



U.S. crop program fiscal costs: Revised estimates with updated participation information

June 2015

FAPRI-MU Report #02-15

Providing objective analysis for 30 years
www.fapri.missouri.edu

Published by the Food and Agricultural Policy Research Institute (FAPRI) at the University of Missouri (MU), 101 Park DeVille Drive, Suite E; Columbia, MO 65203. FAPRI–MU is part of the Division of Applied Social Sciences (DASS) in the College of Agriculture, Food and Natural Resources (CAFNR).

<http://www.fapri.missouri.edu>

This material is based upon work supported by the U.S. Department of Agriculture, under Agreement No. 58-0111-14-001.

Any opinion, findings, conclusions, or recommendations expressed in this publication are those of the authors and do not necessarily reflect the view of the U.S. Department of Agriculture nor the University of Missouri.

Contact authors for this report are Scott Gerlt (gerlts@missouri.edu) and Pat Westhoff (westhoffp@missouri.edu).

Permission is granted to reproduce this information with appropriate attribution to the authors and FAPRI–MU.

The University of Missouri–Columbia does not discriminate on the basis of race, color, religion, national origin, sex, sexual orientation, age, disability or status as a qualified protected veteran. For more information, call Human Resource Services at 573-882-4256 or the U.S. Department of Education, Office of Civil Rights.

Summary

Recent Farm Service Agency (FSA) reports provide information about farm program choices made by U.S. crop producers under the Agricultural Act of 2014 (the 2014 farm bill). It is now known how many farmers have chosen Agricultural Risk Coverage (ARC) and Price Loss Coverage (PLC), as well as the results of base acreage reallocations and program yield updates. With this new information, we are able to update estimates of future farm program costs.

This report shows how the choices made by producers compare to the assumptions made by the Food and Agricultural Policy Research Institute at the University of Missouri (FAPRI-MU) when it prepared its 2015 baseline outlook for U.S. agricultural markets.

- The FAPRI-MU baseline anticipated that most corn and soybean producers would elect ARC, because average ARC payments were projected to exceed PLC payments for those crops. Election results show that even more corn and soybean producers chose ARC than had been expected.
- For wheat, we expected a more even split, with 60 percent choosing PLC, given a closer balance of projected payments. Instead, a narrow majority chose ARC.
- As expected, given projected payments, the vast majority of long grain rice and peanut producers chose PLC, as did smaller majorities of sorghum and barley producers.
- The reallocation of base acreage resulted in more base acres for corn, rice and peanuts, crops that have larger projected ARC or PLC payments than most other crops.

With this new information, we are able to update our estimates of the fiscal costs of the new programs. These estimates do not change assumptions about agricultural markets from those made in preparing the 2015 FAPRI-MU baseline outlook, but they incorporate the new estimates of ARC and PLC participation, base acreage and program yields. Based on incomplete information from the Risk Management Agency, they also assume lower participation in two new crop insurance programs, the Supplemental Coverage Option (SCO) and the Stacked Income Protection Program (STAX).

Relative to the 2015 baseline, these new estimates show:

- Increased outlays associated with the 2014 and 2015 crops. Especially for corn, expected ARC payments exceed PLC payments in both years, so heavier-than-expected participation in ARC increases total payments. Outlays exceed previous estimates by about \$1.8 billion for the 2014 crop and by about \$600 million for the 2015 crop.
- Reduced outlays associated with the 2017 and 2018 crops. For several crops, ARC revenue benchmarks and program outlays are likely to decline after 2015. Projected average per-acre PLC payments exceed ARC payments beginning in 2015 for wheat and 2017 for corn, so fewer PLC acres reduces overall outlays, as do reduced crop insurance expenditures caused by lower SCO and STAX enrollment.
- Total payments under major crop programs and crop insurance net indemnities (indemnities minus producer-paid premiums) are projected to average \$11.2 billion per year for the 2014-2018 crop years. The corresponding average for the ten previous years was \$11.3 billion.

