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## **Investigating the Redundancies in Current Farm Programs**

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**Background:**

The discussion about the 2012 Farm Bill is already under way with House and Senate hearings held in 2010. The growing federal debt caused by budget deficits has added extra scrutiny to government expenditures and provides impetus to look carefully at how effective government programs are at reaching their goals. While it can be argued that agricultural programs have been successful in reducing producer's price and income risk, this has not come without a monetary cost. The United States' debt which stood at \$11.8 trillion dollars at the end of fiscal 2009 (United States Treasury) and the projected annual budget deficits of over half a trillion dollars a year (Congressional Budget Office) have many concerned about government spending. Thus, legislators are trying to reduce expenditures where they can. Agricultural programs, though only a small part of the overall United States budget, may be in line for decreased support.

If cuts are envisioned to the agricultural safety net, it would be helpful for decision makers to know if a set of programs addressed the same risks and/or if there is unnecessary overlap. Therefore, redundant programs could be eliminated with minimal effect to the farm program safety net. The need for research in the area of farm program interaction, effectiveness, and necessity has been raised since the 2008 Farm Bill was passed (Harwood, 2009). Thus, programs are under review to see if they are repetitive in the functions they serve. Given the complexity of federal farm programs that were added in the 2008 Farm Bill, it is important to investigate if the farm programs are redundant in their ability to reduce risk and provide a safety net for producers.

**Objective:**

The objective of this study is to evaluate the farm level economic impacts and risk reduction of various combinations of current farm programs on agricultural producers in major production areas of the United States. The data is examined to see if any potential redundancies or inefficiencies can be determined.

**Data and Methods:**

This study utilizes primary representative farm data in conjunction with a whole farm simulation model to examine the effects current farm programs on reducing firm level financial risk. The representative farms were created through a focus group interview process and are maintained and updated through return visits every three years. Three representative farms located in major production regions throughout the United States are analyzed assuming different alternatives of current farm program combinations. The representative farms are classified by commodity, indicating the primary source of income for each farm. One farm from each commodity category of: Feedgrains and Oilseeds, Cotton, and Rice were analyzed. The farms analyzed include: a 3,400 acre North-central Iowa farm that grows corn and soybeans; a 5,000 acre Northern Arkansas farm that produces only cotton; and a 3,000 acre Southeast Texas rice farm that plants 1,200 acres of rice annually. A stochastic simulation model constructed using Simetar, an Excel based simulation and econometrics software package (Richardson, Schumann, and Feldman, (2004) was used. The model incorporates both price and yield risk into the simulated outcomes by using the multivariate empirical method described by Richardson, Klose, and Gray (2000). The preliminary December baseline from the Food and Agricultural Policy Research Institute (FAPRI) at the University of Missouri was used as the projected mean price path in the future for commodity prices (FAPRI).

Provisions of the current farm programs are modeled along with crop insurance. The farm programs examined include: Average Crop Revenue Election (ACRE), Supplemental Revenue Assistance (SURE), Direct Payments, Counter Cyclical, Marketing Loan, and Crop Insurance (70% CRC). In addition, a whole-farm revenue-based farm program is modeled. The revenue-based program is modeled after the current revenue assurance federal crop insurance policy and conversations with US Senate and House of Representatives agricultural committee professional staff and other policy experts.

Risk reduction will be based on the reduction of the coefficient of variation for each of the farms simulated revenues. Each scenario is simulated 500 iterations, and the mean of the iterations is reported. Scenarios simulated include the following:

1. No government programs
2. Crop Insurance (CI) only (70% CRC)
3. CI plus Direct Payment (DP)
4. CI plus DP plus Marketing Loan (ML)
5. CI plus DP plus ML plus Counter Cyclical Payments (CCP) or Average Crop Revenue Election (ACRE) (*Iowa only*)
6. CI plus DP plus ML plus CCP plus Supplemental Revenue Assistance (SURE)
7. Whole-Farm Revenue only
8. Whole-Farm Revenue and CI

**Results:**

The representative farm's simulated mean revenues are shown in Tables I - III. Also reported are the standard deviations, coefficient of variations, minimums, and maximums for the three farms under each scenario. The focus of this paper is on reduction in risk as measured by

the coefficient of variation, thus, the following discussion of results will target this subset of results.

