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Dimensions of Wealth Dispersion Among Farm Operator Households: An Assessment of the Impact of Farm Subsidies

Hisham S. El-Osta and Ashok K. Mishra

This paper uses microlevel data from the Agricultural Resource Management Survey to examine the changes in the distributions of household wealth and to assess the role farm subsidies play, among other factors, in affecting these distributions. The empirical analysis relies on the concept of the adjusted Gini coefficient and on fixed-effect regression procedures. Coefficients from fixed-effects estimation indicate a negative correlation between government payments and wealth dispersion, with the effect shifting toward more of a positive relation when government payments were allowed to interact with regional dummies.

Key Words: adjusted Gini coefficient, Agricultural Resource Management Survey, fixed-effects regression, government subsidies, life cycle, wealth dispersion

JEL Classifications: C33, D31, D63, O18, Q15

Economists have long argued that higher policy-induced farm incomes are capitalized into the values of farm assets (Boehlje and Griffin; Featherstone and Baker; Goodwin and Ortalo-Magné; Harris; Reinsel and Krenz; Reinsel and Reinsel; Reynolds and Timmons; Schultze; Vantreese, Reed, and Skees). It has also been argued that the values of farm assets reflect the expectations of future returns to farming (e.g., Goodwin and Ortalo-Magné). With the Federal Agricultural Improvement and Reform (FAIR) Act becoming a law on April 4, 1996, participating producers were allowed much greater flexibility in terms of crops that could be grown, while guaranteeing fixed but decreasing production flexibility contract (transition) payments over the next 7 years (Hoppe). The Act also provided nonrecourse marketing assistance loans with marketing loan repayment provisions, and loan deficiency payments for the 1996–2002 contract crops of wheat, rice, corn, sorghum, barley, oats, and upland cotton. Under FAIR, a farm was eligible for production flexibility contract payments if it had at least one crop acreage base in a production adjustment program for any of the crop years 1991 through 1995.

The Farm Security and Rural Investment Act, signed into law on May 13, 2002, extends for the most part the farm policy of the previous farm bill. Specifically, while the marketing loan program and direct payments (i.e., Production Flexibility Contract payments, also known as Agricultural Market Transition Act payment [AMTA]) as defined under FAIR will continue, a new "countercyclical payment" tied to new target prices has been introduced. According to critics, the new legislation has

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the same shortfall as the previous farm bill since large farms will continue to receive a disproportionate share of payments relative to their share of farms.[1] A study by the U.S. General Accounting Office indicates that in recent years, over 80% of farm payments went to large- and medium-size farms, whereas small farms were the recipients of less than 20% of the payments. Others further add that government payments, particularly since FAIR, have allowed some big farms to even get bigger when payments were used for the purchase of more land (see Martin). This and the argument that AMTA has shifted support further toward landowners (through higher land values and higher lease rates) and away from farmers with no landholdings are apt to raise concerns on the potential impact of government payments on the distribution of wealth among farm operator households (see Goodwin, Mishra, and Ortalo-Magné).

A study by Barnard et al. (2001) asserts that more than three-quarters of total U.S. farm assets is held in the form of real estate. The study further notes that portions of that value are increasingly attributable to two factors: direct government payments and urban influence. Ryan, Barnard, and Collender point out that the contribution of government payments to U.S. farm land values has risen from about 13% during 1990–1997 to 25% during 1998–2001.

The objectives of this paper are threefold. First, it measures the dimensions of wealth dispersion among farm operator households on a national basis (all states except Alaska and Hawaii, combined) while providing a brief assessment of the importance of government payments (in terms of participation rates, share of payments, and payment as a part of gross cash income) to farm households on the basis of their quintile shares of wealth.[2] Second, wealth dispersion among farm households is examined on a region-by-region basis.[3] Third, the study uses multilevel regression procedure to examine factors that may explain any observed disparity in regions' farm-household wealth, with special emphasis being given to the role of government payments. Whereas government payments are hypothesized to influence wealth dispersion, the role of the life cycle of farmers along with other pertinent operator, household, and farm characteristics will be considered. The data source for the study is the Agricultural Resource Management Survey (ARMS), 1993–1996 and 1998–2002.[4]

The relevance of looking at the role government payments play in affecting wealth dispersion by region stems primarily from the spatial variability in the extent to which these payments are capitalized. Specifically, as has been noted by many studies (Barnard et al. 1997, 2001), the extent to which farm commodity program payments are capitalized varies geographically, partially depending upon whether the dominant commodity grown in the area is wheat or corn/soybean rotation, or cotton or rice. While capitalization of government payments into land values, which varies by location, may affect positively the wealth position of farmers who own the land, it may cause renters to pay higher rent, thereby worsening their economic well-being. Because of spatial variability in the distribution of land ownership and in the way payments are capitalized, coupled with dependence on local supply and demand factors (among others), land values, as evident in Figure 1, and the corresponding wealth of farm households tend to

[1] The inequitable distribution of government payments resulting from earlier farm bills was illustrated by Rausser where, according to the study, operating farms with sales above $100,000 for the 1988 crop year received 57.6% of the payments.

[2] Quintile shares of wealth divide the ordered wealth distribution into fifths, or quintiles; each quintile therefore accounts for 20% of the population of farm operator households.

