The Outlook for ARC-CO and PLC Payments

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The purpose of this paper is to project the cashflows for The 2014 Farm Bill offered grain and oilseed farmers an option to elect Agriculture Risk Coverage-County (ARC-CO), Agriculture Risk Coverage-Individual (ARC-IC), or Price Loss Coverage (PLC) for base acres of covered commodities for the duration of the bill. The majority of corn and soybean farmers elected ARC-CO, while nearly all rice and peanut farms elected PLC (Table 1). Wheat and sorghum farms were split between ARC-CO and PLC.

The ARC-CO program offered higher payments for corn and soybeans in the early years of a declining price market but lower payments in subsequent years if prices remained low. Also, ARC-CO payments were dependent on the five-year moving average county yield, thus, if the yield trend persists, increased yields tend to offset lower prices in the ARC-CO formula.

The purpose of this paper is to provide a discussion of ARC-CO and PLC payment expectations in 2016-2021. The stochastic August 2016 FAPRI Baseline of crop prices is used to simulate the five-year moving average grain prices over the 2015-2021 period. The county average grain yields for all counties were simulated using empirical probability distributions based on FSA county yields used to calculate ARC-CO payments for 2014. The ARC-CO payment rate for each crop in each county was simulated using the formula specified in the 2014 Farm Bill. Average CCP yields for each crop are available from FSA in each county. These yields were used as a proxy for PLC payment yields in calculating PLC payments for each county. Enrolled ARC-CO and PLC acres are available by crop for each county. Total acres enrolled in ARC-CO and PLC are summarized in Table 1.

The simulation process calculated ARC-CO and PLC payment rates for 500 possible prices each year, incorporating both national price risk and county yield risks. By incorporating risk, we are able to estimate the probability that payments will be made each year as well as by county for ARC-CO.

Table 2 summarizes risk based projections of the five-year moving average commodity prices used to calculate ARC-CO payments for 2015-2021. The moving average corn price decreases over time due to the lower prices projected in the FAPRI August Baseline. The average annual moving average prices are: $5.29/bu for the 2010-2014 period, $4.80 for 2011-2015, $4.04 for 2012-2016, $3.81 for 2013-2017, $3.69 for 2014-2018, and $3.73 for 2015-2019 (Table 2). Because price risk is a reality, we should be aware that the average has a range on it; for example, the 2013-2017 moving average corn price could range from $3.06 to $4.55.

The moving average price projections in Table 2 all exhibit a downward trend due to expectations of continued low market prices for grains. The moving average prices used to calculate ARC-CO payments in 2015-2021 for sorghum and corn decrease about 30% over the period. The decrease for wheat is about 25%; soybeans experience a similar decrease of 26%.

Actual county yields and the five-year moving average of county yields are also factors necessary to calculate ARC-CO payments. The results of including stochastic projections of county yields are included in Table 3, which summarizes the weighted average per acre ARC-CO and PLC payments for 2016-2021 by crop. The per acre ARC-CO payments decrease over the 2016-2021 period for corn, going from

Table 1. Acres Enrolled in ARC-CO and PLC for the 2014 Farm Bill.

	Participation in ARC-CO	Participation in PLC
Corn	81,456,972	6,740,890
Sorghum	2,643,385	6,208,285
Barley	977,057	3,738,891
Soybeans	50,362,578	1,977,826
Wheat	33,362,050	28,176,589
Rice	176,692	3,530,403
Peanuts	6,906	1,904,322

Table 2. Probabilistic Projection of the Five Year Moving Average of Crop Prices Used to Calculate ARC Payments for 2015-2020.

	2010-2014	2011-2015	2012-2016	2013-2017	2014-2018	2015-2019
Wheat						
Mean	6.7	6.7	6.06	5.5	5.19	5.05
StDev	0	0	0.19	0.39	0.54	0.65
CV	0	0	3.16	7	10.46	12.82
Min	6.7	6.7	5.92	4.62	3.7	3.05
Max	6.7	6.7	6.88	6.79	7.06	7.72
Sorghum						
Mean	5.1	4.77	4	3.75	3.57	3.46
StDev	0	0	0.19	0.26	0.35	0.41
CV	0	0	4.87	6.83	9.74	11.72
Min	5.1	4.77	3.83	3.05	2.54	2.12
Max	5.1	4.77	4.88	4.57	4.87	5.24
Corn						
Mean	5.29	4.8	4.04	3.81	3.69	3.73
StDev	0	0.01	0.21	0.23	0.26	0.35
CV	0	0.26	5.08	6.05	6.94	9.3
Min	5.29	4.79	3.85	3.06	3.01	2.64
Max	5.29	4.91	5.14	4.55	4.72	4.95
Barley						
Mean	5.57	5.58	5.58	5.18	4.91	4.71
StDev	0	0.02	0.1	0.26	0.3	0.39
CV	0	0.42	1.88	5.07	6.16	8.2
Min	5.57	5.57	5.49	4.29	4	3.43
Max	5.57	5.73	6.09	5.81	6.02	5.95
Soybeans						
Mean	12.27	11.87	10.87	9.78	9.26	9.07
StDev	0	0	0.41	0.72	0.71	0.89
CV	0	0	3.81	7.38	7.61	9.8
Min	12.27	11.87	10.45	7.79	6.96	6.1
Max	12.27	11.87	12.5	12.6	12.06	12.15

$45.90/acre in 2016 to $8.62/acre in 2021. A similar trend is projected for wheat, sorghum, soybeans, and barley, with wheat and soybeans experiencing the greatest percentage losses of -79% and -72%, respectively. The probability of not receiving ARC-CO payments increases from 2016 to 2021 for all crops (Table 3). For example, the chance of no ARC-CO payments for corn in 2017 is 3% and 25% in 2021 and for soybeans the probability increases from 13% in 2017 to 44% in 2021.

