	$22.00	$26.40	$30.80
	— Hours of Labor —				
Six Percent Capital Cost					
70 Percent Feed Grain-Livestock					
Hourly Labor	1,977,123	3,124,275	3,040,824	4,596,638	4,597,121
Custom Cotton Hoeing	234,518	5,073,596	7,445,950	8,384,138	8,384,138
Custom Cotton Harvest	199,422	3,877,588	5,804,216	6,523,054	6,523,054
Total	2,411,063	12,075,459	16,290,990	19,503,830	19,504,313
100 Percent Feed Grain-Livestock					
Hourly Labor	2,110,267	2,406,169	4,061,827	4,331,846	5,222,425
Custom Cotton Hoeing	83,796	1,036,018	6,534,718	7,613,908	8,089,388
Custom Cotton Harvest	55,720	570,996	4,892,984	5,903,736	6,316,044
Total	2,249,783	4,013,183	15,489,529	17,849,490	19,627,857
130 Percent Feed Grain-Livestock					
Hourly Labor	2,105,414	2,085,514	2,297,273	4,029,789	4,221,681
Custom Cotton Hoeing	35,096	117,946	1,923,048	6,466,950	7,320,924
Custom Cotton Harvest	17,548	91,624	1,010,546	4,891,704	5,545,826
Total	2,158,058	2,295,034	5,230,867	15,388,443	17,088,431
18 Percent Capital Cost					
70 Percent Feed Grain-Livestock					
Hourly Labor	878,921	1,128,939	2,715,544	2,818,646	3,484,910
Custom Cotton Hoeing	297,006	3,631,010	7,494,744	7,693,286	8,384,138
Custom Cotton Harvest	256,646	2,742,956	5,853,010	6,051,552	6,523,054
Total	1,432,573	7,552,905	16,063,298	16,563,484	18,392,102
100 Percent Feed Grain-Livestock					
Hourly Labor	1,367,180	1,841,362	3,346,884	3,386,584	3,899,777
Custom Cotton Hoeing	206,888	889,172	6,961,806	7,602,263	8,232,254
Custom Cotton Harvest	171,792	554,006	5,320,072	5,960,534	6,371,170
Total	1,745,860	3,284,540	15,628,762	16,949,336	18,503,201
130 Percent Feed Grain-Livestock					
Hourly Labor	1,601,856	1,722,562	1,910,225	3,772,120	3,939,440
Custom Cotton Hoeing	97,836	804,603	2,110,092	7,071,430	8,030,794
Custom Cotton Harvest	62,740	469,442	1,197,590	5,429,696	6,169,710
Total	1,762,432	2,996,612	5,217,907	16,273,246	18,139,944

Appendix B. Table 1.—Production of Cotton and Feed Grains and Net Revenue Realized, by Feed Grain-livestock Price Levels with Five Cotton Prices; and Relevant Elasticity Estimates with Respect to Changing Cotton Prices; Included Respondent Resources, Aggregation B-II

Item	Price of Cotton Per Hundredweight Lint				
	$13.20	$17.60	$22.00	$26.40	$30.80
70 Percent Feed Grain-Livestock					
Cotton					
Acres	148,766	2,806,443	4,267,060	4,773,986	4,793,677
Cwt of Lint	401,667	6,060,597	8,758,742	9,480,903	9,502,977
Elasticity of Supply	6.130	1.639	0.435	0.015	
Feed Grain					
Acres	3,247,378	888,929	83,724	0	0
Cwt	30,273,447	7,066,525	704,471	0	0
Net Revenue	28,946,236	33,971,178	75,074,887	115,305,629	157,140,421
Income Flexibility	1.033	2.849	2.324	1.996	
100 Percent Feed Grain-Livestock					
Cotton					
Acres	45,423	419,027	3,611,752	4,340,619	4,643,564
Cwt of Lint	139,871	1,177,669	7,775,003	8,929,255	9,329,631
Elasticity of Supply	5.514	6.632	0.760	0.285	
Feed Grain					
Acres	3,669,376	3,352,036	1,040,424	341,034	126,562
Cwt	35,636,391	32,190,326	7,817,818	2,676,423	857,257
Net Revenue	75,201,092	67,043,848	86,130,090	123,412,640	163,795,297
Income Flexibility	0.098	1.121	1.957	1.828	
130 Percent Feed Grain-Livestock					
Cotton					
Acres	13,681	70,122	749,823	3,615,219	4,093,472
Cwt of Lint	44,561	181,337	1,793,413	7,944,222	8,656,168
Elasticity of Supply	4.238	7.347	6.943	0.557	
Feed Grain					
Acres	3,950,827	3,991,286	3,522,636	1,120,472	701,408
Cwt	38,501,053	38,867,031	33,751,051	8,506,745	5,129,792
Net Revenue	109,226,177	109,528,424	114,844,502	137,859,248	174,782,371
Income Flexibility	0.010	0.213	1.002	1.535	

