Vertical Disintegration and the Shifting Boundary of the Farm Business

Implications for Agricultural Productivity

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Outline

Research Overview: Past, Present, and Future

Farm Vertical Disintegration and Productivity

Research Background

Agricultural contracting and vertical coordination (1999-2007)

- Contract design, risk allocation, quality measurement in agricultural markets
- *AJAE* (1999); *RAE* (1999); *ERAE* (2002)

Cooperative organization and governance (2008-2020)

- Economics of member-owned firms: incentives, monitoring, entry
- *AJAE* (2009); *Econ. Letters* (2014); *J. Econ. & Mgmt. Strategy* (2015)

Cooperative business, supply chains, productivity measurement (2010-present)

- Cooperative business census
- Founded UW-Madison FSRDC
- CNSTAT Complex Farms report
- *AJAE* (2017); *AEPP* (2022); *AEPP* (2023)

Today's paper connects all three themes: examining how organizational change affects agricultural productivity using novel administrative data.

Future Research: Economics of Cooperatives

1. **Census and sector understanding**
   - Comprehensive description of cooperative business landscape
   - Historical context and trends as foundation for education and outreach
2. **Governance and financial management**
   - Managing member heterogeneity; board behavior; capital structure challenges
   - Core subject matter for leadership training
3. **Market-level interactions**
   - Role of cooperatives and entry/equilibrium issues in IO context
4. **Cooperatives and agricultural productivity**
   - Role in technology diffusion, input provision, and sector growth
5. **Startup and development**
   - Formation and growth of new cooperative organizations
   - Economic rationale, public policy implications

Future Research: Complementary Themes

1. **Agricultural supply chains and upstream industries**
   - Farm consolidation effects on input supply and service markets
   - Role of cooperatives in this context; farm driven distintegration

2. **Productivity measurement**
   - Quality adjustment for service inputs in TFP accounting
   - Market power and implications for ag productivity

Farm Vertical Disintegration and Productivity

Disclaimers

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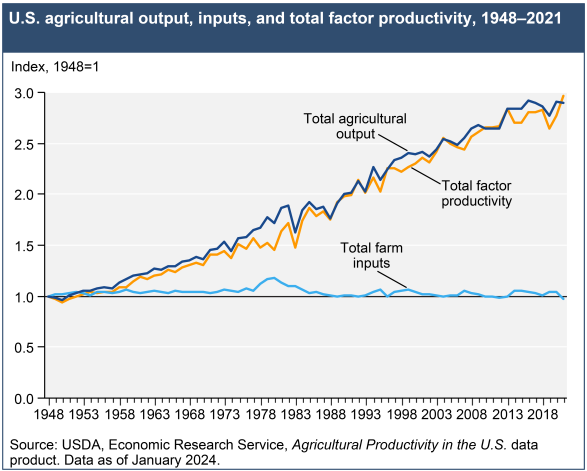
A Puzzle in American Agriculture

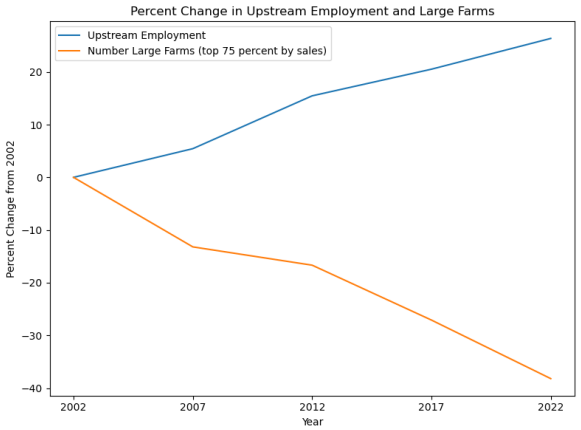


The productivity puzzle:

- Output has nearly tripled since 1948
- Aggregate inputs are essentially flat
- TFP growth: 1.49% annually

Where does this productivity come from?

