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## Resolution of U.S. Crop Year Price Uncertainty and Its Implications for the 2014 Farm Program Decision

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The 2014 farm bill gives Farm Service Agency (FSA) farm owners a 1-time decision to elect their Title 1 crop program for the 2014 through 2018 crop years. FSA has not yet released the sign up dates, but sign up likely will not end until sometime in 2015. By this time, farmers will have good information on 2014 crop yields. The related question, "How much uncertainty about 2014 U.S. crop year prices will have been resolved by the time sign up ends?" is examined in this article. U.S. crop year prices are used to determine payments by the Agriculture Risk Coverage - county (ARC-CO), ARC - Individual (ARC-IC), and Price Loss Coverage (PLC) programs.

### Data

This study uses U.S. monthly cash prices and U.S. crop year prices for 7 major program crops: barley, corn, oats, rice, sorghum, soybeans, and wheat. The prices are from the U.S. Department of Agriculture (USDA), National Agricultural Statistics Service (NASS) Quick Stats website, [http://www.nass.usda.gov/Quick\\_Stats/](http://www.nass.usda.gov/Quick_Stats/). The study period covers the 1974 through 2005 crop years, an extended period of what are called stationary prices. Stationary prices have no long term trend up or down and have stable price variation. Nonstationarity in prices can lead to an overstatement of the resolution of price uncertainty. By crop, U.S. crop years are June 1 through May 31 for barley, oats, and wheat; August 1 through July 31 for rice; and September 1 through August 31 for corn, sorghum, and soybeans.

### Study Perspective

The study examines how much of the year-to-year variation in U.S. crop year price is explained by the year-to-year variation in the average of monthly U.S. prices since the crop year began. Monthly U.S. corn prices for September, October, and November are used to illustrate the analysis. The prices for these three months are averaged for each crop year. A correlation coefficient is estimated between the September through November average monthly price and the crop year average price. The correlation coefficient is squared to obtain the share of year-to-year variation in the U.S. corn crop year price that is

