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AFPC POLICY WORKING PAPER

IMPACT ON REPRESENTATIVE TEXAS CROP FARMS OF FREEZING TARGET PRICES AT 1990 LEVEL

Department of Agricultural Economics
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IMPACT ON REPRESENTATIVE TEXAS CROP FARMS OF FREEZING TARGET PRICES AT 1990 LEVEL

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IMPACT ON REPRESENTATIVE TEXAS CROP FARMS OF FREEZING TARGET PRICES AT 1990 LEVELS

Debate has begun on proposals by President Bush to cut the budget for farm programs. Soon the Congress will begin framing the provisions of the 1990 farm bill. The combination of efforts to reduce the federal deficit and develop a new farm bill will surely have an impact on financial conditions in agriculture.

This *Working Paper* is the second in what will be a series of AFPC research reports analyzing alternative proposals leading to the 1990 farm bill. The scope of this *Working Paper* is limited to the economic impact of freezing target prices, at 1990 levels, on the economic viability of representative Texas crop farms through 1994. The results contained in this report utilize the January 1989 economic and policy baseline developed by FAPRI (Food and Agricultural Policy Research Institute) at the University of Missouri and Iowa State University. The FAPRI baseline results are applied to representative Texas crop farms assuming different initial debt levels. The economic impact was determined using the Farm Level Income Tax and Policy Simulation Model (FLIPSIM) developed at Texas A&M University. Subsequent *Working Papers* will analyze the impact of reduced and increased target prices on the economic viability of these representative farms.

Procedure

The representative farms analyzed in this study are located in the Coastal Bend, Blacklands, Rolling Plains, Southern High Plains and Northern High Plains of Texas (Figure 1). A single-size farming operation was analyzed in all production regions except the Southern High Plains. In this region, a medium- and large-scale operation are evaluated. Data for analyzing representative farms were developed with the assistance of local county extension agents, district-based economists and producer panels with farming operations similar to the scale of farm being represented.

The characteristics of the representative crop farms are identified in Table 1. Most of the farms are in the 1000- to 1400-acres range, except the large Southern High Plains cotton farm (3300 acres) and the Northern High Plains wheat-sorghum farm (2240 acres). All of the farms are single-family operations which hire some labor to supplement that of the family. Total asset

values range from about $277,000 to $688,000. All of the farms grow cotton with the exception of the Northern High Plains farm. The two Southern High Plains farms produce cotton exclusively.

Yields on Texas farms are highly variable across regions and over time. Average yields for the farms are indicated in Table 2. Variability in yields are incorporated in the simulation model to reflect the historical yield risks faced by each farming region.

Production costs per acre on the representative farms are indicated in Table 3. Note that the costs per acre are substantially higher on the medium-scale Southern High Plains cotton farm ($176.70) than on the large scale operation ($153.50). The difference is attributable to both technical and pecuniary economies.

The relatively high costs per acre for cotton on the Coastal Bend and Blacklands farms are due, in part, to the higher yields in these regions. All costs of production were estimated based on information supplied by producer panels in the respective regions and were supplemented by budgets developed by Extension Management Economists.

Assumptions for farm program provisions and market prices over the period 1989-1994 were taken from the January 1989 FAPRI baseline (Tables 4-7). Note that from 1990 through 1994, target prices are frozen at the 1990 levels. Since average market prices, as projected by FAPRI, are below the target price, total producer receipts are largely determined by the target price levels. Acreage reduction levels for grains declined from their 1988 levels due to an assumption of increased acreage in the conservation reserve program and tighter stocks.

Given the asset levels and assumptions regarding three levels of initial debt, the initial net worth for each representative farm is indicated in Table 8. Net worth, of course, declines as the debt-to-asset ratio increases from 0.2 to 0.4 to 0.6. These initial net worth levels provide a benchmark for comparing the 1989-1994 simulation results. The simulation model provides more than 100 output variables which are crucial in evaluating the impacts of frozen target prices on the representative farms. The key variables are summarized here:

- The present value of net worth at the end of the 1994 simulation period, which corresponds to the year in which the 1990 farm bill would expire (Table 9).