Introduction and enrollment information

The 2014 farm bill gave producers a number of choices with potentially large implications for future farm program payments.

1. Whether to choose Price Loss Coverage (PLC) or the county version of Agricultural Risk Coverage (ARC-CO) for each crop on each FSA farm, or to choose the individual version of ARC (ARC-IC) for all the crops on an FSA farm.
2. Whether to reallocate base acreage on a farm to reflect recent acreage mixes, or retain existing base acreage allocations.
3. Whether to update program yields to reflect more recent yield history.
4. Whether to enroll in new crop insurance programs, such as the Stacked Income Protection Program (STAX, available only to upland cotton producers) or Supplemental Coverage Option (SCO, available only to those not enrolled in ARC or STAX).

In preparing its 2015 baseline, FAPRI-MU had to make assumptions about the choices that producers would make, based on information available in January 2015. In June 2015, FSA provided information about actual program choices. The 2015 baseline correctly anticipated that most corn and soybean producers would choose ARC and that most rice, peanut, sorghum and barley producers would choose PLC (Table 1). In the case of wheat, the baseline assumed 60 percent of producers would choose PLC, but instead a narrow majority chose ARC.

The results are broadly consistent with FAPRI-MU projections of national average payment rates for the two programs. For corn and soybeans, for example, projected average ARC payments for the 2014-2018 period exceed projected average PLC payments (Figure 1), while the reverse is true for rice, sorghum, barley and peanuts. For wheat, projected ARC and PLC payments were similar for the five-year period as a whole. For corn, projected national average ARC payments exceed PLC payments from 2014-2016, but the reverse is true in later years. For wheat, projected ARC payments exceed PLC payments in 2014, but projected average PLC payments are larger than corresponding ARC payments from 2015-2018. For soybeans, projected national average ARC payments exceed PLC payments in every year, although the difference is very small by 2018.

Even so, the number of corn, soybean and wheat producers choosing ARC was surprising. The percentage of base acreage electing ARC was 17 percent higher than we had assumed for wheat, 27 percent for soybeans and 33 percent for corn. Further research will be needed to fully understand these program choices. In the case of corn, for example, it is possible that choices may have been strongly affected by expectations about 2014 crop payments. In many counties, 2014 ARC-CO payments for corn were likely to be far greater than PLC payments, which are likely to be a few cents per bushel at most. Missouri is one state where ARC-CO payments were not expected to be large for the 2014 crop (primarily because Missouri had very high corn yields in 2014 relative to recent averages, boosting 2014 county revenues for corn relative to their benchmarks). Perhaps as a result, fewer Missouri producers chose ARC than was the case in most other states.

Table 1. Assumptions of the 2015 FAPRI baseline and this analysis using new information: Program participation, program yields and base area