Appendix B, Table 2.—Cattle Numbers by Crop and Livestock Prices for Included Resources, Two Response Levels, Aggregation B-II

Capital Cost and Feed Grain	Price of Cotton Per Hundredweight Lint				
Livestock Price Level	$13.20	$17.60	$22.00	$26.40	$30.80
	— Number of Animals —				
Full Response Resources					
Cows					
70 Percent Grain and Livestock	78,991	87,915	91,630	91,630	91,630
100 Percent Grain and Livestock	42,614	40,169	76,483	73,516	73,718
130 Percent Grain and Livestock	24,146	27,815	27,815	51,496	68,410
Feeders					
70 Percent Grain and Livestock	393,263	118,605	17,197	0	0
100 Percent Grain and Livestock	1,178,220	1,075,792	507,395	416,188	378,928
130 Percent Grain and Livestock	1,349,508	1,293,256	1,173,911	625,041	493,218
Limited Response Resources					
Cows					
70 Percent Grain and Livestock	5,777	4,326	3,580	3,580	3,580
100 Percent Grain and Livestock	4,595	4,595	4,730	4,933	4,971
130 Percent Grain and Livestock	3,048	3,048	3,145	3,583	3,583
Feeders					
70 Percent Grain and Livestock	0	0	0	0	0
100 Percent Grain and Livestock	11,848	11,848	7,919	2,985	2,142
130 Percent Grain and Livestock	37,525	36,407	33,492	18,903	16,795
Total Included Resources					
Cows					
70 Percent Grain and Livestock	83,763	92,241	95,210	95,210	95,210
100 Percent Grain and Livestock	47,209	44,764	81,213	78,449	78,689
130 Percent Grain and Livestock	27,194	30,333	30,960	55,079	71,993
Feeders					
70 Percent Grain and Livestock	393,623	118,605	17,197	0	0
100 Percent Grain and Livestock	1,190,063	1,037,640	515,314	419,173	381,070
130 Percent Grain and Livestock	1,387,033	1,329,663	1,207,403	643,949	510,013

Appendix B, Table 3.—Total Labor Hired for Aggregation B-II with Five Cotton Prices, by Feed Grain-livestock Price Levels

Feed Grain-Livestock Price Level	Price of Cotton Per Hundredweight Lint				
	$13.20	$17.60	$22.00	$26.40	$30.80
	— Hours of Labor —				
70 Percent Feed Grain-Livestock					
Hourly Labor	2,722,007	4,439,869	4,444,303	6,619,992	6,670,891
Custom Cotton Hoeing	349,516	7,351,062	10,942,032	12,261,684	12,317,766
Custom Cotton Harvest	297,532	5,612,886	8,534,120	9,547,972	9,587,354
Total	3,369,055	17,403,817	23,920,455	28,429,648	28,576,011
100 Percent Feed Grain-Livestock					
Hourly Labor	3,044,964	3,493,428	5,915,279	6,294,778	7,612,174
Custom Cotton Hoeing	132,646	1,511,656	9,636,416	11,199,528	11,900,160
Custom Cotton Harvest	90,846	838,054	7,223,504	8,681,238	9,287,128
Total	3,268,456	5,843,138	22,775,199	26,175,544	28,799,462
130 Percent Feed Grain-Livestock					
Hourly Labor	3,055,645	3,037,102	3,346,518	5,903,184	6,183,340
Custom Cotton Hoeing	52,620	179,112	2,840,810	9,550,690	10,790,932
Custom Cotton Harvest	27,362	140,244	1,499,646	7,230,438	8,186,944
Total	3,135,627	3,356,458	7,686,974	22,684,312	25,161,216

Appendix B, Table 4.—Production of Cotton and Feed Grains and Net Revenue Realized, by Feed Grain-livestock Price Levels with Five Cotton Prices; and Relevant Elasticity Estimates with Respect to Changing Cotton Prices; Included Respondent Resources, Aggregation B-III

