Impact of Fuel Price Increases on Texas Crops

Chris R. Eggerman
Research Assistant
Department of Agricultural Economics
Texas A&M University
College Station, Texas 77843-2124
creggerman@ag.tamu.edu

Sarah A. McMahon
Extension Program Specialist
Department of Agricultural Economics
Texas A&M University
College Station, Texas 77843-2124
samcmahon@ag.tamu.edu

James W. Richardson
Regents Professor & TAES Faculty Fellow
Department of Agricultural Economics
Texas A&M University
College Station, Texas 77843-2124
jwrichardson@tamu.edu

Joe L. Outlaw
Associate Professor & Extension Economist
Department of Agricultural Economics
Texas A&M University
College Station, Texas 77843-2124
joutlaw@tamu.edu

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Abstract: This study estimates the impact of fuel price increases on Texas crop income with probabilistic projections of 2006-2008 production costs, planted acres and net returns for the state's major crops under alternative fuel cost assumptions. Revenue projections are entered into an input-output model to estimate impacts on the state economy.

Keywords: crop model, simulation, input-output model

JEL Codes: C53, Q10

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Introduction

Rising production costs combined with low market prices continue to decrease farmers' profit margins and will adversely impact farm income and rural communities. The Producer Price Index (PPI), which includes agricultural input prices, has increased about three percent per year over the last five years. As a result of these small increases, fuel costs were predicted to increase by less than one percent from 2004 to 2005 in the January 2005 Baseline from the Food and Agricultural Policy Research Institute (FAPRI) at the University of Missouri. However, weekly diesel prices in the Gulf Coast region increased more than 39 percent and weekly gasoline prices in Texas increased over 28 percent from 2004 to 2005 (Energy Information Administration).

The effect of rising fuel prices on agriculture is multi-faceted, increasing production (fuel, fertilizer and irrigation), harvesting and transportation costs. The January 2005 FAPRI Baseline predicted fertilizer costs to decrease from 2004 to 2005, but rising fuel prices have driven fertilizer costs up. The effects of higher energy and fertilizer prices on crop producers is of interest to policy makers because of the impacts on net returns for Texas producers. The secondary impacts on rural communities are also of interest to policy makers.

The primary objective is to estimate the effects of increased fuel prices on economic indicators for crop producers in Texas. The secondary objective is to estimate the short- and intermediate-term impacts on the Texas economy resulting from the effects of increased fuel prices on the state's crop producers.

Methodology

To estimate the economic impacts of increases in fuel and fertilizer prices on Texas crop producers, a state-level model of crop production, costs, prices and net returns is necessary. A state-level model suitable for analyzing the impacts of changes in input prices must be linked to a sector-level model that provides projections of national prices, such as the FAPRI model.

A state-level model that projects net farm income for crops is FAPRI's Missouri crop and livestock model (FAPRI 2005 Outlook for Missouri Agriculture). The crop sector model projects state prices, yields and regional production costs as linear relationships with corresponding variables in the national FAPRI model. Acres planted for each crop is estimated as a function of per acre expected net returns for every crop in the model. Following the methodology used in the FAPRI Missouri crop and livestock model we developed a Texas crop model. The Texas crop model includes all major program crops (corn, upland cotton, peanuts, rice, grain sorghum and wheat). Projections of annual prices and inflation rates from the January 2005 FAPRI Baseline were available for the current study.

Results from the Texas crop model include projections of annual costs of purchased inputs and net returns. These model outputs are used as input in the IMPLAN model to quantify the impacts of changes in fuel and fertilizer prices on rural communities.

Texas Crop Model

Historical data from 1978-2004 was used to develop an econometric model of Texas crops including corn, upland cotton, peanuts, rice, grain sorghum and wheat. Simetar (Richardson, Schumann and Feldman) was used to estimate the econometric equations for the model and to simulate the model stochastically. Data from the Economic Research Service

(USDA/ERS) were used for national and regional costs of production as well as government payments. National Agricultural Statistics Service (USDA/NASS) data were used for price, yield, planted acres and harvested acres for each crop at the national and Texas levels. National costs of production, prices and yields projected in the January 2005 FAPRI Baseline were used as exogenous variables for the Texas crop model. Loan rates, target prices, direct payment rates, direct and counter-cyclical payment (CCP) yields, as well as base acreages were obtained from the Farm Service Agency (USDA/FSA). Although these policy variables are only set through 2007 in the current Farm Bill, they were assumed to remain unchanged for 2008.

Ordinary least squares was used to estimate the model's endogenous variables. Per acre regional production costs were estimated as a function of corresponding variables at the national level. These included costs of seed, fertilizer, chemicals, fuels, custom operations, repairs, hired labor, farm overhead, as well as taxes and insurance for each of the six crops. Also included were irrigation cost for corn and rice, ginning cost for cotton, and drying cost for peanuts. Each crop's production costs were summed and multiplied by an interest rate to estimate short-term or operating interest costs. Short-term interest costs were added to the aforementioned production costs to calculate per acre variable production costs.