- The present value of ending net worth as a percent of initial net worth (Table 10 and Figure 2).
- The probability that the representative farm would earn a 5 percent or greater return on initial net worth (Table 11).
- The average ending debt-to-asset ratio in 1994 (Table 12).
- The average annual net cash income in 1989-1994 for farms with an initial 0.4 debt-to-asset ratio (Table 13 and Figure 3).

Results

The results of the simulations of representative farms over the period 1989-1994 are indicated in Tables 9-13 and in Figures 2 and 3.

Coastal Bend

The 1200-acre Coastal Bend farm produces a combination of cotton, sorghum and corn. For all debt levels, the average level of net cash income declines from the beginning to the end of the period under frozen target prices. For example, net cash income for the Coastal Bend farm having an initial 0.4 debt-to-asset ratio declines from $41,070 in 1989 to $8,310 in 1994 (Table 13 and Figure 3).

The decline in net cash income leads to a progressively larger reduction in the present value of ending net worth as the debt-to-asset ratio increases from 0.2 to 0.6. For example, for the farm having a 0.4 debt-to-asset ratio, average present value of ending net worth declines 13.5 percent from $280,035 at the end of 1988 to $242,240 in 1994 (Tables 8, 9, 10). If the debt-to-asset ratio were initially 0.6, the present value of ending net worth would decline by more than 40 percent.

The probability of the Coastal Bend farm earning a 5 percent return on equity falls as the debt level rises. For example, as the debt-to-asset ratio rises from 0.2 to 0.6, with frozen target prices, the probability of earning a 5 percent return declines from 94 percent to 38 percent (Table 11). Also, the farm's ending debt-to-asset ratio rises as initial debt increases from 0.2 to 0.6. The

ending debt-to-asset ratio in 1994 with frozen target prices is 0.21 for the farm with 20 percent initial debt, and 0.76 for the farm with 60 percent initial debt (Table 12).

Blacklands

The 1000-acre Blacklands farm producing a combination of cotton, sorghum, wheat and corn and having a 0.4 debt-to-asset ratio experiences a decline in average net cash income from $24,910 in 1989 to -$12,670 by 1994 (Table 13 and Figure 3). This results in a 55 percent reduction in net worth from $244,673 to $109,190 with frozen target prices (Tables 8 and 9).

The probability of this farm earning a 5 percent return on initial equity is only 1 percent (Table 11). Even at the 0.2 initial debt-to-asset ratio, the probability of earning a 5 percent return on equity with frozen target prices is only 23 percent. The ratio of debts-to-assets increases substantially from the initial levels; increasing from 0.2 to 0.39, from 0.4 to 0.69, and from 0.6 to more than 1.00 (Table 12).

The poor performance of this farm is largely due to the cost of servicing debt resulting with the high cost of land. In this area, competition from urban land uses results in land prices that are roughly two to three times higher than in the other regions analyzed.

Rolling Plains

The 1300-acre Rolling Plains farm produces a combination of cotton (909 acres) and sorghum (390 acres). With a debt-to-asset ratio of 0.4, it experiences a slight increase in average net cash income from $21,660 in 1989 to $23,180 in 1994 with frozen target prices (Table 13). This leads to a decline in the present value of ending net worth of only 6 percent from an initial level of $189,990 to $179,510 (Tables 8 and 9). With a 0.2 percent debt-to-asset ratio, the present value of ending net worth stays nearly even. The probability of earning a 5 percent return on initial equity is a respectable 84 percent (Table 11). As debt levels increase to 0.4 and 0.6, the probability of earning a 5 percent return on initial equity falls to 71 and 51 percent, respectively.

Southern High Plains

Due to economies of size, the medium- and large-size cotton farms experience substantially different economic results under frozen target prices.

