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Analysis of the State Level Revenue Counter-Cyclical Program:
A Comparison With Other Proposals

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INTRODUCTION

Senators Richard Durbin and Sherrod Brown have proposed a state level revenue-based counter-cyclical program to replace the current marketing loan deficiency and price-based counter-cyclical programs. Their proposal would not change the direct payment program. The proposal is similar to the House farm bill and the proposal by Senator Harkin except that state level yields are used in the place of national yields and payments from the revenue counter-cyclical program (RCCP) would be added to individual crop revenue before federal crop insurance payments would be determined. This program would provide a better safety-net because individual crop yields are more highly correlated with average state yields than with national yields, and the RCCP could in many cases reduce or replace federal crop insurance payments, which would lower premium rates.

The previous farm bill proposals include revenue payments based on average national yields. The weakness of those proposals is that local yields are not highly correlated with the national average yields. For example, the correlation between national wheat yield and local wheat yield is 0.32, and the correlations between national and local yields for soybeans and corn is 0.41 and 0.57, respectively. The correlation between average state yields and local yields are much higher. This correlation is 0.68 for wheat, 0.81 for corn and 0.79 for soybeans, indicating that the local and individual producer yields follow state averages much more closely.

A BRIEF SUMMARY OF RCCP INTEGRATED WITH CROP INSURANCE

The National Corn Growers Association (NCGA) proposes to integrate the RCCP and Federal crop insurance so crop insurance indemnities would be reduced by the amount of RCCP payments. The reduction in crop insurance payments would lower premiums and allow producers to purchase higher levels of protection if desired. To illustrate this, assume that the state average corn yield is 112 bushels per acre and the state level corn price is $3.30, indicating that state target revenue would be $369.60 per acre (112 x 3.30) (Table 1). If actual state corn yield is 115 bushels per acre and average state corn price is $2.85, the realized state revenue would be $327.75 per acre (115 x 2.85). The state revenue deficiency payment would be 90% of the difference between the state target revenue and actual revenue, which is $37.67 per acre (0.9 x(369.60-327.75)).

If a producer had purchased Federal crop insurance, crop insurance payments would be based on total revenue levels and percentage of coverage. For example, if producer's historical corn yield is 114 bushels per acre and the producer's target price is $3.10 per bushel, the target revenue for insurance purposes would be $353.40 per acre (114 X 3.10). If actual production is 104 bushels per acre and

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Table 1. Examples for the Calculation of RCCP							
RCCP calculation Example 1.				**RCCP calculation Example 2.**			
State target yields	State target price	State target revenue		State target yields	State target price	State target revenue
112 bu/ acre	$3.30/ bu	$369.60/acre		112 bu/acre	$3.30/bu	$369.60
State actual yield	State actual price	State actual revenue		State actual yield	State actual price	State actual revenue
115 bu/acre	$2.85/ bu	$327.75/acre		115 bu/acre	$2.85/bu	$327.75/acre
RCCP payment	($369.60-$327.67)*0.9	$37.67/acre		RCCP payment	($369.60-$327.67)*0.9	$37.67/acre
Crop Insurance calculation				**Crop Insurance calculation**			
Producer level yield	Producer level price	Producer actual revenue		Producer level yield	Producer level price	Producer actual revenue
114 bu/acre	$3.10/bu	$353.40/acre		114bu/acre	$3.10/bu	$353.40/acre
Producer actual yield	Producer actual price	Revenue insurance level		Producer actual yield	Producer actual price	Revenue insurance level
104 bu/acre	$2.75/bu	$286.00/ac		80bu/acre	$2.75/bu	$220.00/acre
Current legislation				**Current legislation**			
Insurance level	75%	$0.00/ac		Insurance level	75%	$45.05
	85%	$14.39/ac			85%	$80.39
	95%	$49.73/ac			95%	$115.73
Total payment, RCCP plus crop insurance				**Total payment, RCCP plus crop insurance**			
	75%	$37.67			75%	$82.72
	85%	$52.06			85%	$118.06
	95%	$87.40			95%	$153.40
Proposed legislation				**Proposed legislation**			
Insurance level	75%	$0.00		Insurance level	75%	$7.39
	85%	$0.00			85%	$42.73
	95%	$12.07			95%	$78.07
Total payment, crop insurance less RCCP				**Total payment, crop insurance less RCCP**			
	75%	$37.67			75%	$45.05
	85%	$37.67			85%	$80.39
	95%	$49.73			95%	$115.73

