



## Factors Impacting Farm Growth

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- Outline of Paper
  - Introduction
  - Methods
  - Data
  - Results
  - Summary and Conclusions
- Performance Benchmarks
- MAST
  - November 2006; March 2007



## Introduction

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- Farm growth is impacted by internal and external factors.
- Internal Factors
  - Operator age, farm size, cost efficiency, technology adoption, crop intensity, land tenure, nonfarm income, and financial structure
- External Factors
  - Input and output price changes, and changes in government program and crop insurance program provisions

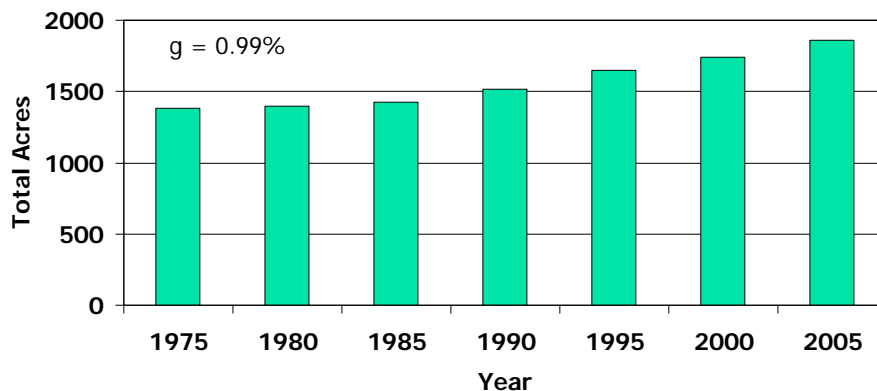


## Introduction

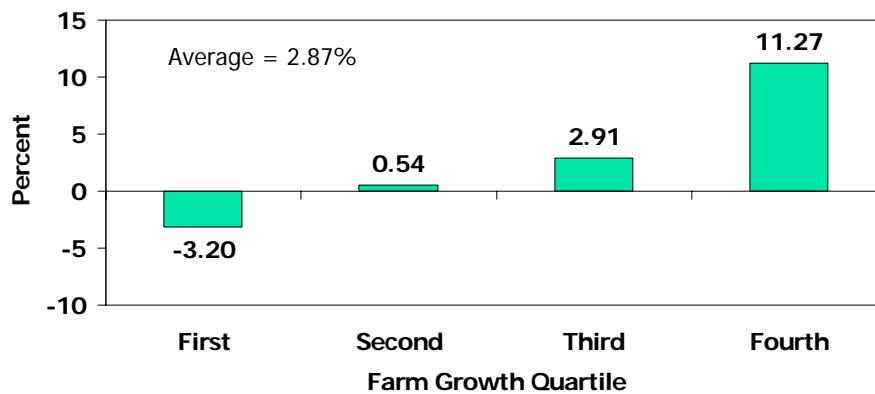
- Using KFMA data this presentation examines internal factors impacting the growth rate of total acres.
- Specifically, the growth rate of total acres is related to farm size, nonfarm income, percent acres owned, operator age, cost efficiency, technology adoption, crop intensity, and financial structure.



## Average Farm Growth KFMA Farms



## Farm Growth Variability KFMA Farms with Continuous Data, 1996-2005



## Methods


- Quartiles
  - Farm Growth
    - First – lowest growth
    - Fourth – highest growth
  - Farm Size
    - First – Less than \$100,000 in value of farm production
    - Fourth – Greater than \$500,000 in value of farm production
- Correlation Coefficients
  - Range from -1 to 1



## Methods

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- Factors
  - Farm Size
  - Nonfarm Income
  - Percent Acres Owned
  - Age of Operator
  - Adjusted Total Expense Ratio
  - Labor Efficiency Index
  - Less Tillage Index
  - Crop Intensity Index
  - Financial Structure



## Methods

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- Adjusted Total Expense Ratio
  - $(\text{Total Expense} + \text{Unpaid Labor}) / \text{Value of Farm Production}$
- Labor Efficiency Index
  - $(\text{Hired Labor} + \text{Unpaid Labor}) / \text{Value of Farm Production}$



