Resource Requirements & Income Opportunities for Beginning Farmers in Selected Areas of Oklahoma

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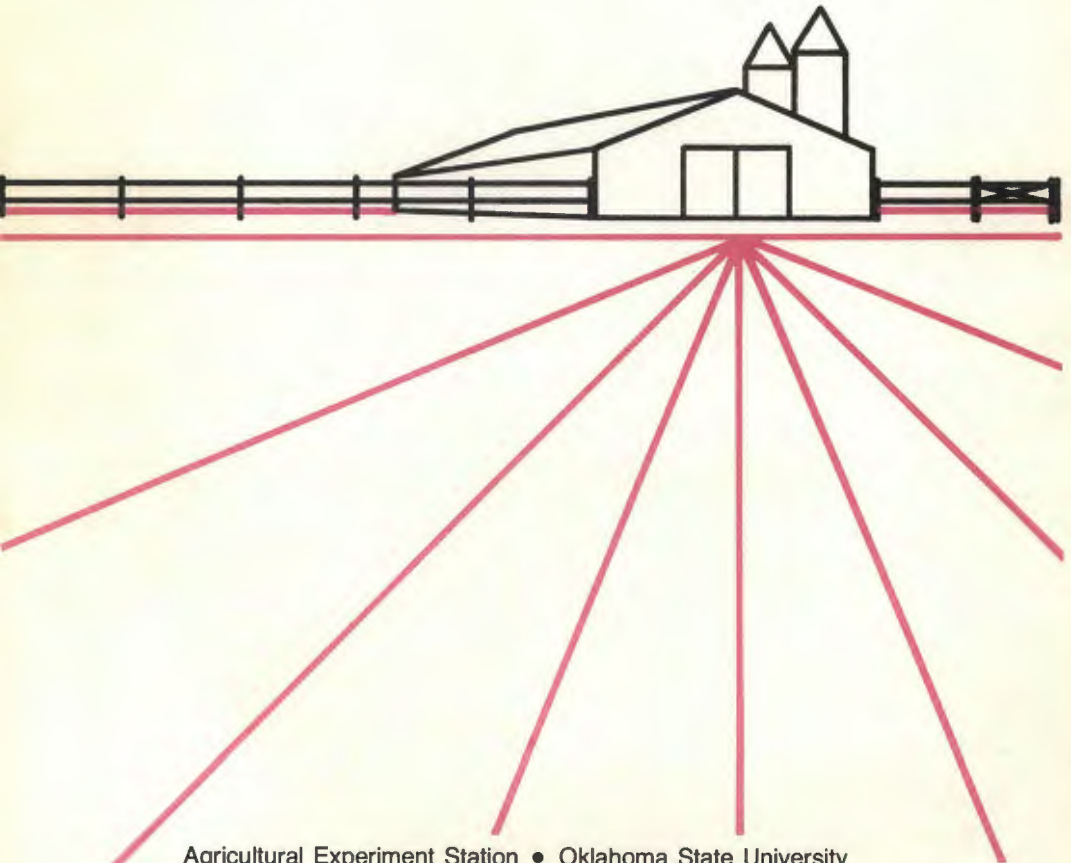Agricultural Experiment Station • Oklahoma State University

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Efficient transition from one generation of farmers to another benefits the parties involved and society as a whole. It is wasteful of scarce productive resources and detrimental to human feeling when new farmers start and fail because of inadequate resources and planning.

The purpose of this study is to provide general planning information regarding (1) the amount of capital resources needed to start farming in five Oklahoma areas, (2) profitable organization of the resources and (3) expected cash flows over the first few years of the new farm firm's life. The results will be useful to prospective entrants to the farming profession and to representatives of credit institutions and private lenders who are important "partners" in the venture.

Brewster, who did initial research on the subject, succinctly described the problem to which the first part of the study is addressed.

> For various regions and types of farming systems, what bundle of resources represents the minimum size of farm and the minimum earnings that would offer a reasonable chance for success? Farms with these resources constitute the safe floor of American agriculture. Information as to their characteristics is needed especially by beginning farmers, particularly from the standpoint of safe credit commitments by themselves as borrowers and by farm lenders, whether public or private [5, p.4].

Research essentially on Brewster's theme has contributed to farmers' abilities to estimate resource needs [2, 4, 6, 9, 13, 16, 17]. However, the step emphasized of relating specific capital needs to available financial alternatives in overcoming barriers to entry has not been adequately studied.

Areas of Study

The geographic areas to which this study applies include northeastern, southeastern, southcentral, northwestern, and panhandle regions of Oklahoma as depicted in Figure 1. These areas are centered by Wagoner, Atoka, Garvin, Woodward, and Texas counties, respectively.

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The northeastern Oklahoma area constitutes a portion of the soil classification region referred to as the Cherokee Prairies. Small grain-livestock production is the principle type of farming. Wheat, oats, grain sorghums, alfalfa, corn, cotton, and soybeans are the major crops grown here. Large quantities of prairie hay are harvested for both local use and sale outside the area. Much of the cropland acreage has been reduced since the 1930's and has been reseeded or improved with bermuda grass, brome, and fescue. The average annual rainfall in this area is about 37 to 42 inches [8, pp. 13, 27].

The southeastern Oklahoma area includes portions of the soil classification regions known as the Ozark Highlands, Forested Coastal Plains, and Cross Timbers. Average annual rainfall is about 38 to 44 inches with a growing season of 200 to 230 days. The primary crops include small grains, grain sorghum, peanuts, and some corn. Improved pastures of bermuda grass, clover, and fescue have been established on acreages cleared of brush and timber. Commercial forests are dominant in the area and cattle are raised on free range in the wooded hills. Much of this area is devoted to livestock production [8, pp. 21, 25, 31].

The southcentral area selected includes portions of the soil classification regions, Cross Timbers and Reddish Prairies. This is a moist subhumid area which has an annual rainfall of 28 to 35 inches and an annual growing season of 200 to 225 days. Wheat, grain sorghums, peanuts, soybeans, and alfalfa are the principle crops. The rolling areas are used for small grain-cattle farming, while the more wooded areas are used primarily for livestock production. Mixed native grasses and alfalfa are cut for hay and used locally as well as sold commerically [8, pp. 13, 14, 30, 36, 37].

The northwestern Oklahoma area selected comprises a portion of the Rolling Red Plains soil classification regions. This dry subhumid area has an annual rainfall of 22 to 28 inches and a typical growing season of 190 to 225 days. Occasional high winds, droughts, and high moisture evaporation characterize the region. Small grain-cattle farming constitutes the principle enterprise situation. The primary crops of wheat and grain sorghum are grown on the clayey and extremely sandy soils, respectively. Medium-sized cow herds are wintered on native grass and locally grown sorghum and alfalfa hay. Grama and buffalo grasses dominate the clay soils of native pastures while tall grasses are dominant on the loam and sandy soils [8, pp. 13, 14, 42].

The panhandle area is part of the soil classification region known as the High Plains. This is a semi-arid area where the annual rainfall ranges from 17 to 22 inches. The growing season is the shortest in the state and long drought periods are common. The primary crops are wheat on loam soils and grain sorghums on the sandy lands with some alfalfa and corn grown on irrigated soils. Buffalo and grama grasses dominate the native pasturelands which are low in grass forage yield but high in nutritive value [8, pp. 13, 14, 49, 50]. Irrigation techniques are widely used for approximately half of the existing cropland [15].
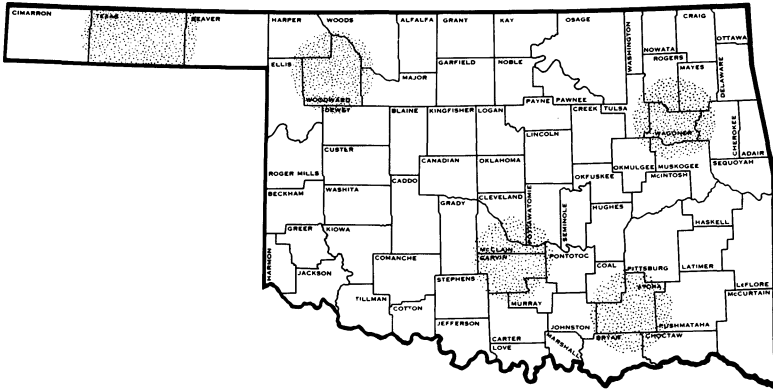
Figure 1. Map of Oklahoma Depicting the Areas of Study.

Theoretical Minimum Resource Models

The Basic Minimum Resource Model

The basic model is depicted in Figure 2. The segmented revenue curve OEFGHI represents the total return to land, operator labor, and management from various farm sizes (or land capital amounts) prior to deducting land, operator labor, and management costs. It represents the returns remaining after hired labor, interest charges on non-land capital and other cash costs have been paid.

Land (farm acreage) is considered a variable input in each of the theoretical minimum resource models illustrated. Farm acreage is directly related to land capital and highly correlated to total capital. For this reason, and because the determination of representative farm sizes is the ultimate objective in using minimization techniques, farm acreage is the variable resource referred to in the discussion of each of the minimum resource models.

The revenue curve, OEFGHI, reflects the typical pattern of diminishing returns for additional increments of land. It approximates a continuous curve with a series of linear segments which exhibit progressively lesser slopes as additional increments of land are included and as different levels and combinations of enterprises enter the solution. The kinks along this curve may be indicative of (1) increases in enterprises that are land intensive (e.g., livestock—improved pastures), (2) reductions in the activities that are land extensive (e.g., crops), (3) the indivisibility of certain inputs, and (4) the exhaustion of certain inputs and subsequent substitution by other types of inputs with different costs — such as hired labor for operator labor.

If line AB represents a specified cost, OA, a farm size of OL_1 would be required to cover unallocated fixed costs. Line CD represents opportunity
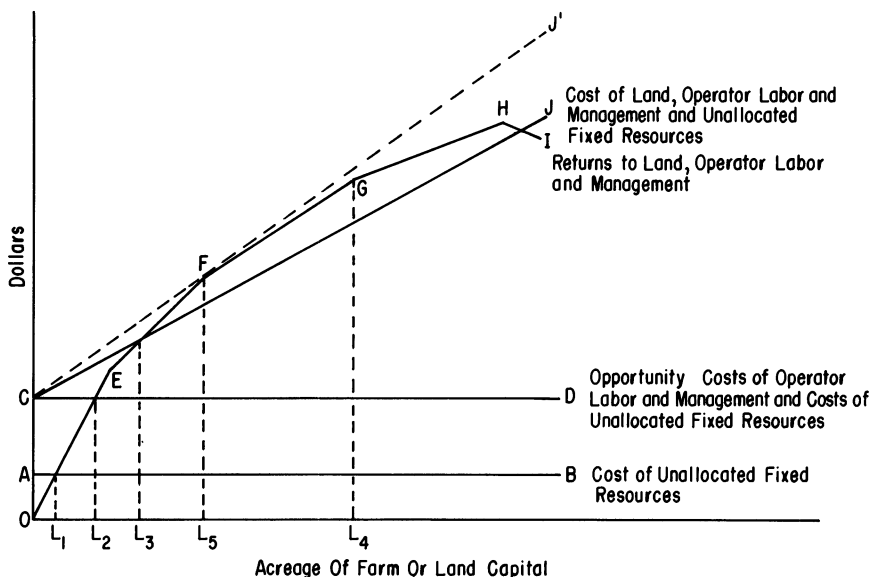
Figure 2. Basic Conceptual Minimum Resource Model

returns, AC, for operator labor and management. A farm size of OL_2 is needed to cover fixed overhead costs in addition to providing opportunity returns to operator labor and management. Land costs— rent or interest on land capital plus taxes—are represented by the height of line CJ above CD. A minimum farm size of OL_3 is required to cover all costs.

Given the costs and returns of Figure 2, farm sizes larger than OL_3 will provide profits whereas those smaller than OL_3 will not. This acreage is not the most profitable farm size nor is it the equilibrium farm size for the area. The most profitable farm size is at OL_4 where the difference between OEF-GHI and CJ is the greatest. However, at OL_4, profits are being realized and new entrepreneurs would be attracted to farming or existing operators would be encourage to expand. Since additional land is needed to obtain these profits, competition would result and land prices or rental rates would be expected to increase. Market forces would cause land costs to increase and CJ would shift upward to CJ'. Under these conditions the minimum size to cover costs of land, operator labor, management and unallocated fixed costs of farm would be OL_5.

Within this framework for analysis it is possible that land prices, interest on land capital, or rental charges could increase beyond those levels which denote the profit maximizing farm size. These increases would be due to changes in exogenous market forces—such as unusually high interest rates, increased demand by investors seeking a tax advantage, or increased invest-

ment by speculators. This additional competition would cause total land costs to change as depicted in Figure 3, shifting CJ upward to CJ'. Given the costs and returns assumed in Figure 3, losses would occur. New entrepreneurs would not attempt entry into farming and some existing operators would be forced out of production. The situation described above would occur unless potential or established operators, (1) could significantly reduce unallocated overhead costs, (2) obtain supplementary income through off-farm employment, or (3) are willing to accept less than an opportunity return for their labor and management. The selection of any one of these alternatives or some combination of all of them has the potential of reducing total costs to a level such that a "breakeven" size of farm could be achieved. In Figure 3, this would represent a reduction in the charge for operator labor, management, and unallocated fixed resources from OC to OC'. Total costs (CJ') would then decrease by the amount CC' to the level C'J'' which would result in a minimum farm size of OL_6.

Levels of Owner Equity

Owner equity is defined as the net owned resources of the operator (total assets-total liabilities). The introduction of owned resources into the minimum resource model results in reduced external costs (Figure 4). First, as
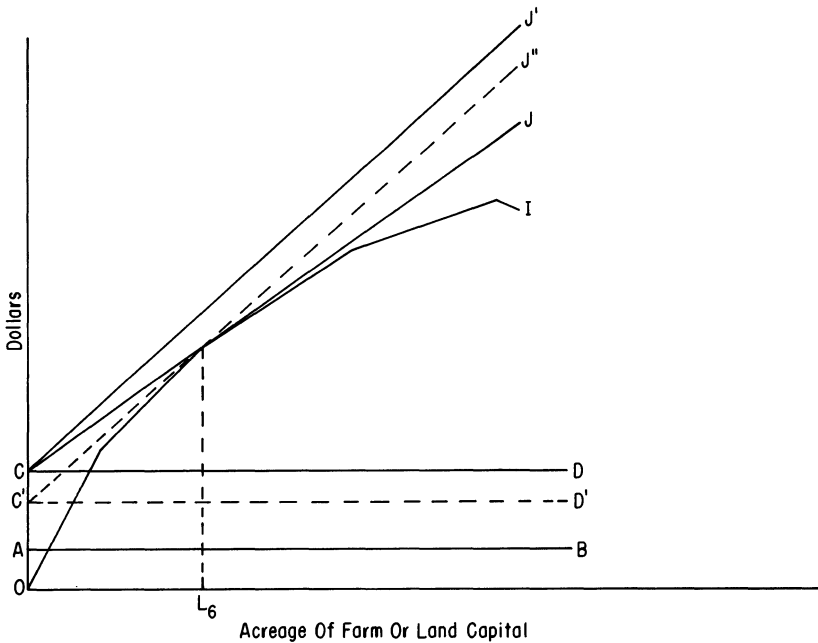
Figure 3. Basic Conceptual Minimum Resource Model With High Land Costs
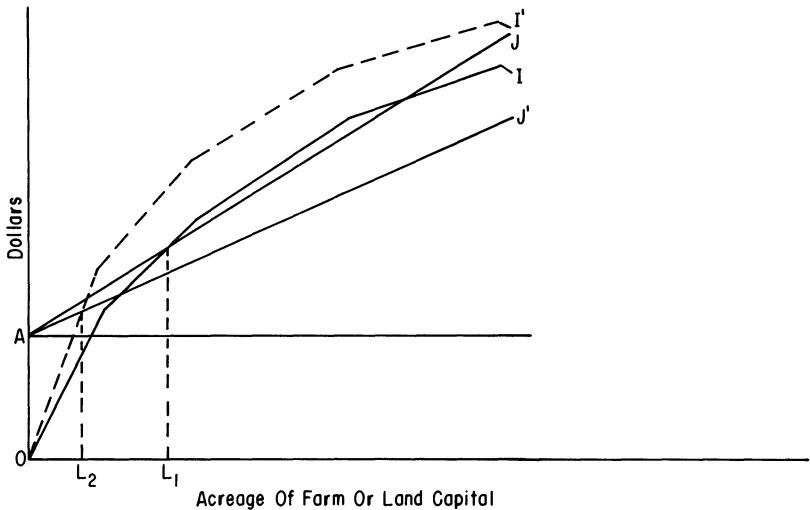
Figure 4. Theoretical Minimum Resource Model with Variable Levels of Operation Equity

land equity increases, land capital costs would decrease and the slope of the land cost curve would drop from AJ to AJ'. Secondly, as nonland equity increases, less interest on nonland capital is deducted from gross revenue, raising the returns curve from OI to OI'. Conceptually, the zero equity level would be the same as depicted in the basic minimum resource model illustrated in Figure 2.

Inherent in the minimum resource model with variable levels of operator equity is the assumption that the operator does not require an opportunity return for his owned resources. That is, in Figure 4, the specified level of income needed to cover unallocated fixed costs and provide opportunity returns for operator labor and management, OA, is not greater than OC in Figure 2.

A farm size of OL_1 is required for a specified income level at zero equity, but a farm size of only OL_2 is required with, say, 50 percent operator equity. A farm size between OL_1 and OL_2 would result from varying the equity level from zero to 50 percent.

An alternative means of analyzing this model involves the assumption of a farm size fixed at OL_1. With zero equity only the specified costs are being covered. However, with farm size fixed at OL_1 and a 50 percent equity level, returns greater than specified costs are being obtained. Similarly, returns over and above the specified costs would result when equity levels varied from zero to 50 percent. These relationships portray the types of analyses used in a portion of this study.

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Various levels of land rental should not be confused with variable levels of operator equity. Rental rates are assumed analogous to interest charges on land capital and do not shift the cost and return curves as do variable equity levels. Thus, rental situations are represented by the relationships for zero equity as depicted in the basic minimum resource model, Figure 2. However, if rental rates on land are less than interest charges per acre, the slope of AJ will decrease.

Product Prices

The conceptual minimum resource model with variable product prices includes not one, but a family of return curves, as illustrated in Figure 5. This model offers possibilities for analyzing minimum resource requirements for prospective entrants into agriculture in an uncertain marketing environment.

