AGGREGATION OF NORMATIVE MICROSUPPLY RELATIONSHIPS FOR DRY-LAND CROP FARMS IN THE ROLLING PLAINS OF OKLAHOMA AND TEXAS

By

JOHN WILLIAM GOODWIN

Bachelor of Arts
Panhandle A. and M. College
Goodwell, Oklahoma
1956

Master of Science
Oklahoma State University
Stillwater, Oklahoma
1959

Submitted to the faculty of the Graduate School of the
Oklahoma State University of Agriculture and
Applied Science in partial fulfillment
of the requirements for the degree of
DOCTOR OF PHILOSOPHY
May, 1962

AGGREGATION OF NORMATIVE MICROSUPPLY RELATIONSHIPS FOR DRY-LAND CROP FARMS IN THE ROLLING PLAINS OF OKLAHOMA AND TEXAS

Thesis Approved:

James S Plaxico
Thesis Advisor

Clark Edwards.

Leo V. Blakley

Arnold M. Sharp

Carl E Marshall

Robert MacVicar
Dean of the Graduate School

PREFACE

Realizing that various government programs aimed at facilitating agricultural adjustments were constantly being developed and modified, the United States Department of Agriculture and the State Experiment Stations of the Land Grant College System joined resources in 1958 in an effort to provide economic guides for agricultural adjustment. Thirteen southern states across the cotton producing South from Oklahoma and Texas to the Carolinas and Virginia are contributors to the research done for what has become known as Southern Regional Project S-42, An Economic Appraisal of Farming Adjustment Opportunities in the Southern Region to Meet Changing Conditions.

The overall purpose of S-42 is stated as "the provision of guides to farmers when choosing among alternative production possibilities, . . . to those persons engaged directly in making and administering public programs and to the public at large, in order that choices of action at the public level may be made in a manner consistent with the public objectives."

The South was divided into subregions for purposes of analysis, and Oklahoma and Texas personnel collaborated in examining the Low Rolling Plains area. Physical resources were separated, and enterprise budgets formulated. The budgets were incorporated into programming models, and through linear programming techniques, microsupply optima were estimated for all resource situations. It is the function of this thesis to aggregate these sets of optima into a consistent set of macrosupply estimates representing aggregate production and income for the Rolling Plains study region in Oklahoma and Texas.

ACKNOWLEDGEMENTS

I am greatly indebted to Dr. James S. Plaxico, the Chairman of my graduate committee, for his counsel and supervision throughout the period of my graduate program and the writing of this thesis. Dr. Leo V. Blakley, a member of my doctoral committee and my advisor during study toward a Master's degree, has also given invaluable aid in his comments based upon the reading of a previous draft.

The Department of Agricultural Economics of Oklahoma State University, Stillwater, is due appreciation for its financial aid to me while pursuing graduate study, and for the help contributed by the women of the departmental statistical laboratory. Mrs. Juanita Marshall, a departmental secretary, is due thanks for her cheerful typing and retyping the various drafts and for the final typing of the thesis. Mrs. Cassie Spencer of the Oklahoma State University Data Processing Center has been of great assistance in her cooperation during the programming phases of my work.

Special appreciation is extended to the two most important women in my life--my wife, Phoebe Jane, and my mother, Mrs. Obera Goodwin--who have always been firmly convinced that I could do anything they set their minds to.

TABLE OF CONTENTS

TABLE OF CONTENTS (Continued)

LIST OF TABLES

LIST OF TABLES (Continued)

LIST OF FIGURES

LIST OF FIGURES (Continued)

CHAPTER I

INTRODUCTION

Because of the atomistically competitive nature of the agricultural sector, farm management researchers often assume that the relationships between individuals, and between individuals and the agricultural sector, and the total economy can be ignored. If analysis is restricted to the farm boundary, this is normally a safe assumption. When an individual farmer adjusts in a given manner, his adjustment has no perceptible effect upon the costs, returns, or adjustment alternatives of other farmers; nor does his adjustment cause an observable change in the agricultural sector. But when large groups of individual farmers make a given adjustment, the effects are apt to be noticeable at the farm, sector, and total economy levels, and further adjustments will probably be necessary.

Recognizing the interdependence among individual farms and between the farm sector and other portions of the entire economy, farm management researchers have extended their areas of interest to include analyses of the manner in which the parts and the whole act and react upon one another when adjusting to change. The major types of change to which agricultural production must be adjusted might be classified as (1) technological, (2) economic, and (3) institutional. These three types of changes have all been partially responsible for the dilemma in which American Agriculture currently finds itself. Technology has enormously increased the productivity of resource inputs. A favorable economic climate has promoted the growth of other economic sectors, but the demand for farm products has not expanded enough for the tremendous supply potential of the farm sector to be absorbed at prices that are acceptable to producers.

Technological progress has almost invariably required that individual firms expand capital investment in order to realize the advantage of lower per-unit costs of production. Increased fixed costs of machinery and equipment may actually increase per-unit production costs if the producer is unable to spread these costs over a large enough volume of production.

As viewed by the individual, the economist, or by society, adjustments in agricultural supply may be desired on the basis of resource efficiency - a necessary condition for optimum production and growth in an economy. Generally, resource efficiency conditions are satisfied when the marginal productivities of resources are equal within and between firms, areas and industries. This efficiency concept implies technical efficiency such that output is maximum for a given level of input, or conversely, that input is minimum for a given level of output. If returns to farm labor are significantly lower than returns to comparable labor in other industries (and there is ample evidence to show that farm wages are lower),[1] then it is evident that the marginal productivity of farm labor is lower than the productivity of comparable labor in other sectors.

Had technological changes occurred slowly over a relatively long period of time, it is possible that adjustment to the changes might have been relatively painless. Population increases and industrial development might have enabled the economy to absorb the increased production without the severe reductions in agricultural prices which precipitated the institutional restrictions upon production. But the production potential of American Agriculture has greatly exceeded the consumption capacity of the American economy. Wilcox[2] has estimated that 30 percent of American agricultural income is directly traceable to the current agricultural program.

---

[1] Cf., D. Gale Johnson, "Labor Mobility and Agricultural Adjustment" in Earl O. Heady, et al., (editors), Agricultural Adjustment Problems in a Growing Economy, Iowa State College Press, 1958.

W. M. Schultz and James S. Plaxico, "Cattle Ranches: Minimum Resources Required to Earn a Specified Labor-Management Return," Oklahoma Current Farm Economics, Vol. 33, No. 2, Oklahoma Agricultural Experiment Station, June, 1960.

John W. Goodwin and James S. Plaxico, "Resources Required to Earn Specified Incomes: Fine Textured Soils in Southwestern Oklahoma," Oklahoma Current Farm Economics, Vol. 33, No. 2, Oklahoma Agricultural Experiment Station, June, 1960.

James S. Plaxico and John W. Goodwin, "Adjustments for Efficient Organization of Southern Farms," Summary of Papers Presented at a Seminar for Southern Agricultural Leaders, Series One, Agricultural Policy Institute, North Carolina State College, Raleigh, North Carolina, January, 1961.

[2] Walter W. Wilcox, "The Farm Policy Dilemma," Journal of Farm Economics, Vol. XL, No. 3, August, 1958.

Within the region to which this analysis refers, physical resource situations have been delineated and their magnitudes estimated. Input-output budgets have been completed for each situation,[3] and linear programming utilized for the estimation of normative firm supply relationships.[4]

The purpose of this analysis, then, is the aggregation of the normative microsupply relationships into a compatible set of macrosupply estimates. The aggregative phase of the project will provide information with regard to effects of price changes upon total agricultural production, farm income, and labor employment in the Rolling Plains.

---

[3] 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, Processed Series P-357, Oklahoma Agricultural Experiment Station, in cooperation with Farm Economics Research Division, Agricultural Research Service, U. S. Department of Agriculture, Stillwater, Oklahoma, September, 1960.

Larry J. Connor, et al., Resource Requirements, Costs and Expected Returns; Alternative Crop and Livestock Enterprises; Loam Soils of the Rolling Plains of Southwestern Oklahoma, Processed Series P-368, Oklahoma Agricultural Experiment Station, in cooperation with Farm Economics Research Division, Agricultural Research Service, U. S. Department of Agriculture, Stillwater, Oklahoma, February, 1961.

Percy L. Strickland, Jr., et al., Resource Requirements, Costs and Expected Returns; Alternative Crop and Livestock Enterprises; Sandy Soils of the Rolling Plains of Southwestern Oklahoma, Processed Series P-369, Oklahoma Agricultural Experiment Station, in cooperation with Farm Economics Research Division, Agricultural Research Service, U. S. Department of Agriculture, Stillwater, Oklahoma, February, 1961.

Kenneth R. Tefertiller, Ralph H. Rogers, and Don S. Moore, Unpublished budgeting materials dealing with Resource Requirements, Costs and Expected Returns for Alternative Crop and Livestock Enterprises on Sandy Soils of the Rolling Plains of Texas. Available from the Department of Agricultural Economics, Agricultural and Mechanical College of Texas, College Station, Texas.

[4] Department of Agricultural Economics, Oklahoma State University, Stillwater, Oklahoma, Unpublished research materials.

There are a number of ways in which aggregation may be undertaken, and a number of bases for aggregation. The objectives of this analysis will therefore be threefold:

(1) The development of alternative aggregation models consistent with the assumptions of the normative microsupply relationships,

(2) The analysis of the implications of the alternative models,

(3) The estimation of aggregate supply response for dry-land crop farms under S-42 and other specified assumptions

  a. Total production of major commodities on dry-land crop farms

  b. Net Returns to owned factors of production on dry-land crop farms.

CHAPTER II

CONCEPTUAL DEVELOPMENT

Supply

Traditionally, a supply schedule is defined to be that schedule of the amount(s) of a product(s) that would be forthcoming at various prices, assuming that all other factors remain constant. Marshall[1] differentiates between market supply and "normal" supply schedules. The market supply schedule is the immediately available stock of a good or a commodity which is offered for sale at various prices. "Normal" supply is the schedule of goods which would be offered for sale at alternative prices, after those prices have prevailed over a period of time long enough for producers to adjust production to those conditions, assuming that other factors remain constant.

Johnson[2] points out that expressing the supply function for agricultural products as a simple relationship between the quantity of output and the price of that output obscures the complexity of the supply process which determines the supply of agricultural products. Johnson

---

[1] Alfred Marshall, Principles of Economics, 8th Edition, Macmillan and Co., Ltd., London, 1920, pp. 383-84.

[2] D. Gale Johnson, "The Nature of the Supply Function in Agriculture," American Economic Review, Vol. XL, (September, 1950) p. 539.

lists the determinants of supply as (1) production conditions - i.e., the technical relationship between inputs and outputs - or the production function, (2) the supply conditions of productive inputs, (3) price conditions for the output, and (4) the behavior of firms, including managerial goals and objectives.

The Production Function

Underlying any analysis of supply is the production function - the technical relationship which exists at any given time between resource inputs and product outputs. There is no manner in which maximum return for a given cost outlay (or minimum cost for a given return) can be estimated except through knowledge of production possibilities expressed in the technical relationship between inputs and outputs.[3] Firm supply is dependent upon costs of production, which in turn are determined by the production function of resource prices. Through the production function and some knowledge of firm behavior, firm supply relationships are derived. From these relationships, supply aggregates may be estimated.

Length of Run

In any definition of costs, reference to a specific length of run is inherent. In any productive process, there is a period so short that no adjustment can be made in response to changing conditions. This is the situation referred to by Marshall[4] as the "very short" or "market"

---

[3] Earl O. Heady, Economics of Agricultural Production and Resource Use, Prentice-Hall, Inc., 1952, pp. 54-56.

[4] Marshall, Principles of Economics, p. 274.

period, and by Boulding[5] as the "instantaneous" period. At the opposite extreme is the long period in which all factors may be completely adjusted to changing conditions. Boulding[6] points out that between these two periods there exists an infinite number of short periods representing temporary adjustments that are not in themselves complete.

Plaxico[7] discusses the supply periods in terms of resource fixity and managerial expectations with regard to the permanence of the observed conditions. Conditions which producers view as temporary make up the short run. Hence, the short-term supply schedule would represent managerial reaction to prices that are expected to change in the near future. No change in firm numbers or asset structures would be observed. Producers would operate along their existing marginal cost curves in making management and output decisions.

The long-run supply curve, as viewed by Plaxico,[8] indicates firm response to conditions which managers view as permanent. Each point on the schedule represents an equilibrium response of the producing unit to each price after an appropriate period of adjustment. Also, each point on the long-run supply schedule is related to a short-run supply schedule (or alternatively, a short-run marginal cost curve) which intersects the long-run supply schedule at that point.

---

[5] Kenneth E. Boulding, Economic Analysis, Harper and Brothers, New York, 1955, p. 568.

[6] Ibid., p. 569.

[7] James S. Plaxico, "Supply Concepts and Aggregation of Firm Supply Functions," Farm Size and Output Research - A Study in Research Methods, Southern Cooperative Series Bulletin No. 56, June, 1956.

[8] Ibid.

Conceptually, all factors are variable in the long run. Firms have time to adjust plant and all equipment, as well as the organization of production. Firm supply curves would be determined by the firm marginal cost curves, with all resources designated as marginal.

A third length of run concept set forth by Plaxico[9] is the intermediate term. Producers view conditions in this situation as being temporary, but expect them to exist for more than one period of production. Equipment and organization of production may be varied, but in the case of farms, owned land is fixed. Firm supply curves would again be determined by the firm marginal cost curves. All factors of production other than land would be variable, and hence would be determinants of the firm marginal cost curves.

Reversability of supply relationships is dependent upon the degree of price certainty and the equality of acquisition and salvage prices of assets. If the cost of acquiring an asset exceeds the return from salvaging it, the owners of such an asset(s) may expand supply along one curve, and contract it along another. Intermediate term assets are often of this sort.[10]

In the short run, elasticity of supply is dependent upon the managerial opinion of the degree of short-run variability characteristic of the various resources. Plaxico[11] lists the non-farm produced goods and services such as fertilizers, feeds, fuels, insecticides, etc., as the short-run variables for modern agriculture. In the long run, all

---

[9] Ibid.

[10] Ibid.

[11] Ibid.

factors are considered variable; hence, one would expect the long-run supply schedule to be relatively more elastic than the short-run supply schedules. The elasticity of the intermediate-term supply schedule would normally be expected to fall between the elasticities of the short and long-term supply schedules. Resources which could be varied (rented land, livestock, buildings, machinery, hired labor, etc.) permit a more elastic schedule.

Long-run supply schedules are not empirically observed because of the perpetual effect of changing conditions which limit the length of adjustment periods. Short-run supply schedules are useful in the estimation of effects of short-term alternatives which commit resources for relatively short periods of time (e.g., the acreage reserve). Intermediate-term supply schedules are of particular interest, since most planning and policy decisions are apt to hinge upon factors relevant to intermediate-term assets. It is the intermediate length of run which will receive particular attention in this analysis.

Shifts in Supply

Heady,[12] Nerlove and Bachman,[13] and Plaxico[14] all express concern with the shifts in supply, and the determinants of these shifts. Heady

---

[12] Earl O. Heady, "Uses and Concepts in Supply Analysis," in Earl O. Heady, et al., ed., Agricultural Supply Functions - Estimating Techniques and Interpretations, Iowa State University Press, Ames, Iowa, 1961, pp. 19-23.

[13] Marc Nerlove and Kenneth L. Bachman, "The Analysis of Changes in Agricultural Supply: Problems and Approaches," Journal of Farm Economics, Vol. XLII, (August, 1960) pp. 535-40.

[14] James S. Plaxico, "Supply Concepts and Aggregation of Firm Supply Functions."

and Nerlove and Bachman identify these determinants as (1) technological change, (2) resource fixity, and (3) expectations and uncertainty. Plaxico adds to this list (4) intrasector resource movements and (5) redistribution of asset ownership (rights, property and skill).

The rate of technological change is apparently impossible to predict, but such changes - if adopted - may profoundly alter the basic conditions of production upon which any analysis of supply must rest. Through technological development, the output which may result from the use of a given bundle of resources may be increased (or alternatively, the quantity of resources required to produce a given output may be reduced). In analyzing the effects of technological advance, complex problems of defining interrelationships arise.

Resources used in agricultural production may be viewed as flows of services rather than stocks of resources. Once investment has been made in these resources, the service flow is present whether or not it is utilized. (An example would be investment in machinery or buildings. A manager faces depreciation on these items whether or not they are used.) Periods over which these services are provided vary tremendously among items. Within the period of fixity, the productive response is but little related to the cost of resources. Only when these resources must be replaced do their costs become an important factor in determining production levels. Lerner[15] has contended that the rate at which "fixed" factors of production are varied is correlated with their cost.

---

[15] Abba P. Lerner, The Economics of Control, The Macmillan Company New York, 1944, pp. 334-38.

Heady[16] points out that with growth in national and family income, income elasticities of demand encourage withdrawal of resources from some types of agricultural production and expansion in other areas. These intrasector shifts of resources may tend to cancel each other in the aggregate of farm supply, but the effect on individual commodities can be considerable.

Whether redistribution of asset ownership is primarily a cause of shifts in supply or simply an incidental result of the advancing technology which also shifts supply is questionable. Johnson[17] illustrates how adoption of advanced technology and consolidation of assets occur simultaneously. Improved technology has almost invariably involved increased capital usage and labor productivity. Thus, by taking advantage of technological development, farm managers have been able to tremendously increase their individual productivity. It is conceivable that certain scale economies resulting from the consolidation could have shifted supply.

Supply Versus Response

Supply and response are used as interchangeable terms in many discussions of "supply." In recent years, some economists have drawn rather subtle distinctions between the two terms. Supply has been used to portray specific relationships while response refers to more general relationships.

---

[16] Earl O. Heady, "The Supply of Farm Products Under Conditions of Full Employment," American Economic Review, Vol. XLV, (May 1955) p. 232.

[17] D. Gale Johnson, "The Nature of the Supply Function in Agriculture."

Cochrane[18] discusses supply as a net response, portraying the net effect directly associated with specific price change, holding all other relevant factors constant at some level. This is the concept used in explaining price formation in a given market. When a supply relationship is confronted with a corresponding demand relationship, an explanation of market price emerges. The supply concept is reversible and timeless, with regard to dated time. That is, if the ceterus paribus conditions hold, regardless of the point in time, the supply relationship is the same.

Output response, in Cochrane's view, is change in the quantity of a commodity offered for sale associated with a change in the price of the commodity with the restrictive ceterus paribus conditions for the supply relationship absent.[19] Thus, the response relationship includes the net response of the supply relationship, but is further concerned with response to a price change by whatever means it occurs. Indirect effects such as changes in resource price in response to a product price change and the resulting changes in the cost structure would be included in the response relationship, but not in the supply relationship.

Cochrane illustrates how such factors as technological change (assumed to be constant in the case of the supply relationship) are incorporated in the response relationship, causing it to be irreversible.

---

[18] Willard W. Cochrane, "Conceptualizing the Supply Relationship in Agriculture," Journal of Farm Economics, Vol. XXXVIII, No. 5, (December, 1955) p. 1161.

[19] Ibid.

In the price increasing phase of the response relationship, producers move along their marginal cost curves in increasing output, adopting new technology in the process. As prices decrease, producers are extremely reluctant to give up the improved technology, and hence reversibility of the function does not occur.

In this analysis, the supply relationship will be examined. Predictions of output response relationships may be of aid in comparing food production-needs balances for some given time period. However, they do not indicate the impact of specific changes in the movement of variables of interest. The net anticipated response of output of a product in an area to a given policy or program is indicated by the supply relationship.[20]

The Concepts of Micro and Macro Agricultural Supply

The process of aggregation of supply relationships involves the translation of microparameters of microtheory of supply into macroparameters of macrotheory of supply. Microsupply refers to that schedule of quantities which an individual firm would produce for sale at a given schedule of prices, other factors remaining constant, while macrosupply refers to the sum of such firm supplies, or the total quantities of product which would be offered for sale at given prices in some predetermined area or universe. In this analysis, the area is the Low Rolling Plains of Oklahoma and Texas.

---

[20] Plaxico, "Supply Concepts and Aggregation of Firm Supply Functions."

Relevant microrelationships in the case of supply analysis might include price, size, tenure and capital parameters, while the macrorelationships would be the collective parameters. In this analysis, we are further concerned with the aggregation of normative supply relationships (with "normative" defined to mean the manner in which economic man would react under the assumptions of economics - i.e. the efficiency model),[21] over an intermediate length of run. All productive factors except the total land base and the distribution of soil qualities within that base are assumed to be variable. Thus, individual farm size might vary, but the sum of acreages in farms would remain fixed. Acreage which is currently in pasture is assumed to remain in pasture. However, seeding to pasture is allowed as one of the crop alternatives for very poor grades of cropland.

The microsupply relationships formulated for any one of the cross-sectional resource situations reflect what action a rational individual holding the profit-maximizing motive would take when faced with the conditions postulated, provided those conditions prevailed long enough for his intermediate term adjustments to be made. That is, the programmed optima then approximate the normative microsupply relationships.

Firm supply curves under purely competitive conditions have been shown to be identical with those portions of firm marginal cost curves

---

[21] The term "normative" departs from the usual Keynesian concept in that no ethical or value judgement is implied. See Earl O. Heady, "Uses and Concepts in Supply Analysis," and H. L. Stewart's discussion of the Heady paper in Earl O. Heady, et al., ed., Agricultural Supply Functions - Estimating Techniques and Interpretation, pp. 16, 26.

which lie above the firms' average variable cost curves.[22] The aggregation of these microsupply curves gives the industry supply curve, assuming constant resource costs. Since resource costs have been assumed to be constant, the effects of variable resource costs will not be considered in this analysis.

The firm marginal cost function is derived from the firm production. Thus, firm supply directly reflects the firm production function. Aggregation of these firm supply functions reflects the aggregate production function for all firms, within the framework of the relevant length of run.

An alternative unit for aggregative purposes would be the supply relationships for entire classes of cropland. Presumably, commodity aggregate estimates would be identical under the two systems. However, there are certain functions such as labor hiring, income realization, etc., which occur only at the firm level. Further, all production decisions must be made at the firm level. The computation of aggregate net revenue received and total labor hired can be done most simply if a representative farm is used as the basic unit for aggregation.

In aggregate adjustments to changing prices in an atomistically competitive industry such as agriculture, the addition or removal of any single firm has no appreciable effect upon the shape or elasticity of the aggregate supply curve. Thus, restrictions placed upon

---

[22] Richard H. Leftwich, The Price System and Resource Allocation, Rhinehart and Company, Inc., New York, 1956, p. 175.

individual firms may not affect the aggregate, depending upon how large the number of restricted firms may be and upon how many do the same thing at the same time.

Conceptual Means of Estimating Aggregate Supply

There are two basic approaches to the estimation of aggregate supply. These are the time-series approach through the use of aggregate data, and the cross-sectional approach through the use of technical input-output coefficients and summation of the individual results.

The use of aggregate time-series data in estimating aggregate supply has certain limitations. As Cochrane points out, the aggregate output response relation is a sort of hybrid concept related to the supply concept.[23] It is output response that time-series analysis normally attempts to measure. No one length of run can represent all the firms in the industry at any given point in time. Aggregate time-series data show some sort of hybrid relationship between all the possible lengths of run that might be relevant to the individual firms which make up the industry. Aggregate data likewise reflect a variety of levels of technology and technical and economic efficiency. These factors must be held constant if the rigorously defined supply relationship is to be measured. Since the time-series analysis obviously lacks

---

[23] Willard W. Cochrane, "Conceptualizing the Supply Relationship in Agriculture."

the *ceterus paribus* conditions, it is necessary that some method be devised that can hold such factors as technology, length of run, etc., constant, or that can measure and include them explicitly in the model.

The length-of-run concept has been associated with asset variability. Since this study is concerned with a period of time over which machinery, buildings, etc., may be varied, it is necessary to "sort out" the relationships for the intermediate length of run. The cross-sectional approach to the estimation of aggregate supply is one means of doing this. With this approach, technological levels can be assumed constant at some level, and levels of economic and technical efficiency may be maximized.

By separating the study area into physical resource groups and then formulating hypothetical farms to be representative of each of the physical resource groups, it is possible to estimate the marginal response of farms with given sets of resources to the various price changes, holding all other influences constant. These estimates may be so made that intermediate term assets such as machinery are variable within each of the enterprise alternatives. In a sense, the *ceterus paribus* conditions necessary for supply estimation may be satisfied by the use of the common denominator of microlevel production functions. These microproduction functions may then be added to secure an estimate of the aggregate production function, and the aggregate supply.

Aggregation of Firm Supply

Several types and levels of economic aggregation are relevant to this analysis. Theil[24] lists the types as (1) aggregation over commodities - either inputs or outputs, (2) aggregation over individuals, and (3) aggregation over time periods. Levels of aggregation which are relevant to this analysis include (1) the individual firm, (2) the resource situation, and (3) the area.

Plaxico discusses the aggregation of commodities at the firm level and the area level. Input commodities which must be used in fixed proportions (i.e., which are perfect complements) or inputs which are perfect substitutes should be aggregated and treated as a single input.[25] Outputs may be aggregated after the common denominator of price has reduced them to common terms, or when they are affected in the same manner by each input category.[26] It has been decided for purposes of this analysis that products be aggregated into a minimum number of commoditty categories[27] in order to reduce the number of variables to be analyzed to manageable proportions. The relevant commodity groups for the Rolling Plains would be (1) food and feed grains, (2) cotton, and (3) land-based livestock alternatives. The food and feed grain category would include all small grains, such as wheat, oats and grain sorghums.

---

[24] H. Theil, Linear Aggregation of Economic Relations, North Holland Publishing Company, Amsterdam, 1954, p. 3.

[25] James S. Plaxico, "Problems of Factor-Product Aggregation in Cobb-Douglas Value Productivity Analysis," Journal of Farm Economics, Vol. XXXVII, (November 1955) pp. 665-70.

[26] Ibid.

[27] James S. Plaxico, Aggregation of Farm Supply Relationships. An unpublished manuscript presented at the Spring Meeting of the Southern Farm Management Research Conference, Memphis, Tennessee, March 21-23, 1960.

Following the commodity aggregation line of reasoning, aggregation over individual farm units within physical resource classifications appears to be the next relevant level of aggregation for the Rolling Plains. Farm units which have similar soil resources could be expected to react to various economic stimuli in similar manners. Thus, it seems reasonable that these resource groups could be aggregated within groups, and these aggregates combined for purposes of area estimates.

Aggregation Over a Set of Individuals

Aggregation over a set of individuals would be relevant to the aggregation within the group of farms included in a single physical resource classification. Theil[28] suggests that linear aggregation over individuals may take two forms: simple summation, or fixed weight aggregation. However, he does illustrate that these forms are fully equivalent.

If it is postulated that individual farm production at a given point in time is a function of labor, capital and acreage used, then it follows that aggregate production must also be some function of these variables. Of primary concern is the relationship between these individual units and the aggregate. Suppose the derived microsupply relationship is given by:

---

[28] H. Theil, Linear Aggregation of Economic Relations, pp. 10-26.

(2.1)

$$y_i = a_i + b_{i1}x_{i1} + b_{i2}x_{i2} + b_{i3}x_{i3} + u_i \quad (i = 1, 2, 3, \ldots, I)$$

where:

y_i is the production of the specified firm to be aggregated

x_{i1} is the amount of labor used by that specified firm

x_{i2} is the amount of capital used by that specified firm

x_{i3} is the acreage used by the specified firm

a_i and b_{ij} are the parameters relating to the x_{ij}'s for the specified firm.

If all macrovariables are assumed to be simple sums of the microvariables, then:

(2.2) $Y = \sum_{i=1}^{I} y_i$, and

(2.3) $X_j = \sum_{i=1}^{I} x_{ij}$ $(j = 1, 2, 3)$

and it is postulated that

(2.4) $Y = A + B_1X_1 + B_2X_2 + B_3X_3 + U$

where:

A and B_j are the macroparameters

Y and X_j are the respective aggregates of the dependent and independent variables.

Total production is dependent upon total labor, capital and acreage.

It is apparent that (2.4) is something less than consistent with (2.2) and (2.3) in that (2.4) holds with fixed parameters A and B_j for whatever values assumed by the microvariables X_{ij}. But if (2.2) and (2.3) are generalized so that the microvariables are not simple sums, but rather weighted averages of the microvariables, the equations are compatible.

"Perfect" Aggregation

As pointed out earlier, the aggregative relationships must be derived from the microrelationships. Theil's rule of perfection[29] for a macroequation is that it must be compatible with the corresponding microrelationships for whatever values and changes assumed by the microvariables and at whatever point or period of time. Thus, if any course of action is to be considered a general adjustment possibility, the composite of the firm effects must be consistent with the total potential for adjustment within the framework of the relevant variables.

The Theil criterion for optimum aggregation appears to be appropriate in the case of agricultural supply analyses, since the decision-making function resides with the individual farm unit manager. Hence, the macroequation must be compatible with the microrelationship.

In our microsupply theory, we have a number of producing units, producing a group (or groups) of commodities, the prices for which remain constant over the period of time considered. The quantities produced by each unit depend upon

(1) the size of the unit
(2) the amount of labor used
(3) the amount of capital used (which in turn is determined by the rate of interest and the marginal productivity or "marginal efficiency" of capital)
(4) the productivity of the soil resources.

There are as many microsupply equations as there are producing units.

---

[29] Ibid., p. 140.

The representative farms are assumed to have the same distributions of physical resource qualities as are observed in the entire physical resource situation. From these situations, individual firm supplies may be estimated. These relationships indicate what action economic man might take when faced with any combination of these variables, assuming that his goal is maximization of returns to the owned factors of production. These normative microsupply relationships may be aggregated using Theil's system of weighted average summation.

Problems in Aggregation

There often seem to be contradictions between microtheory and macrotheory. The effect of a change in an independent macrovariable upon a dependent macrovariable can be measured in two ways. One may measure directly by using a macroequation or indirectly by use of the microequations. If the microequations are used, the composition of change in the macrovariable must be specified in terms of the corresponding microvariables. Different compositions generally lead to different effects upon the dependent macrovariable. Hence, contradictions may usually be traced to errors in composition.

Another difficulty in translating microrelationships into macrorelationships is that of unequal distribution of exogenous variables possessed by various firms. For example, firms might have an unequal distribution of fixed factors such as land or labor (as is the case when one moves from one physical resource situation to another), and there are apt to be differences in degrees of knowledge or value patterns among farm operators. Prices accepted as exogenous to the model may be different at differing levels of industry output due to external economies or diseconomies of scale for the industry. These factors are related to the weighting of the microvariables which compose the macrovariable, and hence may have a profound effect upon the macroparameters.

Since degrees of knowledge and value patterns are not measurable, these factors have been assumed constant. Farm size and resident farm labor should be weighted in accordance with the frequencies of their occurrence in the micromodels. Prices considered exogenous to the model have been accepted as given for this analysis, since external economies or diseconomies of scale for the industry can hardly be estimated for this level of aggregation. The "industry" involves a great deal more territory, production, and productive alternatives than might be observed in a forty-county area in Oklahoma and Texas.

The aggregative resource bases for the various models are simply the residual after excluded resources have been deducted from the total area resource base. This residual of resources is assumed to be distributed among the physical resource types as total area resources are distributed. Further the cropland capability class distribution within resource situations is assumed to be identical with the distribution of total area cropland. This implicitly assumes that the excluded alternatives have equal liklihood of occurrence upon all acreage, and are therefore proportionally distributed among resource situations.

CHAPTER III

THE MICROSUPPLY ESTIMATES

The Low Rolling Plains subregion, as defined for this analysis, includes a forty-county region in North Central Texas and Southwestern Oklahoma. This is approximately that region enumerated as Economic Subregion 83 in the 1959 Census of Agriculture.[1] The study region corresponds to State Economic Area 4 in Oklahoma, and Area 6a in Texas as listed in the 1954 Census of Agriculture[2] (see Figure 1).

The Physical Resource Situations[3]

The forty-county Rolling Plains study area is characterized by three broad classes of soil resources; (1) clay soils, (2) loam soils, and (3) sandy soils. These three soil resource classes are observed in relatively homogeneous blocks over extensive areas. Each soil resource group has been divided into cropland productivity classes. The productivity ratings are based on soil surveys conducted by the Soil Conservation Service of the United States Department of Agriculture.

---

[1] U. S. Department of Commerce, Bureau of the Census, U. S. Census of Agriculture, 1959, for Oklahoma and Texas.

[2] U. S. Department of Commerce, Bureau of the Census, U. S. Census of Agriculture, 1954, for Oklahoma and Texas.

[3] Cf., William F. Lagrone, Soil and Land Classification for Aggregate Economic Analysis, Supplement to the Minutes of the Meeting of the Technical Committee of Regional Project S-42, November 17, 1959.

