

**RECENT STRUCTURAL CHANGE IN THE U.S. FARM SECTOR:
A HOUSEHOLD INCOME EQUIVALENCY PERSPECTIVE**

Carl Zulauf and Sharon Thayer*

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Department of Agricultural Economics
The Ohio State University
103 Ag. Admin. Bldg.
2120 Fyffe Road
Columbus, Ohio 43210

*Associate Professor and Research Assistant of Agricultural Economics

RECENT STRUCTURAL CHANGE IN THE U.S. FARM SECTOR: A HOUSEHOLD INCOME EQUIVALENCY PERSPECTIVE

Structural change in the U.S. farm sector remains a source of continuing national interest. This interest has been heightened recently by concern over vertical integration and the passage of a new farm bill. Structural change is commonly examined in terms of the scale of the farm, such as the dollar value of sales or the number of acres farmed. However, to many farmers and non-farmers, structural change is not about physical or financial scale, but about the ability of the farm to provide an acceptable standard of living relative to other Americans. In this article, we use a household income equivalency perspective to examine recent changes in farm structure. The picture which emerges differs from the conventionally accepted story in several respects.

DEFINITION OF FARM SIZE

We define a small farm to be a farm which generates an income from the farm that places the farm household among U.S. households with the lowest 30 percent of income per household. In contrast, we define a large farm to be a farm which generates an income from the farm that places the farm household among U.S. households with the highest 30 percent of income per household. Farms which generate an income that falls between these two groups are defined as mid-size farms. Because the selected break points are arbitrary, alternative break points were examined. They yielded similar results and identical conclusions.

The selected measure of household income is the money income of U.S. households reported annually by the U.S. Department of Commerce (USDC). To illustrate the

application of this data set to the definitions stated above, a small farm in 1993 (latest year data are available) would be a farm that generated an income to the farm household which was less than \$18,823¹ In contrast, a large farm in 1993 generated an income to the farm household which exceeded \$49,547.

PROCEDURES

Farm numbers and characteristics of farms are currently available on an annual basis only by farm sales class. These data are reported in the U.S. Department of Agriculture's (USDA) *Economic Indicators of the Farm Sector*. Among the characteristics reported in the USDA series is net cash farm income. This income series is largely consistent with USDC's series on household money income. The one major difference is that USDC's income measure includes capital depreciation for family businesses. To create more compatible data, USDA's net cash farm income reported for each sales class is adjusted for USDA's estimate of the current annual replacement charge for machinery, equipment, and motor vehicles.² This estimate is analogous to an annual capital depreciation charge, but is reported in terms of the current replacement value instead of the usual historical cost of the capital good.

Another needed adjustment is that a farm, especially a large farm, may support more than one household. Data collected by USDA since 1988 indicate that average households per farm vary from approximately 1.1 for farms with sales less than \$50,000 to approximately 1.7 for farms with sales of more than \$500,000. To estimate the number of farm households per farm sales class, the number of farms reported for a sales class are multiplied by the average number of households per farm in that sales class.

To distribute the farm characteristics according to the household income equivalency categories defined above instead of according to the farm sales categories, regression equations are estimated between farm sales and the following four characteristics: number of farm households, number of farms, net cash farm income adjusted as described above, and gross farm sales. The estimated regression equations are used to identify the farm sales per farm which generate the household income that divides small from medium farms and medium from large farms. The estimated equations then are used to partition number of farms, farm cash receipts, and net farm income among the three farm size categories.³

RESULTS

Data from the years 1988, 1989, 1992 and 1993 are analyzed. The adjacent years are averaged to smooth potential fluctuations associated with an individual year. The U.S. household money income which defines mid-size farms is estimated to range from \$16,995 to \$43,290 in 1988-89 and from \$18,653 to \$48,823 in 1992-93. To generate this level of income, farm sales of \$107,500 to \$164,000 were needed in 1988-89. In 1992-93, the needed farm sales were \$118,500 to \$186,500.