The state average expected yield for each crop was estimated as a function of trend to account for the technology-driven increases in yields. Each crop's state price (marketing year average) was estimated as a function of its own U.S. marketing year average price. Planted acres for each crop are a function of per acre expected receipts which includes returns from the market and expected loan deficiency payments (LDPs). The expected LDPs are calculated for corn, peanuts, sorghum and wheat with the following equation:

$$E(LDP_t) = max(loan\ rate_t - .95 * U.S.\ price_{t-1}) * expected\ \ yield_t$$

The .95 is an adjustment factor to the make the U.S. price more equivalent to a posted county price. The calculation is the same for cotton and rice except the .95 is replaced with .925 and adjusted world price replaces U.S. price. Expected net returns per acre were calculated as:

$$Expected\ net\ returns_t = \{Texas\ price_{t-1} + E(LDP_t)\} * expected\ \ yield_t\ -\ variable\ costs_t$$

LDPs were included because they are coupled with current price and production, while direct and counter-cyclical payments were not included because they are decoupled from current production. Expected net returns were divided by the PPI to account for the possible effects of inflation.

To reflect producers' planting decision, the number of acres planted for each crop was estimated as a function of the deflated expected net returns for all crops, with the expectation that planted acres for a crop would be positively related to its own expected net returns and negatively related to that of the other crops. For each crop in the model except wheat, the number of harvested acres was estimated as a function of planted acres. A significant amount of wheat planted in Texas is used for cattle grazing. A producer's decision whether to use planted wheat acreage for grazing or wheat production is largely based on expected returns for each alternative. To account for this, harvested acreage for wheat was estimated as a function of wheat acres planted and the ratio of Oklahoma City 600-650 pound feeder steer prices to expected net returns from wheat. Results of the econometric equations for the model are not included in the interest of space. However, they are available from the authors.

Residuals from the regression equations were used to make probabilistic projections of the endogenous variables. The residuals represent the unexplained portion of each endogenous variable and as such represent the risk in production costs, market prices and yields about the deterministic projection. The residuals were used to develop the parameters for simulating the stochastic variables assuming a multivariate normal (MVN) distribution. There are three parameters for a MVN distribution. The deterministic component is the mean, or predicted value from the econometric equation, the stochastic component is the standard error for the prediction, and the multivariate component is the correlation matrix of residuals. The endogenous variables for the six crops were simulated as six MVN distributions based on pre-testing the correlation matrix of residuals. The six MVN distributions are:

1. Texas prices and yields
2. Planted acres and harvested acres
3. Seed costs
4. Fertilizer, chemical and fuel costs
5. Repairs, custom operations, labor and overhead costs
6. Tax & insurance costs and cash receipts

Stochastic values of each crop's endogenous variable i were simulated as follows:

$$\tilde{X}_{ti} = X\text{-}hat_{ti} + \sigma\text{-}hat_i * CSND_{ti}$$

where: $\tilde{X}_t$ = stochastic value in period t,
$X\text{-}hat_t$ = predicted value in period t,
$\sigma\text{-}hat_i$ = standard error of prediction,
and $CSND_{ti}$ = a correlated standard normal deviate for variable i, and is the product of multiplying the factored correlation matrix by a vector of independent standard normal deviates (Richardson, Klose and Gray)

Projections for direct, counter-cyclical and loan deficiency payments were summed to project government payments for the six crops in the model. Direct and counter-cyclical payments were calculated using state averages for their respective yields and total base acres for Texas. The three types of payments were calculated as follows:

*Direct payments = base acreage * .85 * direct payment yield * direct payment rate*

*Counter-cyclical payments = base acreage * .85 * CCP yield * {target price – direct payment rate – max(loan rate, U.S. market price)}*

*Loan deficiency payments = yield * harvested acres * max(0, loan rate – U.S. market price – adjustment factor)*

As in the expected net returns calculation, the adjustment factor in the LDP calculation was used to make the U.S. price more equivalent to a posted country price.

Net income for each crop was calculated with the following equation:

Net income = total revenue – total costs

where: *total revenue = harvested acres * yield * Texas price + government payments*
and *total costs = planted acres * per acre variable production costs*

Net income was divided by planted acres to calculate per acre net returns for each crop. It is important to note that net income and per acre net returns for wheat do not account for returns to the livestock sector from wheat grazing. Production costs were calculated for all acres planted to wheat, but the model accounts only for revenue from wheat harvested for grain.

IMPLAN

IMPLAN is one of the most widely used methods for developing regional input-output models (Jones 2002). It allows for both the estimation of the transaction table for the local economy and the manipulation of the table to estimate multipliers that capture the direct, indirect and induced effects of changes in Texas' major crop sectors.

Input-output modeling is used to analyze the economic relationships or linkages among sectors of an economy. Final demand drives input-output models. There are two phases of input-output modeling: descriptive modeling and predictive modeling. The descriptive model describes the local economic structure with the flow of dollars from the purchaser to the producer. The predictive model is represented by the multipliers that predict the outcome of a change in output within the local economy. An input-output model consists of three basic tables: the transaction table, a direct technical coefficients table and a table of interdependence coefficients (Jones 1997).