actual price is $2.75, this would yield an actual revenue of $286.00 per acre (104 x 2.75). The producer who purchased 75% coverage ($265.05 per acre) would receive no crop insurance payments since the actual revenue is larger than the covered target revenue. The 85% coverage ($300.39) would pay the producer $14.39 per acre, and the 95% coverage would pay the producer $49.73 per acre in addition to non-integrated RCCP payments. Total payments, when RCCP payments are included, would be $37.67 per acre under a 75% insurance revenue package, $52.06 per acre under an 85% insurance package program, and $87.40 per acre under the 95% insurance revenue package. Under the proposed integrated RCCP, RCCP payments would be added to actual revenue before insurance payments would be calculated. In this example, no insurance payments would be made except for the 95% insurance revenue package.

The next illustration (Example 2) shows the same calculation except that the producer has a much smaller crop (80 bu/acre) compared to the first example. The RCCP payments remain the same, assuming that state yields and price levels do not change. In this case, the producers would collect $45.05 ((0.75x353.40)-220.00) per acre with 75% insurance coverage, $80.39 per acre ((0.85x353.40)-220.00) with 85% insurance coverage and $115.73 per acre ((0.95x353.40)-220.00) under 95% insurance coverage. With an integrated RCCP program, payments would be $37.67 per acre (RCCP payments) less under all three insurance levels as the RCCP replaces a portion of the crop insurance payments. That replacement, in theory, would not impact producers income in the long-run as insurance premiums would be reduced by that level. The insurance actuaries would rate the various insurance packages in light of the reduced risk facing the companies. If, on average, a producer's risk was lowered $12 per acre, premiums should fall by $12 per acre. It would not matter to the government whether or not the RCCP payments replaced crop insurance because government funding would remain the same under both proposals.

METHOD

The North Dakota Representative Farm Model, which is operational at NDSU, was used to analyze impacts of both the current and the new farm bill alternatives on the various sizes of representative farms. The model was updated using 2006 data from the North Dakota Farm and Ranch Business Management reports. The model analyzes the effects of the farm policy proposal on net farm income for three different farms: the high-profit farm, average-profit farm, and low-profit farm.

A computer software program, "Risk" by Palisades, is use to determine uncertainty associated with future prices and yields, which is calculated based on historical changes in prices and yields. Since future prices and yields are not know with certainty, distributions of possible net farm incomes are used to estimate the impact of the new farm bill on various sizes of farms. Thus, our analysis is based on historical prices, yields, and the variations within those prices and yields. Further information can be obtained from Agricultural Policy Brief No. 15, August 2007, "An Analysis of the U.S. House of Representatives 2007 Farm Bill."

RESULTS

Six scenarios were developed to analyze the impact of the state-level RCCP proposal. The base scenario was used to compare the new proposal to the current farm bill. The House farm bill scenario and Harkin's proposal use the revenue-based counter-cyclical program which uses the national target revenue levels. These two scenarios are the same except for the slightly different target revenue levels. The last three scenarios are the state-level integrated RCCP under 75%, 85%, and 95% revenue insurance coverage.

Table 2 and Figure 1 show the net farm income for the average-profit representative farm from 2008 to 2012 under the various scenarios. All proposals provide higher net income than the base (current) scenario, although the differences are small. The state-level RCCP proposals provide slightly greater support than the House scenario, but, in most cases, lower than Harkin's scenario. The main reason for the greater support is that the RCCP proposals utilize Harkin's higher target revenue levels, but at the state level. The lower and less frequent crop insurance payments do not impact average net farm income as the lower payments are assumed to reduce insurance premiums by similar amounts. Therefore, they are income neutral. In 2008, net farm income for the average-profit farm is estimated to be $50,036, $51,401 and $53,296 under the Base scenario, House bill and Harkin's scenario, respectively. Net farm income increases slightly as the crop insurance coverage increases. It increases from $51,796 for the 75% scenario to $52,553 and $53,427 for the 85% and 95% scenarios, respectively. Similar patterns exist throughout the forecast period. The five-year average net farm income ranges between $55,775 and $57,458 for the three RCCP scenarios, about a 3% difference.

