



Labor Efficiency and Productivity

- 2008 Risk and Profit Conference
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Outline of Presentation

- Introduction
- Methods
- Data
- Results
 - Non-Irrigated Crop Farms
 - Irrigated Crop Farms
 - Crop/Livestock Farms
- Summary and Conclusions



Introduction

- In a competitive industry, continual improvements in performance are essential.
- Benchmarking is one of the comparative analysis tools that can be used to assess improvements in performance.



Introduction

- Benchmarking Steps
 - Determine what to benchmark
 - Form a benchmarking team
 - Identify benchmarking targets
 - Collect and analyze information and data
 - Take action



Introduction

- Benchmarking Complications
 - Items to benchmark?
 - Computation of benchmarks?
 - Impact of fluctuations due to weather?



Introduction

- Factors Impacting Profitability
 - Volume of production and resources
 - Cost management
 - Whole-farm expense ratios
 - Major cost items (e.g., labor expense ratio)
 - Competitiveness of individual enterprises



Introduction

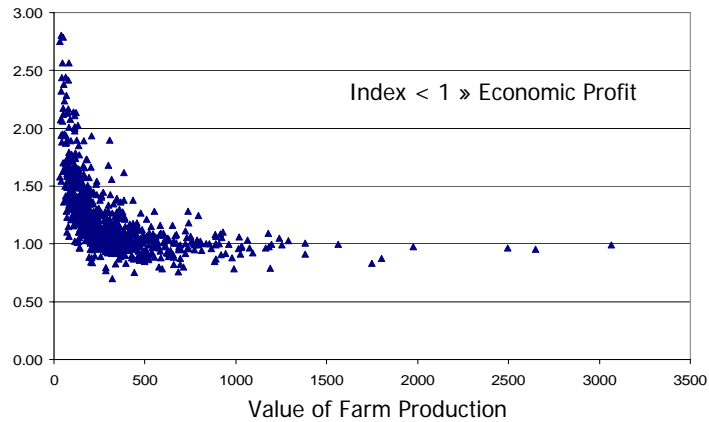
- Objective:
 - Examine differences in labor efficiency and productivity among farms.
 - Farms are categorized using the overall efficiency index.



Methods

- Overall Efficiency Indices
 - Measure differences in cost per unit of output among farms
 - Range from zero to one
 - Farms with an index of one are producing at the lowest cost per unit of output
 - Farms with an index below one could lower cost per unit of output by improving efficiency

Economies of Size



Methods

- Measurement of Overall Efficiency
 - Outputs
 - Crop
 - Livestock
 - Inputs
 - Labor
 - Livestock
 - Seed
 - Fertilizer
 - Herbicide and insecticide
 - Capital

Methods

- Farm Types
 - Non-Irrigated Crop Farms
 - East
 - Central
 - West
 - Irrigated Crop Farms
 - Crop/Dairy Farms
 - Crop/Beef Cow Farms

Methods

- Variables
 - Gross Farm Income
 - Value of Farm Production
 - Net Farm Income
 - Value of Farm Production per Worker
 - Labor Efficiency Index
 - Crop Intensity Index
 - Less Tillage Index
 - Crop Machinery Investment per Acre
 - Percent of Income Derived from Specific Enterprises
 - Expense Ratios
 - Operating Profit Margin Ratio
 - Asset Turnover Ratio

Methods

- Value of Farm Production per Worker
 - Value of Farm Production / Number of Workers
 - Higher Value » Higher Labor Productivity
- Labor Efficiency Index
 - Total Labor Expense / Value of Farm Production
 - Lower Index » Improved Labor Efficiency

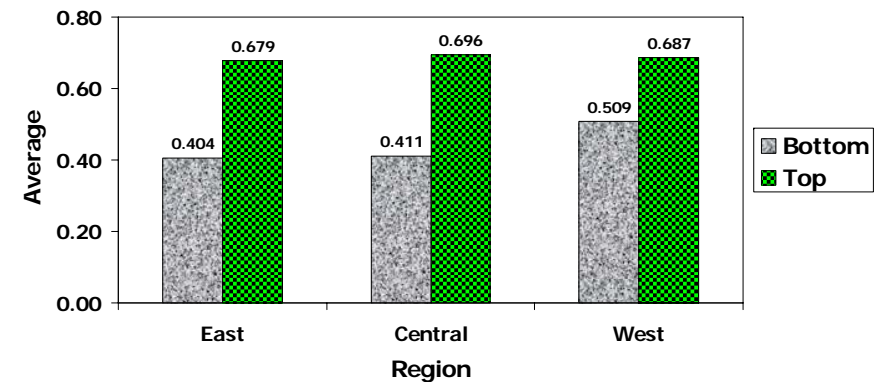
Data

- 781 KFMA Farms
 - Continuous whole-farm data from 2003 to 2007
 - Averages
 - Value of Farm Production = \$330,272
 - Net Farm Income = \$76,951
 - Value of Farm Production per Worker = \$217,786
 - Labor Efficiency Index = 0.1814