Assuming that the cash costs given for the preceding models are unchanged and that the returns specified in those models were obtained with average product prices, a minimum farm size prevails at OL_2, as shown in Figure 5. When high product prices are introduced into the model, the required farm size decrease to OL_1. However, when low prices are used, no feasible solution exists and the model assumes characteristics similar to those described by Figure 3. That is, adjustments to reduce operator labor and management opportunity returns as well as unallocated overhead costs are necessary.
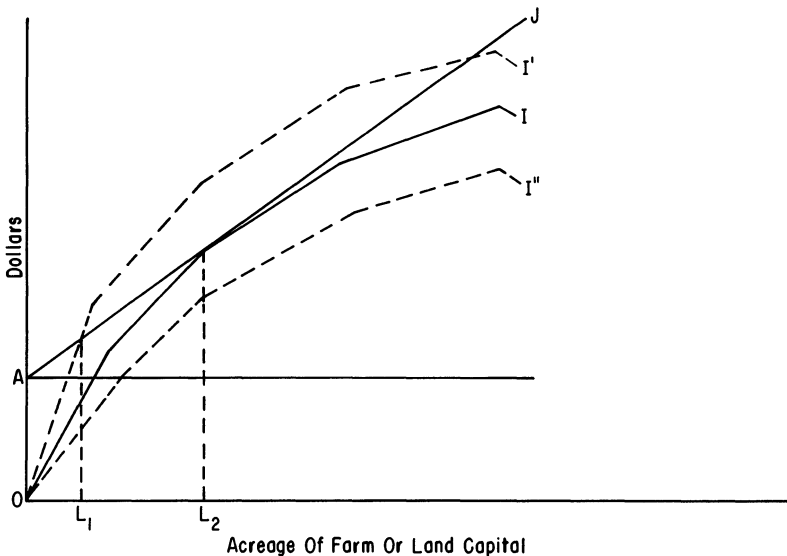
Figure 5. Theoretical Minimum Resource Model With Variable Product Prices

An alternative means of analysis materializes if the farm size is assumed fixed at OL2. This would represent the long-run equilibrium farm size where profit maximization occurs using average product prices and returns are just equal to the specified costs. If product prices increase to high levels, shifting the returns curve upward to OI', profits will be realized and entry into farming will be relatively easier. Conversely, if product prices fall to low levels the returns curve shifts downward to OI'' and entry becomes more difficult, if not impossible.[1] Varying prices in this manner permits an analysis of entry feasibility in an uncertain marketing environment where year to year prices fluctuate about a "normal" or typical condition. These latter situations provide a foundation for portions of the analyses used later in this study.

The Profit Maximization Model

A minimum resource organization may differ from the conventional profit maximization organization because the bias in the former is toward high returns per dollar of capital. Thus, the optimal solution would contain enterprises which substitute labor and other non-capital inputs for capital. Figure 6 illustrates the relationships between optimal solutions for situations where (1) capital is minimized and (2) profits are maximized in obtaining specified levels of income $Y_{1}...9$. If solutions are sought which minimize capital, the expansion path would approximate isocline CA. That is, capital is treated as more expensive than labor (and other non-capital inputs). Consequently, optimal solutions at each income level are biased towards the less expensive labor inputs.

In a conventional profit maximizing framework the expansion path would be isocline DA and would result in relatively different optimal solutions. Only if capital and non-capital inputs (labor) were perfect complements would the expansion paths follow the same isocline. A profit maximizing formulation of linear programming was used to obtain optimum organizations for the representative farm sizes selected via the minimum resource model.

Assumptions, Data, and Results of the Minimization Model

Because this study is concerned with financial alternatives and their useful applications, capital amounts needed to attain a specified income level are of paramount importance. Total capital was selected as the resource to be minimized.

Land Resource Situations

Land is assumed to be a variable resource which can be added in completely divisible and homogeneous units. The compositions of the average

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[1]Although certain long run adjustment hypotheses are implicit in these situations, they are not discussed due to the scope and purpose of this study. For detailed explanation of adjustment situations see [6] and [9].
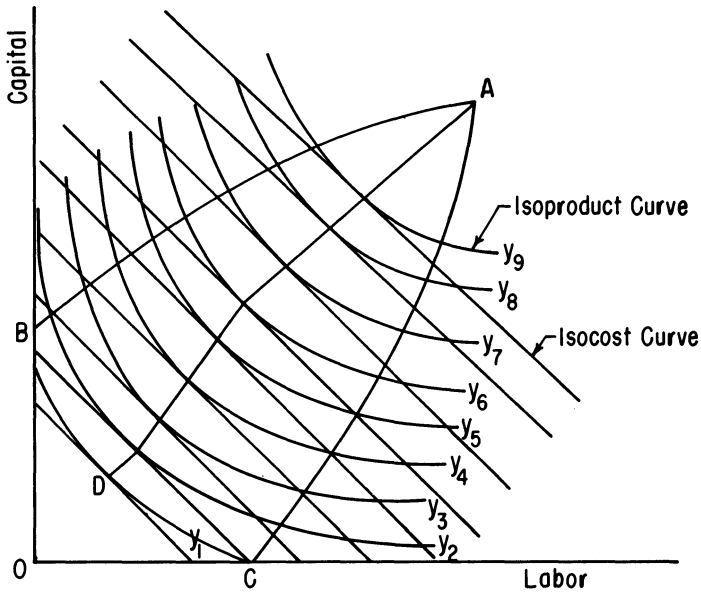
Figure 6. Theoretical Firm Profit Maximization Model

or representative units of land for the five areas are presented in Table. 1. The percentage of each representative unit of land considered to be cropland was determined by investigating actual situations in each area as depicted in the 1969 Agricultural Census [15]. Similar means were used in estimating the composition of an average unit with respect to native pasture, improved pasture and woodland pasture. Additional adjustments were included to reflect the type of operation for each area. For example in the southcentral area a primarily crop farm was desired. Thus, the proportion of each representative unit of land devoted to cropland is much greater than for any of the other areas of study.

Only two soil qualities were distinguished in this study, Class A and Class B. Class A land was considered bottomland in three of the five areas. In the panhandle area, however, Class A refers to cropland upon which surface irrigation is practiced. In the northwest area, Class A land denotes clayey soils. In general, the Class A land resource classification was used to account for those types of cropland which, under proper management, have the potential of producing relatively higher yields than Class B land.

Class B land is defined as being those tillable acreages on the uplands in the eastern and southeastern areas. In the southcentral and northwestern areas it includes those soils typically considered to be more sandy and producing relatively lower yields than Class A land. In the panhandle region, Class B land is simply dryland cropland.

Table 1. Land Resource Situations Assumed in the Areas of Study

Item	Areas of Oklahoma				
	Northeastern	Southeastern	Southcentral	Northwestern	Panhandle
			(Per Representative Acre)		
Cropland (percent)	50	60	80	70	60
Class A (percent of cropland)	60	33	50	43	50[a]
Class B (percent of cropland)	40	67	50	57	50
Pastureland (percent)	50	40	20	30	40
Pasture (AUM's/acre)	.21	.40	.21	.18	.24
Land Price ($ per acre)	335	235	250	230	350
Rental Rates ($ per acre)	23.58	9.88	14.00	7.46	19.92

[a]All of the class A soil on the panhandle farm is assumed irrigable.

The amounts of native grazing provided by each representative acre of land are included in Table 1, expressed in terms of animal unit months. The amounts of grazing provided by each of the types of pastureland (e.g., native and wooded) were determined by estimated livestock carrying capacity. For example, in the northwestern area the annual carrying capacity of native pastureland is assumed to be 20 acres per cow unit. Therefore, each full acre of native pasture supplies 0.6 AUM's of grazing. However, since native pasture constitutes only 30 percent of each representative unit of land, only 0.18 AUM's are provided by each acre.

The land prices per acre ranged from $230 in the northwest region to $350 in the panhandle area. These values were intended to reflect the market value of each representative unit of land in the respective areas. They were based on 1969 U.S. Census data updated by adding to each the total appreciation of land values in the area for the years 1970 through 1974 [1].

The rental rates for each area are also included in Table 1. They ranged from $7.46 per acre in the northwestern area to $23.58 in the northeastern area. These rates are based on a previous study [1] and represent the landlord's net return to overhead, land, risk, and management for a representative unit of land in each area.

Non-Land Resource Restrictions

Labor: Twenty-five hundred hours of annual operator labor were assumed available in each area. This amount was distributed to four periods of 3 months each to reflect typical variations in farm labor requirements. In the first quarter (January through March) 475 hours were assumed available, 700 hours, in the second quarter, 750 hours in the third, and 575 hours in the fourth. The smaller number of hours assigned to the first and fourth periods are indicative of the shorter working days in those periods. Also, the amount of available labor for the first quarter was selected to provide for a two-week vacation by the operator. Additional labor could be hired in each period as needed for $2.00 per hour.

Capital: Capital was assumed to be a variable resource that could be borrowed without limit so long as returns to the firm were greater than or equal to its cost. The basic capital costs used in the minimum resource model were 8.5 percent for short term and intermediate term capital and 7.5 for long term capital. These rates were determined by averaging the normal interest charges assessed by lenders as revealed in [14].

Short term capital includes the costs for operating inputs adjusted for the actual length of time the money is borrowed and is expressed in terms of annual capital. Intermediate term capital refers to capital investments for tractors, machinery, equipment, livestock, and irrigation equipment as set forth in the enterprise budgets. Long term capital charges are investments in land only.

Management, Technology and Input-Output Relationships

Input-output coefficients used in the enterprise budgets are based upon advanced technologies relevant to each area (Tables 2 to 6). The coefficients reflect the production methods and managerial techniques used by the better farmers in each area. All the output relationships used are the result of crop and livestock budgets previously constructed for the area in question. [2]

Production Alternatives

The alternative crop and livestock enterprises selected were limited to those which can be produced efficiently in each area. The enterprises excluded were considered too highly specialized within the context of this study. A summary of each of the budgets used is presented for each area in Tables 2 thru 6.

Crop Alternatives: The crop enterprises selected included grain sorghum, wheat, alfalfa, sudan, barley, soybeans, rye, and corn. Pasture alternatives included native and improved pastures, forage sorghums, and small grain grazing, depending upon their relevance to the specific area. Grain sorghum, wheat, and similar alternatives also produced limited amounts of grazing to the extent pasturing did not interfere with grain or hay production. Grazing production in the various enterpises was separated into three categories (1) native and improved pasture, (2) winter small grain, and (3) spring small grain.[3]

Restraints were included to control the levels at which some of the crop alternatives could enter optimal solutions in three of the models. In the northeastern Oklahoma area the wheat and soybeans doublecrop alternative was confined to 75 percent or less of the upland cropland available. This was done because weather conditions in only 3 of 4 years permit doublecropping.[4] Also, 0.3 of each incoming representative unit of land was assumed already devoted to some type of bermuda pasture enterprise. In the southeastern area alfalfa was limited to 50 percent or less of the Class A land (bottomland). In the southcentral area grain sorghum was restricted to a maximum of 50 percent of the Class B land (upland) and soybeans were confined to no more than 50 percent of the Class A land. No restraints were placed on crop alternatives in the northwestern and panhandle regions.

Livestock Alternatives: Livestock alternatives were limited to beef cow herds and selected stocker-feeder systems. Other livestock — dairy, sheep, poultry, swine — were not considered admissible alternatives. The cow-calf systems emphasized alternative calving dates, wintering programs, and sell-

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[2]See [7, 10, 12, and 18], for the published budgets for each area.

[3]Winter small grain grazing included small grain pasture available November 15 to March 15. Spring small grain grazing included small grain pasture available March 15 to May 31.

[4]Extension farm management personnel in this area contend that only 3 of 4 doublecrops are harvested due to climatic variations which affect seeding and harvesting.

Table 2. Summary Crops and Livestock Budgets Used in the Operational Model, Northeast Area of Oklahoma.

Northeast	Grain Sorghum Upland	Wheat Upland	Alfalfa Hay Bottomland	Bermuda Pasture	Fescue Pasture	Nov.-May Steers	Nov.-Mar. Steers	Wheat Bottomland	Wheat Soybean Double-crop Upland	Small Grain Graze-out Upland
Production										
Total Returns										
Low Prices	61.88	48.25	108.00	0.0	146.58	122.60	86.85	114.69	0.0	
Average Prices	90.44	70.75	151.87	0.0	0.0	190.53	159.39	127.39	167.76	0.0
High Prices	143.08	112.00	219.37	0.0	0.0	249.13	208.41	201.60	265.65	0.0
Yields									27.0W	
Bushels Per Acre		25.00						45.00		
									21.0S	
Cwt. Per Acre	28.00									
Tons Per Acre			3.75							
AUM's Per Acre	.40	.70	1.00	7.37	4.50			.80	.70	2.75
Steers (CWT.)						6.57	5.54			
Heifers (CWT.)										
Cull Cows (CWT.)										
Cull Bulls (CWT.)										
Inputs										
Operating Input Costs	51.16	48.28	107.74	66.43	64.89	21.38	19.91	47.34	87.23	43.76
Annual Operating Capital	6.95	24.25	40.72	20.55	36.24	6.01	2.70	24.42	57.26	23.53
Intermediate Term Capital	47.23	43.28	.96	1.93	2.45	9.67	8.18	32.02	42.93	43.74
Tractor Investment	11.54	8.33	.49	.99	1.51			12.32	16.36	28.53
Equipment Investment	35.69	34.95	.47	.94	.94	4.46	4.46	19.69	25.57	15.21
Machinery Investment						5.21	3.72			
Livestock Investment										
Total Capital	54.18	67.54	41.69	22.48	38.69	15.68	12.82	56.44	99.19	67.27
Labor (Hours)										
First Quarter	.78	.12	.11		.11	1.53	1.56	.12	.11	.34
Second Quarter	1.00	1.71		.11		1.02		1.79	.90	.42
Third Quarter	.74	1.37		.11				1.37	2.24	1.65
Fourth Quarter					.11	1.22	1.24		.36	

Table 2. Continued.

Northeast	Soybeans Upland	Soybeans Bottomland	Fescue-Bermuda Combination	Cow-Calf Fall Calving	Cow-Calf Spring Calving Winter Steers	Cow-Calf Spring Calving	Cow-Calf Fall Calving Cool Season Pasture	Barley Upland	Oats Upland
Production									
Total Returns									
Low Prices	87.60	70.08	12.09	103.05	123.37	94.36	100.78	36.16	43.20
Average Prices	128.10	102.48	17.06	133.96	160.40	122.65	131.03	53.12	63.84
High Prices	202.80	102.24	˙24.65	175.18	209.73	160.39	171.34	83.84	100.80
Yields									
Bushels Per Acre	30.0	24.0						32.0	48.0
Cst. Per Acre									
Tons Per Acre			.5						
AUM's Per Acre			7.9					.9	.8
Steers (CWT.)				2.14	3.47	1.96	2.07		
Heifers (CWT.)				1.47	1.37	1.37	1.45		
Cull Cows (CWT.)				.95	.95	.95	.95		
Cull Bulls (CWT.)				.16	.16	.16	.16		
Inputs									
Operating Input Costs	41.84	41.84	66.49	90.88	193.41	89.44	50.38	44.55	51.59
Annual Operating Capital	14.39	14.39	28.21	33.04	59.17	38.16	17.07	21.34	23.66
Intermediate Term Capital	61.70	61.70	4.91	358.68	356.36	359.27	354.27	43.99	43.38
Tractor Investment	11.18	11.18	3.02					8.58	9.21
Equipment Investment	36.13	36.13	1.89	44.40	46.00	62.40	44.40	35.40	34.17
Machinery Investment				19.33	21.41	26.42	20.93		
Livestock Investment				294.95	288.95	270.45	288.95		
Total Capital	61.70	61.70	33.12	391.73	415.53	397.43	371.35	65.33	67.04
Labor (Hours)									
First Quarter	.57	.57	.11	2.13	2.10	2.10	1.86	.12	.11
Second Quarter	1.38	1.38	.11	2.07	2.16	1.62	2.04	.83	.35
Third Quarter	.35	.35	.22	2.07	2.34	2.34	2.04	1.37	1.24
Fourth Quarter				2.07	1.92	1.92	1.98		.25

Table 3. Summary Crops and Livestock Budgets Used in the Operational Model, Southeast Area of Oklahoma.

	Cow-Calf Fall Calving Cool Season Pasture	Cow-Calf Fall Calving	Nov.-May Steers	Grain Sorghum Upland	Oats Hay Upland	Bermuda Loose Stacked Hay	Bermuda-Fescue Combination Bottomland	Bermuda-Small Grain
Production								
Total Returns								
Low Prices	100.78	101.21	146.58	72.00	46.54	106.38	23.53	0.0
Average Prices	131.03	131.58	190.53	105.28	65.60	150.07	33.20	0.0
High Prices	171.34	172.08	249.13	166.72	94.76	216.81	47.97	0.0
Yields								
Bushels Per Acre								
Cwt. Per Acre				32.00				
Tons Per Acre (hay)					2.00	4.5	1.00	
AUM's Per Acre				.30	.87		10.50	8.50
Steers (CWT.)	2.07	2.07	6.57					
Heifers (CWT.)	1.45	1.20						
Cull Cows (CWT.)	.95	1.56						
Cull Bulls (CWT.)	.16	.16						
Inputs								
Operating Input Costs	50.38	89.36	21.38	58.90	75.69	91.05	112.55	83.69
Annual Operating Capital	17.07	29.29	6.01	12.13	31.60	41.94	50.08	32.68
Intermediate Term Capital	354.28	319.47	9.67	40.16	75.37	100.42	75.07	13.84
Tractor Investment				24.03	33.89	33.89	29.55	8.54
Equipment Investment	44.40	45.00	4.46	16.14	41.48	66.53	45.52	5.30
Machinery Investment	20.93	20.63	5.21					
Livestock Investment	288.95	253.84						
Total Capital	371.35	348.76	15.68	52.29	106.97	142.36	125.15	46.52
Labor (Hours)								
First Quarter	1.86	1.20	1.53	.81	.30	.6	.48	.30
Second Quarter	2.04	.61	1.02	1.05	1.79	.72	1.79	.30
Third Quarter	2.04	1.5		.29	3.19	1.14	2.03	.30
Fourth Quarter	1.98	1.32	1.22	.02		.48		.72

Table 3. Continued.

	Bermuda Pasture	Average Bermuda-Fescue Combination	Sudan Pasture Upland	Sudan Hay Upland	Soybeans Bottomland	Alfalfa Maintenance Bottomland	Small Grain Graze-out Upland	Cow-Calf Spring Calving	Cow-Calf Spring Calving Winter Steers
Production									
Total Returns									
Low Prices	0.0	0.0	0.0	99.79	70.08	114.80	0.0	94.36	123.37
Average Prices	0.0	0.0	0.0	140.80	120.48	161.44	0.0	122.65	160.40
High Prices	0.0	0.0	0.0	203.41	162.24	233.24	0.0	160.39	209.73
Yields									
Bushels Per Acre					24.00				
Cwt. Per Acre									
Tons Per Acre				4.25		4.00			
AUM's Per Acre	9.75	8.0	7.0				2.75		
Steers (CWT.)								1.96	3.47
Heifers (CWT.)								1.37	1.37
Cull Cows (CWT.)								.95	.95
Cull Bulls (CWT.)								.16	.16
Inputs									
Operating Input Costs	77.92	66.83	39.76	132.26	44.72	73.80	43.76	89.44	103.00
Annual Operating Capital	34.05	36.10	2.29	80.62	4.71	21.92	23.53	59.17	59.17
Intermediate Term Capital	22.91	8.25	33.83	33.83	73.08	138.81	43.74	359.27	356.36
Tractor Investment	21.28	6.80	18.53	18.53	29.97	48.07	28.52		
Equipment	1.63	1.45	15.29	15.29	43.09	90.74	15.21	62.40	46.00
Machinery Investment								26.42	21.41
Livestock Investment								270.45	288.95
Total Capital	56.96	44.34	36.11	114.45	77.79	160.72	67.27	397.43	415.53
Labor (Hours)									
First Quarter	.30	.48	.96	.96	1.39	.35	.34	2.10	2.10
Second Quarter	.90	.24	1.28	1.28	2.08	3.10	.47	1.62	2.16
Third Quarter	.60	.48	.11	.11	.41	3.10	1.65	2.34	2.34
Fourth Quarter	.30		.02	.02	.98			1.92	1.92

Table 4. Summary Crops and Livestock Budgets Used in the Operational Model, Southcentral Area of Oklahoma.