Item	Price of Cotton Per Hundredweight Lint				
	$13.20	$17.60	$22.00	$26.40	$30.80
70 Percent Feed Grain-Livestock					
Cotton					
Acres	160,037	2,583,105	4,276,604	4,682,806	4,793,564
Cwt of Lint	424,771	5,557,869	8,780,206	9,366,988	9,503,720
E'asticity of Supply	6.006	2.023	0.356	0.094	
Feed Grain					
Acres	2,966,534	944,251	83,716	0	0
Cwt	27,872,186	8,036,630	704,414	0	0
Net Revenue	30,154,069	37,782,016	74,896,017	115,022,835	156,990,727
Income Flexibility	0.786	2.964	2.324	2.006	
100 Percent Feed Grain-Livestock					
Cotton					
Acres	68,270	415,631	3,602,703	4,351,769	4,602,852
Cwt of Lint	215,663	1,131,183	7,926,748	8,948,069	9,346,950
Feed Grain	4.758	6.752	0.666	0.283	
Acres	3,736,686	3,442,414	1,103,753	361,419	150,614
Cwt	35,976,705	33,871,674	7,285,019	2,688,912	1,203,749
Net Revenue	62,225,625	71,410,521	85,068,270	135,718,451	163,005,358
Income Flexibility	0.481	0.786	2.523	1.187	
130 Percent Feed Grain-Livestock					
Cotton					
Acres	17,740	83,537	786,534	3,721,080	4,186,496
Cwt of Lint	54,923	219,395	1,877,880	8,072,839	8,731,799
Elasticity of Supply	4.197	7.117	6.848	0.510	
Feed Grain					
Acres	4,021,280	4,035,960	3,600,375	1,062,453	626,285
Cwt	39,544,931	39,577,897	34,319,579	7,820,332	4,709,562
Net Revenue	106,641,836	106,725,371	112,109,841	137,049,017	174,007,183
Income Flexibility	0.003	0.221	1.101	1.547	

Appendix B, Table 5.—Cattle Numbers by Crop and Livestock Prices for Included Resources, Aggregation B-III

Capital Cost and Feed Grain-Livestock Price Level	Price of Cotton Per Hundredweight Lint				
	$13.20	$17.60	$22.00	$26.40	$30.80
	— Number of Anima's —				
Full Response Resources					
Cows					
70 Percent Grain and Livestock	56,652	62,994	65,749	65,749	65,749
100 Percent Grain and Livestock	30,577	26,502	54,879	52,685	52,830
130 Percent Grain and Livestock	17,325	19,957	19,957	36,949	49,086
Feeders					
70 Percent Grain and Livestock	272,465	85,104	12,340	0	0
100 Percent Grain and Livestock	845,420	833,245	364,076	298,629	271,895
130 Percent Grain and Livestock	968,326	927,961	893,001	448,493	353,902
Limited Response Resources					
Cows					
70 Percent Grain and Livestock	29,490	30,557	22,097	22,097	22,097
100 Percent Grain and Livestock	28,378	28,378	27,112	30,464	30,696
130 Percent Grain and Livestock	18,835	18,835	19,446	22,138	22,138
Feeders					
70 Percent Grain and Livestock	0	0	0	0	0
100 Percent Grain and Livestock	73,046	73,046	48,825	18,402	13,208
130 Percent Grain and Livestock	237,099	224,441	212,206	116,603	102,896
Total Included Resources					
Cows					
70 Percent Grain and Livestock	86,142	93,551	87,846	87,846	87,846
100 Percent Grain and Livestock	58,955	54,880	81,991	83,149	83,526
130 Percent Grain and Livestock	36,160	38,792	39,403	59,087	71,224
Feeders					
70 Percent Grain and Livestock	272,465	85,104	12,340	0	0
100 Percent Grain and Livestock	918,466	906,291	412,901	317,031	285,103
130 Percent Grain and Livestock	1,205,425	1,152,402	1,105,207	565,096	456,798

Appendix B, Table 6.—Total Labor Hired for Aggregation B-III with Five Cotton Prices, by Feed Grain-livestock Price Levels

