Machinery Investment and Repair Costs

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Presentation

- Background
- Data Used
- Data Analysis
- Observations
- Questions

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Background- KFMA

Kansas Farm Management Association (KFMA)

- Serving Producers in Kansas since 1930's
- 6 Associations and 24 Economists across Kansas
- Part of Department of Agricultural Economics at K-State
- Provide members with information to make decisions on their farm
  - Accounting systems and recordkeeping
  - On-farm visits
  - Accrual analysis
  - Tax planning and preparation
  - Financial benchmarking
  - Much more

Background- KFMA

KFMA Databank

- K-MAR-105 Association
  - Central information processing unit
  - Maintains data banks
  - Used for agricultural economics research and extension activities
- ___ years of farm level data for ___ farms

Background- Machinery Study

When producers choose to invest in updated equipment, what do you believe they are hoping to accomplish?

- Increased Efficiency of Operation
- Less Downtime During Planting/Harvesting/Spraying Windows
- Increased Acreage/Custom Hire Capacity
- Decreased Repair Costs
- Less Labor Needs
- Less Cash Machine Hire Cost (Planting, Spraying, Harvesting, etc)
- Increased Profitability of Operation
- Tax Management

Background- Machinery Study

Questions

- What is the relationship between producers who invest more in machinery and equipment and their repair costs?
- What is the relationship between producers who invest higher amounts in machinery and equipment and producers who show higher (or lower) profitability?
- Does size of operation play a part?
- Livestock vs. crop operations?
- Other costs in relation to varying levels of machinery investment
  - Fuel
  - Machine Hire

Data

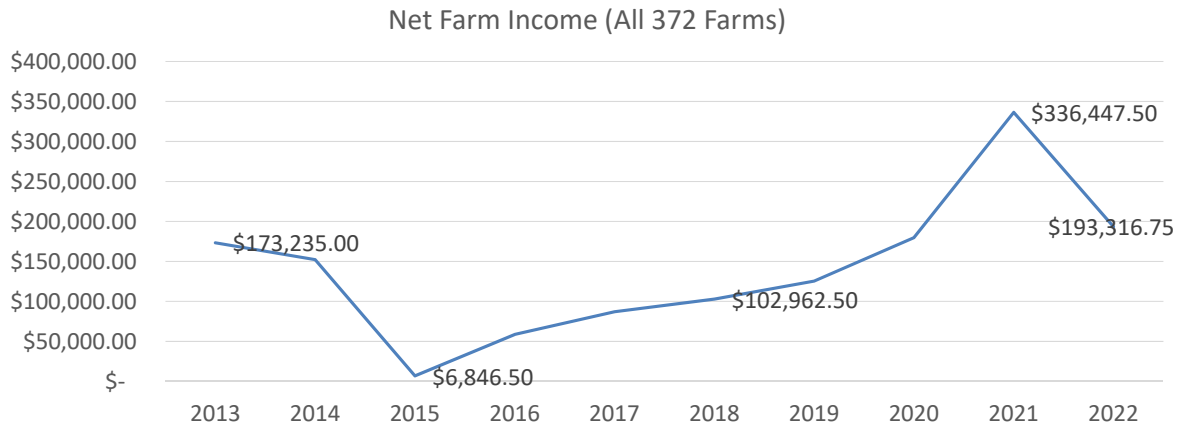
- 10 Years: 2013-2022
- 372 Farms
- Only farms included in analysis each of the last 10 years
- Ranked farms according to 2 separate criteria
  - Crop Machinery Investment per Crop Acre (avg cost over entire 10 years)
  - Crop Machinery Costs per Crop Acre (avg cost over entire 10 years)
- Divided each set into quartiles (93 farms per quartile)

Data- For each quartile, we looked at 10-yr trend for:

- Crop machinery investment
- Total crop acres
- NFI
- Total expenses
- Gross Crop Value
- Livestock value produced
- Repair costs
- Machine hire costs
- Fuel costs

- We Did Not Account for:
  - Geography
  - % of Irrigated Acres (not a sizeable difference amongst quartiles)
  - Crop Mix
  - Land Ownership Mix
  - Debt Load

Observations- Avg Net Farm Income



Crop Machinery Investment Per Crop Acre

(Listed Property Management Basis* Crop Motorized Depr %) +

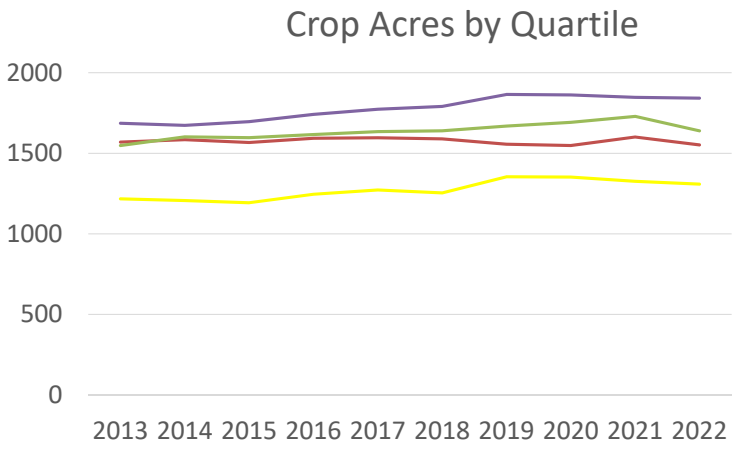
(Motorized Equipment Management Basis * Crop Motorized Depr %) +