Overall, every farm had lower coefficient of variation for each farm program alternative compared to the no program scenario. Also, the lowest coefficient of variation for each farm was the whole-farm revenue plus insurance alternative. Although the difference between this alternative and Revenue only for rice is minimal. Additionally, the marketing loan itself appears to add very little risk protection. This makes intuitive sense due to the relatively high projected prices in the FAPRI December baseline and the relatively low loan rates. The SURE program when combined with crop insurance, direct payments, marketing loans, and counter cyclical payments contributes very little in terms of reducing the coefficient of variation for farm revenues.

As expected, there are differences in the how important each program is to the different commodities. Specifically, the Arkansas cotton farm has the largest reduction in coefficient of variation for the following alternatives: CI, CI plus DP, CI plus DP plus ML plus CCP, Revenue only, and Revenue plus CI. The Arkansas Cotton farm has a reduced coefficient of variation under the 70% CRC insurance scenario for all reported years. The addition of direct payments further reduced the average coefficient of variation across years on farm revenues from 22.43 to 21.82. The CI plus DP plus ML plus CCP alternative has an average coefficient of variation of 21.11 compared to 23.75 for no programs. The alternatives with the two lowest coefficient of variation are Revenue only and Revenue plus CI at 19.15 and 18.77, respectively. The Texas Rice farm has the largest reduction in the measure of risk for only two alternatives, CI plus DP and Revenue only. The No Program average coefficient of variation for the Texas rice farm is 31.57 compared to 28.33 for CI plus DP and 23.81 for Revenue only. It appears that the DP is

the critical factor in the CI plus DP option as the CI only alternative's average coefficient of variation differs only slightly from the no program option. The largest reduction in risk for the Iowa feedgrain farm appears in the CI, CI plus DP, and CI plus DP plus ML plus ACRE alternatives. The no programs coefficient of variation is 27.10 compared to 26.15 for CI, 25.38 for CI plus DP, and 24.39 for CI plus DP plus ML plus ACRE. It is interesting to note that the CI plus DP plus ML plus ACRE alternative's average coefficient of variation is very similar to the Revenue only and the Revenue plus CI alternative.

### **Conclusions:**

When using the coefficient of variation as the measure of risk, every representative farm showed reduced risks with some combination of farm programs compared to the no programs alternative. Also, the lowest coefficient of variation for each farm was the whole-farm revenue plus insurance alternative. Additionally, the marketing loan and the SURE program appear to add very little risk protection when combined with other farm programs. Of the current farm programs, the direct payments appear to have the largest impact on the Texas rice farm while crop insurance had a larger effect on the coefficient of variation for the Arkansas cotton farm and the Iowa feedgrain farm. The ACRE program is also an important risk reducing program for the Iowa farm while counter cyclical payments reduce the risk in revenue for the Arkansas cotton farm.

This paper is a start to the complex issue of how farm programs affect individual farm's risk and if redundancies exist between policy tools. Hopefully, this work will spark discussion and further research. Obviously, this paper is assumption driven. The authors intend to continue further studies which include adding additional representative farms for analysis to capture regional and commodity trends. Additional combinations of farm programs could aid in

potentially capturing the seemingly endless interactions among the farm programs. Different price path projections could provide insight into the sensitivity of the result given different price paths.