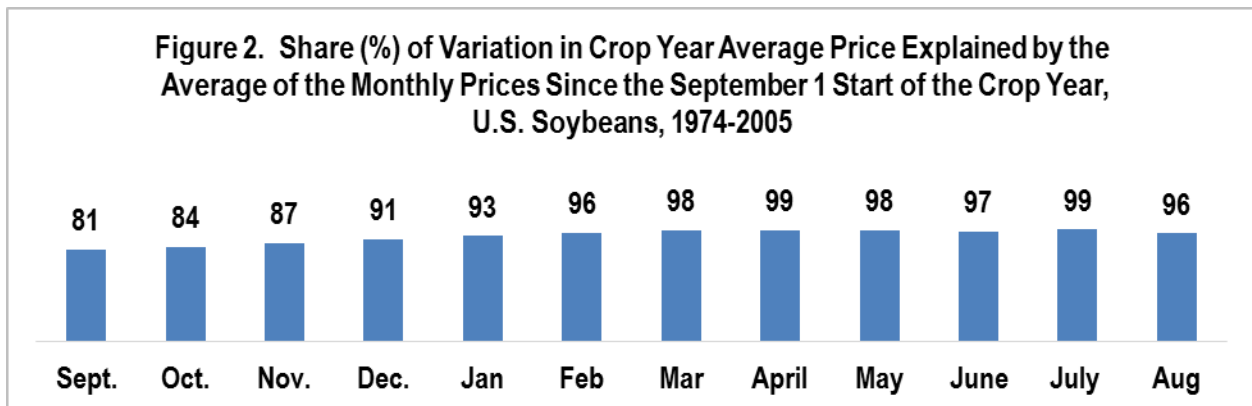
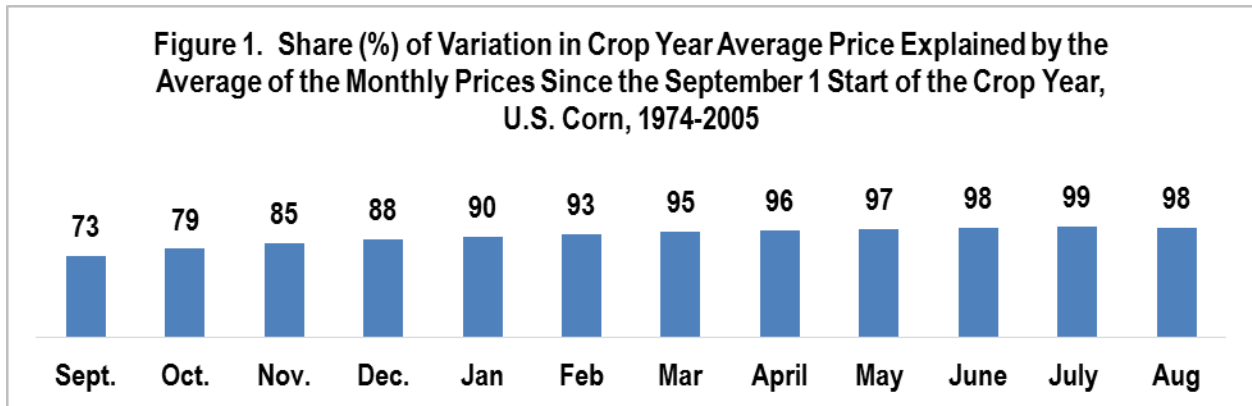
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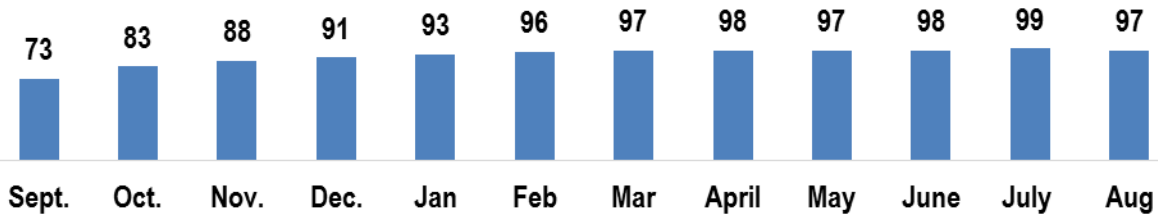
explained by the year-to-year variation in the September through November average monthly price. These calculations are repeated for each month and each crop. Share of variation explained can range from 0% to 100%, with 0% saying no variation is explained and 100% saying all variation is explained. In terms of this study, 0% means no crop year price uncertainty is resolved while 100% means all crop year price uncertainty is resolved.

### Resolution of Crop Year Price Uncertainty

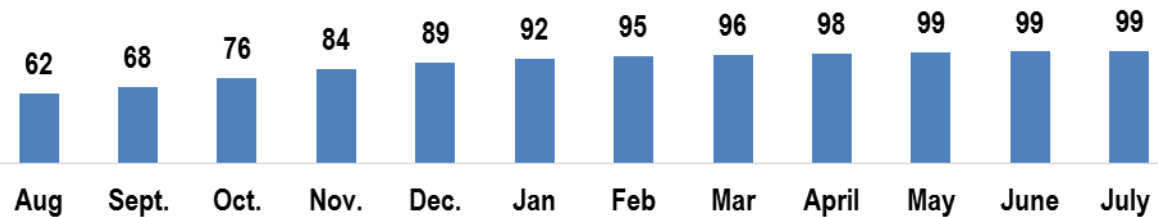
Figures 1 through 7 present the month-by-month resolution of crop year price uncertainty for corn, soybeans, sorghum, rice, wheat, barley, and oats, respectively. The pattern is similar for each crop. The share of year-to-year variation in U.S. crop year price explained is lowest for the first month of the crop year, then steadily increases so that by the mid-point of the crop year over 90% of the annual variation in crop year price is explained by the average of the monthly prices through month 6 of the crop year. In other words, price uncertainty is highest at the start of the crop year, then declines as more and more information becomes known about supply and demand, hence price, of the crop. By the middle of the crop year, the degree of uncertainty remaining about U.S. crop year price is below 10% (variation explained exceeds 90%).