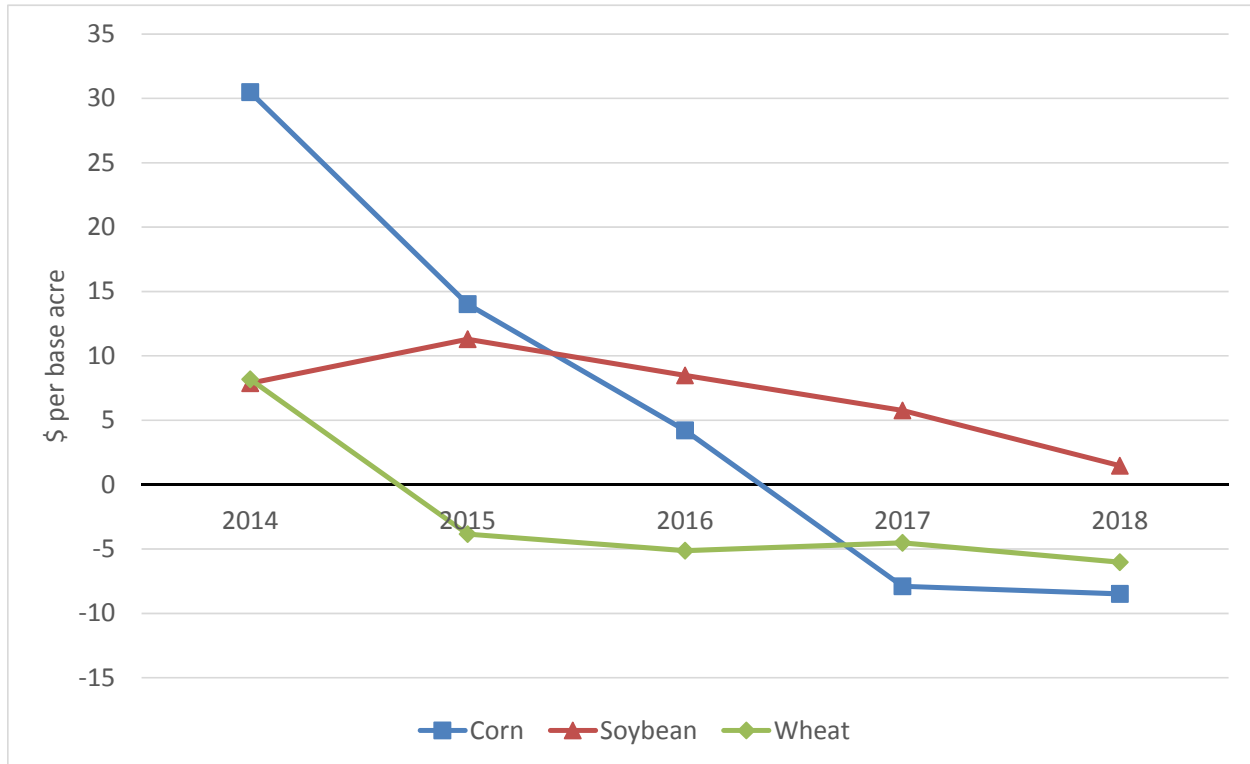
	March 2015 FAPRI baseline		New information
	2013	2014-2018	2014-2018
<u>ARC participation (% of base acres)</u>			
Corn	n.a.	60.0%	93.4%
Soybeans	n.a.	70.0%	96.9%
Wheat	n.a.	40.0%	57.5%
Sorghum	n.a.	20.0%	33.6%
Rice (average of all three classes)	n.a.	10.0%	4.9%
Barley	n.a.	25.0%	25.2%
Peanuts	n.a.	5.0%	0.3%
% of ARC in ARC-IC	n.a.	10.0%	0.0%*
<u>CCP/PLC program yields</u>			
Corn (bu./ac.)	114.6	125.0	124.0
Soybeans (bu./ac.)	34.2	37.4	37.3
Wheat (bu./ac.)	35.9	37.3	40.1
Sorghum (bu./ac.)	58.3	58.3	62.3
Rice (lbs./ac.)	4,827.4	6,067.1	5,870.8
Barley (bu./ac.)	53.0	53.0	56.2
Peanuts (lbs./ac.)	2,999.5	3,126.8	3,128.0
<u>Base area (million acres)**</u>			
Corn	83.32	86.38	96.77
Soybeans	49.49	58.84	54.51
Wheat	72.78	67.29	63.70
Sorghum	11.55	9.22	8.98
Rice	4.31	4.07	4.76
Barley	8.58	7.34	5.19
Peanuts	1.44	1.49	2.02
Upland cotton/generic base	17.53	17.92	17.58
8-crop sum	249.00	252.55	253.51
<u>Crop insurance***</u>			
% of PLC acres also enrolled in SCO		50.0%	40% in 2015, 50% thereafter
	n.a.		
% of upland cotton acres in STAX	n.a.	95.0%	50.0%

* The FSA-reported share is 1.1%, but it is set to 0% for this exercise.