Small farms accounted for 1.81 million or 86.8% of all farms in 1992-93 (Figure 1). By comparison, the number of small farms was 1.94 million in 1988-89. The estimated number of mid-size farms essentially remained constant: 98,500 in 1988-89 and 106,500 in 1992-93. However, given the decline in small farms, the share of farms which are mid-size increased from 4.5% to 5.1%. The estimated number and share of large farms increased: from 148,500 to 167,000 and from 6.8% to 8.0%.

During the late 1980s/early 1990s, large farms accounted for three-fifth to two-thirds of farm cash receipts, a measure of farm output share (Figure 2) Small farms accounted for one-quarter of cash receipts, while mid-size farms accounted for only one-tenth of farm cash receipts Small farms accounted for only about one-tenth of net farm income, essentially the same share as mid-size farms (Figure 3) Thus, large farms account for about 80% of net farm income.

The fact that small farms account for a much smaller share of net farm income than farm output, while the opposite exists for large farms, suggests that strong economic forces exist for the continued decline in small farms This contrast between small and large farms can only exist if small farms are high cost producers relative to large farms The same contrast is observed between mid-size and large farms, except that the advantage of large farms is not as great.

CONCLUDING OBSERVATIONS

When viewed from the perspective of household income equivalency, the following story of U.S. farm structure emerges:

- Mid-size farms have largely disappeared. They account for only 5% of farms and 10% of farm output..
- Small farms dominate in terms of farm numbers, while large farms dominate in terms of output and net farm income. Mid-size farms account for the smallest share of these 3 characteristics. Given that the relative importance of large and

small farms varies substantially by the characteristic being discussed, a good descriptor of this situation is a dual structure of farm production.

- While much of the attention is focused on mid-size farms, small farms currently bear the brunt of structural adjustment. Given their apparent cost-of-production disadvantage, the decline in small farms is not likely to slow unless they (1) identify marketing niches which yield a higher price per unit of output to compensate for their higher production costs and/or (2) aggressively reduce their costs of production.

