Kansas Farmland Turnover Trends

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When do you buy the farm?

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Turnover-definition

Reality

Share of agricultural land that is transacted (sold) every year – county level

The dream

Beyond transactions – land that changes hands

Does an individual parcel change ownership? When was the last time the parcel changed ownership?

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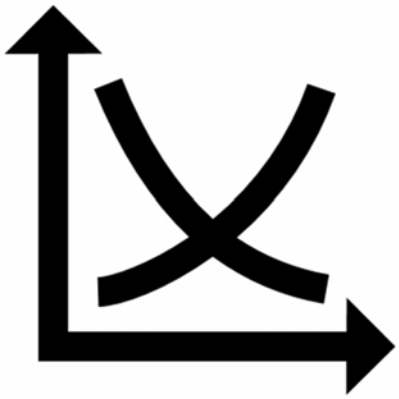
Why study farmland turnover?



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https://www.scott.k-state.edu/images/countylandvalues14.pdf

Why study farmland turnover?

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https://www.agkansitions.org/

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Outline

- Background
- Data
- Findings

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Background

- Not a currently active area of study in the U.S.
  - Most research focuses on price
- Some research studies using German data (slightly different focus)
- MS thesis
- Kansas farmland transactions data from 1985*2021

Research Objectives

1. Trends in turnover – over space and time
2. What factors best predict farmland turnover?
   - Farm Economy
   - Nonfarm economy – local and national
   - Demographics
3. What models most accurately predict farmland turnover?

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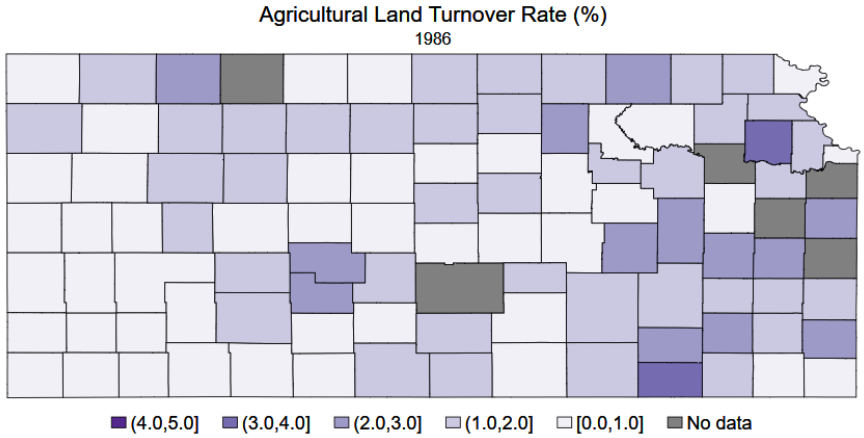
Kansas farmland turnover: 1986



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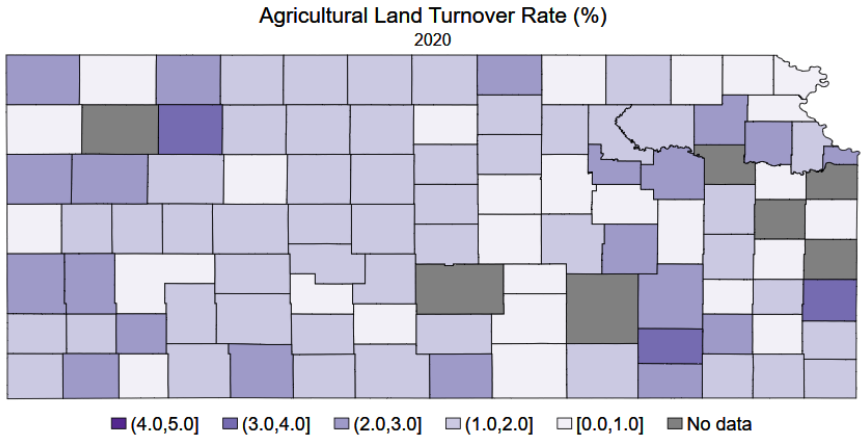
Kansas farmland turnover: 2020