** The final two columns show data for 2014; base area will vary slightly each year.

*** SCO and STAX are first available in 2015. Preliminary RMA data for 2015 shows less enrollment than anticipated, but final enrollment is still unknown.

Figure 1. Estimated average ARC-CO payments minus PLC payments per base acre (average of 500 stochastic outcomes given the market conditions of the FAPRI-MU 2015 baseline)

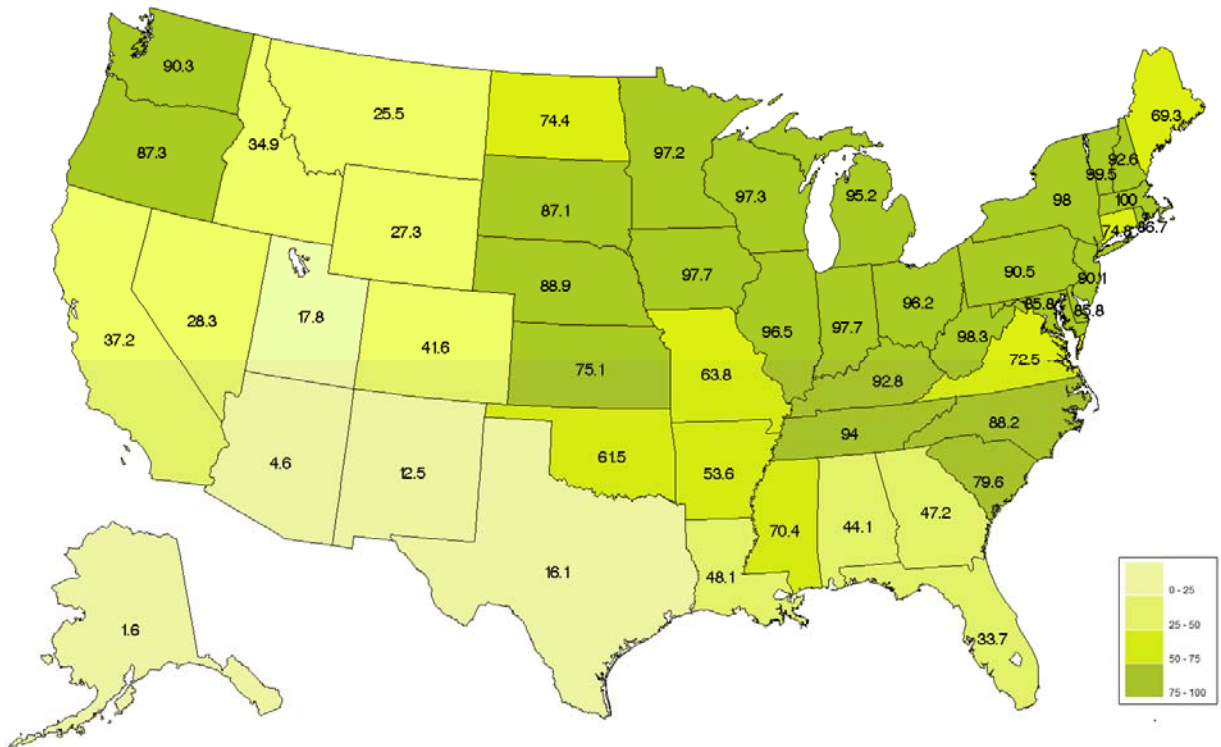


The ARC-PLC election data from FSA show interesting regional patterns (Figure 2). In most Corn Belt states, 90 percent or more of overall base acreage is enrolled in ARC, while less than 20 percent of total base acres is enrolled in ARC in Texas and several other states. Much of the difference can be explained by the mix of crops grown in each state—ARC participation is highest in the states where corn and soybeans account for almost all base acreage; PLC dominates in Texas and other states where other crops are more important. However, there are also important differences in participation rates for a given commodity across the states. Some are easily explained, such as in the case of Missouri corn; others require more investigation.