Table 2. Net Farm Income for the Average-Profit Representative Farms Under Various Scenarios, thousand $

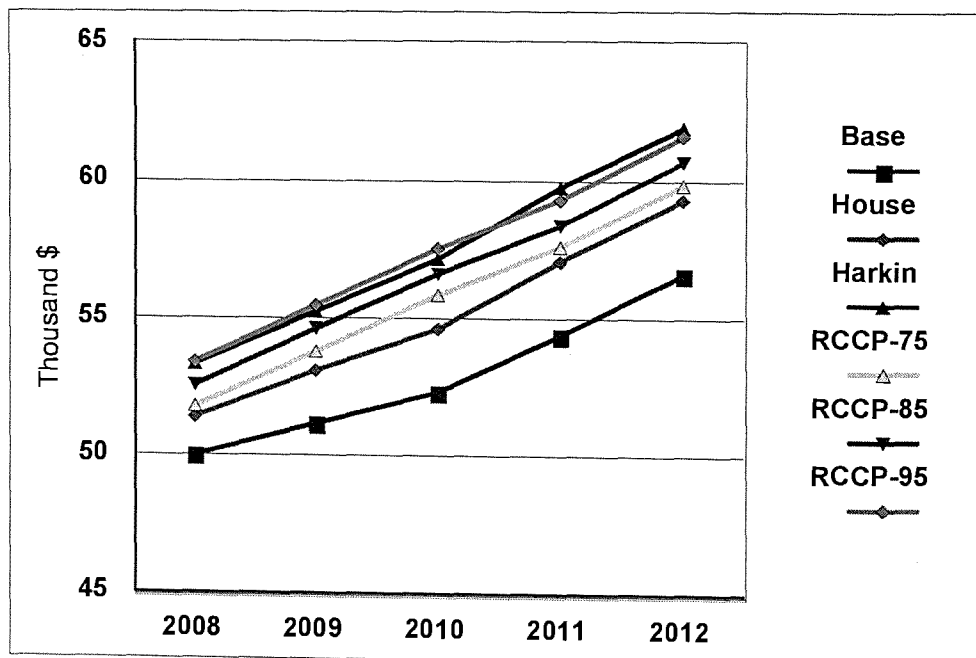|	Base	House	Harkin	RCCP-75	RCCP-85	RCCP-95
2008	50,036	51,401	53,296	51,796	52,553	53,427
2009	51,149	53,049	55,252	53,812	54,582	55,486
2010	52,348	54,623	57,159	55,827	56,613	57,519
2011	54,401	57,092	59,752	57,586	58,381	59,277
2012	56,627	59,304	61,906	59,857	60,641	61,581
Average	52,912	55,094	57,473	55,775	56,554	57,458

Figure 1. Estimated Net Farm Income for the Average-Profit Representative Farm Under Various Scenarios

Table 3 and Figure 2 show the net farm income for the high-profit representative farm from 2008 to 2012 under the various scenarios. In 2008, net farm income for the high-profit farm is estimated to be $115,860, $116,993 and $120,908 under the base scenario, the House bill and Harkin's scenarios, respectively. Net farm income increases slightly as the crop insurance coverage increases in the RCCP proposals. It increases from $119,739 for the 75% scenario to $120,888 and $121,308 in the 85% and 95% scenarios, respectively. Similar patterns exist throughout the forecast period. The five-year average net farm income ranges between $123,558 and $125,481 for the three RCCP scenarios, about a 2% difference.

