EVALUATION OF THE LOSS OF DIRECT PAYMENTS ON THE FINANCING AND PROFITABILITY OF COTTON FARMS OF THE TEXAS HIGH PLAINS

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Abstract

Direct payments through the USDA direct and counter-cyclical farm program have been an integral part of the financing and profitability of cotton farmers in the Texas High Plains. This study looks at the farm-level impact of the loss of direct payments and the need to replace those guaranteed payments with a higher level of FCIC insurance coverage. Additionally, this study looked at the feasibility of reducing costs of production by changing the crop mix to one-half grain sorghum to deal with the reduced borrowing capacity. The FARM Assistance program was used to evaluate a Texas High Plains model farm representing the typical cotton production system. Changes in farm level net income for the Texas High Plains was used as an input to the socioeconomic model, IMPLAN, to measure regional economic impacts. This estimated the "ripple effects" of the loss of direct payments to economic sectors tied directly and indirectly to the spending of producer income. Economic indicators used to measure the impact included changes in industry output and employment. It was determined that the loss of direct payments would not adversely impact the financing of producers with adequate (greater than 10%) working capital. However, for operations with inadequate working capital, the increase in crop insurance level by 10% to increase the guarantee level to sufficiently cover the loss in direct payments would not adversely impact the long-term profitability of the operation. Attempting to reduce costs by planting grain sorghum, as a way to meet reduced borrowing capacity, resulted in lower net returns over the long-term.

Introduction

Currently all Farm Bill proposals being considered contain provisions to eliminate direct and counter-cyclical payments, replacing them with some type of shallow loss payment system to supplement federal crop insurance (Outlaw, 2012). Where direct payments were a known receivable at the beginning of each financing cycle, the new safety net payments that may or may not be forthcoming each year are not. Most agricultural lenders in the Texas High Plains follow the practice of limiting the beginning amount of annual farm operating loans to no more than the FCIC insurance guarantee plus direct payments. Therefore, this study looks at the farm level impact on the ability to secure financing without direct payments, the feasibility of replacing direct payments with higher levels of multi-peril crop insurance and the financial results from reducing costs by changing the crop mix. The FARM Assistance program was used to evaluate a Texas High Plains model farm representing the typical cotton production system. Additionally, changes in farm level net income for the Texas High Plains was used as an input to the socioeconomic model, IMPLAN, to measure regional economic impacts.

Materials and Methods

Representative Farm Analysis

The FARM Assistance program is a computerized decision support system built on a foundation of more than twenty years of research by Texas A&M University System agricultural economists. The computer model projects the financial future of the agricultural operation over the next ten years. This ten-year projection is a statistically based analysis, which uses the variability of the firm's own past production on a farm-by-farm basis and combines that with the expert projections for crop and livestock prices and inflation rates for inputs from the Food and Agricultural Policy Research Institute (FAPRI) and the Agricultural Food and Policy Center (AFPC) research teams. The FARM Assistance model was used to project the financial performance of a representative Texas Southern High Plains cotton farm developed with the assistance of area producers and county extension agents. The representative farm consists of 2,100 acres of cotton. One section (640 acres) is owned by the operator and 1,460 acres are share leased from landowners for 25% of production. Center pivots are used to irrigate 860 acres with the remaining 1,240 acres planted as dryland. Cotton lint yields of 900 pounds irrigated and 300 pounds dryland were used in the baseline and the first two alternatives. Cottonseed yields were calculated at a rate of 1.442 pounds per pound of lint. Crop prices used are from the August 2012 FAPRI Baseline (2013 cotton price $0.7096/lb., sorghum price $4.8071/bu.).

Baseline

In the baseline analysis direct payments were assumed to continue for the entire ten-year period. Direct payments ($44,426 total, $21.15/planted acre) were set at a level that reflects the average payment received per planted acre across NASS Districts 1N and 1S as per the FOIA request for payment information for the 2011 crop year by the authors (FSA, 2011).

Alternative One

The first alternative maintains the exact same structure of the operation minus the direct payments.

Alternative Two

The second alternative looks at the increase in the multi-peril crop insurance yield coverage level from 65% in the baseline to 75% to increase the farm level guarantee of income to cover the loss of direct payments. Crop insurance premiums for revenue protection coverage were estimated using USDA-RMA's online premium estimation tool with an estimated cotton price of $0.78 and volatility of 0.22.