Results

- Number of Farms
 - Non-Irrigated Crop Farms
 - East – 249
 - Central – 234
 - West - 41
 - Irrigated Crop Farms – 15
 - Crop/Dairy Farms – 18
 - Crop/Beef Cow Farms – 37

Non-Irrigated Crop Farms Overall Efficiency Index



Non-Irrigated Crop Farms Eastern Kansas

- Bottom Overall Efficiency Group
 - Difference in Overall Efficiency
 - -0.275
 - Possible Improvement in Net Farm Income
 - \$13,482
 - 57% increase
 - Possible Improvement in Economic Profit
 - \$76,682

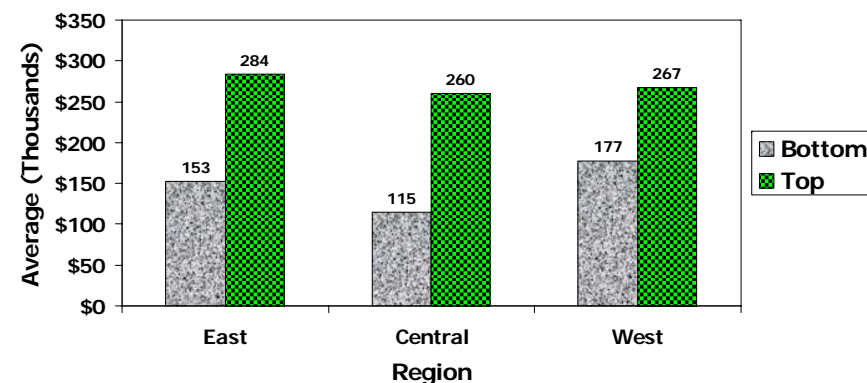
Non-Irrigated Crop Farms Elasticities: Dependent Variable - OE

Income Share	East	Central	West
Feed Grains	0.054	0.033	-0.009
Hay and Forage	-0.027	0.009	-0.030
Oilseeds	-0.086	-0.002	0.008
Wheat	-0.006	-0.108	-0.219

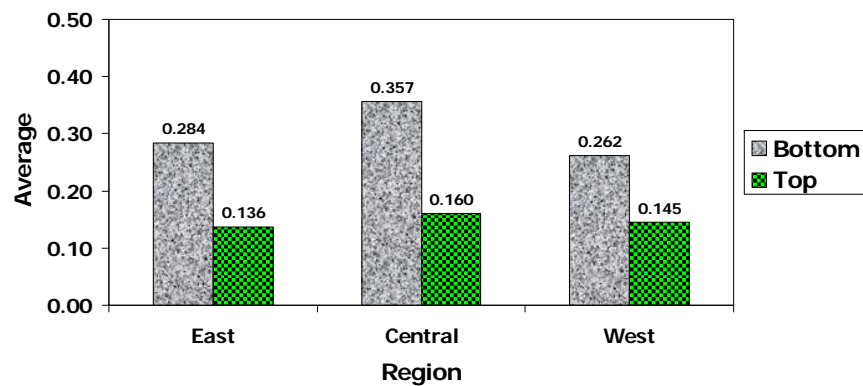
Non-Irrigated Crop Farms Elasticities: Dependent Variable - OE

Cost Share	East	Central	West
Labor	-0.178	-0.199	-0.160
Livestock	0.003	0.000	-0.004
Seed	-0.081	-0.069	-0.050
Fertilizer	-0.062	-0.081	-0.032
Chemicals	-0.059	-0.042	-0.067
Capital	-0.555	-0.554	-0.605

