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Harvest Price Option: Historical Assessment

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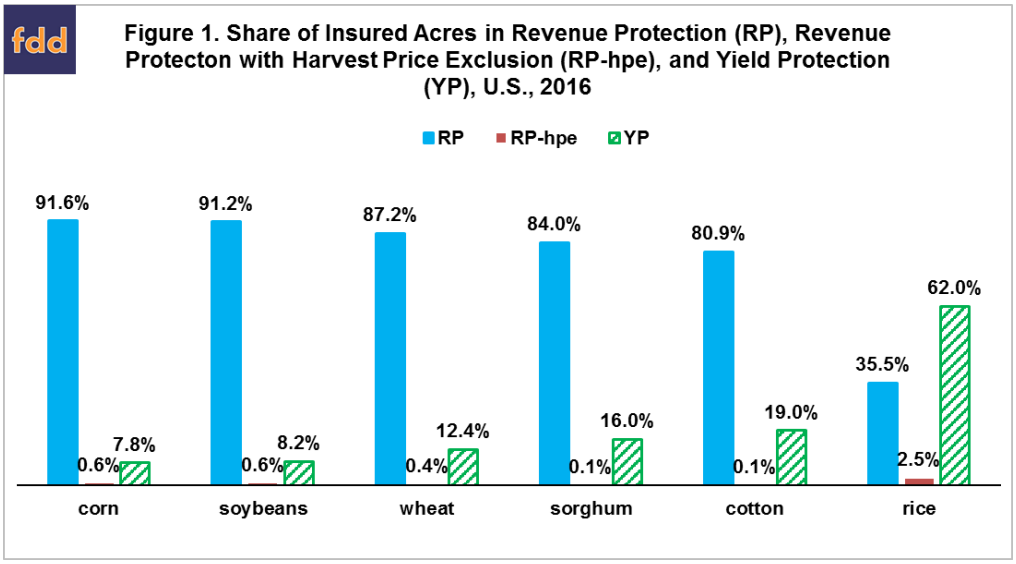
HPO (harvest price option) crop insurance is popular with farmers but there have been several attempts to eliminate public subsidies for it. This article assesses HPO's historical performance in terms of its design mechanism that replaces the projected price with the harvest price if the harvest price is higher. Understanding performance of this mechanism is important to an informed understanding of HPO. Substituting a higher harvest price for the projected price increases insured coverage, one feature likely leading to HPO's popularity with farmers. In addition, using the projected price to calculate insured liability understates insured liability with HPO insurance.

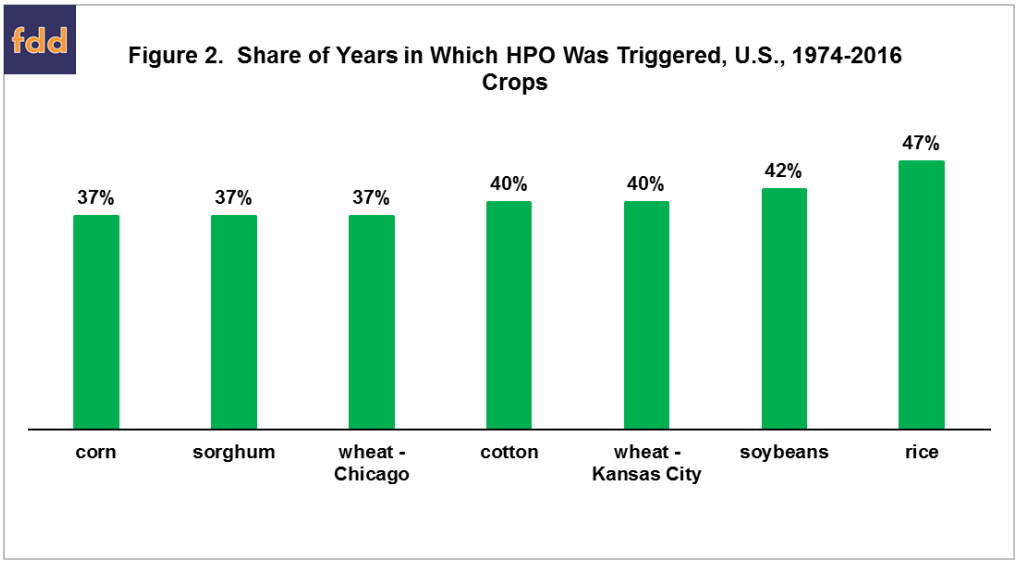
HPO Insurance Payment Formula: Payment formula for HPO insurance is: MAX[$0, coverage level times {(projected yield times MAX(projected price, harvest price)) minus (harvest yield times harvest price)}].The first maximum function means payment must be positive. The second changes the price that determines the covered revenue when the price at harvest is higher than the price projected prior to planting. HPO insurance makes a payment when revenue at harvest is less than the covered revenue. Covered revenue depends in part on the coverage level elected by the individual farm. Coverage levels vary from 50% to 85% in 5 percentage point increments.

