LONG RANGE FINANCIAL IMPACT OF ALTERNATIVE COTTON HARVEST METHODS IN THE TEXAS HIGH PLAINS

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Abstract

The shift to varieties with higher yields and quality, combined with the adoption of more efficient irrigation technology, has created a large acreage of cotton in the High Plains of Texas considered suitable for spindle picker harvest. This region of Texas is widely known for the nearly exclusive use of cotton strippers to harvest the crop each year. Using the Texas AgriLife Extension Service FARM Assistance Strategic Analysis program, this study evaluates the five-year financial impact and risk assessment of changing the harvest method of cotton on a model farm developed with the assistance of Texas South Plains District Extension agriculture agents and farmers. (The FARM Assistance program provides individual farmers and ranchers with sound, statistically based strategic financial analysis.) The baseline analysis evaluates the typical High Plains cotton operation with two John Deere 7460 8-row stripper harvesters with field cleaners, two boll buggies, two module builders and four tractors. Alternatives analyzed include ownership of conventional picker harvesting (John Deere 9996 picker, one boll buggy, one module builder and two tractors) and on-board moduling systems (John Deere 7760 and Case IH 625 pickers). The four systems were compared using the financial indicators of annual net farm income, ending real net worth, ending cash reserves and probability of having to refinance operating note. As would be expected each system had both strengths and weaknesses. The strength of the conventional stripper baseline analysis is the lower probability of having to refinance annual operating notes in the first year of adoption. The conventional picker system and the Case IH on-board modeling system generate the highest overall returns and are very similar on all fronts. The increased costs of operation, primarily due to the cost of the plastic module wrap, and initial purchase price cause the new John Deere system to come out at the bottom of the pack in ending cash and probability of having to refinance operating note.

Introduction

In the study presented at the 2007 Beltwide Cotton Conferences, "Comparison of Costs and Returns for Alternative Cotton Harvest Methods in the Texas High Plains," by Jay Yates, Randy Boman, Mark Kelley (Texas AgriLife Extension Service), and Alan Brashears (USDA-ARS), it was noted that higher yielding cotton could be picked with no negative impact to net return. This analysis was completed using data from research conducted Dr. Boman, Dr. Kelley and Dr. Brashears during the 2004 and 2005 growing seasons. The results were given on a per acre basis. Due to the "lumpy" investment nature of harvest equipment and the introduction by Case IH and John Deere of on-board moduling systems on their spindle pickers, it became obvious that we should expand the study to look at the whole farm aspect of the alternatives now available. The introduction of on-board moduling systems by both Case IH and John Deere on their spindle picker lines and their decision to not make this technology available on strippers, has combined with the shortage of agricultural labor to cause many Texas High Plains farmers to ask the question of whether or not the new systems will work on their farms.

The situation that was outlined in the 2007 report, regarding yield, quality and marketing, has not reversed, but has continued the upward trend with the 2007 High Plains cotton crop. Currently, the season average grade for cotton inspected at the Lubbock Classing Office is 91% color 21 or 11, 96% leaf 3 or better, staple 36 (with 42% 37 and longer), mike 4.1, strength 29.6 and uniformity 80.6. The previous study used loan values to compare the difference in returns per acre; however the stigma of West Texas "stripper" cotton has a distinct negative impact on the final price received by growers. Therefore, this analysis gives an advantage of $0.015 per pound to the spindle picked cotton. Given the fact that the High Plains of Texas now accounts for 28% of the entire U.S. cotton crop and with likely reductions in planted acreage across the rest of the cotton belt in 2008 will be an even greater percentage, it is imperative that we have a crop that is suitable for the export market for which the U.S. is dependent upon.