The medium-size cotton farm (1360 acres) does not fare well in that at the 0.4 debt-to-asset ratio, the average cash income declines from $22,790 in 1989 to -$19,340 in 1994 (Table 13). This leads to a 62 percent decline in the present value of initial net worth from $169,470 at the end of 1988 to $64,280 in 1994 (Tables 8 and 9). The probability of this farm earning a 5 percent return on initial equity is only 35 percent (Table 11). Even at 0.2 debt-to-asset, the medium size Southern High Plains cotton farm has only a 48 percent chance of earning a 5 percent return on initial equity. Debt levels in 1994 will likely be much greater than initial debt levels for all three debt-to-asset situations evaluated (Table 12).

In contrast, the large cotton farm (3300 acres) realizes a higher present value of ending net worth, and the ratio of debts-to-assets improves at all debt levels. The present value of ending net worth *increases* by 35 percent with a 0.2 debt-to-asset ratio, and by 51 percent with a 0.6 debt-to-asset ratio even though target prices are frozen (Table 10). The probability that the large farm will earn a 5 percent return on initial net worth ranges from 97 percent with a 0.2 debt-to-asset ratio to 86 percent with a 0.6 ratio (Table 11).

Northern High Plains

The 2240-acre wheat and sorghum farm experiences a decline in average net cash income with a 0.4 debt-to-asset ratio from $25,250 in 1989 to -$49,300 in 1994 under frozen target prices (Table 13). The result is a 60 percent decline in the present value of ending net worth from $258,445 to $104,230 (Tables 8 and 9). The probability of this farm earning a 5 percent return on initial net worth is only 20 percent (Table 11). Ending debt levels in 1994 are likely to be substantially higher than the initial debt-to-asset ratios in 1989. The low debt farm (0.2) will have an average debt-to-asset ratio of 0.50 and the farm with a 0.6 initial debt-to-asset ratio will have more debts than assets in 1994 (Table 12).

Summary and Implications

Freezing target prices at the 1990 level has a decided adverse impact on net cash income for all farms and all debt levels (Figure 3). The only representative farm that experiences an increase in the present value of ending net worth is the large Southern High Plains cotton farm. Two other farms, the Coastal Bend and Rolling Plains farms, hold their own at the 0.2 debt-to-asset ratio level in terms of the present value of ending net worth. At higher debt levels, however, their economic returns decline markedly.

The results clearly indicate the fragility of economic conditions in Texas agriculture. Frozen target prices run the risk of throwing Texas crop farms back into the financial crisis which characterized the early-to-mid-1980s. Moderate-size farms would be most adversely affected, tending to accelerate the trend toward fewer but larger farms. This transition would occur with considerable economic hardship and jeopardy to the agricultural, credit and agribusiness sectors which are only in the early stages of recovery.

Table 1. Characteristics of Representative Crop Farms in Five Regions of Texas.

Crop	Coastal Bend	Blacklands	Rolling Plains	Southern High Plains Medium	Southern High Plains Large	Northern High Plains
Cropland (Acres)	1200	1000	1300	1360	3300	2240
Owned (Acres)	300	250	325	340	825	560
Leased (Acres)	900	750	975	1020	2475	1680
Assets ($)	473,600	405,280	316,650	277,450	688,160	418,741
Land ($)	342,500	250,000	162,500	116,800	283,400	188,000
Machinery ($)	126,100	145,280	124,150	130,650	331,950	170,241
Other ($)	5,000	10,000	30,000	30,000	72,810	60,500
Crop Mix (Base Acres)						
Irr. Cotton	0	0	0	448	1088	0
Dry. Cotton	456	330	909	911	2211	0
Irr. Sorghum	0	0	0	0	0	560
Dry. Sorghum	589	400	0	0	0	0
Irr. Wheat	0	0	0	0	0	560
Dry. Wheat	0	50	390	0	0	1120
Dry. Corn	95	220	0	0	0	0

Under assets, land includes the market value of cropland. Machinery includes the market value of all farm machinery and irrigation equipment. Other assets consist of pastureland, livestock, off-farm investments, and cash or near-cash investments.