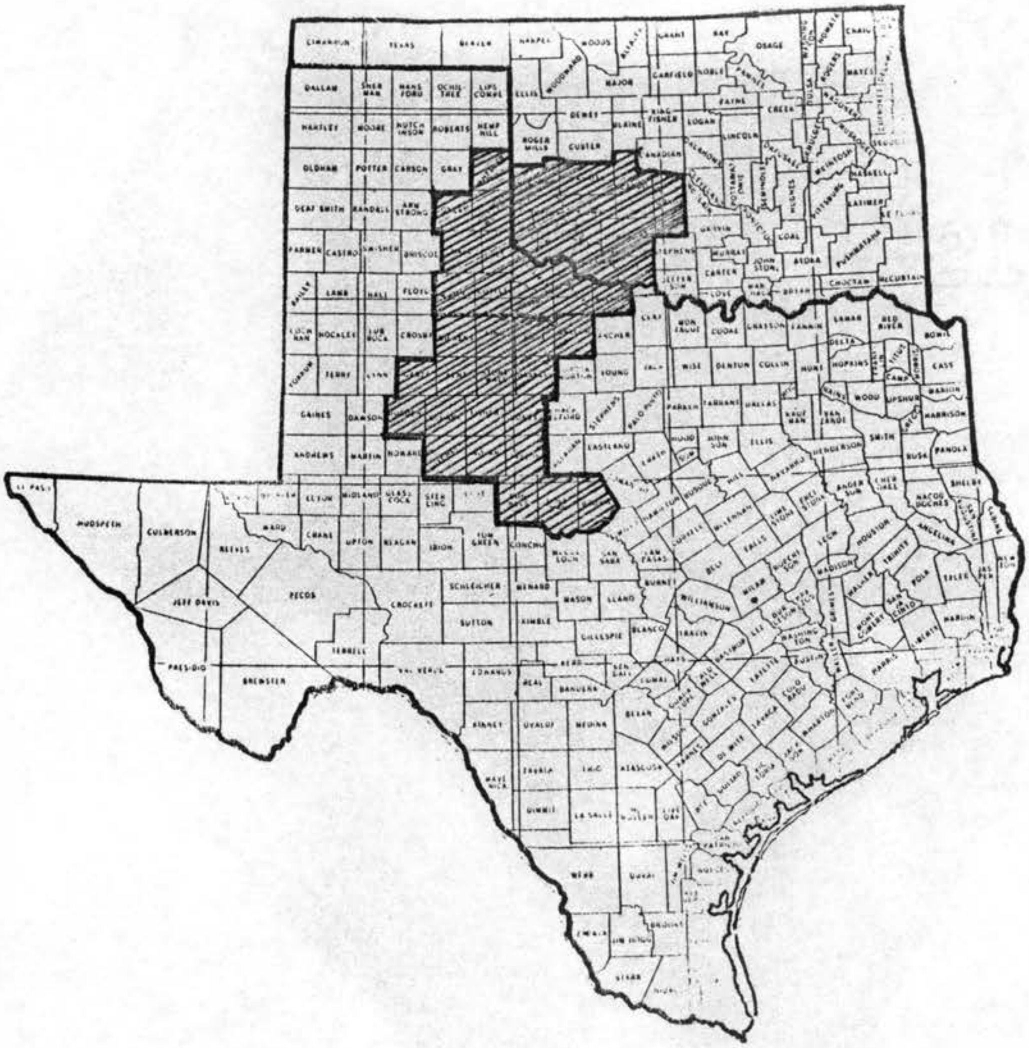


Figure 1. Map of Oklahoma and Texas Indicating Counties of the Low Rolling Plains.

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 soils for purposes of the analysis. Estimates of acreages were secured from analysis and tabulation of results derived from a survey conducted by the Soil Conservation Service in early 1958 for the purpose of estimating the then current land use and the changes expected in that land use by 1975.[4] Since these dates coincide with the target dates of this study, the data provided and estimates made by qualified soils scientists seemed appropriate for the purposes of this study.

The acreages of the various soil resources were specified with the aid of Soil Conservation Service personnel in Oklahoma and Texas. When a discrete difference due to climate, cropland quality distributions, etc., was observed within a major resource group, the group was divided in order to insure maximum possible homogeneity within resource situations. In this manner, eight resource situations were derived from three major resource groups. Though the enterprise budgets might be identical for the cropland classes within any major resource group (for example, the four Loam situations), the combinations in which these enterprises appeared in the programmed optimum microsupply estimates were determined by the combinations in which resources occurred.

The classification of clay (or claypan) soils for purposes of this analysis is based upon a grouping of soils according to major physical characteristics. Clay soils are both fine and medium textured with

---

[4] Soil Conservation Service, U. S. Department of Agriculture, National Inventory of Soil and Water Conservation Needs, Forms N-1 and N-2.

very slowly permeable subsoils or claypans, and are normally mapped as Foard and Tillman series or their equivalents. Because of the "drouthy" nature of these soils, use of fertilizer is generally unprofitable. Definition of these soils classes and estimated yield levels for various crops are found in Appendix I.

The loam soil classification is based on a grouping of soils with medium textures and moderately permeable subsoils. The loam soil situation has been divided into capability classes on the basis of topography and depth of topsoil. These soils are normally mapped as Upland-Tipton, S. Paul, Carey, Bottomland-Spur, plus some Quinland and Vernon soils and their equivalents. Fertilizer may be profitably used in loam areas. Definitions of these soils and the estimated yield levels for various crops may be found in Appendix II.

The division of the loam soil resource situation into level and rolling phases is based upon the proportion of soils of Capability Classes I and II which are observed in the soil resource situation. When these classes in an area form a large proportion of the total cropland acreage, that area has been classified in the Level Loam phase. Areas in which Class III and IV soils are predominant are included in the Rolling Loam phase.

Differences in cropland quality distributions alter the organization of farms on the loam soils, and hence the microsupply relationships corresponding to the two situations, although the same resource type is involved.

The Oklahoma Sandy soils are generally mapped as Miles, Dill, Pratt and enterprise soils, or their equivalents, with some Brownfield and

Nobscott soils in the lower productivity classes. Definition of these subdivisions and the estimated yield levels for the various crops are shown in Appendix III. The sandy soils are well adapted to the production of cotton and other row crops. As on the loam soils, crops on Oklahoma Sandy soils normally respond to fertilizer.

The Texas Sandy soil group has essentially the same physical characteristics as are observed for the Oklahoma Sandy soils. They are normally mapped as Abilene and its equivalents. Because of the climatic factor the response to fertilizer used on Texas Sandy soils is erratic. Definitions of the productivity classes and the corresponding yield level estimates are found in Appendix IV.

When there is wide variation over an area in the cropland capability class distribution within a major soil grouping, the grouping has been subdivided in order to more accurately reflect crop production, labor hired, income received, etc. The clay soils in Texas have a significantly larger proportion of Class III and Class IV capability soils, while in Oklahoma, Capability Class II clay soils are more prevalent. On this basis, clay soils were separated into the Oklahoma Clay and the Texas Clay soils.

The loam resource situation occurs in two distinct phases in both states; level and rolling. The cropland capability class distribution between the Texas Level Loam situation differs significantly from the Oklahoma Level Loam. A similar relationship is observed between the Rolling Loam situation in the two states. Hence, the Loam resource situation has been subdivided into four parts - Oklahoma and Texas Rolling Loams, and Oklahoma and Texas Level Loams.

Sandy soils are divided between the Eastern and Western parts of the area. In addition to differing cropland capability class distributions, a climatic factor is present between these two areas, causing differences in yield coefficients. For these reasons, the sandy soil resources have been divided into the Oklahoma Sandy soils and the Texas Sandy soils. The Oklahoma Sandy soils are observed in four North Texas counties - Wilbarger, Wichita, Hardeman and Foard Counties - as well as in all eleven counties in Oklahoma, while the Texas Sandy soils are restricted to the Texas counties in the Western part of the study area.

The distribution of dry cropland acreage by resource types is shown in Table I. It will be noted that 301,610 acres of soils other than those included in this analysis are in the area. These soils are found in the extreme Southwestern portion of the study area and in reality are not Rolling Plains soils. A similar study applying to these soils is being conducted in the High Plains of Texas. Therefore, this acreage has been excluded from this analysis.

Table II shows the distribution of Rolling Plains 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 data from this source exceeds the figures included in the 1959 Census of Agriculture. Therefore, the percentage distributions of Table III were used to adjust the figures to the Census levels.

The Economic Resource Situations

Ten representative farms have been used to depict the firm supply relationships on the eight physical resource situations. Representative

TABLE I

DRY AND IRRIGATED CROPLAND ACREAGE BY MAJOR SOIL GROUPS: ROLLING PLAINS OF OKLAHOMA AND TEXAS

	Dry Land		Irrigated		Total	
Soil Group	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. Estimates of Expected Changes in Land Use by 1975, Form N-2, Budget Bureau No. 40-5759, Soil Conservation Service, Oklahoma and Texas.

From the National Inventory of Soil and Water Conservation Needs.

TABLE II

LAND CAPABILITY CLASS DISTRIBUTION OF DRY CROPLAND PRESENT IN THE ROLLING PLAINS OF OKLAHOMA AND TEXAS: BY PHYSICAL RESOURCE SITUATIONS

Physical Resource Situation	Land Capability Class					Total
	I or (a)	II or (b)	III or (c)	IV or (d)	V 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 (TS)	0	128,921	645,786	332,355	75,697	1,182,759
Total	610,069	3,046,065	2,809,282	1,408,467	383,965	8,257,848

Source: *Land Use - Present and Expected Changes*, Form N-1, Budget Bureau No. 40-5759, Soil Conservation Service, Oklahoma and Texas. *Estimates of Expected Changes in Land Use by 1975*, Form N-2, Budget Bureau No. 40-5759, Soil Conservation Service, Oklahoma and Texas.

From *National Inventory of Soil and Water Conservation Needs*.

TABLE III

PERCENTAGE DISTRIBUTION OF DRY CROPLAND WITHIN AND BETWEEN PHYSICAL RESOURCE SITUATIONS IN THE ROLLING PLAINS OF OKLAHOMA AND TEXAS

Physical Resource Situation	Land Capability Class						Percent of Total Dry Cropland
	a	b	c	d	e	Total	
	- Percent of Cropland						
Clay Soils:							
Oklahoma Clay (OC)	0.0	33.0	38.2	16.6	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	25.2	29.6	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	23.3	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. Estimates of Expected Changes in Land Use by 1975, Form N-2, Budget Bureau No. 40-5759, Soil Conservation Service, Oklahoma and Texas.

From National Inventory of Soil and Conservation Needs.

farms have been assumed to be owner-operated units in this analysis. Under the assumptions of perfectly competitive economic theory, returns to factors must be equal within and between firms for general economic equilibrium to be achieved. If farming is a purely competitive industry, the returns to land must be equal to the marginal value product of that land - rented or owned - in equilibrium. Differences in farm organization which may occur due to current tenure considerations have therefore been ignored.

The representative farms were selected through extensive analysis of the farms which presently exist. With the aid of ASC and SCS personnel, homogeneous ASC communities were isolated. These communities tended to be clustered in areas. In view of this clustering, the communities were stratified by area and resource type and were sampled at random within strata.

The farm operations in each of the sample communities were then completely enumerated from ASC records with respect to cropland, native range and crop allotments. To gain information concerning current practices, operator interviews were conducted during the summer of 1959. The operators interviewed were statistically selected within the sample communities.

From these survey data, the ratio of native range and cropland within resource situations was estimated. Cropland capability classes were assumed to be uniformly distributed throughout the area. Hence, each representative farm was assumed to have the same cropland distribution as was present in the aggregate physical resource situation. Since the broad resource classes had already been subdivided when widely divergent cropland quality distributions were evident, this assumption seems not to be inappropriate.

The enumeration of farms in the sample communities also provided estimates of current differences in the size distributions within resource situations and the relative importance - in terms of resources controlled - of any farm size group. Table IV indicates the percentage distribution of cropland capability classes within the total cropland base for all resource situations as indicated by the sample communities. The acreages of the various cropland capability classes, native range, other land, and the total acreages assumed for the ten representative farms may be found in Table V.

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 - i.e., if the resources controlled by all farms, and if the organization of those resources and the production of enterprises are in constant proportions - then a single farm may be used to represent this range of linearity. If some factor such as farm size causes the relationship to be curvalinear, then line segments may be used to approximate the nonlinear relationship.

Programming results indicate that the Oklahoma Clay soils, for example, have linear supply relationships for all farm sizes greater than 320 acres of total land, with 250 acres of cropland. This farm size currently controls an estimated 15 percent of all clay cropland. Since average sizes of farms in Southwestern Oklahoma have consistently increased over the past two decades, and since the magnitude of this

TABLE IV

DISTRIBUTION OF CROPLAND CAPABILITY CLASSES WITHIN RESOURCE SITUATIONS BY PERCENTAGE OF TOTAL CROPLAND WITHIN THE RESOURCE SITUATION

	Cropland Capability Class and (Productivity Subscript)					
Resource Situation	I (a)	II (b)	III (c)	IV (d)	V (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

TABLE V

COMPOSITION AND IMPORTANCE OF REPRESENTATIVE FARMS USED IN THE ESTIMATION OF MICROSUPPLY RELATIONSHIPS, BY PHYSICAL RESOURCE SITUATIONS AND LAND CAPABILITY CLASSES, ROLLING PLAINS OF OKLAHOMA AND TEXAS

		Percent of Total Cropland	Cropland Capability Class and (Subscript)							
Physical Resource Situation	Unit	Represented By Farm	I (a)	II (b)	III (c)	IV (d)	V-VIII (e)	Native Range	Other Land	Total Land
Clay Soils:										
Oklahoma Clay (OC)	Acre	100	0	360	368	160	112	235	45	1,280
Texas Clay (TC)	Acre	100	0	258	407	254	81	235	45	1,280
Loam Soils:										
Level Loam										
Oklahoma Level Loam (OL_1)										
Small Farm	Acre	60	210	130	30	0	5	85	20	480
Large Farm	Acre	40	420	260	60	0	10	175	35	960
Texas Level Loam (TL_1)	Acre	100	35	676	39	0	0	175	35	960
Rolling Loam:										
Oklahoma Rolling Loam (OL_2)										
Small Farm	Acre	54	25	50	55	35	23	37	15	240
Large Farm	Acre	46	100	185	225	150	90	175	35	960
Texas Rolling Loam (TL_2)	Acre	100	0	213	370	141	26	175	35	960
Sandy Soils:										
Oklahoma Sandy (OS)	Acre	100	0	125	230	125	20	115	25	640
Texas Sandy (TS)	Acre	100	0	55	285	135	25	115	25	640

increase between 1954 and 1959 was 22 percent,[5] the importance of clay soil farms smaller than 320 acres would be expected to decline rather rapidly in the future. For these reasons, a single representative farm size has been chosen to depict the microsupply estimates generated through linear programming for the Oklahoma Clay resource situation. Similarly, single farm sizes represent all the Texas resource situations, and the Oklahoma Sandy situation.

The current distribution of farm size on both the Oklahoma Loam situations is bimodal. Further, the two modal sizes - in both cases - fall within two different ranges of linearity. Therefore, it was necessary that two farm sizes be used to represent the microsupply relationships on the Oklahoma Level Loam and the Oklahoma Rolling Loam situations. The estimated proportion of Oklahoma Level Loam soils represented by the small and large farms is 60 and 40 percent, respectively. Oklahoma Rolling Loam soils are estimated to be distributed between the small and large farms at 54 and 46 percent, respectively.

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

---

[5] U. S. Department of Commerce, Bureau of the Census, U. S. Census of Agriculture, 1959, for Oklahoma.

The firm's rate and path of adjustment are heavily dependent upon *ex ante* expectations and adjustments. Nerlove and Bachman[6] assert that the firm's adjustment is likely to depend upon the temporal relationship between the firm's actual position - usually non-optimal - 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. Historically, it is evident that technological possibilities have improved over time. Thus, it is doubtful that present technology would still be in general use 15 years hence.

The Production Alternatives

Factors endogenous to the entire system, but exogenous to the firm, 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. It is the responsibility of the researcher to identify those enterprises and eliminate them from aggregate consideration. Adjustments in estimates may later be necessary to account for the effect of these exclusions within the sphere of their limitations.

Alternatives which have been excluded from this analysis include such enterprises as dairy, beef cattle ranching, poultry and livestock feeder operations, and irrigation. Acreages presently employed in

---

[6] Nerlove and Bachman, "Analysis of Changes in Agricultural Supply," p. 536.

these uses are removed from the included 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 at current prices for all population (expanded by 10 percent) within a 300-mile radius of the study area. Further, this figure does not account for inter-area competition from areas adjacent to the study region. If this were taken into consideration, the applicability of dairy and poultry enterprises would be even further limited.

Beef cattle ranches have been eliminated from consideration because the extensive native range which is necessary for such operations rather definitely commits ranch resources to livestock production. Thus, resources which are presently in ranches are assumed to remain in ranches. Other livestock enterprises may be produced on crop farms, but only those livestock enterprises which are land-based. Grain production above requirements for human consumption is considered to be a joint product with livestock. The model constructed for this analysis is incapable of allocating feed grains among the various classes of livestock. Feedlot operations have been excluded since they are largely a function of feed-grain production and the capital market. This leaves only the land-based livestock alternatives to be included on dry-land crop farms.

Presently, data regarding yields on irrigated acreages are unavailable, although research is being conducted in this area. Approximately three percent of total cropland is currently irrigated. By 1975, this acreage is expected to increase to five percent.[7] Because of the very small irrigated acreage and the lack of data concerning yields on irrigated land, irrigated acreage has been excluded from the analysis.

Resources which are included in the base for analysis are those resources which are currently in dry-land 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

Prices received by farmers are specified in Appendices V, VI, and VII. Since cotton obviously competes with other products for resources, meaningful answers can be derived only when the prices received for all major outputs are varied. In the Rolling Plains, cotton, wheat, feed grains, and beef are the major products. For purposes of this analysis, wheat has been priced at $1.25 per bushel, and is assumed to be priced 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 analysis, any estimate involving grain is inherently dependent upon the interactive relationship between beef supply and grain supply, and vice versa.

---

[7] Oklahoma and Texas Soil Conservation Services, U. S. Department of Agriculture, National Inventory of Soil and Water Conservation Needs.

The supply functions for resource inputs are assumed to be perfectly elastic. That is, the prices of inputs are constant, and are independent of the quantities used. It may be argued that the agricultural industry uses a small enough proportion of total resources that changes in agricultural demand for those resources are not likely to affect resource prices. It hardly seems reasonable, however, to argue that increased demand for agricultural labor in a sparsely populated region such as the Rolling Plains will not affect farm wage rates.

Resource costs are assumed to be at 1958 levels as estimated by means of a field survey of machinery, feed and seed, and fertilizer dealers across the study area. The averages of the prices estimated by these dealers are used throughout the analysis. In the case of machinery, allowance has been made for the average discount allowed for trade-in, and in the case of feed, seed, and fertilizer, adjustments were made for bulk purchases. Fencing and specialized building equipment costs have been estimated for the livestock enterprises, based on agricultural engineering research. Custom farm wage rates were derived from a recent survey.[8] 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 that existing in the southern and central portions.

The institutional framework is assumed to be such that no restraints are placed upon crop acreages or livestock numbers. However, only the

---

[8] D. B. Jeffrey, Cecil D. Maynard, and Odel L. Walker, Oklahoma Custom Rates, Leaflet L-50, Oklahoma Agricultural Extension Service, Stillwater, Oklahoma, 1960.

E. A. Tucker, Odell L. Walker, and D. B. Jeffrey, Custom Rates for Farm Operations in Oklahoma, Bulletin B-473, Oklahoma Agricultural Experiment Station, Stillwater, Oklahoma, July, 1956.

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.

The Microestimates

Using the resources on representative farms as restrictions, programming models were constructed for the purpose of determining 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 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 now in process of publication.[9]

---

[9] Department of Agricultural Economics, Oklahoma State University, Unpublished S-42 Research Materials.

CHAPTER IV

AGGREGATIVE PROCEDURES

Resources Available for Adjustment

Courses of action which have one appearance at the firm level may have quite a different appearance in the aggregate. As Boulding[1] points out, we as individuals can do many things only because most other individuals refrain from doing them. Because of the atomistically competitive nature of the agricultural industry, an enterprise which may appear to be an adjustment alternative at the firm level may be no alternative at all in the aggregate.

Through analysis based on the 1959 Census of Agriculture,[2] 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 would tend to be constant in the future. Further, it is assumed that these resource uses are proportionally distributed among the various resource situations. That is, if the excluded alternatives currently occupy 20 percent of the area cropland, 20 percent of the cropland in all resource situations would be removed from the total in estimating the resource base for aggregating production on dry-land crop farms.

---

[1] Boulding, Economic Analysis, p. 238.

[2] U. S. Department of Commerce, Bureau of the Census, U. S. Census of Agriculture, 1959, for Oklahoma and Texas.

The Aggregative Resource Bases

Three primary resource bases have been estimated. For each of these bases, adjustments have been made to differentiate between the currently observed farm size weights and the corresponding 1975 expected weights. These adjustments yield a total of six resource bases. Estimated acreages for each of these bases are found in Table VI.

All resource bases exclude the acreage in the excluded alternatives. Base Number I includes all land currently in included resource uses. Base Number II includes all land expected to be in included resource uses in 1975 - the difference between bases I and II being the expected increase in irrigated cropland. Both bases I and II refer to a full adjustment aggregation. Base III indicates the distribution of respondent and limited response (or nonrespondent) resources for the current observation of resource use, with part-time, semi-retired, and Commercial Class VI farms being designated as nonrespondents. Base IV corresponds to base III for the 1975 projection. Base V shows the current distribution of included resources between the respondent and nonrespondent groups, with resources controlled by individuals older than 55 years of age being added to the nonrespondent base. Base VI corresponds to base V for the 1975 projection of farm size distribution.

The 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, addition of the firm supply curves (which are the firm

TABLE VI

AGGREGATIVE RESOURCE BASES FOR ALTERNATIVE AGGREGATIVE MODELS

Item	Aggregative Resource Base Number					
	Base I	Base II	Base III	Base IV	Base V	Base VI
			- Acreage -			
Total Farm Land	21,564,099	21,564,099	21,564,099	21,564,099	21,564,099	21,564,099
Excluded Alternatives						
Irrigated Cropland	309,976	580,436	309,976	580,436	309,976	580,436
Dry Cropland	2,444,391	2,444,391	2,444,391	2,444,391	2,444,391	2,444,391
Native Range	10,592,611	10,592,611	10,592,611	10,592,611	10,592,611	10,592,611
Other Land	225,373	225,373	225,373	225,373	225,373	225,373
Total Exclusions	13,572,351	13,842,811	13,572,351	13,842,811	13,572,351	13,842,811
Included Resources						
Fully Respondent Included Land						
Dry Cropland	5,510,802	5,240,342	5,225,532	4,955,072	3,749,483	3,479,023
Native Range	2,290,831	2,290,831	2,143,127	2,143,127	1,481,600	1,481,600
Other Land	190,115	190,115	183,578	183,578	51,495	51,495
Total	7,991,748	7,721,288	7,552,237	7,281,777	5,282,578	5,012,118
Nonrespondent, or Limited Response Land						
Dry Cropland	0	0	285,270	285,270	1,761,319	1,761,319
Native Range	0	0	147,704	147,704	809,231	809,231
Other Land	0	0	6,537	6,537	138,620	138,620
Total	0	0	439,511	439,511	2,709,170	2,709,170

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

marginal cost curves) is perfectly 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[3] 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 base as shown in Table 4.1 is 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.

The Farm Size Distribution.

The "even" number aggregative resource bases of Table VI refer to a projected distribution of farm size, while the "odd" numbers refer to

---

[3] H. Theil, p. 140.

the present farm size distribution. Therefore, it was necessary to estimate the rate of transition of small farms into large farms, and the resulting changes in the aggregative weights for those aggregations referring to 1975 distributions of farm size.

The available data required that the estimates of changing farm size distributions be based on weights using the farm size distribution by total land in farms. This is due to the fact that data available from the 1959 Census of Agriculture lists no farm size distribution by the total cropland acreage. Projecting farm numbers by size groups through the use of linear arithmetic trends was not feasible. Negative numbers would be obtained in some size groups and the projected increase in the number of large farms would require more total acreage than was present in the area. A great deal of consolidation of farm resources has occurred in the past fifteen years, and more is expected in the next fifteen. Therefore, it was decided that change in total land by size groups between 1945 and 1959 would be a reasonable basis for projecting between 1959 and 1975. Accordingly, the percentage change between 1945 and 1959 was applied to the 1959 estimates to obtain estimates for weighting the 1975 distribution. The excess in total acreage which occurred was reduced proportionally to correspond with the total included cropland acreage assumed for 1975.

Single representative farms portray the microsupply relationships on all resource situations other than the Oklahoma Loams. Therefore, these were the only resource situations affected by a changing size distribution. Data are available for the current farm size distribution within the "pure" ASC sample communities for the Oklahoma Loam situations. The sample ASC data have been adjusted for overlapping ranges on a proportional basis. The 1975 estimates made for the Census distribution have been divided by the 1959 base, and the resulting percentages used to estimate the Oklahoma Loam soils farm size distributions for 1975.

The ASC community sample indicated that 60 percent of Oklahoma Level Loam resources were represented by the Level Loam small farm. Using the procedure above, the 1975 projected distribution indicates that this figure would be reduced to 45 percent. Comparable figures for the Oklahoma Rolling Loam indicate that small farm resource representation will be reduced from 54 percent to 27 percent by 1975.

The Aggregative Models

Three alternative models for aggregation have been formulated. These are:

Model A

This model assumes three levels of response and two sets of farm size distribution weights, necessitating six separate sets of aggregations. The levels of response are as follows: (1) total adjustment of included resources, (2) total adjustment of resources presently included in Census Commercial Farm Classes I-V, and (3) total adjustment of resources in Census Commercial Classes I-V, such resources being presently controlled by operators younger than 55 years of age. The farm size distribution weights are (1) present, and (2) 1975 expectations.

For adjustment level (2), it has been postulated that Commercial Class VI farms are likely to be the most immediate casualties of the adjustment process. Part-time and semi-retired farms are assumed to be less dependent upon farm income than Commercial farms, and therefore less likely to respond to price changes. With regard to adjustment level (3), it is assumed that operators older than 55 years tend to be less respondent to price changes than younger operators because of Social Security considerations, inertia, health reasons, and other such factors which tend to limit the flexibility of older persons.

In both adjustment levels (2) and (3), "nonrespondent" resources are assumed to continue production at the levels observed in the most recent Census of Agriculture. This production is added to respondent resource production to gain total output estimates. Total net farm incomes have not been estimated for these adjustment levels. Since current farm organization for "nonrespondents" is so dependent upon the current institutional framework of acreage allotments, price supports, etc., cost and return functions under the assumptions of this analysis are indeterminant.

Single farm sizes represent all resource situations except the two Oklahoma Loam soils. The only change which should be observed due to the farm size distribution weights would be those changes occurring due to the shifts of loam farms from one range of linearity to another as a result of farm consolidation. Such shifts would alter the proportions of Oklahoma Loam soils to which the microsupply relationships generated for small and large loam farms would apply.

The mechanics of Model A aggregations involve the estimation of the aggregative weights such that the numbers of representative farms are consistent with the total acreages of cropland in the various resource situations. These weights are multiplied by microsupply relationships for the various situations to estimate the macrosupply relationships for the included resources in a given resource base.

Since it was not possible to determine the composition of livestock enterprises on nonrespondent resources from the Census data, livestock production for nonrespondent resources was budgeted from other research findings.[4] The 1959 field survey showed that the livestock operations were predominantly of the cow-calf variety, and especially so if the operation were small or if the operator were old. It has been assumed that the livestock operation on nonrespondent resources will be of the cow-calf type.

A Model A aggregate will be identified by the letter "A" followed by the number of the resource base to which it applies. Hence, Aggregation A-I refers to that aggregation which assumes the current size distribution of farms, with total adjustment of included resources.

Model B

Model B involves essentially the same assumptions as Model A, except with respect to "nonrespondent" resource behavior. In Model B, it is postulated that these resources respond to price changes, but are less sensitive to such changes than are Class I-V commercial farms (i.e., they have "limited response"). Class VI commercial farms are apt to be limited by capital restrictions, and part-time and semi-retired operators are relatively less dependent upon farm income. It is assumed that these units might fail to reorganize for a small increase in net revenue, but

---

[4] Alfred L. Barr, et al., Beef Cattle Systems: Estimated Production, Income and Costs, Oklahoma Agricultural Experiment Station Processed Series P-358, Stillwater, Oklahoma, September, 1960.

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.

a larger potential increase would provoke reaction. Therefore, it is assumed that "fully respondent" resources require a six percent return on capital while "limited response" resources require some larger return assumed to be 18 percent. These levels have been arbitrarily chosen for purposes of comparison with the capital levels assumed in Model A. However, greater capital return levels might be more realistic.

Model B will require four additional sets of aggregations for two levels of response and two sets of farm size distribution weights. The full adjustment aggregations are identical in all models. Farm size distribution weights are identical to those in Model A while the levels of response correspond to levels (2) and (3) of Model A, except for the differentiated return requirement. Fully respondent resources in Model B react identically with resources at six percent capital levels in Model A. Nonrespondents react as the 18 percent microsupply estimates imply, rather than failing to react at all.

Model B aggregates are identified by the letter "B" followed by the number of the relevant resource base. Thus, aggregate B-V refers to that aggregate in which the farm size distribution is assumed to be the current one. The respondent resources included react to price as if they required a six percent return on capital, and the nonrespondent resources - Class VI Commercial farms, part-time and semi-retired farms, and farms currently operated by older persons - are assumed to react as if an 18 percent return were required.

Model C

Model C assumes that the microsupply relationships generated for the assumed base prices represent an area equilibrium situation. As prices vary from this basic equilibrium, response to price variation reflects producer expectations with respect to the permanence of the change. If all producers expected the change to be permanent, then response would be 100 percent adjustment. If, however, some portion of farmers expected the price situation to return to the equilibrium base in the not too distant future, the magnitude of adjustment would be the proportion of farmers who viewed the change as permanent.

Procedure for aggregating under the assumptions of Model C is identical with that for Models A and B at the assumed base prices for all commodities. But in Aggregations C-III through C-VI, those portions of resources which view price changes as permanent adjust organization and output to the programmed optima. The remaining resources maintain the organization and enterprise combination observed for the initial equilibrium. Computations of total output are made by adding α percent of output at the full adjustment optima to β percent of output at the assumed position of initial equilibrium (where α is the responsive resource percentage and β is the nonresponsive resource percentage). Aggregate net income is computed by adding α percent of the full adjustment income to β percent of the initial equilibrium income adjusted for differences in expected and actual prices received. In Aggregations C-III and C-IV, α is assumed to be 80 while β is assumed to be 20. For Aggregations C-V and C-VI, α and β are both assumed to equal 50 percent.

In Aggregations C-III and C-IV, the 20 percent of farmers who view the price changes as temporary lack the necessary capital, knowledge, will, etc., to adjust. Approximately 30 percent of resources are currently controlled by operators of Commercial Class I-V farms who are older than 55 years of age. It is postulated that the period of time necessary for adjustment exceeds the length of the planning period for these individuals. Hence, the second level of less than full adjustment assumes that nonadjustors total 50 percent (20 + 30 = 50) of the operators.

Six sets of aggregations are required for Model C, based upon the current and expected distributions of farm size, and upon the three response levels. The full (100 percent) adjustment aggregations are identical with corresponding aggregations for Models A and B. Aggregations C-I, C-III and C-V are applicable to Resource Base Number I, which assumes the current farm size distribution. Aggregations C-II, C-IV, and C-VI refer to the projected farm size distribution of Resource Base Number II. Aggregations which are dependent upon the same resource base are all identical at the assumed position of equilibrium for both capital returns levels. With the less-than-full adjustment aggregations, the production of various commodities moves from the initial equilibrium toward those equilibria consistent with new prices as the prices change. Since some units fail to adjust in these aggregations, full equilibrium is not observed at prices other than the assumed equilibrium levels.

CHAPTER V

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 two assumptions:

(1) the relevant farm size distribution, and

(2) the level of adjustment to changing prices.

Cropland acreages of responsive resources by resource situations are shown in Table VII, while Table VIII 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 respondent 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.

It will be noted that there is a constant difference of 270,460 acres in the total responsive cropland acreages for the two farm size distributions for each response level. This difference is due to the exclusion of the increase in irrigated cropland expected by 1975. Since this analysis is concerned with the dry-land crop farm resources, transition of acreage from dry land to irrigated cropland categories necessitates this exclusion.

TABLE VII

DISTRIBUTION OF CROPLAND ACREAGE AMONG RESOURCE SITUATIONS; AGGREGATIVE RESOURCE BASES FOR MODEL A AGGREGATIONS

Resource Situation	Percent of Total Acres: Size Distribution 1958 Observed	Percent of Total Acres: Size Distribution 1975 Projected	Aggregation Number A-I^1	A-II^2	A-III^1	A-IV^2	A-V^1	A-VI^2
					- Acres of Cropland -			
Clay Soils								
Oklahoma (OC)	13.2	13.2	727,426	691,725	689,770	654,070	494,932	459,231
Texas (TC)	10.5	10.5	578,634	550,236	548,681	520,283	393,696	365,297
Level Loam Soils								
Oklahoma (OL_1)								
Small Farm	6.1	4.7	337,261	246,296	318,757	232,888	228,718	163,514
Large Farm	4.1	5.5	224,840	288,219	214,247	272,529	153,729	191,346
Texas (TL_1)	19.1	19.1	1,052,564	1,000,905	998,077	946,419	716,151	664,493
Rolling Loam Soils								
Oklahoma (OL_2)								
Small Farm	3.3	1.6	181,856	83,845	172,443	79,281	123,733	55,664
Large Farm	2.9	4.6	159,813	241,056	151,540	227,933	108,735	160,035
Texas (TL_2)	14.8	14.8	815,599	775,571	773,379	733,351	554,923	514,895
Sandy Soils								
Oklahoma (OS)	11.7	11.7	644,764	613,120	611,387	579,743	438,690	407,046
Texas (TS)	14.3	14.3	788,045	749,369	747,251	708,575	536,176	497,500
Total	100.0	100.0	5,510,802	5,240,342	5,225,532	4,955,072	3,749,483	3,479,023

[1] Refers to the 1958 farm size distribution.

[2] Refers to the projected 1975 farm size distribution.