Feed Grain-Livestock Price Level	Price of Cotton Per Hundredweight Lint				
	$13.20	$17.60	$22.00	$26.40	$30.80
	— Hours of Labor —				
70 Percent Feed Grain-Livestock					
Hourly Labor	2,389,743	3,654,455	4,316,325	5,893,756	6,234,208
Custom Cotton Hoeing	374,126	6,802,814	10,966,050	11,997,804	12,322,304
Custom Cotton Harvest	320,074	5,166,210	8,553,208	9,365,612	9,587,088
Total	3,083,943	15,623,479	23,835,583	27,257,172	28,143,600
100 Percent Feed Grain-Livestock					
Hourly Labor	2,752,379	3,270,967	5,633,880	5,992,736	7,054,371
Custom Cotton Hoeing	181,100	1,453,706	9,618,122	11,184,818	11,750,156
Custom Cotton Harvest	136,540	831,262	7,205,406	8,703,538	9,205,704
Total	3,070,019	5,555,935	22,457,408	25,881,092	28,010,231
130 Percent Feed Grain-Livestock					
Hourly Labor	2,857,348	2,894,157	3,194,067	5,801,770	6,072,260
Custom Cotton Hoeing	57,974	205,760	2,914,162	9,309,998	10,472,824
Custom Cotton Harvest	35,480	167,074	1,573,068	7,442,160	8,372,992
Total	2,950,802	3,266,991	7,681,297	22,553,928	24,918,076

Appendix C, Table 1.—Production of Cotton and Feed Grains, by Feed Grain-livestock and Cotton Price Levels and Relevant Elasticity Estimates, Six Percent Capital Cost, Aggregation C-II

Item	Price of Cotton Per Hundredweight Lint				
	$13.20	$17.60	$22.00	$26.40	$30.80
70 Percent Feed Grain-livestock					
Cotton					
Acres	836,349	2,710,726	4,131,089	4,553,929	4,553,929
Cwt of Lint	1,866,847	6,475,181	8,312,477	9,151,342	9,151,342
Elasticity of Supply	3.867	1.118	0.531	0.0	
Feed Grain					
Acres	2,851,633	912,934	277,298	210,325	210,325
Cwt	26,139,052	7,087,535	2,147,588	1,584,058	1,584,058
Net Revenue	23,643,715	38,529,270	74,072,171	113,088,417	153,381,873
Income Elasticity	1.676	2.841	2.293	1.966	
100 Percent Grain-livestock					
Cotton					
Acres	751,833	1,054,795	**3,595,384**[1]	4,189,833	4,432,230
Cwt of Lint	1,649,158	2,498,372	**7,745,428**	8,689,530	9,010,041
Elasticity of Supply	1.433	4.610	0.632	0.235	
Feed Grain					
Acres	3,135,579	2,877,929	**1,051,626**	479,974	307,847
Cwt	29,996,637	27,030,424	**7,920,292**	3,723,090	2,216,192
Net Revenue	56,256,002	64,531,588	**86,337,770**	122,976,166	162,056,527
Income Flexibility	0.480	1.301	1.926	1.783	
130 Percent Grain-livestock					
Cotton					
Acres	729,393	772,959	1,313,392	3,594,761	3,979,424
Cwt of Lint	1,583,128	1,687,791	2,969,496	7,856,175	8,437,007
Elasticity of Supply	0.224	2.477	4.965	0.456	
Feed Grain					
Acres	3,346,327	3,382,683	3,014,320	1,113,580	783,038
Cwt	32,134,181	32,402,951	28,408,011	8,499,119	5,780,628
Net Revenue	94,697,155	101,787,882	112,845,818	137,765,094	174,124,570
Income Flexibility	0.253	0.464	1.094	1.515	

[1] Bold face figures indicate the assumed position of equilibrium. As prices depart from these levels, 80% of farm operators are assumed to view the changes as permanent and hence to adjust to them. The remaining farmers view these changes as temporary and therefore make no adjustments. Production for nonadjusting farmers is as follows:

Cotton		Feed Grain	
Acres	719,077	Acres	210,325
Cwt. Lint	1,549,085	Cwt	1,584,058

Appendix C, Table 2.—Production of Cotton and Feed Grains, by Feed Grain-livestock and Cotton Price Levels and Relevant Elasticity Estimates, 18 Percent Capital Cost, Aggregation C-II