The transaction table is a “snapshot” of the local economic structure. It is the descriptive part of the model, reflecting the value of goods and services exchanged between industries within an economy. A transaction table contains three components of the local economy which captures all transactions within that economy: producing industries, final demand and value added. In this study, it shows how the six crop sectors are linked to other industries and to the final demand component of the local economy.

Technical coefficients show the production function for each processing sector (Jones 1997). The production function shows where and how much an industry spends to generate each dollar of output. The technical coefficients are used in the calculation of the first round, or direct, effects of an economic change such as a decrease in revenue from a particular crop.

The direct impacts are only a portion of the total impacts. It is also necessary to calculate the indirect effects on the state from decreased crop revenue. The total (direct and indirect) output levels needed to satisfy specified levels of final demand may be found by deriving the interdependence coefficients matrix following the methods developed by Leontief (Jones 1997). The interdependence coefficient matrix measures total output (direct and indirect) required by all industries for any particular industry to make a sale of one dollar to final demand.

Input-output models use multipliers to estimate the impacts of a change in output from one sector on the output requirements of another sector(s). Multipliers account for the difference between an initial effect of a change in final demand and the total effects of that change. It is important to recognize that input-output modeling accounts for backward linkages, not forward linkages. Backward linkages connect an industry to its suppliers of goods and services.

Purchases for final use, in this case products made from Texas’ major crops, drive the IMPLAN model. To produce a commodity such as cotton, producers of cotton must purchase goods and services from other industries. These purchases may include chemicals, machinery and seed. Buying of goods and services is considered to be an indirect impact of changes in crop revenue. Indirect and induced effects are mathematically derived using the Leontief inverse. The resulting sets of multipliers describe the change in output for every regional industry caused by a one dollar change in crop revenue.

In this study, four statistics are reported for the state under each fuel and fertilizer cost scenario to capture the total effects of the changes in crop revenue: total business activity (output), labor income, other income and employment. Total business activity is the value of output produced by an industry or sector. Labor income is composed of employee compensation and proprietary income. Employee compensation is wage and salary payments in addition to benefits such as health insurance, retirement contributions as well as any other non-cash compensation. Proprietary income is payments (income) received by self-employed individuals. Other income is composed of two components: other property type income and indirect business taxes. Other property type income is payments received from interest, rents, royalties, dividends and profits. Indirect business taxes are excise and sales taxes paid by individuals to businesses. Employment includes wage and salary employees along with self-employed individuals and includes full-time as well as part-time workers.

Results

The Texas crop model's key output variables are per acre costs of production, planted acres, per acre net returns, and net income. The 2006-2008 projections of these variables for each crop were simulated stochastically for 250 iterations under three scenarios for per acre fuel and fertilizer cost projections using Simetar. The three scenarios are as follows:

Scenario 1: inflation rates in the January 2005 FAPRI Baseline
Scenario 2: inflation rates in the December 2005 FAPRI Baseline
Scenario 3: annual inflation rates grow at their 1999-2004 average rate

Regional cost projections were used for peanuts because national projections were not available from FAPRI.

Table 1 shows the projected percentage increases in fuel and fertilizer costs under each scenario. From 2004 to 2005, fuel costs are projected to increase slightly in Scenario 1. Fuel costs are projected to rise by 27 to 40 percent from 2004 to 2005 in Scenario 2 and by 3 to 13 percent in Scenario 3. From 2004 to 2008, fuel costs are projected to increase by a total of 5 to 7 percent in Scenario 1. They are assumed to rise by 5 to 22 percent in Scenario 2 and by 13 to 62 percent in Scenario 3 over these four years. Results of these three scenarios are used as input in IMPLAN to quantify community impacts of higher fuel and fertilizer costs.

Crop Impacts

Simulating the Texas crop model's key output variables resulted in probabilistic projections of planted acres, per acre production costs, per acre net returns and net farm income for the six major crops in Texas. Ninety percent confidence intervals were developed from the probabilistic forecasts, meaning 90 percent of the simulated values lie between the 5th and 95th percentile. The confidence intervals for the key output variables for 2006, 2007 and 2008 are shown in Tables 2, 3 and 4, respectively.

With fuel and fertilizer costs increasing for Scenarios 2 and 3 faster than for the base while crop prices remained the same, 2006-2008 expected net returns declined for each crop. In general, this caused a decrease in planted acres each year for every crop from Scenario 1 to Scenarios 2 and 3. In a few cases, either the 5th or 95th percentile of planted acres increased slightly for peanuts, rice or wheat. One possible explanation for this is that fuel and fertilizer expenses were relatively lower for these crops than for other crops. Therefore, a given percentage increase in these costs had a smaller effect on their production costs than on the costs for crops using more fuel or fertilizer.