Use of HP: HPO use is high among farmers. Revenue Protection (RP) has HPO while RP with harvest price exclusion (RP-hpe) does not. The other major farm level insurance product is YP (Yield Protection) yield insurance. For corn in 2016, 92% of acres insured with these 3 insurance types were in RP having HPO (see Figure 1). RP-hpe was elected for less than 1% of corn acres. The remaining 7% of corn acres were insured with YP. Election of RP is overwhelming. A similar pattern exists for soybeans (91% RP use), wheat (87% RP use), sorghum (84% RP use), and cotton (81% RP use). Rice has the lowest use of RP at 35%. RP-hpe is used even less (5%) for rice. YP is the most often used insurance type for rice

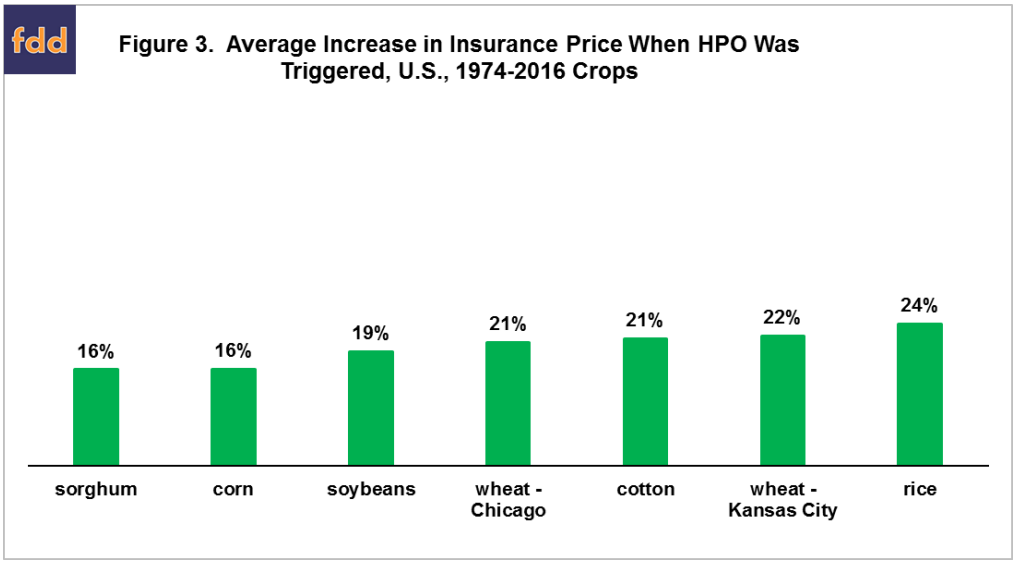
(62%). Farmers pay a higher premium to obtain HPO protection. Their widespread use of HPO indicates that they value it.