Table 3. Net Farm Income For the High-Profit Representative Farms Under Various Scenarios, thousand $

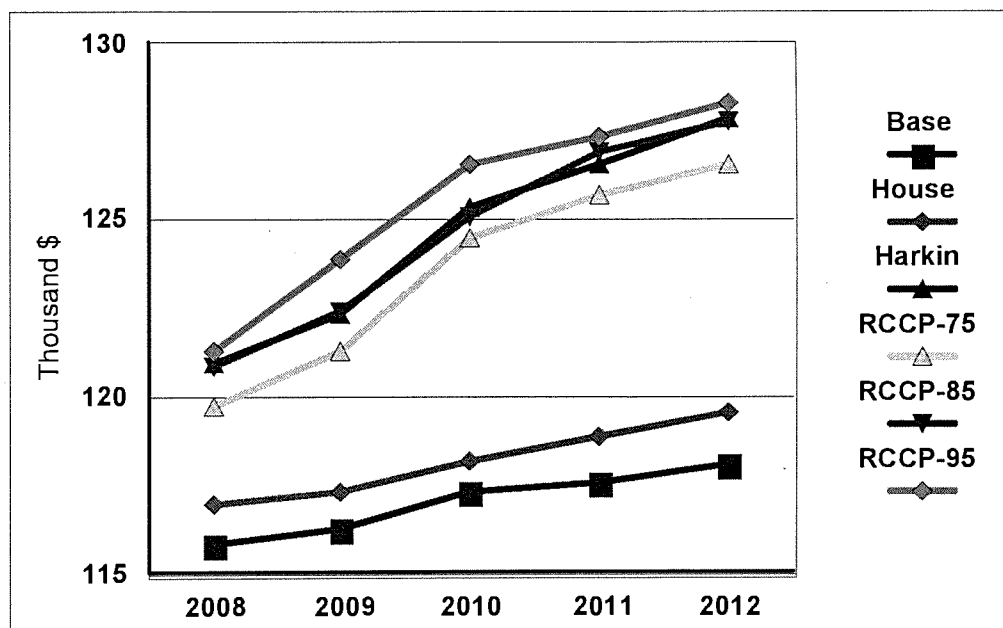|	Base	House	Harkin	RCCP-75	RCCP-85	RCCP-95
2008	115,860	116,993	120,908	119,739	120,888	121,308
2009	116,255	117,267	122,343	121,282	122,450	123,916
2010	117,271	118,183	125,357	124,500	125,096	126,564
2011	117,574	118,858	126,616	125,680	126,888	127,329
2012	118,121	119,530	127,895	126,587	127,772	128,291
Average	117,016	118,166	124,624	123,558	124,619	125,481

Figure 2. Estimated Net Farm Income for the High-Profit Representative Farm Under Various Scenarios

Table 4 and Figure 3 show the net farm income for the low-profit representative farm from 2008 to 2012 under the various scenarios. In 2008, net farm income for the low-profit farm is estimated to be -$6,565,- $4,748 and -$1,660 under the base scenario, the House bill and Harkin's scenario, respectively. Net farm income becomes positive as the crop insurance coverage increases in the RCCP proposals. It increases from -$2,926 in the 75% scenario to -$306 and $3,363 in the 85% and 95% scenarios, respectively. Similar patterns exist throughout the forecast period. The five-year average net farm income ranges between $2,473 and $8,568 for the three RCCP scenarios.

Table 4. Net Farm Income For The Low-Profit Representative Farms Under Various Scenarios, thousand $