[3] The regions considered in the analysis are those 10 agricultural production regions as defined by the National Agricultural Statistics Service. These regions (and the states that are included in them) are the Northeast (CT, DE, ME, MD, MA, NH, NJ, NY, PA, RI, VT); Lake States (MI, MN, WI); Corn Belt (IL, IN, IA, MO, OH); Northern Plains (KS, NE, ND, SD); Appalachia (KY, NC, TN, VA, WV); Southeast (AL, FL, GA, SC); Delta (AR, LA, MS); Southern Plains (OK, TX); Mountain (AZ, CO, ID, MT, NV, NM, UT, WY); and Pacific (CA, OR, WA).

[4] The paper excludes 1997 from the analysis since ARMS in that particular year did not collect information on the nonfarm portion of household's wealth.

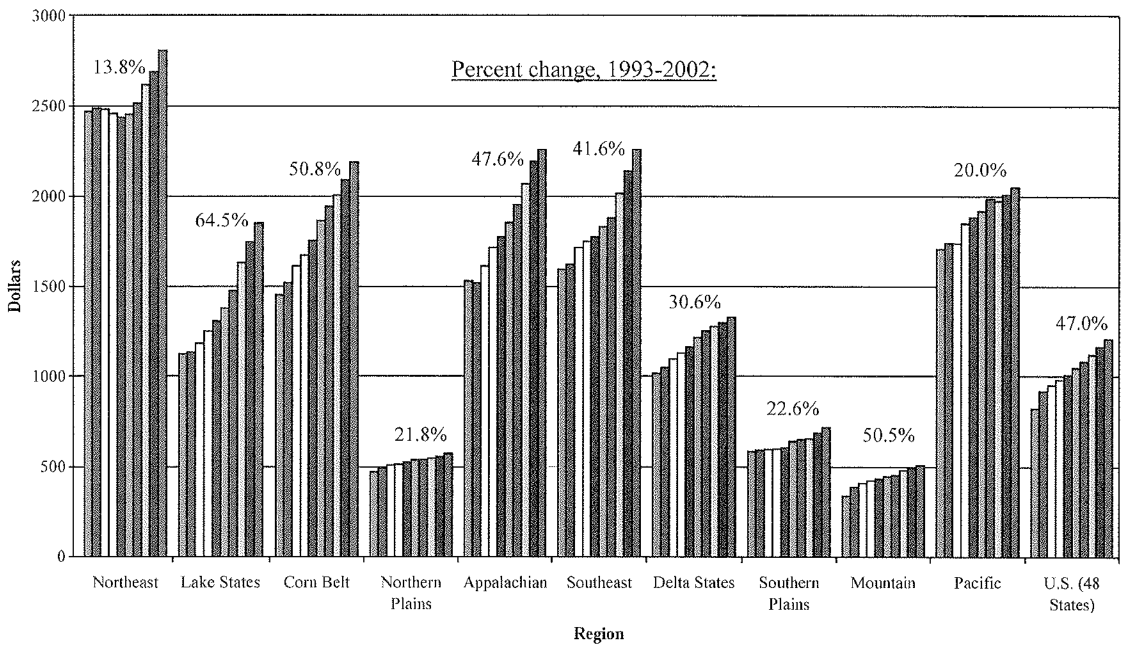

Figure 1. Farm Real Estate: Average Value per Acre (2002 Dollars), by Region, January 1, 1993–2002 (Source: *Agricultural Land Values*, United States Department of Agriculture, National Agricultural Statistics Service, Various Issues)

exhibit great variation across geographic areas. By providing measurement of the distribution of wealth on a region-by-region basis for the time period between 1993 and 2002, findings from this study could serve as a benchmark for policymakers in comparing regions' farm wealth distribution before and during the course of FAIR's 7-year period.[5] This, in turn, could allow for the discernment of who among all of the regions considered in the analysis has witnessed an overall improvement (or deterioration) in the size distribution of farm household wealth.

Many distributional issues are related to the life cycle of farmers.[6] Lins, Harl, and Frey (p. 42) have pointed to the awareness reached by policymakers that while the capitalization due to government payments tends to benefit existing landowners, it may also make it harder for young people to enter farming. Gale has shown that young and new entrants, because of financial constraints, tend to have smaller farms, grow faster, and are less likely to own farmland than older, more experienced farmers. Schultze has alluded to the possibility of capitalization providing incentives for retirement and exits from farming as owners reap the benefits in the form of capital gains. The need for incorporating life-cycle effects when examining the size distribution of farm wealth is evident since farmers tend to shift to less labor- and capital-intensive production enter-

[5] By providing analysis on the size distribution of wealth before 1996, the paper allows for the discernment of how wealth distributions after the Food, Agriculture, Conservation, and Trade Act of 1990 (when payments were coupled to production decisions) might have changed relative to post-Federal Agricultural Improvement and Reform Act of 1996 (when payments became decoupled from production decisions).

[6] The term life cycle refers to a series of stages through which an individual passes during a lifetime. The concept provides a coherent linkage between an individual's consumption patterns and expectations on income and savings as the individual passes from childhood, through education, training, labor force participation, and into retirement. For farm operators, it can trace the stages of the farm business from entry into farming, growth of the farm, consolidation, and retirement and transfer of the farm to the next generation.

prises as they advance in age, and in fact may begin to reduce size of their operation by renting or selling part of their assets to younger, more productive operators (Gale). A consequence of this is that older farmers tend to have different portfolios of farm assets than younger farmers. Similarly, because older farmers have a shorter planning horizon and are more averse to risk than young farmers, they tend to be less inclined to adopt new technology or to purchase newer equipment (Batte, Jones, and Schnitkey; Gale; Haden and Johnson) than their younger counterparts. As a result, the current market value attached to the existing physical capital of older farmers tends to be lower than that of younger farmers.