Comparing weighted per acre ARC-CO payments to PLC payments indicates that corn and soybeans would have higher average PLC payments than ARC-CO payments in 2018-2021 (Table 3). Sorghum, wheat, and barley are projected to experience higher per acre PLC payments than ARC-CO payments each year through 2016-2021. However, it is not certain that a PLC payment would be paid each year. For example, the average per acre PLC payment of $24.37 for corn in 2017 takes into consideration there is a 45%

Table 3. Projected ARC and PLC Payments Per Acre, Weighted by Enrolled Acres in each County, 2016-2021.

	ARC 2016	ARC 2017	ARC 2018	ARC 2019	ARC 2020	ARC 2012		PLC 2016	PLC 2017	PLC 2018	PLC 2019	PLC 2020	PLC 2021
	($/Acre)												
Corn													
Mean	45.9	33.87	15.04	11.07	9.11	8.62		9.53	24.37	24.47	21.28	21.42	19.74
StDev	3.33	21.74	17.81	15	13.89	14.08		6.7	30.8	35.9	31.9	33.09	31.97
CV	7.25	64.2	118.41	135.5	152.44	163.41		70.33	126.37	146.7	149.9	154.51	161.98
Min	28	0	-	0	-	-		-	-	-	-	-	-
Max	51.87	54.32	56.23	52.08	54.51	54.48		25.83	150.04	150.04	135.85	150.04	145.62
P(Pay=0)	0%	3%	15%	14%	21%	25%		16%	45%	52%	53%	57%	57%
Wheat													
Mean	1.38	16	10.62	6.29	4.2	3.36		14.55	20.03	22.03	19.34	17.27	15.03
StDev	0.05	8.08	8.26	6.96	5.85	5.5		1.38	18.12	22.05	21.92	21.27	19.63
CV	3.55	50.51	77.83	110.61	139.12	163.47		9.47	90.46	100.11	113.35	123.21	130.63
Min	1.19	0.05	0	0	0	0		8.71	0	0	0	0	0
Max	1.5	22.94	23.08	22.56	21.54	25.64		17.55	73.36	73.36	73.36	73.36	73.36
P(Pay=0)	0%	3%	6%	11%	24%	27%		0%	25%	33%	39%	42%	44%
Sorghum													
Mean	9.53	24.37	24.47	21.28	21.42	19.74		29.63	30.87	28.87	27.51	26.47	25.18
StDev	6.7	30.8	35.9	31.9	33.09	31.97		3.73	26.88	28.69	28.32	28.03	27
CV	70.33	126.37	146.7	149.9	154.51	161.98		12.59	87.08	99.38	102.95	105.89	107.24
Min	0	0	0	0	0	0		13.38	0	0	0	0	0
Max	25.83	150.04	150.04	135.85	150.04	145.62		37.05	96.57	96.57	96.57	96.57	96.57
P(Pay=0)	16%	45%	52%	53%	57%	57%		0%	24%	32%	31%	35%	35%
Soybeans													
Mean	3.5	20.83	14.35	8.34	5.65	5.83		14.15	10.75	11.18	9.82	7.97	8.43
StDev	6.25	15.91	14.39	11.48	9.64	10.42		20.38	19.89	19.96	18.91	16.26	17.6
CV	178.64	76.38	100.24	137.55	170.49	178.7		144.04	185.03	178.46	192.5	203.93	208.73
Min	0	0	0	0	0	0		0	0	0	0	0	0
Max	24.56	36.75	38.58	36.86	34.35	37.04		82.27	82.27	82.27	82.27	82.27	82.27
P(Pay=0)	42%	13%	17%	32%	36%	44%		52%	66%	64%	69%	70%	71%
Barley													
Mean	21.22	18.82	18.41	14.56	11.49	9.97		78.94	75.38	71.57	69.97	67.84	36.01
StDev	0.54	7.07	7.67	8.43	8.42	8.47		44.03	48.59	46.84	48.1	47.85	13.79
CV	2.54	37.58	41.69	57.94	73.3	84.95		55.78	64.46	65.46	68.74	70.53	38.29
Min	17.44	0	0	0.02	0	0		0	0	0	0	0	0.58
Max	21.78	22.98	24.96	23.82	24.48	24.5		190.75	190.75	180.23	190.75	187.47	67.38
P(Pay=0)	0%	1%	1%	5%	8%	12%		9%	11%	13%	12%	14%	0%

chance there is no PLC payment that year. The probability of no PLC payments increases over the study period for all crops except barley. Absence of PLC payments indicates that prices exceeded the reference price, indicating more favorable market conditions.

In summary, the outlook through 2021 is for per acre ARC-CO payments to decrease and for per acre PLC payments to be higher than ARC-CO payments after 2016 or 2017, depending on the commodity. The probability of not receiving PLC payments is not insignificant for corn, wheat, sorghum, and soybeans as prices are projected to increase and exceed reference prices with a greater frequency in the future.