Risk Attitude & the Structure of Decision Making: Evidence from the Hog Industry

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Introduction: Hog Industry & Research

• Growth in contract use; decline in spot sales
• Mixed evidence on RISK ATTITUDE → CONTRACT
  – Models of Contract Use: CONTRACT = f(risk attitude, age, farm size, financial state)
  – Models of Risk Aversion: RISK ATTITUDE = f(age, farm size, financial state)
  – Should indirect effects be considered?

Objectives

• Explain Risk Attitude & Contracting:
• Contributions:
  – Insight on structure of producers’ decision making & role of risk attitudes.

Hypotheses

H1. Producers’ age & experience reduce contract use indirectly through negative impacts on risk aversion.
H2. Firm size & leverage increase contract use indirectly through positive impacts on risk aversion.
H3. Risk aversion is positively related to contract use.

Reliable Measure of Risk Attitude

<table>
<thead>
<tr>
<th>Risk Attitude Scale Survey Items</th>
<th>Factor Loadings</th>
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<tbody>
<tr>
<td>RA1 I usually like “playing it safe” (for instance, “locking in a price”) instead of taking risks for market prices for (weaner, feeder, finished) hogs.</td>
<td>RA1 0.92</td>
</tr>
<tr>
<td>RA2 When selling/marketing my hogs, I prefer financial certainty to financial uncertainty.</td>
<td>RA2 0.86</td>
</tr>
<tr>
<td>RA3 When selling/marketing my hogs, I am willing to take higher financial risks in order to realize higher average returns.</td>
<td>RA3R 0.38</td>
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<tr>
<td>RA4 I like taking financial risks with my hog farm business.</td>
<td>RA4R 0.59</td>
</tr>
<tr>
<td>RA5 I accept more risk in my hog farm than other hog farmers.</td>
<td>RA5R 0.36</td>
</tr>
<tr>
<td>RA6 With respect to the conduct of business, I dislike risk.</td>
<td>RA6R 0.45</td>
</tr>
</tbody>
</table>

Reliability of Measure

Cronbach’s Alpha 0.785 0.780

Risk attitude items scaled 1 = “strongly disagree” through 9 = “strongly agree.”

Measurement of Model Fit:

– Likelihood ratio χ²/df ≤ 2.50 → actual and predicted input matrices not statistically different at 10% level.
– Adjusted Goodness-of-Fit Index (AGFI) is measured by squared residuals between predicted and actual data, and is bounded above by 1 (perfect fit).
– The Tucker Lewis Index (TLI) accounts for parsimony in a comparative index between proposed and null models, with recommended values ≥ 0.90.
– Root Mean Squared Error of Approximation (RMSEA) estimates how well the fitted model approximates the population covariance matrix, with values ≤ 0.08 indicating a close fit.

Summary of SEM Results

• Model 4 is best representation (best fit)
  – OLS versions of Models 1 & 2 also have
    – Poor fit (R² = 0.25 & 0.30).
    – Sign & magnitude of age & experience indicate collinearity.
  – Supports hypotheses H1, H2, & H3.
    – Age, experience makes producers more comfortable managing price risk without long-term contracts.
    – Larger (expanding) farms with more debt have constrained capacity to bear risk, and hence contract to ensure stable cash flows (to service debt).
    – RISK ATTITUDE more important than in other models.

Implications

• Attitudes revealed by observed behavior reflect contextual/situational circumstances.
  – Measures of risk attitude do not capture only an inherent predisposition toward risk sans contextual circumstances.
  – Care must be taken to identify parsimonious but accurate structure of decision making process.
    – If structure of decision making process is inaccurately modeled, the importance of key variables like risk attitudes may be underestimated.

Conclusions

• While other factors contribute to growth of contract use in the hog industry, risk attitudes are an important indicator of who may contract.
  – While inherent predispositions toward risk may not be changing dramatically, changing circumstances combined with risk preferences may drive propensity for risk averse behavior.
• Future research should investigate generalizability of results for other decision contexts.
  – Hog contracting by younger segments appears to be driven by experience/competence/confidence in managing risk, whereas youth is commonly associated with riskier behavior in other contexts.