(Machinery Management Basis * Crop Machinery Depr %)

Note: Depreciation Cost is a Standard Management Depreciation value used across all KFMA Farms (Sec 179 & Bonus Do Not Apply)

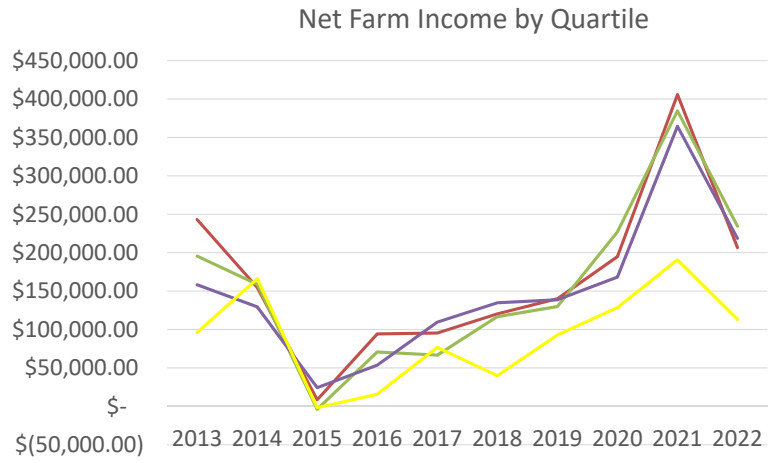
Note: Repairs, Fuel, Machine Hire, & Crop Machinery Investment Cost does not include the livestock portion for this study.

Observations- Crop Machinery Investment Quartiles



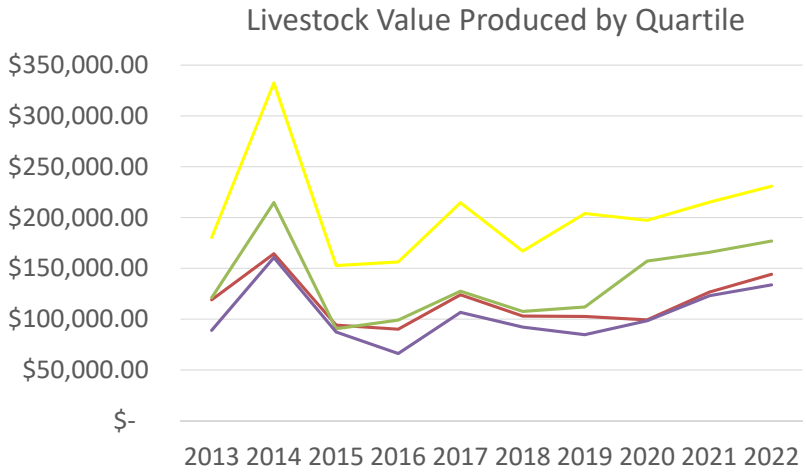
- High Quartile Avg 1,576 Ac
- High Mid Quartile Avg 1,637Ac
- Low Mid Quartile Avg 1,778 Ac
- Low Quartile Avg 1,273 Ac

Observations- Crop Machinery Investment Quartiles



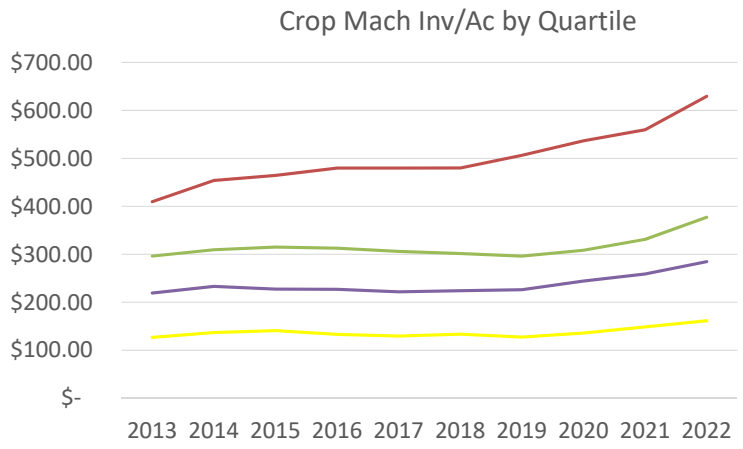
- High Quartile Avg $166,390
- High Mid Quartile Avg $158,089
- Low Mid Quartile Avg $150,046
- Low Quartile Avg $91,795

