Risk and the Farm Bill Participation Decisions for ARC and PLC

James W. Richardson
Regents Professor and Co-Director, AFPC
Texas A&M University

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What is Price Risk?

• We all have expectations of what price will be in 2014 for wheat

• We will all be wrong! Because we do not know what will happen to US demand, Exports, or Exchange Rates over the rest of the year
  – These are only a few of the forces of risk beyond our ability to forecast with accuracy

• If we are not certain about 2014 price, how can we forecast 2015, 2016, 2017, 2018 for ARC and PLC decisions?
Historical Price Risk for Wheat?

Marketing Year Average Wheat Price

Wheat Price Risk About Trend ($/bu)
Simulating Price and Yield Risk?

- Best alternative to a point forecast of price is a probabilistic forecast using historical price risk.
- In the case of ARC yields are also risky.
- Decision aids use simulation to test the PLC and ARC payments under risky prices.
  - NAAFP decision tool incorporates national price risk and county yield risk.
  - Historical period to incorporate risk is 1982-2013.
So What Does This Mean to Users?

- NAAFP Decision Aid asks for “your annual average price expectations for 2014-2018”
- Decision Aid uses your Average Prices as the center of price distributions based on historical price risk
- Assume an average wheat price of $6.50 & $5.50 Ref Price
How Does Price Risk Affect PLC?

PLC Payment\(_t\) = \max[(\text{Ref Price} - \text{Mkt Yr Avg Price}) \text{ or Zero}] \times 0.85 \times \text{Base Acres} \times \text{PLC Payment Yield}

Mkt Yr Avg Price is random about an expected price

SO RISK MATTERS IN THE CALCULATION OF PLC PAYMENTS
Wheat Price Risk Continued

- Given the mean wheat price of $6.50
- 23% chance of Marketing Year Average Price < Ref Price
How Does Risk Affect ARC-CO?

Actual County Revenue = Actual County Yield * \( \text{Max( Natl MYAPrice or Loan Rate)} \)

ARC Rev Benchmark = (US Oly Avg MYAPrice\textsubscript{5 years} * County Oly Avg Yield\textsubscript{5 years})

- If any of the 5 years of prices are lower than Reference Price then replace with the Reference Price.
- If the actual county yield is < 70% of T-yield replace with the T-yield.

ARC Guarantee = 0.86 * ARC Rev Benchmark

\( \text{ARC-CO Payment}_t = \text{Min}[\text{(ARC Guarantee - Actual County Revenue)} \text{ or } 10\% \text{ Benchmark}] \times \text{Base Acres} * 0.85 \)

RISK REALLY MATTERS FOR ARC CALCULATIONS
Demonstration of Risk?

- Two Excel simulation models
- Demonstrate how expected prices and the historical risk affect stochastic prices in Decision Aid
- Demonstrate how stochastic prices affect PLC and ARC Payments for a 100 base acre corn farm in California