



A comparison of data collected through farm management associations and the Agricultural Resource Management Survey

Todd H. Kuethe

Department of Agricultural and Consumer Economics, University of Illinois, Urbana, Illinois, USA

Brian Briggeman

Department of Agricultural Economics, Kansas State University, Manhattan, Kansas, USA

Nicholas D. Paulson

Department of Agricultural and Consumer Economics, University of Illinois, Urbana, Illinois, USA, and

Ani L. Katchova

Department of Agricultural Economics, University of Kentucky, Lexington, Kentucky, USA

Abstract

Purpose – The purpose of this paper is to compare the characteristics of farms who participate in farm management associations to the wider population of farms at the state level.

Design/methodology/approach – Farm-level records obtained from the USDA's Agricultural Resource Management Survey (ARMS) are compared to similar data obtained from farm management associations in three states: Illinois, Kansas, and Kentucky.

Findings – Data collected through farm management associations tend to represent larger farms and a greater share of crop producers as compared to livestock producers. Association data, however, capture a greater share of younger farm operators.

Originality/value – This is the first study to compare farm statistics from several farm management associations to ARMS, and the study confirms the findings of existing studies of prior USDA surveys.

Keywords Agricultural finance, Farm management, Agricultural resource management, Data collection

Paper type General review

Introduction

Financial record keeping is an important component of farm management. Accurate financial records assist farmers in making planning and resource decisions, as well as prepare for tax filings and communicate with lenders, landlords, and other financial institutions. As modern farm enterprises have grown more complex, both the need for and the complexity of financial record keeping has increased. As a result, the majority

This paper was presented in Finance Section paper session at the 2013 Agricultural and Applied Economics Association (AAEA) annual meeting, August 4-6, in Washington, DC. The papers in these sessions are not subjected to the journal's standard refereeing process. Reviews conducted by N. Paulson and/or C.G. Turvey.



of US farms rely on external professional or farm management services for some portion of their business. According to data from the Agricultural Resource Management Survey (ARMS), approximately 56 percent of farm operators reported at least some expense for professional and farm management services in 2011. The definition of professional or farm management services employed by ARMS includes record keeping, accounting, tax and business planning, farm product advice, and conservation practices. The professional services were employed by both crop and livestock farms, at 60 and 54 percent of the farms, respectively. In total, US farmers spent \$1.2 billion on professional or farm management services in 2011.

Many farms maintain standardized records as part of farm management associations that provide record keeping, accounting, and tax and business planning services for their farmer-members. The National Association of Farm Business Analysis Specialists (NAFBAS), for example, has members in Alabama, Illinois, Iowa, Kansas, Kentucky, Minnesota, Nebraska, Michigan, and Wisconsin. Gustafson *et al.* (1990) outline three important benefits of participating in farm management associations. First, members receive comprehensive reports from their farm management associations that yield more information than they would likely collect on an individual basis. Second, members have the opportunity to compare the performance of their enterprises relative to those of peer farms. Third, members benefit from expertise of farm management specialists who could interpret reports and provide benchmarks.

The data collected through farm management associations were used extensively in applied research and extension. The data collected through farm management associations offer a combination of cross-sectional and time-series data obtained from individual farm operators, many of which are included for multiple years (Andersson and Olson, 1996). The opportunity to create a panel of farms surveyed over multiple years is therefore an advantage over other sources of farm financial information that are collected by selecting a new sample every year. A panel of farm management association data can therefore be used to evaluate farm-level decisions in a dynamic framework.

The primary limitation of farm management association data, from applied research perspective, is that the data are not obtained through a random sample (Gustafson *et al.*, 1990). The data are collected through a voluntary agreement between farm operators and the association, and farmers pay a fee to offset the cost of producing reports and collecting information. As a result, researchers must be knowledgeable of the potential problems of sample selection and bias that accompany the use of farm management association data.