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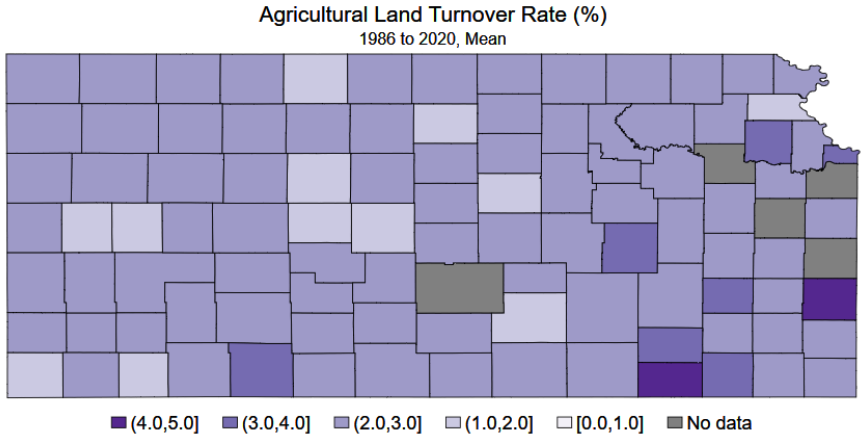
Kansas farmland turnover, 1986-2020



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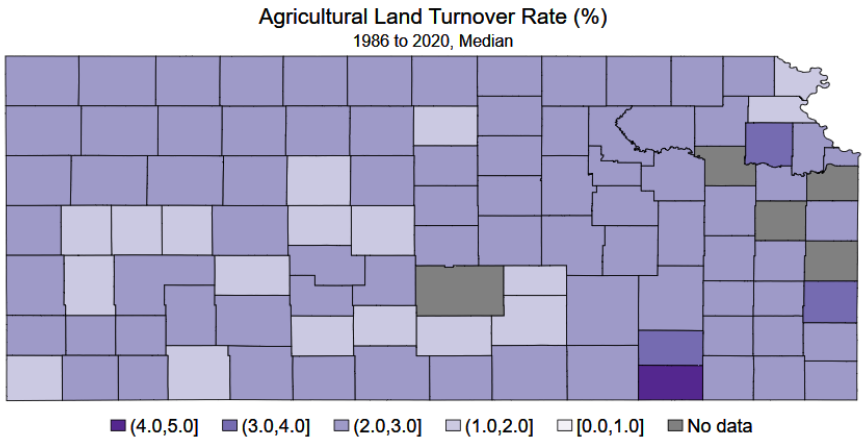
Kansas farmland turnover, 1986-2020



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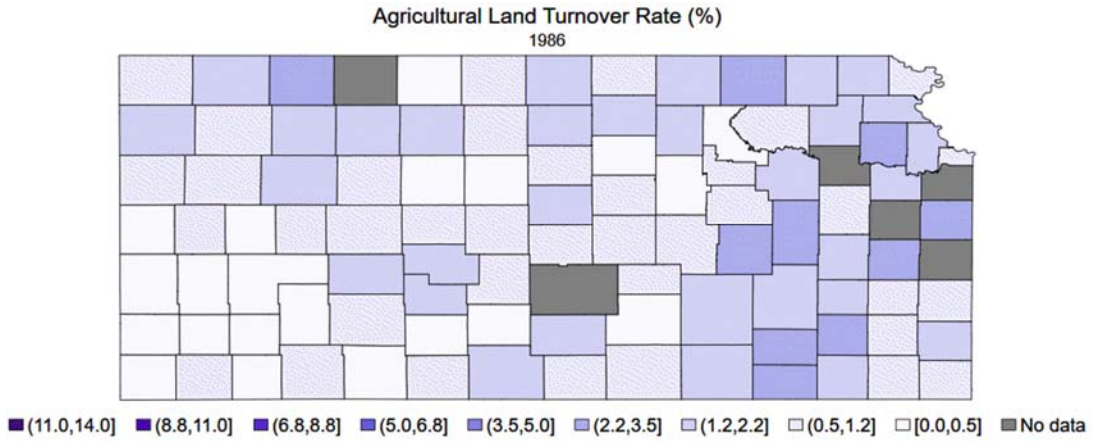
Kansas farmland turnover, 1986-2020