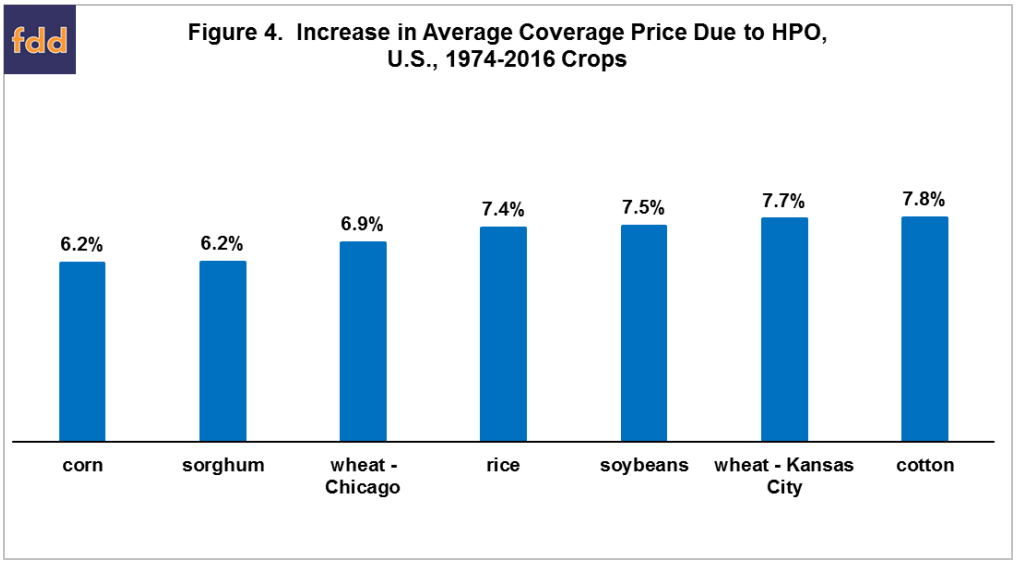


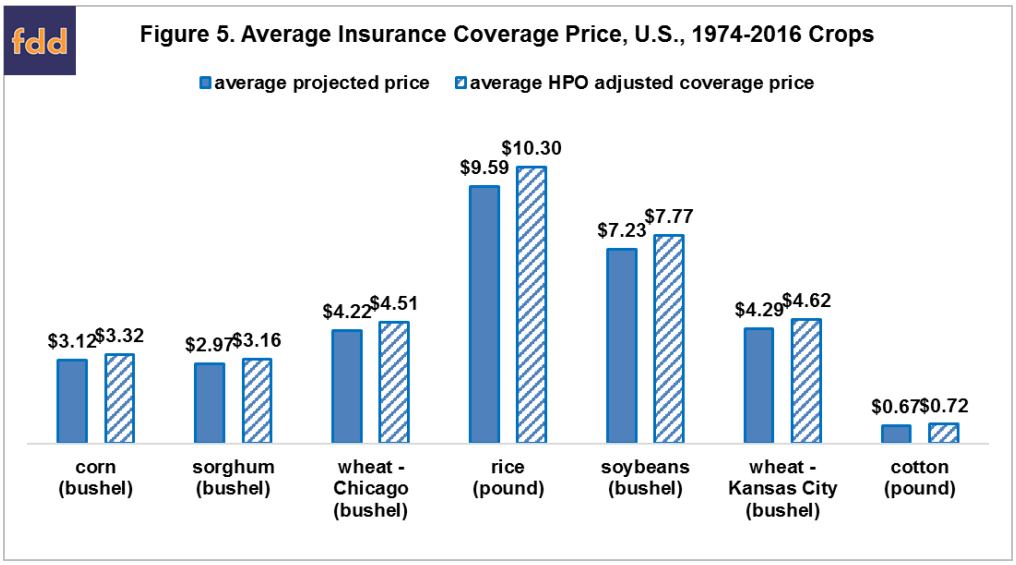
Incidence of HPO: Projected and harvest insurance prices were collected for 1974-2016 corn, cotton, rice (starts with 1987), sorghum, soybeans, and two wheat contracts: Chicago and Kansas City. Sources were a data set compiled by Art Barnaby of Kansas State University and the website of the U.S. Department of Agriculture (USDA), Risk Management Agency. Insurance price at harvest exceeded the projected insurance price in 37% (corn, sorghum, Chicago wheat) to 47% (rice) of the available years (see Figure 2).