The study contributes to the literature on wealth distribution in two fundamental ways. First, although the disparity in wealth is measured nationally and based on geographic regions, the underlying unit of analysis used is the farm household itself and not the corresponding farm business. Operators and other members of these units are the focus of this study since they are the major entrepreneurs and receive most of the residual income from the agricultural production process, making them the most affected by potential policy or market shifts. To stay within the confines of the intended targeted population, the study excludes from the analysis those farm households where the farms are organized as nonfamily corporations or cooperatives, or where the operator does not receive any of the net income of the business. Second, the concept of wealth used is that of total wealth (or net worth), which is defined as the value of both the farm and the nonfarm components of wealth less the value of both the farm and the nonfarm components of debts. Inclusion of the nonfarm component is crucial when examining wealth distribution since many farm operators invested a large portion of their income, among others, in corporate stocks during the 1990s when the value of U.S. stocks, due to strong economic growth, was on the rise (see Mishra et al.). In fact, as Figure 2 demonstrates, the portion of nonfarm assets that in 1999 was in stocks, mutual funds, and in other similar financial instruments by an average farm household (on the basis of available data in the 1999 ARMS) was slightly over one-fifth (22%) of household's total nonfarm assets.

In the next section of the paper, previous research on the subject of wealth dispersion among farm household, in general, and on the subject of farm subsidies and of their potential impact on farm household wealth, in particular, is discussed. This section is followed by a description of data sources where the benefit of using representative microlevel data is highlighted, and by a section that describes the methodology used to measure wealth dispersion and to assess the determinants of regional wealth dispersion. The final two sections are used to first discuss results, and then to summarize findings and provide relevant policy implications.

Previous Research

Changes in farm asset values have important distributional effects. A study by Reinsel and Reinsel notes that rising land values due to government subsidies tend to allow control of land resources to go to those fewer but ever-larger farms with the greatest wealth and highest earnings. Many of the earlier studies on farm commodity programs in the United States have provided evidence that program benefits were distributed unevenly by showing that the largest farms were disproportionately the recipients of most of the payments (e.g., see Boehlje and Griffin; Bonnen; Reinsel and Banker; Schultze; Short; Sumner; Whittaker and Ahearn). Blandford argues that a small number of states receive most of the direct payments, which results in substantial difference in states' per-farm average payments. The study further argues that because direct payments apply only to a subset of the commodities produced by U.S. agriculture, along with the fact that farm structure tends to differ by commodities and by region, any noted unevenness in the distribution of program payments was thus inevitable. To the extent that farm program benefits since the enactment of FAIR continue to be perceived, as under previous farm bills, to be unevenly distributed,

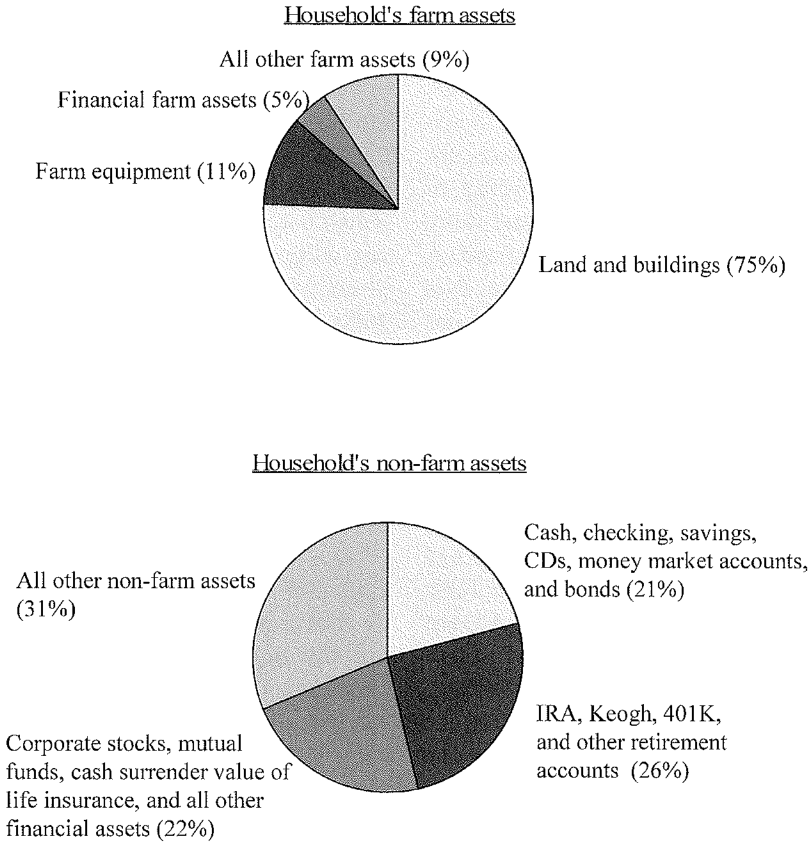

Figure 2. Farm and Nonfarm Asset Holdings for Average Farm Operator Household, 1999 (Source: 1999 Agricultural Resource Management Survey)

there seems to be a paucity of literature concerning the effect of payments on the size distribution of farm wealth.