Non-Irrigated Crop Farms Value of Farm Production per Worker



Non-Irrigated Crop Farms Labor Efficiency Index



Non-Irrigated Crop Farms Correlation Coefficients

	OE and VFP	OE and OPM
East	0.566	0.770
Central	0.586	0.766
West	0.559	0.655

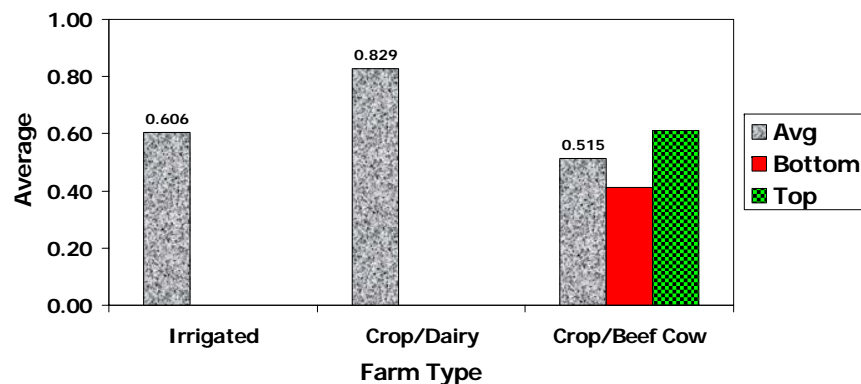
Non-Irrigated Crop Farms Correlation Coefficients

	LE and VFP	VFP W and VFP
East	-0.525	0.560
Central	-0.572	0.667
West	-0.594	0.729

Non-Irrigated Crop Farms Other Crop Benchmarks

Category	Crop Intensity Index	Less Tillage Index	Mach Inv per Acre
East: Bottom	1.022	0.074	\$184.20
East: Top	1.124	0.106	\$153.65
Central: Bottom	0.944	0.078	\$138.37
Central: Top	1.011	0.133	\$108.22
West: Bottom	0.637	0.108	\$86.07
West: Top	0.709	0.158	\$66.57

Irrigated Crop and Crop/Livestock Farms Overall Efficiency Index



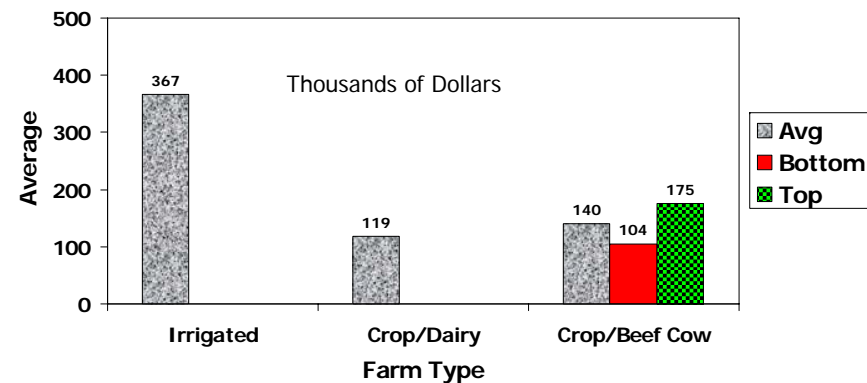
Crop/Beef Cow Farms

- Bottom Overall Efficiency Group
 - Difference in Overall Efficiency
 - -0.201
 - Possible Improvement in Net Farm Income
 - \$6,184
 - 24% increase
 - Possible Improvement in Economic Profit
 - \$77,324

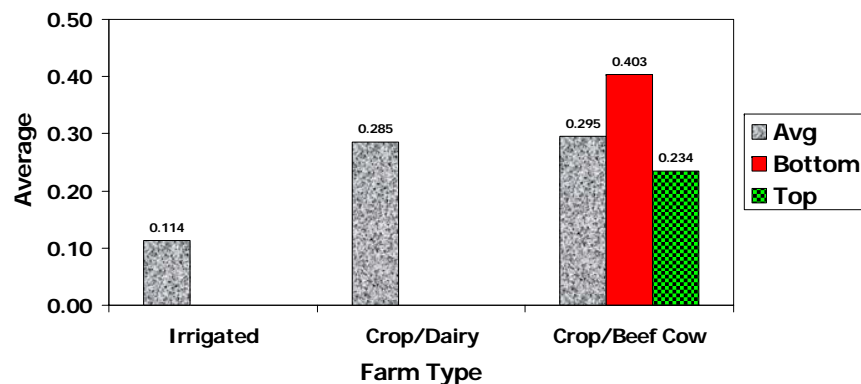
Crop/Beef Cow Farms Dependent Variable - OE

Cost Share	Elasticity
Labor	-0.221
Livestock	-0.047
Seed	-0.110
Fertilizer	-0.047
Chemicals	-0.066
Capital	-0.552

Irrigated Crop and Crop/Livestock Farms Value of Farm Production per Worker



Irrigated Crop and Crop/Livestock Farms Labor Efficiency Index



Crop/Beef Cow Farms Correlation Coefficients

	Overall Efficiency	Labor Cost Share	VFP per Worker
Farm Size (VFP)	0.619	-0.492	0.603
Profit Margin	0.664	-0.854	0.558
Asset Turnover Ratio	0.661	-0.328	0.448

Crop/Beef Cow Farms Livestock Characteristics

	Bottom Half	Top Half
Number of Beef Cows	104	118
Percent Income from Beef	55.15%	36.79%
Percent Income from Dairy	0.01%	7.87%

Summary and Conclusions

- This presentation examined differences in labor efficiency and productivity among KFMA farms.
- Farms in the top overall efficiency category had significantly higher labor productivity (measured using value of farm production per worker) and significantly lower labor expense as a percent of value of farm production.
- In addition, farms in the top category tended to be larger, had higher operating profit margins, and higher asset turnover ratios.