Item	Price of Cotton Per Hundredweight Lint									
	$13.20		$17.60		$22.00		$26.40		$30.80	
70 Percent Feed Grain-livestock										
Cotton										
Acres	932,793		2,394,490		4,222,690		4,339,535		4,616,727	
Cwt of Lint	2,049,083		5,086,906		8,730,624		8,924,301		9,265,302	
Elasticity of Supply		2.980		2.373		0.121		0.244		
Feed Grain										
Acres	1,969,259		1,034,612		233,788		166,815		166,815	
Cwt	18,603,895		9,586,215		1,750,043		1,186,533		1,186,533	
Net Revenue	20,776,119		35,192,313		74,250,102		113,464,055		154,621,654	
Income Flexibility		1.803		3.253		2.298		1.996		
100 Percent Feed Grain-livestock										
Cotton										
Acres	882,920		1,107,609		**3,909,382**[1]		4,286,025		4,527,434	
Cwt of Lint	1,988,862		2,465,777		**8,311,631**		8,858,403		9,174,747	
Elasticity of Supply		0.749		4.882		0.350		0.228		
Feed Grain										
Acres	3,292,941		3,104,368		**834,076**		497,439		336,184	
Cwt	31,481,317		32,522,753		**5,932,664**		3,363,449		2,853,891	
Net Revenue	45,558,289		54,611,201		**82,306,747**		119,508,695		159,782,088	
Income Flexibility		0.633		1.820		2.028		1.874		
130 Percent Feed Grain-livestock										
Cotton										
Acres	804,316		876,321		1,485,938		3,973,951		4,320,278	
Cwt of Lint	1,727,325		1,916,078		3,338,956		8,441,824		8,855,073	
Elasticity of Supply		0.363		2.437		4.765		0.311		
Feed Grain										
Acres	4,210,001		3,737,360		3,243,484		937,518		515,225	
Cwt	35,133,580		34,491,111		29,986,356		6,717,755		4,041,061	
Net Revenue	83,658,313		90,595,258		102,356,519		133,531,682		170,673,369	
Income Flexibility		0.279		0.549		1.454		1.587		

[1] Bold face figures indicate the assumed position of equilibrium. As prices depart from these levels, 80% of farm operators are assumed to view the change as permanent and hence to adjust to them. The remaining farmers view these changes as temporary and therefore make no adjustments. Production for nonadjusting farmers is as follows:

Cotton		Feed Grain	
Acres	781,876	Acres	166,815
Cwt. Lint	1,662,326	Cwt.	1,186,533

Appendix C, Table 3.—Cattle Numbers by Crop and Livestock Prices for Two Capital Cost Levels, Aggregation C-II

Capital Cost and Feed Grain-Livestock Price Level	Price of Cotton Per Hundredweight Lint				
	$13.20	$17.60	$22.00	$26.40	$30.80
	— Number of Animals —				
Six Percent Capital Cost					
Cows					
70 Percent Grain and Livestock	82,773	90,300	93,434	93,434	93,434
100 Percent Grain and Livestock	52,082	50,019	80,656[1]	78,077	78,248
130 Percent Grain and Livestock	35,308	38,403	38,403	56,845	71,110
Feeders					
70 Percent Grain and Livestock	348,693	161,718	114,582	107,017	107,017
100 Percent Grain and Livestock	1,101,037	1,086,685	535,087[1]	458,208	426,702
130 Percent Grain and Livestock	1,246,543	1,198,079	1,114,699	634,363	523,125
18 Percent Capital Cost					
Cows					
70 Percent Grain and Livestock	92,098	84,869	73,592	73,592	73,592
100 Percent Grain and Livestock	89,315	89,315	91,405[1]	94,539	95,122
130 Percent Grain and Livestock	65,475	66,227	66,958	73,696	73,696
Feeders					
70 Percent Grain and Livestock	30,554	30,554	30,554	30,554	30,554
100 Percent Grain and Livestock	213,394	213,394	152,769[1]	76,618	63,617
130 Percent Grain and Livestock	608,546	591,487	546,251	322,438	289,824

[1] These are the assumed equilibrium positions. As prices move away from these equilibria, 80 percent of farm operators view changes as permanent and adjust, while the remainder maintain constant production. These constants are as follows:
6 percent capital: 16,131 cows, and 107,017 feeders,
18 percent capital: 18,281 cows, and 30,554 feeders.