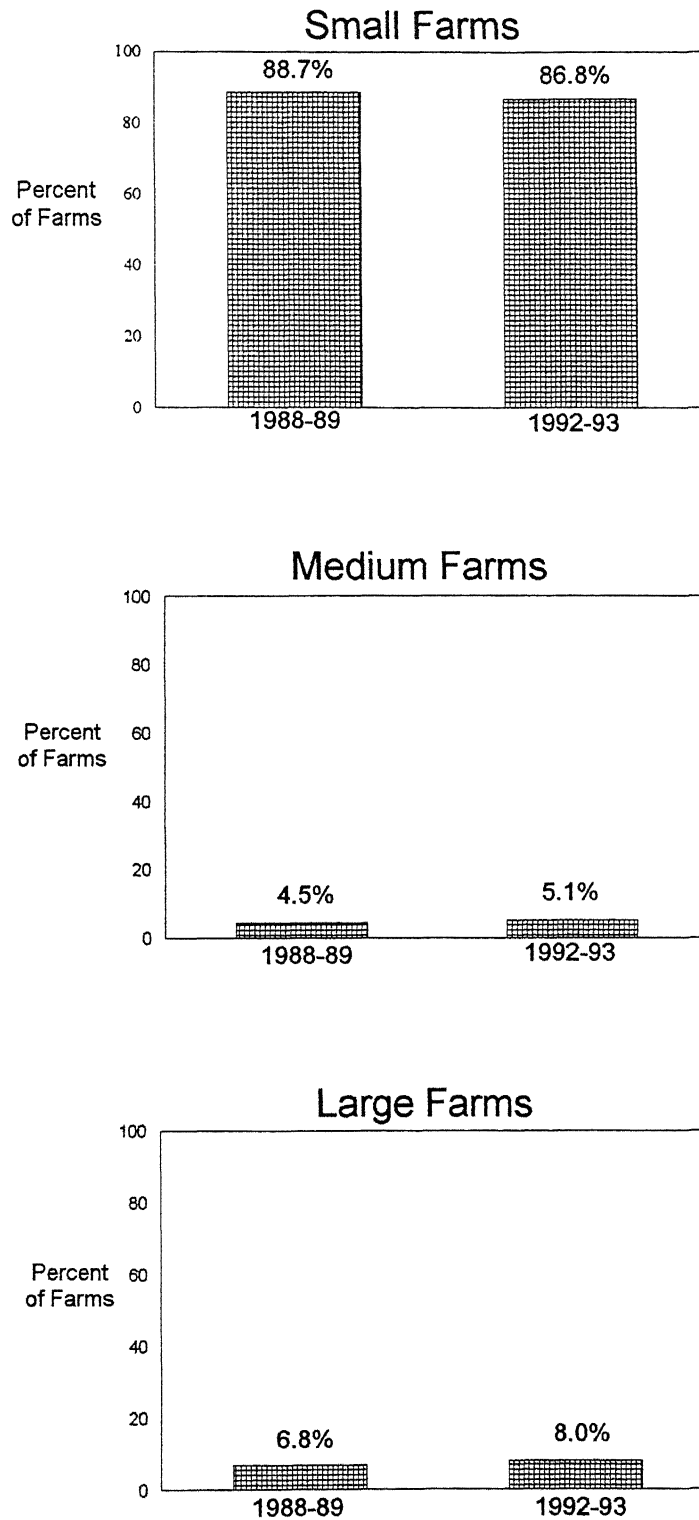
TECHNICAL NOTES

1. Small, medium, and large farms are defined using the income levels which divide households into quintiles according to their money income. Quintile division points have been reported annually since 1967 by the USDC, Bureau of the Census. The specific household money incomes used to identify the lower end of the range on a middle size farm is an average of (1) the household income which divides the first from the second quintiles and (2) the household income which divides the second from the third quintiles. The household income level used to identify the higher end of the range on a middle size farm is an average of (1) the household income which divides the third from the fourth quintiles and (2) the household income which divides the fourth from the fifth quintiles.
2. USDA's annual farm capital replacement charge is reported only for the U.S. farm sector. This sector total is distributed among the farm sales classes according to the sales class's share of the total asset value of farm machinery and equipment. A similar adjustment could not be made for buildings because the value of buildings is not reported by farm sales class.
3. For farm numbers and farm households, the general form of the estimated regression equation is $\ln Y = a + bX + cX^2 + dX^3$. Y is the number of farms which had sales in excess of the minimum sales in the farm sales categories, X is the lower limit of the sales category, and ln is the natural logarithm function. An example of a data point is the number of farms with sales in excess of \$100,000. For cash receipts and net cash farm income, the general form of the estimated equation is $\ln Y = bX + cX^2$. All estimated equations had an R² in excess of 0.95.

