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Weekly Farm Economics: Estimated Likelihoods of PLC and ARC-CO Payments for 2024

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Gardner Policy Series

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Lower commodity price expectations for 2024 have led to increased chances of Ag Risk Coverage (ARC) and Price Loss Coverage (PLC) program payments relative to recent years. This has also led to increased interest in, and attention to, the 2024 program decision which must be made by March 15th.

Estimates from the recently updated Gardner Payment Calculator suggest the county-level ARC program (ARC-CO) has a greater chance than PLC of triggering payments on corn and wheat base acres in 2024. Expected payment levels from ARC-CO are also projected higher than from PLC for corn and wheat. For soybean base, the estimated chances of payments and expected size of payments are much smaller than for corn or wheat, and relatively similar for both program options.

Gardner Payment Calculator

The estimated likelihoods and payment levels for the county scenarios below come from the Gardner Program ARC/PLC Payment Calculator, an online decision tool developed in partnership with the National Center for Supercomputing Applications (NCSA) at the University of Illinois. The calculator provides stochastic program payment estimates which allow for both prices and yields to vary from expectations based on the variability observed historically. It also incorporates the historic relationship, or correlation, between national prices and crop yields at the county level. The calculator was originally built to cover the 2018 Farm Bill period (2019 to 2023) and was recently updated to provide estimates for 2024 program payments.

We generate estimates of the likelihood, or probability, that PLC and ARC-CO payments might be triggered in 2024 along with expected payment levels for both programs for three example counties in Illinois for corn, soybeans, and wheat. Note that expected payment measures are averages across all simulated outcomes, including those which result in zero payments.

Champaign County, located in east-central Illinois, and DeKalb County, in northern Illinois, are examples of areas with relatively high productivity and low yield risk. Jefferson County, in southern Illinois, is an example of an area with relatively low productivity and higher yield risk. More productive counties will tend to have higher PLC program yields and ARC-CO trend-adjusted benchmark yields. Lower risk areas will tend to exhibit lower yield variability through time. Table 1 reports the average PLC yields and 2024 ARC-CO benchmark yields for all three crops for each county.

Table 1. PLC and ARC-CO Benchmark Yields (bu/acre) for Illinois County Examples

	Corn		Soybeans		Wheat	
County	PLC[1]	ARC-CO[2]	PLC[1]	ARC-CO[2]	PLC[1]	ARC-CO[2]
Champaign	170	225	52	71	60	78
DeKalb	162	211	49	65	66	77
Jefferson	110	170	35	49	52	70

[1]Based on average PLC yields as of 2023, as reported in ARC/PLC program data from the Farm Service Agency, USDA
[2]ARC-CO Benchmark Yields for 2024, as reported in ARC/PLC program data from the Farm Service Agency, USDA
ARC-CO Benchmark Yields are for 'Non-Irrigated' or 'All' designation

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Reference, Benchmark and Expected MYA Prices

The default price forecast assumptions – labeled 'Forecast' in the calculator – assume an expected 2024 marketing year average (MYA) price of $4.40 for corn, $11.20 for soybeans, and $6.00 for wheat. These expected prices are consistent with those released by the USDA at the Agricultural Outlook Forum earlier in February. These prices are lower than those used in the January revision of the *farmdoc* 2024 crop budgets and referenced in some of our earlier analyses of the 2024 program decision (see *farmdoc daily* articles from January 16, January 23, January 30, February 6, and February 7, 2024). The corn price is $0.10 lower ($4.40 vs. $4.50), the soybean price is $0.30 lower ($11.20 vs $11.50), and the wheat price is $0.80 lower ($6.00 vs $6.80). Lower expectations for 2024 MYA prices increase the likelihood of PLC and ARC-CO payments being triggered. Note that alternative price scenarios with lower and higher price assumptions for 2024 are also provided for users in the payment calculator.

Levels of the PLC effective reference and ARC-CO benchmark prices relative to the expected or forecast MYA prices for 2024 used in the calculator have large impacts on payment likelihoods and the expected size of payments. Table 2 reports the effective reference and ARC benchmark prices for corn, soybeans, and wheat for 2024.