	Barley Bottomland	Grain Sorghum Upland	Wheat Bottomland	Wheat Upland	Alfalfa Hay Bottomland	Oats Hay Upland	Bermuda Overseeded with Rye	Bermuda Pasture
Production								
Total Returns								
Low Prices	50.85	58.50	61.76	46.32	130.32	46.50	0.0	0.0
Average Prices	72.00	85.54	90.56	67.92	183.29	65.60	0.0	0.0
High Prices	117.90	135.46	143.36	107.52	264.73	94.76	0.0	0.0
Yield								
Bushels Per Acre	45.00		32.00	24.00				
Cwt. Per Acre		26.00			4.50	2.00		
AUM's Per Acre	1.10	.30	1.30	1.10		.87	8.75	5.50
Steers (CWT.)								
Heifers (CWT.)								
Cull Cows (CWT.)								
Inputs								
Operating Input Costs	54.34	39.97	58.62	58.62	120.51	74.84	85.26	49.89
Annual Operating Capital	21.95	21.03	24.11	24.11	25.32	30.88	50.07	17.91
Intermediate Term Capital	29.33	9.44	32.92	32.92	170.75	70.27	20.36	10.65
Tractor Investment	17.94	7.06	17.37	17.37	43.81	35.90	13.90	8.55
Equipment Investment	11.39	2.38	15.55	15.55	126.94	34.37	6.46	2.10
Machinery Investment								
Livestock Investment								
Total Capital	51.28	30.47	57.03	57.03	196.07	101.14	70.44	28.57
Labor (Hours)								
First Quarter	.01		.06	.06		.30	.12	
Second Quarter	.22	.33	.22	.22	2.28	1.37	1.55	1.55
Third Quarter	1.07	.10	.78	.78	3.63	1.82	.12	.12
Fourth Quarter							1.30	

Table 4. Continued.

	Bermuda Loose Stacked Hay	Forage Sorghum Hay Upland	Soybeans Bottomland	Cow-Calf Fall Calving	Oct.-Aug. Steers	Nov.-March Steers	Bonel Rye Bottomland	Nov.-May Steers	Small Grain Graze-out Upland
Production									
Total Returns									
Low Prices	106.38	51.18	64.24	101.21	159.41	122.60	0.0	146.58	0.0
Average Prices	150.07	72.20	93.94	131.58	207.19	159.39	0.0	190.53	0.0
High Prices	216.81	104.31	148.72	172.08	270.96	208.41	0.0	249.13	0.0
Yield									
Bushels Per Acre			22.00						
Cwt. Per Acre									
Tons Per Acre (hay)	4.5	2.10							
AUM's Per Acre		.20					8.50		2.75
Steers (CWT.)				2.07	7.11	5.54		6.57	
Heifers (CWT.)				1.20					
Cull Cows (CWT.)				1.56					
Cull Bulls (CWT.)				.16					
Inputs									
Operating Input Costs	90.12	82.66	48.74	89.36	73.28	19.91	93.24	21.38	41.31
Annual Operating Capital	40.77	16.84	13.44	29.29	30.54	2.70	55.23	6.01	21.59
Intermediate Term Capital	100.42	100.85	42.24	319.47	76.38	8.18	41.51	9.67	43.74
Tractor Investment	33.89	37.78	24.65				28.64		28.53
Equipment Investment	66.53	63.08	17.59	45.00	58.80	4.46	12.87	4.46	15.21
Machinery Investment				20.63	17.58	13.72		5.21	
Livestock Investment				253.84					
Total Capital	141.19	117.69	55.67	348.76	106.92	12.82	96.74	15.68	65.33
Labor (Hours)									
First Quarter	.6	.18	.40	1.20	1.29	.90	.25	1.53	.34
Second Quarter	1.11	.80	.82	.61	.69		.25	1.02	.52
Third Quarter	1.17	2.10	.29	1.52	.74		2.03		1.81
Fourth Quarter	.48	.17	.24	1.32	1.34	.80		1.22	

Table. 5. Summary Crops and Livestock Budgets Used in the Operational Mode, Northwest Area of Oklahoma.

	Grain Sorghum Sandy Soil	Nov.-May Steers	Summer Stockers	Barley Clayey Soil	Wheat Clayey Soil	Wheat Sandy Soil	Alfalfa Hay Clay Soil
Production							
Total Returns							
Low Prices	46.41	146.58	144.26	25.99	42.46	30.88	87.06
Average Prices	67.83	190.53	187.52	38.18	62.26	45.28	122.42
High Prices	107.31	249.13	245.25	60.26	98.56	71.68	176.85
Yields							
Bushels Per Acre				23.00	22.0	16.0	
Cwt. Per Acre	21.00						
Tons Per Acre							3.00
AUM's Per Acre	.75			.50	.50	.45	.20
Steers (CWT.)		6.57	6.76				
Heifers (CWT.)							
Cull Cows (CWT.)							
Cull Bulls (CWT.)							
Inputs							
Operating Input Costs	33.34	21.38	11.42	32.65	36.34	36.34	98.01
Annual Operating Costs	6.93	6.01	1.67	14.08	16.10	16.10	40.60
Intermediate Term Capital	35.98	9.67	5.30	18.97	18.97	11.93	44.53
Tractor Investment	21.70			8.92	8.92	8.92	46.97
Equipment Investment	14.27	4.46	.75	10.05	10.05	10.05	64.96
Machinery Investment		5.21	4.55				
Livestock Investment							
Total Capital	42.91	15.68	6.97	33.05	35.07	35.07	152.53
Labor (Hours)							
First Quarter	.36	1.53					.26
Second Quarter	.71	1.02	1.00	.12	.12		
Third Quarter	.29		1.50	.46	.40	.46	2.24
Fourth Quarter		1.22	.50				

Table 5. Continued.

	Lovegrass Pasture	Sudan Hay Sandy Soil	Sudan Pasture Sandy Soil	Small Grain Graze-out Clay Soil	Range Cow-Calf	Nov.-Mar. Steers	Oct.-Oct. Steers
Production							
Total Returns							
Low Prices	0.0	97.48	0.0	0.0	106.27	122.60	163.10
Average Prices	0.0	137.52	0.0	0.0	138.18	159.39	211.98
High Prices	0.0	198.68	0.0	0.0	182.77	208.41	277.90
Yields							
Bushels Per Acre							
Cwt. Per Acre							
Tons Per Acre		4.00	6.50				
AUM's Per Acre	8.00			2.40			
Steers (CWT.)					2.40	5.54	7.91
Heifers (CWT.)					1.66		
Cull Cows (CWT.)					.95		
Cull Bulls (CWT.)							
Inputs							
Operating Input Costs	48.43	80.99	24.99	27.49	83.19	19.91	44.18
Annual Operating Capital	8.52	27.42	5.25	18.79	27.05	2.70	16.36
Intermediate Term Capital	44.53	29.14	29.14	24.20	547.96	8.18	59.30
Tractor Investment	44.53	20.48	20.46	14.75	29.83	4.46	13.54
Equipment Investment		8.69	8.69	9.45	198.75	3.72	28.23
Machinery Investment					20.78		17.53
Livestock Investment					298.60		
Total Capital	53.05	56.56	34.40	42.99	575.02	12.82	75.66
Labor (Hours)							
First Quarter	1.21				4.05	1.56	1.53
Second Quarter	1.21	1.42	1.42	.22	2.39		1.33
Third Quarter				.84	2.13		1.63
Fourth Quarter					2.17	1.24	1.67

Table 6. Summary Crops and Livestock Budgets Used in the Operational Model, Panhandle Area of Oklahoma.

	Nov.-May Steers	Nov.-Mar. Steers	Summer Steers	Grain Sorghum Dryland	Wheat Dryland	Corn Surface Irrigation	Grain Sorghum Surface Irrigation	Wheat Surface Irrigation	Silage Surface Irrigation	Small Grain Graze-out Dryland
Production										
Total Return										
Low Prices	146.58	122.60	136.82	47.25	31.85	214.50	139.50	106.15	135.0	0.0
Average Prices	190.53	159.39	184.14	69.09	46.69	313.30	203.98	155.65	198.0	0.0
High Prices	249.13	208.41	245.25	109.41	73.92	496.60	323.02	246.40	313.40	0.0
Yields										
Bushels Per Acre					16.50	130.00		55.0		
Cwt. Per Acre				21.00			62.0			
Tons Per Acre									20.0	
AUM's Per Acre				.75	.35	1.4	1.4	1.0		2.0
Steers (CWT.)	6.57	5.54	6.76							
Heifers (CWT.)										
Cull Cows (CWT.)										
Cull Bulls (CWT.)										
Inputs										
Operating Input Costs	21.38	19.91	11.42	33.43	35.34	138.96	86.57	72.87	107.38	12.61
Annual Operating Capital	6.01	2.70	1.668	6.93	17.22	38.65	22.90	25.61	28.72	6.45
Intermediate Term Capital	9.67	8.18	5.30	35.97	22.56	128.74	128.74	11.93	123.04	23.80
Tractor Investment				21.70	11.89	37.64	37.64	25.53	33.35	14.99
Equipment Investment	4.46	4.46	.75	14.27	10.67	25.59	25.59	20.97	23.98	8.81
Machinery Investment	5.21	3.72	4.55							
Livestock Investment										
Irrigation Investment						65.51	65.51	65.43	65.51	
Total Capital	15.68	12.82	6.97	47.91	39.78	167.39	151.64	137.54	151.76	30.25
Labor (Hours)										
First Quarter	1.53	1.56		.36		.56	.42			
Second Quarter	1.02		1.00	.71	.12	3.60	3.02	1.94	2.96	.22
Third Quarter			1.50	.29	.50	2.17	2.90	2.36	3.37	.60
Fourth Quarter	1.22	1.24	.50			.58	.58	.80	.36	

ing dates. The selected stocker-feeder enterprises accentuated various buying dates, feeding systems, and selling dates commensurate with grazing provided by pasture alternatives.

Input Prices

The input prices used to revise the previously constructed enterprise budgets are shown in Table 7. These prices were determined through contacts with Oklahoma State University extension farm management personnel, various merchants and dealers, and other researchers. The input costs approximate current (1974) prices paid by farmers in the five areas of study.

Output Prices

To observe the effects of various market situations on entry, three output price levels were selected for each of the techniques used by the better farmers in each area.

Crops: The prices of crops produced for sale were initially determined by their historical relationships to the price of wheat. For example, the average price of corn during crop years 1963 to 1973 was 84 percent of the average price of wheat for the same period. Similar relationships for all crops — excluding grain sorghum, soybeans, silage, and alfalfa hay — were determined based on average prices for the 1963-1973 period. The prices determined for some crops were greatly overestimated when based on their relationships to average wheat prices during the 1963-1973 period. Grain sorghum and soybean prices were adjusted by using average prices for crop years 1955 to 1973. Similarly, corn silage and alfalfa hay prices were selected independent of their historical relationships to wheat prices. The prices for other types of hay were based on their relationships to the average alfalfa hay price during the 1963-1973 period.

The three wheat prices used were $2.05, $3.00 and $4.75 per bushel, adjusted seasonally [3]. These were intended to reflect low, average, and high levels of market prices, respectively. The seasonally adjusted prices were typically lower than the prices shown in Table 8 because of the assumption inherent in each budget that outputs are sold at the time of harvest.[5]

Livestock: The prices for the types of livestock production specified in each budget were all based on the average prices for the 1966-1973 period. Analogous to the procedure for determining crop prices, the prices for relevant weights and grades of livestock were based on historical relationships to the prices of 300-500 lb. choice steers. For example, the average annual price for 500-800 lb. choice steers in the period 1966-1973 was 88 percent of the average, annual price for the 300-500 lb. choice stocker steers during the same years. The three prices per hundredweight for 300-500 lb. choice steers used were

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[5]The month of sale is usually characterized by lower prices relative to the prices in other months.

Table 7. Assumed Prices Paid for Selected Inputs in the Five Areas of Study.

Item	Units	Price
Plant Seed		
Soybean Seed	BU.	8.50
Barley Seed	BU.	3.30
Oats Seed	BU.	2.75
Milo Seed	LB.	.30
Wheat Seed	BU.	6.00
Ryegrass Seed	LB.	.28
Sudan Seed	LB.	.22
Alfalfa Seed	LB.	2.00
Rye Seed	CWT.	7.00
Grass Seed	LB.	.20
Lovegrass Seed	LB.	2.00
Corn Seed	LB.	.52
Silage Seed	LB.	.52
Fertilizers		
Nitrogen		
Dry	LB.	.25
Anhydrous Ammonia	LB.	.14
Phosphate	LB.	.21
Potash	LB.	.08
Lime	TON	6.00
Chemicals		
Herbicide	ACRE	6.25
Parathion	ACRE	3.00
Atrazine	ACRE	7.50
2-4-D	ACRE	1.75
Insecticide	ACRE	2.20
Insecticide - Irrigated Land	ACRE	8.00
Herbicide - Irrigated Land	ACRE	5.63
Miscellaneous - Crop budgets		
Trucking	BU.	.10
Custom Combining	ACRE	8.00
Trucking - Milo	CWT.	.17
Custom Combining - Corn	BU.	.18
Fertilizer Spreader Rental	ACRE	1.00
Sprayer Rental	ACRE	3.25
Hay Harvesting Expense	TON	14.00
Hay Hauling	TON	6.00
Hay - Miscellaneous Expense	ACRE	3.25
Miscellaneous - Livestock Budgets		
Creep Feed	LB.	.07
Starter Feed	CWT.	6.75
20% Protein Suppl.	LB.	.075
44% Protein Suppl.	CWT.	9.00
Salt and Minerals	LB.	.04
Vet. and Med.	AU.[a]	3.00
Personal Taxes	AU.	3.00
Livestock Supplies	AU.	3.50
Replacement Bull	AU.	6.00
Hauling and Marketing	AU.	5.00
Sales Commission	HD.	3.50
Trucking	CWT.	.25

[a]AU - Animal Unit or Cow Unit.

$25.00, $32.50, and $42.50 to indicate low, average, and high levels of market prices, respectively. All steer and heifer prices determined were seasonally adjusted to reflect the effects of seasonal price fluctuations at the time of marketing [11]. The prices for all cull (cutter) cows and cull (cutter) bulls were not seasonally adjusted, but used as shown in Table 8.

The average or middle product prices for both crops and livestock were used in the minimization models for the study areas to determine representa-

Table 8. Assumed Prices Received in the Study Areas.

		Percent	Price Level		
Item	Units	of Base[a]	Low	Average	High
Crops					
Wheat	BU.	100	2.05	3.00	4.75
Rye	BU.	66	1.35	1.98	3.13
Corn	BU.	84	1.72	2.52	3.99
Oats	BU.	47	.96	1.41	2.23
Barley	BU.	60	1.23	1.80	2.85
Milo	CWT.	112	2.30	3.36	5.32
Soybeans	BU.	150	3.08	4.50	7.13
Alfalfa	TON	N/A	32.00	45.00	65.00
Other Hay[b]	TON	82	26.14	36.77	53.12
Silage	TON	N/A	6.75	9.90	15.67
Livestock					
300-500 lb. Steers[c]	CWT.	100	25.00	32.50	42.50
300-500 lb. Heifers	CWT.	85	21.25	27.63	36.13
500-800 lb. Steers	CWT.	88	22.00	28.60	37.40
500-800 lb. Heifers	CWT.	79	19.75	25.67	33.57
800-1000 lb. Steers	CWT.	81	20.25	26.33	34.43
Cutter Cows	CWT.	52	13.00	16.90	22.10
Cutter Bulls	CWT.	64	16.00	20.80	27.20

[a]Bases are (1) wheat for the crops specified and (2) 300-500 lb. steers for the livestock budgets.
[b]The prices for other hay are 82% of the selected alfalfa price.
[c]Those prices were also used to determine the costs of purchasing stocker calves.

tive farm sizes. The low and high levels of product prices were used in the profit maximization models to be discussed later.

Target Income Selection

A major consideration in any minimum resource study is that of selecting an appropriate level of income to attain. Brewster contended that the most appropriate income level would be ". . . . industrial worker earnings adjusted for differences in the purchasing power of money, cost of living, and values of non-money income items so that any given level would represent equivalent quantities of want-satisfying goods in both farm and nonfarm modes of life" [4, p.97]. This precludes the selection of an income identical to that of factory workers because it would not necessarily equalize real incomes between farming and nonfarming. Therefore, the differences pointed out by Brewster in the form of items such as lower rural housing costs and farm produced foods must be accounted for.

The average annual earnings per employee in various selected industries are shown in Table 9 for Oklahoma in 1973. The average annual earnings ranged from $4,133 for the apparel products industry to $10,426 for the contract construction group. The average wage per full-time employee in manufacturing was $7,391. These earnings reflect varying skills and training required in the various industries.

It was imperative that an income level be selected which was comparable to that of the average nonfarm worker after adjustments for differences similar to those indicated above were accounted for. Thus, the level of income to operator labor, management, and risk assumed for this study was $7,000.

Table 9. Average Annual Earnings per Full-Time Employee for Selected Industries in Oklahoma, 1973[a].

Type of Industry	Average Annual Earnings [b]
Selected Industries	
Manufacturing	7,391
Petroleum Refining	10,263
Primary Metals	8,405
Machinery (except electrical)	7,863
Fabricated Metals	7,354
Printing and Publishing	7,900
Stone, Clay, and Glass Products	7,858
Food and Kindred Products	7,200
Apparel Products	4,133
Wholesale Trade	7,375
Oil and Gas Mining	8,750
Contract Construction	10,426
Retail Trade	5,587

[a]Average annual earnings are calculated by multiplying average weekly earnings times 50 weeks.
[b]Oklahoma Employment Security Commission, Research and Planning Division, Handbook of Oklahoma Employment Statistics, Revised Data Thru 1973, Oklahoma State Employment Service (Oklahoma City, June, 1974)

Unallocated Overhead Costs

Some farm costs are virtually independent of farm size and capital requirements and cannot be attributed to the production of any specific enterprises. Costs such as hay storage, fencing, building depreciation, and machinery ownership costs are included in the enterprise budgets and the total costs vary with the farm size and amounts of enterprises. Total real estate taxes also vary with the farm size. Cash outlays for insurance, bookkeeping, tax service, telephone use, and farm pick-up truck expenses cannot be precisely allocated to specific enterprises. These unallocated overhead costs per farm were assumed to be $1,000 for this study and were added to the specified income target for each area.

Institutional Restraints

Because of the policy emphases on free markets at the time of this study, no institutional restraints were present. Although governmental farm allotments for various enterprises were still maintained for crop insurance payments and other programs, they have no effect on minimum capital requirements. In the context of these models, input and output prices were assumed to be determined by market equilibria. Thus, no marketing restraints for inputs or outputs were included.

Minimum Resource Requirements for the Areas of Study

Preliminary programming with average product prices indicated that infeasible solutions would result in some areas. That is, with the predetermined costs and returns in each model, no farm size could be obtained which yielded the specified income level. For this reason, and to determine the

sensitivity of the models for each area to the level of long term borrowing costs, a programming routine was utilized which varied the long term interest rate in 0.5 percent increments, ranging from 0 to 10 percent. This permitted an analysis of the levels of long term capital costs which rendered the solutions infeasible.

It also provided varying combinations of minimum capital requirements and farm sizes (acres) for each additional increment of interest rate. The amounts of short term, intermediate term, long term, and total capital required for each long term interest rate level, as well as the associated farm sizes are presented by area in Tables 10 to 14. These various capital amounts and farm sizes are discussed by area in the remainder of this section.

Northeastern Area

The operational model for this area yielded an infeasible solution with the 7.5 percent long term interest rate. When the interest rate was varied from 0 to 10 percent, feasible solutions were obtained so long as the rate did not exceed 6.5 percent. The total capital requirements and the related farm acreages are shown graphically in Figure 7. This diagram — as well as those for other areas — presents the capital amounts and farm sizes required for each level of borrowing cost. For example, at the 2 percent long term interest rate in Figure 7, a farm size of approximately 400 acres and total capital amounts of approximately $150,000 were required to obtain the target income level.