Alternative Three

The third alternative looks at planting one-half of both irrigated and dryland acres to grain sorghum. Both the irrigated and dryland grain sorghum were budgeted at comparable yields and costs with the cotton (100 bu. irrigated, 32 bu. dryland). Cotton yields on irrigated land were increased 12.6% in the second through the tenth year to represent the average increase to irrigated cotton yields following sorghum (Keeling 2006-2011). No increase was included for dryland since no consistent yield increase was indicated in the Ag CARES research. Since most South Plains cotton farms do not have an established APH yield for grain sorghum, the county t-yield for Lubbock County (48 bu. irrigated and 25 bu. dryland) was used for insurance purposes. With such a low level of guarantee, the goal of minimizing costs for the alternative was maintained by insuring the sorghum for yield protection at the 50% of production and 100% of price level. Grain sorghum insurance premiums for yield protection coverage were estimated using USDA-RMA's online premium estimation tool with an estimated price of $6.14/bu.

Regional IMPLAN Analysis

Many studies have utilized IMPLAN (Impact Analysis for PLANning) (MIG, 2009a), an economic input-output model, to quantify the impacts of an economic change in a region. IMPLAN was the primary tool used in this study to measure the regional economic impacts of the loss in producer direct payments on the Texas High Plains Region, Figure 1. This model provides access to comprehensive and detailed data coverage of the entire U.S. by county. Datasets are compiled from a wide variety of sources including the U.S. Bureau of Economic Analysis, the U.S. Bureau of Labor, and the U.S. Census Bureau. Multipliers are generated to estimate the response of a region's economy to a "shock" of some type. Typically, the estimated multiplier effects include direct, indirect, and induced effects. Direct effects represent direct final demand changes, indirect effects represent the impacts caused by industries buying from industries to supply inputs for the sector directly affected, and induced effects represent the response of all local industries caused by changes in household income/spending (MIG, 2009b). However, only induced impacts were measured in this study since the impact being measured was proprietary income and production levels were assumed to be unaffected. The measures of economic activity reported in this study include industry output and employment. Industry output is the change in the value of total production of an economy and employment is simply the number of jobs affected.

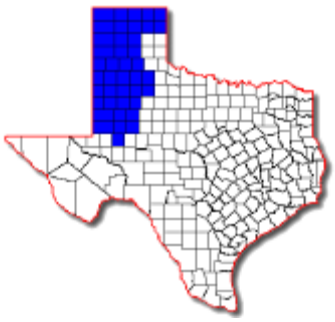

Figure 1. Texas High Plains Study Region.

Direct payment data was collected from the Farm Service Agency for the 2011 crop year (FSA, 2011). This served as the input to the IMPLAN model. It was assumed that producers received 75% of direct payments while the remaining 25% went to landlords. It was further assumed that 75% of landlords reside in the region and the other 25% of direct payments to landlords were a leakage outside of the region.

Results and Discussion

Representative Farm Analysis

Since the objective of this study was to look at how the loss of direct payments affects farmers' ability to obtain annual operating loans, the first factor to consider is the first two years of net farm income as projected in the deterministic analysis. As expected, in 2013 net farm income for the first alternative is less by the $44,426 loss in direct payments. In the second alternative, net farm income is less by the loss in direct payments plus the increase in crop insurance premium. Alternative three, planting one-half of acreage to grain sorghum has the lowest net farm income of the four scenarios (Table 1).

Table 1. Deterministic Analysis – Net Farm Income

	2013	2014
Baseline – Direct Payments Continue	$207,875	$170,691
Alternative 1 – No Direct Payments	$163,449	$125,240
Alternative 2 – No Direct Payments, Increase Crop Insurance Level by 10% to Compensate for Loss in Borrowing Capacity	$139,679	$100,837
Alternative 3 – No Direct Payments, Plant ½ of Acreage to Grain Sorghum to Compensate for Loss in Borrowing Capacity	$106,345	$101,243

At the heart of the analysis is the amount of guaranteed income from crop insurance, and in the case of the baseline scenario the addition of direct payments, as it compares to operating expenses. An income guarantee equal to or greater than operating expenses gives both lenders and borrowers the confidence to proceed with an operating loan. Tables 2 and 3 contain a number of factors which help to determine the appropriate course of action for the South Plains representative cotton farm.

