Production Credit Associations and Agricultural Productivity Change in the United States, 1920-1940

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Motivation

- The Farm Credit System is an important topic of study:
  - Early attempt to address lack of financing to farmers.
  - Introduced the GSE model to US public policy.
  - Theory suggests cooperative ownership model as mechanism to remedy “missing market.”
- Today FCS is the backbone of agriculture finance in the US, but there is no empirical research that measures its impact at the time of its introduction.
- We focus on how the FCS tackled a specific problem, lack of short term lending, with the founding of the Production Credit Associations (PCA’s).

Research Question

Question: Did proximity to PCA's increase county level agricultural productivity and input spending?
Hypothesis: Agricultural productivity and input spending are decreasing in distance to serving PCA after 1935.

- We estimate a difference-in-difference fixed effects model using agricultural census data and bank locations in 1937.
- Significant effects on crop revenue, tractor ownership, and fertilizer spending.
- Counties closer to banks were relatively *less* productive prior to bank placement and *more* productive after.

History and Context

Table: Timeline

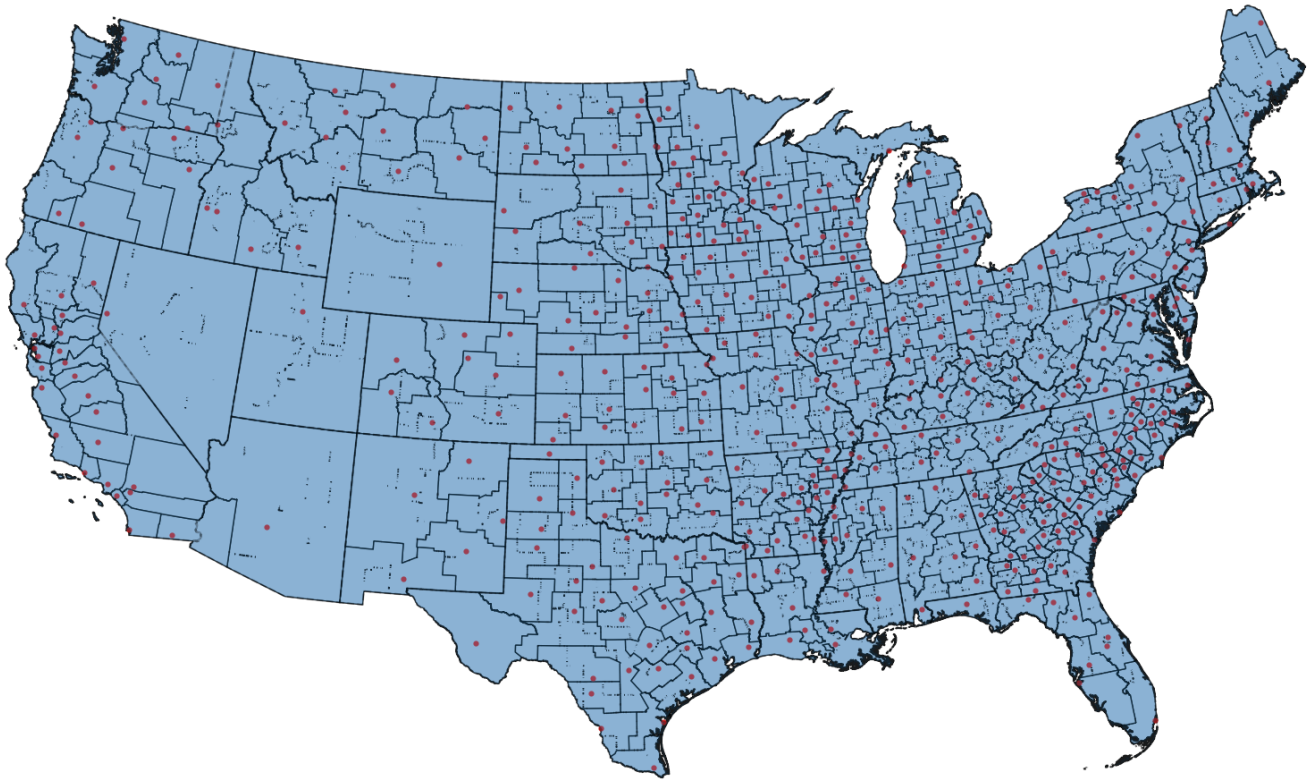
1916	Federal Farm Loan Act, sets up FCS, cooperative Land Banks for mortgages.
1921	Wheat price plummets, the “plow up” continues.
1923	Intermediate Credit Banks created to discount loans for co-ops and banks (failed).
1929	Stock market crash, causes farm foreclosures.
1933	Farm Credit Administration founded, Production Credit Associations chartered.
1935	Dust storms begin, start of Dust Bowl period.

