Legacy Effects of Conservation Payments

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Making the Most of Federal Data: Combining Data for Economic Analysis
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Overview

• Background and research question

• Data wishlist and shortcomings of existing survey data

• Three types of federal data used in this project
  – Program (administrative) data from USDA NRCS Environmental Quality Incentives Program (EQIP)
  – Survey data from USDA Agricultural Resource Management Survey (ARMS)
  – Satellite data

• Challenges and innovations

• Preliminary results
Conservation Payments for No-Till Farming

• Farmer leaves crop residue on field at harvest, and plants next crop without tilling the soil

• USDA provides financial assistance for no-till through working lands programs such as the Environmental Quality Incentives Program (EQIP)

• > 90% of the acres that adopted no-till between 1996 and 2016 did so without a payment
Research Question: Legacy Effects

• Does practice continue after financial incentives end (persistence)?

• Knowing extent of persistence allows us to better estimate program benefits
Data Wishlist

• Treatment variable: Is farmer participating in the EQIP program, and for what years do they have a no-till contract?

• Information on other factors that affect farmer decision to adopt no-till, and farmer participation in conservation programs

• Outcome variable: Is farmer using no-till?
Treatment variable: Is farmer participating in the EQIP program, and for what years do they have a no-till contract?

Information on other factors that affect farmer decision to adopt no-till, and farmer participation in conservation programs

Outcome variable: Is farmer using no-till?
Limitations of Existing Survey Data on No-Till Adoption

- **Time series length**: Up-to five years of no-till adoption data is not sufficient time when conservation contracts are typically three years.

- **Treatment variable**: Linking surveys to data on prior program participation is difficult.

- **Sample size**: There is low statistical power given the likelihood of program participation.
Constructing a Proxy for No-Till Adoption using Satellite Imagery

• Goal: apply existing methods developed by USDA-ARS that transform remotely-sensed, multi-spectral imagery into an index of crop residue cover at planting time
• Challenge: previous work relied on calibration and validation using field observations
• Innovation: Validation with survey data
• Complicating factors:
  – Data sharing and confidentiality issues with non-USDA collaborator
  – Reliability of geolocation of survey data?
  – What spatial unit of analysis?
Constructing a Proxy for No-Till Adoption using Satellite Imagery, cont.

We developed residue estimates for fields in the Northern High Plains for 2007 – 2016.
Preliminary Results

• Survey data suggest that the farmer’s decision to adopt no-till exhibits persistence in general.

• Payments are associated with persistent (but modest) increases in residue following the payment.
Summary

- Programs that pay for conservation practices may generate indirect impacts with measurable benefits
- New research questions may require a creative approach to developing and combining multiple data sources
- Satellite data, survey data, and administrative data have very different strengths and limitations, and combining them, in this case, leverages strengths of each
Questions?
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