Table 2. Average Crop Yields Per Acre for Representative Crop Farms in Five Regions of Texas.

Crop	Coastal Bend	Blacklands	Rolling Plains	Southern High Plains Medium	Southern High Plains Large	Northern High Plains
Irrigated Cotton	--	--	--	430	430	--
Dryland Cotton	600	400	300	270	270	--
Irrigated Sorghum	--	--	--	--	--	53
Dryland Sorghum	36	40	--	--	--	--
Irrigated Wheat	--	--	--	--	--	65
Dryland Wheat	--	35	20	--	--	21
Dryland Corn	80	80	--	--	--	--

Yields are as follows: Cotton, Pounds/Acre; Sorghum, Hundredweight/Acre; Wheat, Bushels/Acre; Corn, Bushels/Acre.

Table 3. Per-Acre Costs of Production for Representative Crop Farms in Five Regions of Texas.

Crop	Coastal Bend	Blacklands	Rolling Plains	Southern High Plains Medium	Southern High Plains Large	Northern High Plains
	($/acre)					
Irrigated Cotton	--	--	--	176.70	153.30	--
Dryland Cotton	186.56	174.79	72.10	92.90	83.82	--
Irrigated Sorghum	--	--	--	--	--	179.40
Dryland Sorghum	70.00	81.01	37.60	--	--	--
Irrigated Wheat	--	--	--	--	--	131.10
Dryland Wheat	--	92.29	36.70	--	--	34.67
Dryland Corn	112.50	73.04	--	--	--	--

Costs include only cash expenses to produce and harvest the crops, but excludes interest and labor expenses. Ginning costs are included in harvesting costs for cotton. Due to the cash cost nature of the values in the table, machinery depreciation and share rent costs are excluded. Interest, labor, fixed and machinery costs are calculated separately for the farms in the FLIPSIM model.

Table 4. Wheat Farm Program Provisions and Market Price, Actual for 1987 and 1988, and Projected for 1989-1994.

Year	Target Price	Loan Rate	Average Market Price	Acreage Reduction Program	Paid Diversion	Diversion Payment
	($/bu)	($/bu)	($/bu)	(% of Base)	(% of Base)	($/bu)
1987	4.38	2.28	2.57	27.5	0.0	--
1988	4.23	2.21	3.68	27.5	0.0	--
1989	4.10	2.06	3.52	10.0	0.0	--
1990	4.00	2.29	3.16	5.0	0.0	--
1991	4.00	2.31	3.01	5.0	0.0	--
1992	4.00	2.42	3.26	5.0	0.0	--
1993	4.00	2.49	3.27	5.0	0.0	--
1994	4.00	2.42	3.32	5.0	0.0	--

Source: FAPRI Ten-Year International Agriculture Outlook; January 1989.

Table 5. Grain Sorghum Farm Program Provisions and Market Price, Actual for 1987 and 1988, and Projected for 1989-1994.

Year	Target Price	Loan Rate	Average Market Price	Acreage Reduction Program	Paid Diversion	Diversion Payment
	($/cwt)	($/cwt)	($/cwt)	(% of Base)	(% of Base)	($/cwt)
1987	5.14	3.11	3.04	20.0	15.0	3.39
1988	4.96	3.00	4.09	20.0	10.0	2.77
1989	4.80	2.79	3.61	10.0	0.0	--
1990	4.64	2.64	3.59	12.5	0.0	--
1991	4.64	2.55	3.61	12.5	0.0	--
1992	4.64	2.70	3.64	12.5	0.0	--
1993	4.64	2.71	3.66	12.5	0.0	--
1994	4.64	2.71	3.77	12.5	0.0	--

Source: FAPRI Ten-Year International Agriculture Outlook; January 1989.

Table 6. Cotton Farm Program Provisions and Market Price, Actual for 1987 and 1988, and Projected for 1989-1994.