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**Table I. Arkansas Cotton Revenue CV's compared among alternative farm programs**

No programs							
	2010	2011	2012	2013	2014	2015	Average
Mean	3,966,020.54	3,455,214.69	3,332,255.65	3,412,249.98	3,447,183.51	3,479,225.79	23.75
StDev	926,789.95	815,851.65	796,330.73	817,851.71	823,535.69	826,417.04	
CV	23.37	23.61	23.90	23.97	23.89	23.75	
Min	1,746,318.42	1,577,977.46	1,331,096.48	1,380,768.68	1,595,122.09	1,501,349.25	
Max	6,460,993.76	5,778,468.55	5,450,463.66	5,616,658.99	5,613,745.68	5,621,572.36	
CI 70% CRC							
	2010	2011	2012	2013	2014	2015	Average
Mean	4,119,581.46	3,625,256.83	3,463,914.39	3,537,130.59	3,582,917.89	3,607,868.98	22.43
StDev	918,520.17	826,573.64	764,521.29	797,232.67	809,896.10	803,667.97	
CV	22.30	22.80	22.07	22.54	22.60	22.28	
Min	1,802,557.07	1,585,156.56	1,501,273.14	1,567,822.48	1,632,995.08	1,538,939.01	
Max	7,378,402.20	6,189,729.70	5,876,874.58	6,382,229.98	6,991,640.37	6,476,322.20	
CI plus DP							
	2010	2011	2012	2013	2014	2015	Average
Mean	4,220,391.52	3,726,066.89	3,566,781.80	3,639,998.00	3,685,785.29	3,710,736.39	21.82
StDev	918,520.17	826,573.64	764,521.29	797,232.67	809,896.10	803,667.97	
CV	21.76	22.18	21.43	21.90	21.97	21.66	
Min	1,903,367.13	1,685,966.62	1,604,140.54	1,670,689.88	1,735,862.49	1,641,806.42	
Max	7,479,212.26	6,290,539.76	5,979,741.99	6,485,097.38	7,094,507.78	6,579,189.60	
CI plus DP plus ML							
	2010	2011	2012	2013	2014	2015	Average
Mean	4,220,391.52	3,726,066.89	3,574,016.38	3,640,599.19	3,685,785.29	3,710,736.39	21.82
StDev	918,520.17	826,573.64	766,958.62	797,254.88	809,896.10	803,667.97	
CV	21.76	22.18	21.46	21.90	21.97	21.66	
Min	1,903,367.13	1,685,966.62	1,604,140.54	1,670,689.88	1,735,862.49	1,641,806.42	