Production Credit System

- Banks were capitalized by government funds and organized with local producers
- PCA's were required to pay back the funds the government lended them, though bonds issued by the FCS were tax exempt.
- PCA practices:
  - All lenders had to buy stock in the PCA.
  - Had to borrow from the PCA in their district.
  - Uniform interest rate ceiling of 6-8%.
- By 1946, served about 7% of total farmers.

Production Credit System

Bank Placement as of 1937



Data

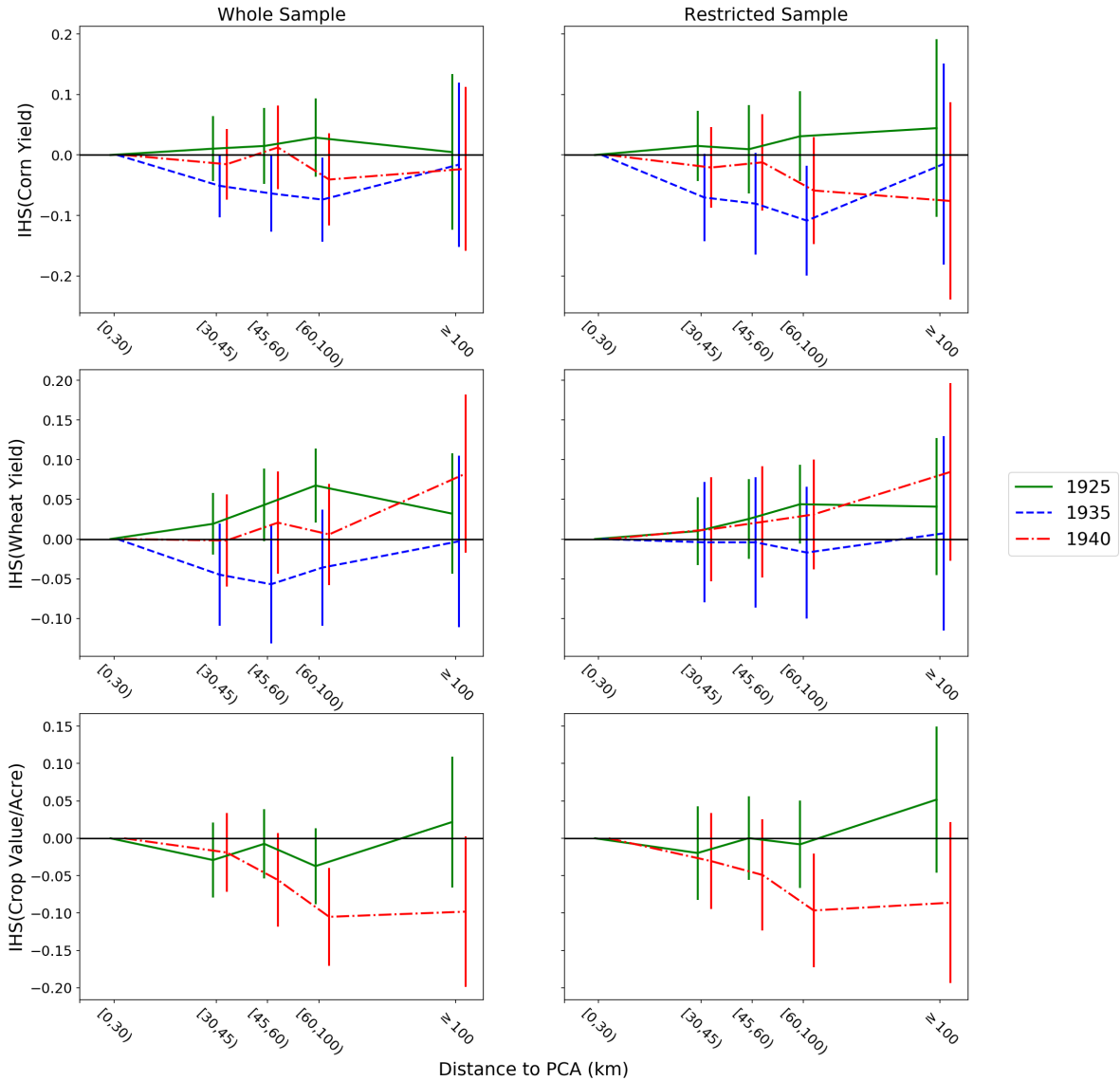
- Agricultural outcomes and county level variables:
  - US Agricultural Census 1920-1940
  - Measured every 5 years.
- Environment variables:
  - FAO GAEZ Soil Measurements.
  - PRISM Weather Data by year.
  - Soil erosion data from Hornbeck (2012)
- x: Linear distance from county centroid to serving PCA.
  - PCA map from 1937.
- New Deal spending data from Fishback et. al. (2005).