TABLE VIII

REPRESENTATIVE FARM NUMBERS CONSISTENT WITH TOTAL AGGREGATIVE CROPLAND BASE FOR MODEL A AGGREGATIONS, BY RESOURCE SITUATIONS

Resource Situation	Representative Farm Cropland Acreage	Aggregation Number					
		A-I[1]	A-II[2]	A-III[1]	A-IV[2]	A-V[1]	A-VI[2]
Clay Soils:							
Oklahoma (OC)	1,000	727.4	691.7	689.7	654.1	494.9	459.2
Texas (TC)	1,000	578.6	550.2	548.7	520.3	393.7	365.3
Level Loam Soils:							
Oklahoma (OL_1)							
Small Farm	375	896.4	656.8	850.0	626.0	609.9	436.0
Large Farm	750	301.3	384.3	285.7	363.4	205.0	255.1
Texas (TL_1)	750	1,403.4	1,334.5	1,330.8	1,261.9	954.9	886.0
Rolling Loam Soils:							
Oklahoma (OL_2)							
Small Farm	188	967.3	446.0	917.2	421.7	658.2	296.1
Large Farm	750	213.1	321.4	202.1	303.9	145.0	213.4
Texas (TL_2)	750	1,087.5	1,034.1	1,031.2	977.8	739.9	686.5
Sandy Soils:							
Oklahoma (OS)	500	1,289.5	1,226.2	1,222.8	1,159.5	877.4	814.1
Texas (TS)	500	1,576.1	1,498.7	1,494.5	1,417.1	1,072.4	995.0
Area Total		9,040.6	8,143.9	8,572.7	7,705.7	6,151.3	5,406.7

[1] Refers to the 1958 farm size distribution.

[2] Refers to the projected 1975 farm size distribution.

Detailed estimates of aggregate response to changing prices are presented in Appendix A of this analysis. For discussion purposes, the analysis will be restricted to general relationships which may be observed in the Model A aggregates.

Aggregations A-I and A-II

These two aggregations represent the full adjustment assumption for the two farm size distributions. A comparison of Figures 2 and 3 indicates that there is very little difference in the incomes generated by dry land resources under the two farm size distribution assumptions. Total cotton production is somewhat less in A-II than in A-I, but the difference is negligible. The full adjustment aggregations are identical for all three model types. Full adjustment aggregations are basic for all other aggregations within types. Therefore, it is concluded that the effect of the changing farm size distribution has no considerable effect upon the aggregates, and that those aggregations which apply to the current distribution of farm size will be relevant for all levels of adjustment. Aggregate figures for both farm size distributions under all assumptions with regard to adjustment levels are included in the Appendices, but in this section of the analysis, the discussion will be confined to Aggregates A-I, A-III, and A-V.

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

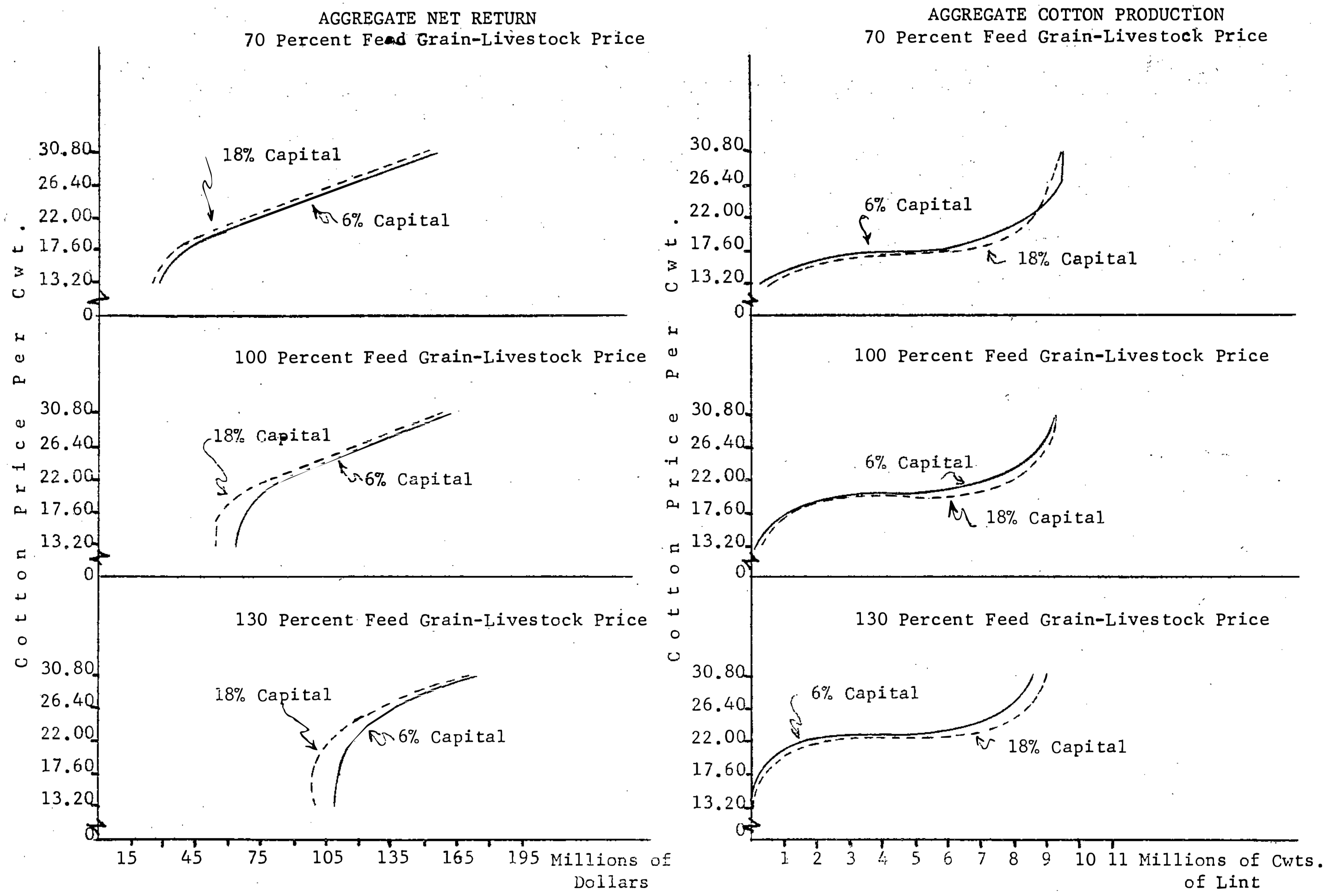


Figure 2. Aggregate Net Returns and Aggregate Cotton Production for Two Capital Cost Levels, by Feed Grain-Livestock and Cotton Price Levels, Rolling Plains of Oklahoma and Texas, Aggregation A-I.

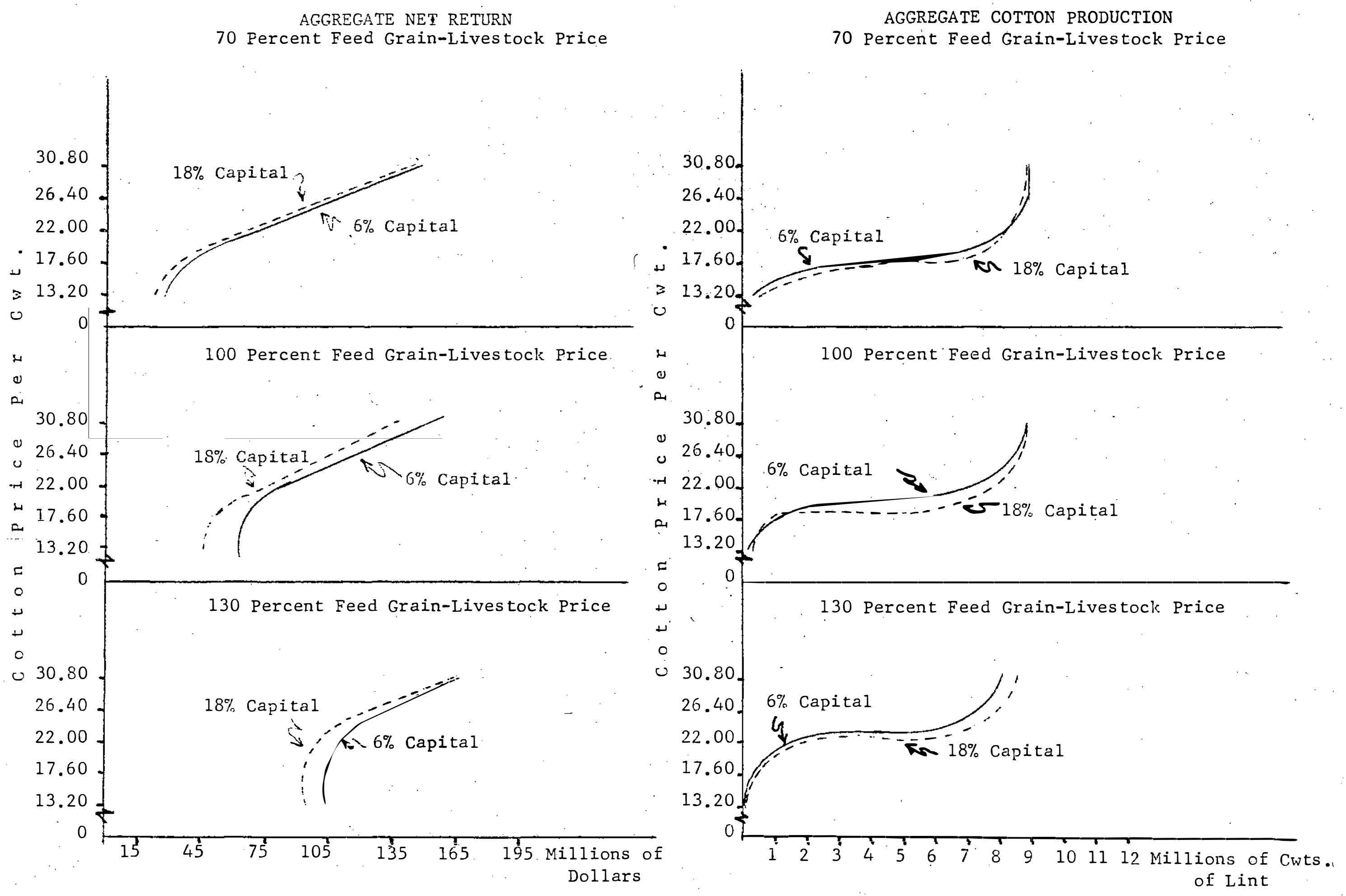


Figure 3. Aggregate Net Returns and Aggregate Cotton Production for Two Capital Cost Levels, by Feed Grain-Livestock and Cotton Price Levels, Rolling Plains of Oklahoma and Texas, Aggregation A-II.

increases. Increasing capital cost from six to 18 percent reduces income, but generally causes cotton production to be increased.

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 production is less at 18 percent capital cost than at six percent. This phenomenon may be explained by the fact that cotton supply is in general rendered more elastic when capital costs increase at low feed grain-livestock prices. Thus, cotton production reaches a physical maximum with the cheaper capital at a lower cotton price than is observed with the relatively more expensive capital, and then is perfectly 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 2 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 costs 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 costs increase, 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 reaction to changing capital cost levels (see Figure 4). As would be expected, cattle numbers increase as livestock prices increase, but increased capital costs rather severely restrict livestock enterprises. This results from the relatively very high capital investment these enterprises require (i.e., 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 feeder 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 utilized for forage production. As capital costs are increased, feed grains production is reduced for low feed grain prices. This results from the "intermediately" capital-extensive character of the feed grain enterprise. Cotton replaces both livestock and feed grain 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 grain has a relatively more favorable profit position. Therefore, it joins cotton in the replacing of the 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 the livestock.

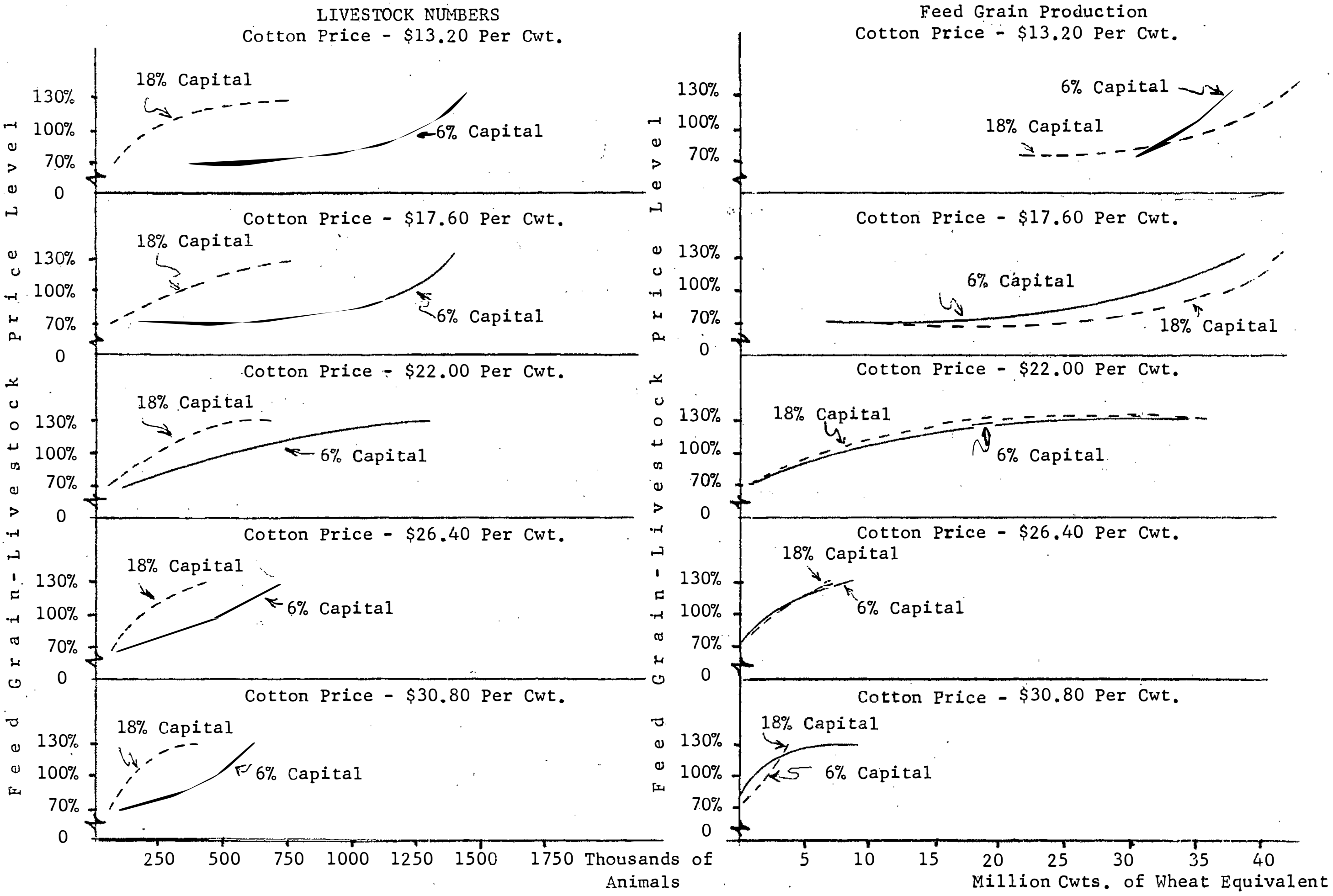


Figure 4. Total Livestock Numbers and Aggregate Feed Grain Production for Two Capital Cost Levels, By Feed Grain-Livestock and Cotton Prices, Rolling Plains of Oklahoma and Texas, Aggregation A-I.

The functions graphed in Figure 4 are not true supply response functions, since the necessary ceterus paribus conditions are absent (i.e., feed grain and livestock prices are varied simultaneously). It is impossible from the information given to separate the complimentary relationships - assuming that they do in fact exist - in estimating the responsiveness of the two products. Nevertheless, some idea of the reaction of these products to changing conditions may be gleaned from such a diagram.

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-III Through A-VI

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

TABLE IX

TOTAL PRODUCTION ESTIMATES FOR NONRESPONSIVE RESOURCES IN AGGREGATIONS A-III, A-IV AND A-V, A-VI, ROLLING PLAINS OF OKLAHOMA AND TEXAS

Item	Unit	Quantity
Resources designated Nonrespondent for Aggregation A-III and A-IV: Commercial Class VI, part-time and semi-retired 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 Nonrespondent for Aggregations A-V and A-VI: Commercial Class VI, part-time and semi-retired 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.*

Figures 5 and 6 show the aggregate production and income for included responsive resources in Aggregation A-III. 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-III in Table IX. For Aggregation A-III, these quantities are so small that they have been ignored.

Total income would be indeterminant for both Aggregations A-III and A-V since it is not feasible to estimate income for the nonrespondent resources organized for current conditions and facing some revenue function which is widely divergent from the current revenue situation. Also, neither labor nor capital requirements could be estimated for the nonrespondents because of the reasons stated above.

Aggregate production and income for respondent resources for Aggregation A-III react in precisely the same manner as for Aggregation A-I, and the same relationships prevail between A-III and A-IV as are observed between A-I and A-II. The primary differences are in the magnitudes in which these reactions occur.

The relationship between A-V and A-VI are of the same sort as between the two farm size distributions for the other adjustment levels. Again, it is a question of magnitudes. Likewise, the relationships in A-V are the same as are present in A-I and A-III, except for the magnitudes in which the responses occur.

Of particular significance in Aggregation A-V is the size of the nonrespondent resource base. Approximately a third of all cropland resources are in this classification, compared with only five percent

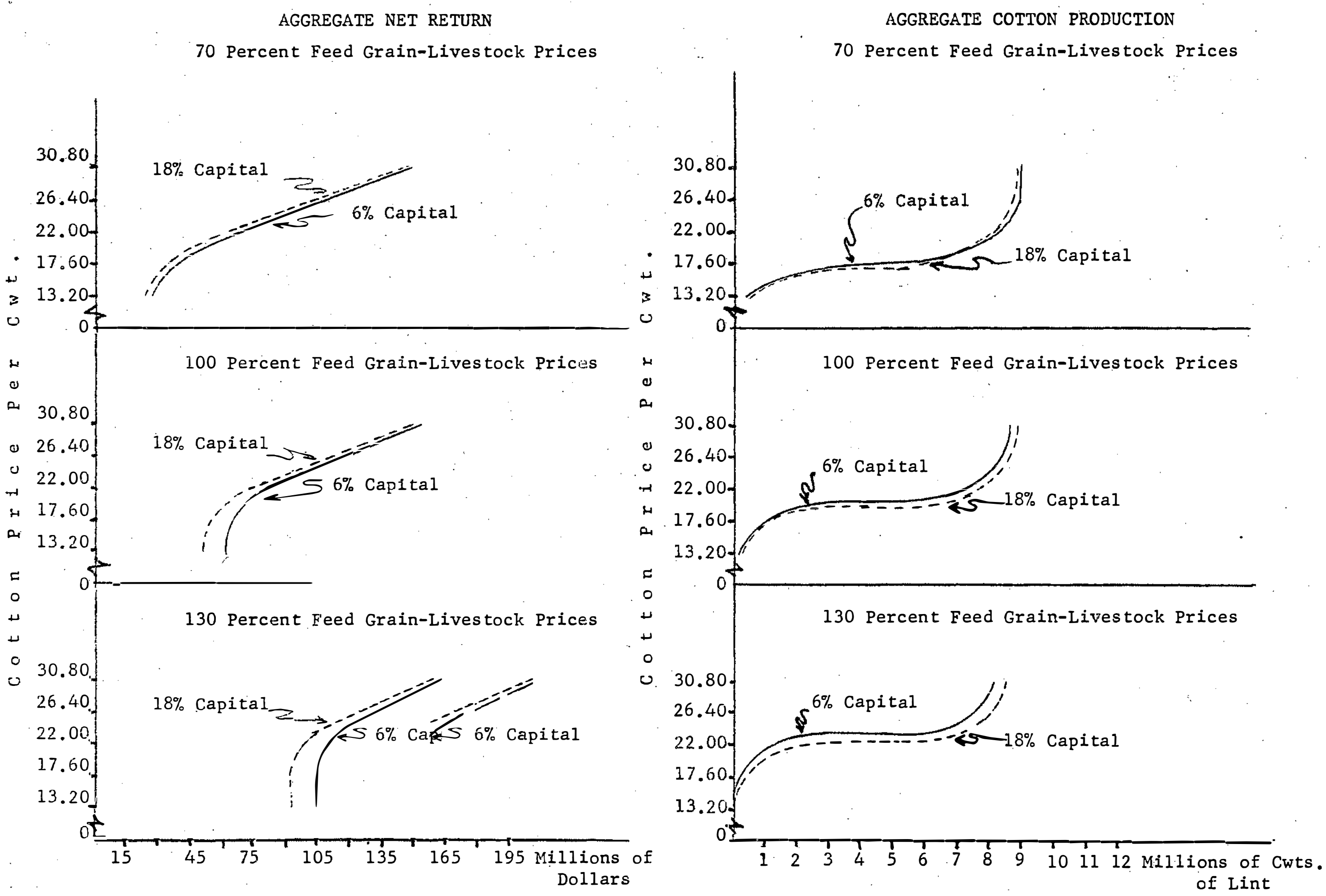


Figure 5. Aggregate Net Returns and Aggregate Cotton Production for Two Capital Cost Levels, by Feed Grain-Livestock and Cotton Price Levels, Included Responsive Resources, Rolling Plains of Oklahoma and Texas, Aggregation A-III.

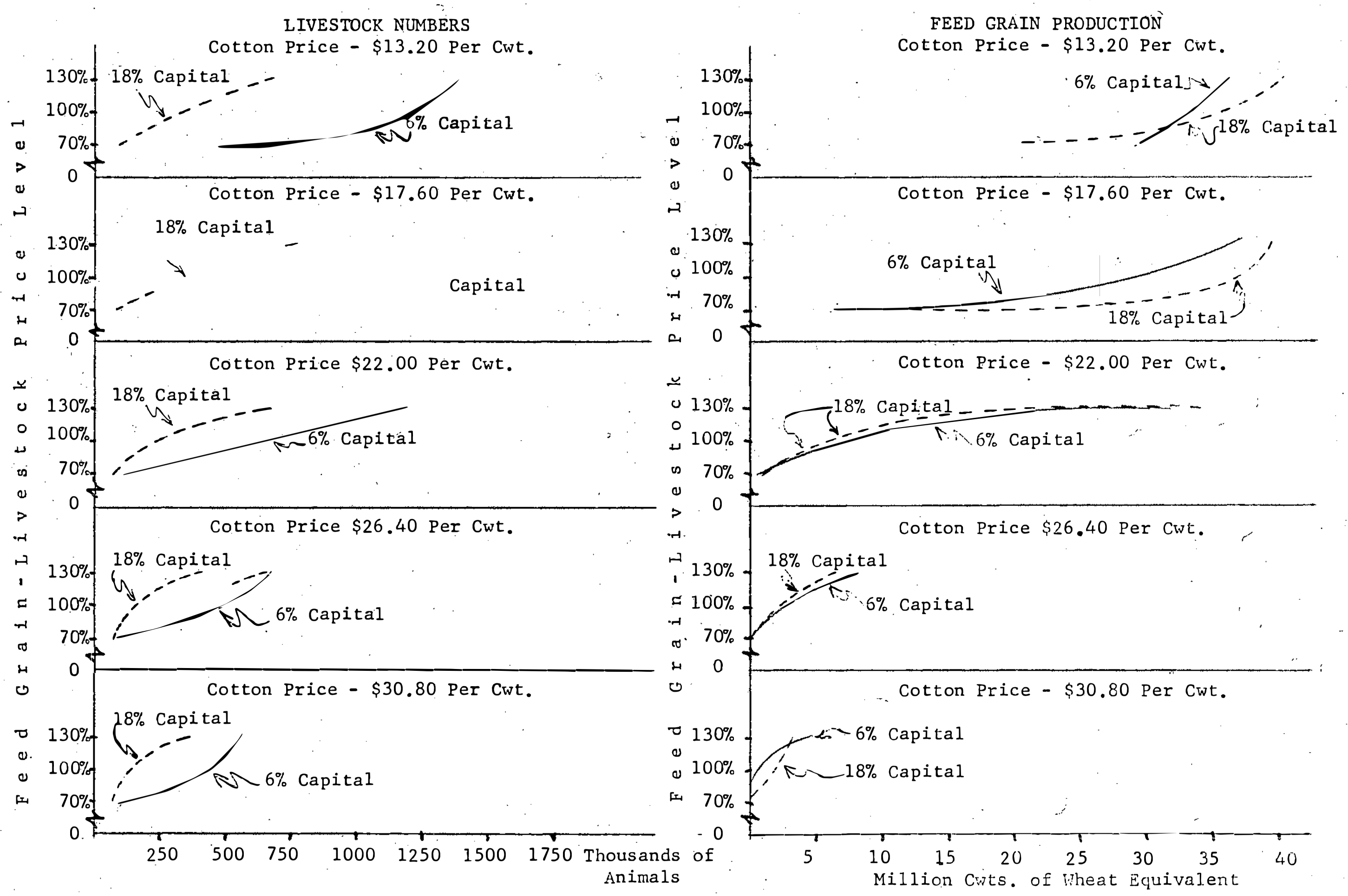


Figure 6. Total Livestock Numbers and Aggregate Feed Grain Production for Two Capital Cost Levels, by Feed Grain-Livestock and Cotton Prices, Included Responsive Resources, Rolling Plains of Oklahoma and Texas, Aggregation A-III.

in Aggregation A-III. When the current production coefficients for these resources are added to the aggregate figures for the respondent resources, a rather noticeable difference is observed.

It is apparent from Figures 7 and 8 that Aggregation A-V allows much less of all products to be supplied. Only net income from respondent resources is shown in Figure 7 since the total income function is indeterminant. About the only generalization that can be made with regard to aggregate income is that 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 the profit maximizing goal as the criterion for optimization.

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-V reduce the breadth of this range tremendously.

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 costs were at 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

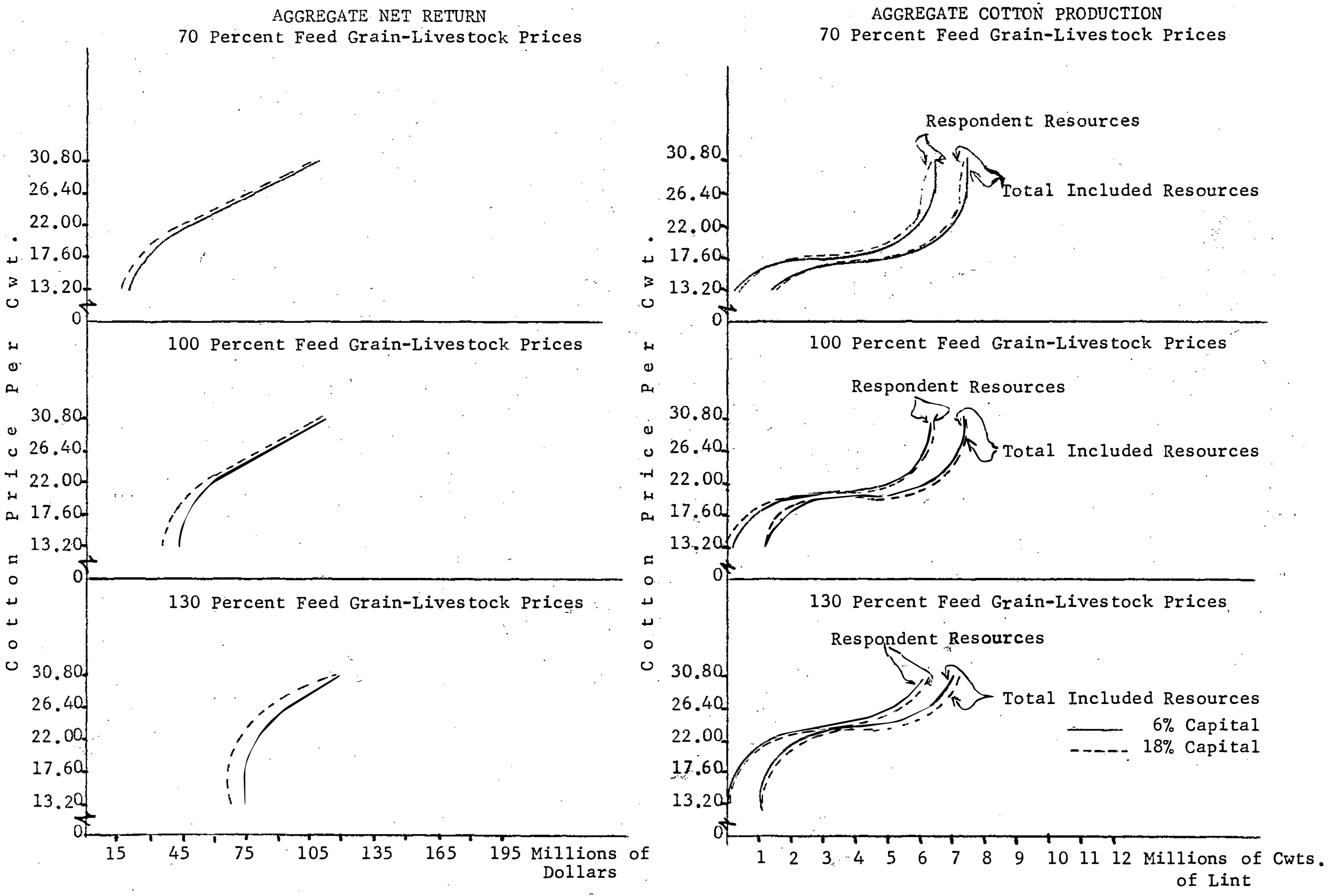


Figure 7. Total Net Returns and Cotton Production for All Included Resources, for Two Capital Cost Levels, by Feed Grain-Livestock and Cotton Price Levels, Rolling Plains of Oklahoma and Texas, Aggregation A-V.

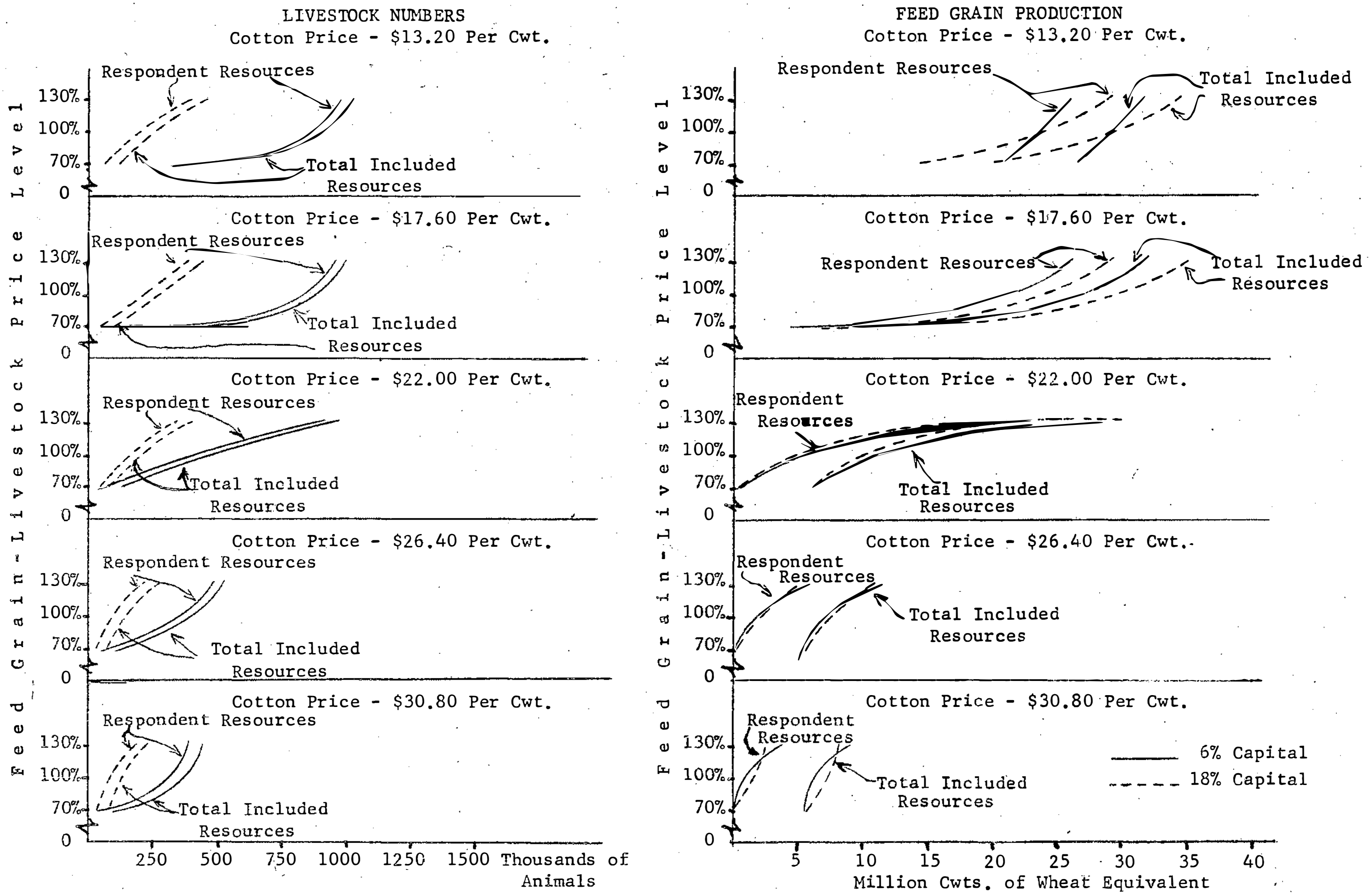


Figure 8. Total Livestock Numbers and Feed Grain Production for Included Respondent and Total Included Resources, by Feed Grain-Livestock and Cotton Prices, Rolling Plains of Oklahoma and Texas, Aggregation A-V.

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, cotton replaced the reseeding. If livestock-feed grain prices were increased, then feed grains 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 (i.e., the class "d" and "e" soils). Because of the difficulty and resulting expense of restoring perennial grasses to clay soils, reseeded cropland was not observed on clay resources.

Summary and Implications

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

If it can be shown that the nonrespondent resources are in fact optimally organized within the framework of present prices - with the institutional restrictions removed - then Aggregations A-III through A-VI may be shown to have some validity. If, on the other hand, these nonresponders would operate differently if free of all institutional restraints, then the Type "A" model must be discarded. The two full adjustment aggregations (A-I and A-II) would of course still be relevant.