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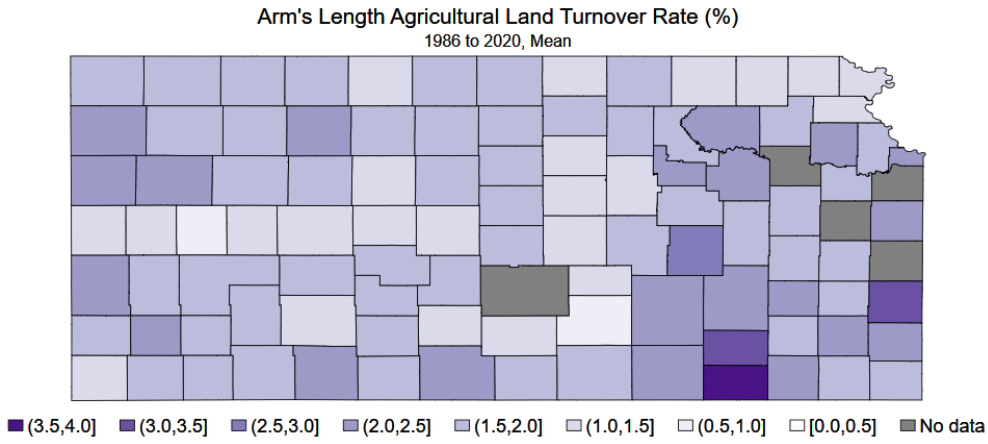
Kansas farmland turnover – arm's length only, 1986-2020



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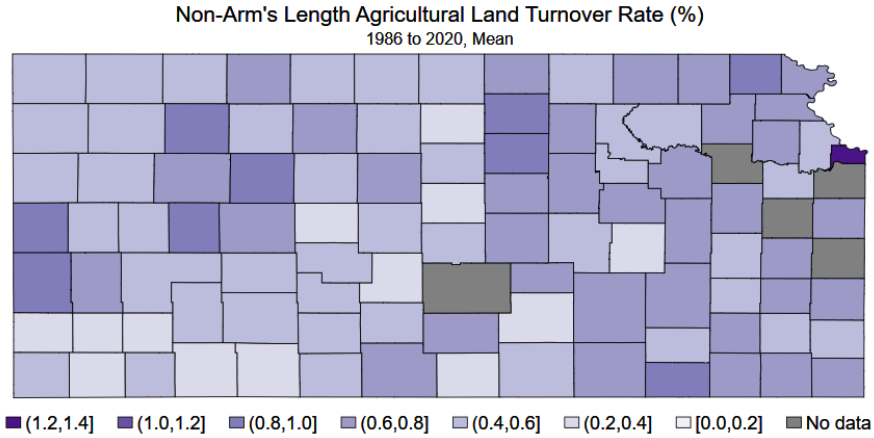
Kansas farmland turnover – non-arm's length only, 1986-2020