In the baseline scenario, which includes direct payments, the guaranteed income is higher than projected operating expenses by $11,839 or a coverage ratio of 1.018. No additional working capital would be required of the borrower to secure an annual operating loan (Note: Most commercial lenders will additionally require free collateral equal to operating needs to guarantee coverage of the loan).

The loss of direct payments leaves the operation short of covering operating expenses by $32,587 or a coverage ratio of 0.951. The additional working capital required to secure a loan in this scenario would amount to 3.7% of gross revenue. Operations with a working capital to gross revenue ratio of less than 10% are considered financially vulnerable (Becker 2009). Therefore, a requirement of 3.7% working capital would not be a problem for financially average to strong operations.

Buying additional 10% crop insurance yield coverage would raise the guarantee to $41,395 more than operating expenses or a coverage ratio of 1.060. No additional working capital would be required of the borrower to secure an annual operating loan.

The alternative of planting grain sorghum on one-half of all acres does lower operating expenses as expected. However, the insurance guarantee drops by even more to a level $9,734 less than expenses for a coverage ratio of 0.982. As in the first alternative of doing nothing to offset the loss in direct payments, a financially healthy operation should have no difficulty in securing operating credit.

Table 2. Deterministic Analysis – 2013 Total Cash Expenses and Lending Guarantee

	Expense	Guarantee
Baseline – Direct Payments Continue	$667,923	$679,762
Alternative 1 – No Direct Payments	$667,923	$635,336
Alternative 2 – No Direct Payments, Increase Crop Insurance Level by 10% to Compensate for Loss in Borrowing Capacity	$691,692	$733,087
Alternative 3 – No Direct Payments, Plant ½ of Acreage to Grain Sorghum to Compensate for Loss in Borrowing Capacity	$532,897	$523,163

Table 3. Deterministic Analysis – 2013 Coverage Ratio and Working Capital Needed

	Coverage Ratio	Working Capital
Baseline – Direct Payments Continue	1.018	$0
Alternative 1 – No Direct Payments	0.951	$32,587
Alternative 2 – No Direct Payments, Increase Crop Insurance Level by 10% to Compensate for Loss in Borrowing Capacity	1.060	$0
Alternative 3 – No Direct Payments, Plant ½ of Acreage to Grain Sorghum to Compensate for Loss in Borrowing Capacity	0.982	$9,734

The stochastic analysis of the baseline and three alternatives was completed using the FARM Assistance program for the ten-year planning horizon. The base year for the analysis is 2013, and projections are carried through 2022. The projected financial position and performance of each scenario is evaluated across four major categories including solvency, profitability, liquidity and repayment capacity. Tables 4-7 and Figures 2-5 contain the results of the stochastic analysis.

Table 4 contains the results for real net worth growth over the ten-year period. The alternative of buying additional insurance coverage shows the greatest gain in net worth at just over 214%. Figure 2 illustrates the growth in real net worth for each year of the analysis along with the risk around that growth. The gray area of the graphs represents the most likely area of growth with 50% of the estimated values falling within this range.

Table 4. Stochastic Analysis – Percent Change in Real Net Worth

	2013-2022
Baseline – Direct Payments Continue	345.38%
Alternative 1 – No Direct Payments	209.02%
Alternative 2 – No Direct Payments, Increase Crop Insurance Level by 10% to Compensate for Loss in Borrowing Capacity	214.18%
Alternative 3 – No Direct Payments, Plant ½ of Acreage to Grain Sorghum to Compensate for Loss in Borrowing Capacity	137.12%