Other shortcomings of the Type "A" models include the difficult, if not impossible, task of estimating such things as net returns, labor hired, etc., for nonrespondent 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 nonrespondent to price changes, the length of this range is shortened, and the entire supply function in general becomes less elastic.

CHAPTER VI

MODEL B AGGREGATIVE RESULTS

Like the Model A aggregations, Model B aggregations have been formulated by the simple summation method. Aggregations B-I and B-II - the full adjustment aggregations for the two farm-size distributions - are identical with the six percent capital cost levels of A-I and A-II. As in Model A, the changing farm-size distribution has so little effect upon the aggregations that the difference is hardly perceptible when graphed. Therefore, for discussion purposes, this section of the analysis will be confined to those aggregations dealing with the current farm size distributions (i.e., Aggregations B-III and B-V). Detailed estimates for all Model B aggregations may be found in Appendix B of this work.

The primary difference in the Model A and Model B aggregation lies in the assumptions made with regard to the nonrespondent 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 (see Table VII), while that for nonresponsive resources is shown in Table X. The numbers of representative farms consistent with nonrespondent acreages (i.e., the aggregative weights) are shown in Table XI.

Aggregation B-III

Even though only five percent of cropland resources are limited by the increased capital return requirement for B-III, Figures 9 and 10 show a difference in aggregative response, compared with results of Aggregation A-III. Over-all cotton production tends to be greater at high cotton prices and lower at low cotton prices. Over-all livestock numbers behave in the same general manner, and over-all grain production tends to be greater than the six percent capital cost level of production for A-III, in both the position and slope of the function. As in Model A, labor requirements are correlated with the acreage of cotton.

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-III 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

TABLE X

DISTRIBUTION OF CROPLAND ACREAGE AMONG RESOURCE SITUATIONS, AGGREGATIVE RESOURCE BASES FOR MODEL B AGGREGATIONS, LIMITED RESPONSE RESOURCES

Resource Situation	Percent of Total Acreage: Size Distribution		Aggregation Number					
	1958 Observed	1975 Projected	B-I^1	B-II^2	B-III^{1,3}	B-IV^{2,3}	B-V^{1,4}	B-VI^{2,4}
Clay Soils:								
Oklahoma (OC)	13.2	13.2	0	0	37,656	37,655	232,494	232,494
Texas (TC)	10.5	10.5	0	0	29,953	29,953	184,938	184,938
Level Loam Soils:								
Oklahoma (OL_1)								
Small Farm	6.1	4.7	0	0	18,504	13,408	108,543	82,782
Large Farm	4.1	5.5	0	0	10,593	15,690	71,111	96,872
Texas (TL_1)	19.1	19.1	0	0	54,487	54,486	336,413	336,412
Rolling Loam Soils:								
Oklahoma (OL_2)								
Small Farm	3.3	1.6	0	0	9,413	4,564	58,123	28,181
Large Farm	2.9	4.6	0	0	8,273	13,123	51,078	81,021
Texas (TL_2)	14.8	14.8	0	0	42,220	42,220	260,676	260,676
Sandy Soils								
Oklahoma (OS)	11.7	11.7	0	0	33,377	33,377	206,074	206,074
Texas (TS)	14.3	14.3	0	0	40,794	40,794	251,869	251,869
Total	100.0	100.0	0	0	285,270	285,270	1,761,319	1,761,319
Area Total			5,510,802	5,240,342	5,510,802	5,240,342	5,510,802	5,240,342

[1] Refers to observed 1958 farm size distribution.

[2] Refers to projected 1975 farm size distribution.

[3] Includes resources currently controlled by Commercial Class VI, part-time and semi-retired farms.

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

TABLE XI

REPRESENTATIVE FARM NUMBERS CONSISTENT WITH TOTAL AGGREGATIVE CROPLAND BASES FOR MODEL B AGGREGATIONS; INCLUDED LIMITED RESPONSE RESOURCES BY RESOURCE SITUATIONS

Resource Situations	Representative Farm Cropland Acreage	Aggregation Number					
		B-I[1]	B-II[2]	B-III[1]	B-IV[2]	B-V[1]	B-VI[2]
Clay Soils:							
Oklahoma (OC)	1,000	0	0	37.7	37.7	232.5	232.5
Texas (TC)	1,000	0	0	30.0	30.0	184.9	184.9
Level Loam Soils:							
Oklahoma (OL_1)							
Small Farm	375	0	0	49.3	35.8	289.4	220.8
Large Farm	750	0	0	14.1	20.9	94.8	129.2
Texas (TL_1)	750	0	0	72.6	72.6	448.6	448.6
Rolling Loam Soils:							
Oklahoma (OL_2)							
Small Farm	188	0	0	50.1	24.3	309.2	149.9
Large Farm	750	0	0	11.0	17.5	68.1	108.0
Texas (TL_2)	750	0	0	56.3	56.3	347.6	347.6
Sandy Soils:							
Oklahoma (OS)	500	0	0	66.8	66.8	412.1	412.1
Texas (TS)	500	0	0	81.6	81.6	503.7	503.7
Total		0	0	469.5	443.5	2,890.9	2,737.3
Area Total		9,040.6	8,143.9	9,042.2	8,149.2	9,042.2	8,144.0

[1] Refers to 1958 observed farm size distribution.

[2] Refers to 1975 projected farm size distribution.

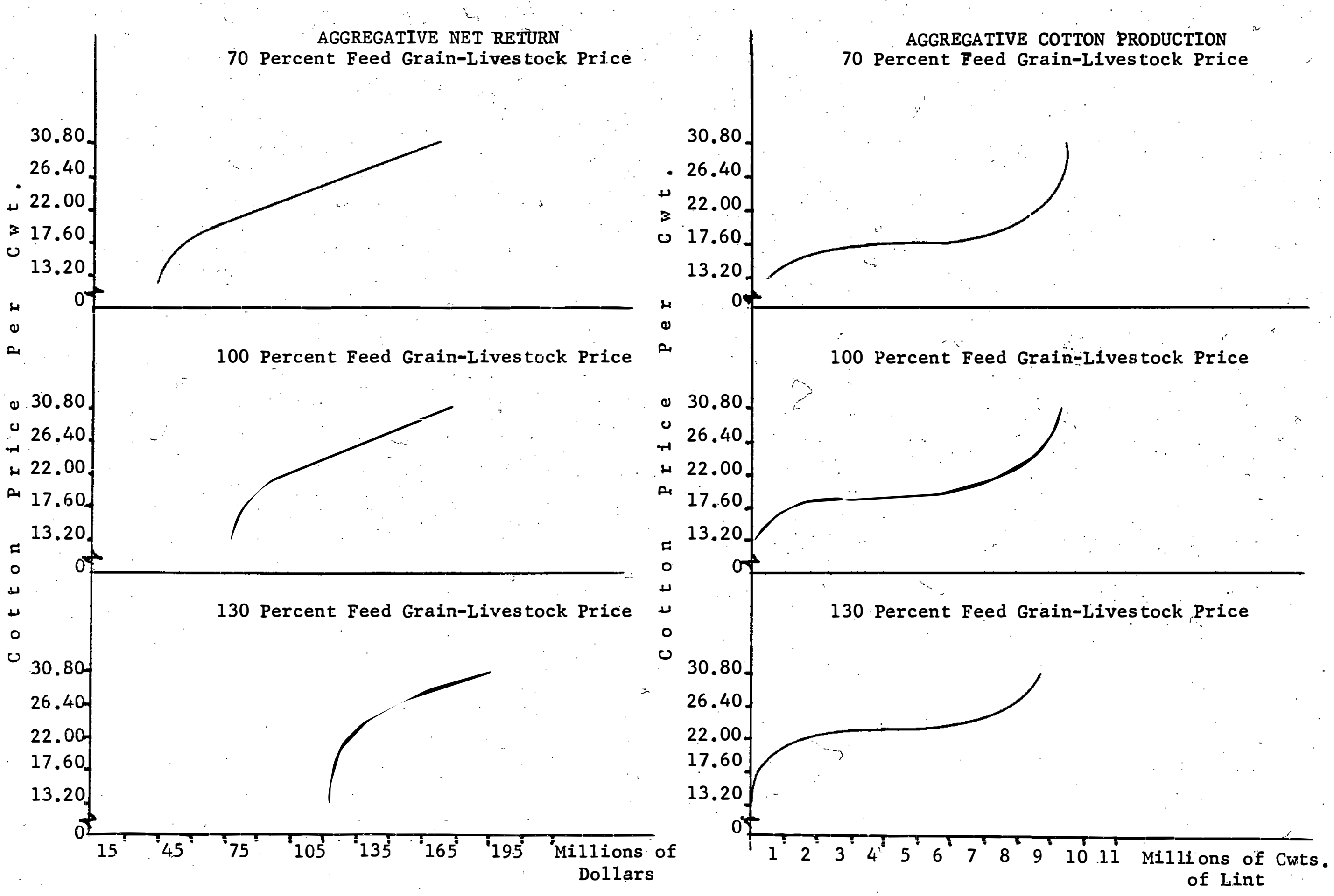


Figure 9. Aggregate Net Returns and Aggregate Cotton Production, by Feed Grain-Livestock and Cotton Price Levels, Total Included Resources, Rolling Plains of Oklahoma and Texas, Aggregation B-III.

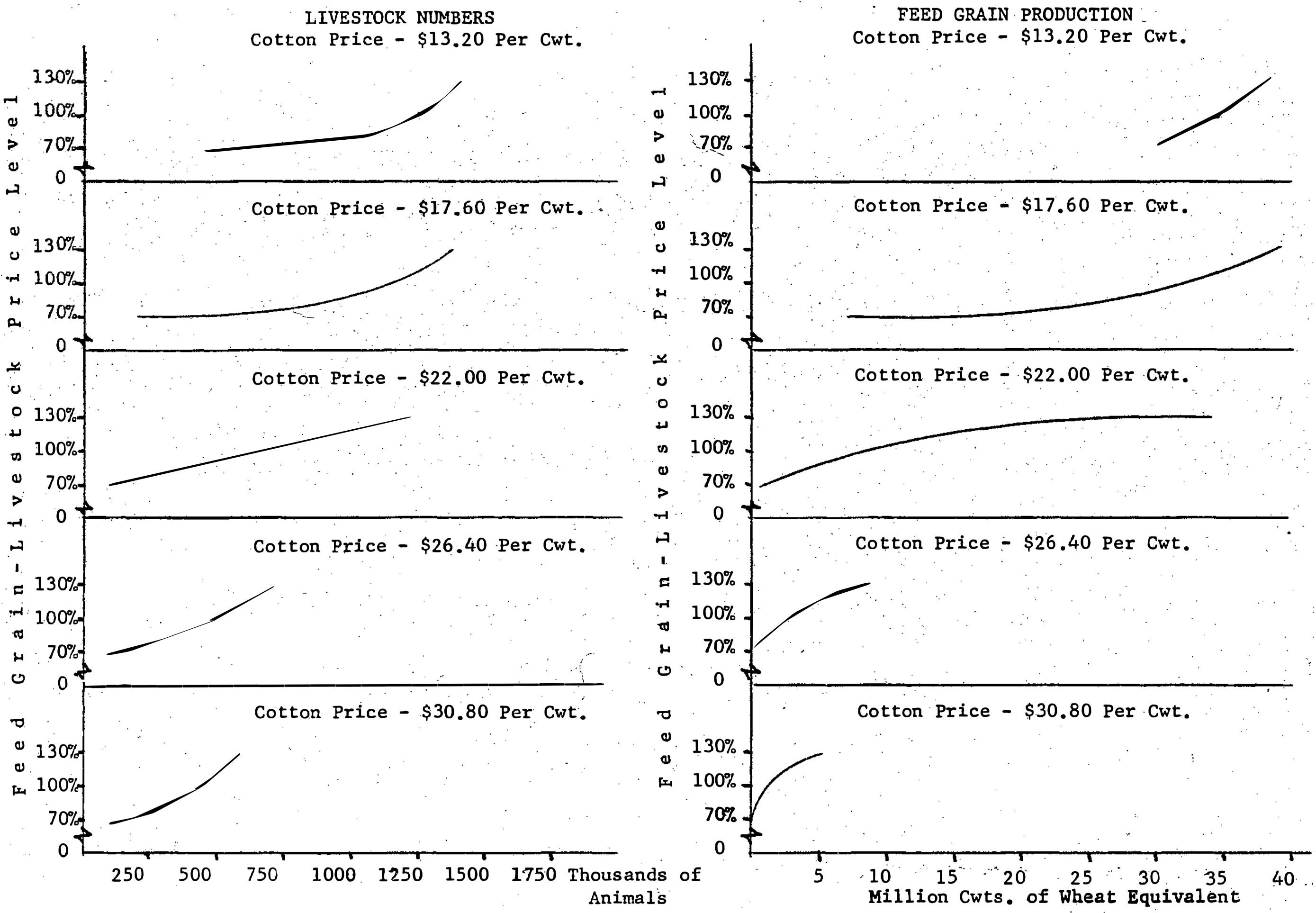


Figure 10. Total Livestock Numbers and Aggregate Feed Grain Production, by Feed Grain-Livestock and Cotton Price Levels, Total Included Resources, Rolling Plains of Oklahoma and Texas, Aggregation B-V

percent capital cost, responsive A-III resources show 8,843,571 hundredweights. Nonresponsive A-III 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-III and B-III 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 hundredweights 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 nonrespondent alternatives operate only the cow-calf sort of livestock enterprise. Grain production in Aggregation B-III 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 - i.e., if the grain price is high and cotton price is low - then the relaxed assumption of the acreage restriction causes the estimate of grain production to tend to be higher in B-III than in the six percent capital cost estimate for A-III. 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-V

The same relationships observed in Aggregation B-III prevail in Aggregation B-V, 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-V is much clearer in this case (see Figures 11 and 12). 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-V is 6,345,587 hundredweights of lint. Nonrespondent resources for A-V produce 1,045,319 hundredweights, for a total of 7,390,906 for the entire aggregation.

Aggregation B-V 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-V's estimate. This difference indicates the influence of the increased capital return requirement for the limited response resources of Aggregation B-V. The total difference between Aggregations A-V and B-V 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 pasture on limited response resources with 70 percent feed grain-livestock prices,

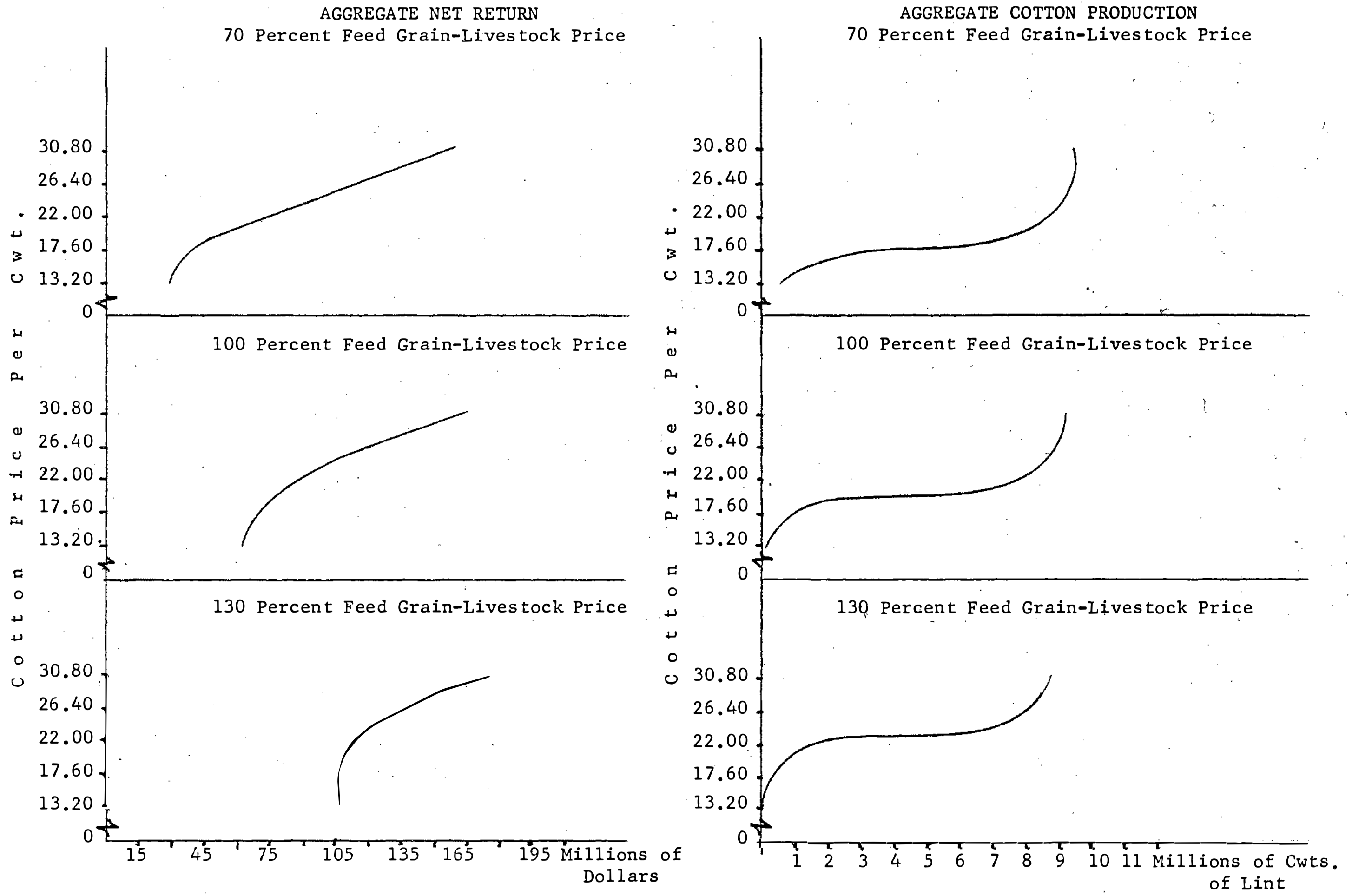


Figure 11. Aggregate Net Returns and Aggregate Cotton Production, by Feed Grain-Livestock and Cotton Price Levels, Total Included Resources, Rolling Plains of Oklahoma and Texas, Aggregation B-V.

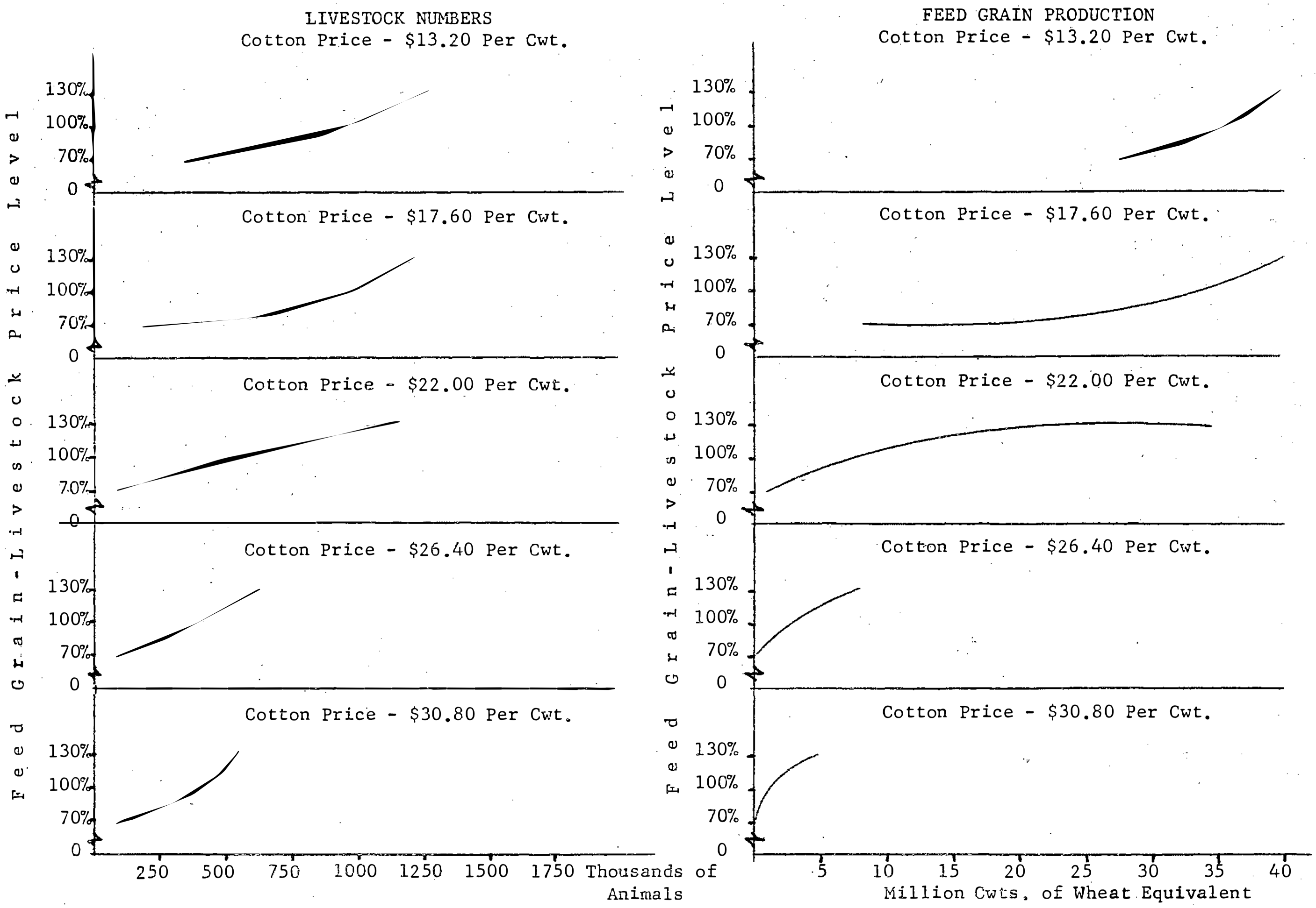


Figure 12. Total Livestock Numbers and Aggregate Feed Grain Production, by Feed Grain-Livestock and Cotton Prices, Total Included Resources, Rolling Plains of Oklahoma and Texas, Aggregation B-V.

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-III and B-V slightly exceed estimates of Aggregations A-III and A-V. 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-III through B-VI when the livestock-feed grain price is 100 percent or more of the base.

Summary and Implications

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 study was initiated.

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.

CHAPTER VII

MODEL C AGGREGATIVE RESULTS

Model C is that model which 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 long run - or permanent - 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, while 20 percent expect them to be of a temporary nature. Hence the 80 percent adjust while the 20 percent hold fast. (Aggregations C-III and C-IV)

(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. (Aggregations C-V and C-VI)

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 at the base prices assumed in Appendices VI and VII. Then as prices change, the respondent resources adjust, while nonrespondents remain at the initial equilibrium organization and production.

Table XII shows the distribution of cropland acreage for responsive resources, by soil resource situations, farm size distribution and adjustment level. Table XIII presents similar information for the nonresponsive cropland resources. Dividing these acreages by the cropland acreage on the corresponding representative farms gives the total numbers of representative farms consistent with the cropland resource base, or the aggregative weights shown in Tables XIV and XV.

As mentioned with regard to Models A and B aggregations, the "odd" numbered aggregations refer to the estimates made for the current distribution of farm size. "Even" numbered aggregations refer to estimates made for the 1975 projected farm-size distribution. This farm-size distributional difference makes little difference in aggregate reaction, production or income, so discussion will be confined to the current farm-size estimates. Appendix "C", however, contains detailed estimates for production, income, labor hired, etc., for all Model C aggregations.

Aggregation C-III

Figures 13 and 14 show the aggregate estimates for Aggregation C-III, when 20 percent of resources fail to adjust. It will be noted that cotton supply becomes relatively inelastic 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

TABLE XII

DISTRIBUTION OF CROPLAND ACREAGE AMONG RESOURCE SITUATIONS, AGGREGATIVE RESOURCE BASES FOR MODEL C AGGREGATIONS, INCLUDED RESPONSIVE RESOURCES, ROLLING PLAINS OF OKLAHOMA AND TEXAS

	Percent of Total Acreage: Farm-Size Distribution		Level of Adjustment and Aggregation Number					
			Full (100 Percent) Adjustment		80 Percent Adjustment		50 Percent Adjustment	
Resource Situation	1958 Observed	1975 Projected	C-I^1	C-II^2	C-III^1	C-IV^2	C-V^1	C-VI^2
					- Acres of Cropland -			
Clay Soils:								
Oklahoma (OC)	13.2	13.2	Identical with A-I, Table VII	Itentical with A-II, Table VII	581,941	553,380	363,713	345,862
Texas (TC)	10.5	10.5			462,907	440,189	289,317	275,118
Level Loam Soils:								
Oklahoma (OL$_1$)								
Small Farm^1	6.1	4.7			269,809	197,037	168,630	123,148
Large Farm	4.1	5.5			179,872	230,575	112,420	144,110
Texas (TL$_1$)	19.1	19.1			842,051	800,724	526,282	500,452
Rolling Loam Soils:								
Oklahoma (OL$_2$)								
Small Farm^2	3.3	1.6			145,485	67,076	90,928	41,923
Large Farm	2.9	4.6			127,850	192,845	79,907	120,528
Texas (TL$_2$)	14.8	14.8			652,479	620,457	407,799	387,785
Sandy Soils:								
Oklahoma (OS)	11.7	11.7			515,811	490,496	322,382	306,560
Texas (TS)	14.3	14.3			630,436	599,495	394,023	374,685
Total	100.0	100.0	5,510,802	5,240,342	4,408,642	4,192,274	2,755,401	2,620,171
Area Total			5,510,802	5,240,342	5,510,802	5,240,342	5,510,802	5,240,342

[1] Refers to 1958 observed farm size distribution.

[2] Refers to 1975 projected farm size distribution.

TABLE XIII

DISTRIBUTION OF CROPLAND ACREAGE AMONG RESOURCE SITUATIONS, AGGREGATIVE RESOURCE BASES FOR MODEL C AGGREGATIONS, INCLUDED NONRESPONSIVE RESOURCES, ROLLING PLAINS OF OKLAHOMA AND TEXAS

Resource Situation	Percent of Total Acreage: Farm-Size Distribution		Level of Adjustment and Aggregation Number					
			Full (100 Percent) Adjustment		80 Percent Adjustment		50 Percent Adjustment	
	1958 Observed	1975 Projected	C-I[1]	C-II[2]	C-III[1]	C-IV[2]	C-V[1]	C-VI[2]
					- Acres of Cropland -			
Clay Soils:								
Oklahoma (OC)	13.2	13.2	0	0	145,485	138,345	363,713	345,862
Texas (TC)	10.5	10.5	0	0	115,727	110,047	289,317	275,118
Level Loam Soils:								
Oklahoma (OL_1)								
Small Farm	6.1	4.7	0	0	67,452	49,259	168,630	123,148
Large Farm	4.1	5.5	0	0	44,968	57,644	112,420	144,110
Texas (TL_1)	19.1	19.1	0	0	210,513	200,181	526,282	500,452
Rolling Loam Soils:								
Oklahoma (OL_2)								
Small Farm	3.3	1.6	0	0	36,371	16,769	90,928	41,923
Large Farm	2.9	4.6	0	0	31,963	48,211	79,907	120,528
Texas (TL_2)	14.8	14.8	0	0	163,120	155,114	407,799	387,785
Sandy Soils:								
Oklahoma (OS)	11.7	11.7	0	0	128,953	122,624	322,382	306,560
Texas (TS)	14.3	14.3	0	0	157,609	149,874	394,023	374,685
Total	100.0	100.0	0	0	1,102,060	1,040,068	2,755,401	2,620,171
Area Total			5,510,802	5,240,342	5,510,802	5,240,342	5,510,802	5,240,342

---

[1] Refers to 1958 observed farm size distribution.

[2] Refers to 1975 projected farm size distribution.

TABLE XIV

REPRESENTATIVE FARM NUMBERS CONSISTENT WITH TOTAL AGGREGATIVE CROPLAND BASES FOR MODEL C AGGREGATIONS, INCLUDED RESPONSIVE RESOURCES BY RESOURCE SITUATIONS, ROLLING PLAINS OF OKLAHOMA AND TEXAS

Resource Situation	Representative Farm Cropland Acreage	Level of Adjustment and Aggregation Number					
		Full (100 Percent) Adjustment		80 Percent Adjustment		50 Percent Adjustment	
		C-I[1]	C-II[2]	C-III[1]	C-IV[2]	C-V[1]	C-VI[2]
Clay Soils:							
Oklahoma (OC)	1,000	Identical with A-I, Table VIII	Identical with A-II, Table VIII	581.9	553.4	363.7	345.8
Texas (TC)	1,000			462.9	440.2	289.3	275.1
Level Loam Soils:							
Oklahoma (OL_1)							
Small Farm[1]	375			717.1	525.4	448.2	328.4
Large Farm	750			241.0	307.4	150.6	192.2
Texas (TL_1)	750			1,122.7	1,067.6	701.7	667.2
Rolling Loam Soils:							
Oklahoma (OL_2)							
Small Farm[2]	188			773.8	356.8	483.7	223.0
Large Farm	750			170.5	257.1	106.5	160.7
Texas (TL_2)	750			870.0	827.3	543.8	517.0
Sandy Soils:							
Oklahoma (OS)	500			1,031.6	982.6	644.7	614.1
Texas (TS)	500			1,260.9	1,199.0	788.1	749.4
Total		9,040.6	8,145.9	7,232.5	6,516.7	4,520.3	4,073.0
Area Total		9,040.6	8,145.9	9,040.6	8,145.9	9,040.6	8,145.9

[1] Refers to 1958 observed farm size distribution.

[2] Refers to 1975 projected farm size distribution.

TABLE XV

REPRESENTATIVE FARM NUMBERS CONSISTENT WITH TOTAL AGGREGATIVE CROPLAND BASES FOR MODEL C AGGREGATIONS, INCLUDED NONRESPONSIVE RESOURCES BY RESOURCE SITUATIONS, ROLLING PLAINS OF OKLAHOMA AND TEXAS

Resource Situation	Representative Farm Cropland Acreage	Level of Adjustment and Aggregation Number					
		Full (100 Percent) Adjustment		80 Percent Adjustment		50 Percent Adjustment	
		C-I^1	C-II^2	C-III^1	C-IV^2	C-V^1	C-VI^2
Clay Soils:							
Oklahoma (OC)	1,000	0	0	145.5	138.3	363.7	345.8
Texas (TC)	1,000	0	0	115.7	110.0	289.3	275.1
Level Loam Soils:							
Oklahoma (OL_1)							
Small Farm^1	375	0	0	179.3	131.4	448.2	328.4
Large Farm	750	0	0	60.3	76.9	150.6	192.2
Texas (TL_1)	750	0	0	280.7	266.9	701.7	667.2
Rolling Loam Soils:							
Oklahoma (OL_2)							
Small Farm^2	188	0	0	193.5	89.2	483.7	223.0
Large Farm	750	0	0	42.6	64.3	106.5	160.7
Texas (TL_2)	750	0	0	217.5	206.8	543.8	517.0
Sandy Soils:							
Oklahoma (OS)	500	0	0	257.9	245.6	644.7	614.1
Texas (TS)	500	0	0	315.2	299.7	788.1	749.4
Total		0	0	1,808.1	1,629.2	4,520.3	4,073.0
Area Total		9,040.6	8,145.9	9,040.6	8,145.9	9,040.6	8,145.9

---

[1] Refers to 1958 observed farm size distribution.

[2] Refers to 1975 projected farm size distribution.

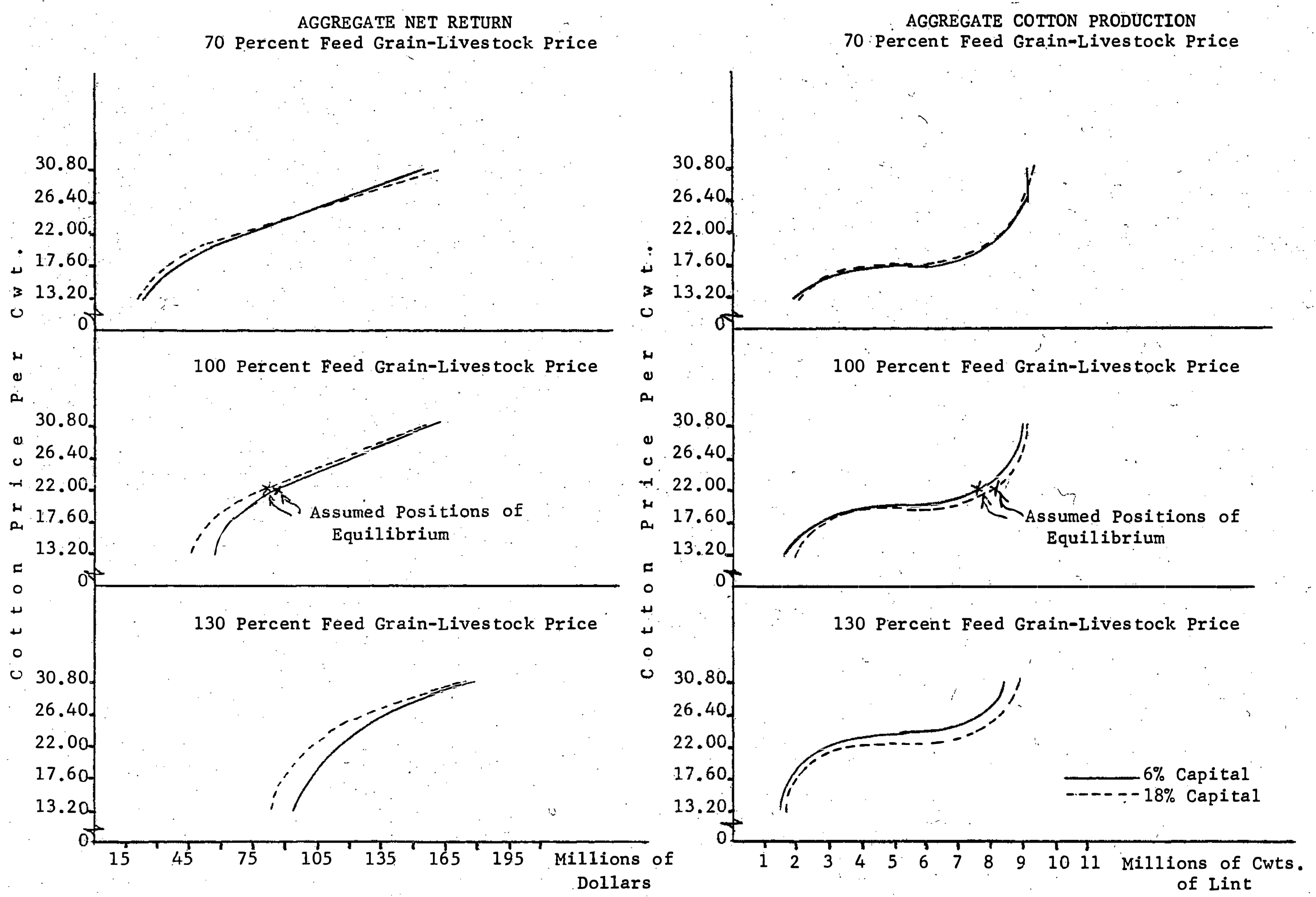


Figure 13. Aggregate Net Returns and Aggregate Cotton Production for Two Capital Costs, by Feed Grain-Livestock and Cotton Price Levels, Total Included Resources, Rolling Plains of Oklahoma and Texas, Aggregation C-III.