Year	Target Price	Loan Rate	Average Market Price	Acreage Reduction Program	Paid Diversion	Diversion Payment
	(cents/lb)	(cents/lb)	(cents/lb)	(% of Base)	(% of Base)	(cents/lb)
1987	79.40	52.30	63.50	25.0	0.0	--
1988	75.90	51.80	51.90	12.5	0.0	--
1989	73.40	50.00	50.00	25.0	0.0	--
1990	72.90	50.00	50.00	25.0	0.0	--
1991	72.90	50.00	51.30	25.0	0.0	--
1992	72.90	50.00	53.20	20.0	0.0	--
1993	72.90	50.00	59.30	20.0	0.0	--
1994	72.90	50.00	60.70	20.0	0.0	--

Source: FAPRI Ten-Year International Agriculture Outlook; January 1989.

Table 7. Corn Farm Program Provisions and Market Prices, Actual for 1987 and 1988, and Projected for 1989-1994.

Year	Target Price	Loan Rate	Average Market Price	Acreage Reduction Program	Paid Diversion	Diversion Payment
	($/bu)	($/bu)	($/bu)	(% of Base)	(% of Base)	($/bu)
1987	3.03	1.82	1.94	20.0	15.0	2.00
1988	2.93	1.77	2.52	20.0	10.0	1.75
1989	2.84	1.65	2.15	10.0	0.0	--
1990	2.75	1.58	2.09	12.5	0.0	--
1991	2.75	1.55	2.09	12.5	0.0	--
1992	2.75	1.58	2.12	12.5	0.0	--
1993	2.75	1.59	2.13	12.5	0.0	--
1994	2.75	1.59	2.16	12.5	0.0	--

Source: FAPRI Ten-Year International Agriculture Outlook; January 1989.

Table 8. Net Worth at the End of 1988 for Representative Farms in Five Regions of Texas, Assuming Alternative Debt-to-Asset Positions and Frozen Target Prices.

Farm	Initial Debt-to-Asset Ratio		
	0.2	0.4	0.6
	($)		
Coastal Bend	373,380	280,035	186,690
Blacklands	326,230	244,673	163,115
Rolling Plains	253,320	189,990	126,660
S. High Plains-Med.	225,960	169,470	112,980
S. High Plains-Lg.	565,725	424,294	282,863
N. High Plains	344,593	258,445	172,297

Table 9. Present Value of Ending Net Worth for Representative Farms in Five Regions of Texas, Assuming Alternative Debt-to-Asset Positions and Frozen Target Prices.[1]

Farm	Initial Debt-to-Asset Ratio		
	0.2	0.4	0.6
	($)		
Coastal Bend	359,250	242,240	109,520
Blacklands	218,300	109,190	-65,750
Rolling Plains	252,730	179,510	102,280
S. High Plains-Med.	145,850	64,280	-360
S. High Plains-Lg.	761,710	599,000	427,350
N. High Plains	227,040	104,230	-24,280

[1]Present value of ending net worth is the farm's net worth at the end of 1994, discounted to 1989, using a 5 percent discount rate.

Table 10. Present Value of Ending Net Worth in 1994, as a Percentage of Beginning Net Worth, for Representative Farms in Five Regions of Texas, Assuming Alternative Debt-to-Asset Positions and Frozen Target Prices.

	Initial Debt-to-Asset Ratio		
Farm	0.2	0.4	0.6
	(percent)		
Coastal Bend	96	86	59
Blacklands	67	45	-40
Rolling Plains	100	94	81
S. High Plains-Med.	65	38	0
S. High Plains-Lg.	135	141	151
N. High Plains	66	40	-14

Table 11. Probability of the Representative Farms Earning a 5 Percent Return or Greater on Initial Net Worth in Five Regions of Texas, Assuming Alternative Debt-to-Asset Positions and Frozen Target Prices.