Production cost projections increased from Scenario 1 to Scenarios 2 and 3 for each crop in all three years of the analysis (Tables 2, 3 and 4). As a result, per acre net returns decreased for every crop except rice. Compared to Scenario 1, the 95th percentile of net returns for rice increased for Scenario 2 in all three years, as well as for Scenario 3 in 2006 and 2008. This may be due to the fact that rice acreage in Texas is projected to continue declining and producers continue to receive direct and counter-cyclical payments on their base acreage.

Net farm income for crops decreased from Scenario 1 to Scenarios 2 as well as Scenario 3 for all three years of the analysis. Figure 1 compares the probability distribution function (PDF) charts of 2006 projected total net farm income under the three scenarios. Compared to Scenario 1, total net farm income decreased more under Scenario 2 than under Scenario 3.

Figure 2 shows the net farm income PDFs for 2007. Fuel and fertilizer cost increases assumed in the Scenarios 2 and 3 have similar effects on 2007 net farm income projections. Figure 3 compares the net farm income distributions for 2008. Compared to Scenario 1, projected total net farm income decreased more under Scenario 3 than under Scenario 2. Therefore, assumed fuel and fertilizer costs in Scenario 2 had a more significant impact on total net farm income in the short term (2006), while those in Scenario 3 had a larger impact on intermediate-term (2008) total net farm income projections.

Community Impacts

The impacts of increased fuel and fertilizer prices on the Texas economy were estimated using an input-output model for the state. The 2005 and 2008 expected state revenue projections under each fuel and fertilizer cost scenario for the six crops in the Texas crop model are summarized in Table 5. These numbers were used as input to IMPLAN to estimate the short- and intermediate-term impacts of increased fuel and fertilizer prices on the state's total business activity (output), labor income, other income and jobs.

In addition to the direct impacts that decreased crop revenue from increased fuel and fertilizer prices has on the Texas economy, there are also indirect and induced effects that need to be taken into account. Indirect effects include purchases of goods and services by each sector to produce a final product. For example, feed mills purchase corn and wheat from crop producers to make livestock feed that is sold to beef producers. Induced effects are changes in household spending as household income increases or decreases due to changes in farm income.

The economic impacts of projected revenue from Texas crops in 2005 and 2008 under the three cost scenarios are shown in Tables 6 and 7. In input-output analysis, business activity (output) is measured as the dollar value of output produced by an industry or sector, in this case the crops sector for Texas. Compared to Scenario 1 which had lower fuel and fertilizer cost projections, 2005 output decreased approximately $257 million in Scenario 2 and $184 million in Scenario 3. For 2008, output decreased roughly $145 million in Scenario 2 and $127 million in Scenario 3. The estimated impact represents the total value of sales by all industries in Texas that are affected both directly and indirectly by the state's crop sector.

The estimated impact on 2005 labor income attributable to increased fuel and fertilizer prices is a decrease from Scenario 1 of just over $88 million in Scenario 2 and a $63.2 million decrease in Scenario 3 (Table 6). In 2008, projected labor income fell by about $69.5 million in Scenario 2 and roughly $64.6 million in Scenario 3 (Table 7). Other income includes payments received from interest, rents, royalties, dividends and profits as well as taxes paid by individuals to businesses. The 2005 projection for other income fell approximately $39.9 million and $28.7 million in Scenarios 2 and 3, respectively. For 2008, the projection for other income fell by roughly $32 million in Scenario 2 and $29 million in Scenario 3, as compared to Scenario 1.

The decrease in farm income due to increased fuel and fertilizer prices has an impact on employment in Texas as well. Compared to Scenario 1, the expected number of jobs in the state supported by the crops sector for 2005 decreased by 5,041 in Scenario 2 and by 3,614 in Scenario 3. For 2008, the state's jobs supported by the crops sector declined from Scenario 1 by 3,933 in Scenario 2 and by 3,717 in Scenario 3.

Summary and Conclusions

Rising production costs combined with low market prices adversely impact farm income and rural communities. The objectives of this study were to estimate the effects of increased fuel prices on farm income for Texas crop producers and to assess the short- and intermediate-term impacts of the resulting decrease in farm income on the state economy. A stochastic model was developed to project planted acres, production costs, per acre net returns and net farm income for six crops in Texas. These variables were projected under three fuel and fertilizer cost scenarios: inflation rates in the January 2005 FAPRI Baseline, inflation rates in the December 2005 FAPRI Baseline, and annual inflation rates growing at their 1999-2004 average rate. Crop revenue projections were used as input in the IMPLAN model to estimate the impacts of fuel and fertilizer price increases on the Texas economy under each scenario.

The primary objective of this study was to estimate the impact of increased fuel and fertilizer prices on Texas crop producers in 2006-2008. As expected, projected production costs, planted acres and net returns for Texas' major crops were less favorable for the state's crop producers under increased fuel and fertilizer price assumptions. In a few cases, projections of planted acres for peanuts, rice or wheat increased slightly, due to their low fuel and fertilizer requirements compared to other crops. Net returns for rice producers increased in some cases, due to DP and CCP payments being paid on acres no longer in rice production.