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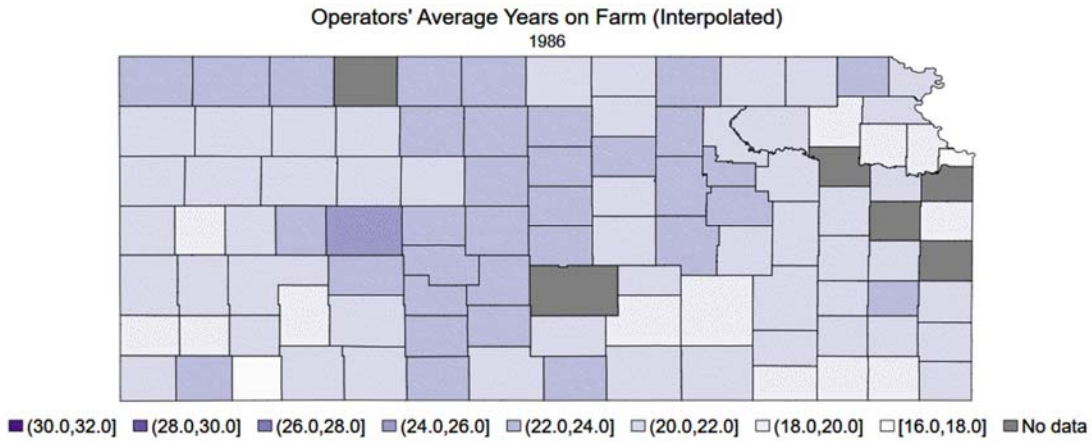
Number of years current operator has been on farm operation



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Source: USDA Census of Agriculture

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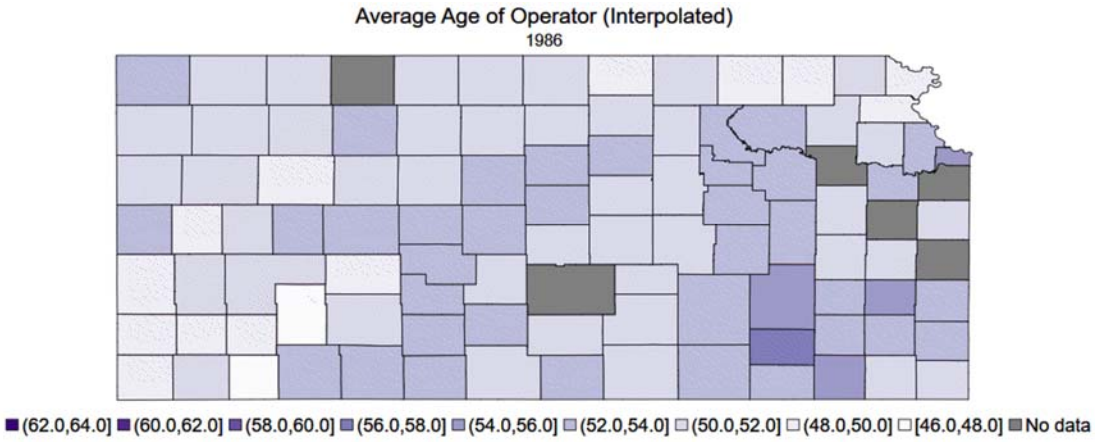
Farm operators are aging



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Source: USDA Census of Agriculture

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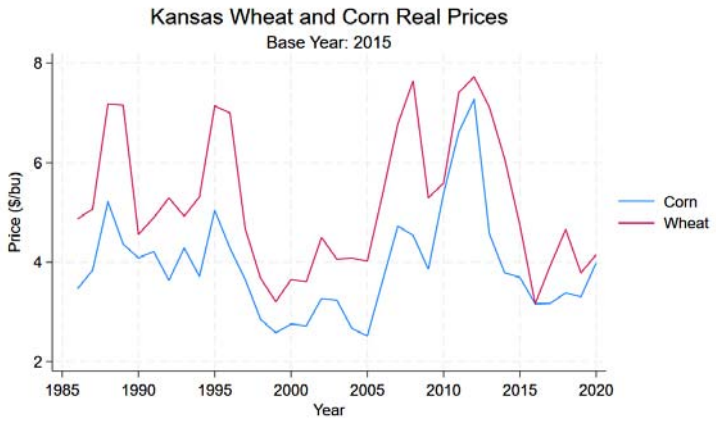
Wheat and corn prices are volatile



