# An Example of Combining Margin Protection and Revenue Protection

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The new Margin Protection crop insurance policy can be purchased along with any COMBO product. Doing so will allow farmers to have "county" margin protection up to a 95% coverage level combined with farm-level coverage for revenues at lower coverage levels (see *farmdoc daily*, September 12, 2017). A specific illustration of combining Margin Protection with Revenue Protection for the years from 2000 to 2016 is provided in this article.

## The Sangamon County Example

The specific example is for corn in Sangamon County, Illinois. Estimated Margin Protection payments were simulated in a *farmdoc daily* article released on September 19, 2017. Table 1 comes from the September 19th article and shows payments for Margin Protection with the harvest price option (MP-hpo). Payments are shown in the table's final two columns. Three important points about these payments are:

- As more fully described in several *farmdoc daily* articles (September 8, 2017, September 12, 2017, and September 19, 2017), Margin Protection makes payments when the harvest margin is below a trigger margin. Calculation of margins depends on futures prices, county yields, expected county yields, and fixed input quantities. A farm's yields and costs do not enter into Margin Protection calculations.

- Margin Protection payments in Table 1 are for a 90% and 95% coverage levels given a 1.0 protection factor. Coverage levels range from 70% to 95% in 5% increments. Protection factors range from .8 to 1.2. A higher protection level results in higher insurance payments.

- The payments in Table 1 are calculated assuming that input costs are constant. This will not necessarily be the case.

**Table 1. Insurance Prices and Changes in Area Risk Protection (ARP) and Margin Protection for the Harvest Price Option Payments Given No Change in Prices of Costs, Corn, Sangamon County, Illinois[1]**

| Year | Insurance Prices[2] | | | Expected Yield | County Yield | ARP 90% | Margin Protection[3] | |
|------|------------------|----------------|---------|----------------|--------------|---------|----------------------|---------|
| | Projected MP-hpo | Projected ARP | Harvest | | | | 90% | 95% |
| | $/bu | $/bu | $/bu | Bu/acre | Bu/acre | $/acre | $/acre | $/acre |
| 2000 | 2.48 | 2.51 | 2.04 | 167.5 | 173.0 | 35 | 21 | 42 |
| 2001 | 2.34 | 2.46 | 2.08 | 161.6 | 160.2 | 34 | 7 | 26 |
| 2002 | 2.53 | 2.32 | 2.52 | 161.6 | 151.4 | 0 | 0 | 7 |
| 2003 | 2.54 | 2.42 | 2.26 | 165.1 | 193.0 | 0 | 0 | 0 |
| 2004 | 2.43 | 2.83 | 2.05 | 165.5 | 191.0 | 42 | 0 | 0 |
| 2005 | 2.59 | 2.32 | 2.02 | 170.1 | 168.3 | 21 | 57 | 79 |
| 2006 | 2.53 | 2.59 | 3.03 | 175.7 | 173.1 | 0 | 0 | 0 |
| 2007 | 3.48 | 4.06 | 3.58 | 175.2 | 197.2 | 0 | 0 | 0 |
| 2008 | 3.11 | 5.40 | 4.13 | 173.0 | 181.5 | 127 | 0 | 0 |
| 2009 | 6.10 | 4.04 | 3.72 | 178.4 | 187.5 | 0 | 282 | 336 |
| 2010 | 3.71 | 3.99 | 5.46 | 183.7 | 153.9 | 87 | 62 | 113 |
| 2011 | 4.46 | 6.01 | 6.32 | 186.3 | 164.1 | 31 | 23 | 81 |
| 2012 | 6.55 | 5.68 | 7.50 | 183.5 | 128.5 | 382 | 275 | 344 |
| 2013 | 6.51 | 5.65 | 4.39 | 181.4 | 196.1 | 85 | 202 | 261 |
| 2014 | 5.08 | 4.62 | 3.49 | 176.9 | 224.8 | 0 | 24 | 69 |
| 2015 | 4.03 | 4.15 | 3.83 | 182.2 | 182.7 | 0 | 0 | 0 |
| 2016 | 3.98 | 3.86 | 3.49 | 188.0 | 219.2 | 0 | 0 | 0 |
| 2017 | 3.74 | 3.96 | | | | | | |
| 2018 | 3.97 | | | | | | | |
| Average[4] | 3.79 | 3.82 | 3.64 | | | 50 | 56 | 80 |

[1] Payments are given for the coverage levels listed and a 1.0 protection factor.

[2] Insurance prices are based on Chicago Mercantile Exchange (CME) futures contracts. The December contract is used with prices averaged from August 15 to September 14 in the year before harvest for the Margin, February for the projected, and October for the Harvest.

[3] Margin Protection payments simulated given that costs do not change between the expected and harvest periods and that Margin Protection is purchased with the harvest price option

[4] Averaged from 2000 to 2016.

## Adding Revenue Protection to Margin Protection

Revenue Protection (RP), or any COMBO plan, can be combined with Margin Protection. The decision to combine RP with Margin Protection does not have to be made at the current time. RP can be purchased up to the March 15th sales closing date for COMBO products in the Midwest. Decisions about the Margin Protection policy must be made by September 30th.