The secondary objective of this analysis was to estimate the short- and intermediate-term impacts on the Texas economy from the effects of increased fuel and fertilizer prices on the state's crop producers. Estimated impacts included decreases of $184 million to $257 million in projected output in 2005 and $127 million to $145 million in 2008, as well as the loss of 3,614 to 5,041 jobs supported by the crops sector in 2005 and 3,717 to 3,933 of such jobs in 2008.

This research is of importance to policy makers, farmers and rural communities, particularly as fuel price increases work their way through the economy, resulting in higher inflation rates. Policy planners need to be aware of the impacts higher fuel and fertilizer prices will likely have on the agricultural sector in the short run. Agricultural producers need impact analysis of higher input costs to better manage their farms. Additionally, rural communities need advance warning as to how farm incomes will be affected by rising fuel and fertilizer prices.

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Table 1. Assumed Percentage Increases in National Fuel & Fertilizer Costs by Crop for Three Scenarios

	Scenario 1[a]		Scenario 2[b]		Scenario 3[c]	
	2004-2005 percentage increase					
	Fuel	Fertilizer	Fuel	Fertilizer	Fuel	Fertilizer
Corn	0.2%	-10.1%	33.3%	10.8%	6.3%	4.3%
Cotton	0.2%	-13.8%	31.4%	10.9%	3.3%	1.4%
Peanuts[d]	4.6%	1.9%	30.9%	14.0%	12.7%	6.6%
Rice	0.2%	-12.5%	28.8%	13.0%	5.8%	5.6%
Sorghum	0.2%	-12.9%	39.5%	16.8%	8.2%	10.9%
Wheat	0.2%	-5.0%	27.4%	11.0%	12.6%	6.6%
	2004-2008 total percentage increase					
	Fuel	Fertilizer	Fuel	Fertilizer	Fuel	Fertilizer
Corn	6.0%	-8.2%	14.3%	7.3%	27.8%	18.2%
Cotton	5.7%	-13.4%	12.2%	14.6%	13.9%	5.5%
Peanuts[d]	-4.4%	3.1%	11.6%	21.3%	61.2%	29.1%
Rice	6.2%	-12.3%	9.2%	17.6%	25.1%	24.4%
Sorghum	5.4%	-12.6%	21.2%	19.6%	37.1%	51.3%
Wheat	6.4%	-11.8%	5.9%	12.9%	60.7%	29.2%

Sources: FAPRI January & December 2005 Baselines and ERS Commodity Costs and Returns

[a]Scenario 1: inflation rates in the January 2005 FAPRI Baseline
[b]Scenario 2: inflation rates in the December 2005 FAPRI Baseline
[c]Scenario 3: annual inflation rates grow at their 1999-2004 average rate
[d]Projected inflation rates for peanuts are regional

Table 2. Ninety Percent Confidence Intervals for Key Output Variables in 2006

		Scenario 1[a]		Scenario 2[b]		Scenario 3[c]	
	Percentile	5th	95th	5th	95th	5th	95th
Corn	Planted acres (1000)	1,245	2,329	1,228	2,299	1,234	2,323
	Production costs ($/acre)	203.88	246.55	260.82	296.51	241.31	277.40
	Net returns ($/acre)	43.93	159.51	-3.39	121.57	8.15	126.88
	Net farm income ($1000)	84,603	265,142	-5,296	175,410	15,346	205,278
Cotton	Planted acres (1000)	4,282	7,587	3,836	7,212	3,955	7,733
	Production costs ($/acre)	205.77	234.74	257.43	288.36	240.78	270.64
	Net returns ($/acre)	7.42	150.11	-34.62	98.01	-26.21	108.70
	Net farm income ($1000)	43,235	826,723	-221,967	513,515	-156,769	600,660
Peanuts	Planted acres (1000)	188	361	182	357	187	364
	Production costs ($/acre)	376.86	417.62	455.44	490.01	426.81	466.58
	Net returns ($/acre)	184.78	556.55	101.11	502.61	133.60	506.96
	Net farm income ($1000)	53,981	149,390	29,501	120,868	39,520	124,542
Rice	Planted acres (1000)	68	472	50	421	58	470
	Production costs ($/acre)	370.48	401.45	462.60	493.48	429.71	460.17
	Net returns ($/acre)	346.38	1,306.63	268.84	1,779.22	294.41	1,578.08
	Net farm income ($1000)	108,068	175,990	99,728	140,200	103,165	152,946
Sorghum	Planted acres (1000)	1,890	4,379	1,485	4,031	1,810	4,168
	Production costs ($/acre)	102.25	110.15	141.33	150.25	128.89	137.61
	Net returns ($/acre)	14.30	70.59	-25.28	37.20	-14.00	49.05
	Net farm income ($1000)	46,020	208,579	-80,820	74,426	-48,569	115,686
Wheat	Planted acres (1000)	5,488	7,778	5,229	7,865	5,220	7,807
	Production costs ($/acre)	64.00	72.02	86.09	92.99	82.05	89.05
	Net returns* ($/acre)	-17.81	13.43	-44.46	-6.04	-38.88	-2.82
	Net farm income* ($1000)	-111,895	85,039	-276,190	-42,055	-249,984	-22,753
TOTAL	Net farm income ($1000)	484,098	1,426,574	-145,802	682,220	651	958,348