Observations- Crop Machinery Investment Quartiles



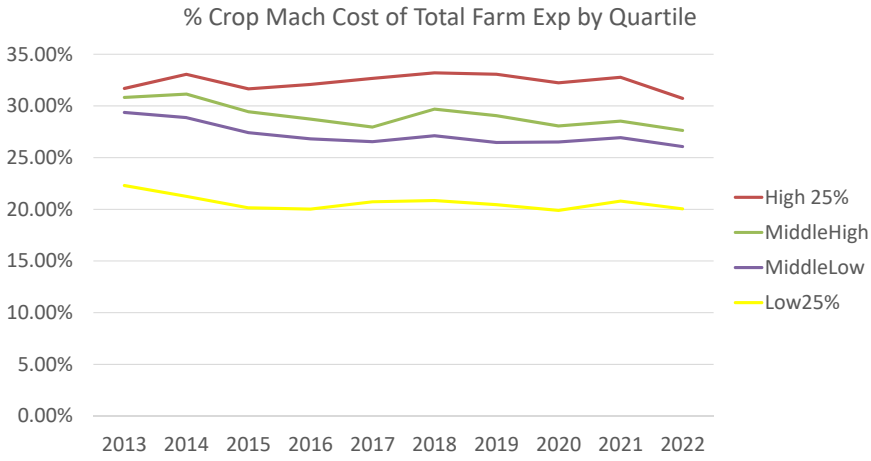
- Low 25% has Lowest # of Crop Acres, Lowest Net Farm Income and Highest Livestock Gross Income

Observations- Crop Machinery Investment Quartiles



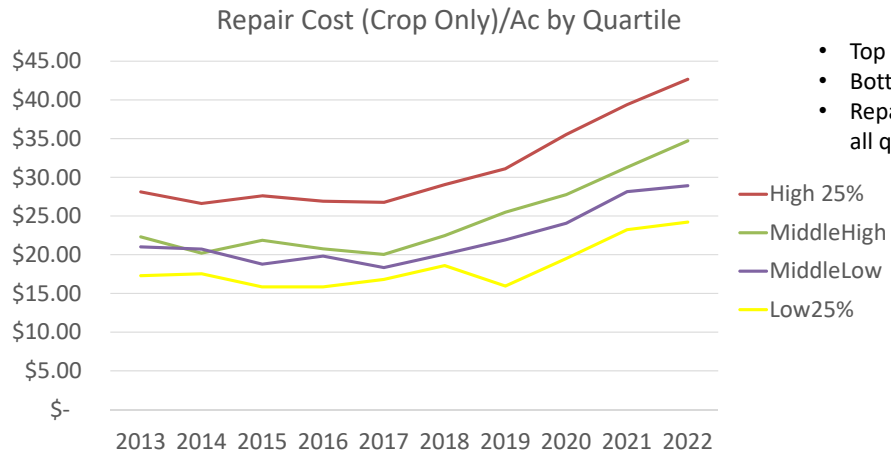
- High Quartile Avg $499.94/Ac
- Low Quartile Avg $137.45/Ac
- All Quartiles Have Seen An Increase of Inv/Ac >20%

Observations- Crop Machinery Investment Quartiles



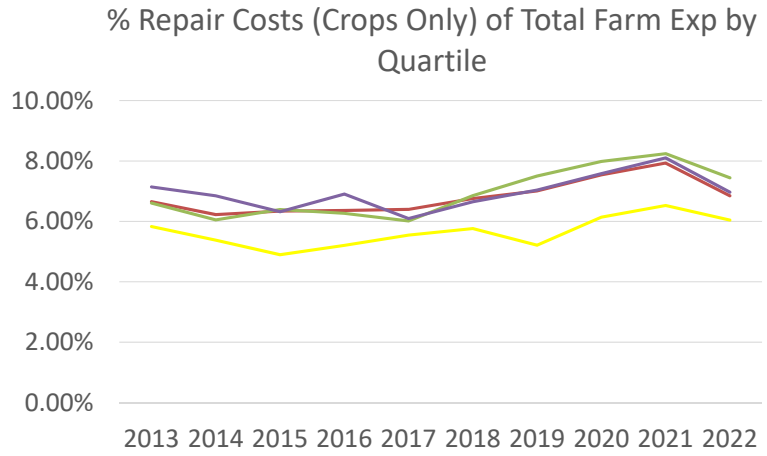
- Top Quartile Avg 32.31%
- Low Quartile is 20.65%
- Top Quartile Steady
- Bottom three quartiles have steadily dropped in past 10 years (12%)

Observations- Crop Machinery Investment Quartiles



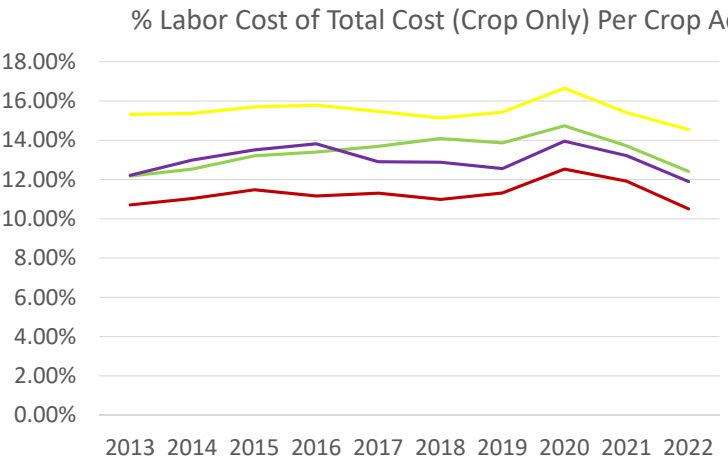
- Top Quartile Avg $31.37/Ac
- Bottom Quartile Avg $18.49/Ac
- Repair/Ac up an Avg of 31% across all quartiles during 10-year study