Where studies on the size distribution of farm wealth have been undertaken, they have done so on the basis of aggregate data instead of microlevel data, or have done so in general terms and without attempting to discern how farm commodity programs have affected the distribution of farm wealth.[7] A case in point is a study by Boyne who, in addition to examining the effect of inflation (or deflation) on the distribution of wealth of farm operators, also explored the linkage between real wealth changes and the welfare implications of asset owners. A study by Ahearn and El-Osta, based on 1988 data from the Farm Costs and Returns Survey (FCRS) and U.S. Department of Commerce, showed that not only was wealth greater for farm businesses, it was also more equally distributed than that of all U.S. households. Weldon, Moss, and Erickson examined the changes in United States' farm wealth for the period 1960 to 1991 using state-level data from multiple data sources including FCRS. Their findings point to the importance of factors such as farm income, government program payments, and income from off-farm employment in generating a more equitable wealth distribution. Gould and Saupe used Wisconsin panel data to examine the role of wealth-based annuity on the distribution of observed income over the 1982 and 1986 time periods. Findings show that when the wealth annuity is added to current cash income to

[7] Although a study by Melichar does not examine the issue of size distribution of farm wealth, it nevertheless provides impressive discussion on the subject of origins of farm wealth and corresponding implications for public policy.

produce this notion of potential income over the two time periods, the inequality in cash income has tended to decrease. Mishra, Moss, and Erickson examined changes in the distribution of farm wealth in the United States for the 1950-to-1993 time period. According to the study's findings, wealth has become more equally distributed over the relevant period. A study by El-Osta and Morehart, based on data from the 1996 and 1999 ARMS, finds a decrease in wealth concentration among farm operator households. Mishra et al. used the concepts of quintile ratio and adjusted Gini coefficient to examine the distribution of wealth for farm and nonfarm households using data from the 1996 ARMS and the 1997 Survey of Consumer Finance, respectively. Findings show the distribution of wealth among farm households, as in the 1991 study by Ahearn and El-Osta, to be much less unequal than that of nonfarm households. Hopkins, Morehart, and Bohman used 1996 ARMS data to analyze the impact of Production Flexibility Contracts payments on the income, expenditures, and wealth of farm households while netting out the amounts 'passed through' to landlords. Results of their study point to wealth inequality, unlike in the case of the other two well-being measures, being induced by the greater payments retained at higher levels of household wealth.

Data

The study uses microlevel data from the 1993–1996 and the 1998–2002 ARMS to examine primarily the dimensions of wealth dispersion among farm operator households (both nationally and by region) and to assess the importance of government payments to farm households on the basis of their wealth levels. The ARMS is a national survey conducted annually by the U.S. Department of Agriculture's (USDA) Economic Research Service and National Agricultural Statistics Service (for more detail, see USDA). It is the primary source of information about the financial condition and economic well-being of farm businesses and of farm households in the United States, and about production practices and use of resources. Each observation in the ARMS, which has a complex survey design, represents a number of similar farms, with the particular number representing the survey expansion factor (or the inverse of the probability of the surveyed farm being selected for surveying). This expansion factor is referred to hereafter as survey weight. For the sake of demonstration, the observations used in the analysis in 1993 and 2002 were based on samples of 3,101 and 9,949 farm households, respectively. When properly expanded using survey weights, these samples yielded each an estimate for the population of all farms in the United States similar to what officially is published by USDA, of over 2 million farm households.

It is important to note that the wealth data, from the ARMS and for the years considered in the analysis, contained a number of extremely high or extremely low observations. To reduce the sampling error and to ameliorate the possible resulting bias to the analysis, these observations, considered as outliers, were deleted from the data sets. Specifically, the paper trimmed from each of the respective data sets those observations where the wealth of the farm household has corresponded to the bottom 0.125% and top 0.125% of the samples' overall wealth distributions (see Altonji and Doraszelski; Wu, Perloff, and Golan). The resulting sample sizes after the trimming of the data for 1993 and 2002, for example, were 3,083 and 9,827, which continued to yield after being properly expanded using survey weights a population of farm households in each year of over 2 million.

Among the many important types of financial information gathered by ARMS, data collected on the amount or type (or both) of payment received by the individual farming unit in the form of federal subsidy stand out, from a policy perspective, as perhaps the most important. For the sake of illustration, on the basis of data from ARMS, the total amount of government payments received by farm operator households in the selected samples, in real terms using the implicit Gross Domestic Product deflator (year 2002 = 100%), decreased from $12.01 billion in 1993 to $9.68 billion in 2002. The average payment for a reporting