Previous studies

A number of previous studies compare the financial characteristics of farm management association members to a random sample of farms. The earliest published study by Mueller (1954) found that, compared to a random sample, farms in the Illinois Farm Business Farm Management (FBFM) Association were of larger size, located on better quality soils, and were better managed, based on financial ratio analysis. However, after controlling for differences in size and soil quality, few differences remain. Olson and Tvedt (1987) analyzed differences between published county-level averages from association member farms in southwest Minnesota and those obtained from the 1982 Census of agriculture. The authors suggest that association farms were larger in terms of acreage and production and better managed based on yields and rate of return on assets.

More recent studies also examine the differences between association farms and a random sample of farms in a statistical testing framework. Gustafson *et al.* (1990) compare association members in North Dakota to farm-level observations collected by the 1986 USDA's Farm Costs and Returns Survey (FCRS). The authors found statistically significant differences between the two groups. Members were found to have substantially more acreage, hired labor, gross income, expenses, assets, and liabilities. Andersson and Olson (1996) statistically compare members of the southeastern and southwestern Minnesota Farm Business Management Association (FBMA) to the 1987 FCRS data. The authors found that FBMA members were significantly larger in terms of acreage, sales, income, and rate or return, even when among farms whose sales exceed \$40,000.

Sources of farm financial information

Following the prior work of Mueller (1954), Olson and Tvedt (1987), Gustafson *et al.* (1990), and Andersson and Olson (1996), we compare the characteristics of farms who belong to a farm management association to the general population of farms in a state. We examine data from three farm management associations: the Illinois FBFM Association, the Kansas Farm Management Association (KFMA), and the Kentucky Farm Business Management (KFBM) Program. The distribution of key financial characteristics of member farms are compared to farm data from the ARMS. The ARMS is the modern farm financial survey conducted jointly by the USDA's National Agricultural Statistics Service (NASS) and Economic Research Service (ERS), and its origination traces back to the FCRS used in similar previous studies (Gustafson *et al.*, 1990; Andersson and Olson, 1996).

The ARMS

The ARMS is the annual survey of farm and ranch operators conducted by the USDA to obtain information on the status of farmer's finances, resource use, and household economic well-being (Kuethe and Morehart, 2012).

The USDA is congressionally mandated to conduct an annual study of the costs of producing major feed grains and milk and to produce annual estimates of the representative costs of the sizes and types of farms engaged in production and the range of technology used (Kuethe and Morehart, 2012). ARMS is the major data collection effort to fulfill this mandate. ARMS is designed to produce financial measures that are representative of the farm population for the 48 contiguous states, as well as state-level estimates for 15 agriculturally intensive states: Arkansas, California, Florida, Georgia, Illinois, Indiana, Iowa, Kansas, Minnesota, Missouri, Nebraska, North Carolina, Texas, Washington, and Texas.

While the survey is not directly designed for a broad range of economic research activities, the relative advantages of the survey have been exploited by a number of previous studies. ARMS employs a stratified sampling framework, and as a result, weighting schemes allow for representative samples of various definitions of the farm population. In addition to the congressionally mandated information, ARMS also features a subset of questions that change from year to year to provide timely information on important or evolving topics in agriculture.

ARMS also carries a number of disadvantages for empirical economic research. First, ARMS is a repeated cross-sectional survey, and the farms surveyed change each year in an effort to reduce the response burden for producers. As a result, it is difficult to track dynamic changes at the farm-level through time. Second, as previously mentioned, a number of the survey questions change periodically, so some research

questions can only be addressed for a limited number of survey periods. Finally, working with ARMS data requires considerable research expertise due to the USDA's strict confidentiality requirements, data access restrictions, and the complex survey design and volume of information collected through ARMS.

Farm management association data, however, are collected through voluntary membership. Members provide information to farm management specialists to prepare financial statements and reports for lending and tax purposes and benchmarking against other members. There are several advantages of using farm management association data in empirical research. First, a number of associations offer comparatively large samples of farm operations. Second, many members provide information for multiple years, and as a result, a panel of farms can be constructed to examine dynamic decision-making framework and to establish causal relationships. Third, similar to ARMS and other survey measures, farm management association data are farmer reported, yet the data include accurate and objective financial information. Farm management association data are collected to communicate with lender and other financial institutions, as well as to fulfill required farm and farm operator tax filings. As a result, the data are likely more accurate and often "certified" by farm management specialists than those collected for other purposes. Finally, the data are collected in a consistent format over time using report forms that remain the same over time (with the exception of one change in the reporting format in Illinois and Kentucky forms in the 1995 and 1998, respectively).