	Initial Debt-to-Asset Ratio		
Farm	0.2	0.4	0.6
	(percent)		
Coastal Bend	94	68	38
Blacklands	23	1	0
Rolling Plains	84	71	51
S. High Plains-Med.	48	35	19
S. High Plains-Lg.	97	93	86
Northern High Plans	41	20	6

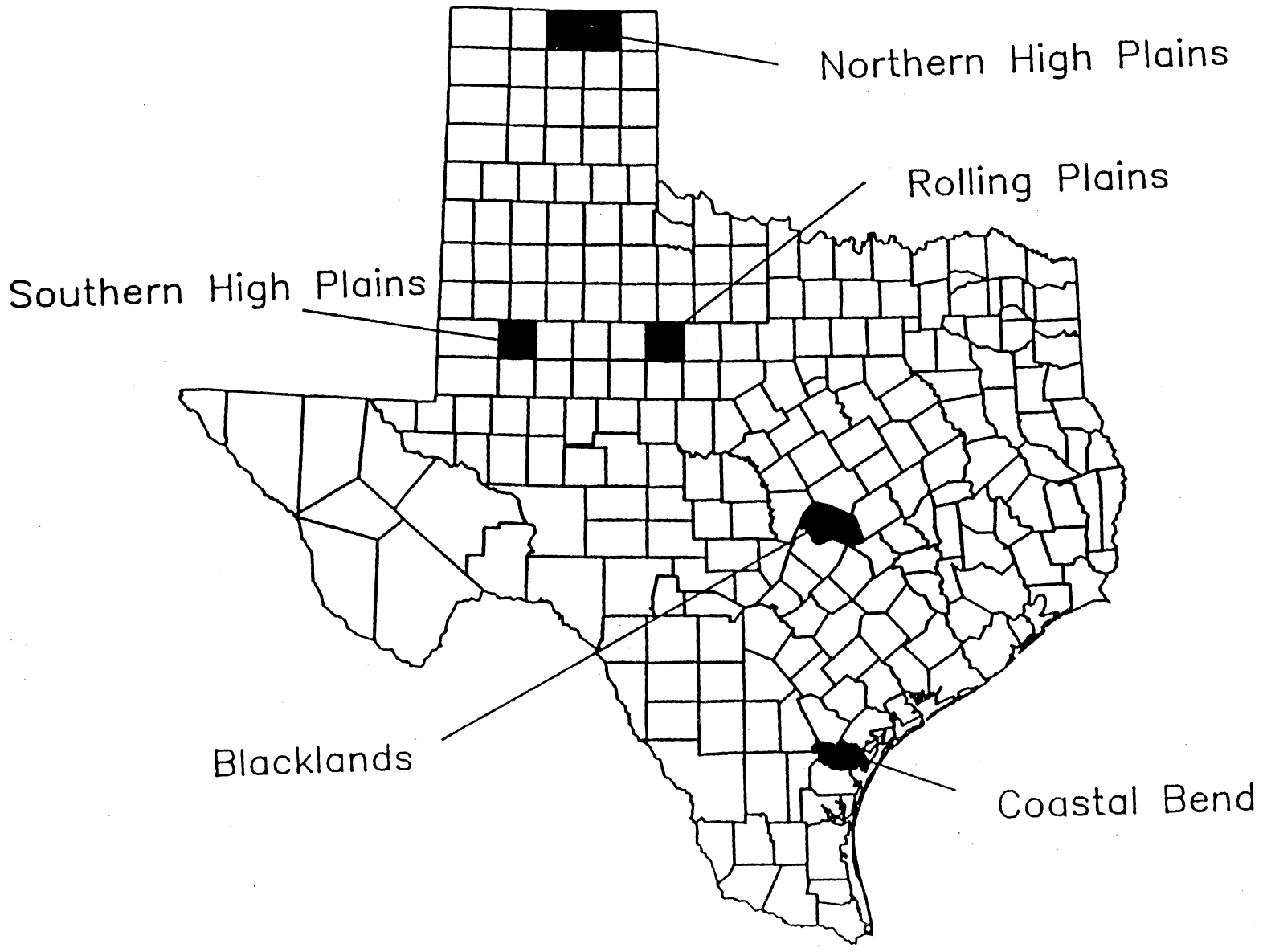
Table 12. Average Ending Debt-to-Asset Ratio in 1994 for Representative Farms in Five Regions of Texas, Assuming Alternative Debt-to-Asset Positions and Frozen Target Prices.