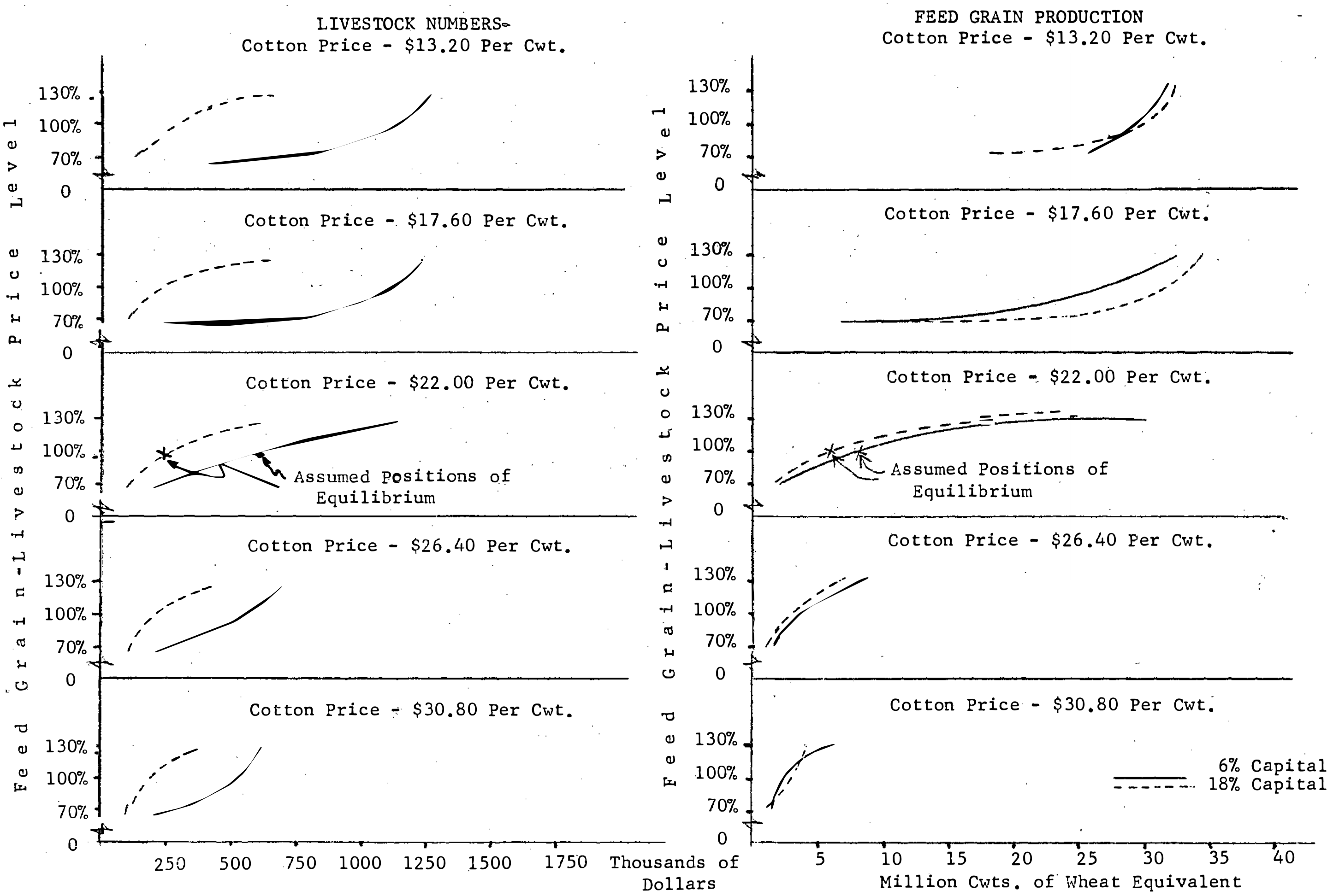


Figure 14. Total Livestock Numbers and Aggregate Feed Grain Production, for Two Capital Cost Levels, by Feed Grain-Livestock and Cotton Prices, Total Included Resources, Rolling Plains of Oklahoma and Texas, Aggregation C-III.

the same sort of effect upon feed grain and livestock production, but is proportionally much larger. At low cotton prices, feed grain 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.

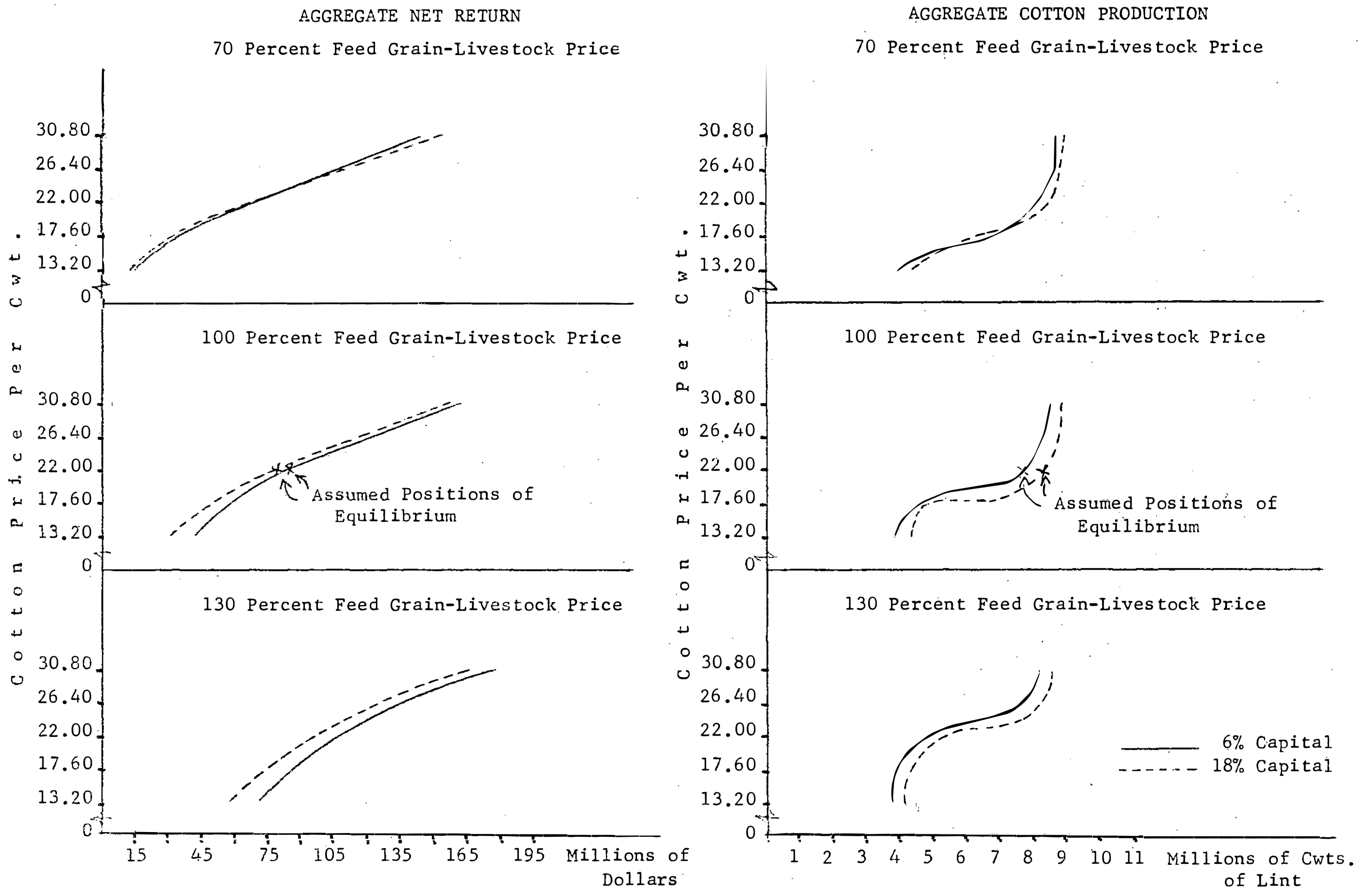
The enterprise most sensitive to capital limitation is the livestock alternative. As capital costs are increased, livestock production not only becomes more inelastic, but also is absolutely reduced by almost half under all conditions. Under many price and capital cost combinations, livestock production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

As the full adjustment assumption is relaxed and 20 percent of farmers are assumed to remain at the equilibrium level of production and organization, aggregate income is less than the full adjustment assumption under all combinations of prices except at the equilibrium point. If the feed grain-livestock price is at 70 percent of base, and if the change is in fact permanent, the penalty for being wrong in expectations at 18 percent capital cost is less with high cotton prices than is the penalty for being wrong with six percent capital cost. However, if cotton price is below the equilibrium, the penalty is greater with 18 percent capital cost. At the equilibrium feed grain-livestock price - or higher - the penalty for being wrong is in all cases higher for 18 percent capital costs. This phenomenon may be explained by the large production of cotton that is present at equilibrium. If cotton prices fall, the adjusting farmers reduce cotton production tremendously. If these prices rise, production is increased only moderately. Since there is a tendency to produce more cotton at higher capital costs, the penalty in terms of sacrificed income for holding incorrect expectations is relatively less at an 18 percent capital cost than at a six percent cost. On the other hand, because of the greater production at 18 percent, and because of the very high production of cotton at equilibrium, as cotton prices fall the loss in income due to the incorrect expectations 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.

Aggregation C-V

Figures 15 and 16 illustrate the effect of a 50 percent adjustment, when prices depart from those effective at the assumed equilibrium position. With half of total resources maintaining the initial equilibrium 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-III. The "compressing" of the cotton supply function occurs primarily at low cotton prices. For example, the minimum cotton production for C-III at 70 percent feed



AGGREGATE NET RETURN

AGGREGATE COTTON PRODUCTION

70 Percent Feed Grain-Livestock Price

100 Percent Feed Grain-Livestock Price

130 Percent Feed Grain-Livestock Price

Figure 15. Aggregate Net Returns and Aggregate Cotton Production for Two Capital Costs, by Feed Grain-Livestock and Cotton Price Levels, Total Included Resources, Rolling Plains of Oklahoma and Texas, Aggregation C-V.

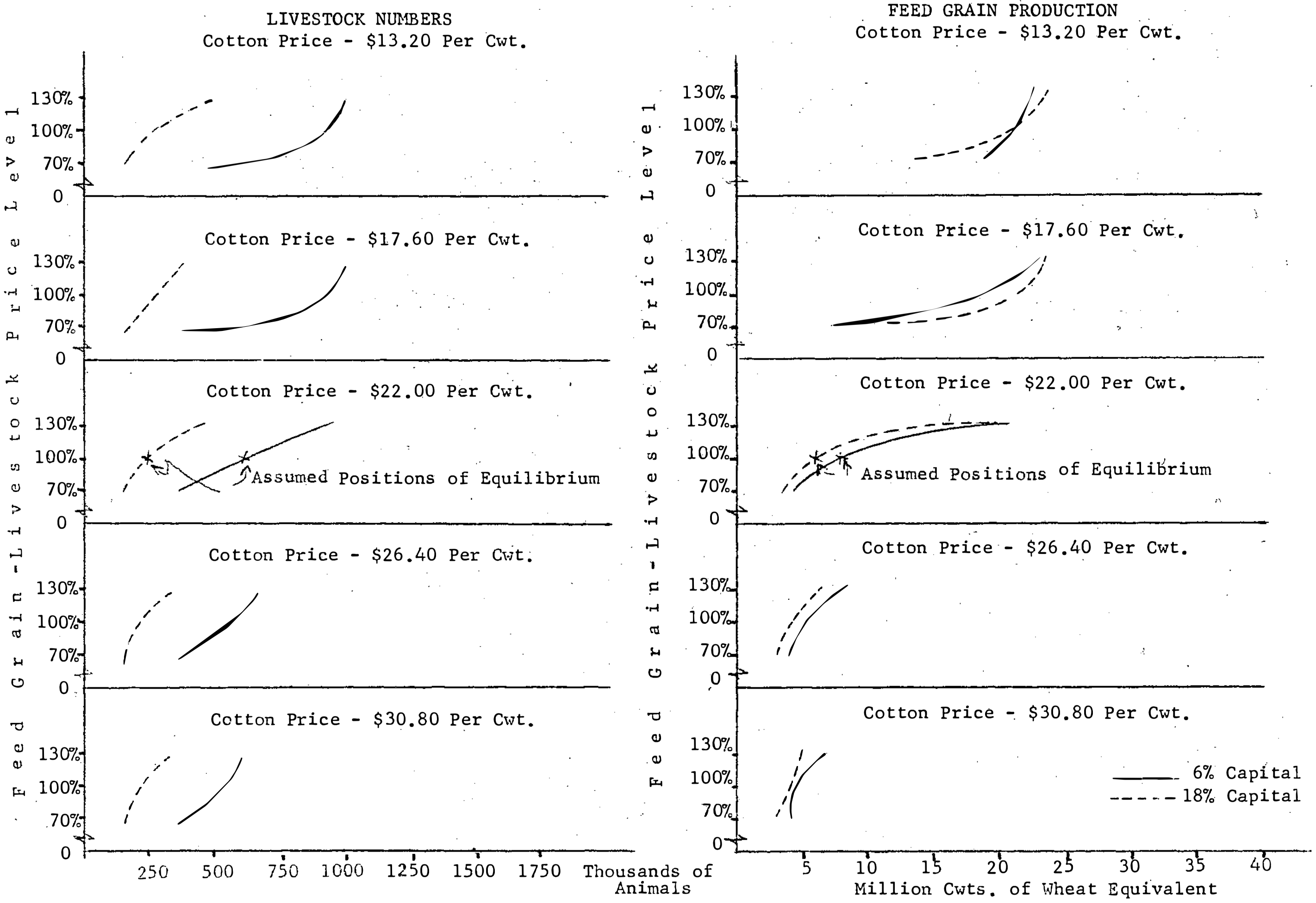


Figure 16. Total Livestock Numbers and Aggregate Feed Grain Production, for Two Capital Cost Levels, by Feed Grain-Livestock and Cotton Prices, Total Included Resources, Rolling Plains of Oklahoma and Texas, Aggregation C-V.

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-V, the corresponding estimates were 4,071,318 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 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 half of resources fail to adjust cotton production to prices higher than the initial equilibrium 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-III. 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-III was $23,643,715, while the maximum was \$153,381,873. Corresponding estimates for Aggregation C-V 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 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 and Implications

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 nonrespondent occurs primarily in the low cotton prices.

In general, the effect of reduced levels of adjustment to price changes from equilibrium, 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 functions 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.

CHAPTER VIII

SUMMARY AND CONCLUSIONS

This study was designed to develop alternative aggregative models, to analyze the implications of the various models, and to estimate normative aggregate supply response and net income for dry-land crop farms in the 40-county area of the Rolling Plains of Oklahoma and Texas. The productive alternatives considered were limited to cotton, feed grains (including wheat), and land-based livestock enterprises. Such alternatives as dairy, poultry, and beef cattle ranching were excluded as general adjustment alternatives. Since resources employed in these excluded uses have been relatively constant in magnitude since 1945, it was assumed that their magnitudes would continue to be constant until 1975, the target date of the study.

Dry-land 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 relationships for each of the ten units under the thirty possible combinations of cotton prices, feed grain and livestock prices, and capital costs. Thus a total of 300 microsupply points were estimated. 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, the levels of Models A and B being identical. These three levels for Models A and B assume full response of all resources, full response of all resources included in commercial farms of the Census classes I through V, and 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 (i.e., 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 persons or 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, etc.). With the three levels of response, the assumed levels of expectations are 100 percent adjustment, 80 percent adjustment, and 50 percent adjustment.

All aggregations for all levels of adjustment and for all three models were made with respect to both the current and projected distributions of farm size.

Differences with respect to farm size affected only two of the eight soil resource categories, and the effect in the aggregate estimates of product output and net income were negligible with respect to all aggregative models. The effect of the nonrespondent resources upon the aggregate estimates was, however, significant and considerable. 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 groups of resources to those organizations which have been largely determined by institutional limitations. Model B recognizes that some resources and some individuals may be less likely to adjust, but their reluctance to adjust is taken into account by the higher return requirement 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 applicable to any time period. The Model A results depend upon the point in time at which the study is initiated because of the assumptions regarding the nonresponsive resources. Their normative qualities 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 are reduced from prices above 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 these circumstances, livestock production does decline faster than price, but feed grain production is still inelastic. However, much cropland remains idle.

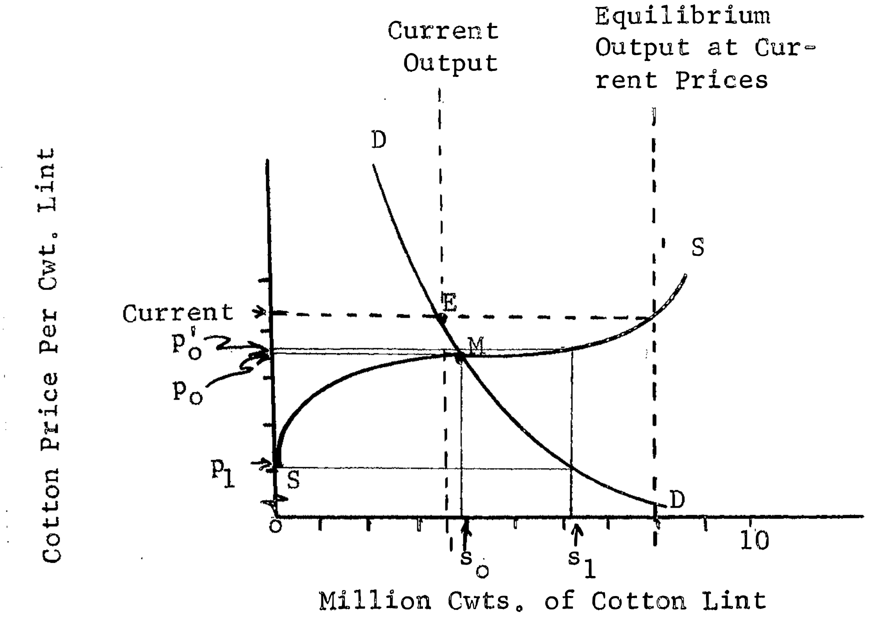


Figure 17. Effects of Producer Miscalculation of Prices of Cotton with "Inverted S" Supply Curve and Conventional Demand Curve, Rolling Plains of Oklahoma and Texas. (Feed Grain and Livestock prices are assumed to be at 130 percent of base levels.)

The aggregate supply function for cotton is observed to have an "inverted S" shape under the assumptions of all three aggregative models. Figure 17 illustrates the effect of producer miscalculation of price in a perfectly competitive situation. The supply function postulated in Figure 17 is that 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_o and receive a price of p_o. If however, producers were forced to estimate price because of imperfect knowledge, a very small miscalculation of price (such as p_o') 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 the price ratios are not such that cotton is less profitable than other enterprises.

Labor requirements tend to be highly correlated with the acreage of cotton, since the cotton enterprise normally requires more hand labor than other productive alternatives in the Rolling Plains. Even when cotton harvest is mechanized, and when hoeing is done by custom operation, the labor for cultivation and planting of cotton exceeds that required for the other crop alternatives.

Cropland reseeding is not generally economically feasible on a private and individual basis. Under the most favorable of circumstances, the maximum quantity of cropland which was reseeded to pasture was nine percent of total cropland acreage. Further, this reseeding was very sensitive to changes in all product prices and in the cost of capital. As feed grain-livestock prices declined from the base levels, reseeding was sharply reduced because the livestock alternative which made the reseeding attractive was rendered much less profitable. As this set of prices increased, the more profitable feed grains pushed the reseeding alternative out of the picture. As cotton prices rose, cotton production caused the reseeding alternative to be reduced. Increasing capital costs from six percent to 18 percent caused the maximum reseeded acreage to decline by almost 90 percent.

Policy Implications

Even if cotton price were to decline to $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 production of cotton would not be so excessive, but acreages of grain would be greatly inflated.

The profitability of cropland reseeding depends upon the profitability of the livestock enterprise through which the increase in grazing is to be marketed. If it is deemed desirable to remove cropland from production by means of cropland reseeding, such removal cannot be accomplished on any major scale by private means unless the profitability of the livestock enterprise is considerably increased. If public funds are to be used for this purpose, the types of cropland which will be reseeded first will be those poorer grades of cropland which are utilized primarily for forage production or left idle, by the programmed optima, so crop production is not likely to be affected until substantial acreages are retired. Approximately 400,000 acres of cropland are of this quality, and an additional 1.4 million acres are of such poor quality that yield coefficients are very low. Thus, more than 20 percent of Rolling Plains cropland could be retired without greatly affecting the aggregate production of Rolling Plains crops.

The extreme sensitivity of the cotton supply function to price across the broad range of production levels illustrates the dilemma in Rolling Plains cotton production. If producers slightly overestimate price, severe losses in producer net revenue could be the result. If all controls were removed from cotton production, a phenomenal increase in cotton supplied would result - probably within a very short time. The resulting decrease in cotton prices would be unlikely to decrease cotton production in anything like the magnitude the original increase occurred because of probable differences in costs of asset acquisition and returns from salvaging those same assets.

Limitations of the Study and Suggestions for Future Research

It is to be emphasized that the estimates presented herein are normative rather than predictive in nature. These estimates reflect the response that Rolling Plains farmers (as an aggregate) would make if their goal were profit maximization, and if they possessed perfect knowledge. The study is in no way designed to predict what would be the actual reaction if the postulated conditions were to occur in fact. If the study is to be made predictive, empirical estimates of such factors as goals, expectations, preferences with regard to productive alternatives, equity positions, capital availability, and estimates of relationships between these and other such factors must be available and must be functionally related to the supply estimates.

More meaning could be derived from the normative aggregate supply estimates presented if comparable normative aggregate product demand and factor supply estimates were available. In the present framework, nothing may be said about a normative equilibrium, and the corresponding aggregate levels of price, production, resource requirements, net income from farming, etc. Information which might be derived from confronting these normative supply relationships with the corresponding factor supply and product demand relationships would provide some guide to the expected rate of agricultural adjustment, if some figure such as the average factory wage rate were used to represent the opportunity cost of farming.

The study would provide much broader information if the prices of agricultural resources were allowed to vary. Assuming such costs as wage rates for cotton chopping labor to be constant over a range of essentially no cotton to more than 4.5 million acres in an area as sparsely populated as the Rolling Plains is little short of heroic. If chopping costs were allowed to increase along with cotton acreage, the result would be some reduced estimate of cotton production.

The study assumes throughout that all units are owner operated, and that deviations from the owner-operator optima represent disequilibrium situations. Hence nonoptimal rental and tenure possibilities have been ignored. Examination of the pattern and prevalence of tenure arrangements could provide guides for estimating the path and rate of adjustment.

An alternative which has been ignored throughout this analysis is the possibility of off-farm work. General and wide spread off-farm work opportunities might have a considerable effect upon the willingness of individuals to adjust to changing prices and production conditions. Thus, in the aggregate, the size of the nonresponsive or limited response resource base could be heavily dependent upon the availability of off-farm work possibilities.

SELECTED BIBLIOGRAPHY

Barr, Alfred L., et al., *Beef Cattle Systems: Estimated Production, Income and Costs*, Oklahoma Agricultural Experiment Station Processed Series P-358, Stillwater, Oklahoma, September, 1960.

Boulding, Kenneth E., *Economic Analysis*, Harper and Brothers, New York, 1955.

Cochrane, Willard W., "Conceptualizing the Supply Relationship in Agriculture," *Journal of Farm Economics*, Vol. XXXVIII, No. 5, Decmeber, 1955.

Connor, Larry J., James S. Plaxico, and W. F. Lagrone, *Resource Requirements, Costs and Expected Returns; Alternative Crop and Livestock Enterprises; Loam Soils of the Rolling Plains of Southwestern Oklahoma*, Oklahoma Agricultural Experiment Station Processed Series P-368, in cooperation with Farm Economics Research Division, Agricultural Research Service, U. S. Department of Agriculture, Stillwater, Oklahoma, February, 1961.

Department of Agricultural Economics, Oklahoma State University, Unpublished S-42 Research Materials, Stillwater, Oklahoma.

Goodwin, John W., and James S. Plaxico, "Resources Required to Earn Specified Incomes: Fine Textured Soils in Southwestern Oklahoma," *Oklahoma Current Farm Economics*, Vol. 33, No. 2, Oklahoma Agricultural Experiment Station, Stillwater, Oklahoma, June, 1960.

__________, James S. Plaxico, and W. F. Lagrone, *Resource Requirements, Costs and Expected Returns; Alternative Crop and Livestock Enterprises; Clay Soils of the Rolling Plains of Southwestern Oklahoma*, Oklahoma Agricultural Experiment Station Processed Series P-357, in cooperation with Farm Economics Research Division, Agricultural Research Service, U. S. Department of Agriculture, Stillwater, Oklahoma, September, 1960.

Heady, Earl O., *Economics of Agricultural Production and Resource Use*, Prentice-Hall, Inc., New York, 1952.

__________, "The Supply of Farm Products Under Conditions of Full Employment," *American Economic Review*, Vol. XLV, May, 1955.

__________, "Uses and Concepts in Supply Analysis," in Earl O. Heady, et al., ed., *Agricultural Supply Functions - Estimating Techniques and Interpretations*, Iowa State University Press, Ames, Iowa, 1961

Jeffrey, D. B., Cecil D. Maynard, and Odell L. Walker, *Oklahoma Custom Rates*, Oklahoma Agricultural Extension Service Leaflet L-50, Stillwater, Oklahoma, 1960.

Johnson, D. Gale, "The Nature of the Supply Function in Agriculture," American Economic Review, Vol. XL, September, 1950.

__________, "Labor Mobility and Agricultural Adjustment," in Earl O. Heady, et al., ed., Agricultural Adjustment Problems in a Growing Economy, Iowa State College Press, Ames, Iowa, 1958.

Lagrone, William F., Soil and Land Classifications for Aggregate Economic Analysis, Supplement to the Minutes of the Meeting of the Technical Committee of Regional Project S-42, Memphis, Tennessee, November 17, 1959.

Leftwich, Richard H., The Price System and Resource Allocation, 1st Edition, Rhinehart and Company, Inc., New York, 1956.

Lerner, Abba P., The Economics of Control, The Macmillan Company, New York, 1944.

Marshall, Alfred, Principles of Economics, 8th Edition, Macmillan and Co., Ltd., London, 1920.

Nerlove, Marc L., and Kenneth L. Bachmann, "The Analysis of Changes in Agricultural Supply: Problems and Approaches," Journal of Farm Economics, Vol. XLII, August, 1960.

Plaxico, James S., "Problems of Factor-Product Aggregation in Cobb-Douglas Value Productivity Analysis," Journal of Farm Economics, Vol. XXXVII, November, 1955.

__________, "Supply Concepts and Aggregation of Firm Supply Functions," Farm Size and Output Research - A Study in Research Methods, Southern Cooperative Series Bulletin No. 56, Oklahoma Agricultural Experiment Station, Stillwater, Oklahoma, June, 1956.

__________, Aggregation of Farm Supply Relationships, An unpublished manuscript presented at the Spring Meeting of the Southern Farm Management Research Conference, Memphis, Tennessee, March 21-23, 1960.

__________, and John W. Goodwin, "Adjustments for Efficient Organization of Southern Farms," in Summary of Papers Presented at a Seminar for Southern Agricultural Leaders, Series One, Agricultural Policy Institute, North Carolina State College, Raleigh, North Carolina, January, 1961.

Schultz, Wolfgang M., and James S. Plaxico, "Cattle Ranches: Minimum Resources Required to Earn a Specified Labor-Management Return," Oklahoma Current Farm Economics, Vol. 33, No. 2, Oklahoma Agricultural Experiment Station, Stillwater, Oklahoma, June, 1960.

Strickland, Percy L., Jr., James S. Plaxico, and W. F. Lagrone, Resource Requirements, Costs, and Expected Returns; Alternative Crop and Livestock Enterprises; Sandy Soils of the Rolling Plains of Southwestern Oklahoma, Oklahoma Agricultural Experiment Station Processed Series P-369, in cooperation with Farm Economics Research Division, Agricultural Research Service, U. S. Department of Agriculture, Stillwater, Oklahoma, February, 1961.

Tefertiller, Kenneth R., Ralph H. Rogers, and Don S. Moore, Unpublished budgeting materials dealing with Resource Requirements, Costs and Expected Returns for Alternative Crop and Livestock Enterprises on Sandy Soils of the Rolling Plains of Texas. Available from the Department of Agricultural Economics, Agricultural and Mechanical College of Texas, College Station, Texas.

Thiel, H., Linear Aggregation of Economic Relations, North Holland Publishing Company, Amsterdam, 1954.

Tucker, E. A., Odell L. Walker, and D. B. Jeffrey, Custom Rates for Farm Operations in Oklahoma, Oklahoma Agricultural Experiment Station Bulletin B-473, Stillwater, Oklahoma, July, 1956.

U. S. Department of Agriculture, Soil Conservation Service, National Inventory of Soil and Water Conservation Needs, 1958. Forms N-1 and N-2 for the relevant counties.

U. S. Department of Commerce, Bureau of the Census, U. S. Census of Agriculture, 1954.

__________, U. S. Census of Agriculture, 1959.

Wilcox, Walter W., "The Farm Policy Dilemma," Journal of Farm Economics, Vol. XL, No. 3, August, 1958.

APPENDICES

APPENDIX I. TABLE 1

DEFINITIONS OF LAND RESOURCE SITUATIONS AND YIELD LEVELS BY LAND CLASSES, CLAY SOILS, ROLLING PLAINS OF OKLAHOMA AND TEXAS

Dry Land

C_b - Land Capability Class IIs. Deep, level (0 to 1 percent slope) with Negligible to moderate erosion. Soil Units 1 and 5, Foard-Tillman equivalents.

C_c - Land Capability Class IIIe. Deep, moderately sloping (1 to 3 percent slopes) with negligible to moderate erosion. Soil Units 1 and 5, Foard-Tillman equivalents.

C_d - Land Capability Class IVe. Sloping (3 to 5 percent slopes) with negligible to moderately severe erosion, or moderately sloping (B slopes) with moderately severe erosion. Soil Units 1 and 5, Foard-Tillman equivalents.

C_e - All other crop land classes. Rolling (5 to 8 percent slopes) or lesser slopes with severe erosion. Not adapted to harvested crops.

Crop	Unit	C_b	C_c	C_d	C_e
Wheat (continuous)	bu.	14	12	10	--
after row crop					
(6 mo. fallow)	bu.	17	14	11	--
after 12 mo. fallow	bu.	19	16	12	--
Cotton	lb. lint	175	125	--	--
Oats (continuous)	bu.	28	20	15	--
Small grain hay	ton	1.6	1.5	1.4	--
Grazing[1]					
Sudan	AUM	3.0	2.8	2.6	1.9
Grazed out small grain	AUM	3.1	2.9	2.8	1.9
Harvested small grain	AUM	.4	.35	.3	.2
Blue panic grass	AUM	3.4	3.2	3.0	2.1

---

[1] Grazing yields are basically expected values since moisture is the limiting factor in forage production. The monthly distribution of grazing is not specified because of seasonal uncertainties. Permanent pasture grazing yield is 1 AUM per acre of range. The acreage of range land and cropland for livestock budgets can be calculated from this table.

Source: 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, Processed Series P-357, Oklahoma Agricultural Experiment Station, in cooperation with Farm Economics Research Division, Agricultural Research Service, U. S. Department of Agriculture, Stillwater, Oklahoma, September, 1960.

APPENDIX II, TABLE 1

DEFINITIONS OF LAND RESOURCE SITUATIONS AND YIELD LEVELS BY LAND CLASSES, LOAM SOILS, ROLLING PLAINS OF OKLAHOMA AND TEXAS

Dry Land

L_a - Land Capability Class I. Deep, level (0 to 1 percent slope) with negligible to moderate erosion. Soil Units 2, 4, 7, and 9. Upland-Tipton, St. Paul, and Carey Soils; Bottomland-Spur and Canadian Soils (or their equivalents).

L_b - Land Capability Class II. Deep, moderately sloping (1 to 3 percent slopes) with negligible to moderate erosion. Same soils as above.