The total capital requirements increased at an increasing rate with additional increments of interest. The capital amounts ranged from approximately $115,000 with zero percent interest to slightly more than $1 million at

Table 10. Estimated Minimum Capital Requirements and Farm Sizes to Earn a $7,000 Return to Operator Labor, Management and Risk; Variable Long Term Interest Rates, Northeastern Oklahoma.

Long Term Interest Rate	Farm Size	Capital Requirements			
		Total Capital	Short Term	Intermediate Term	Long Term
(Percent)	(Acres)	(Dollars)	(Dollars)	(Dollars)	(Dollars)
0.0	298	114,696	6,912	7,772	100,010
0.5	318	122.343	7,373	8,290	106,678
1.0	341	131,083	7,900	8,883	114,299
1.5	367	141,168	8,507	9,566	123,093
2.0	398	152,933	9,216	10,363	133,352
2.5	434	166,838	10,054	11,306	145,477
3.0	478	183,525	11,060	12,436	160,027
3.5	530	203,921	12,289	13,818	177,811
4.0	508	229,268	12,928	46,046	170,293
4.5	568	256,576	14,468	51,530	190,577
5.0	645	291,270	16,424	58,498	216,346
5.5	771	348,080	19,627	69,908	258,543
6.0	1,081	487,838	27,508	97,977	362,351
6.5	2,400	1,082,683	61,051	217,445	804,182

Table 11. Estimated Minimum Capital Requirements and Farm Sizes to Earn a $7,000 Return to Operator Labor, Management and Risk; Variable Long Term Interest Rates, Southeastern Oklahoma.

| Long Term Interest Rate | Farm Size | Capital Requirements | | | |
		Total Capital	Short Term	Intermediate Term	Long Term
(Percent)	(Acres)	(Dollars)	(Dollars)	(Dollars)	(Dollars)
0.0	299	83,554	2,244	11,126	70,184
0.5	312	87,387	2,347	11,636	73,404
1.0	327	91,589	2,460	12,195	76,934
1.5	344	96,216	2,585	12,812	80,820
2.0	362	101,334	2,722	13,493	85,119
2.5	382	107,028	2,875	14,251	89,902
3.0	405	113,401	3,048	15,100	95,254
3.5	431	120,579	3,239	16,056	101,284
4.0	460	128,728	3,458	17,141	108,128
4.5	493	138,058	3,708	18,383	115,965
5.0	532	148,846	3,998	19,820	125,028
5.5	577	161,463	4,337	21,500	135,626
6.0	630	176,417	4,738	23,491	148,187
6.5	695	194,424	5,222	25,889	163,312
7.0	780	218,242	5,862	29,060	183,318
7.5	905	253,439	6,807	33,747	212,883
8.0	1,104	309,050	8,301	41,152	259,596
8.0	1,104	309,050	8,301	41,152	259,596
8.5	1.434	401,224	10,778	53,426	337,020
9.0	2,266	634,215	17,036	84,451	532,727
9.5	6,761	1,891,721	8,301	251,898	1,589,007

Table 12. Estimated Minimum Capital Requirements and Farm Sizes to Earn a $7,000 Return to Operator Labor, Management and Risk; Variable Long Term Interest Rates, Southcentral Oklahoma.

| Long Term Interest Rate | Farm Size | Capital Requirements | | | |
		Total Capital	Short Term	Intermediate Term	Long Term
(Percent)	(Acres)	(Dollars)	(Dollars)	(Dollars)	(Dollars)
0.0	316	94,380	6,474	8,745	79,160
0.5	333	99,293	6,811	9,200	83,280
1.0	351	104,744	7,185	9,705	87,853
1.5	317	110,830	7,602	10,269	92,957
2.0	371	110,830	7,602	10,903	98,691
2.5	421	125,401	8,602	11,620	105,178
3.0	450	134,224	9,207	12,437	112,579
3.5	476	144,376	10,369	14,756	119,248
4.0	515	156,003	11,205	15,946	123,851
4.5	522	168,971	10,774	27,756	130,442
5.0	568	183,970	11,729	30,220	142,021
5.5	600	201,784	13,023	38,809	149,952
6.0	675	223,119	14,321	40,056	168,742
6.5	772	250,566	15,990	41,660	192,915
7.0	925	293,542	19,426	42,755	231,360
7.5	1,192	370,459	23,312	48,633	298,183
8.0	1,784	537,555	33,646	57,040	446,049
8.5	4,180	1,336,350	71,710	218,489	1,045,227

Table 13. Estimated Minimum Capital Requirements and Farm Sizes to Earn a $7,000 Return to Operator Labor, Management and Risk; Variable Long Term Interest Rates, Northwestern Oklahoma.

Long Term Interest Rate	Farm Size	Capital Requirements			
		Total Capital	Short Term	Intermediate Term	Long Term
(Percent)	(Acres)	(Dollars)	(Dollars)	(Dollars)	(Dollars)
0.0	430	112,739	3,700	10,002	98,970
0.5	459	120,172	3,944	10,662	105,498
1.0	491	128,655	4,222	11,414	112,942
1.5	528	138,427	4,543	12,281	121,520
2.0	571	149,804	4,916	13,290	131,509
2.5	623	103,220	5,356	14,481	143,280
3.0	684	179,274	5,884	15,095	147,380
3.5	750	198,832	6,525	17,640	174,549
4.0	852	223,180	7,324	19,800	195,923
4.5	971	254,322	8,347	22,563	223,262
5.0	1,128	295,565	9,700	26,223	259,468
5.5	1,346	352,773	11,577	31,298	209,690
6.0	1,707	447,451	14,685	39,698	392,805
6.5	2,637	690,888	22,674	61,296	606,510
7.0	35,988	9,428,810	9,700	309,450	8,277,295

Table 14. Estimated Minimum Capital Requirements and Farm Sizes to Earn a $7,000 Return to Operator Labor, Management and Risk; Variable Long Term Interest Rates, Panhandle Area of Oklahoma.

Long Term Interest Rate	Farm Size	Capital Requirements			
		Total Capital	Short Term	Intermediate Term	Long Term
(Percent)	(Acres)	(Dollars)	(Dollars)	(Dollars)	(Dollars)
0.0	144	59,417	1,987	7,172	50,257
0.5	148	61,344	2,051	7,404	51,887
1.0	153	63,400	2,120	7,653	53,626
1.5	159	65,600	2,194	7,918	55,486
2.0	164	67,956	2,273	8,203	57,480
2.5	170	70,488	2,357	8,508	59,621
3.0	176	73,216	2.449	8,838	61,929
3.5	184	76,164	2.547	9,193	64,423
4.0	191	79,360	2.654	9,579	67,126
4.5	200	82,835	2,770	9,999	70,065
5.0	209	86,629	2,897	10,457	73,274
5.5	219	90,786	3,036	10,958	76,791
6.0	230	95,363	3,189	11,511	80,662
6.5	242	100,426	3,359	12,122	84,944
7.0	256	106,057	3.547	12,802	89,707
7.5	272	112,356	3,758	13,562	95,035
8.0	289	119,451	3,995	14,419	101,037
8.5	308	127,503	4,264	15,391	107,847
9.0	330	136,719	4,573	16,503	115,642
9.5	350	147,370	4,929	17,789	124,651

6.5 percent. Farm size increased with additional interest increments with the notable exclusion of the acreage obtained at the 4.0 percent interest rate. That is, given this interest rate, a relatively smaller farm size in acres was required to
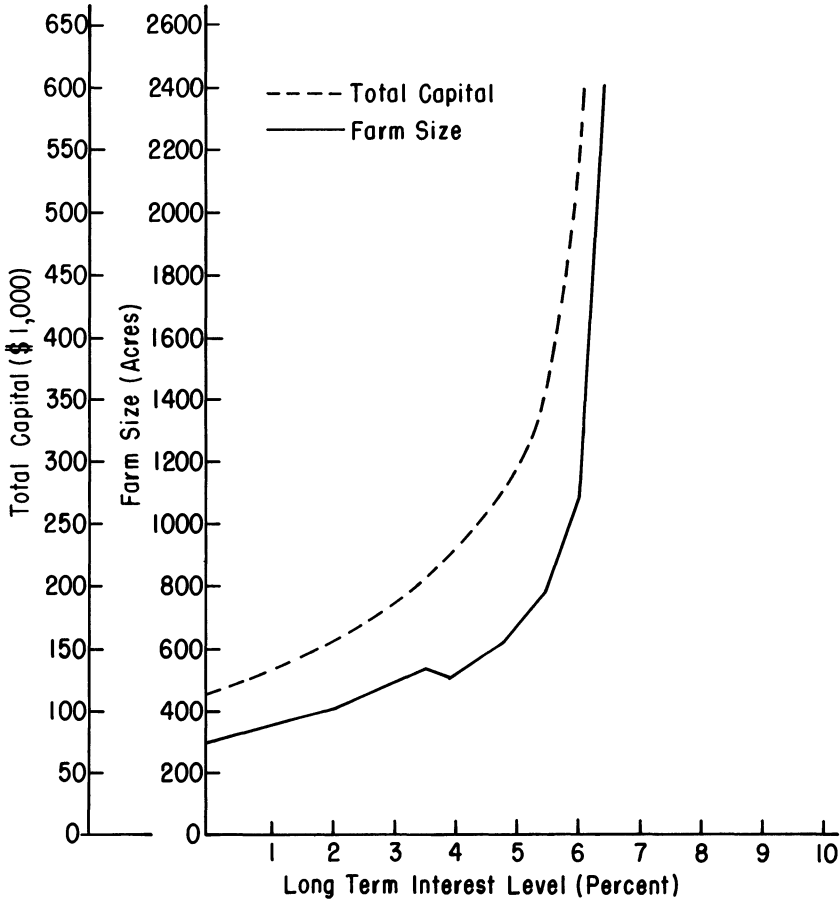
Figure 7. Minimum Capital Amounts and Farm Acreages Required to Obtain a $7,000 Return with Variable Long Term Interest Rates, Northeast Area of Oklahoma.

obtain the $7,000 income target. Total capital requirements increased at this point because of the increased intermediate capital requirements (for cattle) which more than offset the reduced long term capital requirement. Throughout the range of interest rates which resulted in feasible solutions, farm sizes increased from almost 300 acres to 2400 acres.

Southeastern Area

The minimization model for this area yielded feasible solutions for long term interest rates ranging from zero to 9.5 percent. The short, intermediate, and long term capital requirements increased as each increment of long term interest was included. As shown in Figure 8, the total capital requirements
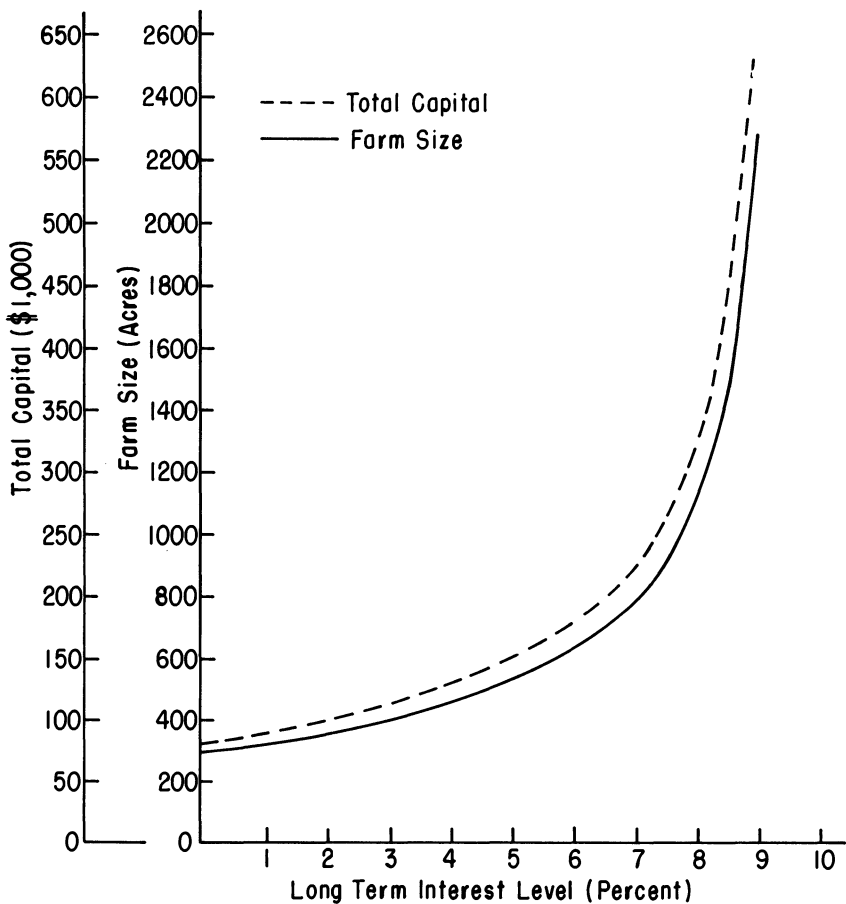
Figure 8. Minimum Capital Amounts and Farm Acreages Required to Obtain a $7,000 Return with Variable Long Term Interest Rates, Southeast Area of Oklahoma.

ranged from approximately $80,000 at zero percent interest to approximately $630,000 at 9.0 percent. Farm sizes ranged from almost 300 acres with no long term borrowing cost to almost 2300 acres with a land charge of 9.0 percent. The total capital requirements and farm sizes needed to obtain the target income with the 9.5 percent long term capital cost are not shown in Figure 8 because of their extraordinary amounts.

The total capital requirements and their associated farm sizes increased at comparable increasing rates as additonal increments of long term interest were included. That is, at each interest level the slopes of the total capital curve and the farm size curve in Figure 8 are approximately equal.

Southcentral Area

Feasible solutions were obtained in the minimization model for this area for long term interest rates ranging from zero to 8.5 percent. Total capital requirements and farm acreages increased at increasing rates with additional increments of long term interest as shown in Figure 9. Unlike the situation depicted in Figure 8, however, the rates of increase were not similar. This is due to changes in the optimal enterprise combinations as the long term borrowing cost was increased. These changes — to relatively land intensive activities — are reflected in the varying amounts of short and intermediate term capital required.
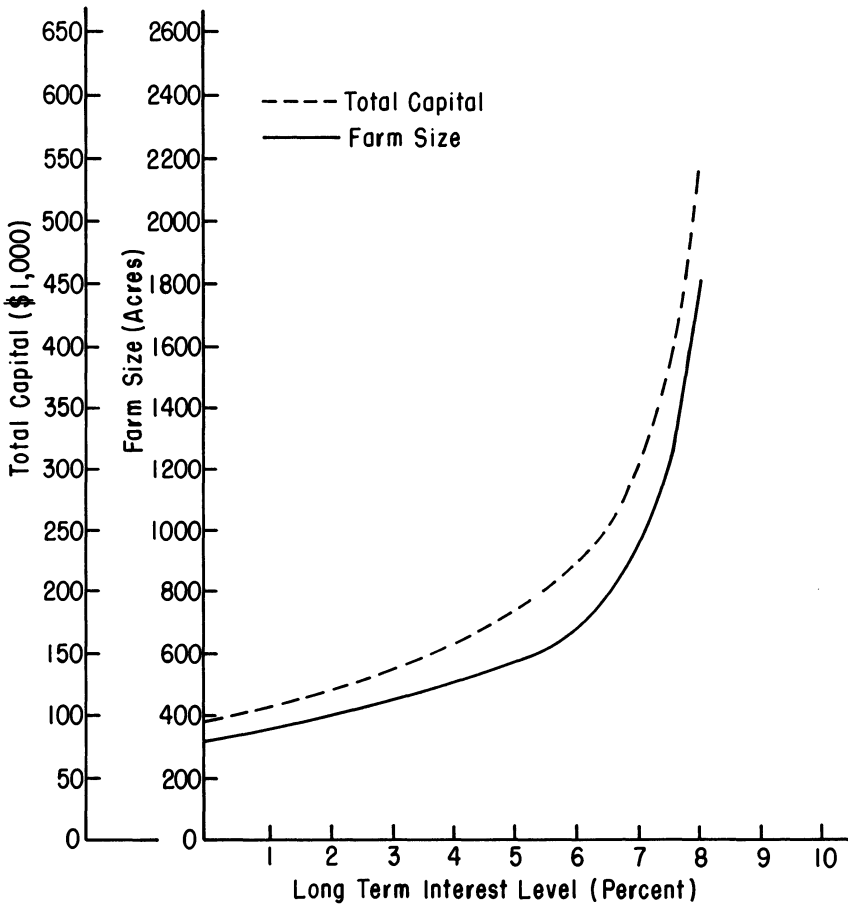

Figure 9. Minimum Capital Amounts and Farm Acreages Required to Obtain a $7,000 Return with Variable Long Term Interest Rates, Southcentral Area of Oklahoma.

Figure 10. Minimum Capital Amounts and Farm Acreages Required to Obtain a $7,000 Return with Variable Long Term Interest Rates, Northwest Area of Oklahoma.

Northwestern Area

Feasible solutions were obtained for this area when the long term interest rate was varied from zero to 7.0 percent. The short, intermediate, and long term capital requirements increased as each additional increment of interest was included within this range. The total capital requirements and farm acreages increased at approximately equal rates as shown in Figure 10.

Panhandle Area

Feasible solutions were obtained in the initial model for this area and when the long term interest rate was varied from 0 to 9.5 percent. The total capital requirements and related farm sizes are shown graphically in Figure 11.