Observations- Crop Machinery Investment Quartiles



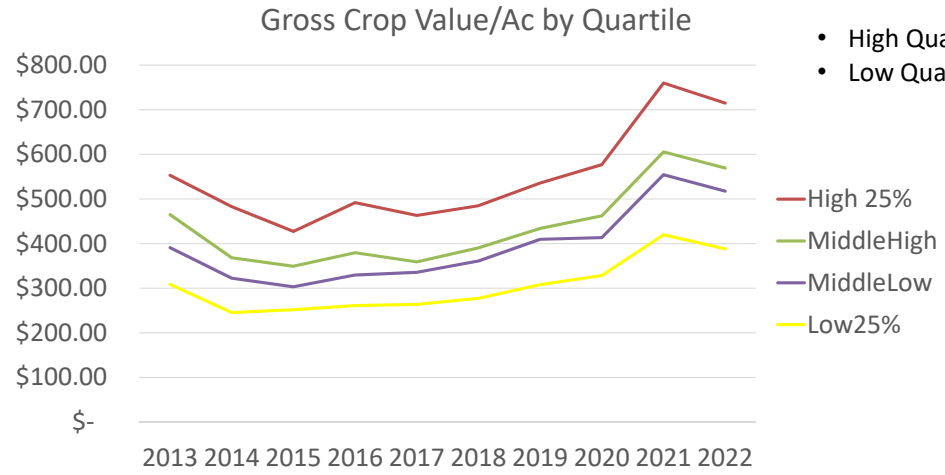
- Top 3 Quartiles Mostly Even
- Highest Quartile at Avg 6.81%
- Lowest Quartile at Avg 5.65%

Observations- Crop Machinery Investment Quartiles



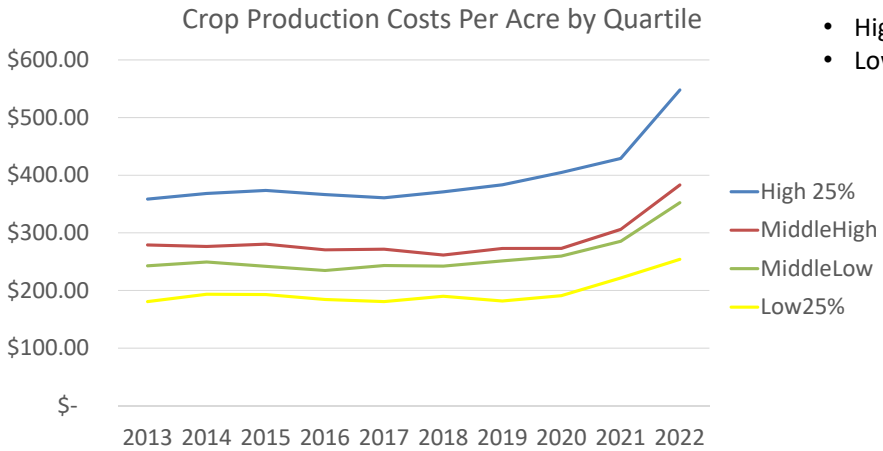
- Top Quartile Avg 11.29%
- Bottom Quartile Avg 15.48%
- Does Seem to be Correlation Between Mach Inv & Labor Cost

Observations- Crop Machinery Investment Quartiles



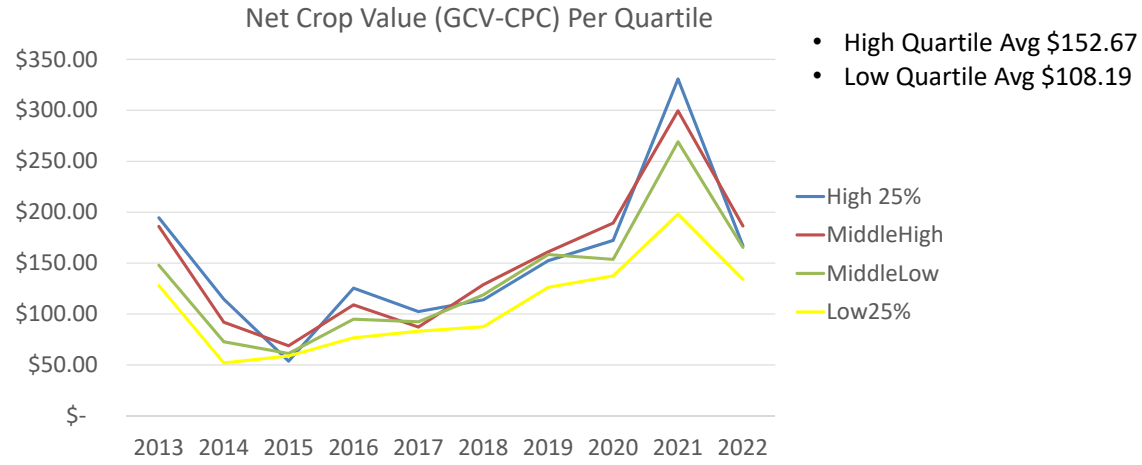
- High Quartile Avg $549.07
- Low Quartile Avg $305.34