Max	7,479,212.26	6,290,539.76	6,022,577.75	6,485,097.38	7,094,507.78	6,579,189.60	
CI plus DP plus ML plus CCP							
	2010	2011	2012	2013	2014	2015	Average
Mean	4,225,714.92	3,740,303.46	3,599,390.23	3,661,965.69	3,704,812.43	3,970,736.39	21.11
StDev	910,640.42	809,946.23	744,347.00	775,172.56	792,198.63	803,667.97	
CV	21.55	21.65	20.68	21.17	21.38	20.24	
Min	2,056,910.71	1,839,510.20	1,760,817.67	1,827,367.01	1,892,539.62	1,901,806.42	
Max	7,479,212.26	6,290,539.76	6,022,577.75	6,485,097.38	7,094,507.78	6,839,189.60	
CI plus DP plus ML plus CCP plus SURE							
	2010	2011	2012	2013	2014	2015	Average
Mean	4,295,542.15	3,804,911.04	3,658,207.00	3,715,074.44	3,763,033.54	4,027,717.19	21.25
StDev	925,931.87	841,191.98	756,690.81	787,845.27	812,000.64	820,984.51	
CV	21.56	22.11	20.68	21.21	21.58	20.38	
Min	2,056,910.71	1,839,510.20	1,760,817.67	1,827,367.01	1,892,539.62	1,901,806.42	
Max	8,028,154.58	6,906,349.76	6,459,894.89	7,009,162.50	7,669,735.80	7,344,729.44	
Revenue only							
	2010	2011	2012	2013	2014	2015	Average
Mean	3,974,276.17	3,514,678.69	3,491,667.70	3,532,853.03	3,673,768.84	3,764,792.09	19.15
StDev	910,636.92	740,288.86	627,903.71	690,189.27	630,421.18	611,398.15	
CV	22.91	21.06	17.98	19.54	17.16	16.24	
Min	2,255,002.30	2,303,400.27	2,297,728.39	2,202,017.08	2,269,862.55	2,513,709.98	
Max	6,460,993.76	5,778,468.55	5,450,463.66	5,616,658.99	5,613,745.68	5,621,572.36	
Revenue plus CI							
	2010	2011	2012	2013	2014	2015	Average
Mean	4,127,837.09	3,684,720.83	3,623,326.44	3,657,733.64	3,809,503.21	3,893,435.28	18.77
StDev	904,003.31	754,187.56	635,827.54	691,575.95	653,385.10	647,684.19	
CV	21.90	20.47	17.55	18.91	17.15	16.64	
Min	2,255,002.30	2,303,400.27	2,307,372.45	2,272,014.90	2,465,729.27	2,542,873.91	
Max	7,378,402.20	6,189,729.70	5,876,874.58	6,382,229.98	6,991,640.37	6,476,322.20	