The sensitivity of the minimization model for this area to changes in the long term interest rate was markedly less than for the other areas, as depicted in Figure 11. The total capital requirements ranged from almost $60,000 at zero percent interest to almost $150,000 at 9.5 percent. Farm sizes ranged from almost 150 acres with no long term borrowing cost to slightly more than 350
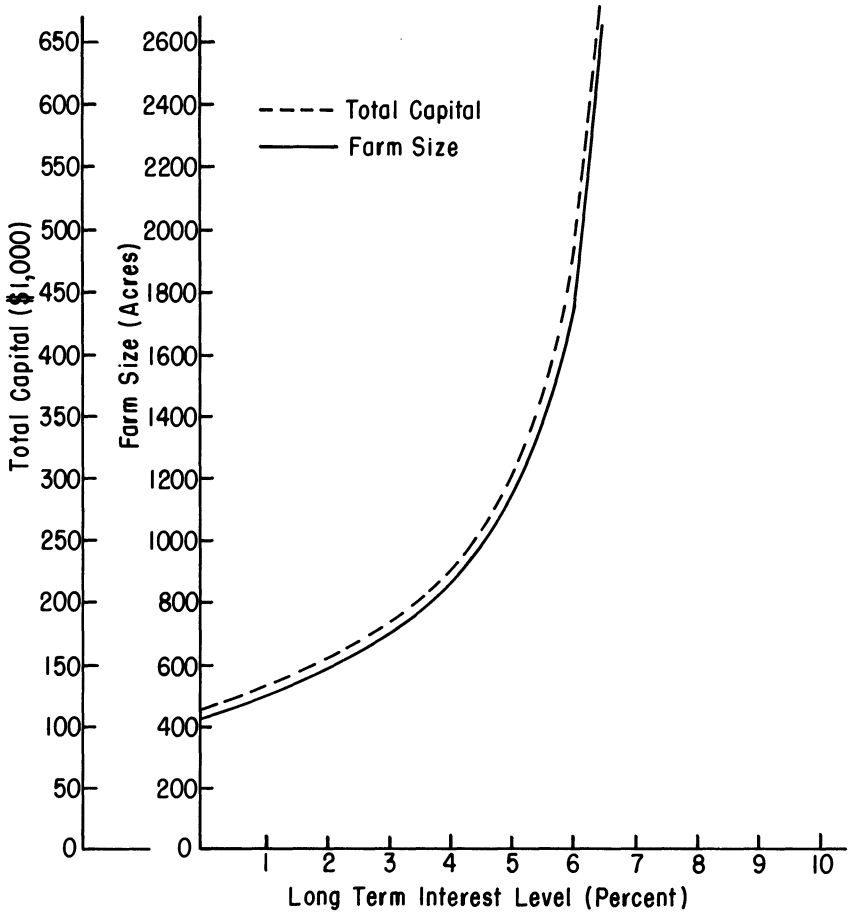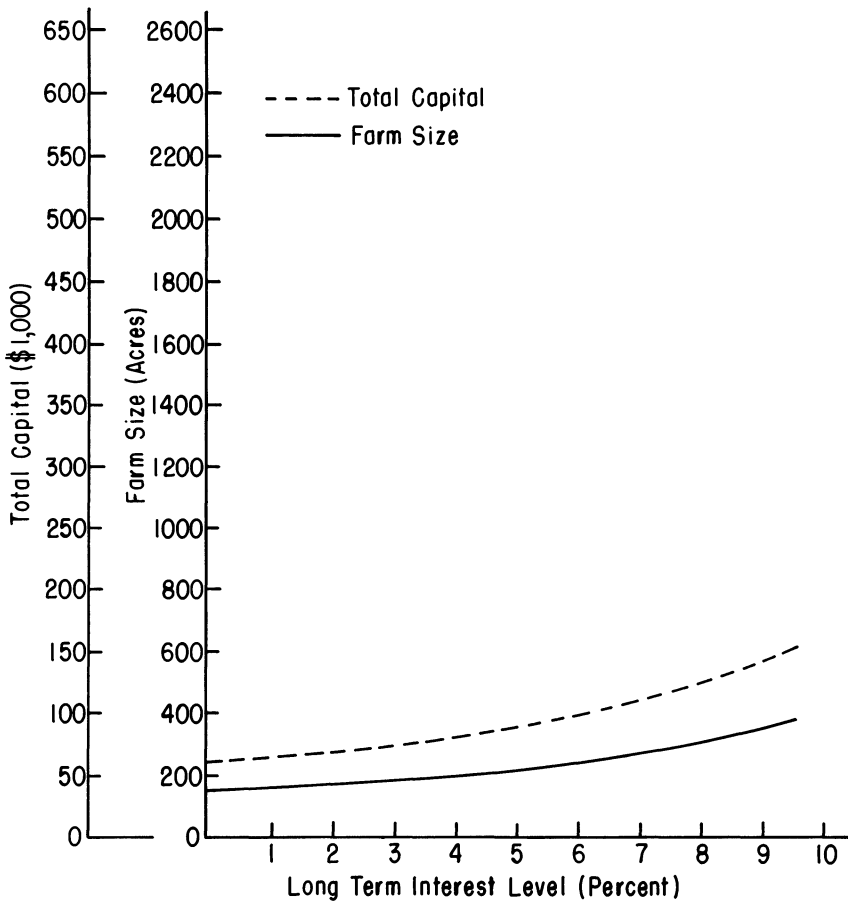
Figure 11. Minimum Capital Amounts and Farm Acreages Required to Obtain a $7,000 Return with Variable Long Term Interest Rates, Panhandle Area of Oklahoma.

acres with a 9.5 percent borrowing cost. Although the capital requirements and farm sizes increased at increasing rates — with additional increments in the long term interest rate — the rate of increase was much less than for the other areas of study.

The estimated minimum farm sizes for the Panhandle are much smaller than those typically found in the area. Concern existed as to the validity of the level of yields and other data contained in each of the enterprise budgets, especially the crop budgets for this area. Consequently, a larger farm size was used — in addition to that estimated via minimization — in the profit maximization model presented in the following section.

Organization of Representative Minimum Sizes of Farms

The preceding section clearly shows that in two areas, northwest and northeast, Oklahoma, a "Minimum Resource Farm" could not be derived under the pure definition of the model. That is, it was either not possible or not reasonable to have a unit that would pay all costs, including interest on long term (land) assets of 7.5 percent, and leave a $7,000 labor-management return to the farmer.[6] Table 15 shows the sizes of farms and organizations for the units selected for further analysis. The units for Northwest and Northeast areas return a $7,000 return to operator, labor and management only if a long term capital charge of 5.5 percent is made, rather than 7.5 percent. Unless operators of those units can borrow for 5.5 percent, invest in some land at a lower price, rent land at 5.5 percent, or have almost one-fourth equity in land, their residual return will not reach $7,000. The effects on cash flows and getting started in farming are analyzed later.

The northeast Oklahoma farm could be classified as a general farm emphasizing soybeans, wheat-soybeans, and cows on intensive bermuda-fescue pastures. The total capital requirement was $348,000. Neither the organization nor the capital requirements changed significantly when the optimization was based on profit maximization for the 772 acre farm.

The southeast Oklahoma farm was a cash crop farm under the minimizing model and total capital required was $253,000. The organization is atypical for this general area in which pasture-forage-beef systems have become very popular. However, this farm is assumed to include 60 percent cropland. The maximizing organization for the 906 acre farm included 27 beef cows and required $265,000 of total capital, in contrast to the organization shown in Table 15.

The farm of the productive agricultural area of southcentral Oklahoma was diversified in cash crops and utilized steers to harvest summer and winter pastures. The winter pastures were derived from extensive wheat acreages.

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[6] In some cases an unreasonably large farm could have met the income goals, but potential diseconomies of size precluded its use in the study.

Table 15. Estimated Resource Requirements to Obtain a $7,000 Return to Operator Labor, Management and Risk; Selected Representative Farm Sizes, Five Areas of Oklahoma.

Item	Units	Areas of Oklahoma				
		Northeast	Southeast	Southcentral	Northwest	Panhandle
Total Land	Acres	772	906	1,193	1,346	272
Cropland						Irrigated
Soybeans - A	Acres	232	91	239		farm
Soybeans - B	Acres	39				
Wheat - A	Acres			130	404	
Wheat - B	Acres			227		
Wheat and Soybeans	Acres	116				
Milo - B	Acres		362	239	533	
Dryland Milo	Acres					81
Irrigated Corn	Acres					81
Bonel Rye	Acres			15		
Fescue and Bermuda	Acres	232				
Bermuda Loose Hay	Acres			11		
Sudan Hay	Acres				5	
Alfalfa Hay	Acres		91	93		
Livestock Activities						
Fall Cow-Calf	Animals	144				
October-August Steers	Animals			62		
March Steers	Animals			171	107	
May Steers	Animals	21		74		
October-October Steers	Animals				58	
Summer Steers	Animals					27
Operator Labor Required						
First Quarter	Hours	475	451	475	447	75
Second Quarter	Hours	700	700	700	511	378
Third Quarter	Hours	698	423	750	434	241
Fourth Quarter	Hours	352	96	373	229	61
Hired Labor	Hours	250	150	50		
Total Capital Requirements	Dollars	348,081	253,439	370,460	352,567	112,357
Short-term	Dollars	19,628	6,808	23,644	11,578	3,758
Intermediate-term	Dollars	69,908	33,748	48,633	31,299	13,563
Tractor Investment	Dollars	5,612	15,777	18,672	16,543	4,834
Equipment Investment	Dollars	19,634	17,971	27,846	13,744	3,268
Machinery Investment	Dollars	3,118		2,116	1,012	125
Livestock Investment	Dollars	41,544				
Irrigation Investment	Dollars					5,336
Long-term	Dollars	258,543	212,884	298,183	309,690	95,036
Returns to Operator Labor, Management, and Risk	Dollars	7,000[a]	7,000	7,000	7,000[a]	7,000

[a]This return assumes a 5.5 percent charge on land capital rather than 7.5 percent used for the other areas.

Total capital was $370,000. The profit maximizing solution for the 1,193 acres reduced milo by approximately 100 acres and simultaneously added alfalfa and wheat. Most of the change was imposed by the addition of a new restriction on grain sorghum so that a maximum of 25 percent rather than 50 percent of the land could be devoted to grain sorghum. The area farm management specialists for this area suggested this change based on their experiences with the crop in the area. The net decrease in return to labor and management was $3,810. The total capital requirement in the maximizing plan was $376,000.

The northwest Oklahoma farm was a cash grain - stocker steer operation utilizing a total of $310,000 of capital. Profit maximization for the 1,346 acres had little effect on capital requirements or organization.

Two farms were used to represent the Panhandle farm in profit maximizing work. The first included 272 acres producing dryland milo, irrigated corn and steers grazing on native pasture in the summer. The total capital required amounted to $112,000. The profit maximizing model did not change the organization or capital use. The second farm, a 640 acre farm, required $265,000 in total capital and promised a residual return of $17,400 to labor and management.

Profit Maximizing Plans for the "Minimum Resource Forms"

The prices presented in Table 7 for "low" and "high" product price levels were used, in addition to average prices, in the model to maximize returns for a given size of farm. The resulting organization, labor requirements, returns to labor and management, and the capital requirements are presented in Tables 16, 17, 18, 19, and 20. In all cases a long term capital charge of 7.5 percent is made. Thus, returns to labor and management for some areas are not comparable to those for the minimum resource results in Table 5 as explained earlier.

Analysis of Farm Entry Opportunities

The determination of capital requirements and returns to operator labor, management, and risk under the three price assumptions for each area permits further analysis as to the feasibility of entry under each of these conditions. The effects of various operator equity-land rental levels and alternative financial assumptions upon first year cash flows may also be evaluated. The first year cash flows provide indications of the relative ease of accomplishing entry. Tables 21 thru 32 were constructed to portray cash flows for six selected equity-land rental situations under each product pricing assumption for each of the study areas. The composition of these tables requires preliminary explanation. Thus, the remainder of this section is devoted to:
  (1) defining the various levels of operator equity-land rental used,
  (2) explaining the effects of alternative equity-land rental arrangements upon the amounts of debt capital required,

Table 16. Estimated Profit Maximization Enterprise Combinations, Labor and Capital Requirements; Variable Product Prices, Northeastern Area of Oklahoma.

Item	Units	Price Level Low	Price Level Average	Price Level High
Total Land	Acres	772	772	772
Cropland				
Fescue and Bermuda	Acres	232	232	232
Soybeans-A	Acres	232	232	232
Soybeans-B	Acres	39	39	39
Wheat and Soybeans	Acres	116	116	116
Livestock Activities				
Fall Cow-Calf	Animals		144	
Spring Cow-Calf	Animals		0	108
May Steers	Animals	137	21	140
Operator Labor Required				
First Quarter	Hours	402	475	475
Second Quarter	Hours	642	700	700
Third Quarter	Hours	405	698	657
Fourth Quarter	Hours	209	352	416
Hired Labor	Hours		134	329
Short Term Capital	Dollars	17,875	19,634	24,258
Intermediate Term Capital	Dollars	20,099	69,929	58,535
Tractor Investment	Dollars	5,613	5,613	5,613
Equipment Investment	Dollars	13,772	19,640	18,733
Machinery Investment	Dollars	71	3,119	3,023
u Livestock Investment	Dollars		41,556	31,165
Long Term Capital	Dollars	258,620	258,620	258,620
Total Capital	Dollars	296,595	348,184	341,414
Returns to Operator Labor				
Management, and Risk	Dollars	-18,491	1,829	39,134

(3) describing the types of financial alternatives assumed, and

(4) explaining the calculation of first year debt retirement payments.

It may be helpful to review one of the tables (e.g. Table 21) and refer to it occasionally while studying succeeding sections.

Equity-Land Rental Situations

Zero Operator Equity denotes an operator who owns no capital resources and must acquire 100 percent financing to overcome capital barriers to entry.

25 Percent Operator Equity describes a prospective entrant who owns one-fourth of the capital resources required to complete entry. More specifically, it defines an operator who owns 25 percent of the short, intermediate, and long term capital requirements. This perhaps describes a low resource farmer who has accumulated savings equal to this equity level or one who has accumulated equity capital through previous farming operations.

50 Percent Operator Equity means the operator owns one-half of the total capital assets needed and borrows the balance to accomplish entry. Although not likely to be predominant in the context of low resource, beginning farmers, a 50 percent equity situation provides a benchmark for analysis as well as implications for potential long run adjustments.

Table 17. Estimated Profit Maximization Enterprise Combinations, Labor and Capital Requirements; Variable Product Prices, Southeastern Area of Oklahoma.

Item	Units	Low	Average	High
			Price Level	
Total Land	Acres	906	906	906
Cropland	Acres	544	544	544
Grain Sorghum	Acres	362	360	362
Bermuda Hay	Acres		2	
Soybeans	Acres	91	91	91
Alfalfa	Acres	91	91	91
Livestock Enterprises				
Spring Cow-Calf	Animals		27	27
Operator Labor Required				
First Quarter	Hours	451	475	475
Second Quarter	Hours	700	700	700
Third Quarter	Hours	423	489	487
Fourth Quarter	Hours	96	149	148
Hired Labor	Hours	150	241	242
Short Term Capital	Dollars	6,809	8,495	8,424
Intermediate Term Capital	Dollars	33,752	43,610	43,476
Tractor Investment	Dollars	15,779	15,803	15,779
Equipment Investment	Dollars	17,973	19,351	19,228
Machinery Investment	Dollars		583	584
Livestock Investment	Dollars		7,873	7,885
Long Term Capital	Dollars	212,910	212,910	212,910
Total Capital	Dollars	253,471	265,015	264,810
Returns to Operator Labor, Management, and Risk	Dollars	-12,221	7,058	42,444

25 Percent Land Rental and Zero Equity denotes an operator who rents one-fourth of the land requirements reflected by the representative farm size. He owns no short, intermediate, or long term capital resources and must borrow to meet these requirements.

50 Percent Land Rental and Zero Equity means the operator rents one-half the total land required. That is, 50 percent of the long term capital assets needed are acquired through rental. As in the preceding situation this represents a transfer of capital requirements from long term to short term. That is, most cash rental arrangements specify annual payments which represent short term capital. Consequently, the short term and long term requirements shown in Tables 11 thru 22 for the various rental levels are altered to reflect the substitutions.

25 Percent Land Rental-25 Percent Operator Equity refers to an operator who rents one-fourth of the land requirement in addition to owning one-fourth of the other total capital assets required.

Table 18. Estimated Profit Maximization Enterprise Combinations, Labor and Capital Requirements; Variable Product Prices, Southcentral Area of Oklahoma.

Items	Units	Price Level		
		Low	Average	High
Total Land	Acres	1,193	1,193	1,193
Cropland	Acres			
Milo	Acres	119	119	119
Wheat-A	Acres	197	108	
Wheat-B	Acres		346	348
Alfalfa	Acres		123	477
Bermuda Hay	Acres	7	12	10
Soybeans	Acres	239	239	
Bonel Rye	Acres	41	8	
Livestock Enterprises				
October-August Steers	Animals		48	57
March Steers	Animals		251	203
May Steers	Animals	199	37	
Operator Labor Required				
First Quarter	Hours	426	475	283
Second Quarter	Hours	499	700	700
Third Quarter	Hours	326	750	750
Fourth Quarter	Hours	303	372	243
Hired Labor	Hours		195	1,874
Short Term Capital	Dollars	14,213	23,036	25,675
Intermediate Term Capital	Dollars	22,000	54,661	101,061
Tractor Investment	Dollars	11,555	20,609	28,123
Equipment Investment	Dollars	9,409	32,091	71,181
Machinery Investment	Dollars	1,036	1,960	1,756
Long Term Capital	Dollars	298,250	298,250	298,250
Total Capital	Dollars	334,463	376,432	425,377
Returns to Operator Labor, Management, and Risk	Dollars	-21,841	3,190	62,959

Loans Obtained

The capital amounts actually borrowed in the zero, 25, and 50 percent equity situations reflect corresponding deductions from the total capital requirements. For example, with the 25 percent equity level, one-fourth of the short, intermediate, and long term capital requirements were subtracted to arrive at the respective amounts borrowed. Separately included are the stock purchase requirements which constitute a portion of the total capital borrowed. Their determination will be discussed in the following section.

Some loans were not obtainable for zero equity levels due to borrowing restrictions which preclude 100 percent financing. These cases are denoted as NA (Not Applicable). Entry for those cases was infeasible.

Actual capital amounts borrowed in the 25 to 50 percent land rental situations (with zero equity) are identical to the previously determined capital

Table 19. Estimated Profit Maximization Enterprise Combinations, Labor and Capital Requirements; Variable Product Prices, Northwestern Area of Oklahoma.

Items	Units	Price Level		
		Low	Average	High
Total Land	Acres	1,346	1,346	1,346
Cropland	Acres			
Milo	Acres	533	533	533
Wheat	Acres	404	404	354
Sudan Hay	Acres	5	5	5
Alfalfa Hay	Acres			50
Livestock Enterprises				
March Steers	Animals	107	107	94
October Steers	Animals	58	58	58
Operator Labor Required				
First Quarter	Hours	446	446	439
Second Quarter	Hours	511	511	700
Third Quarter	Hours	434	434	522
Fourth Quarter	Hours	229	229	213
Hired Labor	Hours			
Short Term Capital	Dollars	11,574	11,574	12,740
Intermediate Term	Dollars	31,288	31,288	35,779
Tractor Investment	Dollars	16,537	16,537	18,360
Equipment Investment	Dollars	13,739	13,739	16,408
Machinery Investment	Dollars	1,011	1,011	1,011
Long Term Capital	Dollars	309,580	309,580	309,580
Total Capital	Dollars	352,648	352,648	358,280
Returns to Operator Labor, Management, and Risk	Dollars	-20,521	806	39,176

requirement because no resource ownership is involved. Stock purchase requirements are listed separately. Loans obtainable in the 25 percent land rental-25 percent equity situation differ from total farm capital requirements by the amount deducted to account for owned resources as well as the stock purchases.

Financing Assumptions Used in the Models

The relevant financial intermediaries were FHA, PCA's, and FLBA's. These lenders were selected because their terms were determined most conducive to overcoming capital barriers to entry. Private lenders would have been considered an acceptable financing alternative; however, their terms of financing long term capital were not standardized well enough to permit a thorough analysis. The remainder of this section explains the applicability of the selected lending alternatives and their financing terms to each of the equity-land rental situations as well as the subsequent calculation of interest and principal payments.

Table 20. Estimated Profit Maximization Enterprise Combinations, Labor and Capital Requirements; Variable Product Prices, Panhandle Area of Oklahoma.

Items	Units	Price Level			
		Low	Average	Average	High
Total Land	Acres	272	272	640	272
Cropland	Acres	162	162	384	162
Dryland Milo	Acres	81	81	192	81
Irrigated Corn	Acres	81	81	192	81
Livestock Activities					
Summer Steers	Animals		27	65	27
Operator Labor Required					
First Quarter	Hours	75	75	177	75
Second Quarter	Hours	351	378	700	378
Third Quarter	Hours	200	241	569	241
Fourth Quarter	Hours	47	61	144	61
Hired Labor	Hours			192	
Short Term Capital	Dollars	3,712	3,757	8,858	3,757
Intermediate Term Capital	Dollars	13,415	13,560	31,967	13,560
Tractor Investment	Dollars	4,833	4,833	11,394	4,833
Equipment Investment	Dollars	3,247	3,267	7,702	3,267
Machinery Investment	Dollars		125	294	125
Irrigation Investment	Dollars	5,339	5,335	12,577	5,335
Long Term Capital	Dollars	95,015	95,015	224,000	95,015
Total Capital	Dollars	112,140	112,332	264,926	112,332
Returns to Operator Labor, Management, and Risk	Dollars	-2,976	6,998	17,472	25,479

Financing Zero Equity and Variable Land Rental Situations

As outlined in the preceding section, zero equity levels are associated with three land rental levels: (1) no land rental, (2) 25 percent land rental, and (3) 50 percent land rental. Because the prospective entrant owns no capital resources he is eligible for the maximum obtainable loans from FHA. The interest on FHA operating loans—short and intermediate term capital—is 8.75 percent. The maximum obtainable operating loan is $50,000. Operating capital requirements in excess of $50,000 are assumed borrowed from PCA's at 9.36 percent interest. PCA borrowers must purchase or borrow an amount equal to 5 percent of the total PCA loan to fulfill stock requirements. The total PCA loan amount is determined by dividing .95 into the amount actually needed. The resulting amount is comprised of 5 percent stock requirements and 95 percent actual proceeds. The total of these provide the basis for calculating annual interest charges by applying the 9.36 percent interest rate.

