

# Ag Policy Brief #2014-05

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## :: Analyzing Mississippi Soybean Producers' Farm Bill Alternatives ::

As a result of changes introduced in the new farm bill, Mississippi soybean producers will soon need to make a number of important decisions. This *Ag Policy Brief* will focus on the decision of whether to sign up for the Agricultural Risk Coverage (ARC) program or the Price Loss Coverage (PLC) program. A related decision is whether to purchase the new Supplemental Coverage Option (SCO) shallow loss crop insurance product, since those who select the ARC farm program are not eligible to purchase SCO. PLC and ARC are both farm programs that are delivered by the Farm Service Agency (FSA). SCO is a supplemental crop insurance product that is available only to those who purchase an underlying Yield Protection (YP) or Revenue Protection (RP) crop insurance product.

PLC makes payments whenever the national market year average price falls below a stated reference price (\$8.40 per bushel for soybeans). ARC makes payments based on revenue shortfalls. Producers can select between either individual or county ARC. County ARC provides commodity-specific coverage whereas individual ARC makes payments based on farm revenue shortfalls measured across *all* covered commodities, with the farm defined as the sum of the producer's interest in all ARC farms in the state. Those who select individual ARC receive payments on 65% of their base acres while those who select county ARC receive payments on 85% of their base acres. SCO payments are triggered by either county yield or revenue shortfalls, depending on whether the underlying crop insurance policy is YP or RP. For more information on these programs, readers are encouraged to follow the hyperlinks above.

Many advisors are suggesting that producers make decisions between ARC and PLC (either with or without SCO) by asking which alternative would have paid the most had it been in place in recent years (e.g., which alternative would have paid the most over the past 5 years). An obvious limitation to such an approach is that it ignores the issue of whether payments would have been received when they were needed. In other words, would the payments help reduce revenue variability? An even more fundamental problem is that while we don't know what the future will hold we can be certain that it won't look exactly like the past. So any conclusion based on how much an alternative would have paid over say, the past 5 years, is almost certainly misinformed.

### *Will Payments be Received When Needed?*

When assessing the available alternatives, producers need to consider whether their yields tend to be correlated with the county average yield. In particular, in years when your farm yield is unusually low, is it likely that the county average yield will also be unusually low? Does your farm have characteristics that are typical of the county or does your farm have characteristics that are unusual for your county (e.g., flood-prone areas, atypical soils, etc.)? Note that the issue **is not** whether your yield is generally higher or lower than the county yield. The issue is whether your yield tends to move up and down in concert with the county

yield. If your yield tends to be correlated with the county yield, then county ARC or SCO should provide some revenue risk protection. On the other hand, if your yield is not correlated with the county yield, you may want to consider another alternative (i.e., PLC or individual ARC).

### *Simulation*

We analyze farm bill alternatives by constructing a representative farm for each of the major soybean producing counties in Mississippi. Rather than simply assuming that history will repeat itself (i.e., back-casting), we utilize a forward-looking simulation approach. This approach recognizes that while we can't perfectly predict the future, we do have some information available to help us consider what the future may look like. For example, while we can't know exactly what yields will be in the future, we do know something about typical expected yields within a county, the trend in expected yields, and (based on National Agricultural Statistics Service NASS and RMA data) the variability in both county and farm-level yields. Similarly, while we can't know future soybean prices with certainty, futures market prices are available which provide the market's "best guess" about soybean prices for several years into the future. By looking at many years of historical data, we also know something about the accuracy of planting time futures market estimates of harvest time prices. While, over time planting time futures market prices are, on average, relatively accurate predictors of harvest prices, the accuracy varies from year to year. We incorporate this variability into our simulation analysis. Finally, we have information about correlations between county yields, farm yields, and prices, all of which is also incorporated into the simulation analysis.

For each representative farm, we simulate farm yield, county yield, and price outcomes thousands of times for each year from 2014 until 2018 (the life of the farm bill). The results presented here are the averages over those thousands of simulations. Also, to simplify the graphs, we present weighted average results at the Crop Reporting District (CRD) level (with the weights being the 2013 planted acreage for each county included in the analysis for that CRD). More specifically, the results for CRD 10 are based on representative farms for Bolivar, Coahoma, Quitman, Tallahatchie, and Tunica Counties; results for CRD 20 are based on representative farms for Benton, Calhoun, De Soto, Marshall, Panola, and Tate Counties; results for CRD 30 are based on representative farms for Alcorn, Lee, Pontotoc, Prentiss, and Union Counties; results for CRD 40 are based on representative farms for Humphreys, Issaquena, Leflore, Sharkey, Sunflower, Washington, and Yazoo Counties; results for CRD 50 are based on representative farms for Holmes and Madison Counties; and results for CRD 60 are based on representative farms for Monroe and Noxubee Counties. These six CRDs account for most Mississippi soybean production.