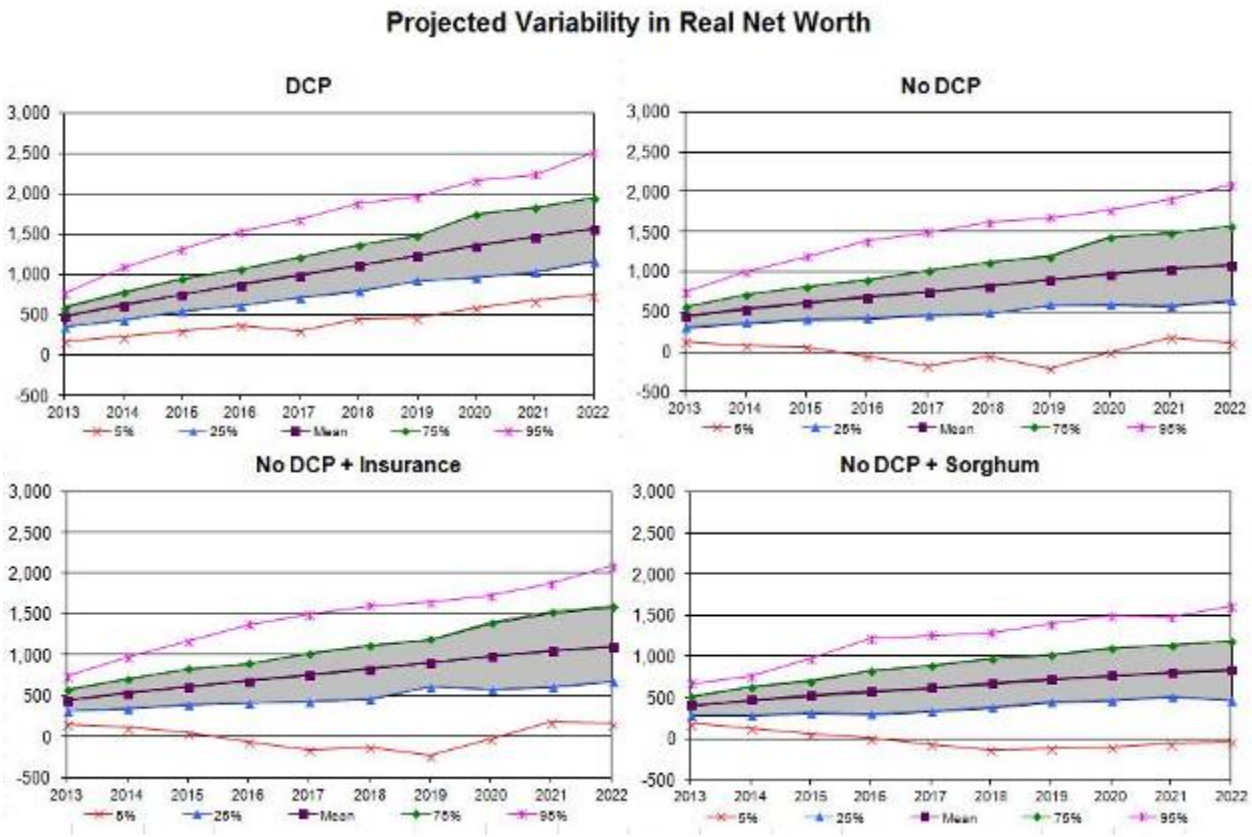

Figure 2. Projected Variability in Real Net Worth 2013-2022

Table 5 contains the results for average net farm income over the ten-year period. The alternative of buying additional insurance coverage shows the highest average net farm income at $143,640. Figure 3 illustrates the average net farm income for each year of the analysis along with the risk around that income. The gray area of the graphs represents the most likely area of farm profit with 50% of the estimated values falling within this range.

Table 5. Stochastic Analysis – Average Net Farm Income

	2013-2022
Baseline – Direct Payments Continue	$223,130
Alternative 1 – No Direct Payments	$140,870
Alternative 2 – No Direct Payments, Increase Crop Insurance Level by 10% to Compensate for Loss in Borrowing Capacity	$143,640
Alternative 3 – No Direct Payments, Plant ½ of Acreage to Grain Sorghum to Compensate for Loss in Borrowing Capacity	$99,350