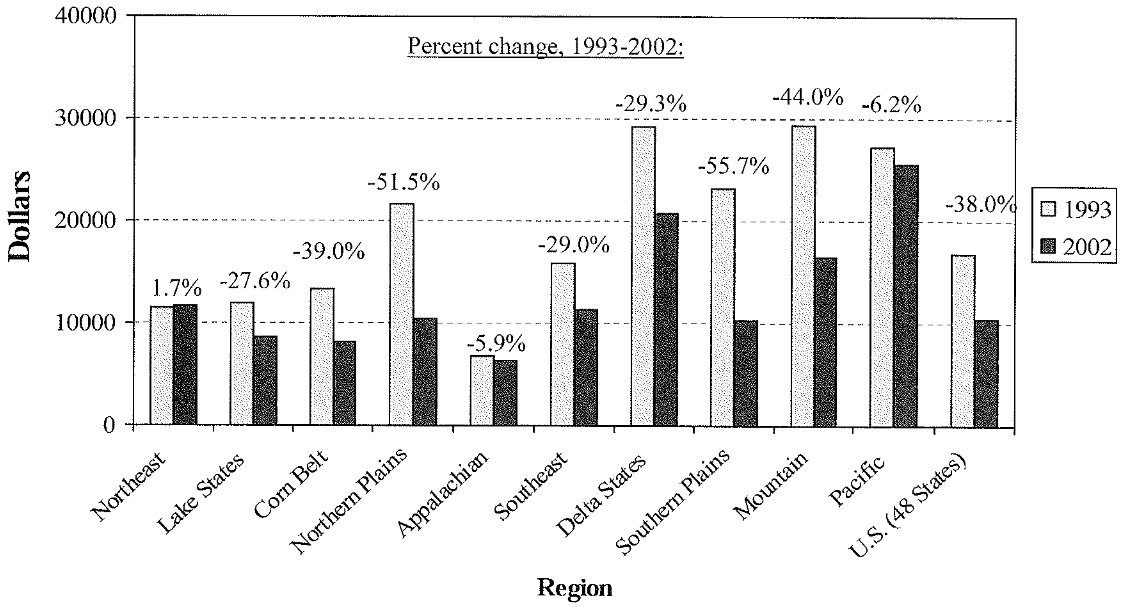

Figure 3. Average Government Payment per Reporting Farm (2002 Dollars), by Region, 1993 and 2002 (Source: 1993 and 2002 Agricultural Resource Management Survey)

farm fell by 38%, from $16,866 to $10,460. Figure 3 shows the average government payment per reporting farm (2002 dollars) by region for the 1993 and 2002 time periods. To examine the role of government payments and of other explanatory variables in terms of their impact on the dispersion of regional wealth by means of multilevel regression procedures, the paper uses 90 region-year observations, which resulted from taking the averages (using ARMS) of relevant dependent and explanatory variables from 10 regions for each of the nine time periods considered.

Methodology

Measuring Wealth Dispersion

The dispersion of wealth among farm operator households is measured on the basis of two distinct dispersion measures. First, shares of wealth by selected percentiles and by all wealth quintiles are analyzed using national samples (1993–1996 and 1998–2002) from ARMS. Second, wealth dispersion over the same two time periods is evaluated, both nationally and for the 10 production regions, on the basis of the concept of the adjusted Gini coefficient (G^*) as proposed by Chen, Tsaur, and Rhai and later further developed by Berrebi and Silber. As defined, G^* is a statistical index that allows for the measurement of dispersion in the presence of negative observations. This measure has a lower bound of zero and an upper bound of 1. When applied to farm household wealth, a Gini value of 0 indicates absence of wealth dispersion (that is, all households are holders of equal shares of wealth). A Gini value of 1 indicates presence of maximum level of wealth disparity (that is, one household holding all the wealth and the rest of the population of households holding none).

The benefit of using the adjusted Gini coefficient, instead of what is commonly known as the standard Gini coefficient (G), is its ability of mitigating the possibility of overstating extent of dispersion when the data contains large number of observations with negative values.[8] The fact that ARMS data show a

[8] In its most simplistic form, the standard Gini coefficient (G) is calculated as the average difference between every pair of values divided by two times the average of the sample. The larger the value of G, the higher the degree of disparity.

number of regions reporting a large percentage of households with negative equity (e.g., 7.0% and 4.6% in Pacific region, in1995 and 1996, respectively; 3.7% in Northern Plains region, in 1998) points to the need of using G^*, as opposed to using G. Letting i denote one of the regions used in the analysis ($i = 1, \ldots, 10$), the G_i^*, which normalizes the distribution of wealth when large number of observations are negative so that the value of Gini has an upper bound of unity, is computed as follows:

$$(1) \quad G_i^* = \left[\left(\frac{2}{n}\right)\sum_{j=1}^{n} jw_j - \frac{n+1}{n}\right] \div \left\{\left[1 + \left(\frac{2}{n}\right)\sum_{j=1}^{m} jw_j\right] + \left(\frac{1}{n}\right)\sum_{j=1}^{m} w_j\left\{\left[\left(\sum_{j=1}^{m} w_j\right)\Big/ w_{m+1}\right] - (1 + 2m)\right\}\right\},$$

where $w_j = W_j/(n\bar{W})$, $\bar{W} = \Sigma_{j=1}^{n} W_j/n > 0$, and $1 = 1, \ldots, 10$.

In Equation (1), n is the total number of households, w_j is the wealth share of the jth household, W_j is the household's total wealth where $W_1 \leq \cdots \leq W_n$ with some $W_j < 0$, and m is the size of the subset of the households whose combined wealth is zero with $W_1 \leq \cdots \leq W_m$. For computational purposes, m is determined where the sum of wealth over the first m households is negative and the first $m + 1$ household is positive. In the absence of any farm household with negative equity, which is the case in some of the regions considered (e.g., Northeast and Southeast regions, in 2001), the computed values of G and G^* will be the same.

Aside from the issue of the presence of observations with negative wealth that separates the use of either G or G^*, both of these measures have advantages over other disparity measures.[9] For example, both measures are suitable for use in assessing wealth dispersion in cases of small sample sizes as in a few of the regions used in this study (e.g., 240 observations in Lake States region and 190 observations in Northern Plains region, in 1993). In addition, use of either G or G^* satisfy the property that a transfer of \$1 from one household to another with lower wealth always yields a less-dispersed wealth distribution (see Arkes).