For each representative farm, program yields are set equal to 95% of the 2014 expected yield. Expected yields (but not program yields) increase each year to account for trend. Based on futures market prices at the time this is being written (with some adjustment for basis) we assume expected soybean prices of \$12.00 per bushel in 2014; \$11.50 per bushel in 2015; and \$11.00 per bushel for 2016, 2017, and 2018. The simulation analysis allows for realized prices to vary around these expected values. For simplicity, we assume that the realized market year average price is the same as the realized harvest time price used to settle revenue insurance contracts.

### *Results*

Figure 1 presents simulated soybean annual average PLC, SCO, and County ARC payments by CRD. The amounts presented for SCO are simulated indemnities received minus the premium paid by the producer. Results for individual ARC are not presented because expected payments will depend on the portfolio of different covered commodities and other factors that vary significantly across different farms.

The most striking aspect of these results is just how small the annual expected payments are for any of the farm bill alternatives. Clearly county ARC is expected to pay more than PLC but even the largest simulated average annual county ARC payment is only about \$9.00 per acre (CRD 40). All of the simulated average annual PLC payments are less than \$1.00 per acre. The low levels of simulated PLC payments occur because this analysis assumes (based on current futures market prices) planting time expected prices of between \$11 and \$12 per bushel throughout the life of the farm bill. With planting time prices at this level, there is only a small probability that market year average prices will fall below the \$8.40 per bushel PLC reference price. Even when PLC is combined with SCO, the largest simulated average annual payment is only \$4.60 per acre per year.

To provide some perspective on the magnitude of these payments, figure 2 presents the simulated payments as a percentage of annual expected revenue per acre. Presenting simulated payments as a percentage of expected revenue per acre (figure 2), reduces the differences between CRDs compared to when simulated payments are expressed in dollars per acre (figure 1). But even more important is that the largest average simulated payments are just over 2% of expected revenue. **This strongly suggests that one should not base planting decisions or decisions about crop insurance coverage levels on expected payments from any of these farm bill alternatives. The expected payments are far too small to have any significant impact on these important management decisions.**

While the average annual results presented in figures 1 and 2 are interesting, they do not show how simulated payments change over time. Figures 3-8 present simulated payments per acre for each year from 2014 through 2018. While there are some differences across CRDs, the most interesting aspect of these figures is the sharp decrease in simulated county ARC payments from 2014 to 2016. This occurs because the county ARC benchmark revenue per acre is based on a 5-year Olympic average. The expected prices used in the simulation (based on current futures prices) are lower than the market year average prices for 2011, 2012, and 2013. This causes county ARC to generate larger payments in 2014 because the ARC benchmark revenue is high relative to expected revenue. The high realized prices in recent years gradually drop out of the Olympic average calculation of ARC benchmark revenue so that by 2016 expected county ARC payments level off. In contrast to county ARC, the simulated sum of PLC and SCO payments is much more stationary over time with payments increasing slightly in the out years (2016-2018) as a result of expected prices being lower than those assumed for 2014 and 2015.

### *Conclusion*

Several conclusions are suggested by this simulation analysis. First, for Mississippi soybean producers, county ARC is likely to be a better alternative than PLC (with or without SCO). Second, if current price projections are accurate, county ARC payments will decline significantly by 2016. Third, and perhaps most importantly, future federal payments are likely to be relatively small. Based on current price projections, these payments are unlikely to be large enough to have any appreciable impact on planting decisions or decisions regarding crop insurance coverage levels.

Figure 1. Mississippi Simulated Soybean Average Annual Payment per Acre, 2014-2018

