Organic farming and federal crop insurance policy

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Introduction

- Organic food in the US: “certified to have grown on soil that had no prohibited substances applied for three years prior to harvest", i.e. synthetic fertilizer and pesticides and GMO.
- There is a substantial price premium for organic food.
- One argument is that it accounts for additional yield risk.
- But farmers in the US benefit from huge federal subsidies for crop insurance (up to 100% of the premium, on average more than 60%).
- Long-term objective: explain relative importance of markup and risk in profit sharing along the organic food value chain; possibly to explain take-up of organic farming.
- Short-term objective: exploit policy discontinuities on availability of insurance policies available for organic crops to test whether farmers react to insurance generosity.

Crop insurance in the US - Basics

- All farmers in the US are covered by “catastrophic insurance" managed by the Department of Agriculture through the Risk Management Agency.
- Zero premium: the federal government guarantees farmers 55% of price on crop losses above 50%.
- A lot of farmers also purchase private insurance policies against revenue loss, at the level of their choice (55-90%).
- These policies are still regulated and subsidized by the RMA.
- Many variants, but 3 main insurance plan types, all based on average yield and predicted price.
  1. Revenue protection (expected yield $\times$ expected prices $\times$ insured acres)
  2. Yield protection (expected yield)
  3. Actual production history (4 to 10 year average of own yield $\times$ expected price $\times$ insured acres)
- Expected yields (except APH) and expected prices are computed by the RMA, typically for each county.

Literature overview

- Adverse selection is present in crop insurance. Just, Calvin and Quiggin (1999) use farm-level data on corn and soybeans to show this is driven up by the subsidies.
- Moral hazard is present in crop insurance: O'Donoghue and Key (2009) show that after a reform that increased subsidies (1994), farmers decreased diversification which is a typical risk management tool.
- Annan and Schlenker (2015) show that corn and soybean yields in counties that are more subsidized for historical reasons are more negatively sensitive to extreme heat, suggesting that farmers who are more protected against adverse outcomes do less to adapt to them.

Crop insurance in the US - Organic

- The USDA Organic seal began being applied to products in 2000.
- By 2001, RMA started insuring organic crops.
- Same policies (prices and yields) as non organic crops, but 5% surcharge.
- In 2008, the Farm bill required the RMA to start establishing organic prices.
- In 2013, the Office of Inspector general realized that applying the same expected yields to organic crops was a mistake:
  "This resulted in excessive insurance coverage and higher indemnity payments for 35 of 48 crop policies with losses. Because the policy guaranteed yields it underwrote were excessive, RMA paid at least $952,000 of $2.56 million in additional indemnities"
  Recommendation: drop the 5% surcharge and adjust the yields.
- Several discrete changes in generosity of insurance available to organic farmers

Data

- Area insured, type of insurance, premiums, subsidies and indemnities paid, by county/crop/insurance plan and by year from the USDA (RMA), 2002-2017
- Won't give me the data by farmer
- Organic data starts in 2006 for rice and "all other crops", 2011 for the rest...
- Details about insurance plans available every year in every county, 2011-2016
- From the USDA census and surveys: Some data on areas planted, but not always separate for organic and not organic.
- Weather by 4kmx4km squares and by day from PRISM, 2000-2016
- Cropland layer data by 30mx30m squares and by year from the USDA (NASS), 2010-2016