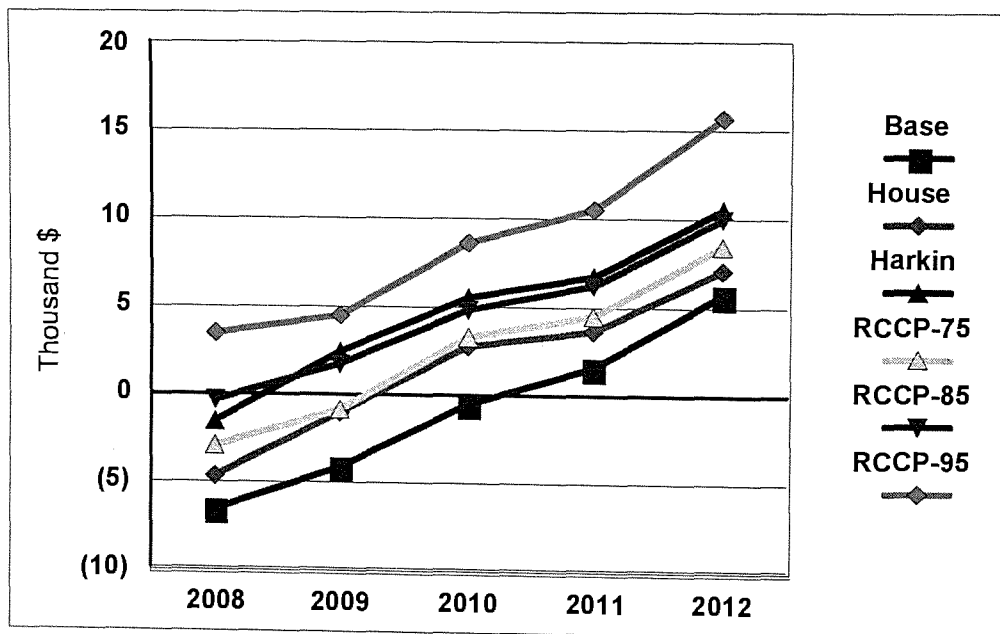|	Base	House	Harkin	RCCP-75	RCCP-85	RCCP-95
2008	(6,565)	(4,748)	(1,660)	(2,926)	(306)	3,363
2009	(4,277)	(1,011)	2,395	(874)	1,759	4,451
2010	(631)	2,763	5,518	3,263	4,908	8,605
2011	1,589	3,588	6,686	4,484	6,138	10,632
2012	5,779	7,145	10,600	8,417	10,065	15,791
Avg	(821)	1,547	4,708	2,473	4,513	8,568

Figure 3. Estimated Net Farm Income for the Low-Profit Representative Farm Under Various Scenarios

Figure 4 shows the net income distribution for the average-profit farm for 2008. The distributions for all scenarios are similar. The frequencies of low incomes are slightly higher for the House bill and Harkin's proposal than the other scenarios, while the frequency of high incomes is slightly lower in the base scenario compared to other scenarios.
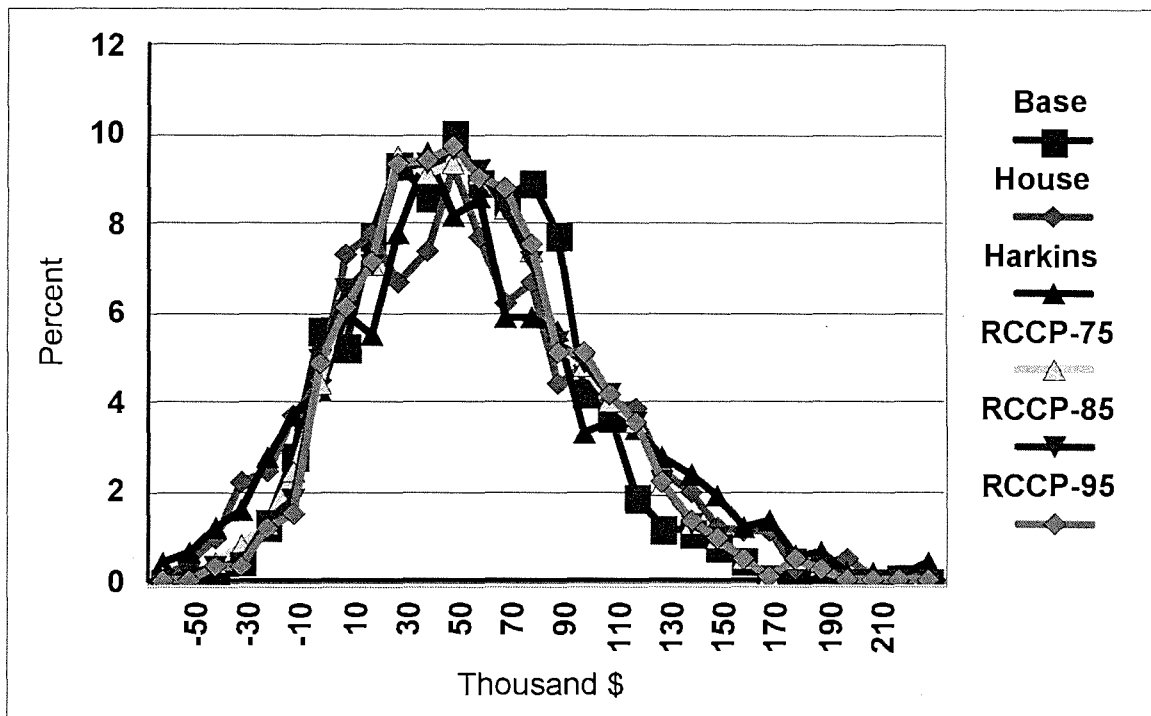