The short and intermediate term requirements are presented separately in the tables. In those instances where their totals exceed the maximum FHA loan obtainable, the $50,000 allowable is considered first as intermediate term capital and secondly, as short term capital. For example, if the requirements

are $2,000 for short term and $49,000 for intermediate term capital, all of the latter and $1,000 of the former is assumed borrowed from FHA. The remaining $1,000 is assumed borrowed from PCA, the participating lender.

The interest rate for FHA land loans is 5.0 percent. The maximum long term loan obtainable is $100,000, providing total long term requirements do not exceed $225,000. In the zero equity situations where land capital requirements are greater than $225,000, it becomes infeasible for the prospective entrant to obtain 100 percent financing and overcome capital barriers.

Participating loans with FLBA's are assumed for long term capital requirements between $100,000 and $225,000. The interest rate for FLBA is 8.5 percent. The amount needed from the FLBA was divided by .94 to arrive at the *total* FLBA loan. The resulting total loan amount is comprised of a one percent loan closing charge, a 5 percent stock requirement, and the 94 percent actually received by the borrower. Interest charges are based on the 100 percent or total FLBA loan. Also, for simplification, the loan closing charge is considered part of the stock requirements in Table 11 thru 22.

Financing Assumptions For Non-Zero Equity Levels

The equity situations investigated include (1) 25 percent operator equity, (2) 50 percent operator equity, and (3) 25 percent equity-25 percent land rental. These variations in determining repayment capacities portray beginning farmers who own some portion of the capital requirements. They are not qualified to obtain low-interest loans from FHA because they own or have access to a level of resources which make them acceptable credit risks for other types of institutional lenders. That is, FHA will grant loans to only those applicants who cannot obtain credit from other sources on reasonable terms. The operators depicted in these situations are assumed capable of securing debt capital from other lenders. Borrowed capital must therefore be obtained from PCA's and FLBA's subject to their respective interest rates and stock purchase requirements.

Calculation of First Year Principal Payments

No principal payments are necessary for short term capital amounts borrowed because this classification includes operating input costs already deducted in each of the enterprise budgets.

PCA's and FHA will grant intermediate term loans for a maximum length of seven years and typically require that equal principal payments be made annually. Because this period of time afforded the lowest annual principal payments (relative to shorter time period) it was most conducive for a beginning operator, and was used in the determination of principal payments and, ultimately, first year cash flows. The first year principal payments are, therefore, one-seventh of the intermediate capital requirements for each equity-land rental situation in each of the study areas.

FLBA's and FHA grant land loans for maximum lengths of 30 and 40 years, respectively. These financiers will amortize loans so that a fixed payment including both interest and principal is made annually. As the loan is gradually repaid, the portion of this payment comprised of interest decreases while the portion of the fixed payment made up of principal increases. Therefore, principal payments will be lowest in the early years of repayment. Conversely, interest costs will be higher in the first few years. The first interest plus principal payment will include interest charges on the total amount of the loan and a small principal payment—as determined by the relevant amortization factors.

The factor for FLBA's was 9.305 percent of the total amount borrowed. That is, each annual payment will equal to 9.305 percent of the face amount of the loan. The portion of the first year payment comprised by principal can be determined by subtracting the actual interest rate of 8.5 percent. Thus, the first year principal payment on a 30-year FLBA loan will be 0.805 percent of the amount borrowed. The amortization factor for a 40-year FHA loan is 5.83 percent of the amount borrowed. The first year principal payment is equal to 0.83 percent of the loan.

Cash Flows and Residuals for Family Living

As previously explained, maximum income levels were determined for three product price levels in each of the study areas by means of linear programming. Interest rates used in the LP model were slightly different from those actually assessed by the three financial intermediaries assumed relevant. The specific financial needs for each situation are difficult to incorporate into the LP model. Therefore, model interest charges were adjusted to evaluate the effects of actual interest charges on cash flows. This was done by adding back total model interest charges to the initial model income to get total returns to capital, owned land, labor, management, and risk. Thus, the total LP model incomes are identical for each of the 0-50 percent equity (with no land rental) situations because their total capital requirements are alike. Conversely, the total model incomes for the land rental situations differ because deductions are made for relevant rental charges.

Depreciation was deducted in each of the enterprise budgets used in the LP model. Because depreciation does not represent a direct cash outlay it, too, must be included in arriving at the total cash residual available for debt retirement and family living, capital replacement and investment or saving. Depreciation charges vary not only from area to area but also from price level to price level due to differences in the optimal enterprise combinations.

Once the total cash residual to owned land, capital, labor ownership costs, management and risk is determined, actual interest and principal payments are deducted to determine residual cash available for family living,

capital replacement and investment or saving for the first year.[7] Cash flows are presented for each area for the different operator equity and land rental situations, using average and high product prices. Cash flows for each area with low prices are not presented for each of the equity-land rental situations because actual interest and principal payments typically exceeded the cash residuals available for family living and debt retirement. However, cash flows are shown for the 50 percent equity situation in each area with the low product price assumptions. This provides benchmarks for analyzing the relative feasibility of completing entry under more adverse market price conditions. The remainder of this section is devoted to descriptions of the cash flows obtained in each of the study areas.

Northeastern Area

The land price for this area was high. The land price was calculated in the same manner as for the other areas, however, the effects of increasing recreational activity and a location close to the large urban center of Tulsa are reflected in the price. This fact should, therefore, be acknowledged when analyzing the empirical results.

Average Product Prices: Entry was infeasible in the zero equity situation (Table 21). The long term capital (land) requirement was $33,620 greater than the maximum $225,000 indebtedness allowed by FHA for 100 percent financing. Entry was also infeasible in the 25 percent equity, 25 percent land rental, and 50 percent land rental situations. The amounts of cash available after principal and interest payments had been made were negative in each of these cases. In the 25 percent equity-25 percent land rental situation, the cash residual for family living was less than $900. That is, entry could have been accomplished in this situation if the operator was willing and able to accept less than an opportunity return for his labor, management, and risk and/or was capable of reducing his unallocated overhead costs, as outlined in the theoretical considerations. Other entry strategies are discussed in a later overview section.

The 50 percent equity situation with average prices, yielded a residual income for family living of over $10,000. Although entry would be easily accomplished in this situation, the assumptions involved provide more of a benchmark for analysis than a probable environment for a beginning farmer.

The zero equity situation was infeasible with high prices because of the excessive long term capital requirements and subsequent lack of financing (Table 22). Entry was feasible in all other equity-land rental situations. The amounts of cash available for family living ranged from $29,759.73 to $48,184.04. This range is comparable to that for the average prices, however, the absolute levels are much greater.

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[7] In further discussion the residual will be called "cash available for family living" for simplicity. The reader should remember the broader meaning.

Table 21. Estimated Capital Requirements and First Year Cash Flow for Beginning Farmers, for Selected Equity — Land Rental Situations and Average Product Prices, Northeastern Oklahoma.

Equity or Rental (Percent)	0% Equity	25% Equity	50% Equity	25% Land Rental 0% Equity	50% Land Rental 0% Equity	25% Land Rental 25% Equity
Total Capital Assets (Excluding Rented Lands)						
A. Short Term	19,633.72	19,633.72	19,633.72	23,702.16	27,770.60	23,702.16
B. Intermediate Term	69,929.03	69,929.03	69,929.03	69,929.03	69,929.03	69,929.03
C. Long Term	258,620.00	258,620.00	258,620.00	193,965.00	129,310.00	193,965.00
Total	348,182.75	348,192.75	348,182.75	287,596.19	227,009.63	287,596.19
Capital Borrowed						
A. Short Term Capital	N/A	14,725.29	9,816,.86	23,702.16	27,770.60	18,793.73
B. Short Term Stock Requirements	N/A	775.02	516.68	1,274.48	1,461.61	989.14
C. Intermediate Term Capital	N/A	52,446.77	34,964.52	69,929.03	69,929.03	52,446.77
D. Intermediate Term Stock Requirements	N/A	2,760.36	1,840.24	1,048.90	1,048.90	2,760.36
E. Long Term Capital	N/A	193,965.00	129,310.00	193,965.00	129,310.00	129,310.00
F. Long Term Stock Requirements	N/A	12,380.74	8,253.83	5,997.77	1,870.85	8,253.83
Total	N/A	277,053.18	184,702.13	295,890.34	231,390.99	212,553.83
Interest Charges						
A. Short Term	N/A	1,450.83	967.22	2,335.29	2,736.13	1,851.68
B. Intermediate Term	N/A	5,167.39	3,444.93	6,338.53	6,338.53	5,167.39
C. Long Term	N/A	17,539.38	11,692.93	13,496.84	7,650.37	11,692.93
Total	N/A	24,157.60	16,105.08	22,220.66	16,725.03	18,712.00
Principal Payments						
A. Intermediate Term	N/A	7,886.73	5,257.82	10,139.70	10,139.70	7,886.73
B. Long Term	N/A	1,661.08	1,107.39	1,637.70	1,081.01	1,107.39
Total	N/A	9,547.81	6,365.21	11,777.40	11,220.71	8,994.12
Cash Residual for Owned Land, Labor, Management, Depreciation, Capital and Risk						
A. LP Model Income	N/A	28,838.62	28,838.62	24,770.18	20,701.74	24,770.18
B. Depreciation	N/A	3,818.54	3,818.54	3,818.54	3,818.54	3,818.54
Total	N/A	32,657.16	32,657.16	28,588.72	24,520.28	28,588.72
Interest and Principal Payment	N/A	33,705.41	22,470.29	33,998.06	27,945.74	27,706.12
Cash Available for Family Living	N/A	−1,048.25	10,186.87	−5,409.34	−3,425.46	882.60

Table 22. Estimated Capital Requirements and First Year Cash Flow for Beginning Farmers, for Selected Equity — Land Rental Situations and High Product Prices, Northeastern Oklahoma.

Equity or Rental (Percent)	0% Equity	25% Equity	50% Equity	25% Land Rental 0% Equity	50% Land Rental 0% Equity	25% Land Rental 25% Equity
Total Capital Assets (Excluding Rented Lands)						
A. Short Term	24,257.51	24,257.51	24,257.51	28,325.95	32,394.39	28,325.95
B. Intermediate Term	58,535.44	58,535.44	58,535.44	58,535.44	58,535.44	58,535.44
C. Long Term	258,620.00	258,620.00	258,620.00	193,965.00	129,310.00	193,965.00
Total	341,412.95	341,412.95	341,412.95	280.820.39	220,239.83	280,826.39
Capital Borrowed						
A. Short Term Capital	N/A	18,193.13	12,128.75	28,325.95	32,394.39	22,261.57
B. Short Term Stock Requirements	N/A	957.53	638.36	1,490.84	1,704.97	1,171.66
C. Intermediate Term Capital	N/A	43,901.58	29,267.72	58,535.44	58,535.44	43,901.58
D. Intermediate Term Stock Requirements	N/A	2,310.61	1,540.41	449.23	449.23	2,310.61
E. Long Term Capital	N/A	11,637.90	7,758.60	5,637.90	1,758.60	7,758.60
F. Long Term Stock Requirements	N/A	12,380.75	8,253.82	5,997.77	1,870.85	8,253.83
Total	N/A	271,708.59	181,139.06	288,764.23	224,264.88	207,209.25
Interest Charges						
A. Short Term	N/A	1,792.50	1,195.00	2,790.85	3,191.70	2,193.35
B. Intermediate Term	N/A	4,325.46	2,883.64	5,215.97	5,215.97	4,325.46
C. Long Term	N/A	17,539.38	11,692.93	13,496.84	7,650.37	11,692.93
Total	N/A	23,657.34	15,771.56	21,503.66	16,058.04	18,211.74
Principal Payments						
A. Intermediate Term	N/A	6,601.74	4,401.16	8,426.38	8,426.38	6,601.74
B. Long Term	N/A	1,661.08	1,107.39	1,637.70	1,081.01	1,107.39
Total	N/A	8,262.82	5,508.55	10,064.08	9,507.39	7,709.13
Cash Residual for Owned Land, Labor, Management, Depreciation, Capital and Risk						
A. LP Model Income	N/A	65,567.79	65,567.79	61,499.35	57,430.91	61,499.35
B. Depreciation	N/A	3,896.36	3,896.36	3,896.36	3,896.36	3,896.36
Total	N/A	69,464.15	69,464.15	65,395.71	61,327.27	65,395.71
Interest and Principal Payment	N/A	31,920.16	21,280.11	31,567.74	25,565.43	25,920.87
Cash Available for Family Living	N/A	37,543.99	48,184.04	29,759.53	35,761.84	39,474.84

The 50 percent equity situation is the only one presented for the low price level (Table 23). The cash available for family living was a significant negative amount. Because this situation would typically provide the easiest entry, it may be assumed that the other equity-land rental arrangements would similarly render entry infeasible.

Southeastern Area

Average Product Prices: The capital barriers to entry were relatively easier to overcome in this area than in the northeastern area (Table 24). The zero equity situation provided almost $3,300 for family living. The 25 percent equity level and the 25 percent land rental situation yielded almost $7,000 in cash residual. The cash available for family living for all the equity-land rental situations ranged from $3,267.96 to $14,703.53.

High Product Prices: Only a slight change occurred in the optimal enterprise combinations. All the equity-land rental situations provided a means of entry under these price assumptions (Table 25). The amounts of cash available for family living ranged from almost $39,000 with zero equity to over $50,000 with 50 percent equity.

Low Product Prices: With low prices and 50 percent equity the cash available for family living was -$3,330.08 (Table 23). Again, this benchmark indicates that other situations are even less feasible. Although required loans could have been obtained, actual operation would yield substantial deficits.

Southcentral Area

Average Product Prices: Like the northeastern area, entry in this region was infeasible with zero equity (Table 26). This also holds for the other price levels and was due to the excessive long term capital requirements which precluded 100 percent financing.

The 25 percent land rental situation provided less than $700 for family living. The 50 percent land rental arrangement yielded slightly more than $4,000 and the 0 percent equity situation furnished less than $4,000.

High Product Prices: Zero equity was infeasible because of the excessive land capital requirement (Table 27). All the equity-land rental situations provided cash residuals for family living which were sufficient to afford comfortable entry.

Low Product Prices: The cash available for family living with 50 percent operator equity was less in this area than for other areas (Table 23). Consequently, it may not only be assumed that the other equity-land rental situations would also prove unprofitable, but also indicates the Southcentral area has the most formidable capital barriers to entry of any of the study areas.

Northwestern Area

Average Product Prices: Entry was infeasible in this area if the entrant required 100 percent financing. The long term capital requirement constituted

Table 23. Estimated Capital Requirements and First Year Cash Flow for Beginning Farmers, for Selected Equity — Land Rental Situations and Low Product Prices, Northeastern Oklahoma.

Areas	50%Equity; Low Prices				
	Northeastern	Southeastern	Southcentral	Northwestern	Panhandle
Total Capital Assets (Excluding Rented Lands)					
A. Short Term	17,875.01	6,808.77	14,213.48	11,780.38	3,711.84
B. Intermediate Term	20,099.13	33,751.76	21,999.52	31,287.57	13,414.55
C. Long Term	258,620.00	212,910.00	298,250.00	309,580.00	95,014.50
Total	296,594.14	253,470.53	334,463.00	352,647.95	112,140.89
Capital Borrowed					
A. Short Term Capital	8,937.51	3,404.39	7,106.74	5,890.19	1,855.92
B. Short Term Stock Requirements	470.40	179.18	374.04	310.01	353.01
C. Intermediate Term Capital	10,049.57	16,875.88	10,999.76	15,643.79	6,707.27
D. Intermediate Term Stock Requirements	528.92	888.20	578.93	823.36	353.01
E. Long Term Capital	129,310.00	106,455.00	149,125.00	154,643.79	47,507.25
F. Long Term Stock Requirements	8,253.82	6,795.00	9,518.61	9,880.20	3,032.38
Total	157,550.22	134,597.65	188,703.08	187,337.55	59,553.51
Interest Charges					
A. Short Term	880.58	335.43	700.20	580.34	182.86
B. Intermediate Term	990.15	1,662.72	1,083.77	1,541.33	660.84
C. Long Term	11,692.92	9,626.25	13,484.71	13,996.97	4,295.87
Total	13,563.65	11,624.39	15,268.68	16,118.65	5,139.57
Principal Payments					
A. Intermediate Term	1,511.21	2,537.73	1,654.10	2,352.45	1,008.61
B. Long Term	1,107.39	911.66	1,277.08	1,325.60	406.84
Total	2,618.60	3,449.39	2,931.18	3,678.05	1,415.45
Cash Residual for Owned Land, Labor, Management, Depreciation, Capital and Risk					
A. LP Model Income	4,133.14	8,195.00	3,605.63	6,357.51	5,606.23
B. Depreciation	3,337.65	3,548.72	2,403.95	3,733.14	1,037.51
Total	7,470.79	11,743.72	6,009.58	10,090.65	6,643.74
Interest and Principal Payment	16,182.25	15,073.78	18,199.86	19,796.69	6,555.02
Cash Available for Family Living	−8,711.46	−3,330.06	−12,190.28	−9,706.04	88.72

Table 24. Estimated Capital Requirements and First Year Cash Flow for Beginning Farmers, for Selected Equity — Land Rental Situations and Average Product Prices, Southeastern Oklahoma.

Equity or Rental (Percent)	0% Equity	25% Equity	50% Equity	25% Land Rental 0% Equity	50% Land Rental 0% Equity	25% Land Rental 25% Equity
Total Capital Assets (Excluding Rented Lands)						
A. Short Term	8,494.70	8,494.70	8,494.70	10,166.27	11,873.84	19,166.27
B. Intermediate Term	43,610.10	43,610.10	43,610.10	43,610.10	43,610.10	43,610.10
C. Long Term	212,910.00	212,910.00	212,910.00	159,682.50	106,455.00	159,682.50
Total	265,014.80	265,014.80	265,014.80	213,458.87	161,902.92	213,458.87
Capital Borrowed						
A. Short Term Capital	8,494.70	6,371.03	4,247.35	10,166.27	11,837.84	8,042.60
B. Short Term Stock Requirements	110.78	335.32	223.54	198.76	286.73	423.29
C. Intermediate Term Capital	43,610.10	32,707.58	21,805.05	43,610.10	43,610.10	32,707.58
D. Intermediate Term Stock Requirements	0.00	1,721.45	1,147.63	0.00	0.00	1,721.45
E. Long Term Capital	212,910.00	159,682.50	106,455.00	159,682.50	106,455.00	106,455.00
F. Long Term Stock Requirements	7,207.02	10,192.50	6,795.00	3,809.52	412.02	6,795.00
Total	272,332.60	211,010.38	140,673.57	217,467.15	162,601.69	156,144.92
Interest Charges						
A. Short Term	766.50	627.71	418.48	931.19	1,095.89	792.41
B. Intermediate Term	3,815.88	3,222.56	2,148.37	3,815.88	3,815.88	3,222.56
C. Long Term	15,209.95	14,439.37	9,626.25	10,396.82	5,583.70	9,626.25
Total	19,792.33	18,289.64	12,193.10	15,143.89	10,495.47	13,641.22
Principal Payments						
A. Intermediate Term	6,230.01	4,918.43	3,278.94	6,230.01	6,230.01	4,918.43
B. Long Term	1,796.94	1,367.49	911.66	1,341.11	885.23	911.66
Total	8,026.95	6,285.92	4,190.61	7,571.12	7,115.29	5,830.09
Cash Residual for Owned Land, Labor, Management, Depreciation, Capital and Risk						
A. LP Model Income	27,397.16	27,397.16	27,397.16	25,725.59	24,054.02	25,725.59
B. Depreciation	3,690.08	3,690.08	3,690.08	3,690.08	3,690.08	3,690.08
Total	31,087.24	31,087.24	31,087.24	29,415.67	27,744.10	29,415.67
Interest and Principal Payment	27,819.28	24,575.56	16,383.71	22,715.01	17,610.76	19,471.31
Cash Available for Family Living	3,267.96	6,511.68	14,703.53	6,700.66	10,133.34	9,944.36

Table 25. Estimated Capital Requirements and First Year Cash Flow for Beginning Farmers, for Selected Equity — Land Rental Situations and High Product Prices, Southeastern Oklahoma.