Explaining Wealth Dispersion

Previous research on the modeling of the relationship between disparity of an economic well-being measure and certain hypothesized determinants was conducted using ordinary least squares (OLS), where a vector of Gini coefficients based on counties, cities, or states is regressed against various explanatory variables (see Nord). For this study where an attempt is being made at investigating the effects of certain explanatory variables (x_i) on the regional disparity of farm household wealth G_i^* across nine time periods, a multivariate regression model is pursued. Two potential complexities in the estimation of such model and of means to combat them warrant further discussion. First, since the values of G_i^* [see Equation (1)] are between 0 and 1, and to not violate the standard assumption in linear regression (best linear unbiased) requiring the residual ϵ_i to have a nontruncated normal distribution, a logistic transformation of G_i^* is used (see Slottje and Hayes). This transformation allows for the dependent variable to take any real value, rather than only those that are bounded by zero and one. Second, because of the pooling of the regions' variables (both G_i^* and x_i) across time periods, which may result in residuals (ε_i) with 'panel heteroscedasticity' or 'serial correlation', thereby biasing the standard errors of estimated parameters (see Beck and Katz), an estimation procedure is adopted that utilizes dummy variables (d_i) to capture systematic differences among panel observations. Based on these two adjustments, let y be the $T \times 1$ column vector of observations for the ith region of the log-transformed level of wealth dispersion as in the following:

[9] Examples of other dispersion measures are the entropy coefficient and the decile wealth ratio, which divides wealth at the 90th percentile with that at the 10th.

$$(2) \quad y_i = \log\left(\frac{G_i^*}{1 - G_i^*}\right) = i\alpha_i + x_i\beta + \varepsilon_i,$$

where log is the natural logarithm operator, x_i is the $T \times K$ matrix of covariates, β is the $K \times 1$ vector of coefficients to be estimated, α_i are the unobservable time-invariant individual effects to be estimated, and the ε_i are the $T \times 1$ vector of disturbance terms. Expanding Equation (2) across all N regions results in (see Greene):

$$(3) \quad \begin{pmatrix} y_1 \\ y_2 \\ \vdots \\ y_N \end{pmatrix} = \begin{pmatrix} i & 0 & \cdots & 0 \\ 0 & i & \cdots & 0 \\ & & \vdots & \\ 0 & 0 & \cdots & i \end{pmatrix} \begin{pmatrix} \alpha_1 \\ \alpha_2 \\ \vdots \\ \alpha_N \end{pmatrix} + \begin{pmatrix} x_1 \\ x_2 \\ \vdots \\ x_N \end{pmatrix} \beta + \begin{pmatrix} \varepsilon_1 \\ \varepsilon_2 \\ \vdots \\ \varepsilon_N \end{pmatrix},$$

or, after rearranging vectors and rewriting Equation (3) more compactly,

$$(4) \quad y = [d_1 \; d_2 \; \cdots \; d_N x]\begin{pmatrix} \alpha \\ \beta \end{pmatrix} + \varepsilon,$$

where d_i is a dummy variable denoting the ith region. Substituting D (an $NT \times N$ matrix) for $(d_1 \; d_2 \cdots d_N)$ and collecting all NT rows will result in the following fixed-effects linear panel model:

$$(5) \quad \begin{aligned} y = \log\left(\frac{G^*}{1 - G^*}\right) &= D\alpha \\ &+ x\beta + \varepsilon = \xi'X + \varepsilon. \end{aligned}$$

Among the covariates considered in the x matrix in Equation (5) is the 'government payments' variable (*GOVPAYMT*), which is the central focus of the analysis in terms of its impact on the regional disparity of wealth among farm operator households. Also included in the x matrix in Equation (5) are some additional explanatory terms that depict the interaction between *GOVPAYMT* and the regional dummy variables $(d_1 \, d_2 \cdots d_{N-1})$.[10] Two further refinements of the model are undertaken before the estimation of Equation (5). First, exploratory analysis of the data revealed that the relationship between y and operator's age (*OP_AGE*) appears to be cubic, which has led to the inclusion of two additional forms of this variable to the regression model, OP_AGE^2 and OP_AGE^3. Second, because of the presence of interaction terms in Equation (5), all explanatory variables (except regional dummies) are centered about their grand means. This transformation of variables is done to insure a proper interpretation of the data. Further, such transformation has the added benefit of achieving orthogonality in the regression, thereby mitigating any possibility of multicollinearity among covariates (Aiken and West; Yi).

[10] The paper fits the model in Equation (5) using 'Proc-Mixed' procedure in SAS (see Littell et al.). The procedure uses a maximum likelihood (*ML*) algorithm to estimate the model's parameters and a spatial power (*SP*) function (because of the unequally spaced time data resulting from a missing 1997 time-period) to model the covariance structure of the disturbance terms for the within-regions repeated measures. For further detail on fitting fixed-effects models, see Baltagi.

Findings

Table 1 presents national findings on the dispersion of wealth among farm operator households between 1993 and 2002 using the percentile and quintile shares method and the method of adjusted Gini coefficient.[11] On the basis of the first method, the shares of wealth by each of the first four quintiles of farm households in 2002 appear to have increased compared to their corresponding levels in 1993, with the increases being the result of the relatively sizeable decrease in share of wealth by the top quintile from 56.8% to 54.0%. These changes in the shares of wealth by all quintiles point to a reduced wealth disparity, with the first four quintiles (the fourth quintile in particular) being the beneficiaries of such expansion in wealth. Despite this reduction, wealth disparity among farm operator households remains nevertheless wide (see second

[11] The bottom panel of Table 1 presents yet a third method of assessing the extent of wealth disparity among farm operator households. Specifically, the wider the gap between median and mean wealth, the more dispersed the distribution of wealth. For example, in 2002, mean wealth was \$516,469, whereas median wealth was \$336,728. These numbers point to a distribution of wealth in 2002 that was positively skewed to the right and to a case where more than 50% of all farm households have wealth levels below the sample's average level of wealth.