HPO's Impact on Coverage Price: In the years when HPO was triggered, the harvest insurance price averaged 16% (corn and sorghum) to 24% (rice) more than the projected price (see Figure 3). Replacing the projected price with the higher harvest price increases the coverage price. When averaged across all years in the data set, HPO increased the average coverage price by 6.2% for corn and sorghum to 7.8% for cotton (see Figure 4). Figure 5 contains the average coverage prices using HPO and using only projected prices.







HPO's Impact on Payments: It is important to note that payment by HPO insurance requires that yield must decline, with the amount of decline dependent on the coverage level elected by the farm. Thus, the impact of HPO on payments depends on the joint occurrence of a higher insurance price at harvest and a

harvest yield that is less than the guaranteed yield. Often actual yields on farms will be below guarantee yields when there are widespread yield shortfalls across the U.S. A widespread yield shortfall in the U.S. provides a potential impetus for the harvest price to be above the projected price. To illustrate, projected yield for a crop was set equal to that year's in-sample linear trend yield estimate (see data note 1). For corn, U.S. yield at harvest was less than the linear trend yield in 75% of the years that harvest price was higher than projected price. This share for the other crops was 50% for rice; 53% for cotton; 56% for wheat-Chicago; 59% for wheat-Kansas City; 61% for soybeans; and 63% for sorghum. This relationship provides the "marketing" rationale for HPO as it provides protection for farmers who forward sell crops and for farmers who feed their crops and would need to buy grain at a higher price. HPO provides a replacement value for the crop in these situations.

Summary Discussion

- Historically, HPO insurance has been justified as protection for farmers who forward sell crops and for livestock producers who produce their own crops. This perspective presents HPO as a replacement value feature when yield declines and price increases from planting to harvest.

- While impossible to know until harvest if the harvest price will be higher, insurance price at harvest has exceeded the projected insurance price in 37% to 47% of years since 1974 for the crops examined in this study.

- Triggering HPO increases the insurance coverage price for that crop year. Averaged across all years since 1974, HPO increased the average coverage price by 6.2% to 7.8% for the crops examined in this study.

- By overwhelmingly electing HPO protection and paying a higher premium for it, farmers have indicated that they value HPO. Reasons include the increasing coverage offered by HPO and the replacement value for forward sales and farm-grown feed needs. Not all farms make forward sales and not all farms feed livestock; however, all farms have the potential to benefit from the increased coverage offered by HPO. Other reasons for its popularity may also exist.

- The HPO insurance mechanism implies that using the projected insurance price to calculate insured liability understates insured liability provided by HPO insurance.

- From a historical perspective, HPO was the first of what has been a series of policy initiatives to increase insured coverage by means other than by electing a higher coverage level. These initiatives include trend-adjusted yield, minimum yield value, and yield exclusion.

Data Notes: (a) Data for production and acres are from *Quick Stats* (U.S. Department of Agriculture, National Agricultural Statistics Service). (b) Yield per planted acre for cotton, rice, soybeans, and wheat equals crop year production divided by acres planted to the crop in the crop year. For corn and sorghum, production is divided by planted acres minus acres harvested for silage. This calculation assumes all non-harvested corn and sorghum acres were intended for grain production. (c) A linear time-trend regression is estimated for each crop using U.S. yield per planted acre for the 1974 through 2016 crop years. The estimated regression equation is used to derive the linear trend-line yield for each year between 1974 and 2016. These within sample regression derived trend-line yields are used as the crop's expected yields.

References

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