Figure 4. Net Farm Income Distribution for Average-Profit Representative Farms, 2008

INSURANCE INTEGRATION

The change from national average yields to state average yields in the calculation of RCCP would allow producers who carried crop insurance, in theory, to collect twice for the same production loss. The integration of Federal crop insurance and government policy would remove that possibility and at the same time should reduce insurance premiums for the producer. The government would assume some of the production risk that Federal crop insurance had maintained in the past. Table 5 shows the frequencies of Federal crop insurance payments for the various regions with RCCP and an integrated Federal crop insurance program. The RCCP reduces the number and amounts of crop insurance payments. With the 75% level of crop insurance, the frequency of crop insurance collection for representative farms in the Red River Valley (RRV) would be less than 1%. South Central (SC) and West representative farms would collect crop insurance benefits 7.9% and 6% of the time, respectively. The North Central (NC) representative farm would collect crop insurance benefits 22% of the time. Without integration, RRV representative farms would collect crop insurance about 24% of the time. Likewise, NC, SC, and West representative farms would collect 43%, 42% and 37% of the time, respectively (Table 6). Higher levels of insurance coverage will increase the frequencies of covered crop losses. Crop insurance levels of 85% increases crop insurance payments to between 19% of the time for the SC and 36% for the NC. Overall average at the 75% level is between $191 in the West and $962 in the NC (Table 7).

Table 5. Frequency of Crop Insurance Payments, various insurance coverage levels

Percent	RRV	NC	SC	West
75	0.4	22.0	7.9	6.0
85	20.5	36.3	19.0	28.1
95	35.1	45.4	27.0	44.2

Table 6. Frequency of Crop Insurance Payments, Average Amount of Crop Insurance Payments and Overall Average, Harkin's Scenario

	RRV	NC	SC	West
Number	235	431	419	371
Average ($)	7,689	15,072	11,544	17,881
Overall ($)	1,806	6,496	4,836	6,633

Table 7. Overall Average of Crop Insurance Payments, $

Percent	RRV	NC	SC	West
75	301	962	438	191
85	1,362	2,166	807	958
95	3,068	3,147	1,403	1,881

To understand the impact of an integrated Federal Crop insurance program, spring wheat production from the SC region was isolated to determine the size and frequency of Federal crop insurance payments with and without a RCCP. Figure 5 shows the distribution of spring wheat revenue for SC region. The mean is $151.69 per acre with a standard deviation of $44.37 per acre. The maximum revenue is $295.22 per acre and the minimum revenue is $22.76 per acre. A 75% insurance coverage would provide a $113.77 per acre floor on revenue. Without an integrated RCCP, the frequency of insurance payments would be 19.6%, or once every five years. The average of those payments would be $22.86 per acre and the overall average would be $4.48 per acre. With an integrated RCCP, the fre-

quency of insurance payments would be 3%. The frequency of insurance payments for an 85% insurance coverage would be 31.1%, or once every 3 years. With an integrated RCCP, the frequency of insurance payments would be 7.2%, or once every 14 years, under an 85% insurance coverage. The frequency of insurance payments for a 95% insurance coverage would be 45.0%, or once every 2 years, without integration, and payment frequency would be 23.4% with insurance integration.

It is possible for a producer to have no revenue, although the model does not estimate that possibility. Likewise it is possible for a producer to have revenue substantially higher than the maximum amount estimated. The model chooses the most likely levels of revenue for each crop, which under estimates the extremes, both positive and negative. For example, premiums for spring wheat at the 70% level for east central North Dakota is about $8.50 to $9.00 per acre. The federal crop insurance premiums for the SC representative farm would be about $4.48 per acre plus selling and administration costs less any federal subsidy. This indicates that although the model under-estimates losses, the estimates are not widely different, and the under-estimations would be consistent under all scenarios.

