Yield Risk, Price Risk, and Political Risk: How Safe is Your Safety Net?

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If we’ve learned from the past, …

- 1933: AAA Agricultural Adjustment Act
- 1936: AAA Agricultural Adjustment Act
- 1948: AA Agricultural Act
- 1949: AA Agricultural Act
- 1954: AA Agricultural Act
- 1956: AA Agricultural Act
- 1958: AA Agricultural Act
- 1961: AA Agricultural Act
• 1965: FAA Food and Agriculture Act
• 1970: AA Agricultural Act
• 1973: ACPA Agriculture and Consumer Protection Act
• 1977: FAA Food and Agriculture Act
• 1981: FAA Food and Agriculture Act
• 1985: FSA Food Security Act
• 1990: FACTA Food, Agriculture, Conservation, and Trade Act
• 1996: FAIR Food and Agriculture Improvement and Reform Act
• 2002: FSRIA Farm Security and Rural Investment Act
Every program being used today has been used before, in some form or another:

- **PFC payments:**
  - 1963-1973 support payments
- **Counter Cyclical Payments:**
  - 1974-1995 deficiency payments
  - 1996-2002 MLA payments
- **Loan Program:**
  - 500 B.C. - present
What is not being used today?

- Set-aside requirements
- Annual paid land diversions
- Loan programs and CCC purchases that take large quantities off the market
- Large export subsidies
What are we trying to accomplish with the Farm Bill?

• Three popular political answers:
  – Stabilize farm income (reduce risk)
  – Raise farm income
  – Affect farm structure

• Let’s consider these criteria for Illinois corn and soybeans.
Backdrop

• 1974 crop through 2001 crop (excluding 1983) in nominal dollars for Illinois:
  – Average market revenue/acre before government payments
    • CORN = $263
    • SOYBEANS = $215
  – Accounting for non-land variable costs, average net market revenue/acre
    • CORN = $129
    • SOYBEANS = $136
• How much “risk” is associated with the average incomes per acre?
  – Corn: $41
  – Soybeans: $26
  – Corn and Soybeans: $31

• Decomposition of this risk shows that it is dominated by “price risk.”
## Sources of crop revenue risk

|          | **Corn** | | **Soybeans** | | |
|----------|----------|----------|----------|---|---|---|
|          | **Price Effect** | **Yield Effect** | **Price-Yield Correlation** | **Price Effect** | **Yield Effect** | **Price-Yield Correlation** |
| **Farm** | 67.4%    | 32.6%    | -42.5%   | 65.3%    | 34.7%    | -38.0%   |
| **State**| 74.6%    | 25.5%    | -51.2%   | 77.5%    | 22.5%    | -40.8%   |

- Additional diversification effect from combining corn and soybeans reduces risk by 23.6% at the farm level, and 14% at the state level relative to the average of individual crop risks.
- How much of the risk is abated through farm programs?
Corn and Soybean Farm Revenue Components

$/Acre

- $10

$10

$40

$90

$140

$190

Year


- PFC Payments
- Div + Def + Loan + MLA
- Farm Market Rev.
## Per acre effects of corn support

<table>
<thead>
<tr>
<th></th>
<th>Without support</th>
<th>With price support</th>
<th>Change</th>
</tr>
</thead>
<tbody>
<tr>
<td>Average Income</td>
<td>$129</td>
<td>$152</td>
<td>$23</td>
</tr>
<tr>
<td>Risk</td>
<td>$41</td>
<td>$30</td>
<td>-$11</td>
</tr>
</tbody>
</table>
## Per acre effects of soybean support

<table>
<thead>
<tr>
<th></th>
<th>Without support</th>
<th>With price support</th>
<th>Change</th>
</tr>
</thead>
<tbody>
<tr>
<td>Average Income</td>
<td>$136</td>
<td>$143</td>
<td>$7</td>
</tr>
<tr>
<td>Risk</td>
<td>$26</td>
<td>$22</td>
<td>-$4</td>
</tr>
</tbody>
</table>
Two periods of large support in 2002 $

- 1986-1988:
  - $86 per corn acre

- 1999-2001:
  - $70 per acre w/o AMTA payments
  - $106 per acre with AMTA payments

- Is it fair to compare these levels of support?
  - Adjusted to an acre basis
  - Adjusted for set-aside costs
  - Adjusted for inflation
  - NOT adjusted for
    - Effects of government program on market price and production
    - Technological changes leading to different sized farm units
If a typical farm in 1970 is 400 acres, what is its equivalent in 2000?