For this analysis, we replaced the 2015 baseline assumptions about program elections with the actual results. One small exception is ARC-IC. About 1 percent of the total base acreage of those electing ARC chose ARC-IC (far less than we had assumed earlier), but to simplify the modeling this analysis assumes no ARC-IC enrollment.

In reallocating base acreage (Table 1), many farmers appear to have chosen the option that would maximize future expected payments. Because projected per-acre payments are larger for rice, peanuts and corn than for most other crops, it should not be surprising that base acreage increased for the higher-payment crops and fell for several crops with lower expected payments. Recent shifts in planted area

Figure 2. Agricultural Risk Coverage (ARC) election by state (percent of base acres)



Source: Author calculations based on FSA data. Represents the sum of ARC-CO and ARC-IC enrollment divided by total crop specific base (which includes allocated generic base electing ARC-IC, but does not assume any other reallocation of generic base acres).

explain some of the changes as well, as landowners could only choose to maintain their current base acreage or reallocate based on recent planted acreage shares. This may account for at least part of the reduction in wheat, sorghum and barley base acreage, as these three crops have seen their share of national planted acreage decline. Perhaps the biggest surprise was the magnitudes of the increase in corn base acreage and the reductions in the base acreage for other crops. It is striking that rice base acreage increased significantly, even though actual rice planted acreage was far below even the previous national base acreage.

The figures in Table 1 do not include any reallocation of generic base acres to ARC-CO or PLC, as that reallocation will depend on actual planted acreage on a farm in a given year.

Many landowners who could increase their program yield by updating chose to do so, increasing the national average program yields for all commodities (note that the figures in Table 1 are estimates based on partial information). Our earlier estimates for corn, soybeans and peanuts appear to be very consistent

with the new information, but the increase in program yields appears greater than we had estimated for wheat, sorghum and barley, but smaller for rice.

Finally, only limited information is currently available about 2015 enrollment in SCO and STAX (the programs were not available for the 2014 crop year). Participation in both programs appears to be less than earlier anticipated, so for this analysis, we have reduced assumed participation rates. SCO is only available on acres not enrolled in ARC or STAX, and we assume here that it is chosen by 40 percent of PLC participants in 2015 and 50 percent in subsequent years. STAX enrollment appears to be far less than we had assumed previously, and we assume 50 percent of cotton acres participate for purposes of this analysis.

Results: Impacts of updating the program assumptions

To determine the impact of the new program information, two scenarios are compared.

1. A baseline that incorporates the same program and market conditions as the 2015 FAPRI-MU baseline. The only changes from the 2015 baseline are technical corrections to address some programming errors that were not identified before the original baseline was released.
2. A scenario that incorporates the new information regarding program elections, base acreage and program yields, as well as lower estimates of SCO and STAX participation. The scenario uses the same market assumptions as the baseline. There is no attempt to update the baseline for new information that would result in different estimates of commodity supply, demand or prices.

The analysis is conducted with the FAPRI-MU stochastic model of U.S. agricultural and biofuel markets. The model provides 500 outcomes for approximately 2000 endogenous variables for the 2014-2024 period. Given different assumptions about the weather, market conditions and other factors, these outcomes provide distributions of possible future prices, yields and other variables needed to calculate future payments, farm income and other results. The tables presented here provide the average of those 500 outcomes, but the model actually generates a wide range of results for any given year. For example, in most of the 500 stochastic outcomes for 2015-2018, corn prices are above the \$3.70 per bushel reference price that triggers PLC payments. However, in some of the outcomes, prices are less than \$3.70 per bushel and PLC payments are available. The reported PLC payments represent the average the many outcomes with zero payments and the smaller number with payments.

The results (Table 2 and 3) indicate that updating the program assumptions results in higher expected farm program outlays associated with the 2014, 2015 and 2016 crops. The difference is greatest for the 2014/15 marketing year, with the new estimate of program outlays exceeding the previous estimate by \$1.8 billion. The difference is about \$600 million for the 2015/16 crop and \$100 million for the 2016/17 crop. In all three years, the increase in estimated ARC expenditures, largely due to increased ARC elections, is larger than the reduction in estimated PLC payments.