Farm management association data, however, also carry several disadvantages for empirical research. First, as shown in previous studies, farm management association data are not necessarily representative of the farm population as a whole (Mueller, 1954; Olson and Tvedt, 1987; Gustafson *et al.*, 1990; Andersson and Olson, 1996). Farm management association members have been consistently shown to have larger and better managed farm operations. Second, the data collected by farm management associations are typically limited to financial information. ARMS and related data sources also collect information on various production practices and farmer demographics that may be limited or omitted in farm management association data. Third, it can be difficult to add questions or collect information on emerging issues in agricultural and resource economics. Finally, similar to USDA surveys, confidentiality is a primary concern of farm management association data, and access to individual responses for research purposes requires approval by the farm management association.

While the institutional structure of farm management associations can vary greatly, the organizations, as a whole, typically share a number of common features. First, farm management associations offer detailed record keeping systems. Second, the associations employ dedicated farm management and record keeping professionals who meet with members multiple times throughout the year. Third, in addition to accounting services, these professionals assist farmers with management decision making by providing financial benchmarks and specific recommendations based on farmer needs and characteristics.

This study compares some key financial characteristics of farm management association members with the broader population of farmers represented by ARMS. In addition to the commonalities outlined above, the following sections introduce the key features and institutional structure of the three farm management associations considered.

Illinois FBFM Association

The Illinois FBFM Association is comprised of nine local not-for-profit association in the state. The Pioneer FBFM Association is the oldest, starting in 1924. The Shawnee

FBFM Association is the most recent, with its origin tracing back to the early 1960s. Participating farmers (or cooperators) are members of the association. The cooperators elect representatives to serve on the board of directors to provide for the services and establish policy. The services are delivered through field staff working with 100-120 cooperators. The field staff extend the University of Illinois' research and education function. Although in the past some staff have carried Illinois Extension appointments, currently most staff are employed directly by the local FBFM Associations. In 1949, the local associations federated to form the Illinois FBFM Associations. The state association was formed to assist in program development, to coordinate recruitment and training of field staff, and to acquire supplies and services for the local associations. A cooperator in a local association is automatically a member of the state association. The local associations elect a representative to sit on the state board of directors. Each year, 95 percent or more of the cooperators renew their membership.

KFMA

The KFMA consists of six regional associations and traces its origins to the early 1930s. The central information processing unit for the six associations, K-MAR-105, maintains databanks that are used extensively for agricultural economic research and extension activities. KFMA is one of the largest farm management programs in the USA. In all, 22 association economists comprise the professional staff of KFMA and are faculty members in the Department of Agricultural Economics at Kansas State University.

KFBM Program

The KFBM Program includes four Area Farm Management Groups, nine Farm Business Management specialists, and over 350 farmer members. The program was founded in 1962. Each of the Area Farm Management Groups elects a board of directors from their membership to set policy and direction for the group. Each board elects representatives to the Kentucky Association of Farm Analysis Groups to set policy and direction for the KFBM Program in partnership with the University of Kentucky Cooperative Extension Service.

Data comparison

ARMS uses the USDA's definition of a farm as any establishment, except institutional farms, that sold or would normally have sold at least \$1,000 of agricultural products during a year. This broad definition therefore captures a large number of establishments that do not typically purchase professional or farm management services. For example, the 2011 ARMS suggests that the share of farms that purchase such services increases substantially with farm size. Nationally, 87 percent of farms with more than \$250,000 in gross farm sales purchase farm management services, yet only 48 percent of farms with less than \$40,000 in gross farm sales purchase farm management services.