Table 2. PLC Effective Reference and ARC-CO Benchmark Prices for 2024

	Corn	Soybeans	Wheat
	$/bu	$/bu	$/bu
Effective reference price	4.01	9.26	5.50
ARC-CO benchmark price	4.85	11.12	6.21

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Effective reference prices enter directly into the calculation of PLC payments. Effective reference prices are $4.01 for corn, $9.26 for soybeans, and $5.50 for wheat for 2024. The effective reference prices are

the higher of the statutory reference price or 85% of the Olympic average of actual MYA prices over the lagged five-years preceding the current year (for 2024, the relevant five-year period is 2018 to 2022), capped at 1.15 of the statutory reference prices. Since its introduction in the 2018 farm bill, the effective reference price calculation for corn and soybeans has not exceeded statutory reference prices until 2024. The $4.01 effective reference price for corn is above the $3.70 statutory reference price. The $9.26 effective reference price for soybeans is above the $8.40 statutory reference price. Wheat's effective reference price equals the $5.50 statutory reference price.

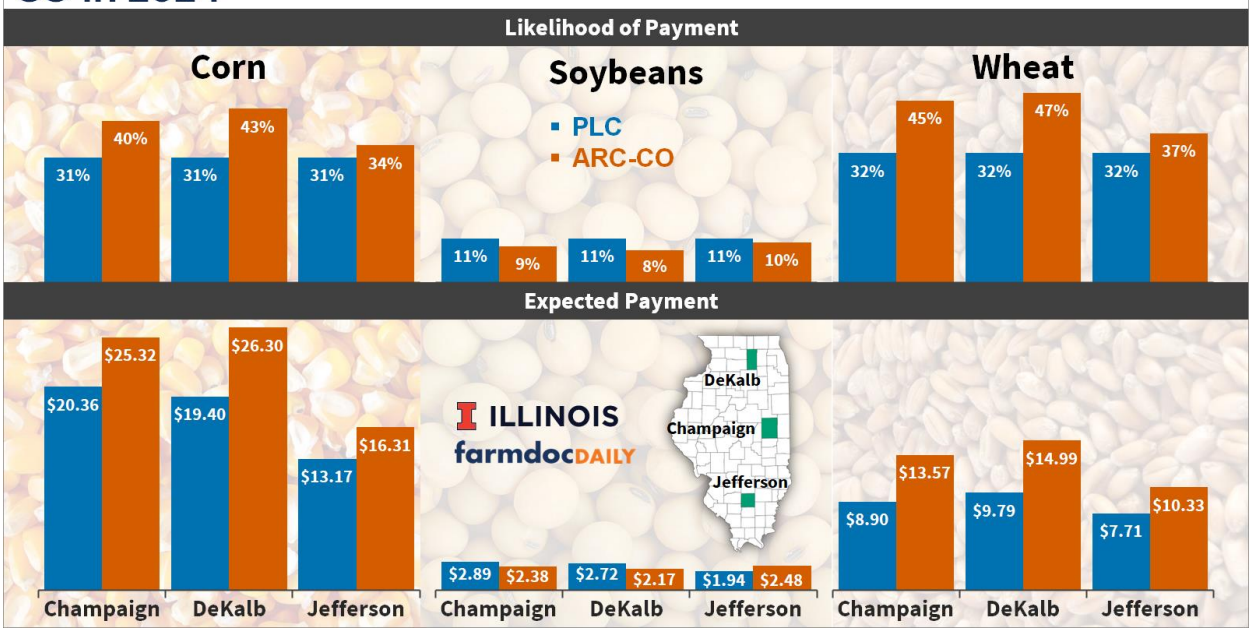
The 2024 ARC-CO benchmark prices are $4.85 for corn, $11.12 for soybeans, and $6.21 for wheat. The ARC-CO benchmark prices are based on Olympic averages over the same five-year period (for 2024, it is 2018 to 2022), where actual MYA prices are replaced by the effective reference price if the actual price is lower. ARC-CO benchmark prices have increased in recent years because of higher commodity prices from 2020 through 2022 and, for corn and soybeans, because of the higher effective reference prices in 2024. In general, higher benchmark prices increase the probability of ARC-CO payments. See the *farmdoc daily* from January 23, 2024 for more discussion on effective reference and ARC benchmark prices for 2024.

Payments on Corn Base

The upper left panel of Figure 1 reports the estimated likelihoods of PLC and ARC-CO payments on corn base acres for the three Illinois county examples. At the expected price of $4.40 for the 2024 marketing year, there is a 31% chance that the 2024 MYA price will be below the $4.01 effective reference price for corn, thereby trigger PLC payments. This chance does not vary across counties as it is only based on the national MYA price. The likelihood of ARC-CO payments being triggered does vary across counties since county yields also impact the revenue measures used to determine payments. For the three counties reported, the chance of ARC-CO payments in 2024 is slightly higher than for PLC. The likelihood of ARC-CO payments is 40% for Champaign, 43% for DeKalb, and 34% for Jefferson.