REFERENCES

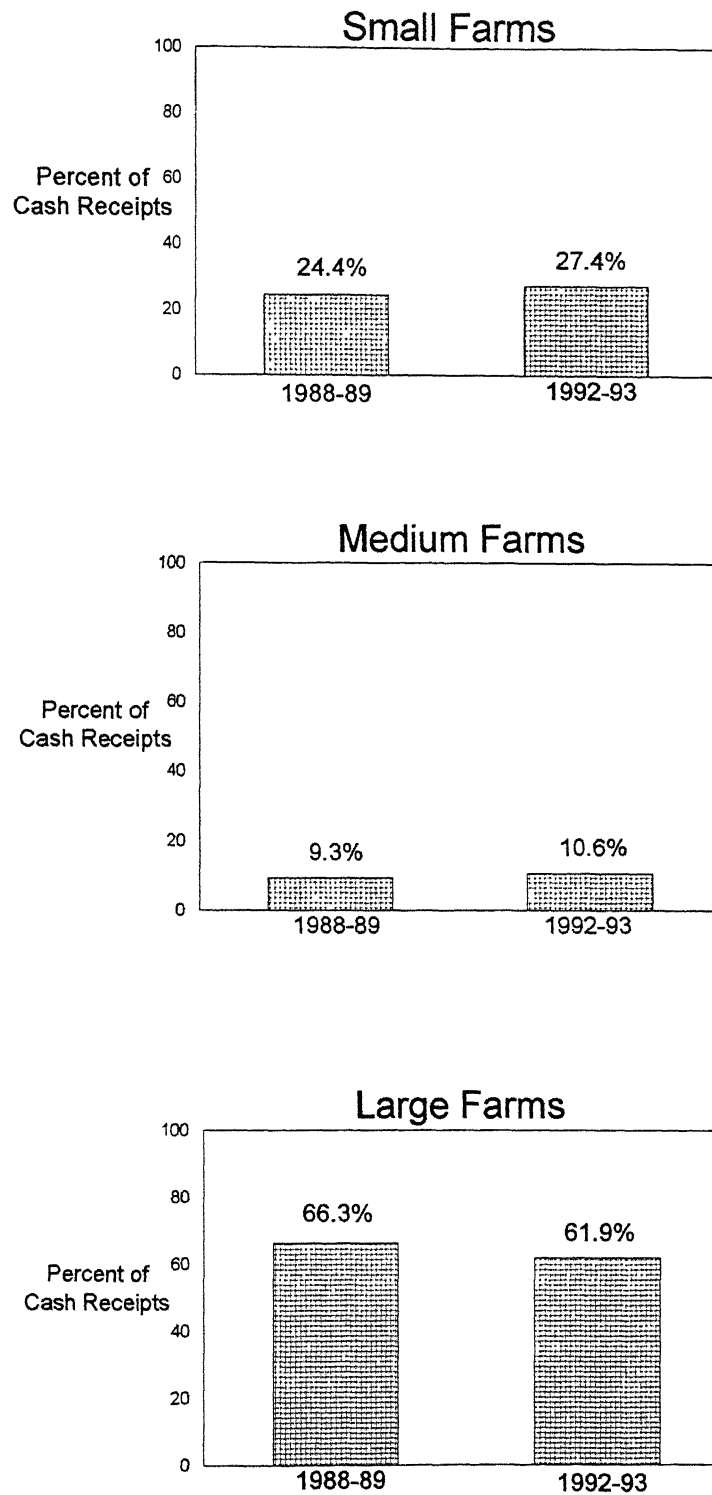
- Ahearn, Mary C., Janet E. Perry, and Hisham S. El-Osta. *The Economic Well-Being of Farm Operator Households, 1988-90*. U.S. Department of Agriculture, Economic Research Service, Agricultural Economic Report Number 666. January 1993.
- Jensen, Ann. Personal Data Inquiry. U.S. Department of Commerce, Income Statistic Branch. March 1996.
- Kalbacher, Judy. Personal Data Inquiry. U.S. Department of Agriculture, Economic Research Service. June 1996.
- Perry, Janet. *Economic Well-Being of Farm Operator Households, 1991-92*. Electronic Publication, [HTTP//WWW.ECON.AG.GOV/](http://www.econ.ag.gov/). 1995.
- U.S. Department of Agriculture. *Economic Indicators of the Farm Sector, National Financial Summary, 1993*. Economic Research Service. ECIFS-13-1. December 1994.
- U.S. Department of Commerce. *Money Income of Households, Families and Persons in the United States: 1992*. Economic and Statistics Administration, Bureau of the Census. Series P60-184.

Figure 1. Share of Farms by Farm Size Categories, 1988-89 and 1992-93



Source: Original Calculations

Figure 2. Share of Cash Farm Receipts by Farm Size Categories, 1988-89 and 1992-93



Source: Original Calculations

Figure 3. Share of Net Farm Income by Farm Size Categories, 1988-89 and 1992-93



Source: Original Calculations

