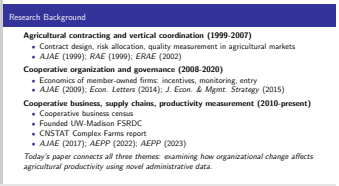
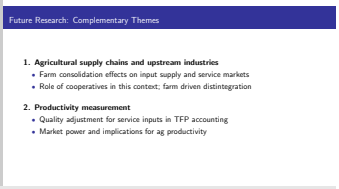
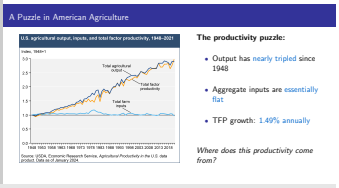


- 5 minutes on the past, 10 minutes on the future — Sampling of past work
- Producer price risk and quality measurement, stylized fact, foundation for risk management — Incentive instruments, description from survey data — Efficient contract, structural estimation
- CEOs and incentive pay — Missing markets and entry, parts 1 and 2
- Brief story and background on this path; exposed to and motivated by major data gaps relevant to the field and center

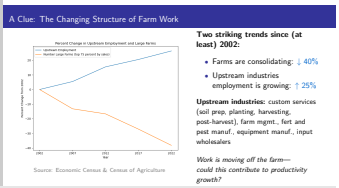
- This the main focus of my research program for THIS position
- Historical context with research on DHIA and Farm Credit, development of dairy industry
- The next slide summarizes complementary work drawing on my experience at ERS and connected with supply chain issues



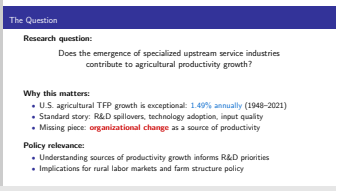
- Complementary in sense of connecting with broader themes and context
- This section focuses on research with supply chain connection
- Disintegration term happens alongside consolidation; emphasis on consequences upstream
- Based on work initiated while at ERS
- Great jumping off point, pivot to paper presentation



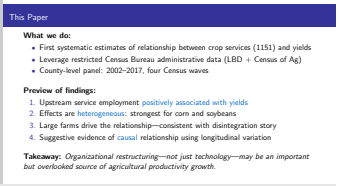
- Hook: Start with a puzzle, not a literature review
- ERS productivity accounts—output nearly 3x, inputs flat
- Standard story: R&D, technology, input quality
- But what about organizational change?



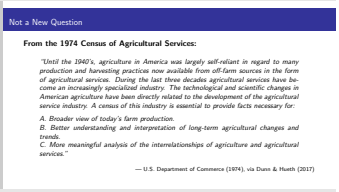
- Data: Economic Census + Census of Agriculture, 2002–2017
- Upstream NAICS: 115112–115116 (custom farm services), 115210 (farm mgmt), 325320 (fertilizer), 333111 (tractors), 424910 (input wholesalers)
- Vertical disintegration: farms outsourcing to specialists
- Sets up the research question



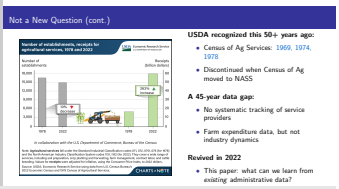
- Big 5 #1: What is the question?
- Big 5 #2: Why is it important?
- Frame as filling a gap in the productivity literature
- Policy hook for applied audience



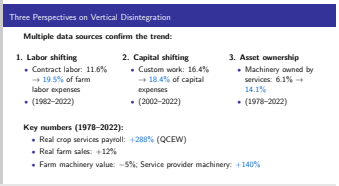
- Big 5 #3: What does existing literature say? (implicitly: not much on org change)
- Big 5 #4: What is your contribution?
- Big 5 #5: What is your key takeaway?
- Shapiro: Preview findings early—don't make them wait 45 minutes



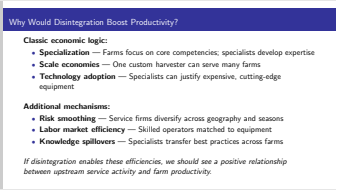
- Direct quote from 1974 Census—they saw this coming
- Same motivation we have today, 50 years later
- Discontinued due to federal budget pressures in early 1980s
- Census Bureau lacked infrastructure/resources to restart



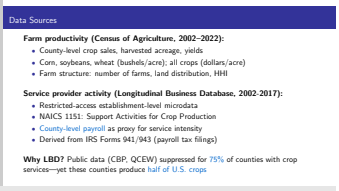
- Historical context—USDA saw this coming
- Data gap explains why this question hasn't been studied
- Sets up our contribution: use LBD + Census of Ag to fill the gap
- New Census of Ag Services will enable future research



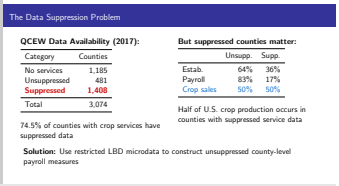
- Figure 1 from the paper
- Three independent data sources, same story
- Contract labor from Census of Ag
- Machinery ownership from BEA Fixed Asset Tables
- Massive growth in services, flat farm sales