*Does not include returns to livestock sector from wheat grazing

[a]Scenario 1: inflation rates in the January 2005 FAPRI Baseline
[b]Scenario 2: inflation rates in the December 2005 FAPRI Baseline
[c]Scenario 3: annual inflation rates grow at their 1999-2004 average rate

Table 3. Ninety Percent Confidence Intervals for Key Output Variables in 2007

		Scenario 1[a]		Scenario 2[b]		Scenario 3[c]	
	Percentile	5th	95th	5th	95th	5th	95th
Corn	Planted acres (1000)	1,269	2,295	1,202	2,294	1,251	2,372
	Production costs ($/acre)	210.22	248.50	242.90	283.77	243.16	280.58
	Net returns ($/acre)	42.36	161.98	2.54	121.98	7.00	133.91
	Net farm income ($1000)	82,934	256,331	5,212	201,070	16,884	208,596
Cotton	Planted acres (1000)	4,291	7,628	4,154	7,320	4,159	7,507
	Production costs ($/acre)	209.50	237.12	244.77	273.23	238.35	268.73
	Net returns ($/acre)	5.33	144.96	-22.83	117.46	-17.47	120.83
	Net farm income ($1000)	31,770	874,514	-152,155	648,431	-95,175	695,771
Peanuts	Planted acres (1000)	193	375	195	369	198	361
	Production costs ($/acre)	374.16	414.11	419.15	462.93	442.61	478.35
	Net returns ($/acre)	167.71	558.64	142.05	504.67	121.16	495.36
	Net farm income ($1000)	54,378	138,257	46,393	133,023	33,783	124,999
Rice	Planted acres (1000)	63	463	48	469	73	458
	Production costs ($/acre)	374.87	405.64	434.55	465.41	435.90	462.37
	Net returns ($/acre)	363.12	1,368.85	301.45	1,901.38	310.52	1,242.53
	Net farm income ($1000)	107,437	171,819	103,513	151,415	105,599	152,049
Sorghum	Planted acres (1000)	1,979	4,288	1,789	4,147	1,726	4,192
	Production costs ($/acre)	103.21	111.55	130.74	140.20	133.92	142.53
	Net returns ($/acre)	10.92	69.01	-15.70	44.35	-19.82	39.60
	Net farm income ($1000)	40,075	194,142	-54,429	103,510	-64,112	98,847
Wheat	Planted acres (1000)	5,199	7,827	5,211	7,951	5,124	7,668
	Production costs ($/acre)	65.13	72.85	80.27	86.83	84.87	92.41
	Net returns* ($/acre)	-22.71	12.42	-37.89	-0.13	-42.78	-7.49
	Net farm income* ($1000)	-136,718	86,340	-238,250	-914	-264,791	-46,986
TOTAL	Net farm income ($1000)	492,174	1,375,144	-6,899	929,395	-43,377	909,487

*Does not include returns to livestock sector from wheat grazing

[a]Scenario 1: inflation rates in the January 2005 FAPRI Baseline
[b]Scenario 2: inflation rates in the December 2005 FAPRI Baseline
[c]Scenario 3: annual inflation rates grow at their 1999-2004 average rate

Table 4. Ninety Percent Confidence Intervals for Key Output Variables in 2008

		Scenario 1[a]		Scenario 2[b]		Scenario 3[c]	
	Percentile	5th	95th	5th	95th	5th	95th
Corn	Planted acres (1000)	1,317	2,371	1,235	2,252	1,245	2,331
	Production costs ($/acre)	213.57	252.47	240.75	278.40	248.79	286.28
	Net returns ($/acre)	36.28	155.01	11.53	129.07	12.25	124.51
	Net farm income ($1000)	79,681	284,940	21,805	217,810	24,592	205,751
Cotton	Planted acres (1000)	4,128	7,688	3,684	7,270	4,030	7,450
	Production costs ($/acre)	210.99	242.89	243.06	274.10	242.30	272.57
	Net returns ($/acre)	10.40	146.32	-19.84	120.31	-21.54	110.65
	Net farm income ($1000)	60,503	882,403	-114,690	582,941	-110,490	611,759
Peanuts	Planted acres (1000)	183	371	181	360	185	365
	Production costs ($/acre)	377.45	414.52	412.84	450.97	463.82	501.35
	Net returns ($/acre)	184.97	561.54	164.96	537.60	99.41	512.38
	Net farm income ($1000)	54,320	146,781	51,418	133,378	31,339	121,446
Rice	Planted acres (1000)	33	433	27	425	30	458
	Production costs ($/acre)	382.69	411.54	431.59	459.79	445.27	474.77
	Net returns ($/acre)	366.00	1,633.92	320.43	2,394.45	311.81	2,375.08
	Net farm income ($1000)	105,419	173,472	102,560	153,999	100,916	150,332
Sorghum	Planted acres (1000)	1,738	4,170	1,602	4,046	1,547	4,018
	Production costs ($/acre)	105.15	113.61	128.31	138.07	140.38	149.68
	Net returns ($/acre)	8.59	68.87	-15.03	46.89	-27.66	33.34
	Net farm income ($1000)	22,098	182,235	-46,954	107,083	-86,737	71,463
Wheat	Planted acres (1000)	5,223	7,927	5,205	7,447	4,823	7,650
	Production costs ($/acre)	66.92	74.04	79.05	86.08	90.05	97.09
	Net returns* ($/acre)	-24.79	11.67	-37.99	-1.63	-51.52	-9.19
	Net farm income* ($1000)	-154,450	88,558	-227,479	-12,550	-296,328	-53,604
TOTAL	Net farm income ($1000)	396,002	1,405,781	108,674	939,464	-83,456	784,426