Observations- Crop Machinery Investment Quartiles



- High Quartile Avg $396.39
- Low Quartile Avg $197.15

Observations- Crop Machinery Investment Quartiles



- High Quartile Avg $152.67
- Low Quartile Avg $108.19

Observations- Crop Machinery Investment Quartiles

Other Observations from Crop Machinery Investment Quartile Data

- The Bottom Quartile has the Highest Machine Hire Expense Per Acre
- On Average, Depreciation Cost on KFMA Farms is Approximately 10% of Total Expenses
  - 14% for the top quartile and 6% for the bottom quartile
- As a % of Total Farm Expenses, the Dollars Spent on Fuel has Dropped 20% in 10 Years
  - However, fuel per acre costs are up 14% in 10 year
- Crop Machinery Costs Per Acre has Increased by 22% in 10 Years
  - Avg $98/ac in 2013; Avg $127/ac in 2022

Crop Machinery Cost Per Crop Acre

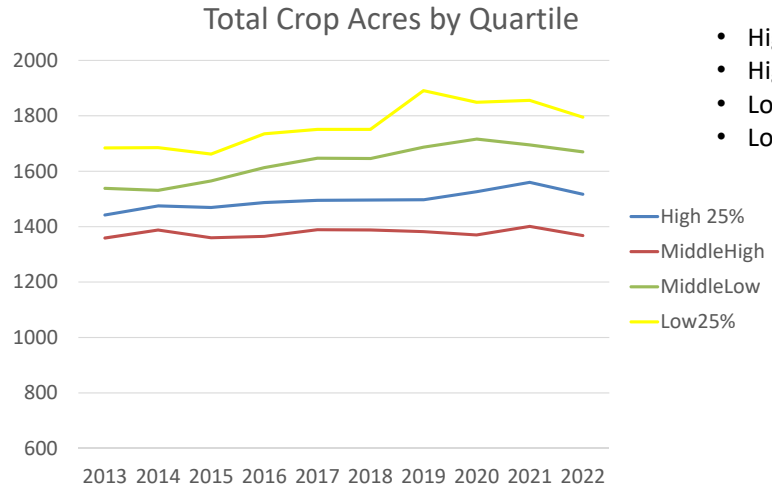
Crop Machinery Cost=

Crop share of Total Machinery (Depreciation, Repairs, Fuel, Machine Hire) + (Crop Machinery Investment * Intermediate Interest Rate)

Note: Depreciation Cost is a Standard Management Depreciation value used across all KFMA Farms (Sec 179 & Bonus Do Not Apply)

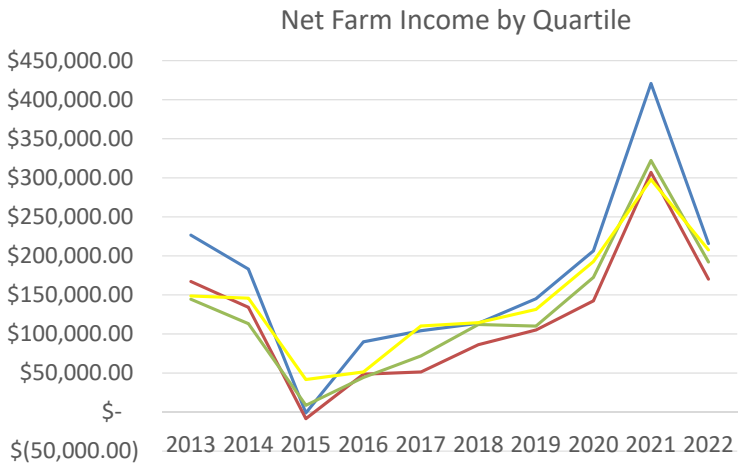
Note: Repairs, Fuel, Machine Hire, & Crop Machinery Investment Cost does not include the livestock portion for this study.

Observations- Crop Machinery Cost Quartiles



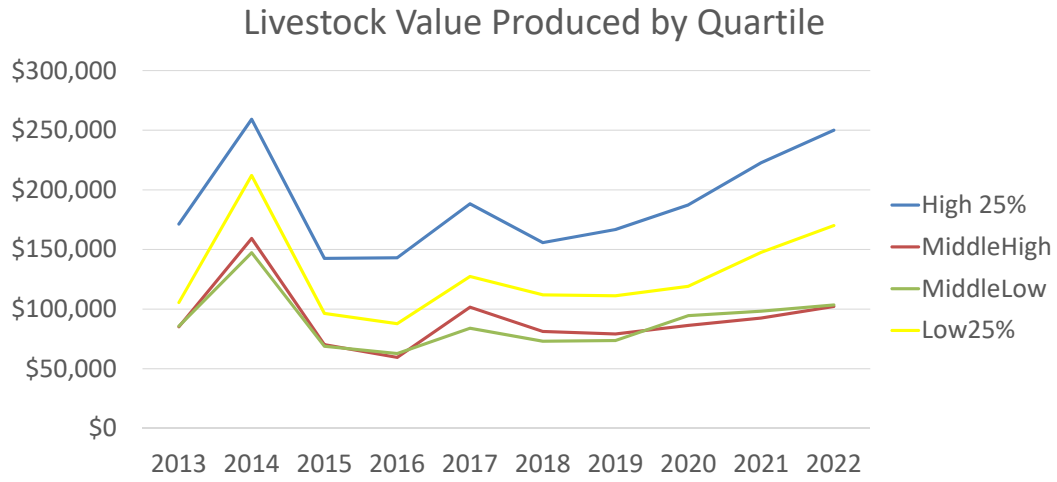
- High Quartile Avg 1496 Ac
- High Mid Quartile Avg 1377 Ac
- Low Mid Quartile Avg 1631 Ac
- Low Quartile Avg 1766 Ac