## Methods

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- Less Tillage Index
  - $(\text{Herbicide and Insecticide Cost}) / \text{Crop Machinery Cost}$
- Crop Intensity Index
  - $\text{Harvested Acres} / \text{Crop Acres}$



## Methods

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- Financial Structure
  - Current Ratio
  - Debt to Asset Ratio



## KFMA Data

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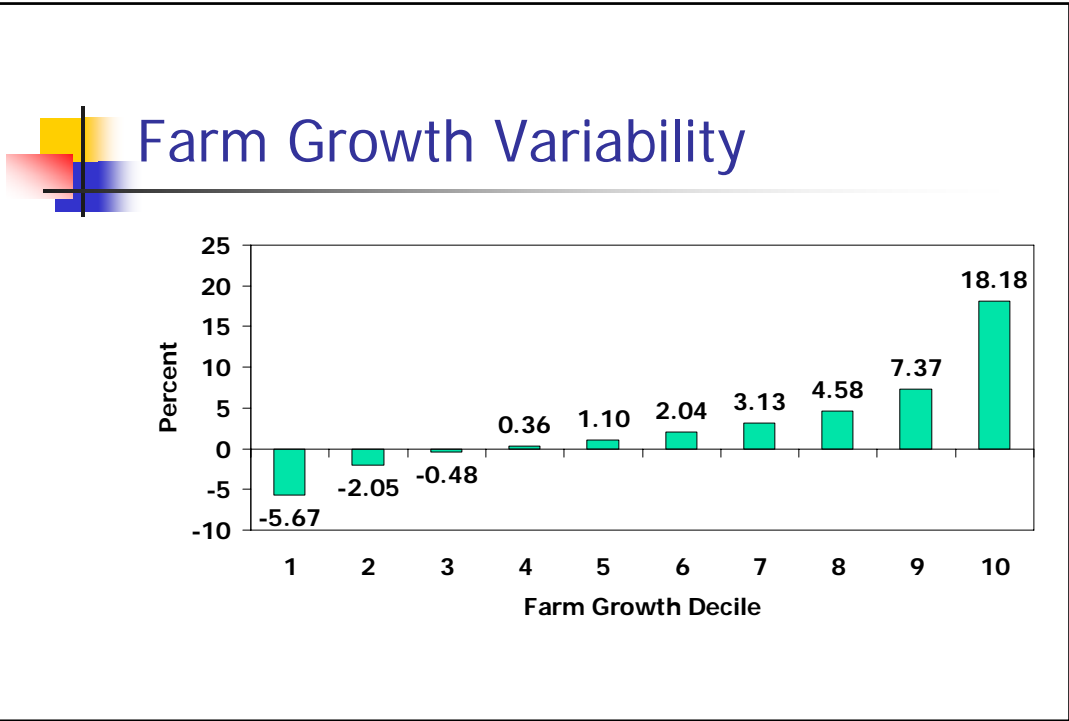
- KFMA crop farms with continuous data from 1996 to 2005
- These 719 farms represent approximately 47% of the farms with whole-farm analysis data in 2005



## KFMA Data

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- Averages:
  - Growth Rate in Total Acres = 2.87%
  - Approximately 31% of the farms had a negative growth rate indicating that these farms actually became smaller over time.
  - A growth rate of 7.20% would result in a doubling of farm size in 10 years.



- ## KFMA Data
- Averages:
    - Value of Farm Production = \$225,707
    - Total Acres = 1,760
    - Percent Acres Owned = 32%
    - Time Devoted to Crop Production = 84%
    - Operator Age = 54
    - Nonfarm Income = \$10,719



## KFMA Data

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- Averages:
  - Adjusted Total Expense Ratio = 0.95
  - Labor Efficiency = 0.20
  - Less Tillage Index = 0.25
  - Crop Intensity Index = 0.94
  - Current Ratio = 2.07
  - Debt to Asset Ratio = 0.29



## Results

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- Quartiles:
  - Farm Growth
  - Farm Size
- Correlation Coefficients
  - Comparisons below will focus on factors with the highest level of significance