L_c - Land Capability Class III. Sloping (3 to 5 percent slopes) with negligible to moderately severe erosion, or moderately sloping (B slopes) with moderately severe erosion. Same soils as above plus Quinlan and Vernon soils (or their equivalents).

L_d - Land Capability Class IV. Rolling (5 to 8 percent slopes) or lesser slopes with severe erosion. Same soils as L_c.

L_e - All other cropland classes. Shallow or severely eroded on variable slopes. Not adapted to row crops.

Crop	Unit	L_a	L_b	L_c	L_d	L_e
Cotton	lb. lint	275	225	185	100	--
Wheat	bu.	23	18	14	11	--
Alfalfa						
hay basis	ton	3.0	2.25	--	--	--
hay and seed basis	ton	2.5	1.75	--	--	--
(seed)	lb.	100	75	--	--	--
Grain sorghum	lb.	1,600	1,450	1,200	900	--
Forage sorghum	ton	2.2	2.0	1.7	1.2	--
Small grain hay	ton	2.0	1.8	1.5	1.0	--
Grazing[1]						
Sudan	AUM	3.0	2.4	1.7	1.3	1.0
Grazed out small grain	AUM	4.0	3.5	3.0	2.8	2.0
Harvested small grain	AUM	.6	.5	.4	.3	--

[1] Grazing yields are basically expected values since moisture is the limiting factor in forage production. The monthly distribution of grazing is not specified because of seasonal uncertainties. Permanent pasture grazing yield is 1 AUM per acre of range. The acreage of range land and cropland for livestock budgets can be calculated from this table.

Source: Larry J. Connor, et al., Resource Requirements, Costs and Expected Returns; Alternative Crop and Livestock Enterprises; Loam Soils of the Rolling Plains of Southwestern Oklahoma, Processed Series P-368, Oklahoma Agricultural Experiment Station, in cooperation with the Farm Economics Research Division, Agricultural Research Service, U. S. Department of Agriculture, Stillwater, Oklahoma, February, 1961.

APPENDIX III. TABLE 1

DEFINITIONS OF LAND RESOURCE SITUATIONS AND YIELD LEVELS BY LAND CLASSES, OKLAHOMA SANDY SOILS, ROLLING PLAINS OF OKLAHOMA AND TEXAS

Dry Land

S_b - Land Capability Class II. Deep, level to moderate slope (0 to 3 percent). Soil Units 70, 7X, 12, 12X. Miles, Dill, Pratt, and Enterprise soils (or their equivalents).

S_c - Land Capability Class III. Deep, moderately sloping (3 to 5 percent). Same soils as above.

S_d - Land Capability Class IV. Sloping (5 to 8 percent). Same soils as above plus some Brownfield and Nobscott soils (deep-plowed Brownfield soils would be included in the S_b group).

S_e - All other cropland classes. Rolling over 8 percent slope or lesser slope with severe erosion or shallow soil. (Not adapted to row crops.)

Crop	Unit	S_b	S_c	S_d	S_e
Cotton[1]	lb. lint	325	275	150	--
Wheat[2]	bu.	18	14	8	--
Grain sorghum[3]	lb.	1,750	1,300	1,000	--
Alfalfa[4]					
hay basis	ton	2.5	2.0	--	--
hay and seed basis	ton hay	2.0	1.5	--	--
	lb. seed	75	50	--	--
Small grain hay[2]	ton	1.7	1.5	1.2	--
Forage sorghum[3]	ton	2.0	1.7	1.0	--
Grazing					
Sudan[6]	AUM	2.7	1.9	1.3	.9
Grazed out small grain	AUM	3.3	2.8	2.3	1.5
Harvested small grain	AUM	.4	.3	.2	--
Rye cover crop	AUM	.5	.4	.3	--

[1] 100 lbs. 10-20-10 and rye cover crop.

[2] 100 lbs. 13-39-0.

[3] 100 lbs. 16-20-0.

[4] 100 lbs. 8-32-16 for establishment and 100 lbs. of 0-46-0 during life of stand (4 years). Not more than 25 percent of cropland in each adapted class may be in alfalfa.

[5] Permanent pasture grazing yield is 1 AUM per acre of range.

[6] 150 lbs. 16-20-0.

Source: Percy L. Strickland, Jr., *et al.*, *Resource Requirements, Costs, and Expected Returns; Alternative Crop and Livestock Enterprises; Sandy Soils of the Rolling Plains of Southwestern Oklahoma*, Oklahoma Agricultural Experiment Station Processed Series, P-369, February, 1961.

APPENDIX IV, TABLE 1

DEFINITION OF LAND RESOURCE SITUATIONS AND YIELD LEVELS BY LAND CLASSES, TEXAS SANDY SOILS, ROLLING PLAINS OF OKLAHOMA AND TEXAS

Dry Land

S_b - Land Capability Class II. Deep, level (0 to 1 percent slope) with negligible to moderate erosion. Soil units 12X, L12, 60, 70, 7KO. Miles, Enterprise, and Springer soils or their equivalents.

S_c - Land Capability Class III. Deep, moderately sloping (1 to 3 percent slopes) with negligible to moderate erosion. Same soils as S_b land.

S_d - Land Capability Class IV. Sloping (3 to 5 percent slope) with negligible to moderately severe erosion, or moderately sloping with moderately severe erosion. Same soils as S_b land.

Crop	Unit	Soil Productivity Class S_b	 S_c	 S_d
Cotton	lb. lint	175	150	125
Grain sorghum	cwt.	11	9	6
Small grain hay	ton	1.5	1.2	0.9
Grazing[1]				
Small grain grazing	AUM	0.3	0.2	0.1
Sudan	AUM	1.5	1.0	0.5

[1] Grazing yields are basically expected values since moisture is the limiting factor in forage production. The monthly distribution of grazing is not specified because of seasonal uncertainties. Permanent pasture grazing yield is 1 AUM per acre of range. The acreage of range land and cropland for livestock budgets can be calculated from this table.

Source: Unpublished research findings from Southern Regional Project S-42, provided by Kenneth R. Tefertiller and Don Moore, Department of Agricultural Economics, A and M College of Texas, College Station, Texas.

APPENDIX V, TABLE 1

ASSUMED RESOURCE PRICES PAID BY FARMERS, ROLLING PLAINS OF OKLAHOMA AND TEXAS

Item	Unit	Assumed Price
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 Dessicant	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 & ties.
Fuel & Lubricants		
L. P. 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)[1]
Livestock		
Feeder Steers	each	( )[2]

---

[1] For itemized list of machinery costs, see Resource and Product Price Assumptions Prepared by The Low Rolling Plains Sub-Committee of S-42, Unpublished Research Material, Department of Agricultural Economics, Oklahoma State University, December 4, 1958.

[2] See APPENDIX VIII.

APPENDIX VI, TABLE 1

ASSUMED PRICES RECEIVED BY FARMERS FOR ALL COMMODITIES, ROLLING PLAINS OF SOUTHWESTERN OKLAHOMA AND NORTH CENTRAL TEXAS

Item	Unit	Base Price Per Unit	Percentage Deviations from Base Price
Wheat	bu.	$ 1.25	± 30
Oats	bu.	.65	± 30
Grain sorghum	cwt.	1.70	± 30
Cotton lint	lb.	.22	± 20, ± 40
Cotton seed	ton	50.00	None
Alfalfa hay	ton	20.00	None
Alfalfa seed	lb.	.21	None
Milk	cwt.	4.25	None
Beef cattle	cwt.	( )[1]	± 30

[1] See Appendix VII.

APPENDIX VII, TABLE 1

ASSUMED[1] PRICES FOR STOCKER AND FEEDER STEERS, AND CULL COWS BY MONTHS, ROLLING PLAINS OF SOUTHWESTERN OKLAHOMA AND NORTH CENTRAL TEXAS

	Monthly Average												Yearly
Class and Grade	Jan.	Feb.	Mar.	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Average
						- price per cwt. -							
Slaughter Calves													
Prime and Choice													
500 lbs. and less	$22.25	$22.75	$23.00	$23.75	$24.00	$23.00	$22.50	$21.75	$21.00	$20.50	$21.00	$21.50	$22.25
Good and Commercial													
500 lbs.	19.50	20.00	20.25	20.75	20.75	19.25	19.25	18.75	18.25	17.50	17.75	18.50	19.25
Slaughter Bulls													
Commercial													
all weights	17.75	18.00	18.50	18.50	18.50	17.75	17.75	16.75	16.50	16.25	15.50	16.75	17.25
Utility and Cutter													
all weights	15.25	15.50	16.25	16.25	16.25	15.00	15.00	14.00	14.00	13.75	13.75	14.50	15.00
Slaughter Cows													
Utility													
all weights	14.00	14.50	15.00	15.00	15.00	14.25	14.00	13.50	13.50	13.00	13.25	13.25	14.00
Canners and Cutters													
all weights	11.75	12.25	12.50	12.50	12.25	11.25	11.00	11.00	10.75	10.25	10.25	10.75	11.25
Stocker and Feeder Steers													
Choice and Good													
500 lbs. and less	23.25	24.50	25.00	25.25	24.50	23.50	23.00	23.25	23.00	22.50	22.50	22.50	23.50
Good													
500-800 lbs.	21.50	22.25	22.25	22.25	22.75	21.50	21.00	20.75	20.50	20.00	20.25	20.50	21.25
800-1050 lbs.	20.75	21.50	21.75	22.25	22.00	21.00	20.75	20.75	20.25	19.75	20.00	20.25	21.00
Medium													
500-1000 lbs.	18.25	19.00	19.00	19.25	19.50	18.25	18.00	17.75	17.50	16.75	17.50	17.25	18.25
Common													
500-900 lbs.	15.00	16.25	16.25	16.25	16.25	14.75	14.75	14.50	13.75	13.75	14.00	14.25	15.00

---

[1] The seasonal pattern as well as the class and grade differentials are based on data from Jackson L. James and James S. Plaxico, Beef Cattle Prices; Seasonal Movements and Price Differentials on the Oklahoma City Market, Oklahoma Agricultural Experiment Station Bulletin B-486, February, 1957.

APPENDIX VIII-A, TABLE A.1.1

PRODUCTION OF COTTON AND FEED GRAINS, BY FEED GRAIN AND LIVESTOCK PRICE LEVELS FOR SIX PERCENT CAPITAL COSTS WITH FIVE COTTON PRICES; AND RELEVANT ELASTICITY ESTIMATES WITH RESPECT TO CHANGING COTTON PRICES; INCLUDED RESOURCES, ROLLING PLAINS OF OKLAHOMA AND TEXAS
AGGREGATION A-I

Item	Price of Cotton Per Hundredweight Lint								
	$13.20		$17.60		$22.00		$26.40		$30.80
70 Percent Feed Grain and Livestock Prices									
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 and Livestock Prices									
Cotton									
Acres	40,945		419,648		3,595,384		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 and Livestock Prices									
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 VIII-A, TABLE A.1.2

PRODUCTION OF COTTON AND FEED GRAINS, BY FEED GRAIN AND LIVESTOCK PRICE LEVELS FOR EIGHTEEN PERCENT CAPITAL COSTS WITH FIVE COTTON PRICES; AND RELEVANT ELASTICITY ESTIMATES WITH RESPECT TO CHANGING COTTON PRICES: INCLUDED RESOURCES, ROLLING PLAINS OF OKLAHOMA AND TEXAS AGGREGATION A-I

	Price of Cotton Per Hundredweight Lint								
Item	$13.20		$17.60		$22.00		$26.40		$30.80
70 Percent Feed Grain and Livestock Prices									
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 and Livestock Prices									
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 and Livestock Prices									
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 VIII-A, TABLE A.1.3

LIVESTOCK NUMBERS BY CROP AND LIVESTOCK PRICES FOR TWO CAPITAL COST LEVELS FOR INCLUDED RESPONSIVE RESOURCES, ROLLING PLAINS OF OKLAHOMA AND TEXAS 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		
6 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 VIII-A, TABLE A.1.4

TOTAL LABOR HIRED FOR AGGREGATION A-I WITH FIVE COTTON PRICES, BY CAPITAL COST AND FEED GRAIN-LIVESTOCK PRICE LEVELS, ROLLING PLAINS OF OKLAHOMA AND TEXAS

Capital Cost Level, Feed Grain-Livestock Price, and Item	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 Price Level					
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 Price Level					
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 Price Level					
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
Eighteen Percent Capital Cost					
70 Percent Feed Grain-Livestock Price Level					
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	27,030,852
100 Percent Feed Grain-Livestock Price Level					
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 Price Level					
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	23,916,734	25,994,798

APPENDIX VIII-A, TABLE A.2.1

PRODUCTION OF COTTON AND FEED GRAINS, AND NET REVENUE REALIZED, BY FEED GRAIN AND LIVESTOCK PRICE LEVELS FOR SIX PERCENT CAPITAL COSTS WITH FIVE COTTON PRICES; AND RELEVANT ELASTICITY ESTIMATES WITH RESPECT TO CHANGING COTTON PRICES: INCLUDED RESPONDENT RESOURCES, ROLLING PLAINS OF OKLAHOMA AND TEXAS AGGREGATION A-II

Item	Price of Cotton Per Hundredweight Lint								
	$13.20		$17.60		$22.00		$26.40		$30.80
70 Percent Feed Grain and Livestock Prices									
Cotton									
Acres	122,501		2,688,922		4,074,104		4,558,438		4,558,438
Cwt of Lint	335,131		5,816,371		8,372,286		9,035,100		9,035,100
Elasticity of Supply		6.237		1.621		0.419		0.0	
Feed Grain									
Acres	3,174,959		851,458		79,608		0		0
Cwt	30,150,372		6,701,812		669,840		0		0
Net Revenue	27,554,637		36,866,932		71,055,389		109,291,570		149,037,275
Income Flexibility		1.011		2.852		2.332		2.000	
100 Percent Feed Grain and Livestock Prices									
Cotton									
Acres	28,985		387,069		3,436,982		4,107,849		4,413,784
Cwt of Lint	92,417		1,096,596		7,412,156		8,468,360		8,866,946
Elasticity of Supply		5.912		6.680		0.732		0.299	
Feed Grain									
Acres	3,539,561		3,240,254		1,015,564		336,070		115,921
Cwt	34,397,719		30,952,329		7,640,673		2,651,677		752,097
Net Revenue	62,465,323		64,059,483		81,750,358		117,172,398		155,480,732
Income Flexibility		0.088		1.092		1.959		1.826	
130 Percent Feed Grain and Livestock Prices									
Cotton									
Acres	12,262		52,983		691,422		3,422,209		3,863,905
Cwt of Lint	40,465		136,934		1,649,554		7,505,854		8,174,161
Elasticity of Supply		3.807		7.620		7.036		0.554	
Feed Grain									
Acres	3,800,705		3,845,309		3,407,482		1,085,905		698,565
Cwt	37,001,013		37,421,352		32,602,735		8,276,594		5,105,798
Net Revenue	102,805,873		104,642,131		109,548,934		130,892,855		165,982,373
Income Flexibility		0.062		0.206		0.976		1.536	

APPENDIX VIII-A, TABLE A.2.2

PRODUCTION OF COTTON AND FEED GRAINS, AND NET REVENUE REALIZED, BY FEED GRAIN AND LIVESTOCK PRICE LEVELS FOR EIGHTEEN PERCENT CAPITAL COSTS WITH FIVE COTTON PRICES; AND RELEVANT ELASTICITY ESTIMATES WITH RESPECT TO CHANGING COTTON PRICES: INCLUDED RESPONDENT RESOURCES, ROLLING PLAINS OF OKLAHOMA AND TEXAS

AGGREGATION A-II

	Price of Cotton Per Hundredweight Lint								
Item	$13.20		$17.60		$22.00		$26.40		$30.80
70 Percent Feed Grain and Livestock Prices									
Cotton									
Acres	163,090		1,874,077		4,099,162		4,211,145		4,558,438
Cwt of Lint	418,546		3,985,335		8,427,368		8,612,817		9,035,757
Elasticity of Supply		5.669		3.221		0.120		0.311	
Feed Grain									
Acres	2,173,714		1,058,693		79,608		0		0
Cwt	21,057,473		10,274,439		669,840		0		0
Net Revenue	24,445,955		32,563,612		70,410,194		108,259,230		148,508,730
Income Flexibility		0.997		3.308		2.330		2.038	
100 Percent Feed Grain and Livestock Prices									
Cotton									
Acres	102,343		355,026		3,726,748		4,147,542		4,441,614
Cwt of Lint	345,379		856,350		7,929,333		8,534,745		8,917,434
Elasticity of Supply		2.976		7.245		0.404		0.285	
Feed Grain									
Acres	3,785,233		3,557,020		802,043		401,900		210,224
Cwt	36,719,059		37,885,912		5,707,801		2,653,129		2,047,444
Net Revenue	46,245,484		48,631,580		75,451,393		110,249,052		151,694,219
Income Flexibility		0.176		1.945		2.061		2.057	
130 Percent Feed Grain and Livestock Prices									
Cotton									
Acres	16,723		100,247		774,258		3,776,240		4,188,254
Cwt of Lint	50,726		269,839		1,855,187		8,038,492		8,530,330
Elasticity of Supply		4.785		6.714		6.875		0.386	
Feed Grain									
Acres	4,357,349		4,309,819		3,723,080		931,647		429,693
Cwt	41,025,705		40,278,370		34,923,671		6,683,794		3,502,158
Net Revenue	95,042,821		94,615,069		99,989,920		128,106,856		163,279,565
Income Flexibility		-0.017		0.248		1.356		1.569	

APPENDIX VIII-A, TABLE A.2.3

LIVESTOCK NUMBERS BY CROP AND LIVESTOCK PRICES FOR TWO CAPITAL COST LEVELS FOR INCLUDED RESPONSIVE RESOURCES, ROLLING PLAINS OF OKLAHOMA AND TEXAS
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 -		
6 Percent Capital Cost					
Cows					
70 Percent Grain and Livestock	79,314	88,381	92,106	92,106	92,106
100 Percent Grain and Livestock	44.632	42,179	77,532	71,289	73,840
130 Percent Grain and Livestock	25,144	28,822	28,822	53,379	69,790
Feeders					
70 Percent Grain and Livestock	383,431	118,940	17,245	0	0
100 Percent Grain and Livestock	1,159,526	1,144,872	503,023	418,545	379,992
130 Percent Grain and Livestock	1,331,410	1,166,176	1,232,762	617,112	491,177
18 Percent Capital Cost					
Cows					
70 Percent Grain and Livestock	86,318	76,536	64,322	64,322	64,322
100 Percent Grain and Livestock	84,655	87,139	87,139	90,864	91,556
130 Percent Grain and Livestock	57,307	57,307	57,803	64,751	66,089
Feeders					
70 Percent Grain and Livestock	0	0	0	0	0
100 Percent Grain and Livestock	217,333	217,333	145,270	54,754	39,300
130 Percent Grain and Livestock	676,266	596,018	622,824	348,251	279,369

APPENDIX VIII-A, TABLE A.2.4.

TOTAL LABOR HIRED FOR AGGREGATION A-II WITH FIVE COTTON PRICES, BY CAPITAL COST AND FEED GRAIN-LIVESTOCK PRICE LEVELS, ROLLING PLAINS OF OKLAHOMA AND TEXAS

Capital Cost Level, Feed Grain - Livestock Price, and Item	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 Price Level					
Hourly Labor	2,942,450	4,455,540	4,336,809	6,522,312	6,522,933
Custom Cotton Hoeing	294,450	7,049,298	10,442,574	11,717,792	11,717,792
Custom Cotton Harvest	245,402	5,377,844	8,148,208	9,116,876	9,116,876
Total	3,482,302	16,882,682	22,927,591	27,356,980	27,357,601
100 Percent Feed Grain-Livestock Price Level					
Hourly Labor	3,099,075	3,492,060	5,832,085	6,045,400	7,423,675
Custom Cotton Hoeing	97,208	1,424,024	9,168,330	10,605,708	11,305,864
Custom Cotton Harvest	57,970	774,138	6,873,964	8,215,698	8,827,568
Total	3,254,253	5,690,222	21,874,379	24,866,806	27,557,107
130 Percent Feed Grain-Livestock Price Level					
Hourly Labor	3,058,077	3,030,267	3,329,213	5,725,129	5,911,082
Custom Cotton Hoeing	49,048	142,752	2,658,094	9,045,864	10,208,558
Custom Cotton Harvest	24,524	105,966	1,382,844	6,844,418	7,727,810
Total	3,131,649	3,278,985	7,370,151	21,165,411	23,847,450
Eighteen Percent Capital Cost					
70 Percent Feed Grain-Livestock Price Level					
Hourly Labor	1,287,045	1,642,910	3,907,796	4,039,374	5,024,943
Custom Cotton Hoeing	382,586	5,059,106	10,492,690	10,716,656	11,717,792
Custom Cotton Harvest	326,180	3,748,754	8,198,324	8,422,290	9,116,876
Total	1,995,811	10,450,770	22,598,810	23,178,320	25,859,611
100 Percent Feed Grain-Livestock Price Level					
Hourly Labor	1,990,566	2,654,111	4,830,781	4,873,749	5,616,383
Custom Cotton Hoeing	253,734	1,178,460	9,747,862	10,589,170	11,483,864
Custom Cotton Harvest	204,686	710,052	7,453,496	8,295,084	8,883,228
Total	2,448,986	4,542,623	22,032,139	23,758,003	25,983,475
130 Percent Feed Grain-Livestock Price Level					
Hourly Labor	2,352,280	2,525,476	2,787,254	5,420,400	5,654,240
Custom Cotton Hoeing	48,160	237,208	2,823,826	9,846,846	10,766,518
Custom Cotton Harvest	33,446	200,494	1,548,516	7,552,480	8,376,246
Total	2,433,886	2,963,178	7,159,596	22,819,726	24,797,004

APPENDIX VIII-A, TABLE A.3.1

PRODUCTION OF COTTON AND FEED GRAINS, AND NET REVENUE REALIZED, BY FEED GRAIN AND LIVESTOCK PRICE LEVELS FOR SIX PERCENT CAPITAL COSTS WITH FIVE COTTON PRICES; AND RELEVANT ELASTICITY ESTIMATES WITH RESPECT TO CHANGING COTTON PRICES: INCLUDED RESPONDENT RESOURCES, ROLLING PLAINS OF OKLAHOMA AND TEXAS
AGGREGATION A-III

	Price of Cotton Per Hundredweight Lint								
Item	$13.20		$17.60		$22.00		$26.40		$30.80
70 Percent Feed Grain and Livestock Prices									
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 and Livestock Prices									
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 and Livestock Prices									
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		104,37[illegible],635		109,398,164		130,871,538		165,875,787
Income Flexibility		0.011		0.212		0.983		1.533	

APPENDIX VIII-A, TABLE A.3.2

PRODUCTION OF COTTON AND FEED GRAINS, AND NET REVENUE REALIZED, BY FEED GRAIN AND LIVESTOCK PRICE LEVELS FOR EIGHTEEN PERCENT CAPITAL COSTS WITH FIVE COTTON PRICES; AND RELEVANT ELASTICITY ESTIMATES WITH RESPECT TO CHANGING COTTON PRICES: INCLUDED RESPONDENT RESOURCES, ROLLING PLAINS OF OKLAHOMA AND TEXAS, AGGREGATION A-III

Item	Price of Cotton Per Hundredweight Lint				
	$13.20	$17.60	$22.00	$26.40	$30.80
70 Percent Feed Grain and Livestock Prices					
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 and Livestock Prices					
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 and Livestock Prices					
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 VIII-A, TABLE A.3.3

LIVESTOCK NUMBERS BY CROP AND LIVESTOCK PRICES FOR TWO CAPITAL COST LEVELS FOR INCLUDED RESPONSIVE RESOURCES, ROLLING PLAINS OF OKLAHOMA AND TEXAS 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 -		
6 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 VIII-A, TABLE A.3.4

TOTAL LABOR HIRED FOR AGGREGATION A-III WITH FIVE COTTON PRICES, BY CAPITAL COST AND FEED GRAIN-LIVESTOCK PRICE LEVELS, ROLLING PLAINS OF OKLAHOMA AND TEXAS

Capital Cost Level, Feed Grain - Livestock Price, and Item	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 Price Level					
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 Price Level					
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 Price Level					
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
Eighteen Percent Capital Cost					
70 Percent Feed Grain-Livestock Price Level					
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 Price Level					
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 Percetn Feed Grain-Livestock Price Level					
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 VIII-A, TABLE A.4.1

PRODUCTION OF COTTON AND FEED GRAINS, AND NET REVENUE REALIZED, BY FEED GRAIN AND LIVESTOCK PRICE LEVELS FOR SIX PERCENT CAPITAL COSTS WITH FIVE COTTON PRICES; AND RELEVANT ELASTICITY ESTIMATES WITH RESPECT TO CHANGING COTTON PRICES: INCLUDED RESPONDENT RESOURCES, ROLLING PLAINS OF OKLAHOMA AND TEXAS AGGREGATION A-IV

	Price of Cotton Per Hundredweight Lint								
Item	$13.20		$17.60		$22.00		$26.40		$30.80
70 Percent Feed Grain and Livestock Prices									
Cotton									
Acres	116,023		2,542,588		3,852,412		4,310,354		4,310,354
Cwt of Lint	316,887		5,499,854		7,916,710		8,543,447		8,543,447
Elasticity of Supply		6.237		1.621		0.419		0.0	
Feed Grain									
Acres	3,002,222		805,125		75,280		0		0
Cwt	28,020,975		6,337,333		633,433		0		0
Net Revenue	26,055,268		34,860,764		67,188,799		103,344,330		140,927,236
Income Flexibility		1.012		2.852		2.332		2.000	
100 Percent Feed Grain and Livestock Prices									
Cotton									
Acres	27,408		366,011		3,249,921		3,884,277		4,173,563
Cwt of Lint	87,387		1,036,935		7,008,768		8,007,535		8,384,437
Elasticity of Supply		5.912		6.680		0.732		0.299	
Feed Grain									
Acres	3,346,976		3,063,953		960,350		317,786		109,620
Cwt	32,526,065		25,623,279		7,225,275		2,507,445		711,220
Net Revenue	59,066,617		60,574,027		77,302,179		110,796,558		147,020,648
Income Flexibility		0.088		1.092		1.959		1.827	
130 Percent Feed Grain and Livestock Prices									
Cotton									
Acres	11,595		50,099		653,797		3,235,951		3,653,591
Cwt of Lint	38,264		129,482		1,559,803		7,094,357		7,729,324
Elasticity of Supply		3.806		7.620		7.035		0.557	
Feed Grain									
Acres	3,593,909		3,636,087		3,222,080		1,026,862		660,581
Cwt	34,987,656		35,385,136		30,828,682		7,826,580		4,828,178
Net Revenue	98,701,858		98,948,641		103,590,453		123,770,912		156,950,843
Income Flexibility		0.009		0.206		0.976		1.536	

APPENDIX VIII-A, TABLE A.4.2

PRODUCTION OF COTTON AND FEED GRAINS, AND NET REVENUE REALIZED, BY FEED GRAIN AND LIVESTOCK PRICE LEVELS FOR EIGHTEEN PERCENT CAPITAL COSTS WITH FIVE COTTON PRICES; AND RELEVANT ELASTICITY ESTIMATES WITH RESPECT TO CHANGING COTTON PRICES: INCLUDED RESPONDENT RESOURCES, ROLLING PLAINS OF OKLAHOMA AND TEXAS, AGGREGATION A-IV

	Price of Cotton Per Hundredweight Lint				
Item	$13.20	$17.60	$22.00	$26.40	$30.80
70 Percent Feed Grain and Livestock Prices					
Cotton					
Acres	154,213	1,772,091	3,876,071	3,981,961	4,310,354
Cwt of Lint	395,767	3,768,452	7,968,790	8,144,143	8,544,068
Elasticity of Supply		7.289	3.221	0.120	0.311
Feed Grain					
Acres	2,055,425	1,001,084	75,280	0	0
Cwt	19,991,531	9,715,358	633,433	0	0
Net Revenue	23,115,627	30,791,526	66,578,717	92,368,147	140,427,466
Income Flexibility		0.997	3.308	1.785	2.684
100 Percent Feed Grain and Livestock Prices					
Cotton					
Acres	96,771	335,707	3,523,900	3,921,813	4,199,890
Cwt of Lint	326,580	809,750	7,497,825	8,070,315	8,432,187
Elasticity of Supply		2.976	7.245	0.404	0.285
Feed Grain					
Acres	3,579,280	3,363,473	758,440	380,045	198,787
Cwt	34,721,159	35,824,537	5,396,772	2,508,863	1,936,097
Net Revenue	49,269,950	50,851,174	73,714,871	107,253,863	144,375,681
Income Flexibility		0.111	1.652	2.080	1.918
130 Percent Feed Grain and Livestock Prices					
Cotton					
Acres	15,813	94,791	732,123	3,570,693	3,960,306
Cwt of Lint	47,965	255,151	1,754,241	7,601,035	8,066,132
Elasticity of Supply		4.785	6.714	6.875	0.386
Feed Grain					
Acres	4,120,262	4,075,313	3,520,501	880,992	406,325
Cwt	38,793,386	38,086,731	33,023,368	6,320,396	3,331,730
Net Revenue	89,918,847	89,467,088	94,549,529	121,136,412	154,394,998
Income Flexibility		-0.018	0.253	1.356	1.570

APPENDIX VIII-A, TABLE A.4.3

LIVESTOCK NUMBERS BY CROP AND LIVESTOCK PRICES FOR TWO CAPITAL COST LEVELS FOR INCLUDED RESPONSIVE RESOURCES, ROLLING PLAINS OF OKLAHOMA AND TEXAS AGGREGATION A-IV

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 -				
6 Percent Capital Cost					
Cows					
70 Percent Grain and Livestock	74,999	83,572	87,096	87,096	87,096
100 Percent Grain and Livestock	42,204	39,885	73,312	69,517	69,821
130 Percent Grain and Livestock	23,774	27,253	27,253	50,475	65,992
Feeders					
70 Percent Grain and Livestock	362,579	112,474	16,307	0	0
100 Percent Grain and Livestock	1,096,446	1,082,589	745,676	395,790	359,333
130 Percent Grain and Livestock	1,258,974	1,208,243	1,165,401	583,553	464,472
18 Percent Capital Cost					
Cows					
70 Percent Grain and Livestock	81,623	72,373	60,825	60,825	60,825
100 Percent Grain and Livestock	80,049	80,049	82,398	85,922	86,576
130 Percent Grain and Livestock	54,188	54,188	54,658	62,493	62,493
Feeders					
70 Percent Grain and Livestock	0	0	0	0	0
100 Percent Grain and Livestock	205,520	205,520	137,375	51,778	37,164
130 Percent Grain and Livestock	626,721	611,508	588,945	329,317	292,548

APPENDIX VIII-A, TABLE A.4.4

TOTAL LABOR HIRED FOR AGGREGATION A-IV WITH FIVE COTTON PRICES, BY CAPITAL COST AND FEED GRAIN-LIVESTOCK PRICE LEVELS, ROLLING PLAINS OF OKLAHOMA AND TEXAS

Capital Cost Level, Feed Grain - Livestock Price, and Item	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 Price Level					
Hourly Labor	2,687,827	4,213,110	4,100,814	6,167,630	6,167,934
Custom Cotton Hoeing	278,426	6,665,658	9,874,312	11,080,072	11,080,072
Custom Cotton Harvest	232,046	5,085,176	7,704,824	8,620,708	8,620,708
Total	3,198,299	15,963,944	21,679,950	25,868,410	25,868,714
100 Percent Feed Grain-Livestock Price Level					
Hourly Labor	2,930,522	3,802,117	5,467,490	5,716,463	7,042,897
Custom Cotton Hoeing	91,920	1,346,558	8,669,330	10,028,484	10,690,540
Custom Cotton Harvest	54,816	732,022	6,499,842	7,768,554	8,347,126
Total	3,077,258	5,880,697	20,636,662	23,513,501	26,080,563
130 Percent Feed Grain-Livestock Price Level					
Hourly Labor	2,891,746	2,865,447	3,148,129	5,413,638	5,589,454
Custom Cotton Hoeing	46,380	134,982	2,513,454	8,553,530	9,652,914
Custom Cotton Harvest	23,190	100,198	1,307,594	6,471,902	7,307,182
Total	2,961,316	3,100,627	6,969,177	20,439,070	22,549,550
Eighteen Percent Capital Cost					
70 Percent Feed Grain-Livestock Price Level					
Hourly Labor	1,217,049	1,553,505	3,695,157	3,819,577	4,751,507
Custom Cotton Hoeing	361,762	4,783,770	9,921,630	10,133,410	11,080,072
Custom Cotton Harvest	308,426	3,544,182	7,752,142	7,963,922	8,620,708
Total	1,887,237	9,881,457	21,368,929	21,916,909	24,452,287
100 Percent Feed Grain-Livestock Price Level					
Hourly Labor	1,881,322	2,509,719	4,567,923	4,608,549	5,310,780
Custom Cotton Hoeing	239,922	1,114,342	9,217,288	10,013,114	10,859,144
Custom Cotton Harvest	193,542	671,414	7,047,800	7,843,626	8,399,780
Total	2,314,786	4,295,474	20,833,011	22,465,289	24,569,704
130 Percent Feed Grain-Livestock Price Level					
Hourly Labor	2,224,334	2,388,102	2,635,639	5,125,468	5,346,582
Custom Cotton Hoeing	45,540	224,366	2,670,106	9,310,874	10,180,542
Custom Cotton Harvest	31,626	189,582	1,464,246	7,141,386	7,920,612
Total	2,301,500	2,802,050	6,769,991	21,577,728	23,447,736

APPENDIX VIII-A, TABLE A.5.1

PRODUCTION OF COTTON AND FEED GRAINS, AND NET REVENUE REALIZED, BY FEED GRAIN AND LIVESTOCK PRICE LEVELS FOR SIX PERCENT CAPITAL COSTS WITH FIVE COTTON PRICES; AND RELEVANT ELASTICITY ESTIMATES WITH RESPECT TO CHANGING COTTON PRICES: INCLUDED RESPONDENT RESOURCES, ROLLING PLAINS OF OKLAHOMA AND TEXAS, AGGREGATION A-V