Equity or Rental (Percent)	0% Equity	25% Equity	50% Equity	25% Land Rental 0% Equity	50% Land Rental 0% Equity	25% Land Rental 25% Equity
Total Capital Assets (Excluding Rented Lands)						
A. Short Term	8,423.61	8,423.61	8,423.61	10,095.18	11,766.75	10,095.18
B. Intermediate Term	43,476.53	43,476.53	43,476.53	43,476.53	43,476.53	43,476.53
C. Long Term	212,910.00	212,910.00	212,910.00	159,682.50	106,455.00	159,682.50
Total	264,810.14	264,810.14	264,810.14	213,254.21	161,698.28	213,254.21
Capital Borrowed						
A. Short Term Capital	8,423.61	6,317.71	4,211.81	10,095.18	11,766.75	7,989.28
B. Short Term Stock Requirements	100.01	332.51	221.67	187.96	275.96	420.59
C. Intermediate Term Capital	43,476.53	32,682.50	21,738.27	43,476.53	43,476.53	32,607.40
D. Intermediate Term Stock Requirements	0.00	1,716.18	1,144.12	0.00	0.00	1,716.18
E. Long Term Capital	212,910.00	159,682.50	106,455.00	159,682.50	106,455.00	106,455.00
F. Long Term Stock Requirements	7,207.02	10,192.50	6,795.00	3,809.52	412.02	6,795.00
Total	272,117.17	210,848.80	140,565.87	217,251.69	162,386.26	155,983.35
Interest Charges						
A. Short Term	758.01	622.46	414.97	922.70	1,087.40	787.15
B. Intermediate Term	3,804.20	3,212.69	2,141.79	3,804.20	3,804.20	3,212.69
C. Long Term	15,209.95	14,439.37	9,626.25	10,396.82	5,583.70	9,626.25
Total	19,772.16	18,274.52	12,183.01	15,123.72	10,475.30	13,626.09
Principal Payments						
A. Intermediate Term	6,210.93	4,093.37	3,268.91	6,210.93	6,210.93	4,903.37
B. Long Term	1,796.94	1,367.49	911.66	1,341.11	885.28	91.66
Total	8,007.87	6,270.86	4,180.57	7,552.04	7,096.21	5,815.03
Cash Residual for Owned Land, Labor, Management, Depreciation, Capital and Risk						
A. LP Model Income	62,823.31	62,823.31	62,823.31	61,151.74	59,480.17	16,151.74
B. Depreciation	3,670.08	3,670.08	3,670.08	3,670.08	3,670.08	3,670.08
Total	66,493.39	66,493.39	66,493.39	64,821.82	63,150.25	64,821.82
Interest and Principal Payment	27,780.03	24,545.38	16,363.58	22,675.76	17,571.51	19,441.12
Cash Available for Family Living	38,713.36	41,948.01	50,129.81	42,146.06	45,578.74	45,380.70

Table 26. Estimated Capital Requirements and First Year Cash Flow for Beginning Farmers, for Selected Equity — Land Rental Situations and Average Product Prices, Southcentral Oklahoma.

Equity or Rental (Percent)	0% Equity	25% Equity	50% Equity	25% Land Rental 0% Equity	50% Land Rental 0% Equity	25% Land Rental 25% Equity
Total Capital Assets (Excluding Rented Lands)						
A. Short Term	23,520.77	23,520.77	23,520.77	26,950.64	30,380.52	26,950.64
B. Intermediate Term	54,661.36	54,661.36	54,661.36	54,661.36	54,661.36	54,661.36
C. Long Term	298,250.00	298,250.00	298,250.00	223,687.50	149,125.00	223,687.50
Total	376,432.13	376,432.13	376,432.13	305,299.40	234,166.88	205,299.50
Capital Borrowed						
A. Short Term Capital	N/A	17,640.58	11,760.39	26,950.64	30,380.52	21,070.45
B. Short Term Stock Requirements	N/A	928.45	618.97	1,418.45	1,598.97	1,108.97
C. Intermediate Term Capital	N/A	40,996.02	27,330.68	54,661.36	54,661.36	40,996.02
D. Intermediate Term Stock Requirements	N/A	2,157.69	1,438.46	245.33	245.33	2,157.69
E. Long Term Capital	N/A	223,687.50	149,125.00	223,687.50	149,125.00	149,125.00
F. Long Term Stock Requirements	N/A	14,277.92	9,518.61	8,155.93	3,135.64	9,518.61
Total	N/A	299,688.16	199,792.11	315,119.21	239,146.82	223,976.74
Interest Charges						
A. Short Term	N/A	1,738.06	1,158.71	2,655.35	2,993.28	2,075.99
B. Intermediate Term	N/A	4,039.19	2,692.79	4,834.27	4,834.27	4,039.19
C. Long Term	N/A	20,227.06	13,484.71	16,206.69	9,442.15	13,484.71
Total	N/A	26,004.31	17,336.21	23,696.31	17,269.70	19,599.89
Principal Payments						
A. Intermediate Term	N/A	6,164.82	4,109.88	7,843.81	7,843.81	6,164.82
B. Long Term	N/A	1,915.62	1,277.08	1,891.34	1,250.70	1,277.08
Total	N/A	8,080.4	5,386.96	9,735.15	9,094.51	7,441.90
Cash Residual for Owned Land, Labor, Management, Depreciation, Capital and Risk						
A. LP Model Income	N/A	32,204.24	32,204.24	28,774.37	25,344.49	28,774.37
B. Depreciation	N/A	5,308.30	5,308.30	5,308.30	5,308.30	5,308.30
Total	N/A	37,512.54	37,512.54	34,082.67	30,652.79	34,082.67
Interest and Principal Payment	N/A	34,084.75	22,723.17	33,431.46	26,364.21	27,041.79
Cash Available for Family Living	N/A	3,427.79	14,789.37	651.21	4,288.58	7,040.88

Table 27. Estimated Capital Requirements and First Year Cash Flow for Beginning Farmers, for Selected Equity — Land Rental Situations and High Product Prices, Southcentral Oklahoma.

Equity or Rental (Percent)	0% Equity	25% Equity	50% Equity	25% Land Rental 0% Equity	50% Land Rental 0% Equity	25% Land Rental 25% Equity
Total Capital Assets (Excluding Rented Lands)						
A. Short Term	26,066.55	26,066.55	26,066.55	29,496.42	32,926.29	29,496.42
B. Intermediate Term	101,060.93	101,060.93	101,060.93	101,060.93	101,060.93	101,060.93
C. Long Term	298,250.00	298,250.00	298,250.00	223,687.50	149,125.00	223,687.50
Total	425,377.48	425,377.48	425,377.48	354,244.85	283,112.22	354,244.85
Capital Borrowed						
A. Short Term Capital	N/A	19,459.91	13,033.27	29,496.42	32,926.29	22,889.78
B. Short Term Stock Requirements	N/A	1,024.20	685.96	1,552.44	1,732.96	1,204.73
C. Intermediate Term Capital	N/A	75,795.70	50,530.47	101,060.93	101,060.93	75,795.70
D. Intermediate Term Stock Requirements	N/A	3,989.25	2,659.50	2,687.42	2,687.42	3,989.25
E. Long Term Capital	N/A	223,687.50	149,125.00	223,687.50	149,125.00	149,125.00
F. Long Term Stock Requirements	N/A	14,277,92	9,518.61	8,155.93	3,135.64	9,518.61
Total	N/A	338,234.48	225,552.81	358,484.71	290,668.24	262,523.07
Interest Charges						
A. Short Term	N/A	1,917.13	1,284.12	2,906.17	3,244.11	2,255.25
B. Intermediate Term	N/A	7,467.87	4,978.58	9,405.85	9,405.85	7,467.87
C. Long Term	N/A	20,222.06	13,484.71	16,206.69	9,442.15	13,484.71
Total	N/A	29,612.06	19,747.41	28,518.71	22,092.11	23,207.83
Principal Payments						
A. Intermediate Term	N/A	11,397.85	7,598.57	14,821.19	14,821.19	11,397.85
B. Long Term	N/A	1,915.62	1,277.08	1,891.34	1,250.70	1,277.08
Total	N/A	13,313.47	8,875.65	16,712.53	16,071.89	12,674.93
Cash Residual for Owned Land, Labor, Management, Depreciation, Capital and Risk						
A. LP Model Income	N/A	96,133.92	96,133.92	92,704.05	89,274.18	92,704.05
B. Depreciation	N/A	8,840.80	8,840.80	8,840.80	8,840.80	8,840.80
Total	N/A	104,974.72	104,974.72	101,544.85	98,114.98	101,544.85
Interest and Principal Payment	N/A	42,925.23	28,623.06	45,231.24	38,164.00	35,882.76
Cash Available for Family Living	N/A	62,049.19	76,351.66	56,313.61	59,950.98	65,662.09

$310,000 of the $350,000 total capital needed. The 25 percent equity level and the 25 percent land rental situation provided the lowest cash residuals for family living, $1,722.98 and $2,475.41, respectively. Each of the three remaining arrangements were conducive to overcoming barriers to entry and produced residuals for family living greater than $7,000. Overall, the amounts ranged from almost $12,000 with 50 percent equity to slightly more than $1,700 with 25 percent equity (Table 28).

High Product Prices: The cash residuals for family living ranged from over $40,000 to almost $51,000 (Table 29). Entry was not feasible at the zero equity level because of lending restraints. The various equity-land rental situations in order of their relative effectiveness in accomplishing entry in this area for each of the price assumptions were (1) 50 percent equity, (2) 50 percent land rental, (3) 25 percent equity-25 percent land rental, (4) 25 percent land rental, and (5) 25 percent equity.

Low Product Prices: The 50 percent equity benchmark yielded −$9,706.04 available for family living (Table 23). Assuming that other situations provide lesser returns, no profitable means of completing entry were available under these price assumptions.

Panhandle Area

Because of the relatively small farm size obtained via the minimization model, a 640 acre farm was used in the maximization model in addition to the 272 acre farm. Maximization techniques were applied to this additional farm size under average price assumptions only.

Average Product Prices, 272 Acre Farm: All the equity-land rental situations yielded residuals available for family consumption which were conducive to completing entry (Table 30). The 25 percent equity level provided slightly more than $6,000 for family living. The five remaining situations furnished cash residuals greater than $7,000. The total capital requirements were slightly greater than $112,000.

Average Product Prices, 640 Acre Farm: This farm size is approximately 2.36 times the size of the 272 acre farm. Consequently, the levels of optimum enterprises and the capital requirements are approximately 2.36 times those respective amounts for the previous farm size. However, because of the effects of the financial assumptions involved in determining cash flows, the residuals for family living are not directly related.

Entry was easily accomplished in each of the equity-land rental situations. The cash residuals for family living provided by each of them were greater than $14,000 (Table 31).

Higher Product Prices: The range in cash residuals under these price assumptions was also comparable (Table 32). The 25 percent equity situation yielded $26,150 for family living, and the 50 percent equity level furnished

Table 28. Estimated Capital Requirements and First Year Cash Flow for Beginning Farmers, for Selected Equity — Land Rental Situations and Average Product Prices, Northwestern Oklahoma.

Equity or Rental (Percent)	0% Equity	25% Equity	50% Equity	25% Land Rental 0% Equity	50% Land Rental 0% Equity	25% Land Rental 25% Equity
Total Capital Assets (Excluding Rented Lands)						
A. Short Term	11,780.38	11,780.38	11,780.38	13,449.42	15,118.46	13,449.42
B. Intermediate Term	31,287.57	31,287.57	31,287.57	31,287.57	31,287.57	31,287.57
C. Long Term	309,580.00	309,580.00	309,580.00	232,185.00	154,790.00	232,185.00
Total	352,647.95	352,647.95	352,647.95	276,921.99	201,196.03	276,921.99
Capital Borrowed						
A. Short Term Capital	N/A	8,835.29	5,890.19	13,449.42	15,118.46	10,504.33
B. Short Term Stock Requirements	N/A	465.02	310.01	0.00	0.00	552.86
C. Intermediate Term Capital	N/A	23,465.68	15,643.79	31,287.57	31,287.57	23,465.68
D. Intermediate Term Stock Requirements	N/A	1,235.03	823.36	0.00	0.00	1,235.03
E. Long Term Capital	N/A	232,185.00	154,790.00	232,185.00	154,790.00	154,790.00
F. Long Term Stock Requirements	N/A	14,820.30	9,880.21	8,437.34	3,497.23	9,880.21
Total	N/A	281,006.32	187,337.50	285,359.33	204,693.26	200,428.11
Interest Charges						
A. Short Term	N/A	870.51	580.34	1,176.82	1,322.87	1,034.95
B. Intermediate Term	N/A	2,311.99	1,541.33	2,737.66	2,737.66	2,311.99
C. Long Term	N/A	20,995.45	13,996.97	16,927.40	9,954.41	13,996.97
Total	N/A	24,177.95	16,118.64	20,841.88	14,014.91	17,343.91
Principal Payments						
A. Intermediate Term	N/A	3,528.67	2,352.45	4,469.65	4,469.65	3,528.67
B. Long Term	N/A	1,988.39	1,325.59	1,962.01	1,299.21	1,325.59
Total	N/A	5,517.06	3,678.04	6,431.66	5,768.86	4,854.26
Cash Residual for Owned Land, Labor, Management, Depreciation, Capital and Risk						
A. LP Model Income	N/A	27,684.82	27,684.82	26,015.78	24,346.74	26,013.78
B. Depreciation	N/A	3,733.17	3,733.17	3,733.17	3,733.17	3,733.17
Total	N/A	31,417.99	31,417.99	29,748.95	28,079.91	29,748.95
Interest and Principal Payment	N/A	29,695.01	19,796.68	27,273.54	19,783.77	22,198.17
Cash Available for Family Living	N/A	1,722.98	11,621.31	2,475.41	8,296.14	7,550.78

Table 29. Estimated Capital Requirements and First Year Cash Flow for Beginning Farmers, for Selected Equity — Land Rental Situations and High Product Prices, Northwestern Oklahoma.

Equity or Rental (Percent)	0% Equity	25% Equity	50% Equity	25% Land Rental 0% Equity	50% Land Rental 0% Equity	25% Land Rental 25% Equity
Total Capital Assets (Excluding Rented Lands)						
A. Short Term	12,920.88	12,920.88	12,920.88	14,589.92	16,258.96	14,589.92
B. Intermediate Term	35,779.22	35,779.22	35,779.22	35,779.22	35,779.22	35,779.22
C. Long Term	309,580.00	309,580.00	309,580.00	232,185.00	154,790.00	232,185.00
Total	358,280.10	358,280.10	358,280.10	282,554.14	206,828.18	282,554.14
Capital Borrowed						
A. Short Term Capital	N/A	9,690.66	6,460.44	14,589.92	16,258.96	11,359.70
B. Short Term Stock Requirements	N/A	510.03	340.02	19.43	107.27	597.88
C. Intermediate Term Capital	N/A	26,834.42	17,889.61	35,779.22	35,779.22	26,834.42
D. Intermediate Term Stock Requirements	N/A	1,412.34	941.56	0.00	0.00	1,412.34
E. Long Term Capital	N/A	232,185.00	154,790.00	232,185.00	154,790.00	154,790.00
F. Long Term Stock Requirements	N/A	14,820.30	9,880.21	8,437.34	3,497.23	9,880.21
Total	N/A	285,452.76	190,301.84	290,991.48	210,432.68	204,874.55
Interest Charges						
A. Short Term	N/A	954.78	636.52	1,280.69	1,445.13	1,119.23
B. Intermediate Term	N/A	2,643.90	1,762.60	3,130.68	3,130.68	2,643.90
C. Long Term	N/A	20,995.45	13996.97	16,927.40	9,954.51	13,996.97
Total	N/A	24,594.13	16,396.09	21,338.77	14,530.22	17,760.10
Principal Payments						
A. Intermediate Term	N/A	4,035.25	2,690.17	5,111.32	5,111.32	4,035.25
B. Long Term	N/A	1998.39	1,325.59	1,962.01	1,299.21	1,325.59
Total	N/A	6,033.64	4,015.76	7,073.33	6,410.53	5,360.84
Cash Residual for Owned Land, Labor, Management, Depreciation, Capital and Risk						
A. LP Model Income	N/A	66,533.66	66,533.66	64,864.62	63,195.58	64,864.62
B. Depreciation	N/A	4,472.03	4,472.03	4,472.03	4,472.03	4,472.03
Total	N/A	71,005.69	71,005.69	69,336.65	67,667.61	69,336.65
Interest and Principal Payment	N/A	30,627.77	20,411.85	28,412.10	20,940.75	23,120.94
Cash Available for Family Living	N/A	40,377.92	50,593.84	40,924.55	46,726.86	46,215.71

Table 30. Estimated Capital Requirements and First Year Cash Flow for Beginning Farmers, for Selected Equity — Land Rental Situations and Average Product Prices, Panhandle Area of Oklahoma.

Equity or Rental (Percent)	0% Equity	25% Equity	50% Equity	25% Land Rental 0% Equity	50% Land Rental 0% Equity	25% Land Rental 25% Equity
Total Capital Assets (Excluding Rented Lands)						
A. Short Term	3,757.50	3,757.50	3,757.50	4,939.80	6,122.27	4,939.80
B. Intermediate Term	13,559.67	13,559.67	13,559.67	13,559.67	13,559.67	13,559.67
C. Long Term	95,014.50	95,014.50	95,014.50	71,260.87	47,507.25	71,260.87
Total	112,331.67	112,331.67	112,331.67	89,760.34	67,189.19	89,760.34
Capital Borrowed						
A. Short Term Capital	3,757.50	2,818.13	1,878.75	4,939.80	6,122.27	4,000.43
B. Short Term Stock Requirements	0.00	148.32	98.88	0.00	0.00	210.55
C. Intermediate Term Capital	13,559.67	10,169.75	6,779.83	13,559.67	13,559.67	10,169.75
D. Intermediate Term Stock Requirements	0.00	535.25	356.83	0.00	0.00	535.25
E. Long Term Capital	95,014.50	71,260.87	45,507.25	71,260.87	47,507.25	47,507.25
F. Long Term Stock Requirements	0.00	4,548.57	3,032.38	0.00	0.00	3,032.38
Total	112,331.67	89,480.89	59,653.92	89,760.34	67,189.19	65,455.61
Interest Charges						
A. Short Term	328.78	277.66	185.11	432.23	535.70	394.15
B. Intermediate Term	1,186.47	1,001.99	667.99	1,186.47	1,186.47	1,001.99
C. Long Term	4,750.73	6,443.80	4,295.87	3,563.04	2,375.36	4,295.87
Total	6,265.98	7,723.45	5,148.97	5,181.74	4,097.53	5,692.01
Principal Payments						
A. Intermediate Term	1,937.10	1,529.29	1,019.52	1,037.10	1,937.10	1,529.29
B. Long Term	788.62	610.27	406.84	591.47	394.31	406.84
Total	2,725.72	2,749.83	1,426.36	2,528.57	2,331.41	1,936.13
Cash Residual for Owned Land, Labor, Management, Depreciation, Capital and Risk						
A. LP Model Income	15,598.05	15,598.05	15,598.05	14,415.75	13,233.28	14,415.75
B. Depreciation	1,064.89	1,064.89	1,064.89	1,064.89	1,064.89	1,064.89
Total	16,662.94	16,662.94	16,662.94	15,480.64	14,298.17	15,480.64
Interest and Principal Payment	8,991.70	10,473.28	6,575.33	7,710.31	6,428.94	7,628.14
Cash Available for Family Living	7,671.24	6,189.66	10,087.11	7,770.33	7,869.23	7,852.50

Table 31. Estimated Capital Requirements and First Year Cash Flow for Beginning Farmers, for Selected Equity — Land Rental Situations and Average Product Prices, Panhandle Area of Oklahoma, 640 Acre Farm.

