

Does crop insurance
participation encourage
cropping of environmentally
sensitive land?

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Criticism of FCIP

- Work is still in progress.
- Broadly stated, crop insurance (availability, subsidization, participation) causes or leads to farming of environmentally sensitive land.
- Typically equates environmentally sensitive and marginally productive.

Testing this criticism

- If environmentally sensitive and marginally productive are the same – expect to see lower county level yields.
- Measure of crop insurance participation – net reported acres (insured)/total acres planted by county – essentially opt in or out for an acre (avoiding some endogeneity by leaving level of coverage out of the question).

Controlling for...

- Other potentially influential forces
 - Weather (problematic)
 - Credit costliness and availability (problematic)
 - Profitable (or not) eras
 - Time/Technology
 - Prior Year Price

Weather

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Credit

Average prime rate

Demand for loans

Loan fund availability

Loan repayment rates

Renewals or extensions

Profitable Eras

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FEDERAL RESERVE BANK OF KANSAS CITY

Chart 2

GROSS FARM INCOME AND NET RETURNS TO FARM OPERATORS



Note: Calculations based on U.S. Census Bureau and USDA data deflated with CPI from the Federal Reserve Bank of Minneapolis.



Henderson, J., B. Gloy, and M. Boehlje. 2011. "Agriculture's Boom-Bust Cycles: Is This Time Different." *Economic Review* (Q IV):81–103. Available at: <http://www.kc.frb.org/publicat/econrev/PDF/11q4HendersonGloyBoehlje.pdf> [Accessed April 11, 2014].

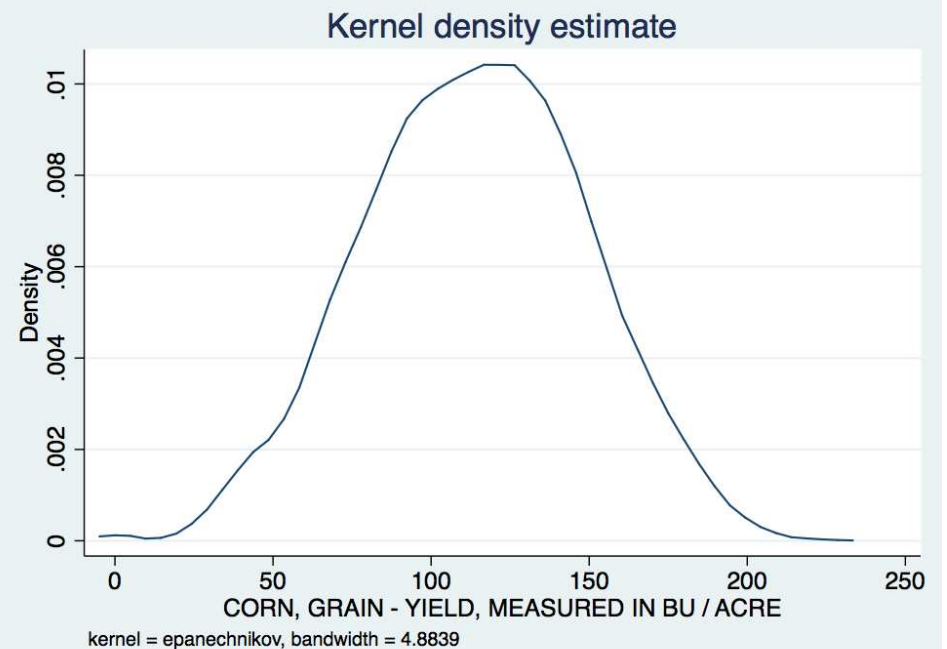
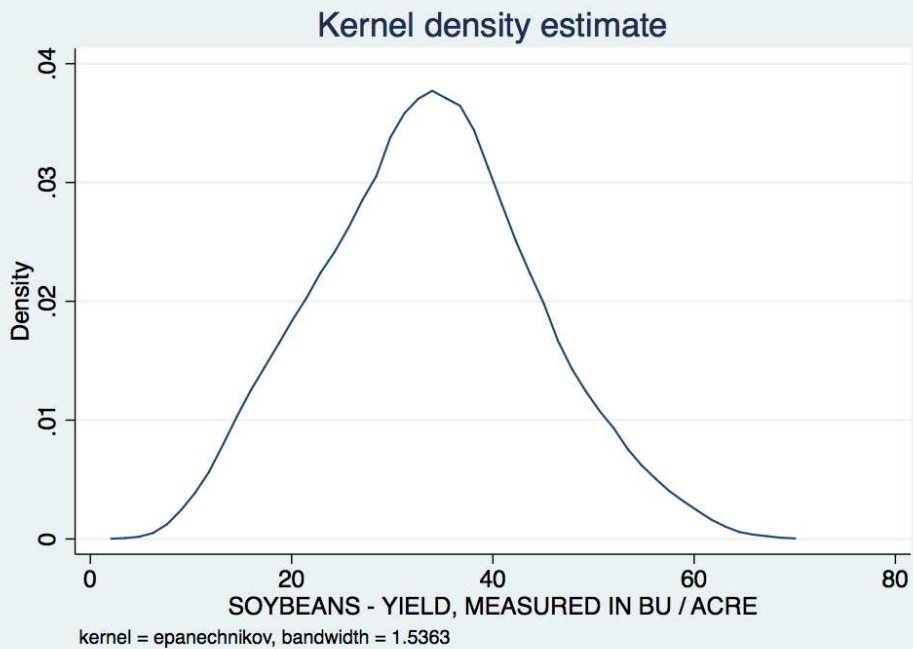
RE Panel Data Model