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Source: USDA NASS

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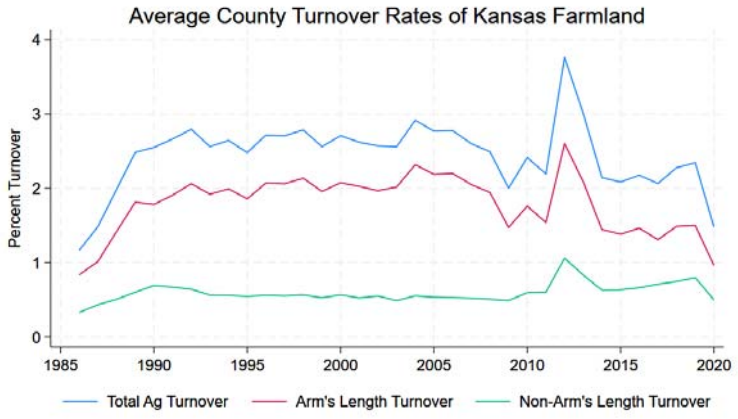
Average Kansas County Turnover: 1986-2020



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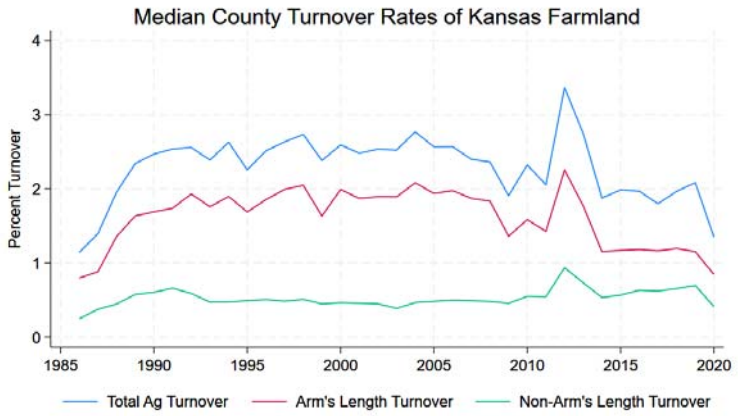
Median Kansas County Turnover: 1986-2020



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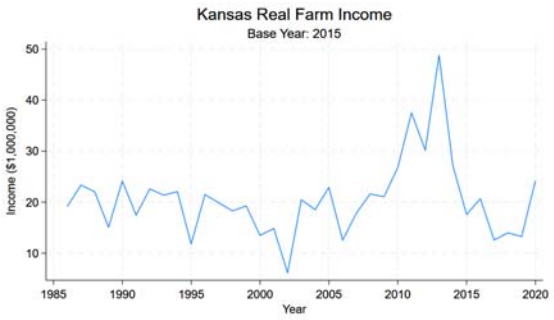
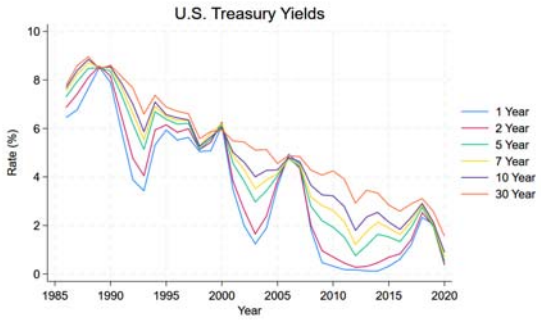
KS farmland markets determinants

Farm income



T-note



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Source: BEA, FRED - "Farm personal income comprises the net personal income of sole proprietors, partners, and hired laborers arising directly from the current production of agricultural commodities, both livestock and crops. It excludes corporate farm income"