Empirical Strategy

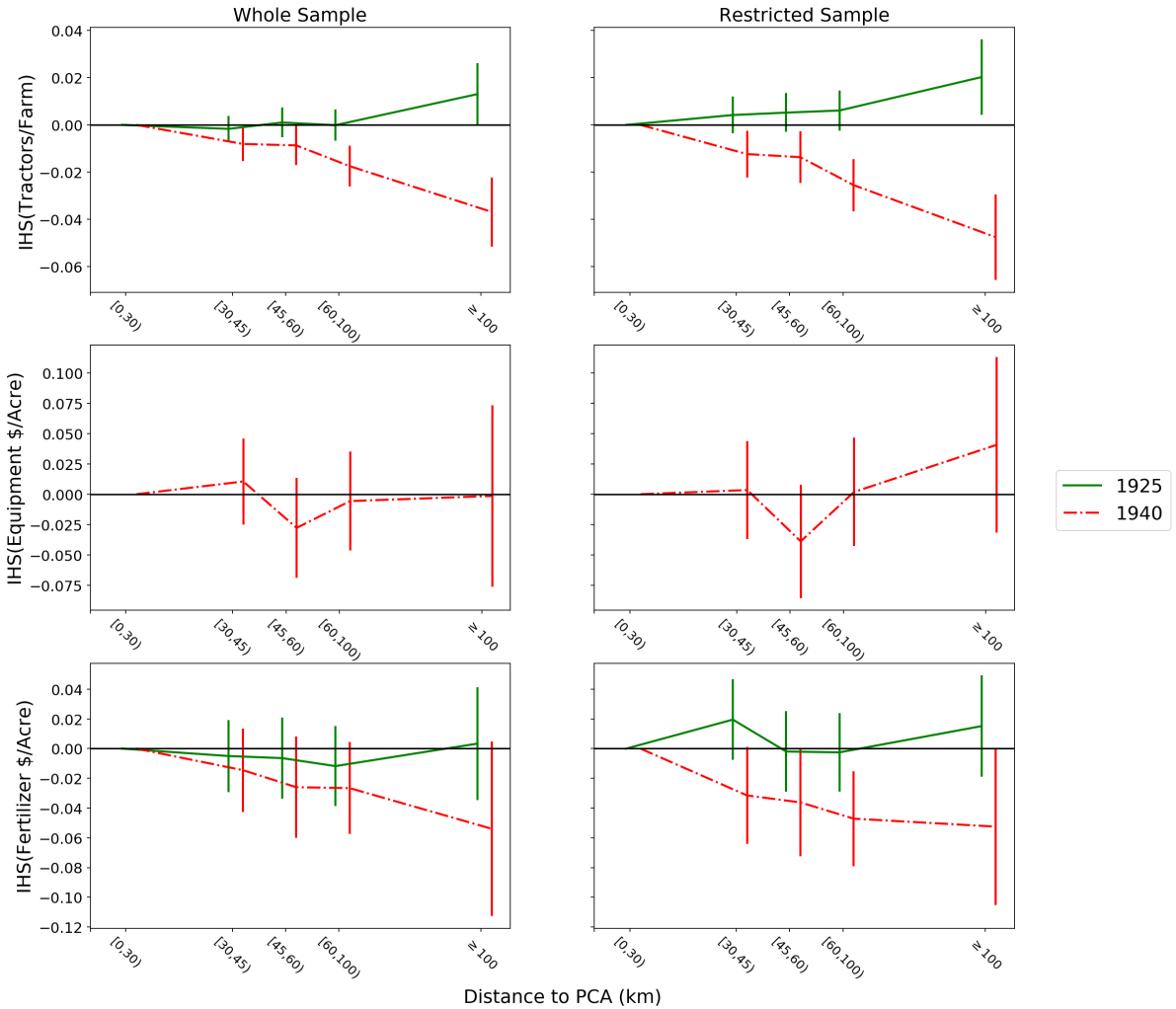
$$lnY_{it} = \alpha + \gamma Z_{ij} + \sum_{j=1920}^{1940} \beta_j x_i \times I(\text{year} = j) + \delta_j E_i \times I(\text{year} = j) + \mu_i + \tau_t + \epsilon_{it}$$

- Distance (km) x_i discretized roughly by quantile.
- Z and E are time variant and time invariant covariates respectively.
- Parallel trends: $\beta_{1920} = \beta_{1925} = \beta_{1930} = 0$.
- Hypothesis: $\beta_{1935} < 0, \beta_{1940} < 0$.
- "Restricted" sample excludes the South and some western states.

Results, Productivity



Results, Inputs



Summary

- Modest effects of 5-10%, but likely biased downwards.
- Currently in the process of digitizing bank level outcomes and locations in every year as well as liquidations.
- Enables a more detailed analysis of the effect of PCA's as well as opens up a variety of new topics:
  - Bank formation and survival.
  - The functioning of the system as a cooperative.
  - Effect on other financial markets.