**Table II. Texas Rice Revenue CV's compared among alternative farm programs**

<i>No programs</i>							
	2010	2011	2012	2013	2014	2015	Average
Mean	1,111,323.73	1,127,775.68	1,106,678.24	1,131,675.15	1,156,774.43	1,181,748.53	
StDev	349,018.53	362,547.30	348,163.95	358,513.68	370,768.36	362,330.59	
CV	31.41	32.15	31.46	31.68	32.05	30.66	31.57
Min	485,409.75	458,158.51	457,498.27	460,514.88	469,820.95	489,005.43	
Max	2,516,265.52	2,547,032.13	2,496,744.69	2,542,356.92	2,610,822.07	2,612,657.00	
<i>CI 70% CRC</i>							
	2010	2011	2012	2013	2014	2015	Average
Mean	1,111,831.70	1,134,442.67	1,111,555.24	1,137,453.05	1,161,832.40	1,192,293.86	
StDev	348,597.35	361,497.55	348,275.21	357,147.84	368,668.94	361,958.74	
CV	31.35	31.87	31.33	31.40	31.73	30.36	31.34
Min	485,409.75	462,138.48	457,498.27	467,886.40	472,837.28	531,726.39	
Max	2,516,265.52	2,547,032.13	2,496,744.69	2,542,356.92	2,610,822.07	2,612,657.00	
<i>CI plus DP</i>							
	2010	2011	2012	2013	2014	2015	Average
Mean	1,231,218.82	1,253,829.79	1,233,378.83	1,259,276.65	1,283,655.99	1,314,117.45	
StDev	348,597.35	361,497.55	348,275.21	357,147.84	368,668.94	361,958.74	
CV	28.31	28.83	28.24	28.36	28.72	27.54	28.33
Min	604,796.87	581,525.60	579,321.86	589,709.99	594,660.88	653,549.99	
Max	2,635,652.64	2,666,419.25	2,618,568.28	2,664,180.52	2,732,645.66	2,734,480.60	
<i>CI plus DP plus ML</i>							
	2010	2011	2012	2013	2014	2015	Average
Mean	1,231,218.82	1,253,829.79	1,233,378.83	1,259,276.65	1,283,655.99	1,314,117.45	
StDev	348,597.35	361,497.55	348,275.21	357,147.84	368,668.94	361,958.74	
CV	28.31	28.83	28.24	28.36	28.72	27.54	28.33
Min	604,796.87	581,525.60	579,321.86	589,709.99	594,660.88	653,549.99	
Max	2,635,652.64	2,666,419.25	2,618,568.28	2,664,180.52	2,732,645.66	2,734,480.60	
<i>CI plus DP plus ML plus CCP</i>							
	2010	2011	2012	2013	2014	2015	Average
Mean	1,233,559.88	1,256,093.45	1,235,717.58	1,261,541.88	1,285,799.86	1,316,188.26	
StDev	345,525.88	358,399.11	345,201.74	354,043.93	365,690.66	358,969.70	
CV	28.01	28.53	27.94	28.06	28.44	27.27	28.04
Min	633,384.16	610,112.89	608,492.56	618,880.69	623,831.58	682,720.69	
Max	2,635,652.64	2,666,419.25	2,618,568.28	2,664,180.52	2,732,645.66	2,734,480.60	
<i>CI plus DP plus ML plus CCP plus SURE</i>							
	2010	2011	2012	2013	2014	2015	Average
Mean	1,233,872.82	1,266,069.15	1,244,988.51	1,270,264.56	1,296,614.43	1,330,123.70	
StDev	345,376.33	361,448.88	346,928.21	354,466.30	365,165.40	361,841.65	
CV	27.99	28.55	27.87	27.90	28.16	27.20	27.95
Min	633,384.16	610,112.89	608,492.56	618,880.69	623,831.58	682,720.69	
Max	2,635,652.64	2,666,419.25	2,618,568.28	2,664,180.52	2,732,645.66	2,734,480.60	
<i>Revenue only</i>							
	2010	2011	2012	2013	2014	2015	Average
Mean	1,148,406.91	1,208,560.50	1,222,199.12	1,245,532.57	1,256,486.25	1,296,600.00	
StDev	311,611.26	297,097.67	267,049.79	282,430.61	308,619.75	285,808.81	
CV	27.13	24.58	21.85	22.68	24.56	22.04	23.81
Min	743,754.75	755,088.97	835,405.56	755,925.48	743,789.17	798,314.48	
Max	2,516,265.52	2,547,032.13	2,496,744.69	2,542,356.92	2,610,822.07	2,612,657.00	
<i>Revenue plus CI</i>							
	2010	2011	2012	2013	2014	2015	Average
Mean	1,148,914.88	1,215,227.49	1,227,076.11	1,251,310.47	1,261,544.22	1,307,145.33	
StDev	311,243.67	296,476.60	268,380.74	281,878.79	307,728.27	287,857.34	
CV	27.09	24.40	21.87	22.53	24.39	22.02	23.72
Min	743,754.75	755,088.97	835,405.56	755,925.48	743,789.17	798,314.48	
Max	2,516,265.52	2,547,032.13	2,496,744.69	2,542,356.92	2,610,822.07	2,612,657.00	