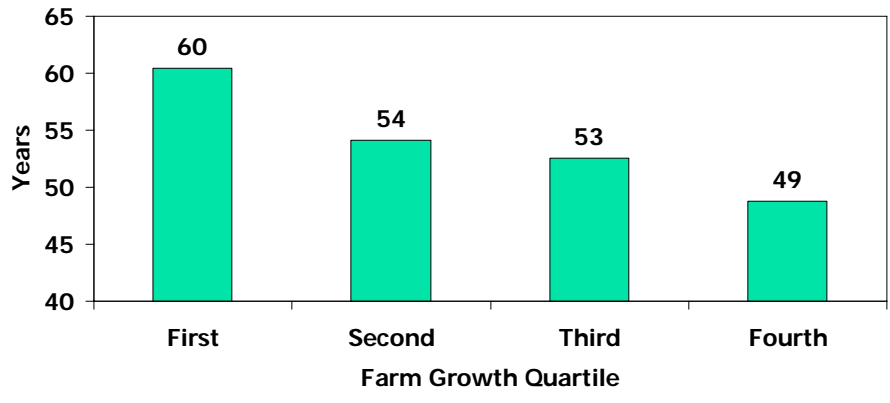


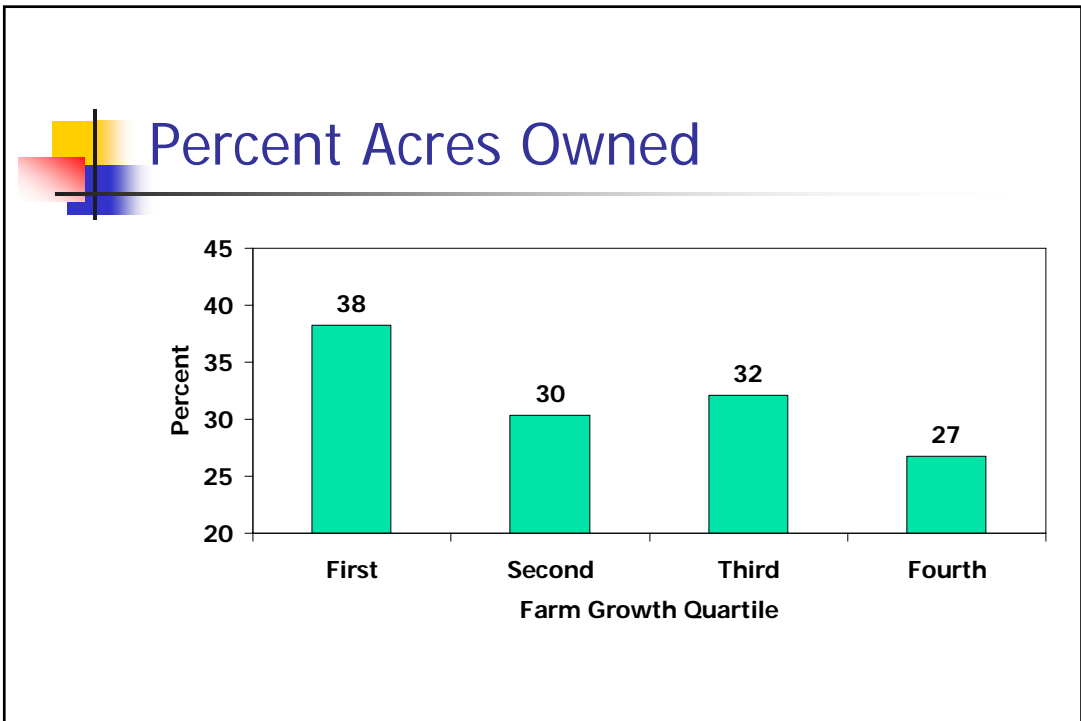
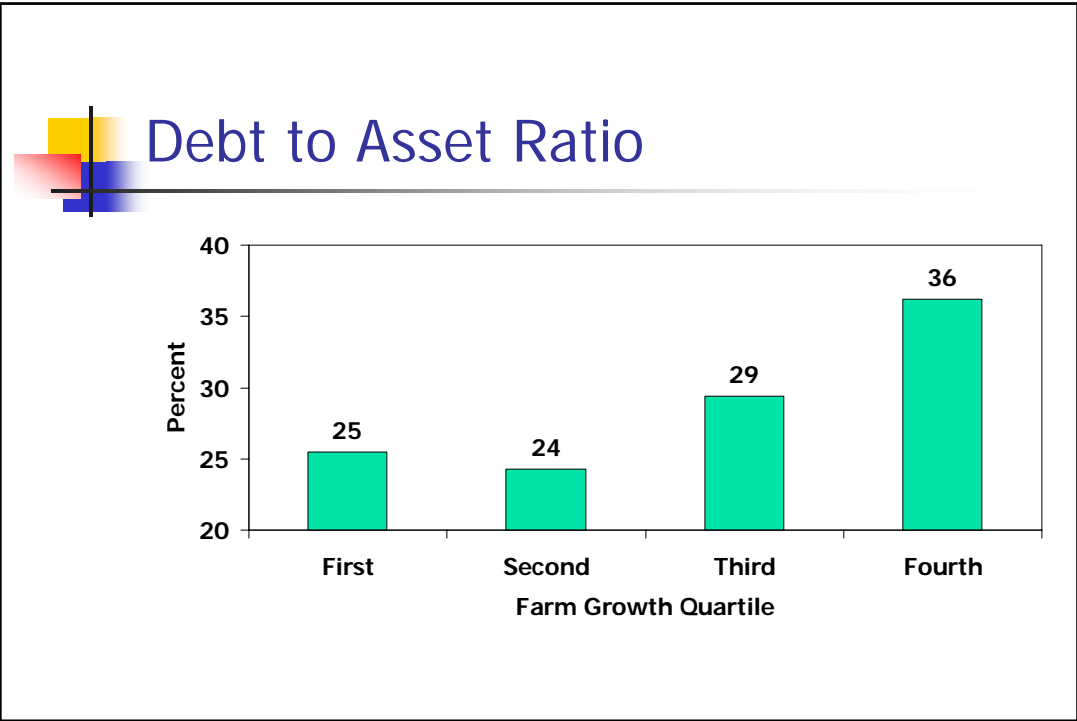
## Results