Methods and Procedures

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 for up to ten years in the future. This multi-year projection is a statistically based analysis, which uses the variability of the firms 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. An initial analysis, referred to as the baseline, takes the producer's operation as it exists today and projects a possible financial picture using the previously stated assumptions. The real strength in the program lies in the ability to make either minor or major changes in the farming operation and see how those changes impact the firm during the projection period. The FARM Assistance computer model was used to develop the baseline and alternatives for this study. A focus group was convened with the help of county Extension ag agents from Crosby, Floyd and Lubbock counties. The model farm was updated in December of 2007 with the help of Lubbock County Extension ag agent Mark Brown and the Lubbock County Marketing Club. Continuation of the current government farm program was assumed for this analysis. However, changes to the farm program could dramatically change the results of this projection.

Baseline Assumptions

The baseline consists of 3,500 acres of cotton on a 4,000 acre farming operation. Fifteen hundred (1,500) acres are owned by the operator and 2,500 acres are leased from landowners for 25% of production. The farm has the capacity to irrigate 2,100 acres of cotton, 1,400 acres are dryland cotton and the remaining acreage is planted to dryland wheat (150 acres), grain sorghum (150 acres) or fallow (200 acres). With the help of the producer focus group it was determined that a typical Texas High Plains cotton harvesting complement for an operation this size would include two John Deere strippers, two boll buggies, two module builders and four tractors operated by a six man crew (three of which would be seasonal help). Since it is customary in the Texas High Plains for cotton gins to tarp modules, no additional ground crew would be necessary. Certain cultural practices are necessary when stripping cotton to keep plants compact and to prepare them for harvest. In the baseline the irrigated land had a cost of $12.00 per acre for mepiquat chloride (Pix) as a plant growth regulator and $20.00 per acre for harvest aids. The dryland had no plant growth regulator applied and a cost of $15.00 per acre for harvest aids. Based on the previous study by the authors, the percent lint turnout was assumed to be 32% and the seed-to-lint ratio was set at 1.6 pounds. The focus group provided the ginning rate of $2.65 per hundredweight of seed cotton, which would include the cost of bagging and ties, module tarping and hauling. The final key assumption in the baseline is that the producer is ready to trade the two current strippers for two new John Deere 7460 8-row strippers with field cleaners. The purchase price of $177,190 each for the strippers represents list price minus 16% for normal dealer discounts.

Alternative 1

The first alternative analyzes the effect of selling the two current strippers, one of the boll buggies and one of the module builders and buying one John Deere 9996 6-row picker. The money generated from the sale of the current harvest equipment was used as a down payment on the new machine. Due to the increased hours of operation in the normally dry Texas High Plains, the same number of seasonal laborers would be needed to complete harvest working in two shifts. However, labor cost was reduced by $1,000 to account for finishing a few days earlier with the picker. Costs for plant growth regulators and harvest aids were reduced by $3.00 and $5.00 per acre respectively. Percent lint turnout was raised to 35% while the seed-to-lint ratio remained the same, as indicated in the previous study. Ginning rate was assumed to stay the same as field cleaned cotton since we have no evidence to suggest any difference in charges at this time. The purchase price of $370,110 for the picker represents list price minus 16% for normal dealer discounts.

Alternative 2

The second alternative analyzes the effect of selling the two current strippers, both of the boll buggies and both of the module builders and buying one John Deere 7760 6-row picker with on-board moduling system and a cotton module handler. The money generated from the sale of the current harvest equipment was used as a down payment on the new machine. It was assumed that no seasonal labor would be needed to complete harvest, since three full time employees would be able to run the machine in two shifts with the third man to stage modules for pick up and help with daily servicing. Therefore, labor cost was reduced by $8,000. Costs for plant growth regulators and harvest aids were reduced by $3.00 and $5.00 per acre respectively. Percent lint turnout was raised to 35% while the

seed-to-lint ratio remained the same. Ginning rate was assumed to stay the same as field cleaned cotton. The purchase price of $497,740 for the picker represents list price minus 16% for normal dealer discounts. A purchase price of $12,000 was estimated for the cotton module handler. Per pound harvest cost was increased $0.015 to cover the added cost of plastic wrap.