Appen Table 4.—Total Labor Hired by C Cost and Feed Grain-livestock Price , Aggregation C-II

Capital Cost and Feed Grain-Livestock Price level	Price of Cotton Per Hundredweight Lint				
	$13.20	$17.60	$22.00	$26.40	$30.80
	— Hours of Labor —				
Six Percent Capital Cost					
70 Percent Feed Grain-Livestock					
Hourly Labor	3,518,402	4,867,077	4,703,102	6,597,210	6,597,382
Custom Cotton Hoeing	2,088,530	7,778,229	10,207,018	11,670,599	11,670,599
Custom Cotton Harvest	1,672,698	5,997,452	8,262,178	9,107,858	9,107,858
Total	7,279,630	18,642,758	23,172,298	27,375,667	27,375,839
100 Percent Feed Grain-Livestock					
Hourly Labor	3,674,957	4,022,847	**5,969,283**[1]	6,286,748	7,365,094
Custom Cotton Hoeing	1,911,285	3,030,908	**9,063,608**	10,764,972	11,324,040
Custom Cotton Harvest	1,503,666	2,109,591	**7,190,768**	8,379,666	8,864,460
Total	7,089,908	9,163,346	**22,223,659**	25,431,386	27,553,594
130 Percent Feed Grain-Livestock					
Hourly Labor	3,669,226	3,645,820	3,894,799	5,931,634	6,157,160
Custom Cotton Hoeing	1,853,986	1,951,434	4,073,858	9,416,186	10,420,492
Custom Cotton Harvest	1,458,786	1,545,919	2,626,716	7,189,522	7,958,832
Total	6,981,998	7,143,173	10,595,373	22,537,342	24,536,484
18 Percent Capital Cost					
70 Percent Feed Grain-Livestock					
Hourly Labor	2,017,093	2,311,080	4,176,377	4,297,605	5,080,817
Custom Cotton Hoeing	2,395,607	6,374,468	10,858,220	11,091,911	11,904,196
Custom Cotton Harvest	1,865,587	4,788,982	8,013,380	8,679,071	9,233,457
Total	6,278,287	13,474,530	23,479,977	24,068,587	26,218,470
100 Percent Feed Grain-Livestock					
Hourly Labor	2,591,157	3,148,674	**4,918,574**[1]	4,965,253	5,568,573
Custom Cotton Hoeing	2,289,673	3,091,857	**10,231,604**	10,984,891	11,725,609
Custom Cotton Harvest	1,765,841	2,215,219	**7,818,764**	8,572,051	9,054,868
Total	6,646,671	8,455,750	**22,968,942**	24,522,195	26,349,050
130 Percent Feed Grain-Livestock					
Hourly Labor	2,867,048	3,008,944	3,229,589	5,418,529	5,615,209
Custom Cotton Hoeing	2,103,580	2,266,166	4,527,319	10,360,743	11,133,862
Custom Cotton Harvest	1,608,633	1,752,643	2,971,878	7,947,903	8,640,556
Total	6,579,261	7,027,753	10,728,786	23,727,175	25,389,627

[1] Bold face figures indicate labor hired at assumed equilibirium position.

Appendix C, Table 5.—Production of Cotton and Feed Grains, by Feed Grain-livestock and Cotton Price Levels and Relevant Elasticity Estimates, Six Percent Capital Cost, Aggregation C-III

Item	Price of Cotton Per Hundredweight Lint				
	$13.20	$17.60	$22.00	$26.40	$30.80
70 Percent Feed Grain-livestock					
Cotton					
Acres	1,870,987	3,042,472	3,930,204	4,194,474	4,194,474
Cwt of Lint	4,071,316	6,951,524	8,099,834	8,624,124	8,624,124
Elasticity of Supply	1.829	0.639	0.345	0.0	
Feed Grain					
Acres	2,176,630	964,944	567,671	525,813	525,813
Cwt	19,328,876	7,399,819	4,312,352	3,960,146	3,960,146
Net Revenue	15,641,769	37,093,147	72,719,470	109,884,582	147,847,951
Income Flexibility	2.847	2.920	2.239	1.923	
100 Percent Feed Grain-livestock					
Cotton					
Acres	1,818,164	2,007,516	**3,595,384**[1]	3,966,914	4,118,412
Cwt of Lint	3,935,260	4,446,018	**7,745,428**	8,335,492	8,535,812
Elasticity of Supply	0.427	2.436	0.404	0.154	
Feed Grain					
Acres	2,354,096	2,193,066	**1,051,626**	694,344	586,764
Cwt	21,718,008	19,864,125	**7,920,292**	5,297,041	4,355,230
Net Revenue	42,176,748	60,128,948	**86,337,770**	122,216,726	161,913,212
Income Flexibility	1.228	1.610	1.892	1.816	
130 Percent Feed Grain-livestock					
Cotton					
Acres	1,804,139	1,831,368	2,169,014	3,594,994	3,835,409
Cwt of Lint	3,893,991	3,959,405	4,760,471	7,814,645	8,177,666
Elasticity of Supply	0.058	0.827	2.672	0.295	
Feed Grain					
Acres	2,485,814	2,508,536	2,278,310	1,090,348	883,758
Cwt	23,053,973	23,221,954	20,725,116	8,282,059	6,583,002
Net Revenue	72,354,769	89,566,432	109,257,600	137,612,106	173,116,736
Income Flexibility	0.744	0.891	1.263	1.485	