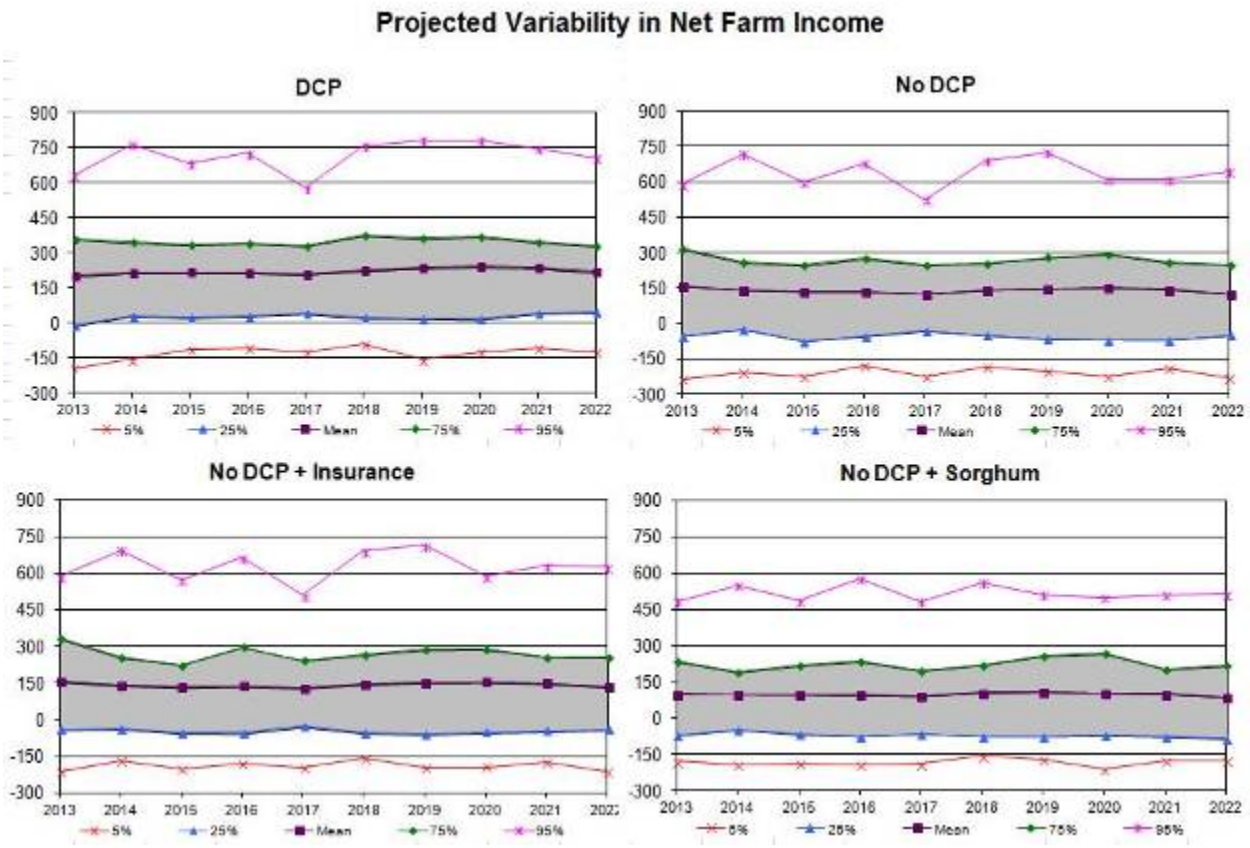

Figure 3. Projected Variability in Net Farm Income 2013-2022

Table 6 contains the results for ending cash reserves at the end of 2022 which are an indicator of the operations projected liquidity. The alternative of buying additional insurance coverage shows the highest average ending cash reserves at $686,470. Figure 4 illustrates the average ending cash reserves for each year of the analysis along with the risk around those reserves. The gray area of the graphs represents the most likely area of cash reserves with 50% of the estimated values falling within this range.

Table 6. Stochastic Analysis – Ending Cash Reserves

	2022
Baseline – Direct Payments Continue	$1,240,400
Alternative 1 – No Direct Payments	$664,690
Alternative 2 – No Direct Payments, Increase Crop Insurance Level by 10% to Compensate for Loss in Borrowing Capacity	$686,470
Alternative 3 – No Direct Payments, Plant ½ of Acreage to Grain Sorghum to Compensate for Loss in Borrowing Capacity	$383,660