Item	Price of Cotton Per Hundredweight Lint								
	$13.20		$17.60		$22.00		$26.40		$30.80
70 Percent Feed Grain and Livestock Prices									
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 and Livestock Prices									
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 and Livestock Prices									
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 VIII-A, TABLE A.5.2

PRODUCTION OF COTTON AND FEED GRAINS, AND NET REVENUE REALIZED, BY FEED GRAIN AND LIVESTOCK PRICE LEVELS FOR EIGHTEEN PERCENT CAPITAL COSTS WITH FIVE COTTON PRICES; AND RELEVANT ELASTICITY ESTIMATES WITH RESPECT TO CHANGING COTTON PRICES: INCLUDED RESPONDENT RESOURCES, ROLLING PLAINS OF OKLAHOMA AND TEXAS AGGREGATION A-V

	Price of Cotton Per Hundredweight Lint								
Item	$13.20		$17.60		$22.00		$26.40		$30.80
70 Percent Feed Grain and Livestock Prices									
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 and Livestock Prices									
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 and Livestock Prices									
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 VIII-A, TABLE A.5.3

LIVESTOCK NUMBERS BY CROP AND LIVESTOCK PRICES FOR TWO CAPITAL COST LEVELS FOR INCLUDED RESPONSIVE RESOURCES, ROLLING PLAINS OF OKLAHOMA AND TEXAS AGGREGATION A-V

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 -		
6 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 VIII-A, TABLE A.5.4

TOTAL LABOR HIRED FOR AGGREGATION A-V WITH FIVE COTTON PRICES, BY CAPITAL COST AND FEED GRAIN-LIVESTOCK PRICE LEVELS, ROLLING PLAINS OF OKLAHOMA AND TEXAS

Capital Cost Level, Feed Grain - Livestock Price, and Item	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 Price Level					
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 Price Level					
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 Price Level					
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	2,295,084	5,230,867	15,388,443	17,088,431
Eighteen Percent Capital Cost					
70 Percent Feed Grain-Livestock Price Level					
Hourly Labor	878,921	1,128,939	2,715,544	2,818,646	3,484,910
Custom Cotton Hoeing	297,006	3,681,010	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 Price Level					
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	7,602,268	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	16,949,386	18,503,201
130 Percent Feed Grain-Livestock Price Level					
Hourly Labor	1,601,856	1,722,562	1,910,225	3,772,120	3,939,440
Custom Cotton Hoeing	97,836	804,608	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 VIII-A, TABLE A.6.1

PRODUCTION OF COTTON AND FEED GRAINS, AND NET REVENUE REALIZED, BY FEED GRAIN AND LIVESTOCK PRICE LEVELS FOR SIX PERCENT CAPITAL COSTS WITH FIVE COTTON PRICES; AND RELEVANT ELASTICITY ESTIMATES WITH RESPECT TO CHANGING COTTON PRICES: INCLUDED RESPONDENT RESOURCES, ROLLING PLAINS OF OKLAHOMA AND TEXAS

AGGREGATION A-VI

Item	Price of Cotton Per Hundredweight Lint								
	$13.20		$17.60		$22.00		$26.40		$30.80
70 Percent Feed Grain and Livestock Prices									
Cotton									
Acres	81,459		1,785,155		2,704,780		3,026,300		3,026,300
Cwt of Lint	222,491		3,861,452		5,558,317		5,998,351		5,998,351
Elasticity of Supply		6.237		1.621		0.419		0.0	
Feed Grain									
Acres	2,130,632		637,713		52,851		0		0
Cwt	19,673,331		4,449,291		444,709		0		0
Net Revenue	18,293,202		24,475,556		47,173,103		72,547,921		98,871,544
Income Flexibility		1.012		2.851		2.331		1.996	
100 Percent Feed Grain and Livestock Prices									
Cotton									
Acres	19,244		256,979		2,281,795		2,727,153		2,930,262
Cwt of Lint	61,358		728,047		4,920,886		5,622,091		5,886,712
Elasticity of Supply		5.912		6.680		0.732		0.299	
Feed Grain									
Acres	2,349,896		2,151,184		674,233		223,115		76,961
Cwt	22,589,270		20,548,987		5,072,642		1,760,447		499,323
Net Revenue	41,470,210		42,528,580		54,633,557		77,790,011		103,222,673
Income Flexibility		0.088		1.121		1.926		1.827	
130 Percent Feed Grain and Livestock Prices									
Cotton									
Acres	8,141		35,176		459,046		2,271,985		2,565,290
Cwt of Lint	26,865		90,910		1,095,165		4,983,084		5,426,772
Elasticity of Supply		3.807		7.620		7.036		0.554	
Feed Grain									
Acres	2,523,272		2,552,886		2,262,204		720,931		463,778
Cwt	24,564,704		24,843,782		21,644,622		5,494,821		3,389,749
Net Revenue	69,297,830		69,471,103		72,728,811		86,899,074		110,194,761
Income Flexibility		0.009		0.206		0.976		1.536	

APPENDIX VIII-A, TABLE A.6.2

PRODUCTION OF COTTON AND FEED GRAINS, AND NET REVENUE REALIZED, BY FEED GRAIN AND LIVESTOCK PRICE LEVELS FOR EIGHTEEN PERCENT CAPITAL COSTS WITH FIVE COTTON PRICES; AND RELEVANT ELASTICITY ESTIMATES WITH RESPECT TO CHANGING COTTON PRICES: INCLUDED RESPONDENT RESOURCES, ROLLING PLAINS OF OKLAHOMA AND TEXAS, AGGREGATION A-VI

	Price of Cotton Per Hundredweight Lint								
Item	$13.20		$17.60		$22.00		$26.40		$30.80
70 Percent Feed Grain and Livestock Prices									
Cotton									
Acres	108,272		1,244,186		2,721,388		2,795,732		3,026,300
Cwt of Lint	277,869		2,645,824		5,594,882		5,717,994		5,998,787
Elasticity of Supply		5.980		3.221		0.120		0.311	
Feed Grain									
Acres	1,443,110		722,864		552,851		0		0
Cwt	13,979,826		6,821,169		444,709		0		0
Net Revenue	16,229,337		21,618,565		46,744,776		71,872,493		98,593,931
Income Flexibility		0.997		3.308		2.330		2.038	
100 Percent Feed Grain and Livestock Prices									
Cotton									
Acres	67,943		235,964		2,474,142		2,753,504		2,948,742
Cwt of Lint	229,295		865,681		5,264,236		5,666,163		5,920,234
Feed Grain		4.068		6.458		0.404		0.285	
Acres	2,512,996		2,361,474		532,478		266,822		139,563
Cwt	24,377,568		25,152,259		3,788,908		1,761,420		1,359,303
Net Revenue	34,591,985		35,702,187		51,754,916		75,302,688		101,365,913
Income Flexibility		0.111		1.652		2.039		1.918	
130 Percent Feed Grain and Livestock Prices									
Cotton									
Acres	11,103		66,554		514,041		2,506,997		2,780,083
Cwt of Lint	33,678		179,144		1,231,684		5,338,193		5,663,232
Elasticity of Supply		4.785		6.714		6.876		0.384	
Feed Grain									
Acres	2,892,827		2,861,666		2,471,718		618,522		285,271
Cwt	27,236,710		26,740,566		23,185,483		4,437,393		2,325,091
Net Revenue	63,131,259		62,814,070		66,382,524		85,049,424		98,400,348
Income Flexibility		-0.018		0.249		1.356		0.946	

APPENDIX VIII-A, TABLE A.6.3

LIVESTOCK NUMBERS BY CROP AND LIVESTOCK PRICES FOR TWO CAPITAL COST LEVELS FOR INCLUDED RESPONSIVE RESOURCES, ROLLING PLAINS OF OKLAHOMA AND TEXAS AGGREGATION A-VI

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 -		
6 Percent Capital Cost					
Cows					
70 Percent Grain and Livestock	52,656	61,269	63,742	63,742	63,742
100 Percent Grain and Livestock	29,632	28,004	51.473	48,810	49,023
130 Percent Grain and Livestock	16,692	19,135	19,135	35,438	46,333
Feeders					
70 Percent Grain and Livestock	254,557	78,964	11,450	0	0
100 Percent Grain and Livestock	769,894	760,840	331,612	277,875	252,512
130 Percent Grain and Livestock	883,916	848,298	818,217	409,704	326,094
18 Percent Capital Cost					
Cows					
70 Percent Grain and Livestock	57,305	50,812	42,704	42,704	42,704
100 Percent Grain and Livestock	56,201	56,201	57,851	60,324	60,783
130 Percent Grain and Livestock	38,048	38,048	38,377	43,876	43,876
Feeders					
70 Percent Grain and Livestock	0	0	0	0	0
100 Percent Grain and Livestock	144,288	144,288	96,446	36,351	26,092
130 Percent Grain and Livestock	440,010	429,329	413,485	231,206	205,392

APPENDIX VIII-A, TABLE A.6.4

TOTAL LABOR HIRED FOR AGGREGATION A-VI WITH FIVE COTTON PRICES, BY CAPITAL COST AND FEED GRAIN-LIVESTOCK PRICE LEVELS, ROLLING PLAINS OF OKLAHOMA AND TEXAS

Capital Cost Level, Feed Grain - Livestock Price, and Item	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 Price Level					
Hourly Labor	1,887,011	2,957,953	2,879,129	4,330,266	4,330,479
Custom Cotton Hoeing	195,482	4,680,012	6,932,822	7,779,386	7,779,386
Custom Cotton Harvest	162,918	3,570,310	5,409,560	6,052,600	6,052,600
Total	2,245,411	11,208,275	15,221,511	18,162,252	18,162,465
100 Percent Feed Grain-Livestock Price Level					
Hourly Labor	2,057,365	2,318,264	3,838,584	4,013,406	4,944,702
Custom Cotton Hoeing	64,540	945,430	6,086,852	7,041,066	7,505,900
Custom Cotton Harvest	38,488	513,958	4,563,590	5,454,306	5,860,524
Total	2,160,393	3,777,652	14,489,026	16,508,778	18,311,126
130 Percent Feed Grain-Livestock Price Level					
Hourly Labor	2,030,151	2,018,650	2,210,160	3,800,773	3,924,234
Custom Cotton Hoeing	32,564	94,776	1,764,754	6,005,442	6,777,584
Custom Cotton Harvest	16,282	70,352	918,092	4,543,970	5,130,580
Total	2,078,997	2,183,778	4,893,006	14,350,185	15,832,398
Eighteen Percent Capital Cost					
70 Percent Feed Grain-Livestock Price Level					
Hourly Labor	761,346	985,965	2,468,046	2,661,716	3,316,293
Custom Cotton Hoeing	253,992	3,358,728	6,966,038	7,114,726	7,779,386
Custom Cotton Harvest	216,544	2,488,372	5,442,776	5,591,464	6,052,600
Total	1,231,882	6,833,065	14,876,860	15,367,906	17,148,279
100 Percent Feed Grain-Livestock Price Level					
Hourly Labor	1,259,049	1,695,406	3,057,810	3,102,660	3,595,694
Custom Cotton Hoeing	168,450	782,394	6,471,544	7,030,268	7,624,270
Custom Cotton Harvest	135,886	471,408	4,948,284	5,507,008	5,897,484
Total	1,563,385	2,949,208	14,477,638	15,639,936	17,117,448
130 Percent Feed Grain-Livestock Price Level					
Hourly Labor	1,473,842	1,586,783	1,762,114	3,465,574	3,620,823
Custom Cotton Hoeing	31,976	157,532	1,874,744	6,537,256	7,146,926
Custom Cotton Harvest	22,206	133,108	1,028,082	5,013,994	5,560,166
Total	1,528,024	1,877,423	4,664,940	15,016,824	16,327,915

APPENDIX VIII-A, TABLE A.7.1

ACREAGE OF CROPLAND RESEEDED TO PERMANENT PASTURE BY FEED GRAIN-LIVESTOCK AND COTTON PRICE LEVELS FOR TWO CAPITAL COSTS, AGGREGATIVE MODEL A, ROLLING PLAINS OF OKLAHOMA AND TEXAS

Feed Grain-Livestock Price	6 Percent Capital Cost					18 Percent Capital Cost				
Level and Aggregation Number	$13.20	$17.60	$22.00	$26.40	$30.80	$13.20	$17.60	$22.00	$26.40	$30.80
70 Percent Grain and Livestock										
Aggregation A-I[1]	277,966	277,966	65,192	65,192	65,192	0	0	0	0	0
Aggregation A-II[2]	264,316	264,316	61,992	61,992	61,992	0	0	0	0	0
Aggregation A-III[1]	263,576	263,576	61,818	61,818	61,818	0	0	0	0	0
Aggregation A-IV[2]	249,926	249,926	58,618	58,618	58,618	0	0	0	0	0
Aggregation A-V[1]	189,132	189,132	44,358	44,358	44,358	0	0	0	0	0
Aggregation A-VI[2]	175,482	175,482	41,157	41,157	41,157	0	0	0	0	0
100 Percent Grain and Livestock										
Aggregation A-I[1]	490,712	453,316	418,577	360,550	360,550	25,790	25,790	25,790	25,790	25,790
Aggregation A-II[2]	453,231	417,672	392,693	337,514	337,514	24,524	24,524	24,524	24,524	24,524
Aggregation A-III[1]	460,207	424,746	391,805	336,779	336,779	24,456	24,456	24,456	24,456	24,456
Aggregation A-IV[2]	428,561	394,935	371,315	319,138	319,138	23,190	23,190	23,190	23,190	23,190
Aggregation A-V[1]	330,223	304,778	281,138	241,656	241,656	17,548	17,548	17,548	17,548	17,548
Aggregation A-VI[2]	300,906	277,298	260,713	224,078	224,078	16,282	16,282	16,282	16,282	16,282
130 Percent Grain and Livestock										
Aggregation A-I[1]	149,558	144,721	136,983	95,932	101,802	64,482	55,776	25,790	25,790	25,790
Aggregation A-II[2]	112,516	110,286	106,718	98,763	104,580	42,364	38,350	24,524	24,524	24,524
Aggregation A-III[1]	141,827	137,241	129,904	90,974	96,457	61,144	52,889	24,456	24,456	24,456
Aggregation A-IV[2]	108,499	106,390	103,017	95,496	99,883	40,058	36,263	23,190	23,190	23,190
Aggregation A-V[1]	101,771	98,480	93,214	65,277	69,211	43,876	37,952	17,548	17,548	17,548
Aggregation A-VI[2]	76,180	74,699	72,330	67,051	70,131	28,126	25,461	16,282	16,282	16,282

[1] Refers to 1958 observed farm size distribution.

[2] Refers to 1975 projected farm size distribution.

APPENDIX VIII-B, TABLE B.3.1

PRODUCTION OF COTTON AND FEED GRAINS, AND NET REVENUE REALIZED, BY FEED GRAIN AND LIVESTOCK PRICE LEVELS WITH FIVE COTTON PRICES; AND RELEVANT ELASTICITY ESTIMATES WITH RESPECT TO CHANGING COTTON PRICES: INCLUDED RESPONDENT RESOURCES, ROLLING PLAINS OF OKLAHOMA AND TEXAS, AGGREGATION B-III

Item	Price of Cotton Per Hundredweight Lint								
	$13.20		$17.60		$22.00		$26.40		$30.80
70 Percent Feed Grain and Livestock Prices									
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		38,971,178		75,074,887		115,305,629		157,140,421
Income Flexibility		1.033		2.849		2.324		1.996	
100 Percent Feed Grain and Livestock Prices									
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		32,196,326		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 and Livestock Prices									
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		6.948		0.557	
Feed Grain									
Acres	3,950,827		3,991,286		3,522,686		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 VIII-B, TABLE B.3.2

LIVESTOCK NUMBERS BY CROP AND LIVESTOCK PRICES FOR INCLUDED RESOURCES, TWO RESPONSE LEVELS, FOR INCLUDED RESOURCES, ROLLING PLAINS OF OKLAHOMA AND TEXAS AGGREGATION B-III

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	18,908	16,795
Total Included Resources					
Cows					
70 Percent Grain and Livestock	83,768	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	30,833	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	1,190,068	1,087,640	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 VIII-B, TABLE B.3.3

TOTAL LABOR HIRED FOR AGGREGATION B-III WITH FIVE COTTON PRICES, BY FEED GRAIN-LIVESTOCK PRICE LEVELS, ROLLING PLAINS OF OKLAHOMA AND TEXAS

Feed Grain-Livestock Price and Item	Price of Cotton Per Hundredweight Lint				
	$13.20	$17.60	$22.00	$26.40	$30.80
			- Hours of Labor -		
70 Percent Feed Grain-Livestock Price Level					
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	3,369,005	17,403,817	23,920,455	28,429,648	28,576,011
100 Percent Feed Grain-Livestock Price Level					
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 Price Level					
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 VIII-B, TABLE B.4.1

PRODUCTION OF COTTON AND FEED GRAINS, AND NET REVENUE REALIZED, BY FEED GRAIN AND LIVESTOCK
PRICE LEVELS WITH FIVE COTTON PRICES; AND RELEVANT ELASTICITY ESTIMATES WITH RESPECT
TO CHANGING COTTON PRICES: INCLUDED RESPONDENT RESOURCES,
ROLLING PLAINS OF OKLAHOMA AND TEXAS,
AGGREGATION B-IV

Item	Price of Cotton Per Hundredweight Lint								
	$13.20		$17.60		$22.00		$26.40		$30.80
70 Percent Feed Grain and Livestock Prices									
Cotton									
Acres	124,905		2,644,630		4,075,639		4,539,685		4,558,598
Cwt of Lint	339,680		5,716,846		8,375,542		9,012,387		9,036,043
Elasticity of Supply		6.215		1.698		0.403		0.017	
Feed Grain									
Acres	3,120,569		862,744		79,620		0		0
Cwt	29,167,399		6,896,519		669,949		0		0
Net Revenue	27,386,167		36,633,731		71,022,327		109,238,616		149,013,021
Income Flexibility		1.011		2.875		2.332		2.002	
100 Percent Feed Grain and Livestock Prices									
Cotton									
Acres	32,982		385,386		3,452,846		4,110,141		4,415,447
Cwt of Lint	106,194		1,084,609		7,440,451		8,472,219		8,869,970
Elasticity of Supply		5.751		6.710		0.713		0.298	
Feed Grain									
Acres	3,553,082		3,257,628		1,004,065		339,688		121,071
Cwt	34,525,373		27,686,179		7,536,338		2,652,030		822,787
Net Revenue	61,903,955		63,502,433		81,546,909		116,972,315		155,333,903
Income Flexibility		0.089		1.120		1.963		1.833	
130 Percent Feed Grain and Livestock Prices									
Cotton									
Acres	12,506		55,558		695,968		3,441,574		3,881,669
Cwt of Lint	41,028		144,175		1,660,853		7,531,990		8,193,762
Elasticity of Supply		3.899		7.562		7.025		0.547	
Feed Grain									
Acres	3,831,180		3,870,770		3,424,805		1,077,635		683,996
Cwt	37,221,494		37,578,280		32,730,162		8,190,849		5,019,036
Net Revenue	103,880,175		104,101,078		109,035,568		130,746,620		165,841,420
Income Flexibility		0.007		0.208		0.996		1.538	

APPENDIX VIII-B, TABLE B.4.2

LIVESTOCK NUMBERS BY CROP AND LIVESTOCK PRICE LEVELS FOR INCLUDED RESOURCES, ROLLING PLAINS OF OKLAHOMA AND TEXAS
AGGREGATION B-IV

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 -		
Full Response Resources					
Cows					
70 Percent Grain and Livestock	74,999	83,572	87,096	87,096	87,096
100 Percent Grain and Livestock	42,204	39,885	73,312	69,517	69,821
130 Percent Grain and Livestock	23,774	27,253	27,253	50,475	65,992
Feeders					
70 Percent Grain and Livestock	362,579	112,474	16,307	0	0
100 Percent Grain and Livestock	1,096,446	1,082,589	745,676	395,790	359,333
130 Percent Grain and Livestock	1,258,974	1,208,243	1,165,401	583,553	464,472
Limited Response Resources					
Cows					
70 Percent Grain and Livestock	4,701	4,168	3,503	3,503	3,430
100 Percent Grain and Livestock	4,611	4,611	4,746	4,949	4,987
130 Percent Grain and Livestock	3,120	3,120	3,147	3,599	3,599
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	36,108	35,233	33,933	19,069	16,860
Total Included Resources					
Cows					
70 Percent Grain and Livestock	79,700	87,740	90,599	90,599	90,526
100 Percent Grain and Livestock	46,815	44,496	78,058	74,466	74,808
130 Percent Grain and Livestock	26,894	30,373	30,400	54,074	69,591
Feeders					
70 Percent Grain and Livestock	362,579	112,474	16,307	0	0
100 Percent Grain and Livestock	1,108,294	1,094,437	753,595	398,775	361,475
130 Percent Grain and Livestock	1,295,082	1,243,476	1,199,334	602,622	481,332

APPENDIX VIII-B, TABLE B.4.3

TOTAL LABOR HIRED FOR AGGREGATION B-IV WITH FIVE COTTON PRICES, BY FEED GRAIN-LIVESTOCK PRICE LEVELS, ROLLING PLAINS OF OKLAHOMA AND TEXAS

Feed Grain-Livestock Price and Item	Price of Cotton Per Hundredweight Lint				
	$13.20	$17.60	$22.00	$26.40	$30.80
			- Hours of Labor -		
70 Percent Feed Grain-Livestock Price Level					
Hourly Labor	2,757,865	4,302,514	4,313,546	6,387,534	6,441,512
Custom Cotton Hoeing	299,262	6,955,374	10,445,714	11,668,932	11,718,208
Custom Cotton Harvest	249,810	5,289,260	8,151,278	9,079,370	9,117,196
Total	3,306,937	16,547,148	22,910,538	27,135,836	27,276,916
100 Percent Feed Grain-Livestock Price Level					
Hourly Labor	3,038,902	3,946,700	5,730,500	5,981,813	7,348,700
Custom Cotton Hoeing	105,740	1,410,826	9,230,128	10,605,160	11,315,956
Custom Cotton Harvest	65,964	770,772	6,905,692	8,220,282	8,830,894
Total	3,210,606	6,128,298	21,866,320	24,807,255	27,495,550
130 Percent Feed Grain-Livestock Price Level					
Hourly Labor	3,019,876	3,003,006	3,299,949	5,708,772	5,897,322
Custom Cotton Hoeing	49,004	147,904	2,667,256	9,089,724	10,239,228
Custom Cotton Harvest	25,012	111,116	1,391,936	6,883,148	7,763,338
Total	3,093,892	3,262,026	7,359,141	21,681,644	23,899,888

APPENDIX VIII-B, TABLE B.5.1

PRODUCTION OF COTTON AND FEED GRAINS, AND NET REVENUE REALIZED, BY FEED GRAIN AND LIVESTOCK PRICE LEVELS WITH FIVE COTTON PRICES; AND RELEVANT ELASTICITY ESTIMATES WITH RESPECT TO CHANGING COTTON PRICES: INCLUDED RESPONDENT RESOURCES, ROLLING PLAINS OF OKLAHOMA AND TEXAS, AGGREGATION B-V

	Price of Cotton Per Hundredweight Lint								
Item	$13.20		$17.60		$22.00		$26.40		$30.80
70 Percent Feed Grain and Livestock Prices									
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
Elasticity 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 and Livestock Prices									
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 and Livestock Prices									
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 VIII-B, TABLE B.5.2

LIVESTOCK NUMBERS BY CROP AND LIVESTOCK PRICES FOR INCLUDED RESOURCES, ROLLING PLAINS OF OKLAHOMA AND TEXAS AGGREGATION B-V

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 -		
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 VIII-B, TABLE B.5.3

TOTAL LABOR HIRED FOR AGGREGATION B-V WITH FIVE COTTON PRICES, BY FEED GRAIN-LIVESTOCK PRICE LEVELS, ROLLING PLAINS OF OKLAHOMA AND TEXAS

Feed Grain-Livestock Price and Item	Price of Cotton Per Hundredweight Lint				
	$13.20	$17.60	$22.00	$26.40	$30.80
			- Hours of Labor -		
70 Percent Feed Grain-Livestock Price Level					
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 Price Level					
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 Price Level					
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 VIII-B, TABLE B.6.1

PRODUCTION OF COTTON AND FEED GRAINS, AND NET REVENUE REALIZED, BY FEED GRAIN AND LIVESTOCK PRICE LEVELS WITH FIVE COTTON PRICES; AND RELEVANT ELASTICITY ESTIMATES WITH RESPECT TO CHANGING COTTON PRICES: INCLUDED RESPONDENT RESOURCES, ROLLING PLAINS OF OKLAHOMA AND TEXAS, AGGREGATION B-VI

	Price of Cotton Per Hundredweight								
Item	$13.20		$17.60		$22.00		$26.40		$30.80
70 Percent Feed Grain and Livestock Prices									
Cotton									
Acres	136,277		2,415,077		4,082,556		4,441,716		4,558,439
Cwt of Lint	363,174		5,201,033		8,390,972		8,893,342		9,035,926
Elasticity of Supply		6.086		2.112		0.320		0.103	
Feed Grain									
Acres	2,861,279		993,586		79,606		0		0
Cwt	26,751,399		7,902,980		669,840		0		0
Net Revenue	26,510,354		35,421,221		70,839,965		108,936,813		148,789,273
Income Flexibility		1.007		3.000		2.331		2.010	
100 Percent Feed Grain and Livestock Prices									
Cotton									
Acres	53,644		376,265		2,534,404		4,121,192		4,423,136
Cwt of Lint	177,449		1,015,866		7,586,153		8,490,842		8,884,081
Elasticity of Supply		4.918		6.874		0.619		0.294	
Feed Grain									
Acres	3,622,206		3,346,794		943,798		358,193		147,622
Cwt	34,931,492		33,283,332		6,990,258		2,652,156		1,187,464
Net Revenue	58,984,039		60,604,493		80,836,842		115,915,487		154,543,759
Income Flexibility		0.095		1.287		1.961		1.857	
130 Percent Feed Grain and Livestock Prices									
Cotton									
Acres	13,762		68,835		719,230		3,541,230		3,973,011
Cwt of Lint	43,913		181,609		1,718,674		7,685,046		8,294,039
Elasticity of Supply		4.274		7.280		6.979		0.495	
Feed Grain									
Acres	3,987,869		4,001,508		3,513,630		1,034,055		608,200
Cwt	38,354,445		38,382,317		33,383,534		7,741,221		4,566,815
Net Revenue	101,260,898		101,273,551		106,330,685		129,958,751		157,800,303
Income Flexibility		0.0		0.220		1.100		1.258	

APPENDIX VIII-B, TABLE B.6.2

LIVESTOCK NUMBERS BY CROP AND LIVESTOCK PRICE LEVELS FOR INCLUDED RESOURCES, ROLLING PLAINS OF OKLAHOMA AND TEXAS AGGREGATION B-VI

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	52,656	61,269	63,742	63,742	63,742
100 Percent Grain and Livestock	29,632	28,004	51,473	48,810	49,023
130 Percent Grain and Livestock	16,692	19,135	19,135	35,438	46,333
Feeders					
70 Percent Grain and Livestock	254,557	78,964	11,450	0	0
100 Percent Grain and Livestock	769,894	760,840	331,612	277,875	252,512
130 Percent Grain and Livestock	863,916	848,298	818,217	409,704	326,094
Limited Response Resources					
Cows					
70 Percent Grain and Livestock	29,013	25,725	21,619	21,619	21,619
100 Percent Grain and Livestock	28,456	28,456	29,290	30,542	30,774
130 Percent Grain and Livestock	19,263	19,263	19,430	22,216	22,216
Feeders					
70 Percent Grain and Livestock	0	0	0	0	0
100 Percent Grain and Livestock	73,046	73,046	48,824	18,402	13,208
130 Percent Grain and Livestock	152,770	217,361	209,339	117,080	103,976
Total Included Resources					
Cows					
70 Percent Grain and Livestock	81,669	86,994	85,361	85,361	85,361
100 Percent Grain and Livestock	58,088	56,460	80,763	79,352	79,797
130 Percent Grain and Livestock	35,955	38,398	38,565	57,654	68,549
Feeders					
70 Percent Grain and Livestock	254,557	78,964	11,450	0	0
100 Percent Grain and Livestock	842,940	833,886	380,436	296,277	265,720
130 Percent Grain and Livestock	1,106,686	1,065,659	1,027,556	526,784	430,070

APPENDIX VIII-B, TABLE B.6.3

TOTAL LABOR HIRED FOR AGGREGATION B-VI WITH FIVE COTTON PRICES, BY FEED GRAIN-LIVESTOCK PRICE LEVELS, ROLLING PLAINS OF OKLAHOMA AND TEXAS

Feed Grain-Livestock Price and Item	Price of Cotton Per Hundredweight Lint				
	$13.20	$17.60	$22.00	$26.40	$30.80
			- Hours of Labor -		
70 Percent Feed Grain-Livestock Price Level					
Hourly Labor	2,319,653	3,510,224	4,192,674	5,678,037	6,019,499
Custom Cotton Hoeing	324,074	6,380,452	10,459,482	11,381,326	11,717,796
Custom Cotton Harvest	272,554	4,830,154	8,165,112	8,883,432	9,116,878
Total	2,916,281	14,720,830	22,817,268	25,942,795	26,854,173
100 Percent Feed Grain-Livestock Price Level					
Hourly Labor	2,726,086	3,210,325	5,462,356	5,651,624	6,832,515
Custom Cotton Hoeing	149,824	1,341,424	9,363,178	10,600,252	11,365,780
Custom Cotton Harvest	107,288	752,530	7,068,808	8,242,384	8,846,272
Total	2,983,198	5,304,279	21,894,342	24,494,260	27,044,567
130 Percent Feed Grain-Livestock Price Level					
Hourly Labor	2,820,772	2,867,485	3,146,975	5,622,715	5,824,773
Custom Cotton Hoeing	48,752	174,458	2,713,714	9,315,142	10,396,276
Custom Cotton Harvest	27,524	137,670	1,438,460	7,082,460	7,946,022
Total	2,897,048	3,179,613	7,299,149	22,020,317	24,167,071

APPENDIX VIII-B, TABLE B.7.1

ACREAGE OF CROPLAND RESEEDED TO PERMANENT PASTURE BY FEED GRAIN-LIVESTOCK AND COTTON PRICE LEVELS, AND BY RESPONSE LEVELS, AGGREGATIVE MODEL B, ROLLING PLAINS OF OKLAHOMA AND TEXAS

Feed Grain-Livestock Price Level and Aggregation Number	- Full Response Resources - Cotton Price Per Hundredweight					- Limited Response Resources - Cotton Price Per Hundredweight				
	$13.20	$17.60	$22.00	$26.40	$30.80	$13.20	$17.60	$22.00	$26.40	$30.80
					- Acres -					
70 Percent Grain and Livestock										
Aggregation B-I[1]	277,966	277,966	65,192	65,192	65,192	0	0	0	0	0
Aggregation B-II[2]	264,316	264,316	61,992	61,992	61,992	0	0	0	0	0
Aggregation B-III[1]	263,576	263,576	61,818	61,818	61,818	0	0	0	0	0
Aggregation B-IV[2]	249,926	249,926	58,618	58,618	58,618	0	0	0	0	0
Aggregation B-V[1]	189,132	189,132	44,358	44,358	44,358	0	0	0	0	0
Aggregation B-VI[2]	175,482	175,482	41,157	41,157	41,157	0	0	0	0	0
100 Percent Grain and Livestock										
Aggregation B-I[1]	490,712	453,316	418,577	360,550	360,550	0	0	0	0	0
Aggregation B-II[2]	453,231	417,672	392,693	337,514	337,514	0	0	0	0	0
Aggregation B-III[1]	460,207	424,746	391,805	336,779	336,779	1,336	1,336	1,336	1,336	1,336
Aggregation B-IV[2]	428,561	394,935	371,315	319,138	319,138	1,336	1,336	1,336	1,336	1,336
Aggregation B-V[1]	330,223	304,778	281,138	241,656	241,656	8,242	8,242	8,242	8,242	8,242
Aggregation B-VI[2]	300,906	277,298	260,713	224,078	224,078	8,242	8,242	8,242	8,242	8,242
130 Percent Grain and Livestock										
Aggregation B-I[1]	149,558	144,721	136,983	95,932	101,802	0	0	0	0	0
Aggregation B-II[2]	112,516	110,286	106,718	98,763	104,580	0	0	0	0	0
Aggregation B-III[1]	141,827	137,241	129,904	90,974	96,457	3,340	2,889	1,336	1,336	1,336
Aggregation B-IV[2]	108,499	106,390	103,017	95,496	99,883	2,308	2,089	1,336	1,336	1,336
Aggregation B-V[1]	101,771	98,480	93,214	65,277	69,211	20,610	17,827	8,242	8,242	8,242
Aggregation B-VI[2]	76,180	74,699	72,330	67,051	70,131	14,238	12,889	8,242	8,242	8,242

---

[1] Refers to 1958 observed farm size distribution.

[2] Refers to 1975 projected farm size distribution.