- Positively Correlated with Farm Growth
  - Debt to Asset Ratio
  - Farm Size
  - Nonfarm Income
- Negatively Correlated with Farm Growth
  - Age of Operator
  - Percent Acres Owned
  - Labor Efficiency Index
  - Adjusted Total Expense Ratio



## Age of Operator

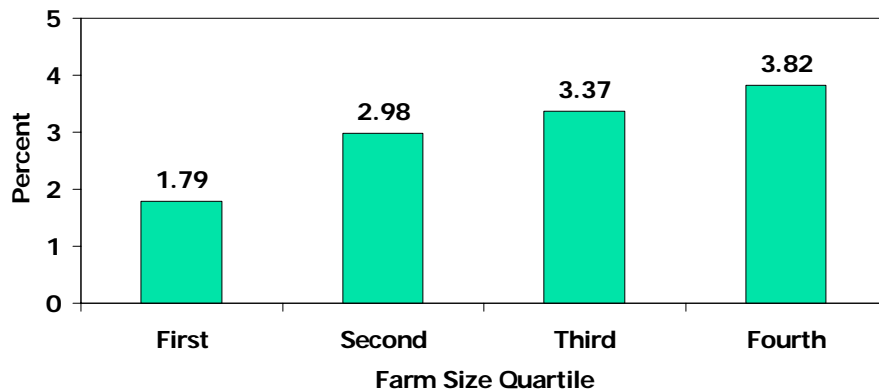


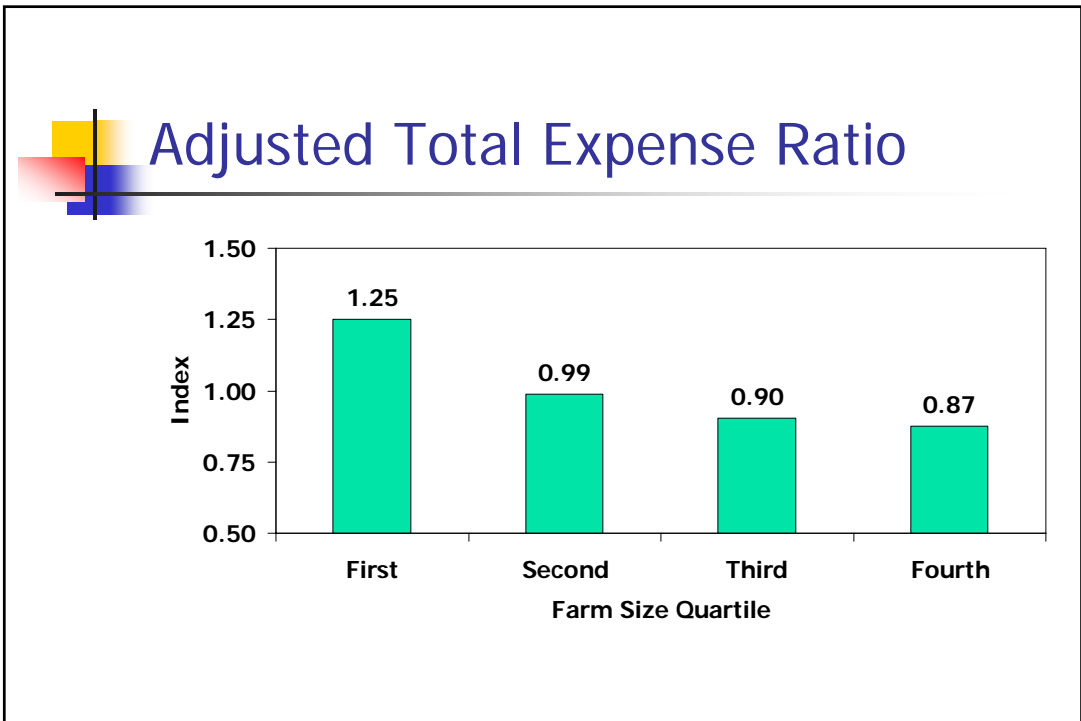
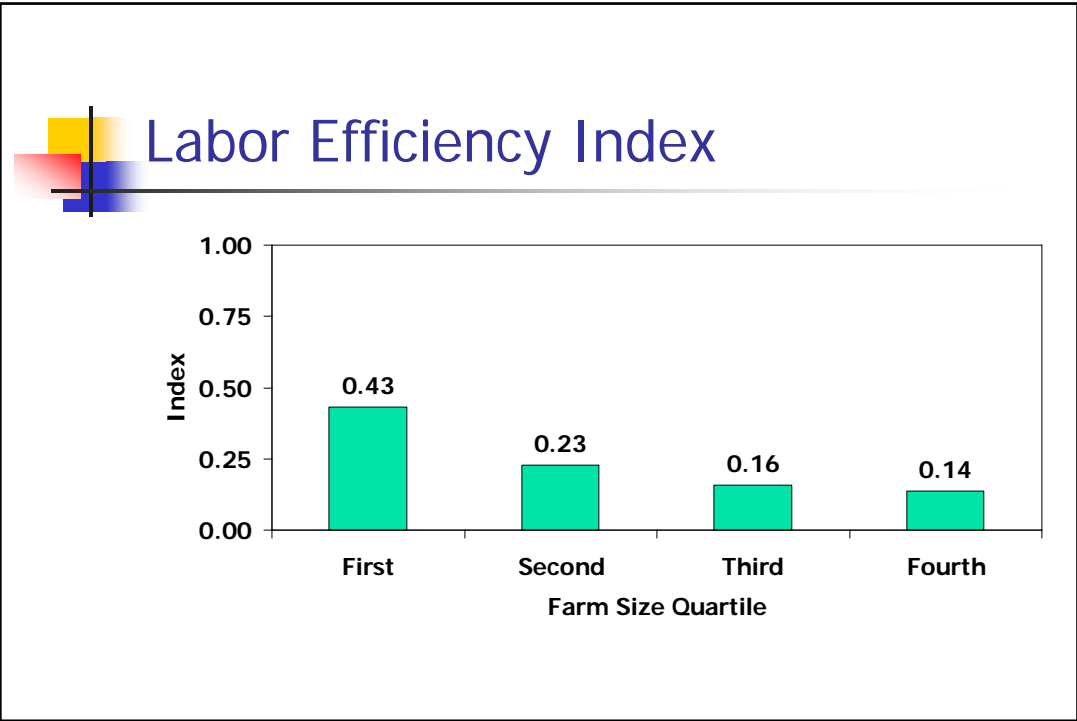