Figures 1-3 compare the share of farms by sales class in each of the three management associations to ARMS estimates of the population of farms in each state. Representative summary statistics using ARMS data were estimated using the delete-a-group jackknife procedure (Kott, 1998). The economic class definition groups farms into six distinct classifications by volume of total sales (less than \$100,000; \$100,000-\$174,999; \$175,000-\$249,999; \$250,000-\$499,999; \$500,000-\$999,999; \$1,000,000 or more). Because of the small sample size of farms in KFBM and ARMS for the State of Kentucky, two of the economic class groups were combined into one

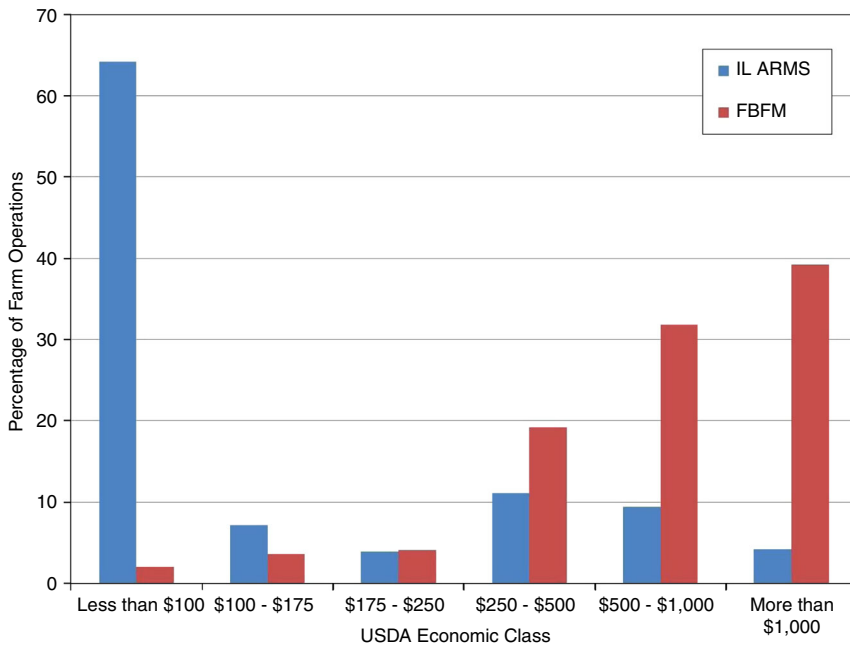


Figure 1. Share of Illinois farms by USDA Economic Class, 2011

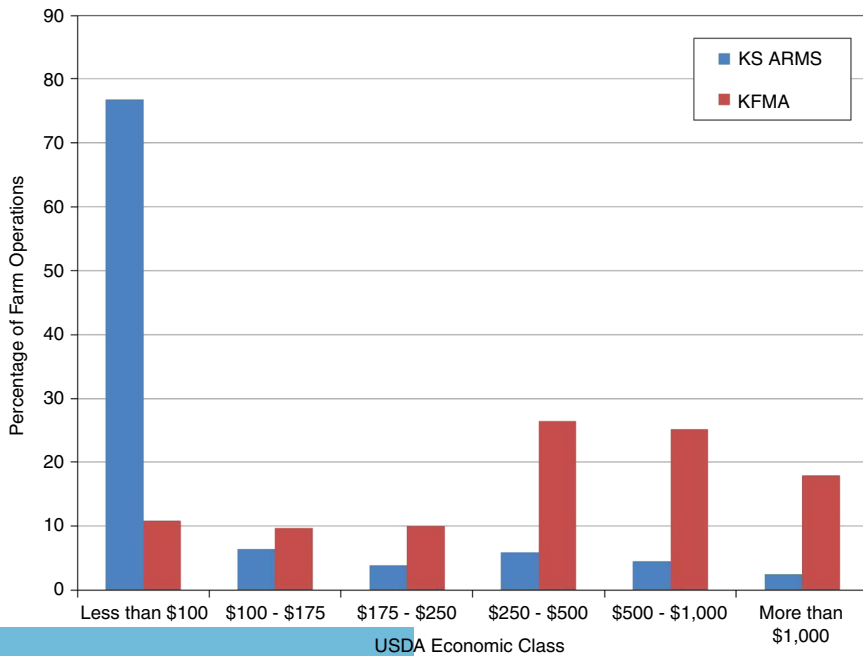


Figure 2. Share of Kansas farms by USDA Economic Class, 2011

Figure 3.
Share of Kentucky farms
by USDA Economic
Class, 2007-2011



(\$100,000-\$249,000) and also five years of data were used (2007-2011). The figures suggest that in each state, the share of farms belonging to the smallest sales class definition (less than \$100,000) is much greater in ARMS than in the farm management associations. For example, in Illinois, more than 60 percent of farms were in the lowest sales class definition, but the same farms represent less than 10 percent of the FBFM membership. Similarly, larger sales class farms make up a larger portion of the association members than the population of farms in each state. For example, less than 10 percent of the farms in the state of Kansas had more than \$1 million in total farm sales, but nearly 20 percent of KFMA members fell into the top sales class category. A similar phenomenon was found for the total acreage operated by sales class, but due to limitation of space, the results are unreported here. This observation is consistent with prior research (Mueller, 1954; Olson and Tvedt, 1987; Gustafson *et al.*, 1990; Andersson and Olson, 1996).

Aggregate statistics suggest that crop farms are more likely than livestock farms to acquire professional or farm management services. The 2011 ARMS survey suggested that nationally, 60 percent of crop farms purchased farm management services, compared to 54 percent of livestock farms. (A crop farm is defined as any farm for which the majority of total revenue is generated through the sale of field crops.) The farm management association data confirm this observation. Table I demonstrates that, across all sales classes, ARMS suggests a greater share of livestock farms than those represented by either FBFM or KFMA. For example, less than 1 percent of all Illinois FBFM members can be classified as livestock farms, but ARMS suggests that 25.9 percent of Illinois farms can be classified as livestock farms. A similar result can be found for Kansas, with 17.22 percent of KFMA members being reported as livestock farms as compared to 38.6 percent of all farms according to ARMS.

