Structural Changes in U.S. Agriculture: Financial Performance of Farms in Transition

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Presentation outline

- Structural changes in US agriculture: transitioning of farms from retired to beginning farmers
  - Issues, farmer needs, and research questions
  - Trends and statistics for the U.S.

- Analysis of the financial condition of transitioning farmers
  - Regression analysis predicting financial stress
  - Recommendations for educational programs
Structural changes in US agriculture: the issues

- Over the next decade half of the farmers will retire and will be replaced by beginning farmers.
  - Farmers face financial, production, price, legal, and human risk
  - Need to ensure farm sustainability, reduce risk and avoid disruptions

- Definitions
  - Beginning farmers: with 10 years or less of experience
  - Retired farmers: consider themselves retired from farming
Structural changes in US agriculture: farmer needs

- Beginning farmers need to:
  - Develop managerial skills
  - Obtain financing to acquire capital
  - Operate a profitable business

- Retiring farmers need to:
  - Implement farm succession and estate planning
  - Provide income stream for their retirement

- Network is needed that matches beginning and retiring farmers
Current projects

- **Beginning Farmer Project in Kentucky, USA**
  - Funded by USDA
  - 3 year project

- **Farm Transitions Project in Kentucky, USA**
  - Funded by the Southern Risk Management Education Center
  - 1 year project

- **Activities**
  - Provide production, management, financial, and legal training
  - Training to farmers and county extension agents
  - Develop mentorship programs and farm transition network
  - Need for applied research
Structural changes in US agriculture: research questions

- Who are transitioning farmers? What are their characteristics?

- What determines their financial performance and stress?

- How do they start or exit farm businesses? Farm transfers?

- What is the structure of their businesses? Enterprise choices, financing, asset acquisition?

- What educational materials, knowledge, and skills will help them be successful?
Objectives of this study

- To provide benchmark characteristics and demographics of transitioning farmers
  - Demographics, choice of enterprises, land tenure, etc.

- Analysis of financial performance
  - Study the factors affecting their financial performance and financial stress
  - Use of critical zones of financial ratios to indicate stress
Data

- USDA’s Agricultural Resource Management Survey (ARMS)
  - National farm-level survey data for approximately 20,000 farm households every year.
  - USDA's primary source of information.
  - Data on the financial condition, production practices, resource use, and economic well-being of America's farm households.
  - Allows for regional analysis
  - Statistics for years 2005-2008
## Farmer benchmark characteristics

<table>
<thead>
<tr>
<th></th>
<th>All Farmers</th>
<th>Beginning Farmers</th>
<th>Retired Farmers</th>
</tr>
</thead>
<tbody>
<tr>
<td>Male</td>
<td>90%</td>
<td>85%</td>
<td>85%</td>
</tr>
<tr>
<td>Female</td>
<td>10%</td>
<td>15%</td>
<td>15%</td>
</tr>
<tr>
<td>Age (years)</td>
<td>56.9</td>
<td>48.2</td>
<td>69.6</td>
</tr>
<tr>
<td>College graduate</td>
<td>25%</td>
<td>32%</td>
<td>19%</td>
</tr>
<tr>
<td>White</td>
<td>96%</td>
<td>95%</td>
<td>95%</td>
</tr>
<tr>
<td>Black</td>
<td>2%</td>
<td>2%</td>
<td>2%</td>
</tr>
<tr>
<td>Hispanic</td>
<td>2%</td>
<td>4%</td>
<td>2%</td>
</tr>
</tbody>
</table>
Operator age distribution

- Less than 35 years
- 35 to 44 years
- 45 to 54 years
- 55 to 64 years
- 65 years or older

- All Farmers
- Beginning Farmers
- Retired Farmers
Farmer education

![Bar chart showing farmer education levels by education level and category (All Farmers, Beginning Farmers, Retired Farmers). The chart indicates that a higher proportion of farmers have completed high school education compared to those with less than high school and college graduate education. The data is presented with bars for each category, showing the percentage of farmers in each group.](image-url)
Farmer primary occupation

- Farm work
- Homemaker
- Nonfarm work
- Not in workforce

- All Farmers
- Beginning Farmers
- Retired Farmers
Farm types

- Cattle and calves: 37%
- Hay: 16%
- Other crops: 9%
- Tobacco: 1%
- Grains and oilseeds: 16%
- Other livestock: 11%
- Horses: 10%
Land ownership and tenure

<table>
<thead>
<tr>
<th></th>
<th>All Farmers</th>
<th>Beginning Farmers</th>
<th>Retired Farmers</th>
</tr>
</thead>
<tbody>
<tr>
<td>Acres operated</td>
<td>422</td>
<td>231</td>
<td>182</td>
</tr>
<tr>
<td>Land tenure</td>
<td>89%</td>
<td>89%</td>
<td>114%</td>
</tr>
</tbody>
</table>

Land tenure is the proportion of owned land to all land operated.
Land ownership and tenure

[Bar chart showing land ownership and tenure for All Farmers, Beginning Farmers, and Retired Farmers. The chart indicates the percentage of full land owners, part land owners, and full land tenants.]
## Demographic characteristics