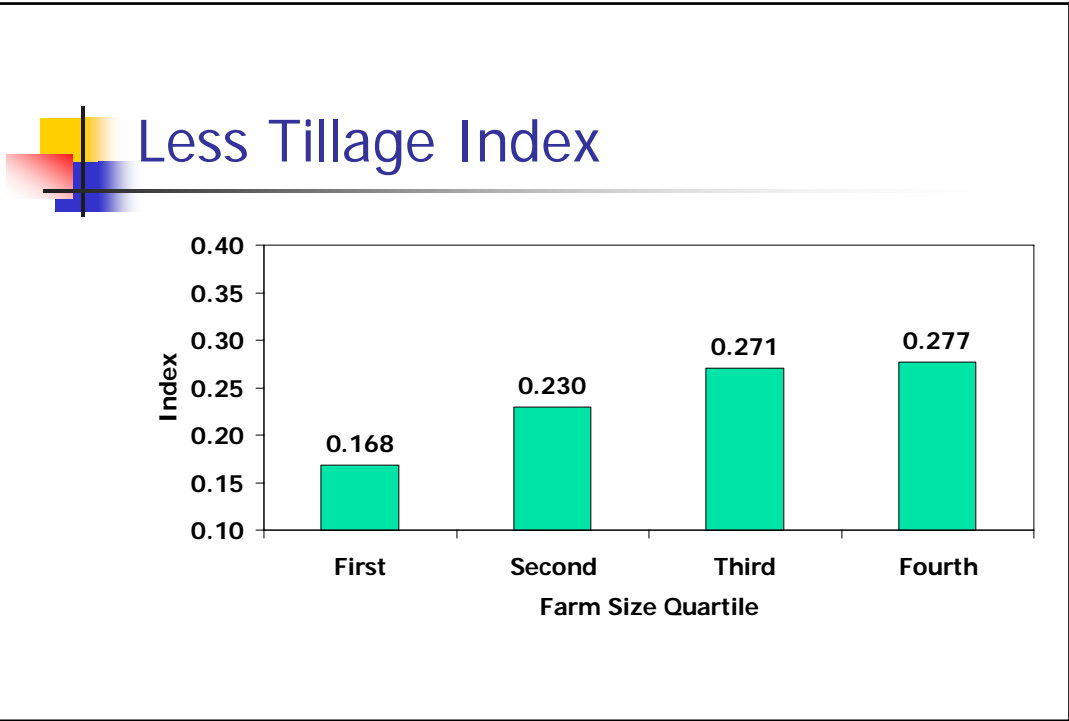
## Results

- Positively Correlated with Farm Size
  - Less Tillage Index
  - Crop Intensity Index
  - Debt to Asset Ratio
  - Growth Rate in Total Acres
- Negatively Correlated with Farm Size
  - Labor Efficiency Index
  - Adjusted Total Expense Ratio
  - Nonfarm Income
  - Age of Operator
  - Percent Acres Owned

## Farm Growth and Farm Size







- ## Summary and Conclusions
- Farm growth rates varied considerably among a sample of farms.
  - Farm size, nonfarm income, and the debt to asset ratio were positively correlated with farm growth rates.
  - Percent acres owned, operator age, the adjusted total expense ratio, and labor cost as a percent of value of farm production were negatively correlated with farm growth rates.