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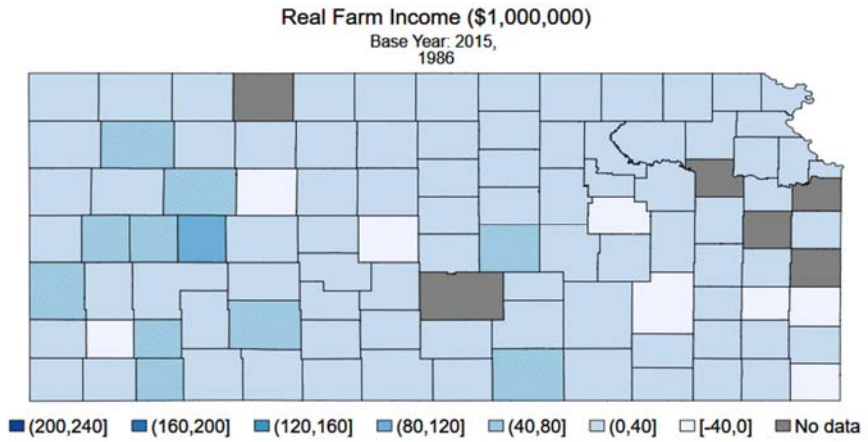
County farm income trends



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Source: BEA

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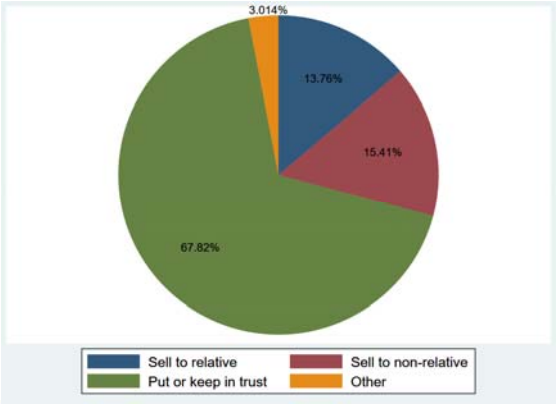
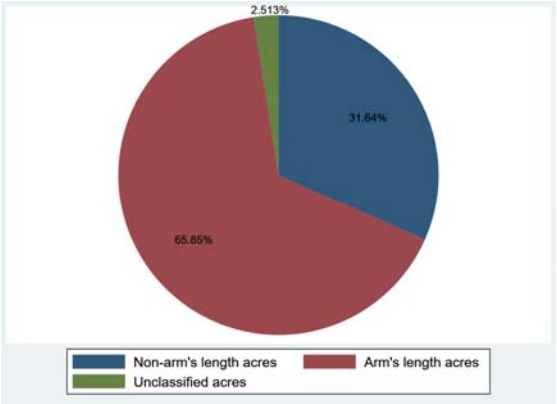
TOTAL Comparison

TOTAL Survey



Transactions data



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TOTAL Comparison

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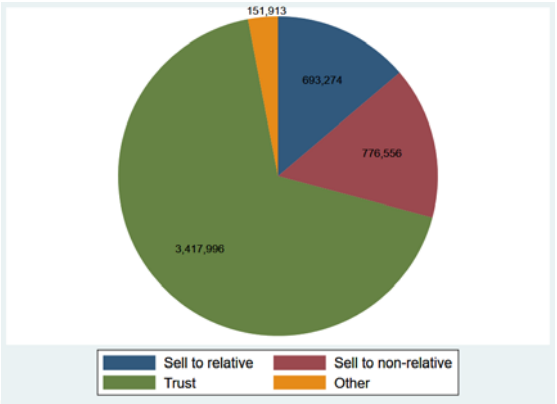

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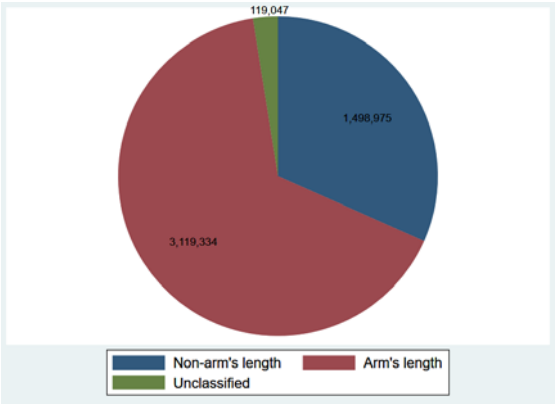