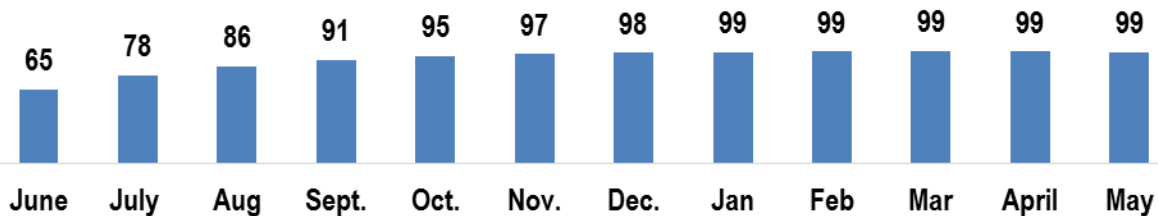
**Figure 3. Share (%) of Variation in Crop Year Average Price Explained by the Average of the Monthly Prices Since the September 1 Start of the Crop Year, U.S. Sorghum, 1974-2005**



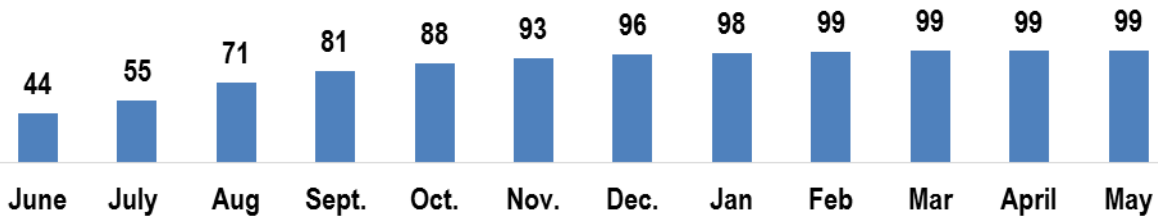
**Figure 4. Share (%) of Variation in Crop Year Average Price Explained by the Average of the Monthly Prices Since the August 1 Start of the Crop Year, U.S. Rice, 1974-2005**



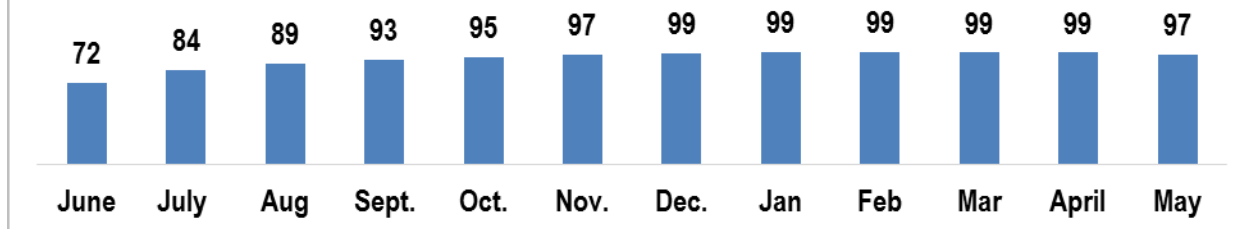
**Figure 5. Share (%) of Variation in Crop Year Average Price Explained by the Average of the Monthly Prices Since the June 1 Start of the Crop Year, U.S. Wheat, 1974-2005**



**Figure 6. Share (%) of Variation in Crop Year Average Price Explained by the Average of the Monthly Prices Since the June 1 Start of the Crop Year, U.S. Barley, 1974-2005**



**Figure 7. Share (%) of Variation in Crop Year Average Price Explained by the Average of the Monthly Prices Since the June 1 Start of the Crop Year, U.S. Oats, 1974-2005**



Excluding barley, at least 60% of year-to-year variation in U.S. crop year price is explained by the price during the first month of the crop year. This share may seem large, but can be explained by the relatively large market presence of the U.S. in each of these crops. In other words, weather in the U.S. during the growing season and thus the size of the U.S. crop is a significant pricing factor. By the first month of the crop year, size of the U.S. crop is known with a notable degree of accuracy because of the public information provided by USDA's crop production reports. In short, at least 40% and usually more than 70% of the uncertainty over the U.S. crop year price for the crops examined in this study is resolved by the first month of the crop year.