According to Bruce Babcock, Iowa State University (internal communications to the National Corn Growers Associations), insurance premiums for spring wheat would be reduced 28% if a RCCP program was integrated with Federal crop insurance. The premium reduction for soybeans and corn would be 27% and 41%, respectively.
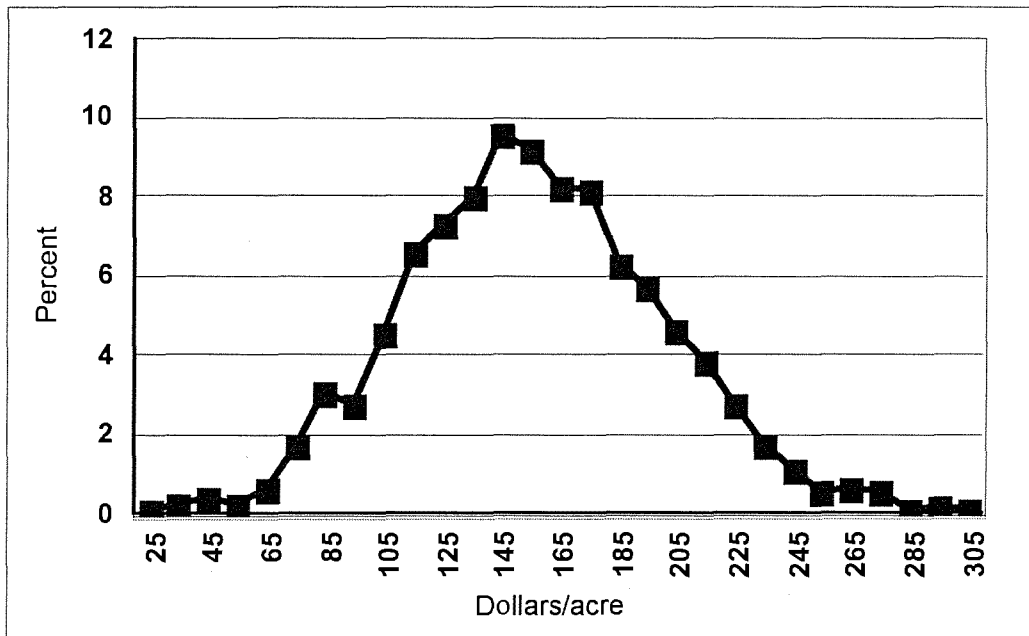

Figure 5. Distribution of Gross Returns for Spring Wheat for South Central Representative Farm, 2008

SUMMARY AND CONCLUSIONS

The analysis of the Durbin-Brown farm bill proposal, when integrated with Federal crop insurance, shows that net farm incomes are not substantially different from those under the House bill or Harkin's proposal. The income variation under the Durbin-Brown proposal is less than that under the other proposals because of the state level revenue targets. NCGA has proposed to integrate the RCCP with Federal crop insurance to eliminate double collection of benefits.

Net farm income for the average-profit farm under the Durbin-Brown proposal when integrated with revenue crop insurance is projected to be about $52 thousand in 2008, compared to $51 thousand under the House bill and $53 thousand under Harkin's proposal. For the high-profit representative farm, net farm income for 2008 is projected to $120 thousand under the RCCP, compared to $117 thousand and $121 thousand under the House farm bill and Harkin's proposal, respectively. The low-profit farm shows losses under all scenarios in 2008. All of these levels assume 75% revenue crop insurance coverage. Except for the low-profit farm, higher levels of coverage do not increase net farm income significantly, as higher payments are off set by higher premiums.

The state-level revenue targets do lower income variations. The standard deviations for the average-profit representative farm range between $44 thousand and $45 thousand under the state-level RCCP and between $53 thousand and $56 thousand under the House bill and Harkin's proposal. The standard deviations for the high-profit representative farm range between $75 thousand and $76 thousand under the state-level RCCP and between $87 thousand and $98 thousand under the House bill and Harkin's proposal. The smaller variation in income under the state-level RCCP is due to the use of state revenue targets instead of the national revenue targets used in the House bill and Harkin's proposal.

The integration of federal crop insurance with the RCCP will reduce crop insurance premiums in the states. Payments will occur less frequently and at lower levels, but in the long-run, it will not change net farm income levels because insurance premiums will decline.

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