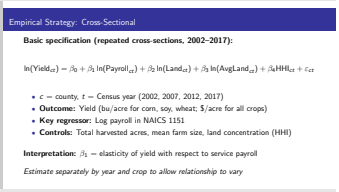
- Intuitive appetizer—give them a mental model before regressions
- Smith/Ricardo specialization logic
- Sets up the empirical test
- Counterargument: transaction costs, coordination problems (address in discussion)



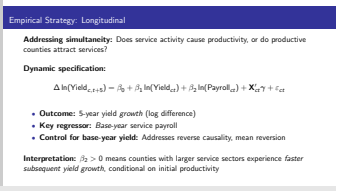
- Census of Ag: public county tables from NASS
- LBD: restricted access through FSRDC network
- Payroll better than employment (March 12 employment misses seasonality)
- Key contribution: overcoming data suppression problem



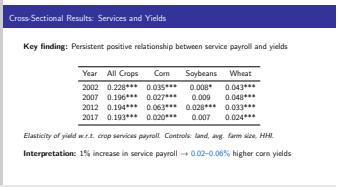
- Table 1 from the paper
- Suppression for disclosure avoidance (few establishments)
- Can't study services-productivity relationship with public data
- LBD access through FSRDC is key contribution



- Log-log specification for elasticity interpretation
- Controls address scale and structure confounds
- Repeated cross-section (not panel FE) to see how relationship evolves
- Hypothesis: $\beta_1 > 0$ if services boost productivity



- Key innovation: use lagged payroll to predict future growth
- Controls for initial productivity level
- Not full causal identification, but addresses main endogeneity concern
- Equation 3 from the paper


Cross-Sectional Results: Services and Yields

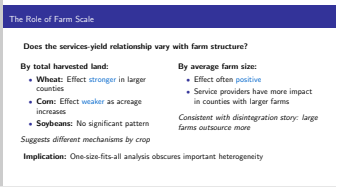
Key finding: Persistent positive relationship between service payroll and yields

Year	All Crops	Corn	Soybeans	Wheat
2002	0.226***	0.035***	0.008*	0.043***
2007	0.196***	0.027***	0.009	0.048***
2012	0.194***	0.063***	0.028***	0.033***
2017	0.193***	0.020***	0.007	0.024***

Elasticity of yield w.r.t. crop services payroll. Controls: land, avg. farm size, HHI.

Interpretation: 1% increase in service payroll → 0.02–0.06% higher corn yields

- Table 3 from the paper
- All crops uses $/acre; individual crops use bu/acre
- Soybeans weakest association—less labor intensive?
- Coefficients smaller for individual crops (payroll affects all crops)


The Role of Farm Scale

Does the services-yield relationship vary with farm structure?

By total harvested land:
- **Wheat:** Effect stronger in larger counties
- **Corn:** Effect weaker as acreage increases
- **Soybeans:** No significant pattern

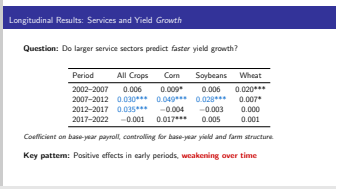
Suggests different mechanisms by crop

By average farm size:
- Effect often positive
- Service providers have more impact in counties with larger farms

Consistent with disintegration story: large farms outsource more

Implication: One-size-fits-all analysis obscures important heterogeneity

- Figure 3 from the paper shows marginal effects
- Wheat: scale economies in services matter more
- Corn: diminishing returns at larger scale
- Large farms drive the relationship—they're the ones outsourcing


Longitudinal Results: Services and Yield *Growth*

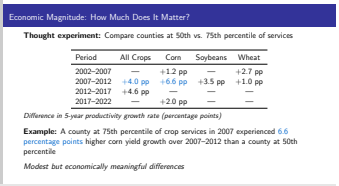
Question: Do larger service sectors predict *faster* yield growth?

Period	All Crops	Corn	Soybeans	Wheat
2002–2007	0.006	0.009*	0.006	0.020***
2007–2012	0.030***	0.049***	0.028***	0.007*
2012–2017	0.035***	−0.004	−0.003	0.000
2017–2022	−0.001	0.017***	0.005	0.001

Coefficient on base-year payroll, controlling for base-year yield and farm structure.

Key pattern: Positive effects in early periods, **weakening over time**

- Table 4 from the paper
- Addresses simultaneity: does service activity *cause* productivity?
- Controlling for base-year yield addresses reverse causality
- Weakening suggests diminishing returns as sector matures


Economic Magnitude: How Much Does It Matter?