- $Yield = \beta_{0it} + \beta_{1it}Time + \beta_{2it}Weather + \beta_{3it}Credit + \beta_{4it}Percent\ Insured\ Acres + \beta_{5it}Price + \beta_{6it}Pre86 + \beta_{7it}Post05 + \varepsilon$
- Sample initially defined using the boundaries of the Federal Reserve Bank of Kansas City
 - Modified to include all of Missouri and none of New Mexico. Other states include: Colorado, Kansas, Nebraska, Oklahoma, and Wyoming
- 1981-2013
- Corn and Soybean Production

Reminder about Random Effects

- Stronger Assumptions than Fixed Effects
 - “...any unobserved heterogeneity as being distributed independently of the regressors. Then the effects are called **random effects**, though a better term is purely random effects” (Cameron and Trivedi 2005, p.697).
 - Inconsistent if this assumption is untrue.
 - $y_{it} = \alpha_i + \gamma_i + \mathbf{x}'_{it}\boldsymbol{\beta} + u_{it}$
 - N individual dummies, T-1 individual time dummies
 - $\alpha_i \sim [\alpha, \sigma_\alpha^2], \varepsilon_{it} \sim [0, \sigma_\varepsilon^2]$ both individual random effects, α , and the error term are iid.
 - The RE model assumes that the expectations of the individual specific effects are constant over time.
 - Hausman tests indicate that RE is proper model.
 - Panel-Robust Sandwich Standard Errors used.

Distribution of dependent variable



Regression Results: Robust Random-effects GLS regression, Dependent Variable: Corn Grain Yield in Bushels per Acre

| | Coefficient | Standard Error | P>z |
|------------------------------------|-------------|----------------|-------|
| Year | 1.072821 | 0.1289402 | 0.000 |
| Weather Index | 2.277613 | 0.4475849 | 0.000 |
| Credit Index | 1.17251 | 0.2715144 | 0.000 |
| Insured Proportion of Planted Corn | -8.71162 | 2.919534 | 0.003 |
| Corn Grain Price Received (t-1) | -1.56348 | 0.3847299 | 0.000 |
| Before 1986 (binary) | -7.83009 | 1.432134 | 0.000 |
| After 2005 (binary) | 4.041813 | 1.194719 | 0.001 |
| Constant | -2018.3 | 255.7451 | 0.000 |

* 275 Groups (Counties), 7170 Observations, Prob> $\chi^2 = 0.0000$

Weather index causes 155 (36%) observations to drop out

Regression Results: Robust Random-effects GLS regression, Dependent Variable: Soybean Yield in Bushels per Acre

| | Coefficient | Standard Error | P>z |
|--|-------------|----------------|-------|
| Year | 0.322368 | 0.034 | 0.000 |
| Weather Index | 1.893497 | 0.104 | 0.000 |
| Credit Index | 0.829861 | 0.110 | 0.000 |
| Insured Proportion of Planted Soybeans | -3.50936 | 0.740 | 0.000 |
| Soybean Price Received (t-1) | 0.288461 | 0.064 | 0.000 |
| Before 1986 (binary) | -5.42451 | 0.503 | 0.000 |
| After 2005 (binary) | 1.218922 | 0.384 | 0.002 |
| Constant | -606.127 | 68.253 | 0.000 |

228 groups (clusters) - 6002 observations - Prob > chi2 = 0.0000

Conclusions

- Results indicate that insured proportion has a small statistically significant negative effect on yield.
- This *may* in turn show that participation has encouraged cropping of environmentally sensitive land.
- Several limitations
 - Need better measures.
 - Weather, credit
 - More crops
 - Better estimation technique

Questions or Comments?