In addition to the financial characteristics and production practices, ARMS collects a number of important demographic characteristics of farm operators and farm households (Kuethe and Morehart, 2012). While some demographic information can be obtained through farm management association databases, the number of characteristics is substantially smaller. ARMS survey is designed to collect information from the primary farm operator, although some information refers to the secondary operators and

	Illinois				Kansas			
	ARMS		FBFM		ARMS		KFMA	
	Crop (%)	Livestock (%)	Crop (%)	Livestock (%)	Crop (%)	Livestock (%)	Crop (%)	Livestock (%)
Less than \$100,000	40.40	23.80	1.30	0.10	44.20	32.60	6.86	3.95
\$100,000 to \$174,999	6.40	0.80	3.60	0.00	4.00	2.40	7.61	2.12
\$175,000 to \$249,999	3.60	0.30	4.10	0.00	3.80	0.00	8.35	1.54
\$250,000 to \$499,999	10.80	0.30	19.10	0.20	4.90	1.10	23.28	3.20
\$500,000 to \$999,999	9.00	0.40	31.90	0.20	3.00	1.50	21.80	3.38
\$1,000,000 or more	3.90	0.30	39.10	0.40	1.50	1.00	14.87	3.03
Total	74.10	25.90	99.10	0.90	61.40	38.60	82.77	17.22

Table I.
Crop vs livestock farms by sales class, 2011

landlords. Farm management associations, however, can collect information from a wider array of those involved in the financial operations of farm enterprises. For example, a small group of farm operators may wish to join a farm management association to take advantage of the tax preparation services offered. Our analysis suggests that this feature may provide a greater ability to study important questions that relate to new and beginning farm operators.

Table II shows the share of farmers in several age categories, ranging from under 35 to 65 and older. The Illinois and Kansas statistics are for 2011 while the Kentucky statistics are for 2007-2011 to increase the reliability of results with larger sample sizes. The summary statistics provided by ARMS suggest that a very small portion of farm operators in each state are under age 35, ranging from 2.5 percent in Kansas for 2011 to 4.2 percent in Kentucky for 2007-2011. In addition, ARMS suggests that a large portion of farm operators are over age 65, ranging from 30.5 percent in Kentucky to 38.1 percent in Kansas. However, the farm management association data suggest that a greater share of farm operators are under age 35, and a smaller share is over age 65. For example, 7 percent of KFBM members that are operating farms as sole proprietors are under age 35, and 14.5 percent are age 65 or over. While the larger share of young farmers may not directly represent the principal operator of these firms, the summary statistics suggest that management association may carry the additional advantage of being able to draw from a larger pool of young or beginning farms.