*Does not include returns to livestock sector from wheat grazing

[a]Scenario 1: inflation rates in the January 2005 FAPRI Baseline
[b]Scenario 2: inflation rates in the December 2005 FAPRI Baseline
[c]Scenario 3: annual inflation rates grow at their 1999-2004 average rate

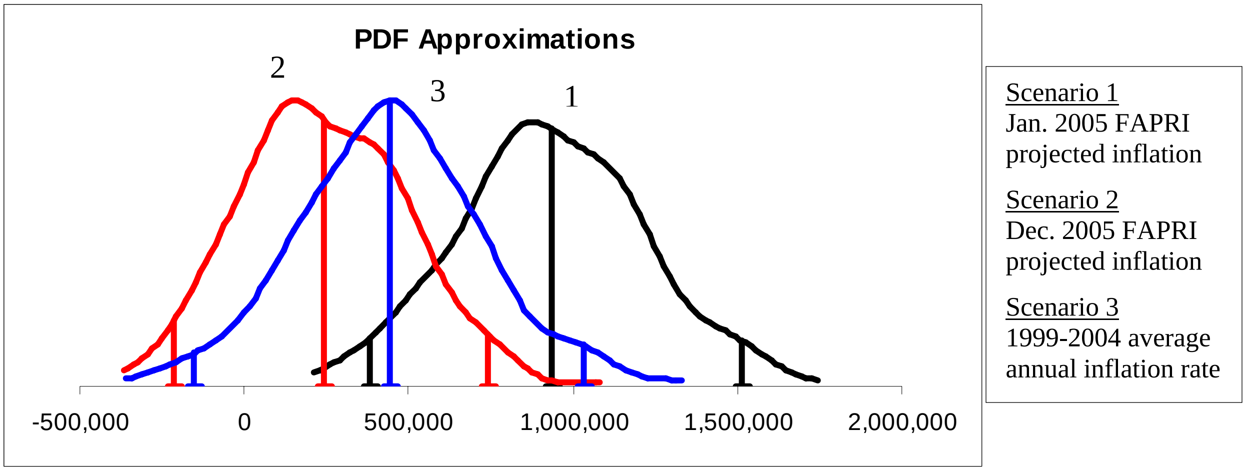

Figure 1. PDF of 2006 Texas Crops Net Farm Income under Three Scenarios ($1,000)

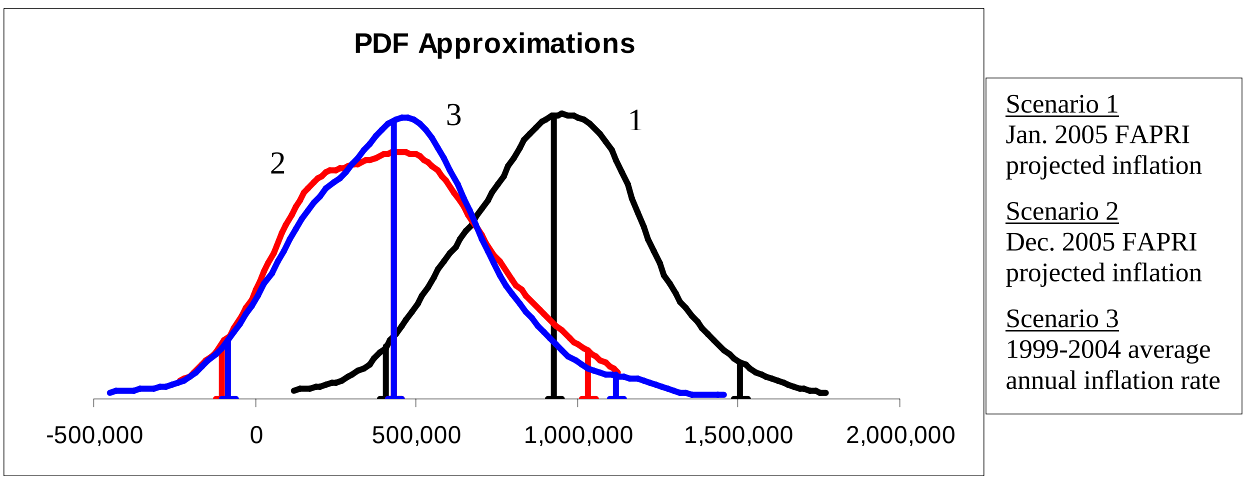

Figure 2. PDF of 2007 Texas Crops Net Farm Income under Three Scenarios ($1,000)