Alternative 3

The third alternative analyzes the effect of selling the two current strippers, both of the boll buggies and both of the module builders and buying one Case IH Module Express 625 6-row picker with on-board moduling system. The money generated from the sale of the current harvest equipment was used as a down payment on the new machine. It was assumed that no seasonal labor would be needed to complete harvest, since three full time employees would be able to run the machine in two shifts with the third man to help with daily servicing. Therefore, labor cost was reduced by $8,000. Costs for plant growth regulators and harvest aids were reduced by $3.00 and $5.00 per acre respectively. Percent lint turnout was raised to 35% while the seed-to-lint ratio remained the same. Ginning rate was assumed to stay the same as field cleaned cotton in this alternative as well. The purchase price of $462,000 for the picker represents list price minus 16% for normal dealer discounts.

Results

The following table and figures contain the key financial factors normally evaluated with the FARM Assistance model to help producers make strategic business decision. While a ten-year horizon is normally used in this process, a five-year planning period was used to represent the normal life cycle of harvest equipment in the Texas High Plains.

Table 1. All Scenarios Compared Using Key Financial Factors.

	2 - JD 7460 Strippers	1 - JD 9996 Picker	1 - JD 7760 Picker	1 - Case IH 625 Picker
Change in Real Net Worth (%)				
2008-2012	47.12	59.18	51.90	59.26
Real Net Worth ($1000)				
2008	1,815.41	1,827.42	1,800.36	1,824.97
2009	1,963.50	2,022.18	1,971.52	2,020.18
2010	2,098.83	2,205.82	2,130.95	2,204.83
2011	2,248.51	2,402.50	2,304.70	2,403.16
2012	2,401.09	2,597.89	2,479.08	2,599.29
2008-2012 Average	2,105.47	2,211.16	2,137.32	2,210.49
Debt to Assets Ratio (%)				
2008	33.28	31.83	34.63	33.07
2009	31.52	29.49	32.14	30.47
2010	28.18	25.65	28.17	26.41
2011	24.41	21.57	23.77	22.09
2012	20.56	17.64	19.46	17.90
2008-2012 Average	27.59	25.24	27.63	25.99
Total Cash Receipts ($1000)				
2008	1,776.72	1,798.60	1,798.60	1,798.60
2009	1,781.96	1,811.86	1,811.86	1,811.86
2010	1,790.83	1,820.97	1,820.97	1,821.26
2011	1,830.48	1,861.15	1,861.15	1,862.01
2012	1,843.30	1,874.29	1,874.29	1,873.98
2008-2012 Average	1,804.66	1,833.37	1,833.37	1,833.54

Total Cash Costs ($1000)				
2008	1,470.02	1,427.45	1,451.57	1,420.16
2009	1,475.94	1,433.22	1,467.31	1,430.74
2010	1,488.01	1,442.65	1,477.61	1,439.59
2011	1,486.71	1,438.83	1,474.29	1,435.07
2012	1,478.86	1,428.70	1,464.10	1,424.16
2008-2012 Average	1,479.91	1,434.17	1,466.98	1,429.95
Net Farm Profit or Loss ($1000)				
2008	351.59	424.32	425.21	432.01
2009	272.07	344.57	310.48	347.05
2010	284.68	360.39	325.42	363.85
2011	333.57	412.24	376.78	417.03
2012	352.73	433.92	398.52	437.63
2008-2012 Average	318.93	395.09	367.28	399.51
Ending Cash Reserves ($1000)				
2008	106.01	75.08	37.78	66.64
2009	186.90	207.83	131.37	192.24
2010	244.56	320.99	202.13	297.96
2011	319.53	452.78	290.05	422.09
2012	401.02	589.52	381.89	549.96
2008-2012 Average	251.60	329.24	208.65	305.78
Prob. of Ending Cash Reserves < Zero (%)				
2008	16.00	29.00	42.00	31.00
2009	23.00	20.00	29.00	22.00
2010	24.00	14.00	28.00	17.00
2011	19.00	15.00	23.00	15.00
2012	18.00	10.00	20.00	16.00
Prob. of Ending Cash Reserves < Zero				
2008-2012 (%)	20.00	17.60	28.40	20.20