The situation reverses for the 2017 and 2018 crops. By then, several years of lower average prices have reduced the benchmarks used to calculate ARC payments. Projected ARC payments decline over time, and they increase less relative to the 2015 baseline than in earlier years.

Table 2. Change in selected farm program outlays (by program, crop year basis) resulting from the use of updated assumptions regarding program participation, base acreage and program yields relative to estimates based on 2015 FAPRI-MU baseline assumptions

Marketing year	14/15	15/16	16/17	17/18	18/19	5 year avg.
	(million dollars)					
ARC payments	1,948	2,047	1,595	817	557	1,393
PLC payments	-152	-1,076	-1,123	-918	-771	-808
Marketing loans	-5	-30	-18	-15	-17	-17
Crop insurance subsidies	0	-312	-320	-330	-339	-260
Total	1,791	631	134	-445	-570	308

Note: Includes selected payments for feed grains, food grains, oilseeds, and upland cotton. All projections are averages across 500 outcomes, and represent changes caused by using updated assumptions regarding program participation rates, program yields and base area.

Table 3. Change in selected farm program outlays (by commodity, crop year basis) resulting from the use of updated assumptions regarding program participation, base acreage and program yields relative to estimates based on 2015 FAPRI-MU baseline assumptions

Marketing year	14/15	15/16	16/17	17/18	18/19	5 year avg.
	(million dollars)					
Corn	1,458	760	301	-276	-328	383
Soybeans	111	27	14	-21	-86	9
Wheat	75	-119	-133	-102	-125	-81
Sorghum	6	-6	-13	-18	-15	-9
Rice	45	53	46	45	45	47
Peanuts	96	94	103	109	104	101
Upland cotton	-5	-127	-122	-122	-114	-98
All other	5	-51	-63	-60	-50	-44
Total	1,791	631	134	-445	-570	308

Note: Includes same programs as Table 2, and the same notes apply.

In addition, assumed lower participation rates for SCO and STAX reduce projected crop insurance outlays. These results would change, of course, if actual participation rates in SCO and STAX prove to be different than assumed here.

For the five-year period from 2014-2018, total average annual payments are about \$300 million higher than previously estimated. This figure should be kept in context; just changing average crop price projections by a few cents per bushel would result in a larger change in projected outlays.

Looking at particular crops, note that the changes for corn are similar to the change for all crops. The corn differences are especially large because:

- 1) Corn has more base acreage than any other crop, and the actual corn base acreage was larger than previously assumed;
- 2) There is a large difference in average ARC and PLC payments for corn each year; and
- 3) The change in program election shares was larger for corn than for other crops.