[1] Bold face figures indicate the assumed position of equilibrium. As prices depart from these levels, 50 percent of farm operators are assumed to view the changes as permanent and hence to adjust to them. The remaining farmers view the changes as temporary and therefore make no adjustments. Production for nonadjusting farm resources is as follows:

Cotton		Feed Grain	
Acres	1,797,692	Acres	525,813
Cwt. Lint	3,872,717	Cwt.	3,960,146

Appendix C, Table 6.—Production of Cotton and Feed Grains, by Feed Grain-livestock and Cotton Price Levels and Relevant Elasticity Estimates, 18 Percent Capital Cost, Aggregation C-III

Item	Price of Cotton Per Hundredweight Lint				
	$13.20	$17.60	$22.00	$26.40	$30.80
70 Percent Feed Grain-Livestock					
Cotton					
Acres	2,049,014	2,962,575	4,105,200	4,178,228	4,351,473
Cwt of Lint	4,397,539	6,296,178	8,573,502	8,694,550	8,907,676
Elasticity of Supply	1.243	1.378	0.077	0.158	
Feed Grain					
Acres	1,543,566	959,411	458,896	417,038	417,038
Cwt	13,852,184	8,216,134	3,318,538	2,966,332	2,966,332
Net Revenue	13,117,008	35,841,324	73,966,635	112,183,300	151,627,242
Income Flexibility	3.249	3.125	2.258	1.944	
100 Percent Feed Grain-Livestock					
Cotton					
Acres	2,017,844	2,158,274	**3,909,382**[1]	4,144,784	4,295,664
Cwt of Lint	4,359,901	4,658,223	**8,311,631**	8,653,364	8,851,079
Elasticity of Supply	0.232	2.535	0.222	0.147	
Feed Grain					
Acres	2,370,867	2,253,085	**834,076**	623,678	522,894
Cwt	21,900,572	22,551,470	**5,932,664**	4,326,904	4,008,431
Net Revenue	31,910,574	51,282,838	**32,306,747**	119,272,159	158,157,223
Income Flexibility	1.632	2.093	2.017	1.822	
130 Percent Feed Grain-Livestock					
Cotton					
Acres	1,968,716	2,013,719	2,394,730	3,949,738	4,166,192
Cwt of Lint	4,196,440	4,314,411	5,203,710	8,393,002	8,651,283
Elasticity of Supply	0.097	0.841	3.049	0.197	
Feed Grain					
Acres	2,943,984	2,648,628	2,339,956	898,728	634,794
Cwt	24,183,236	23,781,693	20,966,222	6,423,346	4,750,412
Net Revenue	59,027,798	77,077,583	98,142,565	131,341,236	168,268,984
Income Flexibility	0.928	1.082	1.591	1.603	

[1] Bold face figures indicate the assumed position of equilibrium. As prices depart from these levels, 50 percent of farm operators are assumed to view the changes as permanent and hence to adjust to them. The remaining farmers view the changes as temporary and therefore make no adjustments. Production for nonadjusting farm resources is as follows:

Cotton		Feed Grain	
Acres	1,954,691	Acres	417,036
Cwt. Lint	4,155,816	Cwt.	2,966,332

Appendix C, Table 7.—Cattle Numbers by Crop and Livestock Prices for Two Capital Cost Levels, Aggregation C-III