Selecting RP with MP will have two impacts on Margin Protection:

- Payments from RP will reduce Margin Protection payments

- The Margin Protection premium will be reduced. The exact reduction depends on the projected price of the RP policy. Higher projected prices will result in more Margin Protection premium reductions. Projected prices for RP will not be known until the end of February.

An example of combining RP and Margin Protection is given for a specific farm in Sangamon County, Illinois. Actual yields are 135 bushel per acre in 2012, 205 in 2013, 240 in 2014, 202 in 2015, and 230 in 2016 (see Table 2). The average yield from 2012 to 2016 of 202 bushels per acre.

| | Actual Yield [1] | Guarantee Yield [2] | Projected Price [3] | Harvest Price [4] | RP Payment at a Coverage Level of [5]: | | | |
|---|---|---|---|---|---|---|---|---|
| Year | | | | | 70% | 75% | 80% | 85% |
| | bu/acre | bu/acre | $/bu | $/bu | $/acre | $/acre | $/acre | $/acre |
| 2000 | 149 | 162 | 2.51 | 2.04 | 0 | 1 | 21 | 42 |
| 2001 | 157 | 160 | 2.46 | 2.08 | 0 | 0 | 0 | 8 |
| 2002 | 149 | 167 | 2.32 | 2.52 | 0 | 0 | 0 | 0 |
| 2003 | 194 | 165 | 2.42 | 2.26 | 0 | 0 | 0 | 0 |
| 2004 | 185 | 173 | 2.83 | 2.05 | 0 | 0 | 12 | 37 |
| 2005 | 158 | 180 | 2.32 | 2.02 | 0 | 0 | 15 | 36 |
| 2006 | 169 | 176 | 2.59 | 3.03 | 0 | 0 | 0 | 0 |
| 2007 | 212 | 179 | 4.06 | 3.58 | 0 | 0 | 0 | 0 |
| 2008 | 177 | 188 | 5.40 | 4.13 | 0 | 30 | 81 | 132 |
| 2009 | 195 | 193 | 4.04 | 3.72 | 0 | 0 | 0 | 0 |
| 2010 | 179 | 193 | 3.99 | 5.46 | 0 | 0 | 0 | 0 |
| 2011 | 190 | 192 | 6.01 | 6.32 | 0 | 0 | 0 | 0 |
| 2012 | 135 | 197 | 5.68 | 7.50 | 22 | 96 | 170 | 243 |
| 2013 | 205 | 192 | 5.65 | 4.39 | 0 | 0 | 0 | 22 |
| 2014 | 240 | 190 | 4.62 | 3.49 | 0 | 0 | 0 | 0 |
| 2015 | 202 | 201 | 4.15 | 3.83 | 0 | 0 | 0 | 0 |
| 2016 | 230 | 202 | 3.86 | 3.49 | 0 | 0 | 0 | 0 |
| | | | Average RP Payments | | 1 | 7 | 18 | 31 |

**Table 2. Revenue Protection (RP) Payments for a Sangamon County Farm**

[1] Yields for a specific farm in Sangamon County, Illinois.

[2] Average of 10 historical yields adjusted for a trend yield of 1.85 bushels per acre

[3] Average of settlement prices of December Chicago Mercantile Exchange (CME) contract during February.

[4] Average of December CME contract during October.

[5] Equal maximum of zero or (coverage level x max(projected price, harvest price) x guarantee yield - actual yields x harvest price).

For the years from 2000 to 2016, the farm yield and county yield has a .89 correlation coefficient. This is close to the average of farms enrolled in Illinois Farm Business Farm Management (FBFM) in Sangamon County. Correlation coefficients for FBFM farms in Sangamon County range from .64 to .96. Farms with higher correlations will have a higher proportion of Margin Protection Payments offset by the RP policy.

RP payments from the policy from 2000 to 2016 are shown in Table 2. Payments are given for 70%, 75%, 80%, and 85% coverage levels. At an 85% coverage level, payments were received in seven of the seventeen years, with the highest payment of $243 per acre being received in 2012. Over the 2000 to 2016 period, average payments were $1 per acre at the 70% coverage level, $7 at the 75% coverage level, $18 at the 80% coverage level, and $31 at the 85% coverage level.

**Combining Payments**

Table 3 provides an example of combining payments from RP and Margin Protection. Table 3 first shows payments from the 95% MP-hpo policy given a 1.0 protection factor (see Table 1). These MP-hpo payments are the same as given in Table 1. Next, Table 3 shows RP payments at different coverage levels. These RP payments come from Table 2. The final four columns of Table 3 shows combined MP-hpo policy at 95% combined with RP at different coverage levels. These payments equal:

(Maximum of 0 or MP-hpo payment – RP payment) + RP payment.