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Total comparison

- Not apples-to-apples, but magnitudes are comparable
  - Trusts not observed in transactions data (probably?)
- More sales than anticipated?
  - DDD
  - 2015-2019 was not a high-income period
  - Land intended for a trust sold instead?

Modeling farmland transactions

Supply

Demographics – retirement and capital accumulation

Farm economy – hold or sell; stress vs opportunistic sell

Nonfarm economy – household financial stress or retirement decision

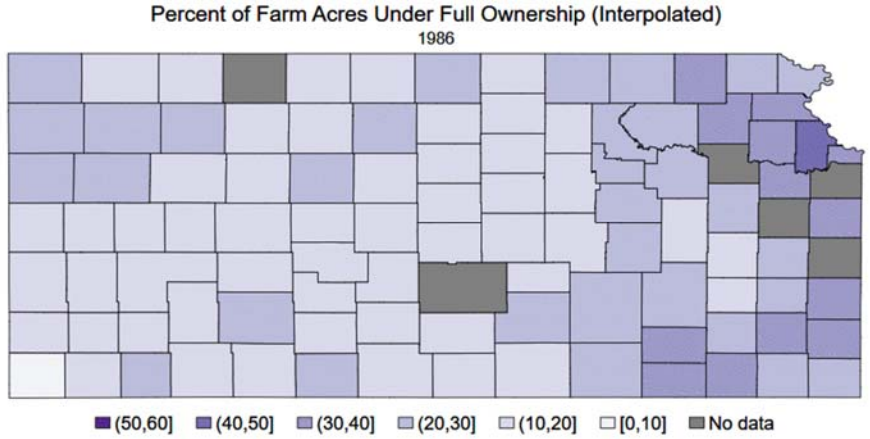
Demand

Demographics – beginning farms

Farm economy – attractiveness of farmland investment; cash for investment

Nonfarm economy – way to invest $$$ from strong economy; countercyclical to general economy

Transaction determinants: tenure



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NASS – land operated by operators that own all the land that they farm

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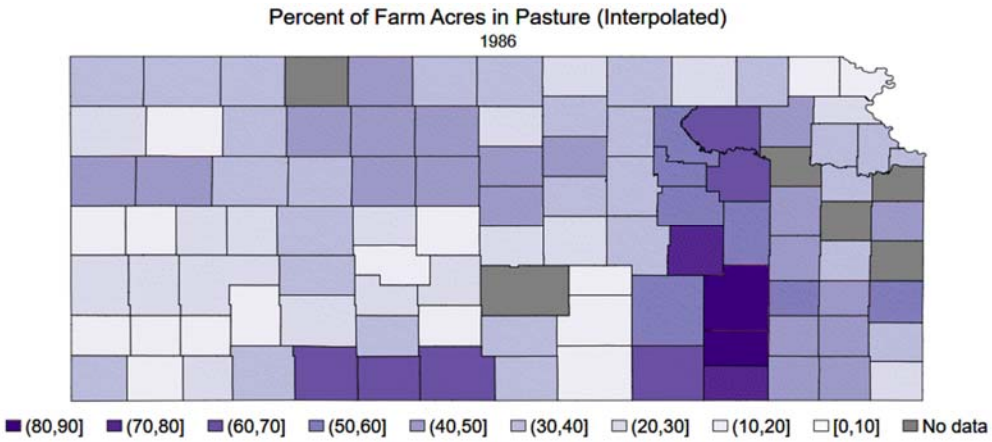
Transaction determinants: pasture



