A Structural Equation Model of Farm Performance

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Background and Motivation
- What drives farm performance?
- Are those drivers consistent when farmers operate in different economic environments?
- Recent evidence from farmdoc analyses suggests that top performers tend to do everything better, consistently outperforming peers under varying economic conditions.
- Which managerial skills are most important in which circumstances? In this study, we attempt to answer this question using a structural equation model and farm-level data from crop farms in Illinois.

Price Environments
- Stable prices and returns
- Rising prices, poor yields, high returns
- Falling prices, high yields, low returns

Structural Model
- We utilize the method of Ford and Shonkwiler (1994) in their study of the importance of managerial ability on dairy farm financial success.
- We model returns to Illinois crop farms as functions of three primary managerial skills: financial, production, and marketing (listed in the middle ovals in the above diagram).
- Direct measure of management skills are unobservable, but are associated with observables (listed in the far right boxes in the above diagram).

Results—Structural Component
- Evidence of returns to scale
- Negative effect of experience
- Narrow age range, older farmers may be primarily in retirement mode
- Consistent importance of Financial skill
- Production skill important under tight margins (every extra bushel helps)
- Does not support importance of Marketing skill

Results—Measurement Component
- Working capital and repayment margin positively associated with Financial skill, negative associated with expense ratios.
- Positive leverage association during high return period.
- Strong association between yields, input expense control and Production skill.

Conclusions
- In tight margin environments, the positive impact of farm size on management returns is greater.
- The importance of different managerial skills varies across environments — farmers with only one highly developed skill are unlikely to perform across varying price levels.
- Is a rebalancing of management skills necessary for resilient farm performance? Investing only in areas of strength (Levinthal and March, 1993) is likely to exacerbate boom and bust cycles.

Data
- Over 1000 farm observations per period from across IL.
- Primary crops: corn and soybeans (min. 200 acres).
- Certified, audit quality financial records, crop yields, and prices received.

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