Thought experiment: Compare counties at 50th vs. 75th percentile of services

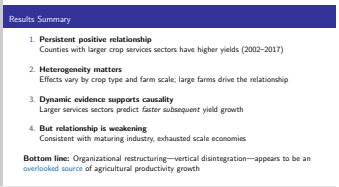
Period	All Crops	Corn	Soybeans	Wheat
2002–2007	—	+1.2 pp	—	+2.7 pp
2007–2012	+4.0 pp	+6.6 pp	+3.5 pp	+1.0 pp
2012–2017	+4.6 pp	—	—	—
2017–2022	—	+2.0 pp	—	—

Difference in 5-year productivity growth rate (percentage points)

Example: A county at 75th percentile of crop services in 2007 experienced 6.6 percentage points higher corn yield growth over 2007–2012 than a county at 50th percentile

Modest but economically meaningful differences

- Table 5 from the paper
- Makes elasticities concrete
- 6.6 pp difference over 5 years is substantial
- Blank cells = coefficient not statistically significant


Results Summary

1. **Persistent positive relationship**
   Counties with larger crop services sectors have higher yields (2002–2017)
2. **Heterogeneity matters**
   Effects vary by crop type and farm scale; large farms drive the relationship
3. **Dynamic evidence supports causality**
   Larger services sectors predict *faster subsequent* yield growth
4. **But relationship is weakening**
   Consistent with maturing industry, exhausted scale economies

Bottom line: Organizational restructuring—vertical disintegration—appears to be an overlooked source of agricultural productivity growth

- Wrap up results before moving to discussion
- Key message: disintegration contributes to productivity
- But effects may be diminishing as sector matures
- Sets up discussion of implications

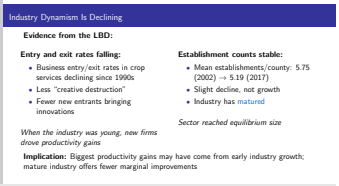

Why Is the Relationship Weakening?

Observed pattern: Services-yield relationship strongest in 2007–2012, fading since

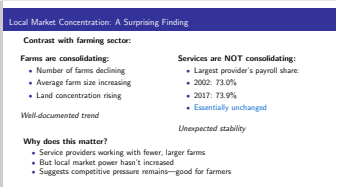
Possible explanations:

1. **Maturing industry**
   - Entry and exit rates declining since 1990s
   - "Creative destruction" drives innovation; less dynamism → slower gains
2. **Exhausted scale economies**
   - Early adopters captured largest gains
   - Remaining farms may face higher transaction costs
3. **Farm consolidation**
   - Largest farms increasingly self-sufficient
   - Service providers working with fewer, larger clients

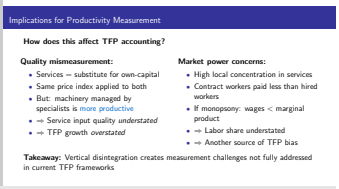
- Important to address why effects are weakening
- Industry dynamism declining—business dynamics literature
- Consistent with Stigler: scale economies eventually exhausted
- Farm consolidation may be shifting the equilibrium



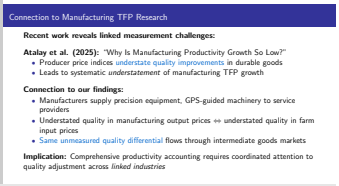
- Business dynamics literature: declining dynamism across economy
- Crop services sector fits this pattern
- Creative destruction theory: entry/exit drives innovation
- May explain why relationship weakened post-2012



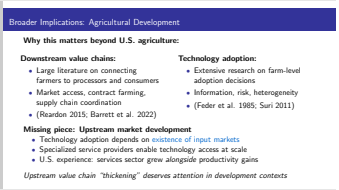
- Table 2 from the paper
- Surprising finding: no concentration increase
- Contrasts with farm consolidation, processor consolidation
- May reflect geographic nature of service provision
- Important for market power concerns in Discussion



- Links to productivity measurement literature
- Quality adjustment is key issue
- Wang & Loduca (2025): contract workers paid less
- Suggests some "TFP growth" may be mismeasured input growth

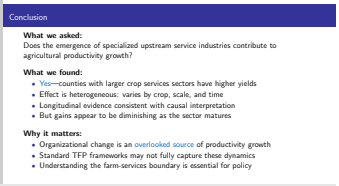


- Atalay et al. NBER WP 34264
- Nice connection: same problem from opposite ends of supply chain
- Manufacturing understates output quality $\rightarrow$ Ag understates input quality
- Suggests need for integrated approach to productivity measurement



- Relevant for ISU's international focus
- Downstream value chains well-studied
- Upstream market development less so
- U.S. case suggests services enable technology adoption
- Policy implication: support input market development

- Honest about limitations
- 2022 Census is a big deal—revived after 44 years
- Sets up future research agenda
- Connects to position at ISU—supply chain focus



- Circle back to opening question
- Clear answer: yes, with nuance
- Broader implication for how we think about productivity

- Big 5 #5: What is the key takeaway?
- Memorable framing for the audience
- Connects to title of the paper