The five-year average Net Farm Income is $318,930 for the baseline, $395,090 for alternative 1, $367,280 for alternative 2 and $399,510 for alternative 3. Figure 1 represents the risk around Net Farm Income for each of the four alternative strategies. The gray area on the graph represents where the average falls fifty percent of the time and the pink and red lines represent where the value falls ninety percent of the time. The baseline has a fifty percent probability that Net Farm Income will fall between $40,170 and $584,900 during the five-year period. For alternative 1 the range is between $112,780 and $679,210. For alternative 2 the range is between $77,560 and $635,600. For alternative 3 the range is between $114,920 and $682,840.

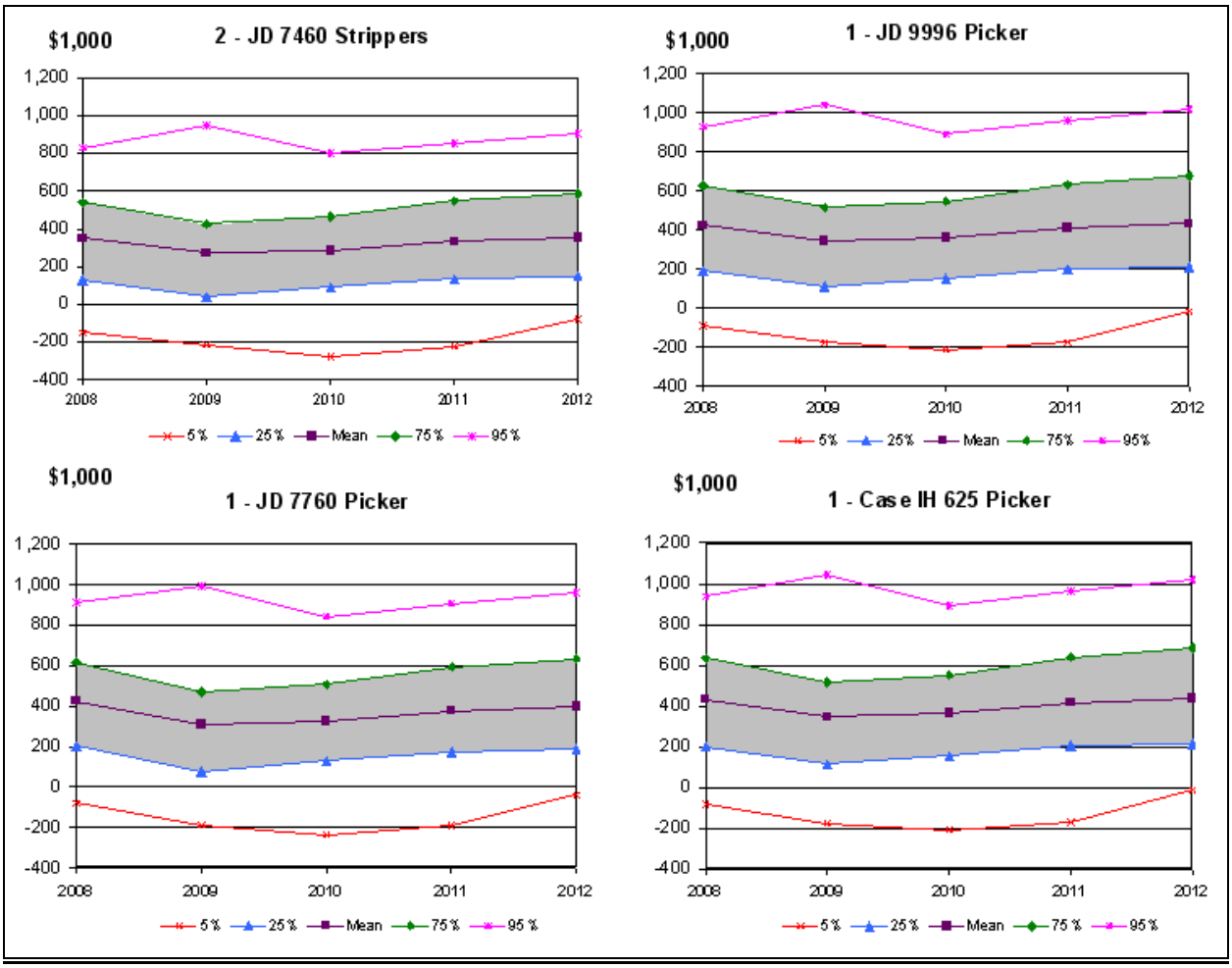

Figure 1. Projected Variability in Net Farm Income

Real Net Worth at the end of the five-year period is $2,401,090 for the baseline, $2,597,890 for alternative 1, $2,479,080 for alternative 2 and $2,599,290 for alternative 3. Figure 1 represents the risk around Real Net Worth for each of the four alternative strategies. The gray area on the graph represents where the average falls fifty percent of the time and the pink and red lines represent where the value falls ninety percent of the time. The baseline has a fifty percent probability that Real Net Worth will fall between $2,087,670 and $2,670,990 during the five-year period. For alternative 1 the range is between $2,277,550 and $2,895,310. For alternative 2 the range is between $2,163,530 and $2,770,210. For alternative 3 the range is between $2,278,030 and $2,895,530.