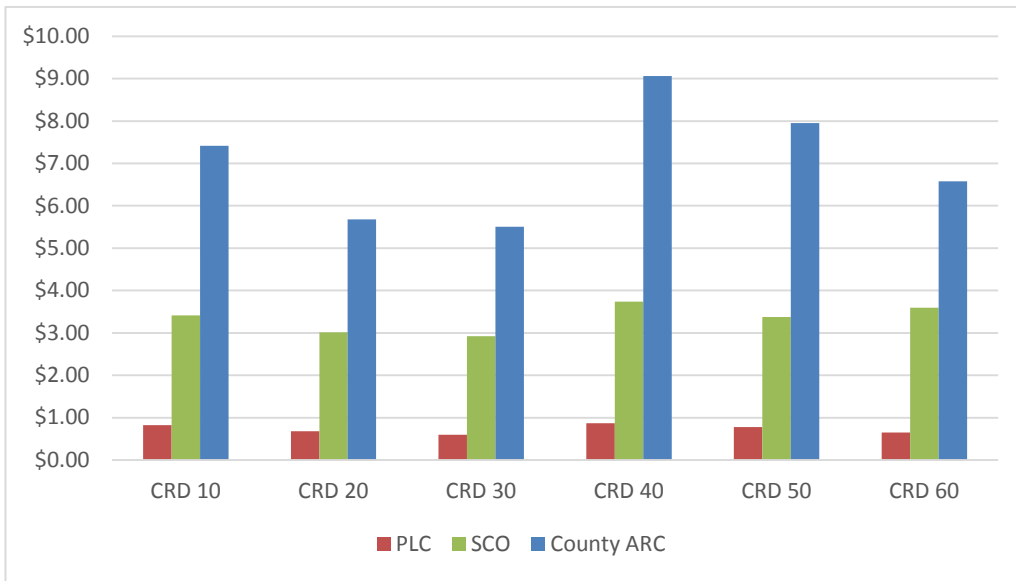


Figure 2. Mississippi Simulated Soybean Average Annual Payment as a Percentage of Expected Revenue per Acre, 2014-2018