A Clue: The Changing Structure of Farm Work



Source: Economic Census & Census of Agriculture

Two striking trends since (at least) 2002:

- Farms are consolidating: ↓ 40%
- Upstream industries employment is growing: ↑ 25%

Upstream industries: custom services (soil prep, planting, harvesting, post-harvest), farm mgmt., fert and pest manuf., equipment manuf., input wholesalers

Work is moving off the farm—could this contribute to productivity growth?

The Question

Research question:

Does the emergence of specialized upstream service industries contribute to agricultural productivity growth?

Why this matters:

- U.S. agricultural TFP growth is exceptional: 1.49% annually (1948–2021)
- Standard story: R&D spillovers, technology adoption, input quality
- Missing piece: **organizational change** as a source of productivity

Policy relevance:

- Understanding sources of productivity growth informs R&D priorities
- Implications for rural labor markets and farm structure policy

This Paper

What we do:

- First systematic estimates of relationship between crop services (1151) and yields
- Leverage restricted Census Bureau administrative data (LBD + Census of Ag)
- County-level panel: 2002–2017, four Census waves

Preview of findings:

1. Upstream service employment positively associated with yields
2. Effects are heterogeneous: strongest for corn and soybeans
3. Large farms drive the relationship—consistent with disintegration story
4. Suggestive evidence of causal relationship using longitudinal variation

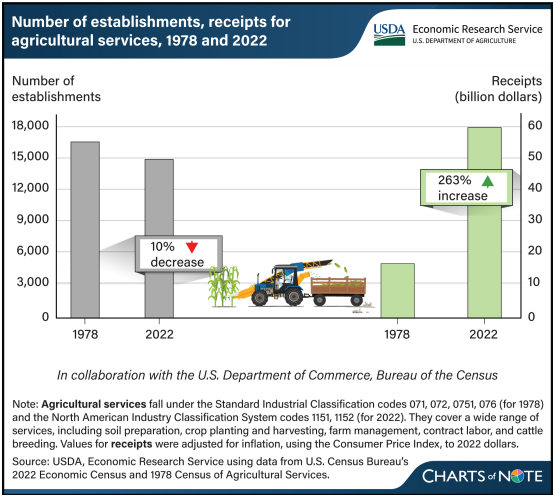
Takeaway: *Organizational restructuring—not just technology—may be an important but overlooked source of agricultural productivity growth.*

Not a New Question

From the 1974 Census of Agricultural Services:

> *"Until the 1940's, agriculture in America was largely self-reliant in regard to many production and harvesting practices now available from off-farm sources in the form of agricultural services. During the last three decades agricultural services have become an increasingly specialized industry. The technological and scientific changes in American agriculture have been directly related to the development of the agricultural service industry. A census of this industry is essential to provide facts necessary for:*
>
> *A. Broader view of today's farm production.*
> *B. Better understanding and interpretation of long-term agricultural changes and trends.*
> *C. More meaningful analysis of the interrelationships of agriculture and agricultural services."*
>
> — U.S. Department of Commerce (1974), via Dunn & Hueth (2017)

Not a New Question (cont.)



USDA recognized this 50+ years ago:

- Census of Ag Services: 1969, 1974, 1978
- Discontinued when Census of Ag moved to NASS

A 45-year data gap:

- No systematic tracking of service providers
- Farm expenditure data, but not industry dynamics

Revived in 2022

- This paper: what can we learn from *existing* administrative data?

Why Would Disintegration Boost Productivity?

Classic economic logic:

- **Specialization** — Farms focus on core competencies; specialists develop expertise
- **Scale economies** — One custom harvester can serve many farms
- **Technology adoption** — Specialists can justify expensive, cutting-edge equipment

Additional mechanisms:

- **Risk smoothing** — Service firms diversify across geography and seasons
- **Labor market efficiency** — Skilled operators matched to equipment
- **Knowledge spillovers** — Specialists transfer best practices across farms

If disintegration enables these efficiencies, we should see a positive relationship between upstream service activity and farm productivity.

Data and Methodology

[To be developed]

Results

[To be developed]

Discussion

[To be developed]

Conclusion

[To be developed]