Equity or Rental (Percent)	0% Equity	25% Equity	50% Equity	25% Land Rental 0% Equity	50% Land Rental 0% Equity	25% Land Rental 25% Equity
Total Capital Assets (Excluding Rented Lands)						
A. Short Term	8,858.43	8,858.43	8,858.43	11,645.63	14,432.83	11,645.63
B. Intermediate Term	31,967.39	31,967.39	31,967.39	31,967.39	31,967.39	31,967.39
C. Long Term	224,000.00	224,000.00	244,000.00	168,000.00	112,000.00	168,000.00
Total	264,825.82	264,825.82	264,825.82	211,613.02	158,400.22	211,613.02
Capital Borrowed						
A. Short Term Capital	8,858.43	6,643.82	4,429.22	11,645.63	14,432.83	9,431.02
B. Short Term Stock Requirements	0.00	349.67	233.12	0.00	0.00	497.37
C. Intermediate Term Capital	31,967.39	23,975.54	15,983.70	31,967.39	31,967.39	23,975.54
D. Intermediate Term Stock Requirements	0.00	1,261.86	841.25	0.00	0.00	1,261.87
E. Long Term Capital	224,000.00	168,000.00	112,000.00	168,000.00	112,000.00	112,000.00
F. Long Term Stock Requirements	7,914.89	10,723.40	7,148.94	4,340.00	765.96	7,148.94
Total	272,740.71	210,954.30	140,636.23	215,953.02	159,166.18	154,313.74
Interest Charges						
A. Short Term	775.11	654.59	436.39	1,018.99	1,262.87	929.20
B. Intermediate Term	2,797.15	2,362.22	1,574.82	3,142.39	2,797.15	2,362.22
C. Long Term	16,212.77	15,191.49	10,127.66	11,148.94	6,085.11	10,127.66
Total	19,785.03	18,208.30	12,138.87	15,310.32	10,145.13	13,419.08
Principal Payments						
A. Intermediate Term	4,566.77	3,605.34	2,403.56	4,566.77	4,566.77	3,605.34
B. Long Term	1,891.91	1,438.72	959.15	1,412.34	932.77	959.14
Total	6,458.18	5,044.06	3,362.71	5,979.11	5,499.54	4,564.49
Cash Residual for Owned Land, Labor, Management, Depreciation, Capital and Risk						
A. LP Model Income	37,742.13	37,742.13	37,742.13	34,954.93	32,167.62	34,954.93
B. Depreciation	2,510.52	2,510.52	2,510.52	2,510.52	2,510.52	2,510.52
Total	40,252.65	40,252.65	40,252.65	37,465.45	34,678.14	37,465.45
Interest and Principal Payment	26,243.71	23,252.36	15,501.58	21,289.43	15,644.67	17,983.57
Cash Available for Family Living	14,008.94	17,000.29	24,751.07	16,176.02	19,033.47	19,481.88

Table 32. Estimated Capital Requirements and First Year Cash Flow for Beginning Farmers, for Selected Equity — Land Rental Situations and High Product Prices, Panhandle Area of Oklahoma.

Equity or Rental (Percent)	0% Equity	25% Equity	50% Equity	25% Land Rental 0% Equity	50% Land Rental 0% Equity	25% Land Rental 25% Equity
Total Capital Assets (Excluding Rented Lands)						
A. Short Term	3,757.50	3,757.50	3,757.50	4,939.80	6,122.27	4,939.80
B. Intermediate Term	13,559.67	13,559.67	13,599.67	13,559.67	13,559.67	13,559.67
C. Long Term	95,014.50	95,014.50	95,014.50	71,260.87	47,507.25	71,260.97
Total	112,331.67	112,331.67	112,331.67	89,760.34	67,189.10	89,760.34
Capital Borrowed						
A. Short Term Capital	3,757.50	2,818.13	1,878.75	4,939.80	6,122.27	4,000.43
B. Short Term Stock Requirements	0.00	148.32	98.88	0.00	0.00	210.55
C. Intermediate Term Capital	13,559.67	10,169.75	6,779.83	13,559.67	13,559.67	10,169.75
D. Intermediate Term Stock Requirements	0.00	535.25	356.83	0.00	0.00	535.25
E. Long Term Capital	95,014.50	71,260.87	47,507.25	71,260.87	47,507.25	47,507.25
F. Long Term Stock Requirements	0.00	4,548.57	3,032.38	0.00	0.00	3,032.38
Total	112,331.67	89,480.89	59,653.92	89,760.34	67,189.19	65,455.61
Interest Charges						
A. Short Term	328.78	277.66	185.11	432.23	535.70	394.15
B. Intermediate Term	1,186.47	1,001.99	667.99	1,186.47	1,186.47	1,001.99
C. Long Term	4,750.73	6,443.80	4,295.87	3,563.04	2,375.36	4,295.87
Total	6,265.98	7,723.45	5,148.97	5,181.74	4,097.53	5,692.01
Principal Payments						
A. Intermediate Term	1,937.10	1,529.29	1,019.52	1,937.10	1,937.10	1,529.29
B. Long Term	788.62	610.27	406.84	591.47	394.31	406.84
Total	2,725.72	2,749.83	1,426.36	2,528.57	2,331.41	1,936.13
Cash Residual for Owned Land, Labor, Management, Depreciation, Capital and Risk						
A. LP Model Income	34,077.15	34,077.15	34,077.15	32,894.85	31,712.38	32,894.85
B. Depreciation	1,064.89	1,064.89	1,064.89	1,064.89	1,064.89	1,064.89
Total	35,142.04	35,142.04	35,142.04	33,959.74	32,777.27	33,959.74
Interest and Principal Payment	8,991.70	10,473.28	6,575.33	7,710.31	6,428.94	7,628.14
Cash Available for Family Living	26,150.34	24,668.76	28,566.71	26,249.43	26,348.33	26,331.60

almost $29,000. The remaining four situations were all within $1,000 greater than the residuals provided by the 25 percent equity level.

Low Product Prices: The 50 percent equity situation in this area provided the only positive cash residual for family living relative to the other areas of study—$88.72 (Table 23). However, this is not sufficient to promote entry nor is it an indication of the relatively greater feasibility of other situations. Considering typical relationships, the other equity-land rental arrangements would result in negative residuals for family consumption. The relatively greater residual return in the 50 percent equity situation does indicate that this area provides the most conducive economic environment to entry of all the study areas.

An Overview Of Entry Problems and Solutions

The interpretations of cash flow results presented for Tables 21 to 32 were straightforward. If the residual for family living wouldn't meet reasonable family and firm needs, entry was considered infeasible. Likewise, if by present rules credit institutions could not provide financing under zero equity, entry was infeasible. But, what if the prospective entrant has an optimistic view of agricultural opportunities over the long run and wants a piece of the action? What if he really *wants* to farm?

This section introduces some strategies for gaining entry not analyzed in preceding sections. The strategies include (1) opportunities for part time farming for entering farmers, (2) the possibility of planning a "bare bones" budget and using direct help from family, friends and neighbors, and (3) an analysis of projected net worth gains in a new farming unit and a strategy of borrowing on equity gains and using other non-conventional credit approaches. Finally, as a disquieting closing note perfect knowledge assumptions are forsaken for the more realistic world of price and yield variability in agriculture.

Part Time Farming

Table 33 summarized excess operator labor for each minimum size of farm under average prices. The Panhandle farm needed no income supplement even though several hours were available. If off-farm employment is available anytime during the year in the northwest and mostly in the fall in other areas, worthwhile additions to labor-management income could be made. For example in Northwest Oklahoma, an addition of $1620 of labor income would increase cash available for family living to about $4400 for the 25% rental-zero equity situation. If other family labor can be substituted for operator labor on the farm or employed off-farm, the opportunity for a viable farming operation would improve. These simple examples illustrate the potential role of part-time farming. The new farmers would join many other farmers in their areas who work part-time off-farm.

Table 33. Unused Operator Labor by Calendar Quarters for Minimum Sizes of Farms and Average Prices, Five Selected Areas of Oklahoma.

Period	Available	Northeast	South-central	Southeast	Northwest	Panhandle
		(Hours of Unused Labor)				
January - March	475	0	0	0	29	298
April - June	700	0	0	0	189	0
July - September	750	52	0	261	316	181
October - November	575	223	203	426	346	431
Total	2500	275	203	687	870	810
8 Hours Day Equivalent	--	34	25	85	108	101
Net Wages at $15.00/day	--	$510	$375	$1275	$1620	$1515

The Bare Bones Budget and Help from Family and Friends

Based on Tables 21-32 the distribution of cash available for family living for areas in which entry appeared most difficult and for low equity situations is as follows:[8]

Range of Residual Income	Number of Situations
<-5000	1
-5000 to -2500	0
-2501 to 0	1
1 to 2500	3
2501 to 5000	2
>5000	2

For a number of situations, entry is within grasp. If the farm has a house and a garden can be grown, some pressure on living is released. Because of tax deductions, the cash available is almost assuredly tax free. Sharing some farm implements with a neighbor or relative would be helpful. Direct assistance from family in the form of money, equipment, or other farm assets might be obtained. Family assistance often is the source of initial equity. Such aid would be considered unconventional credit which is repaid in some way at an indefinite later date. Because the help needed is modest, many farmers could and probably do start farming this way.

Use Gains in Net Worth

The forced saving requirement in agriculture is well demonstrated by this study. Partial ownership of assets is forced by policies of credit institutions, by customs in the industry and by psychology of farmers. There are few perpetual debt loans. Farmers want to own land, or at least the home place and land that touches it. The low resource farmer is faced with a saving requirement at a

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[8]The 50 percent equity situation and the Panhandle and Southeast areas are excluded. Zero equity is not possible in any remaining situation because of limits on total borrowing by FHA.

time when he needs cash for economic survival. Default or deferral of interest or principal payments is required in order to substitute consumption for saving.

Table 34 contains a summary of changes in net worth (total assets minus total liabilities) and residual cash for family living in the first year of farming for each area and rental-equity situation. In balance sheet terms, net worth is increased by the payments on principle shown in the cash flow tables. However, net worth is decreased by the decrease in value of assets due to depreciation. Recall that depreciation was included in net cash available. The difference between the increase and decrease is gain or loss in net worth.[9] The gains in net worth shown in Table 24 are impressive for some situations.

Long term debt principal payments increase over time.[10] Intermediate term interest payments decrease each year while principle payments are constant until the eighth year when payment is complete. Thus, for the first seven years for the analysis in this study, the gain in net worth will increase each year and jump substantially the eighth year. Interest payments on intermediate term loans decrease each year and allow more for family living or for interest on new debts to replace capital items worn out, such as machinery. Thus, prospects for the economic position getting better are fairly good. The first year result tends to be the critical one for determining whether a prospect can enter farming.

A key question is "can a gain in net worth be put to use as a basis for family living, capital replacement and, perhaps, firm growth?" What lender would refuse to make a loan to a frugal person who's net worth position improves each year? Probably all lenders, if the frugal person has little basis in his cash flow for taking on new interest and principle payments. The only possible alternative is to spread intermediate payments over more years or defer a few payments.

The lending principle of matching length of a loan to life of the asset would need to be stretched. The loan would be made more on the overall net worth position of the operator than on value of any one machine or other asset. Results of the study suggest that relaxation of credit terms when a strong cash flow and a balance sheet gain are projected would be a consideration. This step, along with doing away with inflexible institutional limits on total loans, would give more low resource potential farmers a chance.

Risks and Uncertainties

The analysis presented assumes essentially perfect knowledge of the future. That is, the farmer is assumed to plan as though the environment of agriculture doesn't cause prices and yields to vary, that the rules of the game

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[9]Additionally, assets such as land may increase in market value to provide another gain in net worth, or they may decrease.

[10]Because the loan in amortized with constant total payments, the interest component decreases and the principal payment increases.

Table 34. Cash Residuals for Family Living and Changes in Net Worth at the End of Year I, Average Product Prices, Six Equity-Land Rental Situations, Five Areas of Oklahoma.

	0% Equity	25% Equity	50% Equity	25% Land Rental 0% Equity	50% Land Rental 0% Equity	25% Land Rental 25% Equity
Northeast						
Cash Available for Family Living	N/A	−1,048.25	10,186.87	−5,409.34	−3,425.46	882.60
Change in Net Worth, Year 1	N/A	5,729.27	2,546.67	7,958.86	7,402.17	5.175.58
Southeast						
Cash Available for Family Living	3,267.96	6,511.68	14,703.53	6,700.66	10,133.34	9.944,36
Change in Net Worth, Year 1	4,336.87	2,595.84	500.53	3,881.04	3,425.21	2,140.01
Southcentral						
Cash Available for Family Living	N/A	3,427.79	14,789.37	651.21	4,288.58	7,040.88
Change in Net Worth, Year 1	N/A	2,772.14	78.66	4,426.85	3,786.21	2,133.60
Northwest						
Cash Available for Family Living	N/A	1,722.98	11,621.31	2,475.41	8,296.14	7,550.78
Change in Net Worth, Year 1	N/A	1,783.89	−55.13	2,698.49	2,035.69	1,121.09
Panhandle						
Cash Available for Family Living	7,671.24	6,189.66	10,087.61	7,770.33	7,869.23	7,268.14
Change in Net Worth, Year 1	1,660.83	1,684.91	361.47	1,463.68	775.31	871.24

(e.g., farm programs) don't change, and that health and other problems don't beset the human element in the operation. Implicit concern with those questionable assumptions is reflected in the fact that three price situations were included in the analysis. In general entry appears impossible under low prices (or low yields) and rather easy under high prices (or high yields).

If the prospective farmer has sufficient flexibility in his opportunity to start farming, his key decision may be when to start. An unfavorable period with respect to prices and production conditions should be avoided. At least some information is always available on general conditions. Even though land availability or other important factors may appear to offer a one-time chance, he needs to avoid rushing into failure.

Once the step has been made, variability in agriculture certainly takes its toll. An average year followed by a low price or yield year would leave the beginning farmer desperate, and a series of low years is possible. Liquidity in the form of a favorable equity ratio is one way farmers survive agriculture's uncertain environment. In this regard, the higher the equity the better. Another way is to seek low levels and high flexibility in financial obligations such as principle and interest payments. The share rental arrangement gave lower levels of payments. Flexibility in payments would depend on the creditor.

References Cited

[1] Anderson, Kim B. and Odell L. Walker, "Estimating Returns From Renting Out Farm Land in Selected Areas of Oklahoma." *Journal of the American Society of Farm Managers and Rural Appraisers*, Vol. 39:2, October 1975.

[2] Barnhill, H. E. *Resource Requirements of Farms for Specified Operator Incomes.* Washington: USDA, Agricultural Economics Report No. 5, 1962.

[3] Blakley, Leo V. "Seasonal Indexes of Prices of Oklahoma Crop, Ten-Year and Last Five-Year Averages for the Period 1964-65 Through 1973-74." *Okalhoma Current Farm Economics.* Volume 48, Number 1, March, 1975, pp. 3-8.

[4] Brewster, John M. "Analyzing Minimum Resource Requirements for Specified Income Levels." *Farm Size and Output Research.* Stillwater: Oklahoma. Agricultural Experiment Station, Southern Cooperative Series Bulletin No., 56, June, 1958, pp. 95-104.

[5] _____. *Farm Resources Needed for Specified Income Levels.* USDA, ERS, Agriculture Information Bulletin No. 180 (Washington, December, 1957).

[6] Conner, Larry J. and Odell L. Walker. *Potential Long-Run Adjustments for Oklahoma Panhandle Farms.* Stillwater: Oklahoma Agricultural Experiment Station in cooperation with the United States Department of Agriculture, Technical Bulletin T-114, January, 1965.

[7] Fawcett, Dave. *Crop and Livestock Budgets: Northwest Oklahoma.* Stillwater, Oklahoma, 1974-75, pp. 56, 64-71, 74, 82, 86, 92-95, 100, 112-115, 118-122, and 125.

[8] Gray, Fenton, and H. M. Galloway. *Soils of Oklahoma.* Stillwater: Oklahoma Agricultural Experiment Station, Miscellaneous Publication MP-56, 1959.

[9] Halbrook, Waymon A. "Minimum Resource Requirements and Adjustment Alternatives for Livestock Producers on the Eastern Prairies of Oklahoma." (Unpublished Ph.D. Dissertation, Oklahoma State University, 1964.)

[10] Hudgins, Ladd. *Crop and Livestock Budgets: Northeast Oklahoma.* Stillwater, Oklahoma, 1974-75, p. 86.

[11] Hummer, Paul D. and Ronald B. Campbell. "Seasonal Relationships of Beef Cattle Prices in Oklahoma." Bulletin B-703, Agricultural Experiment Station, Oklahoma State University, Stillwater, Oklahoma, October, 1972, pp. 5-39.

[12] Hutson, A. L. *Crop and Livestock Budgets: Southcentral Oklahoma*. Stillwater, Oklahoma, 1974-75, pp. 20, 54, 64, 80, 86-89, 96, 102, and 120.

[13] Minnick, Dale Lee. "Financial Alternatives and Minimum Resource Requirements for Low Resource, Beginning Farmers in Oklahoma." (Unpublished M. S. thesis, Oklahoma State University, 1975.)

[14] _____and Odell L. Walker. "An Assessment of Alternative Credit Sources for Low Resource Beginning Farmers." Bulletin B-728, Oklahoma Agricultural Experiment Station, Stillwater, Oklahoma, Dec., 1976.

[15] U. S. Department of Commerce, *U. S. Census of Agriculture 1969, Bureau of the Census (Washington, 1972)*.

[16] Walker, Odell L., Roy E. Hatch, and C. Leroy Quance. "Minimum Resource Analysis of Farm and Area Adjustments - An Example for North Central Oklahoma." In *Proceedings, GP-5 and W-54 Regional Technical Committee Symposium*. Fort Collins: Great Plains Agricultural Council Publication No. 36. August, 1968, pp. 78-192.

[17] Watzek, John A. "Factors Related to Success or Failure on Getting Started in Farming." (Unpublished M. S. thesis, Purdue University, 1970.)

[18] Williams, Gene. *Crop and Livestock Budgets: Southwest Oklahoma*. Stillwater, Oklahoma, 1974-75, pp. 12, 44, 58, 70-73, 76-79, 84-87, 92-97, and 116.