Capital Cost and Feed Grain-Livestock Price Level	Price of Cotton Per Hundredweight Lint				
	$13.20	$17.60	$22.00	$26.40	$30.80
	— Number of Animals —				
Six Percent Capital Cost					
Cows					
70 Percent Grain and Livestock	81,979	86,684	88,642	88,642	88,642
100 Percent Grain and Livestock	62,798	61,508	80,656[1]	79,044	79,151
130 Percent Grain and Livestock	52,314	55,248	55,248	65,774	74,690
Feeders					
70 Percent Grain and Livestock	418,592	301,732	272,272	267,544	267,544
100 Percent Grain and Livestock	888,806	879,836	535,087[1]	487,048	467,347
130 Percent Grain and Livestock	979,123	949,458	897,345	597,136	527,612
18 Percent Capital Cost					
Cows					
70 Percent Grain and Livestock	91,838	87,320	80,272	80,272	80,272
100 Percent Grain and Livestock	90,098	90,098	91,405[1]	93,364	93,728
130 Percent Grain and Livestock	75,168	75,668	76,125	80,336	80,336
Feeders					
70 Percent Grain and Livestock	76,384	76,384	76,384	76,384	76,384
100 Percent Grain and Livestock	190,659	190,659	152,769[1]	105,174	97,048
130 Percent Grain and Livestock	437,629	426,967	398,694	258,812	238,428

[1] These are the assumed equilibrium positions. As prices move away from these equilibria, 50 percent of farm operators view changes as permanent and adjust, while the remaining 50 percent maintain constant production. These constants are as follows:
6 percent capital: 40,328 cows and 267,544 feeders,
18 percent capital: 45,762 cows, and 76,384 feeders.

Appendix Table 8.—Total Labor Hired by Capital Cost and Feed Grain-livestock and Cotton Price Levels, Aggregation C-III

Capital Cost and Feed Grain-livestock Price level	Price of Cotton Per Hundredweight Lint				
	$13.20	$17.60	$22.00	$26.40	$30.80
	— Hours of Labor —				
Six Percent Capital Cost					
70 Percent Feed Grain-Livestock					
Hourly Labor	4,437,483	5,280,405	5,177,920	6,361,738	6,361,846
Custom Cotton Hoeing	4,704,184	8,260,246	10,003,239	10,692,977	10,692,977
Custom Cotton Harvest	3,741,974	6,444,945	7,860,399	8,388,949	8,388,949
Total	12,883,641	19,985,596	23,041,558	25,443,664	25,443,772
100 Percent Feed Grain-Livestock					
Hourly Labor	4,535,330	4,752,762	**5,969,283**	6,167,700	6,571,666
Custom Cotton Hoeing	4,593,406	5,293,170	**9,063,608**[1]	10,126,960	10,476,378
Custom Cotton Harvest	3,636,329	4,015,032	**7,190,768**	7,933,829	8,236,825
Total	12,765,065	14,060,964	**22,223,659**	24,228,489	25,284,869
130 Percent Feed Grain-Livestock					
Hourly Labor	4,531,748	4,517,120	4,672,732	5,945,752	6,086,707
Custom Cotton Hoeing	4,557,594	4,618,499	5,945,014	9,283,969	9,911,660
Custom Cotton Harvest	3,608,279	3,622,737	4,338,048	7,189,989	7,670,808
Total	12,697,621	12,758,356	14,955,794	22,419,710	23,669,175
18 Percent Capital Cost					
70 Percent Feed Grain-Livestock					
Hourly Labor	3,105,148	3,288,890	4,454,701	4,530,468	5,009,976
Custom Cotton Hoeing	5,334,106	7,820,894	10,623,239	10,769,296	11,276,974
Custom Cotton Harvest	4,098,028	5,925,150	8,210,399	8,356,456	8,702,947
Total	12,537,282	17,034,934	23,288,339	23,656,220	24,989,897
100 Percent Feed Grain-Livestock					
Hourly Labor	3,463,938	3,812,386	**4,918,574**	4,947,748	5,324,823
Custom Cotton Hoeing	5,267,897	5,769,262	**10,231,604**[1]	10,702,408	11,165,357
Custom Cotton Harvest	4,035,687	4,316,548	**7,818,764**	8,289,568	8,591,329
Total	12,767,522	13,989,196	**22,968,942**	23,939,724	25,081,509
130 Percent Feed Grain-Livestock					
Hourly Labor	3,636,370	3,725,055	3,862,958	5,231,046	5,353,971
Custom Cotton Hoeing	5,151,589	5,253,205	6,666,426	10,312,316	10,795,515
Custom Cotton Harvest	3,937,432	4,027,438	4,789,460	7,899,476	8,332,384
Total	12,725,391	13,005,698	15,318,844	23,442,838	24,481,870

[1]Bold face figures indicate labor hired at assumed equilibrium positions.

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