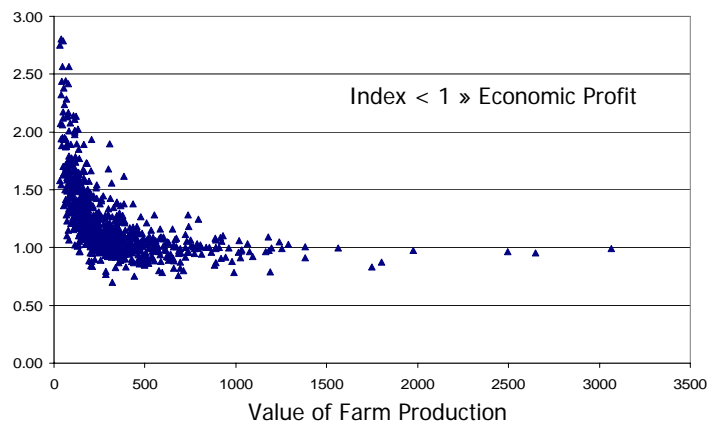
Labor Benchmarks Based on 2003-2007 Data

Farm Type	Labor Efficiency	Labor Productivity
Dry: East	0.136	\$283,521
Dry: Central	0.160	\$260,290
Dry: West	0.145	\$267,013
Irrigated	< 0.114	> \$367,065
Crop/Dairy	< 0.285	> \$118,984
Crop/Beef Cow	0.235	\$174,898

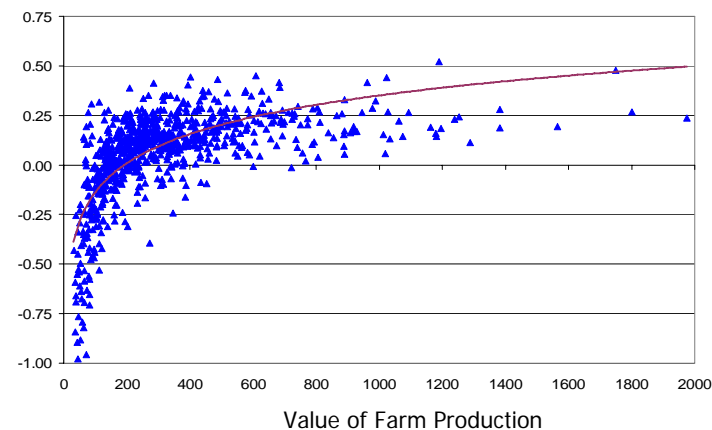
Financial Ratio Benchmarks Based on 2003-2007 Data

- Non-Irrigated Crop Farms
 - Operating Profit Margin Ratio
 - 0.2386
 - Asset Turnover Ratio
 - 0.3453
- Crop/Beef Cow Farms
 - Operating Profit Margin Ratio
 - 0.1796
 - Asset Turnover Ratio
 - 0.2319

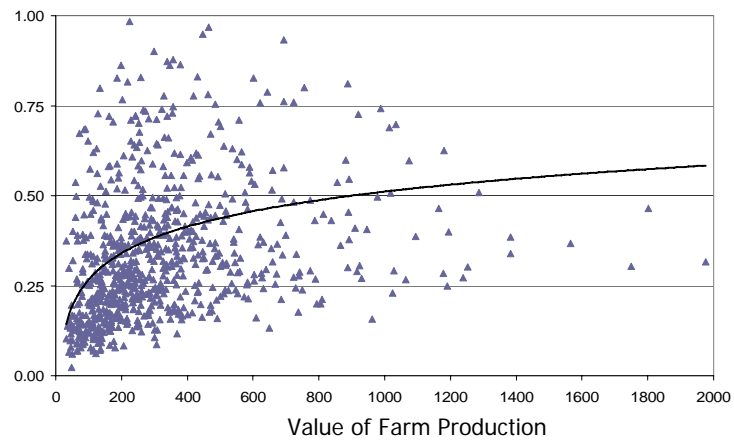
Economies of Size



Operating Profit Margin Ratio



Asset Turnover Ratio



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