**Table III. Iowa Feedgrain Revenue CV's compared among alternative farm programs**

No programs							
	2010	2011	2012	2013	2014	2015	Average
Mean	2,430,642.67	2,182,815.00	2,170,517.12	2,203,138.72	2,280,560.42	2,295,402.85	
StDev	639,363.59	606,918.98	560,930.97	588,670.55	634,134.72	645,439.89	
CV	26.30	27.80	25.84	26.72	27.81	28.12	27.10
Min	1,114,447.45	1,038,109.33	1,013,497.62	1,101,612.90	1,173,369.44	1,177,748.10	
Max	4,960,978.85	4,494,987.02	4,642,310.97	4,542,484.75	4,700,422.35	4,841,790.05	
CI 70% CRC							
	2010	2011	2012	2013	2014	2015	Average
Mean	2,454,642.41	2,216,774.12	2,203,296.86	2,252,138.36	2,324,471.95	2,338,245.88	
StDev	631,033.72	595,006.78	550,252.50	575,083.51	620,995.88	634,360.31	
CV	25.71	26.84	24.97	25.53	26.72	27.13	26.15
Min	1,241,484.49	1,133,932.02	1,145,748.96	1,279,121.55	1,229,564.68	1,291,933.72	
Max	4,960,978.85	4,494,987.02	4,642,310.97	4,542,484.75	4,700,422.35	4,841,790.05	
CI plus DP							
	2010	2011	2012	2013	2014	2015	Average
Mean	2,523,647.55	2,285,779.25	2,273,710.26	2,322,551.76	2,394,885.35	2,408,659.29	
StDev	631,033.72	595,006.78	550,252.50	575,083.51	620,995.88	634,360.31	
CV	25.00	26.03	24.20	24.76	25.93	26.34	25.38
Min	1,310,489.63	1,202,937.16	1,216,162.37	1,349,534.95	1,299,978.08	1,362,347.12	
Max	5,029,983.99	4,563,992.15	4,712,724.38	4,612,898.15	4,770,835.76	4,912,203.45	
CI plus DP plus ML							
	2010	2011	2012	2013	2014	2015	Average
Mean	2,523,647.55	2,285,779.25	2,273,710.26	2,322,551.76	2,394,885.35	2,408,659.29	
StDev	631,033.72	595,006.78	550,252.50	575,083.51	620,995.88	634,360.31	
CV	25.00	26.03	24.20	24.76	25.93	26.34	25.38
Min	1,310,489.63	1,202,937.16	1,216,162.37	1,349,534.95	1,299,978.08	1,362,347.12	
Max	5,029,983.99	4,563,992.15	4,712,724.38	4,612,898.15	4,770,835.76	4,912,203.45	
CI plus DP plus ML plus ACRE							
	2010	2011	2012	2013	2014	2015	Average
Mean	2,513,333.11	2,298,051.73	2,301,897.43	2,343,806.55	2,415,467.64	2,438,529.27	
StDev	628,376.49	577,928.09	527,914.54	553,319.01	601,286.48	603,686.49	
CV	25.00	25.15	22.93	23.61	24.89	24.76	24.39
Min	1,296,688.60	1,291,897.51	1,285,892.94	1,335,452.27	1,301,481.95	1,404,607.76	
Max	5,016,182.96	4,550,191.13	4,698,641.70	4,598,815.47	4,756,753.08	4,898,120.77	
CI plus DP plus ML plus CCP plus SURE							
	2010	2011	2012	2013	2014	2015	Average
Mean	2,513,832.52	2,298,565.15	2,302,405.68	2,344,171.98	2,416,043.98	2,439,026.53	
StDev	628,118.90	578,235.67	528,050.91	553,057.22	601,193.44	603,575.70	
CV	24.99	25.16	22.93	23.59	24.88	24.75	24.38
Min	1,296,688.60	1,291,897.51	1,285,892.94	1,335,452.27	1,301,481.95	1,404,607.76	
Max	5,016,182.96	4,550,191.13	4,698,641.70	4,598,815.47	4,756,753.08	4,898,120.77	
Revenue only							
	2010	2011	2012	2013	2014	2015	Average
Mean	2,432,329.01	2,209,432.46	2,235,253.62	2,297,641.48	2,363,573.03	2,428,562.43	
StDev	660,311.43	604,888.83	546,757.01	534,763.25	545,174.91	553,696.52	
CV	27.15	27.38	24.46	23.27	23.07	22.80	24.69
Min	1,228,925.46	1,318,713.98	1,436,939.56	1,449,197.61	1,493,426.69	1,497,255.16	
Max	5,139,807.60	4,488,785.26	4,462,952.35	4,654,915.34	4,446,052.47	4,667,667.94	
Revenue plus CI							
	2010	2011	2012	2013	2014	2015	Average
Mean	2,454,987.35	2,230,260.15	2,243,588.26	2,325,590.30	2,413,617.72	2,465,242.41	
StDev	630,422.57	579,832.46	511,589.92	517,375.94	551,120.34	546,019.48	
CV	25.68	26.00	22.80	22.25	22.83	22.15	23.62
Min	1,297,644.32	1,409,500.32	1,450,593.25	1,464,725.33	1,574,127.70	1,557,043.63	
Max	4,960,978.85	4,494,987.02	4,642,310.97	4,542,484.75	4,700,422.35	4,841,790.05	