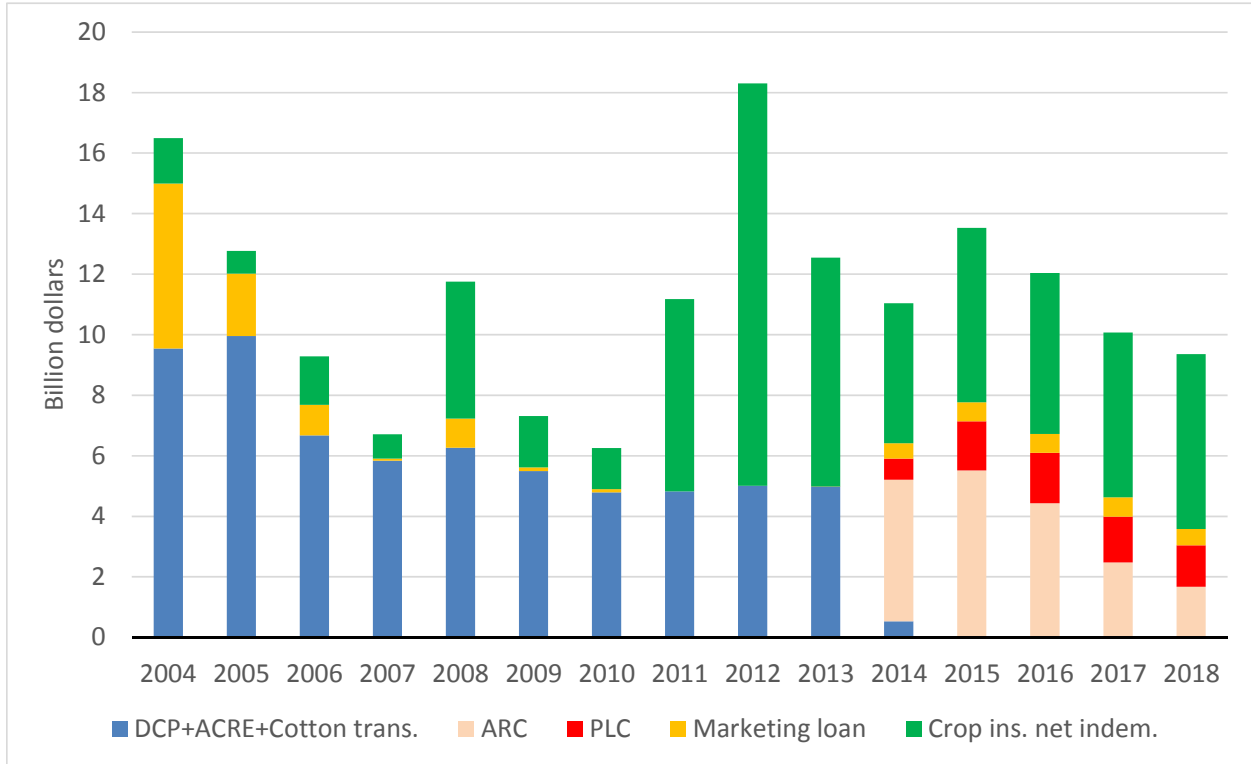
For most crops, the results are consistent with most producers making program choices that maximize expected payments. Total corn payments increase in part because more corn producers elected ARC, the program that we estimate will maximize future payments for most corn producers, given all of the market and program assumptions of this analysis. As demonstrated with the farm bill decision aid developed with colleagues at Texas A&M's Agricultural and Food Policy Center, this would not be true for all corn producers, as results will differ depending on county yields, farm-specific program bases and program yields, price and yield projections and many other factors.

For wheat, note that payments for the five-year period are less than in the earlier analysis. One reason is that actual base acreage for wheat is less than we had assumed previously. Also important, however, are our projections that national average PLC payment rates for wheat will slightly exceed ARC payment rates. It is important not to read too much into this result, as the difference is fairly small and producers may have different expectations about future wheat prices and yields.

To provide context, it may be useful to compare projected program payments and crop insurance benefits to historical levels. For the 2004-2013 crop years, producers received an annual average of \$11.3 billion in benefits from selected farm programs (Direct and Countercyclical Program (DCP) payments (DCP), Average Crop Revenue Election (ACRE) program payments, marketing loan benefits and crop insurance net indemnities (indemnities for losses minus producer-paid premiums). For the 2014-2018 crop years covered by the 2014 farm bill, the corresponding average is \$11.2 billion (for ARC, PLC, marketing loans, 2014 cotton transition payments and crop insurance net indemnities).

Total projected benefits peak in the 2015 crop year, but decline in later years as ARC benchmarks and projected payments decline. Projected 2014-2018 average annual commodity program payments are about \$1.5 billion per year less than the 2004-2013 average, while annual crop insurance net indemnities are projected to be \$1.4 billion greater.

Figure 3. Selected government payments and crop insurance net indemnities, crop year basis: Historical data and projections using updated program assumptions



Notes: Historical data from USDA. Projections by the authors, based on market conditions of the 2015 FAPRI-MU baseline and updated program assumptions from Table 1.