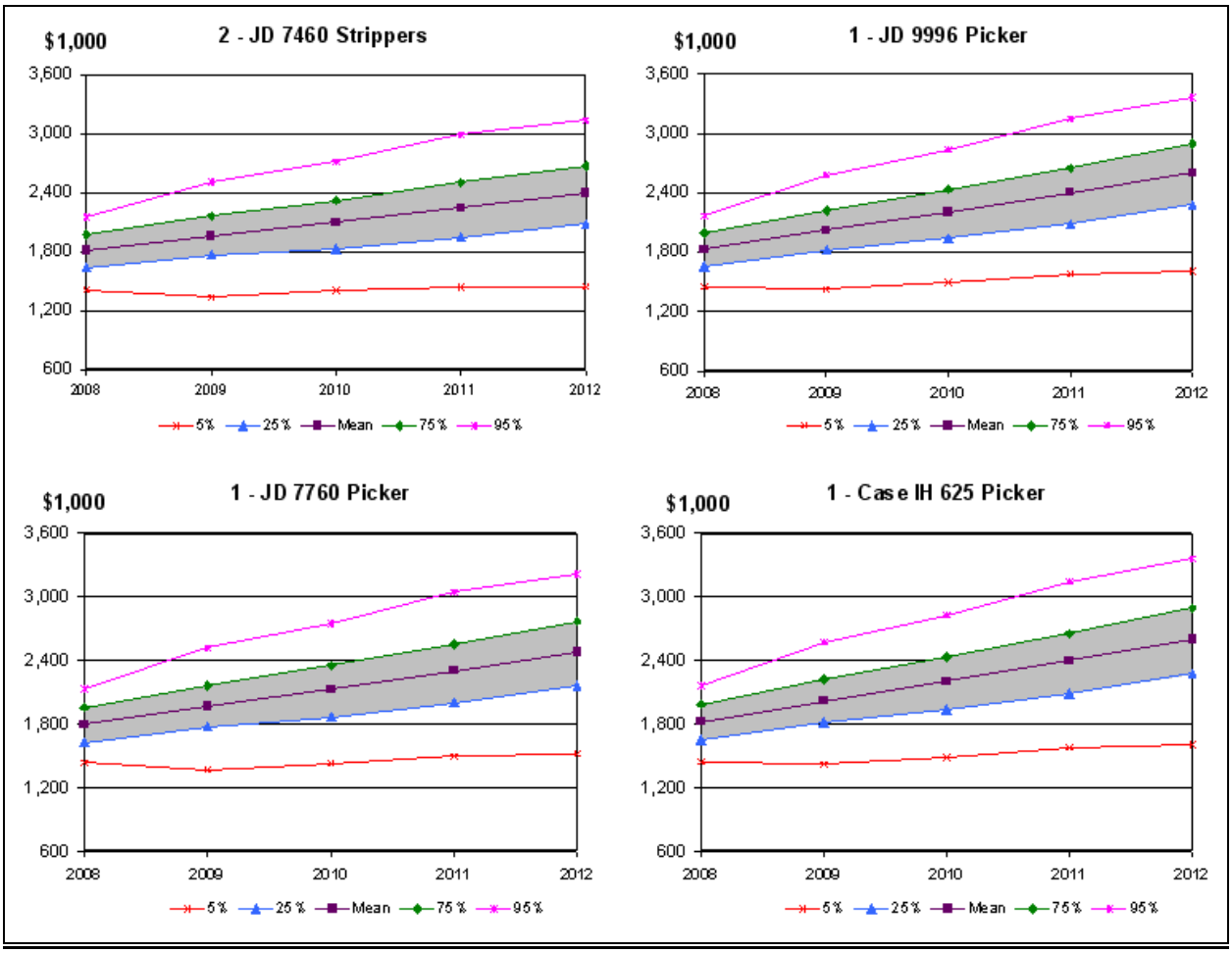

Figure 2. Projected Variability in Real Net Worth

Ending Cash Reserves at the end of the five-year period is $401,020 for the baseline, $589,520 for alternative 1, $381,890 for alternative 2 and $549,960 for alternative 3. Figure 1 represents the risk around Ending Cash Reserves for each of the four alternative strategies. The gray area on the graph represents where the average falls fifty percent of the time and the pink and red lines represent where the value falls ninety percent of the time. The baseline has a fifty percent probability that Ending Cash Reserves will fall between $101,200 and $667,380 during the five-year period. For alternative 1 the range is between $303,820 and $874,880. For alternative 2 the range is between $91,570 and $662,050. For alternative 3 the range is between $263,740 and $833,230.