Estimates of expected program payments on corn base are in the lower left panel of Figure 1. Expected payment levels from PLC are estimated at just over $20 per base acre for Champaign County, just under $20 per base acre for DeKalb, and just over $13 per acre for Jefferson County. The differences in expected PLC payments are due to the difference in PLC payment yields assumed for each county. Expected ARC-CO payments are higher than for PLC for all three counties - $25 per acre for Champaign, $26 per base acre for DeKalb, and $16 per base acre for Jefferson.

Figure 1. Likelihoods and Expected Payments for PLC and ARC-CO in 2024



Payments on Soybean Base

The upper middle panel of Figure 1 reports the estimated likelihoods of PLC and ARC-CO payments on soybean base for the three Illinois county examples. At the $11.20 soybean price forecast, the likelihood of the 2024 MYA price for soybeans falling below the $9.26 effective reference price to trigger PLC payments is estimated at 11%. The likelihood of ARC-CO payments being triggered is similar, ranging from 8% for DeKalb to 10% for Jefferson. The likelihood of ARC-CO payments for Champaign County is estimated at 9%. The lower likelihoods of PLC and ARC-CO payments reflect the fact that current expectations for the 2024 soybean MYA price ($11.20), while lower than the past 2 years, remains well above the PLC effective reference price ($9.26) and the ARC trigger price ($9.56) where ARC-CO payments would be triggered assuming benchmark yield levels.

Estimates of expected program payments on soybean base are in the lower middle panel of Figure 1. Given the relatively low likelihood of PLC or ARC-CO payments being triggered on soybean base acres in 2024, the expected payment levels for both programs are also relatively small. The expected PLC payment is just under $3 per acre for Champaign and DeKalb, and less than $2 per acre for Jefferson County. The expected ARC-CO payments are similar – in the low to mid $2 per acre range for all three counties.

Payments on Wheat Base

The upper right panel of Figure 1 reports the estimated likelihoods of PLC and ARC-CO payments on wheat base for the three Illinois county examples. The likelihood of PLC payments on wheat base is estimated at 32% for 2024. PLC payments would be triggered if the MYA price for wheat, which is currently expected to be $6 per bushel, falls below the $5.50 reference price. The likelihood of ARC-CO payments for wheat is estimated to be higher than for PLC payments. For Champaign, there is a 45% chance for ARC-CO payments. For DeKalb County, the likelihood is 47%. For Jefferson County the chance of ARC-CO payments for wheat is 37%.

Estimates of expected program payments on wheat base are in the lower right panel of Figure 1. Expected PLC payment levels for wheat range from just under $9 per base acre for Champaign, closer to $10 per base acre for DeKalb, and under $8 per base acre for Jefferson. Expected ARC-CO payments

are slightly larger ranging from nearly $15 per base acre for DeKalb to around $10 per base acre for Jefferson. For Champaign County, the expected ARC-CO payment is around $9 per base acre.

Discussion

Estimates from the recently updated Gardner Program Payment Calculator suggest that ARC-CO has the higher likelihood of triggering payments on both corn and wheat base in Illinois in 2024. This is mainly driven by the ARC-CO benchmark price being sufficiently above the PLC effective reference price for both crops for 2024. Moreover, ARC-CO can trigger payments due to yield losses even when prices are above the effective reference price. The relative price protection offered by PLC and ARC-CO for 2024 was discussed in more detail in the *farmdoc daily* articles from January 16 and January 23, 2024. Yield variability and ARC-CO was most recently discussed in the *farmdoc daily* from February 6, 2024.

For both corn and wheat, there looks to be a roughly 1 in 3 chance of PLC payments based on current price expectations. The likelihood of ARC-CO payments varies between 40 and 50% across Illinois counties. Expected PLC payment levels will vary based on farm-specific PLC yields but will likely be in the range of $10 to $20 per base acre for corn, and $7 to $10 for wheat. Expected ARC-CO payments will also vary across counties but will likely be in the range of $15 to $25 per base acre for corn and $10 to $15 per base acre for wheat.

The chances of triggering PLC or ARC-CO payments on soybean base acres in 2024 are estimated at about 1 in 10. Based on the low chances of triggering payments from either program, expected payment levels are also relatively low for soybeans – in the $2 to $3 per base acre range for both programs.

The Gardner payment calculator can be used to generate estimated likelihood and expected payment levels for corn, soybean, and wheat base acres in a number of states and counties across the US. Producers are encouraged to use the tool as they make their final program decisions by the March 15th deadline for 2024.

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