<table>
<thead>
<tr>
<th>Variables</th>
<th>All Farmers</th>
<th>Beginning Farmers</th>
<th>Retired Farmers</th>
</tr>
</thead>
<tbody>
<tr>
<td>Age</td>
<td>57.07</td>
<td>45.74</td>
<td>68.53</td>
</tr>
<tr>
<td>Education (category)</td>
<td>2.15</td>
<td>2.24</td>
<td>2.02</td>
</tr>
<tr>
<td>Male</td>
<td>0.89</td>
<td>0.85</td>
<td>0.86</td>
</tr>
<tr>
<td>Household size</td>
<td>2.60</td>
<td>3.12</td>
<td>2.05</td>
</tr>
<tr>
<td>Sole proprietor</td>
<td>0.82</td>
<td>0.85</td>
<td>0.85</td>
</tr>
<tr>
<td>Hobby farm</td>
<td>0.68</td>
<td>0.76</td>
<td>0.87</td>
</tr>
<tr>
<td>Livestock farm</td>
<td>0.59</td>
<td>0.64</td>
<td>0.54</td>
</tr>
<tr>
<td>Gross sales ($1,000)</td>
<td>110.49</td>
<td>66.19</td>
<td>38.73</td>
</tr>
<tr>
<td>Government payments ($1,000)</td>
<td>4.63</td>
<td>2.08</td>
<td>2.72</td>
</tr>
<tr>
<td>Total off-farm income ($1,000)</td>
<td>71.95</td>
<td>85.79</td>
<td>59.48</td>
</tr>
</tbody>
</table>
Summary of results

- **Beginning farmers are:**
  - Younger
  - More educated
  - Have smaller farms
  - Have more off-farm income
  - Have lower participation in gov programs

- **Retiring farmers are:**
  - Older
  - Less educated
  - Have smaller farms
  - Have less off-farm income
  - Have lower participation in gov programs

- This information can help in the development of better targeted programs for beginning/retired farmers.
Research on Financial Condition/Stress of Beginning farmers

- Financial stress is when financial ratios (liquidity, solvency fall in the critical/red zone)

- Need to understand the predictors of financial stress for beginning and retiring farmers
  - Understanding financial stress is particularly important in the current economic situation
  - Lenders are interested/ have programs for beginning farmers
## Financial ratios and critical zones

<table>
<thead>
<tr>
<th>Financial Ratios</th>
<th>Financial Measures</th>
<th>Critical Zones</th>
</tr>
</thead>
<tbody>
<tr>
<td>Current ratio</td>
<td>Liquidity</td>
<td>&lt;1</td>
</tr>
<tr>
<td>Debt-to-asset ratio</td>
<td>Solvency</td>
<td>&gt;55%</td>
</tr>
<tr>
<td>Return on assets ratio</td>
<td>Profitability</td>
<td>&lt;1%</td>
</tr>
<tr>
<td>Operating profit margin ratio</td>
<td>Profitability</td>
<td>&lt;10%</td>
</tr>
<tr>
<td>Operating expense ratio</td>
<td>Efficiency</td>
<td>&gt;80%</td>
</tr>
<tr>
<td>Term debt coverage ratio</td>
<td>Repayment capacity</td>
<td>&lt;1.1</td>
</tr>
</tbody>
</table>
Percent farms in the critical zone for the following financial ratios
Probit models

- Dependent variables: critical zones for financial ratios
  - Liquidity
  - Solvency
  - Profitability
  - Efficiency
  - Repayment capacity

- Independent variables
  - Age
  - Education
  - Household Size
  - Male
  - Livestock
  - Sole proprietors
  - Hobby farms
  - Gross Sales
  - Government Payments
  - Total Off Farm Income
Probit model summary results

- Farmers who are *less likely* to experience financial stress:
  - Older farmers and larger farms

- Farmers who are *more likely* to experience farm stress:
  - Hobby farms and livestock farms
  - During recession year

- No significant effect
  - Legal structure of the farm (sole proprietorship or not) and household size
Probit models by groups of farms

- Probit models predicting financial stress (financial ratios being in the critical zone)

- Analysis done for beginning farmers and retired farmers

- Seek to find differences between these two groups
Probit model summary results for beginning farmers

For beginning farmers:

- Fewer characteristics show significant influences.
  - Homogeneity of beginning farmers

- Most of the personal and farm characteristics do not affect the probability of farmers experiencing liquidity and efficiency problems.

- Hobby farms and farms with higher off-farm income generally do not have significant effects on the financial stress.
For retired farmers:

- Males are more likely to be in the critical zones for their profitability and efficiency ratios.

- Being a hobby farm and receiving more total off-farm income generally do not have significant effects on the financial ratios being in the critical zones.

- The dummy variables indicating prior years no longer have significant effects on the likelihood of farmers experiencing financial stress.
Conclusions and recommendations

- Research can help beginning farmer educational programs to:
  - Provide benchmark characteristics of beginning farmers
  - Better target the programs based on farmers’ characteristics (demographics, enterprise choices, etc.)
  - Understand recent trends in establishing new farms (farm transfers)
  - Understand what predicts financial performance and stress
  - Provide specific recommendations based on what makes farmers successful
Thank you!