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Note that the combined RP and MP-hpo will never be greater than the maximum of the MP-hpo payment or RP payment.  Two cases are of specific interest:

- The first is that the RP makes lower payments than the MP-hpo payment.  In this case, RP reduces the MP-hpo payment resulting in the combined payment equal to MP-hpo payment. Takes 2012 as an example.  In this case, MP-hpo would make a $344 per acre payment.  RP at the 85% level would have made a $243 payment (see Table 3).  The $243 RP payment reduces the MP-hpo payment to $101 per acre ($343 MP-hpo payment only - $243 RP payment alone). The combine payment than equals $344 ($243 RP payment + $101 MP-hpo payment), equal to the MP-hpo payment.  For the Sangamon County case farm, this situation occurs in 200, 2001, 2005, 2009, 2010, 2012, 2013, and 2014.

- The second is when MP-hpo is less than the RP.  In this situation, the MP-hpo is completely offset and the farmer receives the RP payment. For the Sangamon County case farm, this occurs in 2004 and 2008.

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| **Table 3. Margin Protection, Revenue Protection, and Combined Payments** | | | | | | | | | |
| | MP-hpo[1] | RP at coverage level of [2] | | | | MP-hpo 95% plus RP at coverage levels of [3] | | | |
| Year | 95% | 70% | 75% | 80% | 85% | 70% | 75% | 80% | 85% |
| 2000 | 42 | 0 | 1 | 21 | 42 | 42 | 42 | 42 | 42 |
| 2001 | 26 | 0 | 0 | 0 | 8 | 26 | 26 | 26 | 26 |
| 2002 | 7 | 0 | 0 | 0 | 0 | 7 | 7 | 7 | 7 |
| 2003 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 2004 | 0 | 0 | 0 | 12 | 37 | 0 | 0 | 12 | 37 |
| 2005 | 79 | 0 | 0 | 15 | 36 | 79 | 79 | 79 | 79 |
| 2006 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 2007 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 2008 | 0 | 0 | 30 | 81 | 132 | 0 | 30 | 81 | 132 |
| 2009 | 336 | 0 | 0 | 0 | 0 | 336 | 336 | 336 | 336 |
| 2010 | 113 | 0 | 0 | 0 | 0 | 113 | 113 | 113 | 113 |
| 2011 | 81 | 0 | 0 | 0 | 0 | 81 | 81 | 81 | 81 |
| 2012 | 344 | 22 | 96 | 170 | 243 | 344 | 344 | 344 | 344 |
| 2013 | 261 | 0 | 0 | 0 | 22 | 261 | 261 | 261 | 261 |
| 2014 | 69 | 0 | 0 | 0 | 0 | 69 | 69 | 69 | 69 |
| 2015 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 2016 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Avg Paymen | 80 | 1 | 7 | 18 | 31 | 80 | 82 | 85 | 90 |
| Farmer-paid premium[4] | 36 | 4 | 6 | 12 | 22 | 39 | 40 | 44 | 51 |

[1] Taken from Table 1.

[2] Taken from Table 2.

[3] Equals max(0, MP-hpo payment - RP payment) + RP payment.

[4] MP and MP reductions taken from marginProtection.com.  RP payments estimated using 2017 parameters.

Due to the RP payments reducing Margin Protection payments, the combined payments from Margin Protection and RP will be less than the sum of the two insurance programs.  Take the RP policy at an 85% coverage level as an example.  For the years from 2000 to 2016, the average payment for the MP-hpo at the 95% coverage level is $80 per acre and the RP at the 85% coverage level is $31 per acre (see average payment row in Table 3).  Combining the insurance programs results in a $90 average payment (see table 3).  In this case, adding an 85% coverage level to an MP-hpo product adds only $10 per acre

more than the stand-alone program.  For the different RP coverage levels, the additional payment from combined the two programs for the period from 2000 to 2016 is.

- $0 per acre for a 70% RP coverage level ($80 combined average payment - $80 MP-hpo payment)

- $2 per acre for a 75% RP coverage level ($82 combined average payment - $80 MP-hpo payment)

- $5 per acre for a 80% RP coverage level ($85 combined average payment - $80 MP-hpo payment)

- $10 per acre for a 85% RP coverage level ($90 combined average payment - $80 MP-hpo payment)

The combined payments may not always cover the additional premium costs from combining the program.  For example, the 95% MP-hpo product has a farmer-paid premium cost of $36 per acre (see the final row of Table 3).  At the current time, the MP-hpo and RP at the 85% policies have a combined premium of $51 per acre.  In this example, the combined policy has $15 per acre additional premium costs ($51 combined premium - $36 MP-hpo premium) while the combined policy only gained $10 in average payments from 2000 to 2016 ($10 = $90 combine payments - $80 MP-hpo payments)

This farm has yields that are highly correlated with the county yields.  Farms with lower correlations will have fewer of the MP-hpo payments offset by county payments.  Also, note that the RP and MP-hpo reductions are not known for 2018.  These will be known at the end of February when the projected price for February is known.

**The Tradeoff**

Farmers can use Margin Protection to obtain coverage at a high level based on county yields and changes in futures markets.   Combining Margin Protection and Revenue Protection will allow farmers also to obtain farm-level protection.  Doing so has relatively high farmer-paid premiums.

**References**

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