APPENDIX VIII-B, TABLE B.7.2

ACREAGE OF CROPLAND RESEEDED TO PERMANENT PASTURE, BY FEED GRAIN-LIVESTOCK AND COTTON PRICE LEVELS, TOTAL FOR BOTH RESPONSE LEVLES, MODEL B AGGREGATIONS, ROLLING PLAINS OF OKLAHOMA AND TEXAS

Feed Grain-Livestock Price Level and Aggregation Number	Price of Cotton Per Hundredweight Lint				
	$13.20	$17.60	$22.00	$26.40	$30.80
			- Acres -		
70 Percent Grain and Livestock					
Aggregation B-I	277,966	277,966	65,192	65,192	65,192
Aggregation B-II	264,316	264,316	61,992	61,992	61,992
Aggregation B-III	263,576	263,576	61,818	61,818	61,818
Aggregation B-IV	249,926	249,926	58,618	58,618	58,618
Aggregation B-V	189,132	189,132	44,358	44,358	44,358
Aggregation B-VI	175,482	175,482	41,157	41,157	41,157
100 Percent Grain and Livestock					
Aggregation B-I	490,712	453,316	418,577	360,550	360,550
Aggregation B-II	453,231	417,672	392,693	337,514	337,514
Aggregation B-III	461,543	426,082	393,141	338,115	338,115
Aggregation B-IV	429,897	396,271	372,651	320,474	320,474
Aggregation B-V	338,465	313,020	289,380	249,898	249,898
Aggregation B-VI	309,148	285,540	268,955	232,320	232,320
130 Percent Grain and Livestock					
Aggregation B-I	149,558	144,721	136,983	95,932	101,802
Aggregation B-II	112,516	110,286	106,718	98,763	104,580
Aggregation B-III	145,167	140,130	131,240	92,310	97,793
Aggregation B-IV	110,807	108,479	104,353	96,832	101,219
Aggregation B-V	122,381	116,307	101,456	73,519	77,453
Aggregation B-VI	90,418	88,937	80,572	75,293	78,373

APPENDIX VIII-C, TABLE C.3.1

PRODUCTION OF COTTON AND FEED GRAINS, AND NET REVENUE REALIZED, BY FEED GRAIN AND LIVESTOCK PRICE LEVELS FOR SIX PERCENT CAPITAL COSTS WITH FIVE COTTON PRICES; AND RELEVANT ELASTICITY ESTIMATES WITH RESPECT TO CHANGING COTTON PRICES: INCLUDED RESPONDENT RESOURCES, ROLLING PLAINS OF OKLAHOMA AND TEXAS
AGGREGATION C-III

Item	Price of Cotton Per Hundredweight Lint								
	$13.20		$17.60		$22.00		$26.40		$30.80
70 Percent Feed Grain and Livestock Prices									
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 and Livestock Prices									
Cotton									
Acres	751,833		1,054,795		3,595,384 [A]		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		86,337,77[illegible]		122,976,166		162,056,527
Income Flexibility		0.480		1.301		1.926		1.783	
130 Percent Grain and Livestock Prices									
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	

[A] Boxed area indicates 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 VIII-C, TABLE C.3.2

PRODUCTION OF COTTON AND FEED GRAINS, AND NET REVENUE REALIZED, BY FEED GRAIN AND LIVESTOCK PRICE LEVELS FOR EIGHTEEN PERCENT CAPITAL COSTS WITH FIVE COTTON PRICES; AND RELEVANT ELASTICITY ESTIMATES WITH RESPECT TO CHANGING COTTON PRICES: INCLUDED RESPONDENT RESOURCES, ROLLING PLAINS OF OKLAHOMA AND TEXAS
AGGREGATION C-III

Item	Price of Cotton Per Hundredweight Lint								
	$13.20		$17.60		$22.00		$26.40		$30.80
70 Percent Feed Grain and Livestock Prices									
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 and Livestock Prices									
Cotton						[A]			
Acres	882,920		1,107,609		3,909,382		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 and Livestock Prices									
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	

[A] Boxed area indicates 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	781,876	Acres	166,815
Cwt Lint	1,662,326	Cwt	1,186,533

APPENDIX VIII-C, TABLE C.3.3

LIVESTOCK NUMBERS BY CROP AND LIVESTOCK PRICES FOR TWO CAPITAL COST LEVELS FOR INCLUDED RESPONSIVE RESOURCES, ROLLING PLAINS OF OKLAHOMA AND TEXAS 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 -		
6 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[A]	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[A]	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[A]	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[A]	76,618	63,617
130 Percent Grain and Livestock	608,546	591,487	546,251	322,438	289,824

[A] 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.

APPENDIX VIII-C, TABLE C.3.4

TOTAL LABOR HIRED FOR AGGREGATION C-III WITH FIVE COTTON PRICES, BY CAPITAL COST AND FEED GRAIN-LIVESTOCK PRICE LEVELS, ROLLING PLAINS OF OKLAHOMA AND TEXAS

Capital Cost Level, Feed Grain-Livestock Price, and Item	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 Price Level					
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	23,532,298	27,375,667	27,375,839
100 Percent Feed Grain-Livestock Price Level					
Hourly Labor	3,674,957	4,022,847	5,969,283[A]	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	25,511,386	27,553,234
130 Percent Feed Grain-Livestock Price Level					
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	10,595,073	22,537,342	24,536,484
Eighteen Percent Capital Cost					
70 Percent Feed Grain-Livestock Price Level					
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	26,164,360
100 Percent Feed Grain-Livestock Price Level					
Hourly Labor	2,591,157	3,148,674	4,918,574[A]	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	24,522,105	26,349,050
130 Percent Feed Grain-Livestock Price Level					
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

[A] Boxed areas indicate labor hired at assumed equilibrium position.

APPENDIX VIII-C, TABLE C.4.1

PRODUCTION OF COTTON AND FEED GRAINS, AND NET REVENUE REALIZED, BY FEED GRAIN AND LIVESTOCK PRICE LEVELS FOR SIX PERCENT CAPITAL COSTS WITH FIVE COTTON PRICES; AND RELEVANT ELASTICITY ESTIMATES WITH RESPECT TO CHANGING COTTON PRICES: INCLUDED RESPONDENT RESOURCES, ROLLING PLAINS OF OKLAHOMA AND TEXAS
AGGREGATION C-IV

	Price of Cotton Per Hundredweight Lint								
Item	$13.20		$17.60		$22.00		$26.40		$30.80
70 Percent Feed Grain and Livestock Prices									
Cotton									
Acres	785,397		2,838,534		3,946,679		4,334,146		4,334,146
Cwt of Lint	1,750,536		6,135,528		8,180,260		8,710,511		8,710,511
Elasticity of Supply		3.892		1.285		0.345		0.0	
Feed Grain									
Acres	2,743,080		884,279		266,799		203,113		203,113
Cwt	25,648,432		6,889,584		2,064,006		1,528,134		1,528,134
Net Revenue	22,230,173		36,202,705		70,076,166		107,187,407		145,507,067
Income Flexibility		1.674		2.869		2.303		1.971	
100 Percent Feed Grain and Livestock Prices									
Cotton									
Acres	710,584		997,051		3,436,982 [A]		3,973,675		4,218,423
Cwt of Lint	1,556,365		2,359,708		7,412,156		8,257,119		8,575,988
Elasticity of Supply		1.436		4.654		0.593		0.246	
Feed Grain									
Acres	3,034,762		2,795,316		1,015,564		467,169		295,850
Cwt	29,044,309		26,289,997		7,640,673		3,649,476		2,129,812
Net Revenue	53,276,938		61,074,962		81,750,358		116,610,686		153,780,050
Income Flexibility		0.477		1.303		1.933		1.787	
130 Percent Feed Grain and Livestock Prices									
Cotton									
Acres	697,206		729,782		1,240,534		3,425,163		3,778,520
Cwt of Lint	1,514,803		1,591,978		2,802,074		7,487,114		8,021,760
Elasticity of Supply		0.174		2.479		5.009		0.448	
Feed Grain									
Acres	3,243,677		3,279,360		2,929,099		1,071,837		761,965
Cwt	31,128,944		31,465,216		27,610,322		8,149,409		5,612,772
Net Revenue	88,667,595		96,659,298		107,107,436		129,728,096		165,299,573
Income Flexibility		0.302		0.461		1.051		1.567	

[A] Boxed area indicates 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	687,396	Acres	203,113
Cwt Lint	1,482,431	Cwt	1,538,134

APPENDIX VIII-C, TABLE C.4.2

PRODUCTION OF COTTON AND FEED GRAINS, AND NET REVENUE REALIZED, BY FEED GRAIN AND LIVESTOCK PRICE LEVELS FOR EIGHTEEN PERCENT CAPITAL COSTS WITH FIVE COTTON PRICES; AND RELEVANT ELASTICITY ESTIMATES WITH RESPECT TO CHANGING COTTON PRICES: INCLUDED RESPONDENT RESOURCES, ROLLING PLAINS OF OKLAHOMA AND TEXAS AGGREGATION C-IV

Item	Price of Cotton Per Hundredweight Lint								
	$13.20		$17.60		$22.00		$26.40		$30.80
70 Percent Feed Grain and Livestock Prices									
Cotton									
Acres	875,822		2,244,612		4,024,680		4,114,266		4,392,100
Cwt of Lint	1,920,704		4,774,135		8,327,761		8,476,121		8,814,473
Elasticity of Supply		2.983		2.441		0.097		0.254	
Feed Grain									
Acres	1,899,380		1,007,363		224,095		160,409		160,409
Cwt	17,987,538		9,361,111		1,677,432		1,141,560		1,141,560
Net Revenue	19,005,488		32,477,429		69,372,509		106,989,553		146,166,968
Income Flexibility		1.832		3.260		2.346		2.012	
100 Percent Feed Grain and Livestock Prices									
Cotton									
Acres	827,224		1,029,371		3,726,748[A]		4,063,384		4,298,641
Cwt of Lint	1,862,170		2,270,947		7,929,333		8,413,663		8,719,814
Elasticity of Supply		0.692		4.992		0.326		0.232	
Feed Grain									
Acres	3,188,595		3,006,025		802,043		481,929		328,588
Cwt	30,516,807		31,450,290		5,707,801		3,264,063		2,779,515
Net Revenue	38,131,036		47,017,728		75,451,393		110,267,336		150,401,284
Income Flexibility		0.733		2.090		2.062		2.001	
130 Percent Feed Grain and Livestock Prices									
Cotton									
Acres	758,728		825,548		1,364,756		3,766,342		4,095,953
Cwt of Lint	1,626,448		1,801,738		3,070,017		8,016,661		8,410,131
Elasticity of Supply		0.358		2.343		4.908		0.311	
Feed Grain									
Acres	3,646,288		3,608,264		3,138,873		905,727		504,163
Cwt	33,962,124		33,364,256		29,080,497		6,488,595		3,943,286
Net Revenue	78,854,831		85,490,444		95,768,140		126,239,504		161,355,486
Income Flexibility		0.283		0.557		1.454		1.587	

[A] Boxed area indicates 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	745,350	Acres	160,409
Cwt Lint	1,585,867	Cwt	1,141,560

APPENDIX VIII-C, TABLE C.4.3

LIVESTOCK NUMBERS BY CROP AND LIVESTOCK PRICES FOR TWO CAPITAL COST LEVELS FOR INCLUDED RESPONSIVE RESOURCES, ROLLING PLAINS OF OKLAHOMA AND TEXAS AGGREGATION C-IV

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 -				
6 Percent Capital Cost					
Cows					
70 Percent Grain and Livestock	78,917	86,171	89,151	89,151	89,151
100 Percent Grain and Livestock	51,172	49,209	77,532[A]	72,497	74,538
130 Percent Grain and Livestock	35,581	38,524	38,524	58,169	71,298
Feeders					
70 Percent Grain and Livestock	407,350	195,757	114,401	100,605	100,605
100 Percent Grain and Livestock	1,028,226	1,016,503	503,023[A]	435,441	404,599
130 Percent Grain and Livestock	1,165,733	1,033,546	1,086,815	594,295	493,547
18 Percent Capital Cost					
Cows					
70 Percent Grain and Livestock	86,482	78,657	68,886	68,886	68,886
100 Percent Grain and Livestock	85,152	87,139	87,139[A]	90,119	90,673
130 Percent Grain and Livestock	63,274	63,274	63,670	69,229	70,299
Feeders					
70 Percent Grain and Livestock	29,054	29,054	29,054	29,054	29,054
100 Percent Grain and Livestock	202,920	202,920	145,270[A]	72,857	60,494
130 Percent Grain and Livestock	570,067	505,868	527,313	307,655	252,549

[A] 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: 15,466 cows, and 100,605 feeders,
18 percent capital: 17,428 cows, and 29,054 feeders.

APPENDIX VIII-C, TABLE C.4.4

TOTAL LABOR HIRED FOR AGGREGATION C-IV WITH FIVE COTTON PRICES, BY CAPITAL COST AND FEED GRAIN-LIVESTOCK PRICE LEVELS, ROLLING PLAINS OF OKLAHOMA AND TEXAS

Capital Cost Level, Feed Grain-Livestock Price, and Item	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 Price Level					
Hourly Labor	3,520,377	4,730,849	4,635,864	5,217,850	6,384,763
Custom Cotton Hoeing	2,069,226	7,473,104	10,187,725	11,207,900	11,207,900
Custom Cotton Harvest	1,571,115	5,676,068	7,893,359	8,668,294	8,668,294
Total	7,160,718	17,881,021	22,716,948	26,260,460	26,260,957
100 Percent Feed Grain-Livestock Price Level					
Hourly Labor	3,645,677	3,960,065	5,832,085 [A]	6,002,737	7,105,357
Custom Cotton Hoeing	1,911,432	2,972,885	9,168,330	10,318,232	10,878,357
Custom Cotton Harvest	1,421,169	1,994,103	6,873,964	7,947,351	8,436,847
Total	6,978,278	8,927,053	21,874,379	24,268,320	26,420,561
130 Percent Feed Grain-Livestock Price Level					
Hourly Labor	3,612,879	3,590,631	3,829,787	5,386,520	5,904,083
Custom Cotton Hoeing	1,872,904	1,947,868	3,960,141	9,070,357	10,000,512
Custom Cotton Harvest	1,394,412	1,459,566	2,481,068	6,850,327	7,557,041
Total	6,880,195	6,998,064	10,270,996	21,307,204	23,452,836
Eighteen Percent Capital Cost					
70 Percent Feed Grain-Livestock Price Level					
Hourly Labor	1,995,792	2,280,484	4,092,393	4,197,655	4,986,110
Custom Cotton Hoeing	2,255,641	5,996,857	10,343,724	10,522,897	11,323,806
Custom Cotton Harvest	1,751,643	4,489,702	8,049,358	8,228,531	8,784,200
Total	6,003,076	12,767,043	22,485,475	22,949,083	25,094,116
100 Percent Feed Grain-Livestock Price Level					
Hourly Labor	2,558,609	3,089,445	4,830,781 [A]	4,865,155	5,459,262
Custom Cotton Hoeing	2,152,559	2,892,340	9,747,862	10,420,908	11,136,663
Custom Cotton Harvest	1,654,448	2,058,741	7,453,496	8,126,766	8,597,281
Total	6,365,616	8,040,526	22,032,139	23,412,829	25,193,206
130 Percent Feed Grain-Livestock Price Level					
Hourly Labor	2,847,980	2,986,537	3,195,959	5,302,476	5,489,548
Custom Cotton Hoeing	1,988,100	2,139,338	4,208,633	9,827,049	10,562,786
Custom Cotton Harvest	1,517,456	1,651,094	2,729,512	7,532,683	8,191,696
Total	6,353,536	6,776,969	10,134,104	22,662,208	24,244,030

[A] Boxed areas indicate labor hired at assumed equilibrium position.

APPENDIX VIII-C, TABLE C.5.1

PRODUCTION OF COTTON AND FEED GRAINS, AND NET REVENUE REALIZED, BY FEED GRAIN AND LIVESTOCK PRICE LEVELS FOR SIX PERCENT CAPITAL COSTS WITH FIVE COTTON PRICES; AND RELEVANT ELASTICITY ESTIMATES WITH WITH RESPECT TO CHANGING COTTON PRICES: INCLUDED RESPONDENT RESOURCES, ROLLING PLAINS OF OKLAHOMA AND TEXAS
AGGREGATION C-V

Item	Price of Cotton Per Hundredweight Lint								
	$13.20		$17.60		$22.00		$26.40		$30.80
70 Percent Feed Grain and Livestock Prices									
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		0.689		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 and Livestock Prices									
Cotton									
Acres	1,818,164		2,007,516		3,595,384[A]		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,[illegible]51,626		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 and Livestock Prices									
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 Flexibiltiy		0.744		0.891		1.263		1.485	

[A] Boxed area indicates the assumed position of equilibrium. As prices depart from these levels, 50% 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	3,872,714	Cwt	3,960,146

APPENDIX VIII-C, TABLE C.5.2

PRODUCTION OF COTTON AND FEED GRAINS, AND NET REVENUE REALIZED, BY FEED GRAIN AND LIVESTOCK PRICE LEVELS FOR EIGHTEEN PERCENT CAPITAL COSTS WITH FIVE COTTON PRICES; AND RELEVANT ELASTICITY ESTIMATES WITH RESPECT TO CHANGING COTTON PRICES: INCLUDED RESPONDENT RESOURCES, ROLLING PLAINS OF OKLAHOMA AND TEXAS AGGREGATION C-V

Item	Price of Cotton Per Hundredweight Lint								
	$13.20		$17.60		$22.00		$26.40		$30.80
70 Percent Feed Grain and Livestock Prices									
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 and Livestock Prices									
Cotton									
Acres	2,017,844		2,158,274		3,909,382[A]		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		82,306,747		119,272,159		158,157,223
Income Flexibiltiy		1.632		2.093		2.017		1.822	
130 Percent Feed Grain and Livestock Prices									
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	

[A] Boxed area indicates the assumed position of equilibrium. As prices depart from these levels, 50% 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	417,038
Cwt Lint	4,155,816	Cwt	2,966,332

APPENDIX VIII-C, TABLE C.5.3

LIVESTOCK NUMBERS BY CROP AND LIVESTOCK PRICES FOR TWO CAPITAL COST LEVELS FOR INCLUDED RESPONSIVE RESOURCES, ROLLING PLAINS OF OKLAHOMA AND TEXAS AGGREGATION C-V

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		
6 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[A]	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[A]	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[A]	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[A]	105,174	97,048
130 Percent Grain and Livestock	437,629	426,967	398,694	258,812	238,428

[A] 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: 45,702 cows, and 76,384 feeders.

APPENDIX VIII-C, TABLE C.5.4

TOTAL LABOR HIRED FOR AGGREGATION C-V WITH FIVE COTTON PRICES BY CAPITAL COST AND FEED GRAIN-LIVESTOCK PRICE LEVELS, ROLLING PLAINS OF OKLAHOMA AND TEXAS

Capital Cost Level, Feed Grain-Livestock Price, and Item	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 Price Level					
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 Price Level					
Hourly Labor	4,535,330	4,752,762	5,969,283[A]	6,167,700	6,571,666
Custom Cotton Hoeing	4,593,406	5,293,170	9,063,608	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	25,554,869
130 Percent Feed Grain-Livestock Price Level					
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	12,798,356	14,955,794	22,419,710	23,669,175
Eighteen Percent Capital Cost					
70 Percent Feed Grain-Livestock Price Level					
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	24,999,897
100 Percent Feed Grain-Livestock Price Level					
Hourly Labor	3,463,938	3,812,386	4,918,574[A]	4,947,748	5,324,823
Custom Cotton Hoeing	5,267,897	5,769,262	10,231,604	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	23,940,724	25,081,509
130 Percent Feed Grain-Livestock Price Level					
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

[A] Boxed areas indicate labor hired at assumed equilibrium positions.

APPENDIX VIII-C, TABLE C.6.1

PRODUCTION OF COTTON AND FEED GRAINS AND NET REVENUE REALIZED, BY FEED GRAIN AND LIVESTOCK PRICE LEVELS FOR SIX PERCENT CAPITAL COSTS WITH FIVE COTTON PRICES; AND RELEVANT ELASTICITY ESTIMATES WITH RESPECT TO CHANGING COTTON PRICES: INCLUDED RESPONDENT RESOURCES, ROLLING PLAINS OF OKLAHOMA AND TEXAS

AGGREGATION C-VI

Item	Price of Cotton Per Hundredweight Lint								
	$13.20		$17.60		$22.00		$26.40		$30.80
70 Percent Feed Grain and Livestock Prices									
Cotton									
Acres	1,779,742		3,062,952		3,755,543		3,997,710		3,997,710
Cwt of Lint	3,873,644		6,614,264		7,892,221		8,223,628		8,223,628
Elasticity of Supply		1.829		0.793		0.226		0.0	
Feed Grain									
Acres	2,095,262		933,511		547,586		507,782		507,782
Cwt	18,895,522		7,171,242		4,155,256		3,820,336		3,820,336
Net Revenue	14,243,198		35,206,090		68,607,062		104,040,274		143,211,490
Income Flexibility		2.967		2.896		2.258		2.059	
100 Percent Feed Grain and Livestock Prices									
Cotton									
Acres	1,732,984		1,912,026		3,436,982[A]		3,772,416		3,925,383
Cwt of Lint	3,752,287		4,254,376		7,412,156		7,940,258		8,139,551
Elasticity of Supply		0.439		2.436		0.378		0.161	
Feed Grain									
Acres	2,277,562		2,127,909		1,015,564		675,817		565,742
Cwt	21,019,196		19,296,500		7,640,673		5,146,174		4,196,384
Net Revenue	39,494,354		56,598,178		81,750,358		115,768,121		151,229,031
Income Flexibility		1.246		1.636		1.894		1.727	
130 Percent Feed Grain and Livestock Prices									
Cotton									
Acres	1,724,622		1,744,983		2,064,202		3,429,596		3,650,444
Cwt of Lint	3,726,310		3,774,545		4,530,885		7,459,005		7,793,158
Elasticity of Supply		0.048		0.820		2.686		0.285	
Feed Grain									
Acres	2,408,134		2,430,436		2,211,523		1,050,734		857,064
Cwt	22,320,842		22,531,012		20,121,704		7,958,633		6,373,235
Net Revenue	67,460,442		84,685,314		103,445,458		127,980,950		162,970,240
Income Flexibility		0.792		0.897		1.166		1.563	

[A] Boxed area indicates the assumed position of equilibrium. As prices depart from these levels, 50% 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	1,718,491	Acres	507,782
Cwt Lint	3,706,078	Cwt	3,820,336

APPENDIX VIII-C, TABLE C.6.2

PRODUCTION OF COTTON AND FEED GRAINS, AND NET REVENUE REALIZED, BY FEED GRAIN AND LIVESTOCK PRICE LEVELS FOR SIX PERCENT CAPITAL COSTS WITH FIVE COTTON PRICES; AND RELEVANT ELASTICITY ESTIMATES WITH RESPECT TO CHANGING COTTON PRICES: INCLUDED RESPONDENT RESOURCES, ROLLING PLAINS OF OKLAHOMA AND TEXAS AGGREGATION C-VI

Item	Price of Cotton Per Hundredweight Lint								
	$13.20		$17.60		$22.00		$26.40		$30.80
70 Percent Feed Grain and Livestock Prices									
Cotton									
Acres	1,962,919		2,818,412		3,930,955		3,986,946		4,160,593
Cwt of Lint	4,173,939		5,957,334		8,178,350		8,271,074		8,482,544
Elasticity of Supply		1.232		1.414		0.065		0.164	
Feed Grain									
Acres	1,487,879		930,368		440,826		401,022		401,022
Cwt	13,382,636		7,991,120		3,188,820		2,853,900		2,853,900
Net Revenue	10,844,800		32,348,158		68,715,979		105,025,027		142,654,307
Income Flexibility		3.485		3.239		2.299		1.975	
100 Percent Feed Grain and Livestock Prices									
Cotton									
Acres	1,932,546		2,058,887		3,762,748[A]		3,955,145		4,102,181
Cwt of Lint	4,137,356		4,392,841		7,929,333		8,232,038		8,423,383
Elasticity of Supply		0.210		2.583		0.206		0.149	
Feed Grain									
Acres	2,293,638		2,179,532		802,043		601,972		506,134
Cwt	21,213,430		21,796,856		5,707,801		4,180,464		3,877,622
Net Revenue	25,959,377		44,596,956		75,451,393		110,294,752		148,461,866
Income Flexibility		1.849		2.313		2.063		1.918	
130 Percent Feed Grain and Livestock Prices									
Cotton									
Acres	1,889,736		1,931,498		2,268,503		3,769,494		3,975,501
Cwt of Lint	3,990,029		4,099,586		4,892,260		7,983,912		8,229,831
Elasticity of Supply		0.095		0.793		2.546		0.197	
Feed Grain									
Acres	2,579,696		2,555,932		2,262,562		866,846		615,868
Cwt	23,366,752		22,993,085		20,315,736		6,195,797		4,604,979
Net Revenue	54,572,860		71,803,514		91,935,470		123,438,468		158,469,352
Income Flexibility		0.954		1.107		1.609		1.615	

[A] Boxed area indicates the assumed position of equilibrium. As prices depart from these levels, 50% 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	1,881,374	Acres	401,022
Cwt Lint	3,964,666	Cwt	2,853,900

APPENDIX VIII-C, TABLE C.6.3

LIVESTOCK NUMBERS BY CROP AND LIVESTOCK PRICES FOR TWO CAPITAL COST LEVELS FOR INCLUDED RESPONSIVE RESOURCES, ROLLING PLAINS OF OKLAHOMA AND TEXAS AGGREGATION C-VI

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 -		
6 Percent Capital Cost					
Cows					
70 Percent Grain and Livestock	78,423	82,956	84,819	84,819	84,819
100 Percent Grain and Livestock	60,947	60,856	77,532	74,410	75,686
130 Percent Grain and Livestock	51,338	53,177	53,177	65,456	73,661
Feeders					
70 Percent Grain and Livestock	443,228	310,982	260,134	251,512	251,512
100 Percent Grain and Livestock	831,275	823,948	503,023[A]	460,784	441,508
130 Percent Grain and Livestock	917,217	834,600	867,893	560,068	461,100
18 Percent Capital Cost					
Cows					
70 Percent Grain and Livestock	86,729	81,838	75,731	75,731	75,731
100 Percent Grain and Livestock	85,898	87,139	87,139[A]	89,002	89,348
130 Percent Grain and Livestock	72,224	72,224	72,472	75,946	76,615
Feeders					
70 Percent Grain and Livestock	72,635	72,635	72,635	72,635	72,635
100 Percent Grain and Livestock	181,302	181,302	145,270[A]	100,012	92,285
130 Percent Grain and Livestock	410,768	370,646	384,047	246,760	212,320

[A] 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 remainder maintain constant production. These constants are as follows:

6 percent capital: 38,766 cows, and 251,512 feeders,
18 percent capital: 43,570 cows, and 72,635 feeders.

APPENDIX VIII-C, Table C.6.4

TOTAL LABOR HIRED FOR AGGREGATION C-VI WITH FIVE COTTON PRICES BY CAPITAL COST AND FEED GRAIN-LIVESTOCK PRICE LEVELS, ROLLING PLAINS OF OKLAHOMA AND TEXAS

Capital Cost Level, Feed Grain-Livestock Price, and Item	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 Price Level					
Hourly Labor	4,387,267	5,143,812	5,084,446	6,177,198	6.177,508
Custom Cotton Hoeing	4,731,390	8,108,814	9,805,452	10,443,061	10,443,061
Custom Cotton Harvest	3,559,683	6 125,904	7,511,086	7,995,420	7,995,420
Total	12,678,340	19,378,530	22,400,984	24,615,679	24,615,989
100 Percent Feed Grain-Livestock Price Level					
Hourly Labor	4,465,580	4,662,072	5,832,085 [A]	5,938,742	6,627,880
Custom Cotton Hoeing	4,632,769	5,296,177	9,168,330	9,887,019	10,237,097
Custom Cotton Harvest	3,465,967	3,824,051	6,873,964	7,544,831	7,850,766
Total	12,564,316	13,782,300	21,874,379	23,370,592	24,715,743
130 Percent Feed Grain-Livestock Price Level					
Hourly Labor	4,445,080	4,431,176	4,580,648	5,778,607	5,871,583
Custom Cotton Hoeing	4,608,689	4,655,541	5,913,212	9,107,097	9,688,444
Custom Cotton Harvest	3,449,244	3,489,965	4,128,404	6,859,191	7,300,887
Total	12,503,013	12,576,682	14,622,264	21,519,895	22,860,914
Eighteen Percent Capital Cost					
70 Percent Feed Grain-Livestock Price Level					
Hourly Labor	3,058,912	3,236,845	4,369,288	4,435,077	4,927,862
Custom Cotton Hoeing	5,065,224	7,403,484	10,120,276	10,232,259	10,732,827
Custom Cotton Harvest	3,889,838	5,601,125	7,825,910	7,937,893	8,285,186
Total	12,013,974	16,241,254	22,315,474	22,605,229	23,945,875
100 Percent Feed Grain-Livestock Price Level					
Hourly Labor	3,410,673	3,742,446	4,830,781	4,852,264	5,223,582
Custom Cotton Hoeing	5,000,798	5,463,161	9,747,862 [A]	10,168,516	10,525,863
Custom Cotton Harvest	3,829,091	4,081,774	7,453,496	7,874,290	8,168,362
Total	12,240,562	13,287,381	22,032,139	22,895,070	23,007,807
130 Percent Feed Grain-Livestock Price Level					
Hourly Labor	3,591,530	3,678,128	3,809,017	5,125,590	5,242,510
Custom Cotton Hoeing	4,898,011	4,992,535	6,285,844	9,797,354	10,257,190
Custom Cotton Harvest	3,743,471	3,826,995	4,501,006	7,502,988	7,914,871
Total	12,233,012	12,497.658	14,595,867	22,425,932	23,414,571

[A] Boxed areas indicate labor hired at assumed equilibrium positions.

APPENDIX VIII-C, TABLE C.7.1

ACREAGE OF CROPLAND RESEEDED TO PERMANENT PASTURE BY FEED GRAIN-LIVESTOCK AND COTTON PRICE LEVELS FOR TWO CAPITAL COSTS, AGGREGATIVE MODEL C, ROLLING PLAINS OF OKLAHOMA AND TEXAS

Feed Grain-Livestock Price	6 Percent Capital Cost					18 Percent Capital Cost				
Level and Aggregation Number	$13.20	$17.60	$22.00	$26.40	$30.80	$13.20	$17.60	$22.00	$26.40	$30.80
70 Percent Grain and Livestock										
Aggregation C-I[1]	277,966	277,966	65,192	65,192	65,192	0	0	0	0	0
Aggregation C-II[2]	264,316	264,316	61,992	61,992	61,992	0	0	0	0	0
Aggregation C-III[3]	306,087	306,087	135,869	135,869	135,869	5,158	5,158	5,158	5,158	5,158
Aggregation C-IV[4]	289,992	289,992	128,133	128,133	128,133	4,905	4,905	4,905	4,905	4,905
Aggregation C-V[5]	348,271	348,271	241,884	241,884	241,884	12,895	12,895	12,895	12,895	12,895
Aggregation C-VI[6]	328,614	328,614	227,452	227,452	227,452	12,262	12,262	12,262	12,262	12,262
100 Percent Grain and Livestock										
Aggregation C-I[1]	490,712	453,316	418,577	360,550	360,550	25,790	25,790	25,790	25,790	25,790
Aggregation C-II[2]	453,231	417,672	392,693	337,514	337,514	24,524	24,524	24,524	24,524	24,524
Aggregation C-III[3]	476,285	446,368	418,577	372,155	372,155	25,790	25,790	25,790	25,790	25,790
Aggregation C-IV[4]	441,124	412,677	392,693	348,550	348,550	24,524	24,524	24,524	24,524	24,524
Aggregation C-V[5]	454,644	435,946	418,577	389,563	389,563	25,790	25,790	25,790	25,790	25,790
Aggregation C-VI[6]	423,072	405,292	392,693	365,213	365,213	24,524	24,524	24,524	24,524	24,524
130 Percent Grain and Livestock										
Aggregation C-I[1]	149,558	144,721	136,983	95,932	101,802	64,482	55,776	25,790	25,790	25,790
Aggregation C-II[2]	112,516	110,286	106,718	98,763	104,580	42,364	38,350	24,524	24,524	24,524
Aggregation C-III[3]	203,361	199,492	193,301	160,461	165,157	56,744	49,779	25,790	25,790	25,790
Aggregation C-IV[4]	168,552	166,768	163,913	157,549	162,203	38,796	35,585	24,524	24,524	24,524
Aggregation C-V[5]	284,067	281,648	277,780	257,254	260,189	45,136	40,783	25,790	25,790	25,790
Aggregation C-VI[6]	252,714	251,599	249,815	245,838	248,746	33,444	31,437	24,524	24,524	24,524

---

[1] Refers to full adjustment, 1958 observed farm size distribution.

[2] Refers to full adjustment, 1975 projected farm size distribution.

[3] Refers to 80% adjustment, 1958 observed farm size distribution.

[4] Refers to 80% adjustment, 1975 projected farm size distribution.

[5] Refers to 50% adjustment, 1958 observed farm size distribution.

[6] Refers to 50% adjustment, 1975 projected farm size distribution.

VITA

John William Goodwin

Candidate for the Degree of

Doctor of Philosophy

Thesis: AGGREGATION OF NORMATIVE MICROSUPPLY RELATIONSHIPS FOR DRY-LAND CROP FARMS IN THE ROLLING PLAINS OF OKLAHOMA AND TEXAS

Major Field: Agricultural Economics

Biographical:

Personal Data: Born at Durham, Roger Mills County, Oklahoma, January 1, 1935, the fourth son of Robert L. and Obera Hatley Goodwin.

Education: Attended elementary and high school at Durham, Oklahoma; graduated from Durham High School in 1953; received the Bachelor of Arts degree from Panhandle A. and M. College, Goodwell, Oklahoma, 1956, with a major in history; received graduate training in agricultural economics at the University of Connecticut, Storrs, in 1956-57; received the Master of Science degree from Oklahoma State University, Stillwater, in 1959; completed requirements for the Doctor of Philosophy degree in 1961.

Professional Experience: Research Assistant, University of Connecticut from September, 1956 to July, 1957; Research Assistant, Oklahoma State University, from September, 1957, to September, 1958; Instructor of Agricultural Economics, Oklahoma State University, September, 1958, to November, 1961.