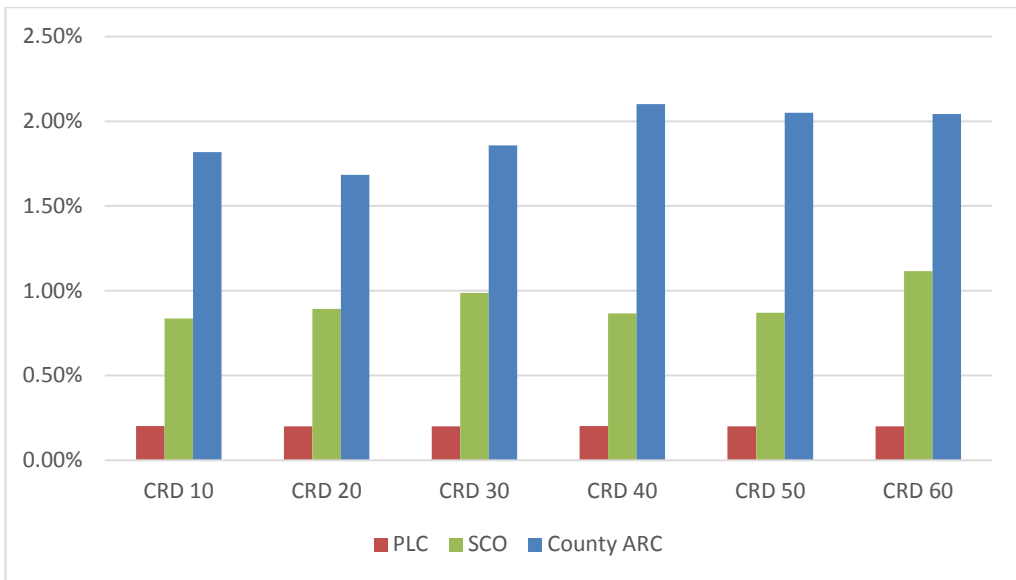


Figure 3. Mississippi CRD 10 Simulated Soybean Payment per Acre

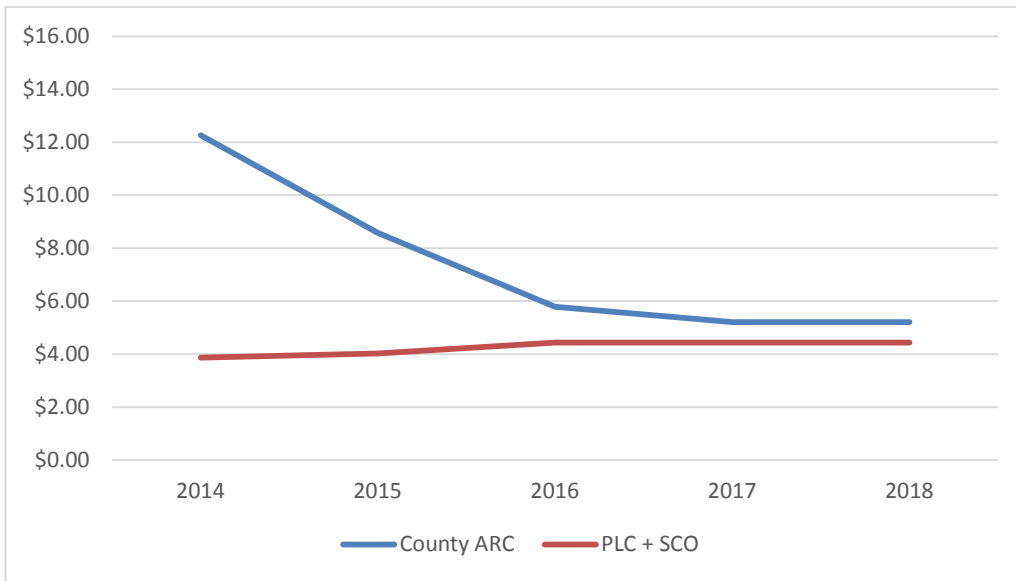


Figure 4. Mississippi CRD 20 Simulated Soybean Payment per Acre

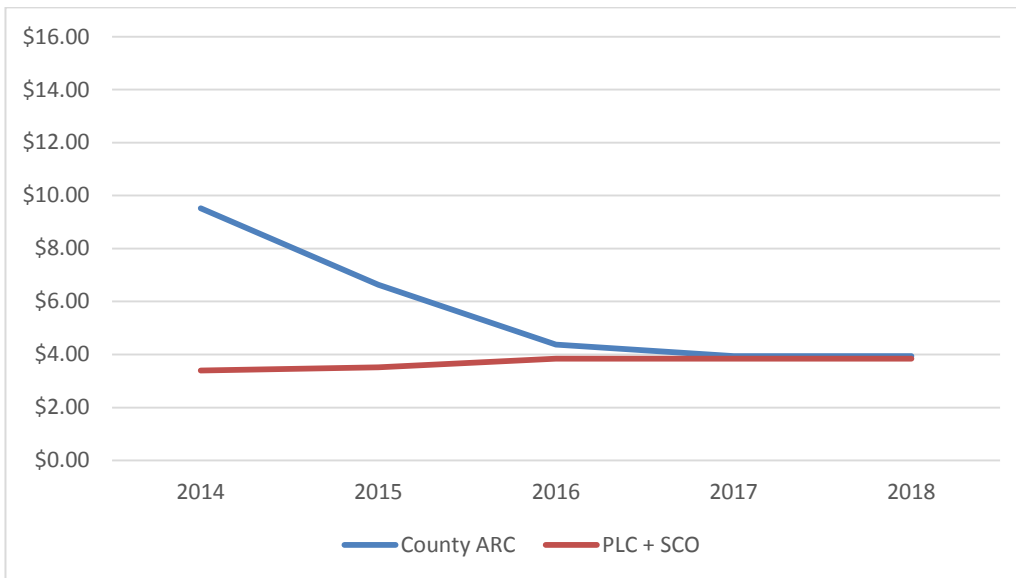


Figure 5. Mississippi CRD 30 Simulated Soybean Payment per Acre