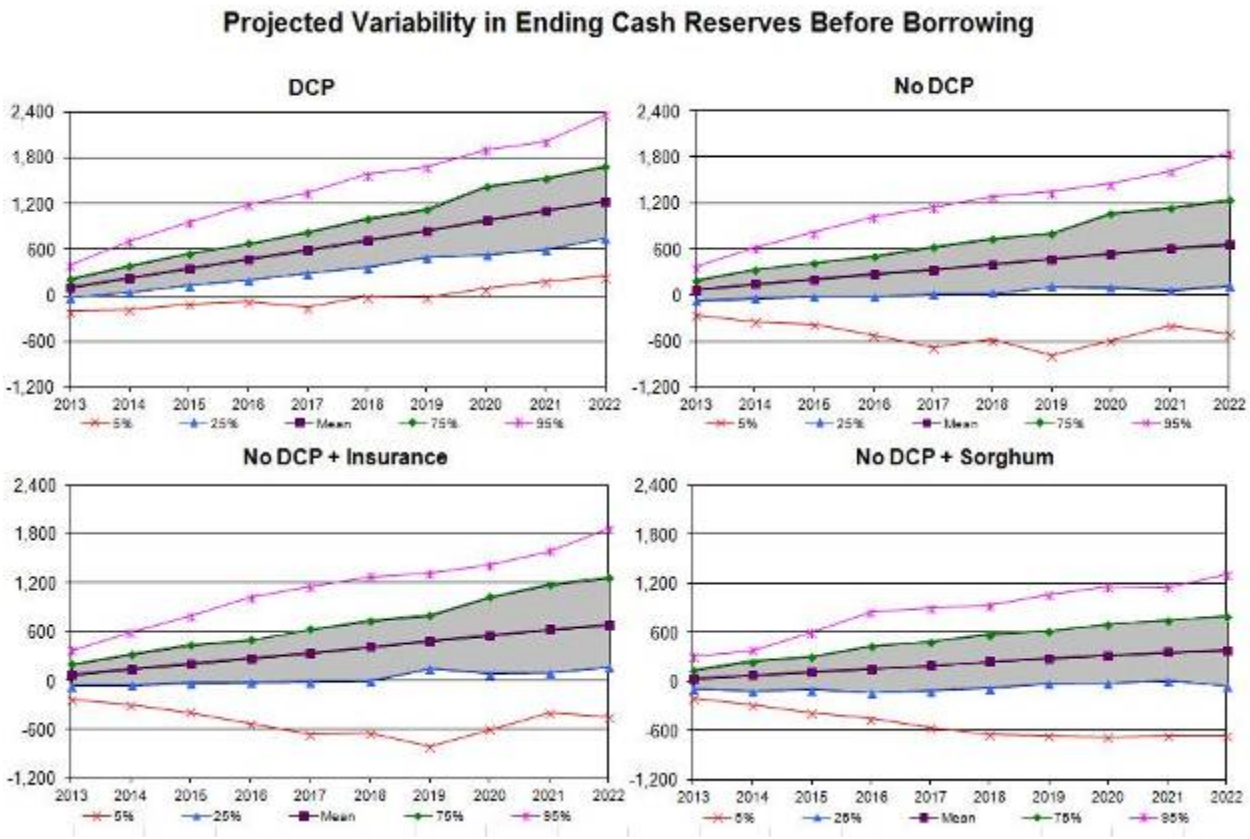

Figure 4. Projected Variability in Ending Cash Reserves Before Borrowing 2013-2022

Table 7 contains the results for the probability of a cash shortfall over the ten-year period which is an indicator of the operations projected repayment capacity. The alternative of buying additional insurance coverage shows the lowest probability of being short at 24.5%. Figure 5 combines projected ending cash reserves and probability of a cash shortfall for each alternative for each year of the analysis. This graphical representation demonstrates how similar the options of doing nothing in response to the loss of direct payments and buying additional insurance coverage actually are.

Table 7. Stochastic Analysis – Average Probability of a Cash Shortfall

	2013-2022
Baseline – Direct Payments Continue	8.9%
Alternative 1 – No Direct Payments	24.8%
Alternative 2 – No Direct Payments, Increase Crop Insurance Level by 10% to Compensate for Loss in Borrowing Capacity	24.5%
Alternative 3 – No Direct Payments, Plant ½ of Acreage to Grain Sorghum to Compensate for Loss in Borrowing Capacity	31.5%