Farm	Initial Debt-to-Asset Ratio		
	0.2	0.4	0.6
	(fraction)		
Coastal Bend	0.21	0.46	0.76
Blacklands	0.39	0.69	>1.00
Rolling Plains	0.13	0.33	0.62
S. High Plains-Med.	0.49	0.81	>1.00
S. High Plains-Lg.	0.05	0.15	0.36
Northern High Plans	0.50	0.88	>1.00

Table 13. Average Annual Net Cash Farm Income for Representative Farms in Five Regions of Texas, Assuming 40% Debt and Frozen Target Prices.

	1989	1990	1991	1992	1993	1994
	($)					
Coastal Bend	41,070	23,100	23,740	28,860	19,100	8,310
Blacklands	24,910	4,820	5,270	3,140	-1,900	-12,670
Rolling Plains	21,660	16,860	20,470	32,000	26,930	23,180
S. High Plains-Med.	22,790	2,720	-4,270	200	-4,500	-19,340
S. High Plains-Lg.	96,700	83,150	71,270	90,750	80,350	61,600
N. High Plains	25,250	-1,500	-12,170	-13,450	-31,460	-49,300

Figure 1. Study Areas for Representative Crop Farms.



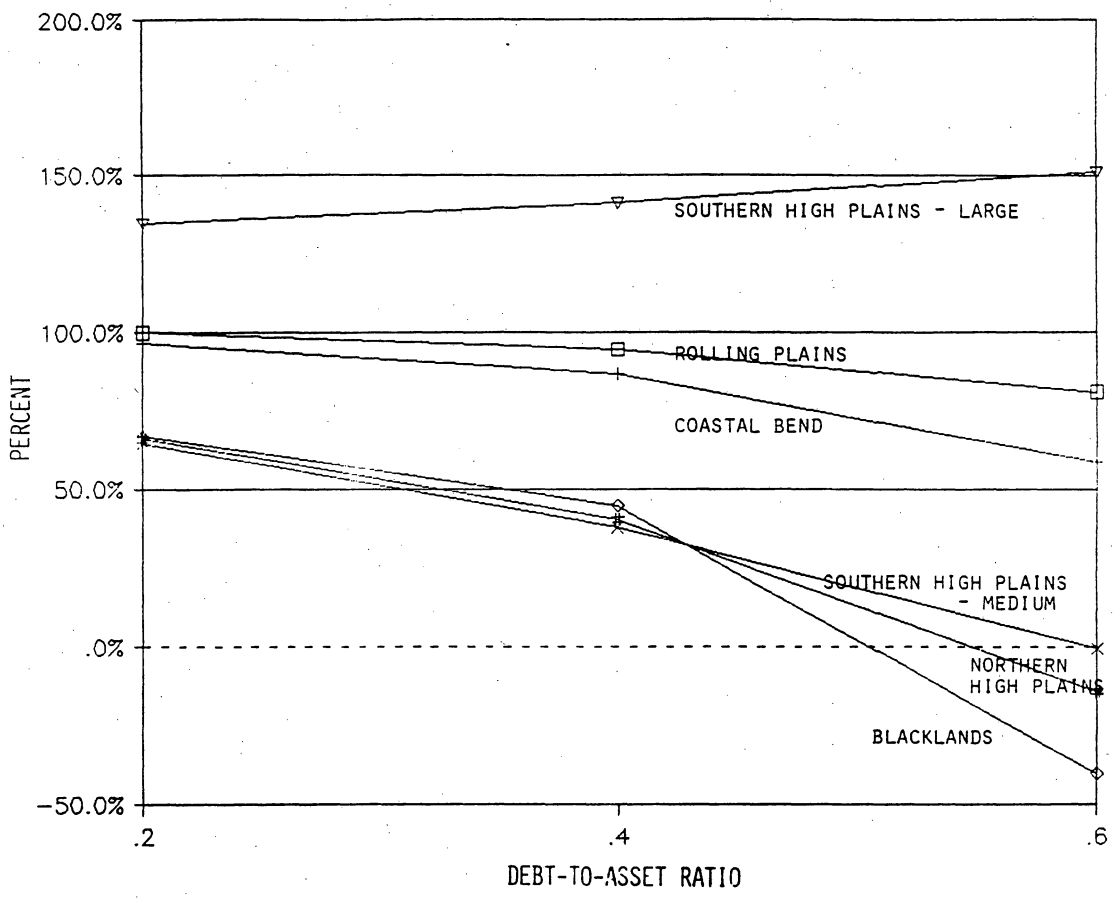


Figure 2. **Real Value of Ending Net Worth in 1994 Expressed as a Percentage of Initial Net Worth for Representative Crop Farms in Five Regions of Texas, Assuming Frozen Target Prices and Alternative Initial Debt-to-Asset Ratios.**

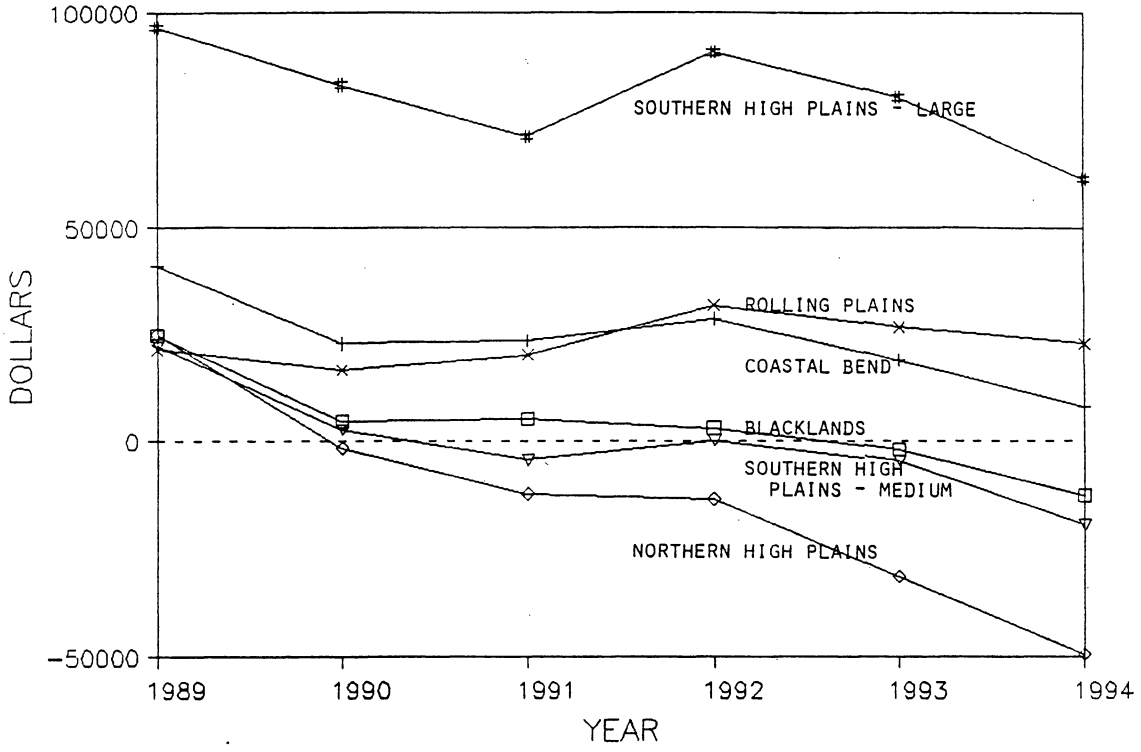


Figure 3. **Average Annual Net Cash Farm Income for Six Representative Texas Farms, Assuming 40% Debt and Frozen Target Prices.**

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