Observations- Crop Machinery Cost Quartiles

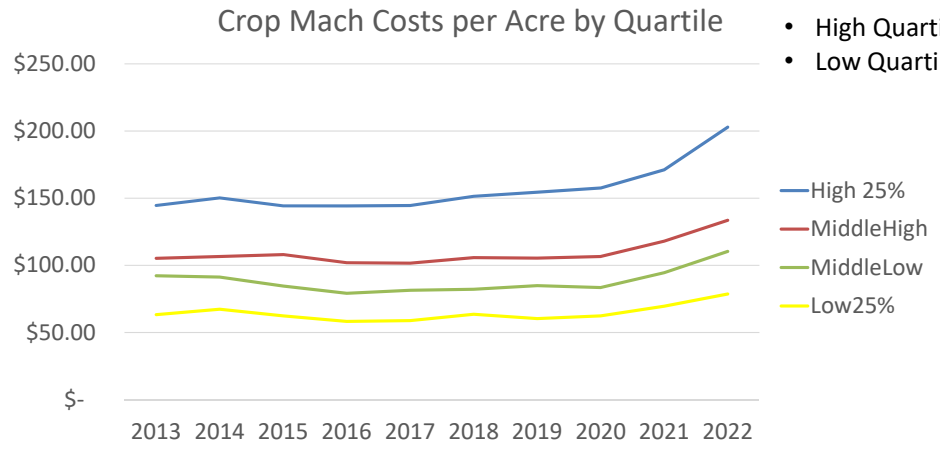


- High Quartile Avg $170,491
- High Mid Quartile Avg $120,380
- Low Mid Quartile Avg $129,183
- Low Quartile Avg $144,227

Observations- Crop Machinery Cost Quartiles

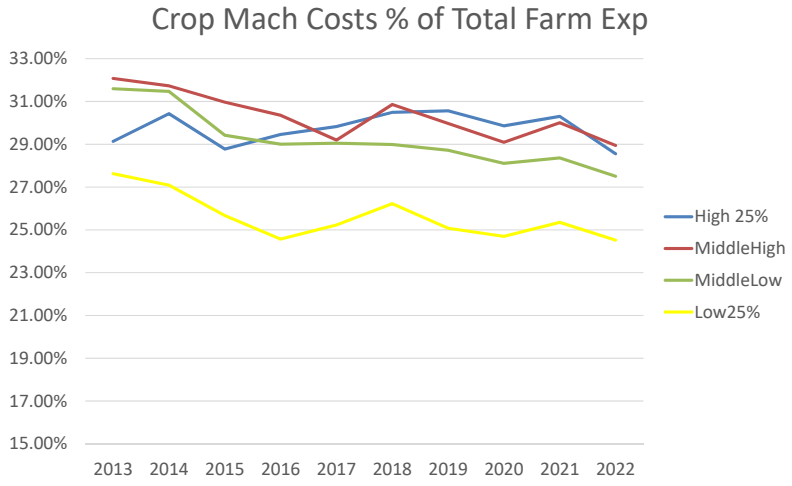


Observations- Crop Machinery Cost Quartiles



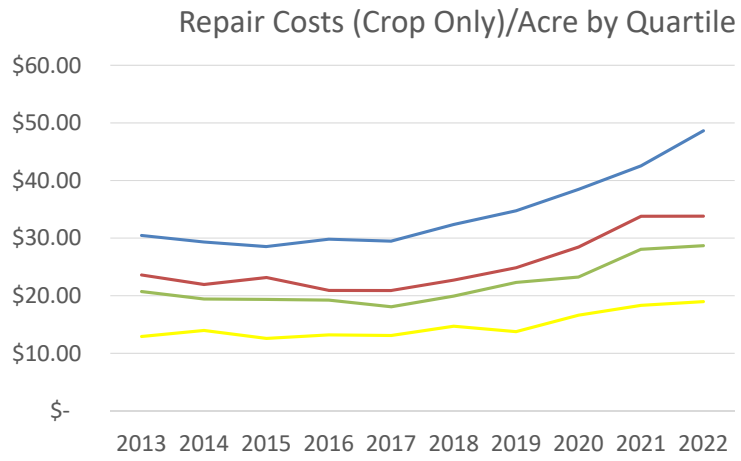
- High Quartile Avg $156.51/Ac
- Low Quartile Avg $64.44/Ac