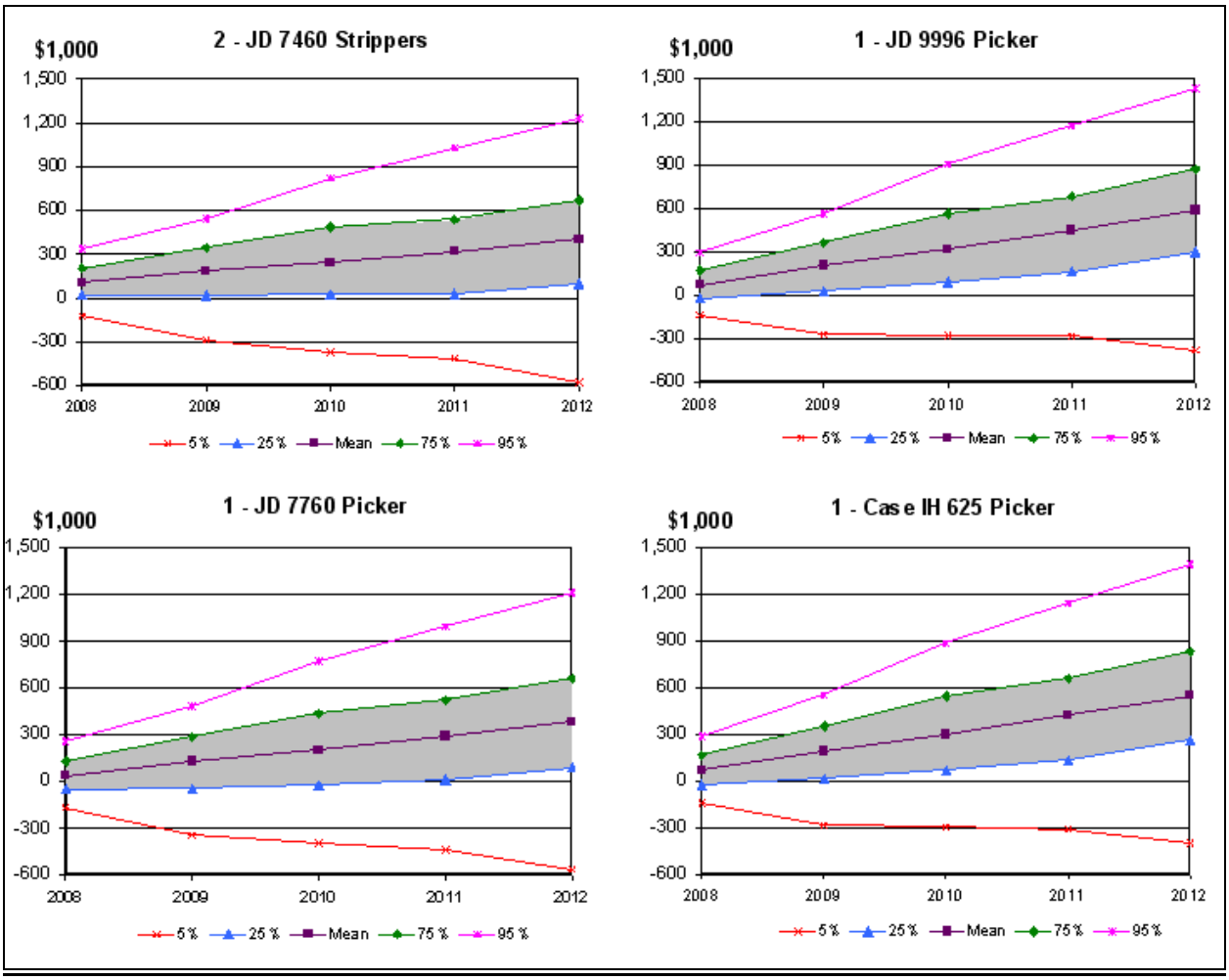

Figure 3. Projected Variability in Ending Cash Reserves Before Borrowing

Figure 4 depicts the risk of having a cash shortfall and having to refinance the annual operating line of credit. It is a key indicator in how much risk is associated with alternative levels of debt servicing. The overall average probability of having a shortfall over the five year period is 20.0% for the baseline, 17.6% for alternative 1, 28.4% for alternative 2 and 20.2% for alternative 3.