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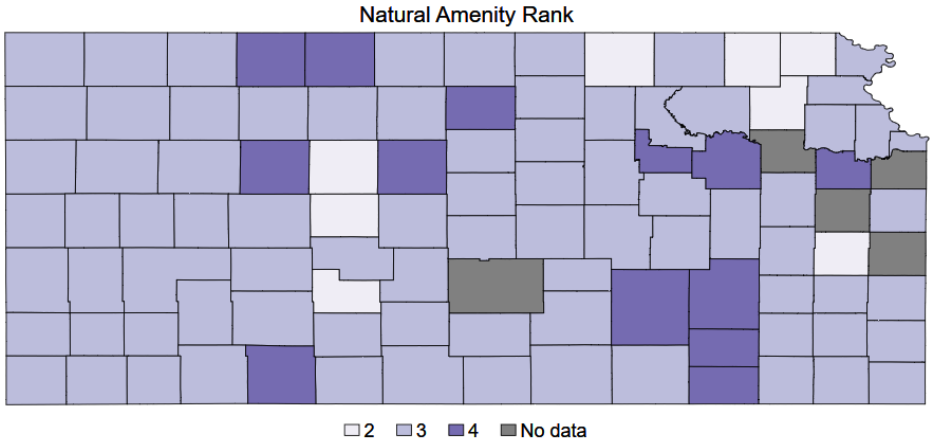
Transaction determinants: natural amenities



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Econometric methodology

- 700 + variables, including lags and moving averages
- Used multiple machine learning models
- These models rank variables (features) for their importance or value in **predicting** turnover
- Goals
  - Variable selection – many ways to measure what theory tells us matters
  - Exploratory/determinants analysis that can inform future research on farmland turnover

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What predicts turnover: approach 1

Demography is destiny?

Conditions over the 5 years matter more than current conditions

Operators' average age 5 years ago
Operator's average age 4 years ago
Operators average age 3 years ago
Farms that own all acreage – 2 years ago
Operators average age 2 years ago
Farms that own all acreage – 3 years ago
Farms that own part of their acreage – 2 years ago
Share pastureland – 2 years ago
Share pastureland -3 years ago
Share pastureland – 5 years ago
Share operators between 45 and 54 – 2 years ago
Max temperature 3 years ago
Farms that own all acreage –4 years ago
Share pastureland – 4 years ago
Share acres operated by a female – 5 years ago

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What predicts turnover: approach 2

Similar approach to above, but used an Olympic average

Preferred approach?

Kansas corn price 3 years ago
Operator's average age 4 years ago
Maximum temperature 3 years ago
Kansas wheat price 3 years ago
Operators average age 5 years ago
Kansas corn price 1 year ago
Natural amenity rank
Years on farm - 2 years ago
Current Kansas wheat price
Operator's average age 4 years ago
Current 2 year t-note yield (short term interest rates)
Farms that own all acreage – 2 years ago
Operator's average age 2 years ago
Years on farm - 2 years ago
Average wheat price over previous 3 years

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Low predictive power

- Local economic indicators
- Nearly all macroeconomic indicators
- Farm income measures (but related to prices)
- Cattle sector indicators
- Non-county specific factors

What did we learn?

- About 2.5% of farmland turns over every year, with substantial variability over time and space
  - Non-arms length is under 1% but fairly constant
- Turnover may be trending downward, but slowly
  - Trusts?
- Regional differences
  - Turnover is higher in eastern KS

What did we learn?

- Demographics and market structure predict turnover
- Farm economic factors predict turnover
- Macroeconomic and non-farm economic factors are less useful for predicting turnover
- Past conditions have more predictive power
  - Decisions
  - Expectations

What's next?

- Does our model accurately predict high turnover in 2021 or 2022?
- Publish results!
- National model
- Do taxation policies that are other favorable to farmland owners such as 'stepped up basis' influence farmland turnover?
- Application to land access issues

Questions?
Comments?
Thank you!

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