Table 1. The Inequality of Wealth among Farm Operator Households, 1993–2002[a]

	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002
	% of wealth									
Share of:										
Bottom 60%	22.5	23.2	23.8	21.9	NA	22.3	24.9	24.5	20.7	24.1
Top 1%	8.8	8.7	8.2	8.1		10.0	7.5	8.2	9.4	7.6
Quintile shares:										
First (lowest)	2.5	2.9	3.1	2.6		2.7	3.4	3.3	0.8	2.9
Second	7.2	2.7	7.9	7.3		7.4	8.3	8.0	7.2	8.0
Third	12.8	12.5	12.7	12.0		12.1	13.2	13.2	12.7	13.1
Fourth	20.7	20.7	21.2	21.7		20.3	21.3	21.8	22.0	21.9
Fifth (highest)	56.8	56.1	55.0	56.4		57.4	53.7	53.7	57.3	54.0
Adj. Gini Coefficient	0.530	0.520	0.508	0.525		0.533	0.492	0.496	0.556	0.501
Mean (2002 dollars)	423,421	417,234	410,239	433,481		507,659	583,028	509,269	514,452	516,469
Median (2002 dollars)	268,210	262,626	258,476	262,202		304,448	381,911	333,095	321,810	336,728
Sample Size	3,083	4,754	7,075	6,894		7,934	9,662	7,593	5,365	9,827
Population of Farms	2,028,592	1,987,493	2,032,995	1,958,387		2,016,830	2,142,758	2,116,205	2,089,054	2,111,211

NA denotes 'not available' since data on household's nonfarm wealth was not collected in the 1997 ARMS, which in effect contributed to the lack of information on household's total wealth.

[a] The reported means have coefficients of variation (CV) values of less than 10%.

row of Table 1) as the top 1% (21,165) of the households in 2002 owned nearly 8% ($82.63 billion) in total farm household wealth ($1.09 trillion), whereas the bottom 60% (1,266,682) of the households owned a disproportionate share of about 24% ($262.74 billion). On the basis of the second method, the decline in the values of the adjusted Gini coefficients from 0.530 in 1993 to 0.501 in 2002 (or 5.47% decline) further confirms the reduction in the overall wealth disparity among farm households between the two time periods.[12] This reduction in wealth disparity is interesting, particularly when it is looked at in the context of the sizeable increase in wealth that occurred between 1993 and 2002. Specifically, as evident in the lower panel of Table 1, the median wealth of a farm operator household rose, in 2002 dollars, by nearly 26%, from $268,210 in 1993 to $336,728 in 2002. In assessing wealth dispersion across all nine time periods, findings on the basis of adjusted Gini coefficient show wide-ranging wealth disparity whereby the least and the most dispersed distributions occurred in 1999 and 2001, respectively (see corresponding G^* values of 0.492 and 0.556). The increase in wealth disparity between 1999 and 2001, as indicated by the 13% rise in the values of G^*, appears to be associated with a sizeable drop (16%) in median wealth between the two time periods. Findings in Table 1 with regard to the levels of wealth dispersion as measured by the adjusted Gini coefficient and median wealth across the nine time periods appear to point to a likely inverse association between disparity in wealth and levels of accumulated wealth.[13]

Figure 4 uses data from the 1993 and 2002 ARMS to demonstrate the pattern of association between the wealth ranking of the farm households and three important government payments indicators; participation rate, share of payments received by the household, and payment as a percentage of gross cash income. The top chart shows a significant rise in the participation rate over the 1993 and 2002 time period for households in the lower- to mid-size range of the wealth distribution (first, second, and third quintiles). The chart also reveals that for the wealthiest 20% of farm households (fifth quintiles), the proportion of households reporting payments within each of these wealth categories hovered at (in 1993) or above the 50% mark (in 2002). The middle chart shows a disproportionate distribution of government payments among farm operator households. Specifically, while the richest 20% of the households in 1993 and 2002 received 48% and 43% of the total payments, respectively, the shares of payments received by the poorest 20% of households were at 10% and 8%. The lowest chart demonstrates that although the importance of government payment to the gross cash-income has decreased, although variably, for the households in the lowest and highest two quintiles of the wealth distribution over the 1993 and the 2002 time period, it has rather increased for those households in the middle quintile.

Although the finding of what appears as a falling trend in wealth dispersion between 1993 and 2002 is interesting in and by itself, more useful information on the dimension of wealth disparity among farm households is reached when the analysis is carried on a region-by-region basis. This is because only then it becomes possible to discern, first, the extent of wealth disparity among the regions within and across each time period, and, second, which regions have benefited from the improvement in the overall wealth distribution and which did not. Results in Table 2 show that in 1993, whereas the Lake States region exhibited the least dispersed wealth distribution, the Delta States region experienced the most dispersed wealth distributions, with G_i^* equaling 0.473 and 0.562, respectively. In 2002, the rank of regions with 'least dispersed' and 'most dispersed' wealth distribu-

[12] The drop in G^* by 5.47 percentage points is considered sizeable since Gini coefficients, as noted by Pendakur, are quite sluggish, and a two- or three-point drop in their values is considered quite a large drop.