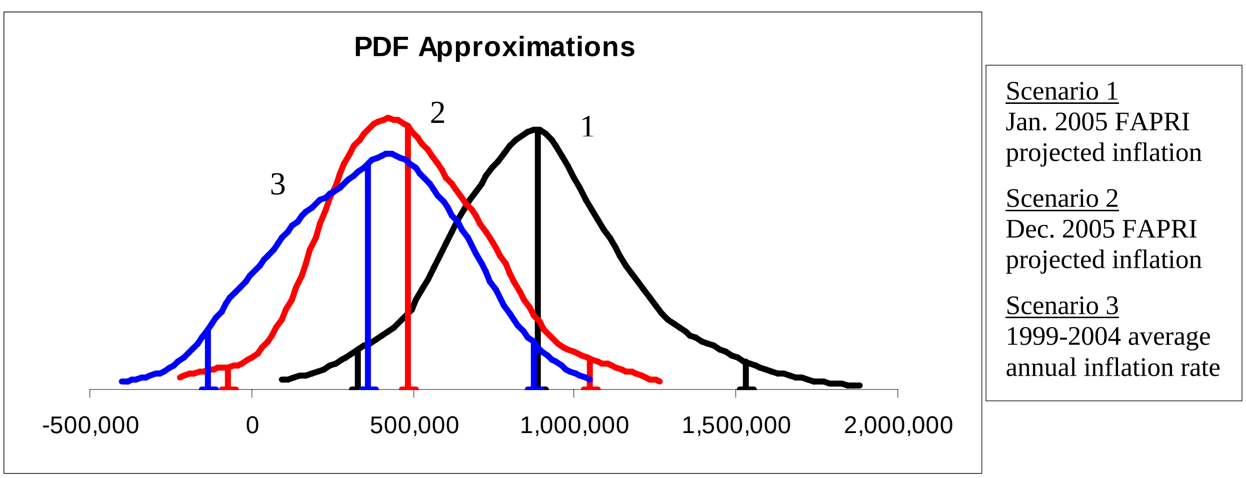

Figure 3. PDF of 2008 Texas Crops Net Farm Income under Three Scenarios ($1,000)

Table 5. Projected Texas Crop Revenue under Three Scenarios[a] ($1,000)

	2005			2008		
	Scenario 1	Scenario 2	Scenario 3	Scenario 1	Scenario 2	Scenario 3
Corn	541,163	532,045	536,025	598,237	587,089	587,379
Cotton	1,669,099	1,604,110	1,621,724	1,733,276	1,677,874	1,688,961
Peanuts	206,920	206,017	206,464	214,435	213,560	212,922
Rice	247,910	237,409	239,954	230,058	224,169	230,062
Sorghum	456,447	421,398	432,414	425,515	405,370	411,537
Wheat	479,154	468,568	469,845	414,859	403,740	390,035
TOTAL	3,600,692	3,469,547	3,506,426	3,616,380	3,511,802	3,520,896

[a]Scenario 1: inflation rates in the January 2005 FAPRI Baseline
Scenario 2: inflation rates in the December 2005 FAPRI Baseline
Scenario 3: annual inflation rates grow at their 1999-2004 average rate

Table 6. Economic Impacts of Projected 2005 Texas Crop Revenue under Three Scenarios ($1,000)

Scenario[a]	State Crop Revenue	Business Activity	Labor Income	Other Income	Employment (jobs)
1	3,600,692	7,034,081	2,414,874	1,106,393	136,067
2	3,469,547	6,777,525	2,326,818	1,066,467	131,026
3	3,506,426	6,849,643	2,351,677	1,077,687	132,453

[a]Scenario 1: inflation rates in the January 2005 FAPRI Baseline
Scenario 2: inflation rates in the December 2005 FAPRI Baseline
Scenario 3: annual inflation rates grow at their 1999-2004 average rate

Table 7. Economic Impacts of Projected 2008 Texas Crop Revenue under Three Scenarios ($1,000)

Scenario[a]	State Crop Revenue	Business Activity	Labor Income	Other Income	Employment (jobs)
1	3,616,380	7,006,262	2,413,914	1,113,664	135,149
2	3,511,802	6,861,574	2,344,384	1,081,693	131,216
3	3,520,896	6,879,592	2,349,357	1,084,631	131,432

[a]Scenario 1: inflation rates in the January 2005 FAPRI Baseline
Scenario 2: inflation rates in the December 2005 FAPRI Baseline
Scenario 3: annual inflation rates grow at their 1999-2004 average rate