## Performance Benchmarks

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- Operating Profit Margin Ratio
  - $(\text{Net Farm Income} + \text{Interest} - \text{Unpaid Labor}) / \text{Value of farm Production}$
- Asset Turnover Ratio
  - $\text{Value of Farm Production} / \text{Average Total Assets}$



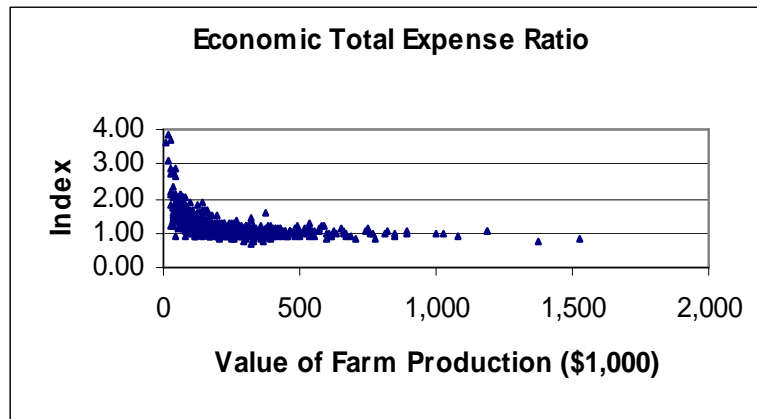
## KFMA Data

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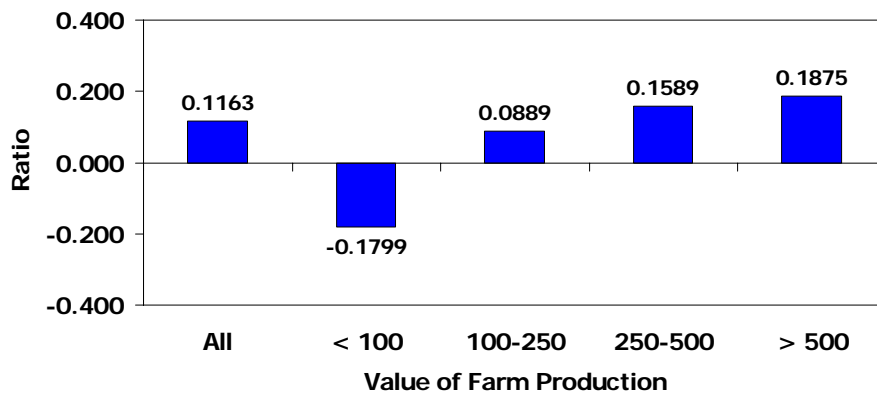
- Farms with continuous data (834 farms)
- 1996 to 2005
- 10-Year Averages:
  - Number of Workers = 1.45
  - Total Acres = 1,733
  - VFP = 221,696
  - VFP per Worker = 152,894



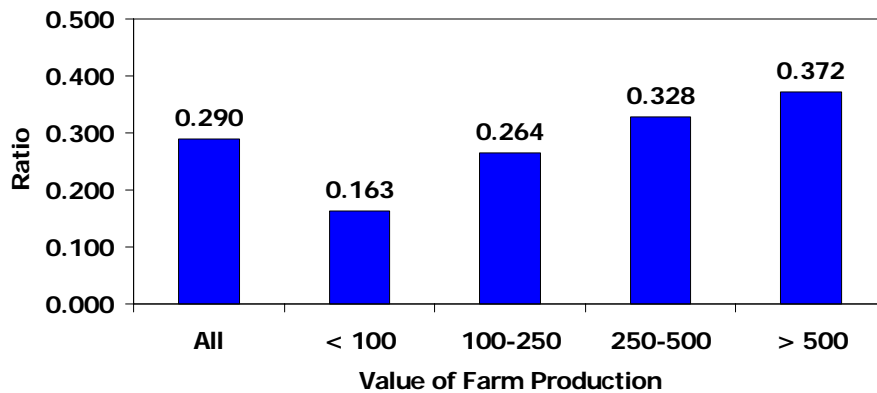
## Economies of Size



## Profit Margin Ratio, KFMA (1996-2005 Average)



## Asset Turnover Ratio, KFMA (1996-2005 Average)



## Contact Information

- Publications and Data:
  - [www.agmanager.info](http://www.agmanager.info)
  - [www.kmar105.com](http://www.kmar105.com)
  
- E-mail:
  - [mlange@agecon.ksu.edu](mailto:mlange@agecon.ksu.edu)