Identification strategy

Focusing on the 2014 reform

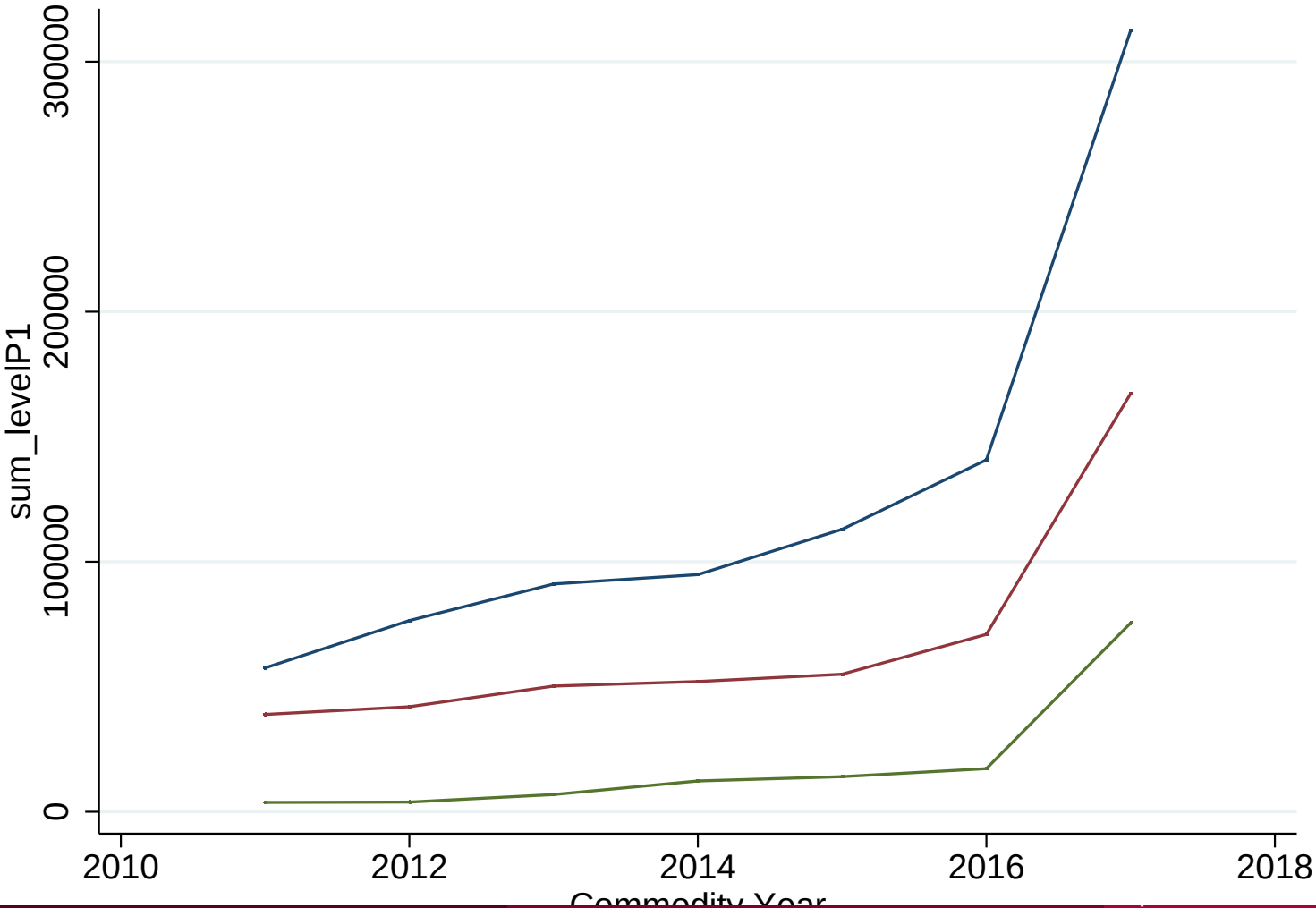
- Adjusted expected yields for organic crops downward
- Should only make a difference for the crops whose true organic yield was much lower than conventional crops
- Yield ratio: average yield for organic crop to average yield for the same, non organic crop. From the OIG:

Crop Name	Yield ratio
Almonds	0.61
Barley	0.58
Corn	0.75
Cotton	1.01
Dry Peas	0.46

- Organic cotton growers should see no difference before and after the reform, but organic corn growers will be worse off.
- Expect to see a negative effect on expansion of organic farming for corn, and not for organic cotton.

Graphical evidence

Ratio of total organic acres insured to total conventional acres insured, for soybeans in green (67% yield ratio) corn in red (75%) and cotton in blue (100%).



First (mixed) results

- Triple diff: organic/conventional, different crops, after/before.
- Simple: compare two crops that differ in ratio of organic yield but are not too different in other aspects.
- Corn and cotton: “field crop", went through same insurance reform path, 25 pp. difference in yield ratio. BUT not same region/weather.
  $\rightarrow$ find negative, significant coefficient.
- Corn and soybeans: “field crop", went through same insurance reform path, same region BUT close yield ratios (8 pp difference)
  $\rightarrow$ find negative, significant coefficient.
- The Card way: use intensity of treatment (the yield ratio).
- Problem: not that many crops went through no other reform.
  $\rightarrow$ find positive, significant coefficient.

Conclusion and next steps

- The 2014 crop insurance reform **might** have slowed down the adoption of the “organic farming technology"
- But much remains to be done.
- First, do more detailed research on the insurance program to make sure there is no confounder.
- Second, collect data on other outcomes such as area planted instead of insured.