Observations- Crop Machinery Cost Quartiles



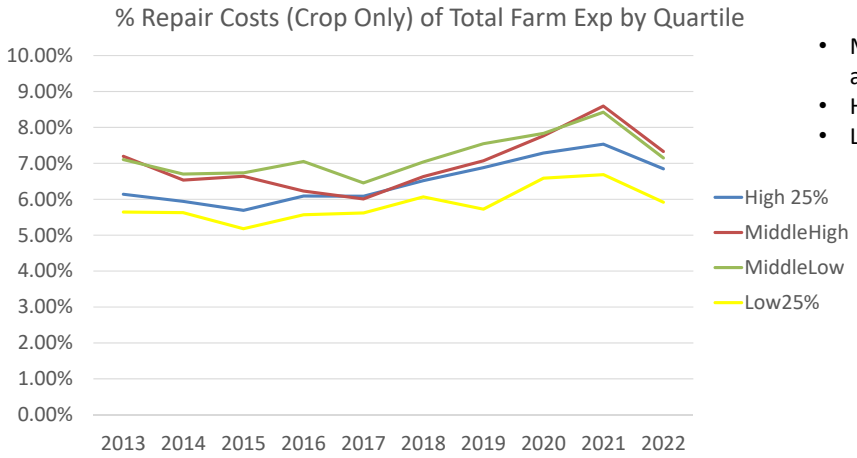
- Top 3 Quartiles are nearly 30% on Average
- Low Quartile is 26%
- All quartiles have steady dropped in past 10 years

Observations- Crop Machinery Cost Quartiles



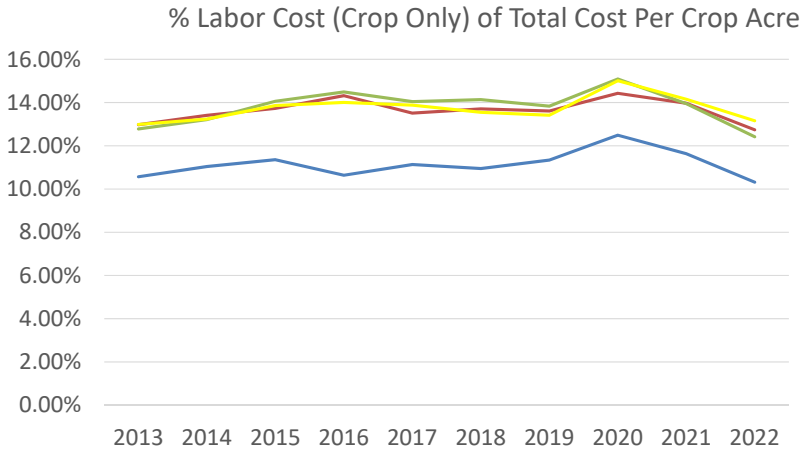
- Top Quartile Avg $34.44/Ac
- Bottom Quartile Avg $14.82/Ac
- Repair/Ac up an Avg of 47% across all quartiles during 10-year study

Observations- Crop Machinery Cost Quartiles



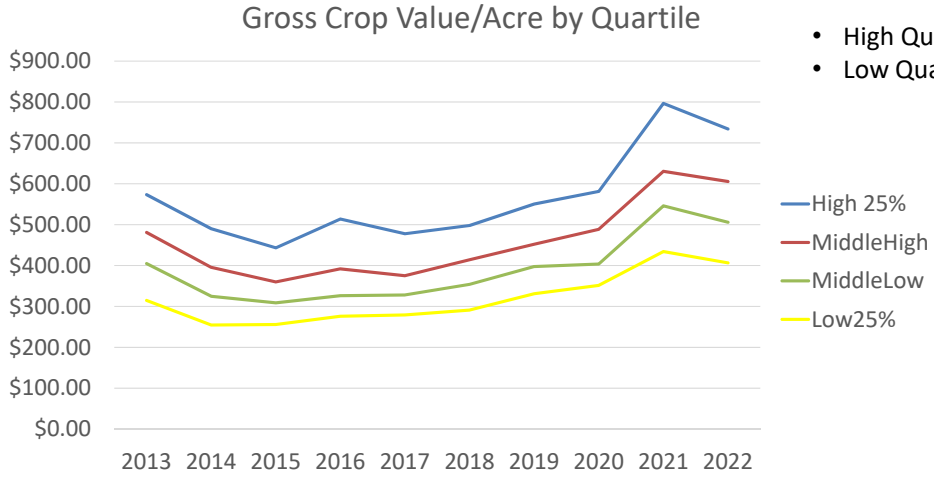
- Middle Two Quartiles are Highest at Avg of 7.1%
- Highest Quartile at Avg 6.5%
- Lowest Quartile at Avg 5.86%