<table>
<thead>
<tr>
<th>Soybean Acres</th>
<th>Corn Acres</th>
<th>Farm Acres</th>
<th>Growth in farm ac/yr</th>
</tr>
</thead>
<tbody>
<tr>
<td>200</td>
<td>200</td>
<td>400</td>
<td>0</td>
</tr>
<tr>
<td>500</td>
<td>500</td>
<td>1,000</td>
<td>20</td>
</tr>
<tr>
<td>750</td>
<td>750</td>
<td>1,500</td>
<td>36.66</td>
</tr>
<tr>
<td>1,000</td>
<td>1,000</td>
<td>2,000</td>
<td>53.33</td>
</tr>
<tr>
<td>1,250</td>
<td>1,250</td>
<td>2,500</td>
<td>70</td>
</tr>
<tr>
<td>1,500</td>
<td>1,500</td>
<td>3,000</td>
<td>86.66</td>
</tr>
</tbody>
</table>
## Support under different growth rate assumptions

<table>
<thead>
<tr>
<th>Growth per year</th>
<th>2000 Farm total ac</th>
<th>1987 $ per corn ac</th>
<th>2000 W/O AMTA $ per corn ac</th>
<th>2000 With AMTA $ per corn ac</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>400</td>
<td>$16,000</td>
<td>$14,000</td>
<td>$21,200</td>
</tr>
<tr>
<td>20</td>
<td>1,000</td>
<td>$31,820</td>
<td>$35,000</td>
<td>$53,000</td>
</tr>
<tr>
<td>53</td>
<td>2,000</td>
<td>$55,900</td>
<td>$70,000</td>
<td>$106,000</td>
</tr>
<tr>
<td>87</td>
<td>3,000</td>
<td>$80,840</td>
<td>$105,000</td>
<td>$159,000</td>
</tr>
</tbody>
</table>

2000 Farm total ac values reflect support under different growth rate assumptions with and without AMTA.
Looking back over three decades

• In 2002 $:
  – Income support, on average, has been about $23 per corn acre with a risk reduction effect of $11.
  – The same level of risk reduction is achieved through soybean rotation.

• The “large” recent support payments are:
  – About the same level in real dollars per acre as in 1986 through 1988
  – Much larger on a “per farm” basis, depending on how the farm unit is defined
How does present program stack up?

• Depends on your view of
  – The average price for corn and soybeans through 2007?
  – PFC payments versus price responsive payments
  – Market versus political risk
## Current Program

<table>
<thead>
<tr>
<th>Corn Price</th>
<th>Price Support/Acre</th>
<th>Risk Reduction/Acre</th>
</tr>
</thead>
<tbody>
<tr>
<td>$1.57</td>
<td>$114</td>
<td>$18.46</td>
</tr>
<tr>
<td>$1.72</td>
<td>$93</td>
<td>$18.53</td>
</tr>
<tr>
<td>$1.89</td>
<td>$72</td>
<td>$18.09</td>
</tr>
<tr>
<td>$2.07</td>
<td>$50</td>
<td>$17.47</td>
</tr>
<tr>
<td>$2.28</td>
<td>$31</td>
<td>$14.86</td>
</tr>
<tr>
<td>$2.51</td>
<td>$15</td>
<td>$10.17</td>
</tr>
<tr>
<td>$2.76</td>
<td>$5</td>
<td>$4.81</td>
</tr>
</tbody>
</table>
In summary

• With CC and LDP, a corn price of $2.40 - $2.45 provides about the same income support and risk reduction as past 30 years. Lower prices lead to more support and risk reduction
  – This does not include direct payments.
  – And does not account for farm size.

• So, under reasonable assumptions, today’s program is “successful,” relative to past programs, in reducing the income risk present in year to year changes

• But …
“Political” Risk

- Associated with the uncertainty about what the next program will be
- Depends greatly on three things:
  - Congress’s attitude toward PFC payments
  - Perceived level of “equilibrium” commodity prices (market conditions the year before …)
  - WTO negotiations
Political risk, continued …

• Given the capitalization of payments into land prices, this creates a huge risk to land owners and lenders.

• Suggest that when “penciling out” what land is worth as farm land, that you explicitly consider PFC and price-support programs separately
Effect on farm structure, or “optimal” farm size

- Programs affect cost of entry, encouraging larger farms
- Programs reduce risk, causing …?
- These program effects, however, are arguably swamped by
  - Technological effects
  - Yield diversification effects
Take home messages

• Crop revenue risk is dominated by price risk
• The ability to reduce revenue risk through current program is “high” relative to past programs
• The income support is “high” relative to past programs
Messages, continued

• No free lunch
  – The high level of risk reduction and income support creates a high level of political risk
  – This political risk is faced primarily in land valuation decisions