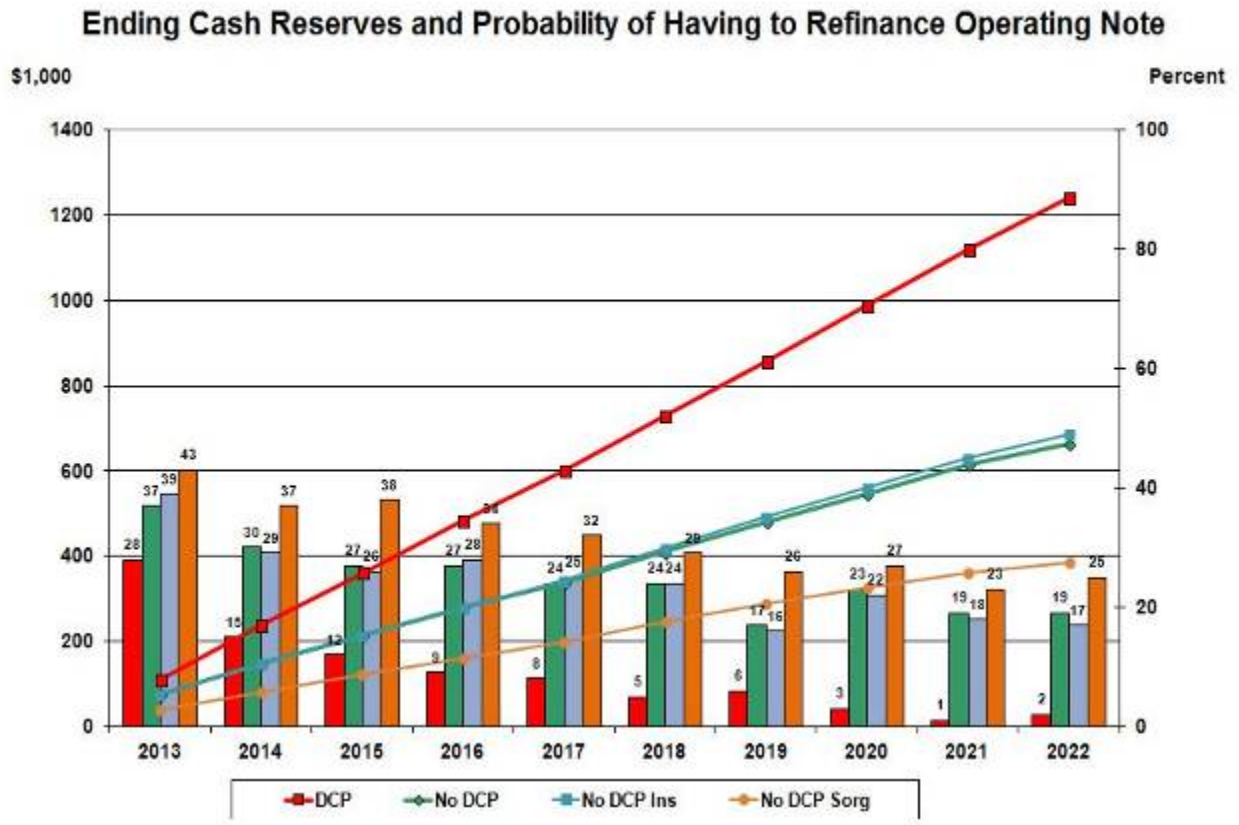

Figure 5. Ending Cash Reserves and Probability of Having to Refinance Operating Note

Regional IMPLAN Analysis

The 2011 crop year direct payments for the region totaled $244.6 million. Results indicate that the impact of the loss in these direct payments would be approximately $149.3 million in industry output. In addition, approximately 1,319 jobs would be affected by the change, Table 8. The impacts from a change in labor income are somewhat less than what would be expected from a change in industry output. This is due to the fact that income represents a portion of industry output in the IMPLAN model.

Table 8. Regional Economic Impact of the Loss of Producer Direct Payments in the Texas High Plains, 2011.

Indicator	Induced Effects
Output	$149,315,987
Employment	1,319

Summary

Loss of direct payments should have very little adverse impact on the ability of financially strong operations to obtain annual operating financing (those with working capital ratios greater than 25%). Loss of direct payments will have the greatest impact on the ability of financially weak operations to obtain annual operating financing (those with working capital ratios less than 10%). While a higher level of crop insurance coverage would indicate a lower annual deterministic net farm income, it would generate long-term higher returns in a stochastic analysis. Lowering costs by planting lower value crops, such as grain sorghum, to meet reduced operating loan capacity results in lower annual and long-term net farm income. Higher irrigated cotton yields, due to the rotation effect, do not adequately compensate for lower projected long term returns for grain sorghum. The "slip" in regional impact from direct payment subsidies would indicate that a future farm program which encourages increased productive farm output would have a higher level of economic impact to the region.

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