The Latest Approaches to Weather-Related Agricultural Disasters

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Preface

- Low probability- severe impact weather events are one of the hallmarks of ag production

- Last Year’s hurricane strike on Florida exemplifies this phenomenon
  - Flood insurance (government)
  - Ad hoc and standing disaster programs (government)
  - Property and casualty insurance (private)
A Few More Preliminary Thoughts

• Why do farmers behave as they do?
  – Difficulty assessing low probability events
  – May over or under-estimate risk

• Pricing risk
  – Accurately pricing agricultural weather risk is HARD!
  – Priced risk management may under or over estimate the risk
An inherent tension

• More years of data the accurate the probability of the event
• But,
  – Is weather stationary?
  – Is the response function stationary?

Agricultural Crop Risk Spectrum of Risk
Independence

Insurance

Independent risk

Positively Correlated risk

Futures Markets

Hail
Yield
Revenue
Price
Options

• Government Ex Ante (standardized terms, funds, policy certainty, timely indemnification, costly infrastructure)
  – Standing Disaster
  – Insurance

• Government Ex Post (ad hoc terms, funding uncertainty, policy uncertainty, without the infrastructure cost)
  – Ad hoc Disaster

• Private risk management (standardized terms, funds, policy certainty, timely indemnification, costly infrastructure, customer pays full cost)
  – Insurance
  – Cat bonds, index products, and other financial instruments
Modern Risk Management

The revolutionary idea that defines the boundary between modern times and the past is the mastery of risk....Risk management guides us over the vast range of decision making from allocating wealth to safeguarding public health, from waging a war to planning a family, from paying insurance premiums to wearing a seatbelt; from planting corn to marketing cornflakes.

Peter Bernstein in “Against the Gods: The Remarkable Story of Risk
An Example

Munich RE

Swiss Re

PartnerRe

The Hanover Insurance Group

Berkshire Hathaway Group, Reinsurance Division
CROP INSURANCE
Why good loss experience? Good weather, risk pool, production systems, or better crop insurance program

RMA Aggregate Loss Ratio 1980-2016

- 1980-1995 Avg. = 1.48
- 1996-2015 Avg. = 0.85

Year

- Loss Ratio
- 80-95 AVG
- 96-16 AVG
- Expon. (Loss Ratio)
## RMA Market Penetration

<table>
<thead>
<tr>
<th>Principal Crops</th>
<th>Other Field Crops</th>
<th>Fruits and Nuts</th>
<th>Vegetables</th>
</tr>
</thead>
<tbody>
<tr>
<td>93%</td>
<td>88%</td>
<td>54%</td>
<td>79%</td>
</tr>
</tbody>
</table>

Source: RMA Portfolio Analysis – Market Penetration 2013
## Crop Insurance Subsidy Levels

<table>
<thead>
<tr>
<th>Coverage Level</th>
<th>Basic &amp; Optional Subsidy %</th>
<th>Enterprise Unit Subsidy %</th>
<th>SCO Subsidy</th>
<th>STAX Subsidy %</th>
</tr>
</thead>
<tbody>
<tr>
<td>50%</td>
<td>67%</td>
<td>80%</td>
<td>65%</td>
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<tr>
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<td>85%</td>
<td>38%</td>
<td>53%</td>
<td>65%</td>
<td>80%</td>
</tr>
</tbody>
</table>
2017 Florida Producer Paid Premium as a Percent of Crop Value (National average 2.53%)
2017 Florida Crop Insurance losses
Integrating Data Sources for Improved Estimates

AIR Worldwide

The Florida reports post- Irma
Developing Consistent Ex Post Damage Estimation Procedure

• What are the best practices?
• What resources does one turn to when asked to do a damage assessment?
• Consistency of estimates across states and agencies
• The SAEA conversation
Final Thoughts

• What is the right mix of government program and private risk management?

• What research will make damage assessment faster and more accurate?
  – “Redesigning Farm Policy in an Era of Digital Agriculture,” New AFRII grant
  – Damage functions, etc.

• Farm Bill Title I and Title XI