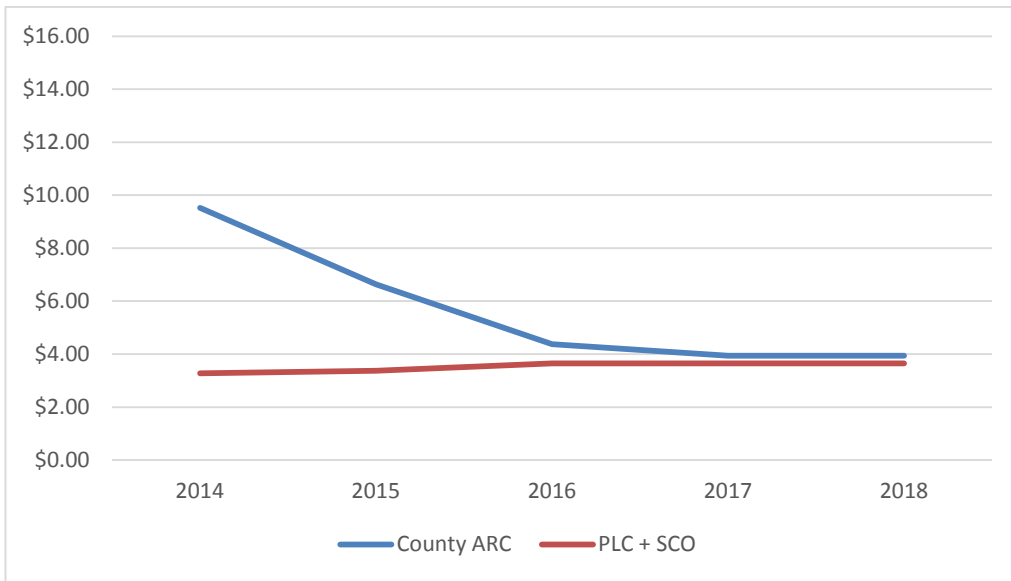


Figure 6. Mississippi CRD 40 Simulated Soybean Payment per Acre

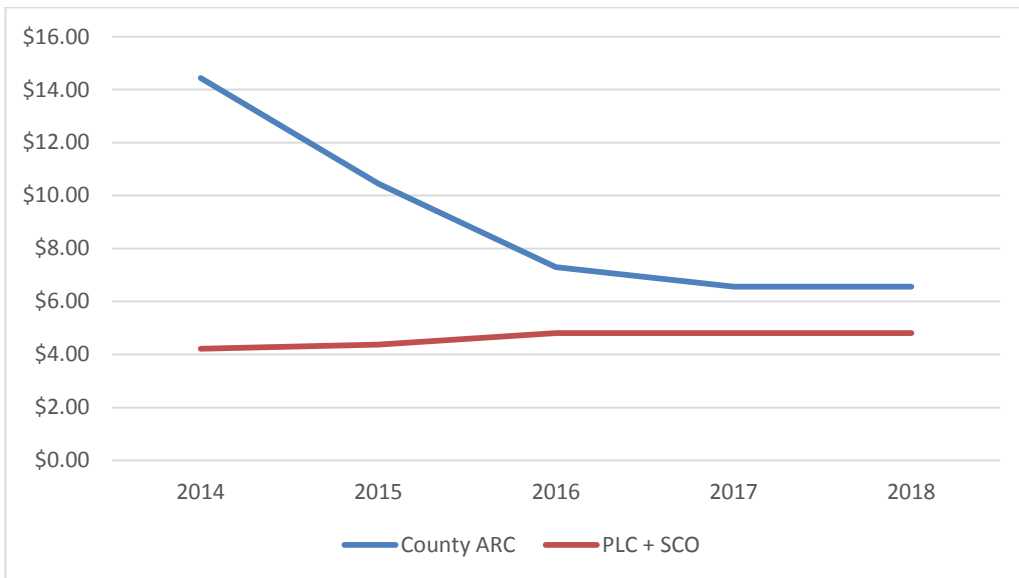


Figure 7. Mississippi CRD 50 Simulated Soybean Payment per Acre

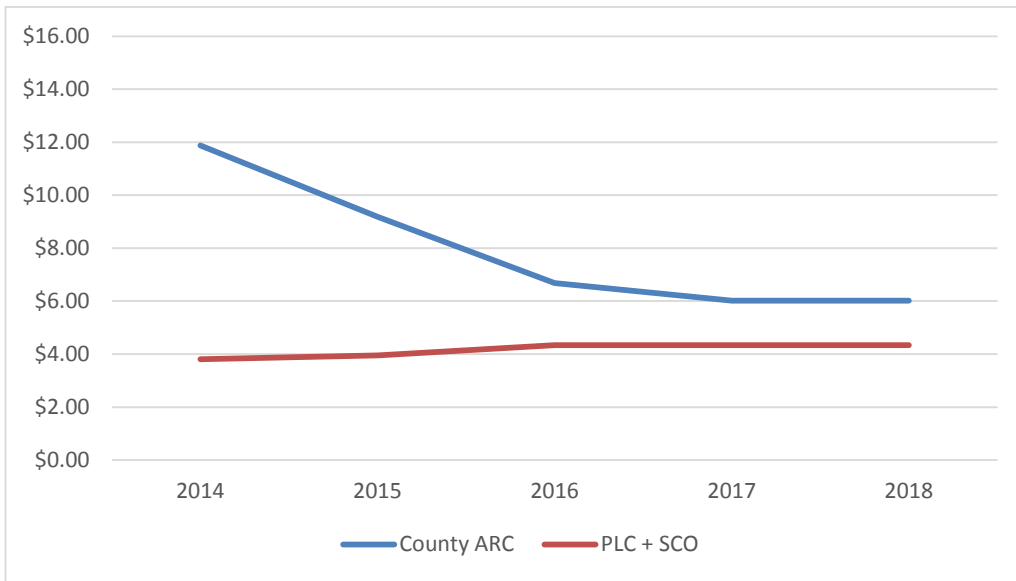


Figure 8. Mississippi CRD 60 Simulated Soybean Payment per Acre