Age	Illinois 2011		Kansas 2011		Kentucky 2007-2011	
	ARMS (%)	FBFM (%)	ARMS (%)	KFMA (%)	ARMS (%)	KFBM ^a (%)
Under 35	2.2	4.8	2.5	9.39	4.2	7.0
35-44	9.9	9.6	14.1	10.3	17.1	13.6
45-54	27.7	25.3	14.6	22.04	18.9	30.4
55-64	29.4	35.2	30.7	30.39	29.3	34.5
65 or older	30.7	25.1	38.1	27.88	30.5	14.5

Table II.
Young and beginning farmers

Note: ^aThe percent of farms are calculated only for KFBM members established as sole proprietors

Suggestions for future research

Farm management association data offer a number of attractive features for empirical research, such as accurate financial information and the ability to track farms for multiple years. However, previous empirical studies suggest that farms who belong to farm management associations may not be representative of the overall population of farms (Mueller, 1954; Olson and Tvedt, 1987; Gustafson *et al.*, 1990; Andersson and Olson, 1996). Following previous studies, we examine the distribution of several key farm financial and demographic characteristics for farm management association members and the greater population of farms. We confirm the prior notion that association farms tend to be larger, and in addition, we find a greater share of crop and younger farms within farm management association data.

Aggregate USDA data suggest that 82 percent of all farms sold less than \$100,000 of agricultural products in 2011 (ERS, 2014). However, these farms account for approximately 10 percent of the total gross cash income of the agricultural sector. While farm management associations capture a relatively small portion of the smallest farms by volume of sales (Figures 1-3), aggregate data suggest that these farms account for a limited portion of agricultural output across the sector.

While both USDA surveys and farm management association data offer a number of distinct advantages for applied research, they suffer from a common disadvantage. Farmers who supply data to either farm management associations or the Federal government have great concerns about the uses and distribution of the information provided. As a result, gaining access for research purposes to either source of information for those outside of the institution is a lengthy process and requires approval from the institutions.

References

- Andersson, H. and Olson, K.D. (1996), "On comparing farm record association members to the farm population", *Review of Agricultural Economics*, Vol. 18 No. 2, pp. 259-264.
- ERS (2014), "ARMS farm financial and crop production practices, tailored reports", available at: www.ers.usda.gov/data-products/arms-farm-financial-and-crop-production-practices/tailored-reports.aspx#.U2v8KfldV8E (accessed May 8, 2014).
- Gustafson, C.R., Nielsen, E. and Morehart, M.J. (1990), "Comparison of the financial results of record-keeping and average farms in North Dakota", *North Central Journal of Agricultural Economics*, Vol. 12 No. 2, pp. 165-172.
- Kott, P. (1998), "Using the delete-a-group jackknife variance estimator in practice", *Proceedings of the Annual Meeting of the American Statistical Association, Section of Survey Research Methods*, pp. 763-768.
- Kueth, T. and Morehart, M. (2012), "The Agricultural Resource Management Survey", *Agricultural Finance Review*, Vol. 72 No. 2, pp. 191-200.
- Mueller, A.G. (1954), "Comparison of farm management service farms and a random sample of farms in western Illinois", *Journal of Farm Economics*, Vol. 36 No. 2, pp. 285-292.
- Olson, K.D. and Tvedt, D.D. (1987), "On comparing farm management associations and the farm population", Staff Paper No. P87-29, Department of Agricultural and Applied Economics, University of Minnesota, Minnesota, MN.

Corresponding author

Dr Todd H. Kueth can be contacted at: tkueth@illinois.edu

To purchase reprints of this article please e-mail: reprints@emeraldinsight.com
Or visit our web site for further details: www.emeraldinsight.com/reprints

Reproduced with permission of copyright owner. Further reproduction prohibited without permission.