Observations- Crop Machinery Cost Quartiles



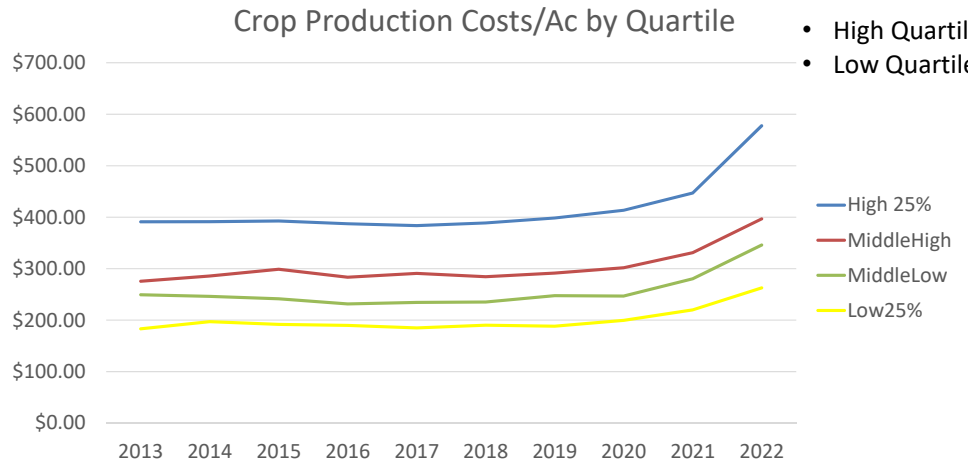
- Bottom Three Quartiles Avg 13.72%
- Top Quartile Avg 11.15% Avg

Observations- Crop Machinery Cost Quartiles



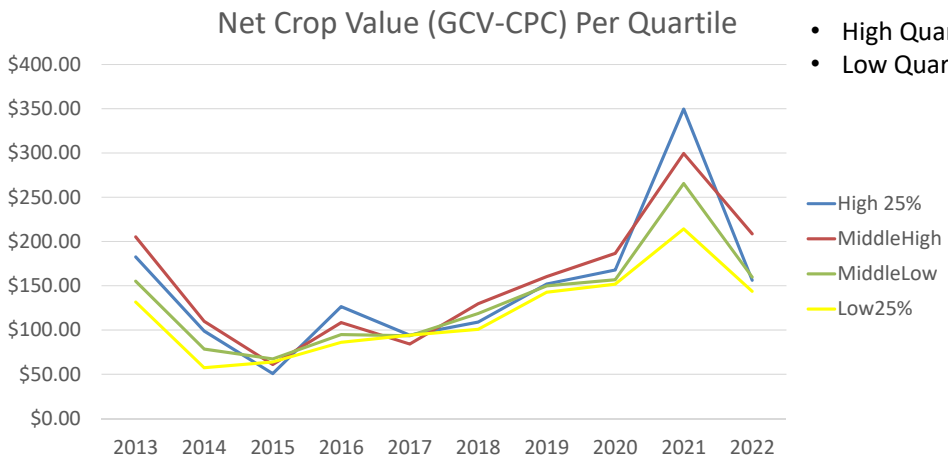
- High Quartile Avg $565.87
- Low Quartile Avg $319.45

Observations- Crop Machinery Cost Quartiles



- High Quartile Avg $417.12
- Low Quartile Avg $200.80

Observations- Crop Machinery Cost Quartiles



- High Quartile Avg $148.75
- Low Quartile Avg $118.65

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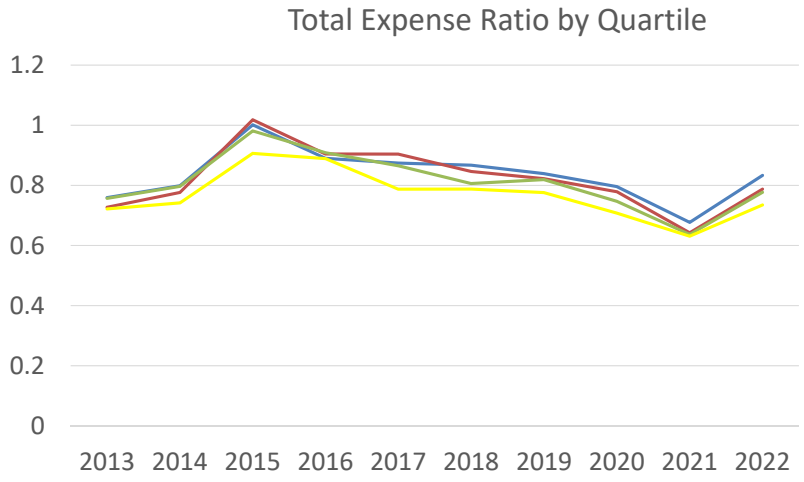
Observations- Crop Machinery Cost Quartiles



- High Quartile Avg .834
- Low Quartile Avg .768
- There is potentially a correlation between CMC and overall efficiency

Results- Machinery Study

The results of our 2023 study is very similar to a previous study conducted in 2014 by the Economists in KFMA, North Central.

- 2014 Study on 218 farms in North Central Kansas (2004-2013)

- Results and observations

1. Low machinery costs managers are low-cost managers on all costs.
2. There is not a relationship between machinery investment and reduced repairs.
3. The relationship between farm size and equipment costs is inconsistent.
4. Machinery costs are important to Net Income, but not the driver.
5. Net farm income and equipment investment per acre have a direct relationship

Questions?