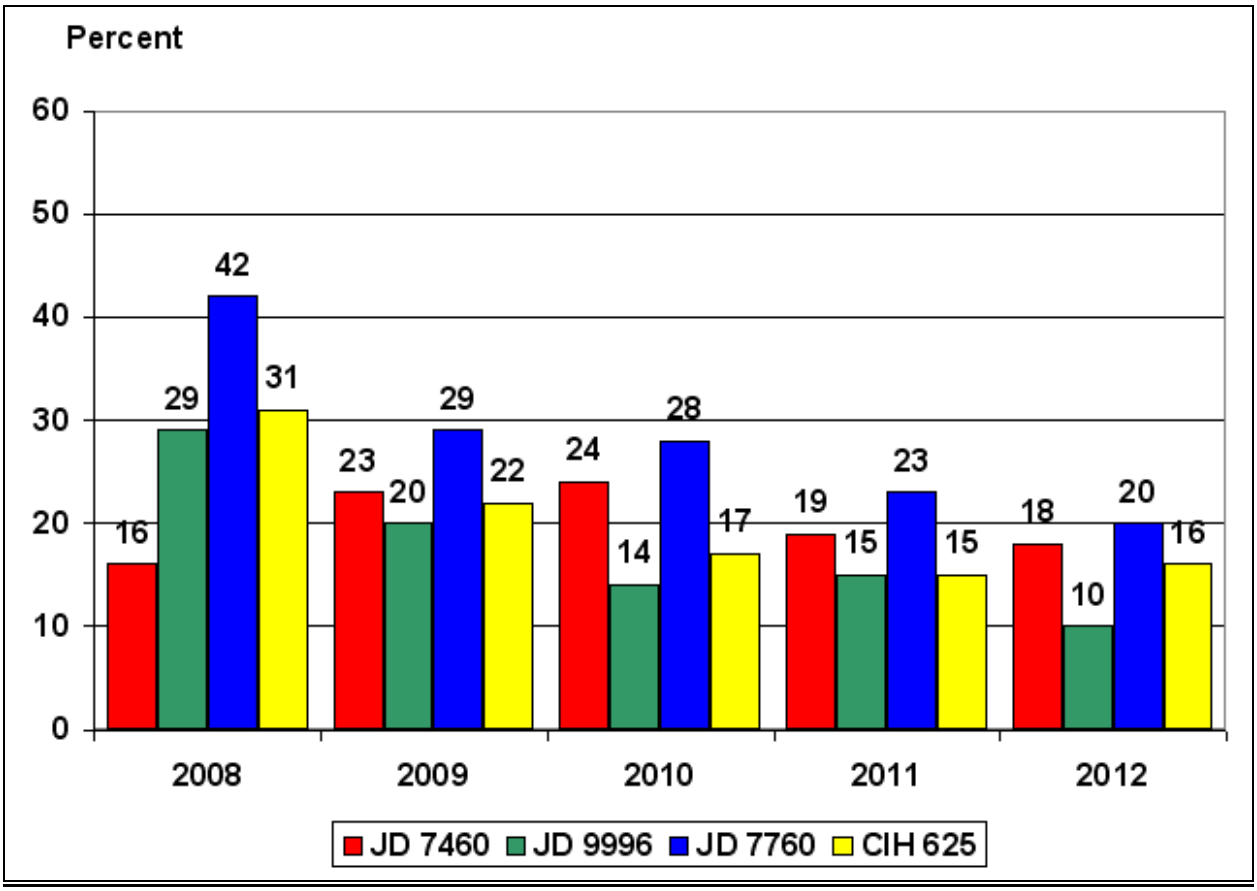

Figure 4. Probability of Having to Refinance Operating Note

Conclusions

The objective of this study was to extend the field research that was reported on a per acre basis to the whole farm level and include the latest in cotton harvesting technology, which was previously not available. It should be noted from the preceding results that there is tremendous overlap of probable outcomes in each of the financial indicators for all of the alternatives. The conventional John Deere 9996 picker and the Case IH Module Express 625 had the highest increase in Real Net Worth, Net Farm Income and Ending Cash Reserves as well as the lowest ending Probability of Having to Refinance Operating Note. Although not included in this study, it would be appropriate to assume that the conventional Case IH Cotton Express picker should yield similar results to the John Deere 9996.

This study was done using a model farm develop by a group of farmers and county Extension agents and therefore represents an average with many assumptions that may not apply to an individual farm. Therefore, it is imperative that before any producer undertake an investment of this magnitude that they complete a similar analysis using their own specific situation. In defense of the John Deere 7760, it should be noted that the technology has not been commercially available long enough to make assumptions for increased lint value due to the protection provided by the plastic wrap. It should also be noted that in the Texas High Plains, the harvest season and winter is typically the driest time of year with a normal rainfall of less than five inches. The efficiency gained from “non-stop” harvesting is not fully realized in this study because the farm has excess harvest capacity. This would allow the 7760 to be used to generate custom harvest income if it were available to make up the difference in purchase price and the cost of the plastic module wrap.

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