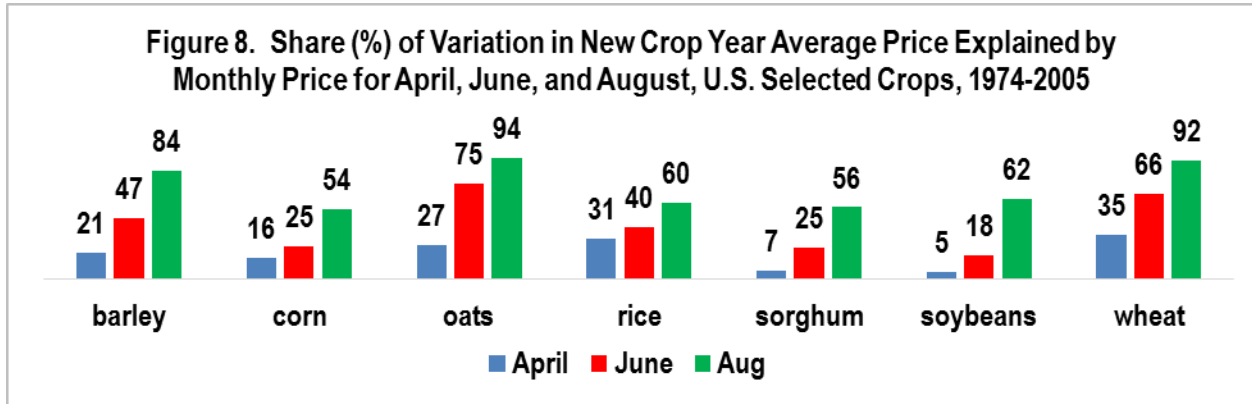
The share never equals 100%. The reason is that the U.S. crop year price is a weighted, not simple, average price. Specifically, the monthly prices are weighted by the share of the total crop sold during the month. However, this share is not known with certainty until after the crop year ends. While the shares historically sold in a month could be used, a simple average of monthly prices since the start of the crop year is used in this study because it is a method anyone can use.

### Implications for 2014 Farm Program Sign Up

- Whenever the farm program sign up period ends, FSA farm owners will have a very good idea of 2014 crop year prices and yields for the crops examined in this article. Thus, FSA farm owners will have a fairly accurate estimate of payments by the various program choices for the 2014 crop year.
- A decision strategy question becomes: because so much will be known about 2014 crop year payments, will FSA farm owners want to assign more importance to the relatively well known payments for 2014 than to the more uncertain payments for the 2015 through 2018 crop years?
- FSA has historically had a single final sign up date that applied to all crops. The findings of this study suggest that discussion is needed over whether this is appropriate for the 2014 farm program sign-up. The significance of this issue is framed by Figure 8. It presents the share of variation in U.S. crop year price explained by the monthly prices for April, June, and August. These monthly prices are before or during the early part of the crop year. In essence, Figure 8 is a calendar month as opposed to crop year perspective on the resolution of price uncertainty. The share of explanation begins to increase with increasing rapidity once the calendar passes April for barley and especially wheat and oats (in other words, the degree of uncertainty begins to decline with increasing rapidity after April). This is not surprising given the planting and harvest dates for these three crops. The policy implication is that having a final sign up date after April 2015 will begin to provide substantial information to FSA farm owners with barley and especially wheat and oats base acres concerning payments for not just 2014 but also for 2015. The advantage begins to decline during July and August as the other crops move closer to harvest. As Figures 1 through 7 illustrate, little advantage exists among crops by the beginning of the calendar year.

Please note that May and July are not presented in Figure 8 to facilitate the graphical presentation. The values for these two months lie between the values for their surrounding months.

- In conclusion, policy is not legislation; it is the implementation of legislation through regulations. Final farm program sign up date is a regulation issue that can have important implications for which farm program is selected and have differential impacts across crops.



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