[13] A simple linear regression model was estimated on the basis of the findings in Table 1 to discern such a relationship. Results showed that for every $10,000 increase in wealth, wealth disparity, as measured by G^*, appeared to decrease by 0.0019, although the decrease in wealth dispersion based on the estimated coefficient was not statistically significant (t-ratio = 1.16).

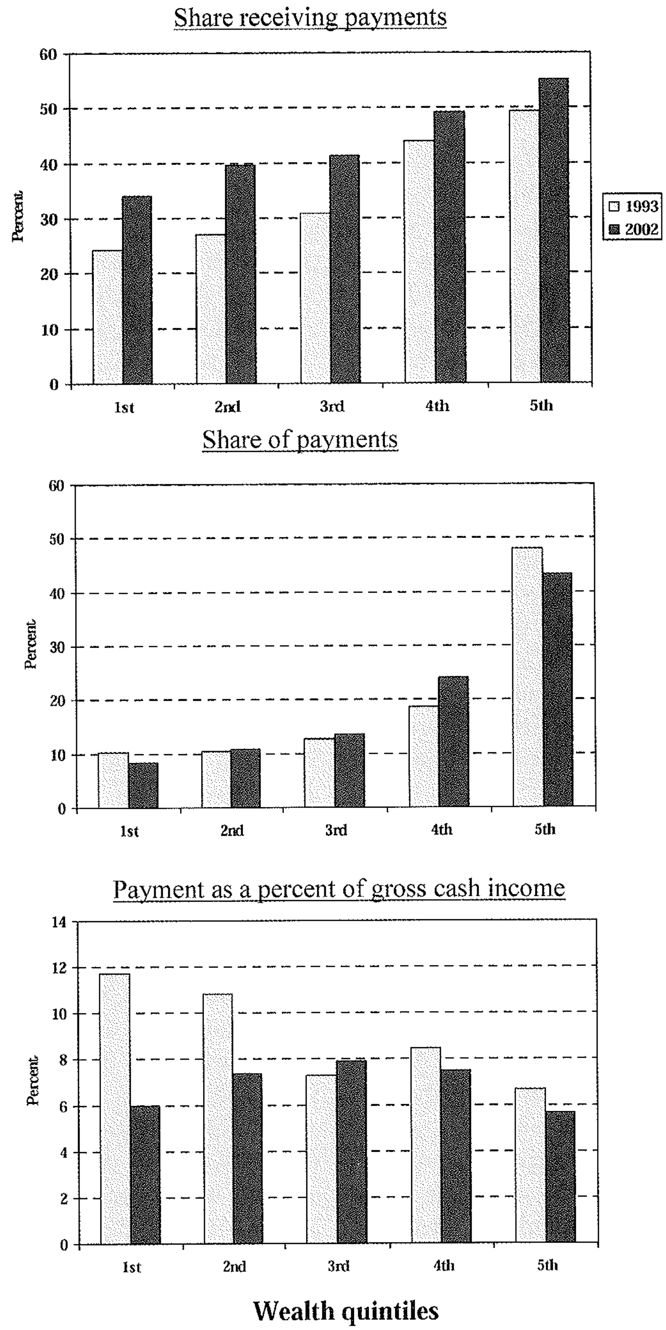

Figure 4. Percentage of Farm Households Receiving Government Payments, Distribution of Payments, and Payments as a Percentage of Gross Cash Farm Income in the United States, by Wealth Quintiles, 1993 and 2002 (Source: 1993 and 2002 Agricultural Resource Management Survey)

tions stayed the same as in 1993 on the basis of G_i^* values for the Lake and Delta States equaling 0.448 and 0.604, respectively. Despite the stability in the ranking of wealth dispersion for these two regions in both 1993 and 2002, the level of wealth disparity in the Delta has become even wider as indicated by the rise in its corresponding G_i^* value from 0.562 in

Table 2. Adjusted Gini Coefficients of Household Wealth by Region, 1993–1996 and 1998–2002

	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	% Change: 1993–2002
All 48 States	0.530	0.520	0.508	0.525	NA	0.533	0.492	0.496	0.556	0.501	−5.47
Northeast	0.551	0.487	0.467	0.493		0.536	0.504	0.458	0.625	0.481	−12.70
Lake States	0.473	0.476	0.441	0.467		0.461	0.450	0.464	0.493	0.448	−5.29
Corn Belt	0.517	0.519	0.485	0.533		0.511	0.452	0.459	0.486	0.468	−9.48
Northern Plains	0.495	0.475	0.507	0.537		0.542	0.474	0.484	0.497	0.482	−2.63
Appalachian	0.510	0.486	0.495	0.496		0.526	0.481	0.478	0.479	0.488	−4.31
Southeast	0.534	0.516	0.535	0.492		0.564	0.513	0.495	0.519	0.517	−3.18
Delta	0.562	0.564	0.522	0.529		0.518	0.465	0.522	0.510	0.604	7.47
Southern Plains	0.564	0.544	0.520	0.535		0.492	0.520	0.518	0.733	0.511	−7.76
Mountain	0.561	0.537	0.500	0.488		0.550	0.520	0.518	0.561	0.544	−3.03
Pacific	0.541	0.530	0.557	0.595		0.577	0.506	0.524	0.553	0.509	−5.91
CV (%) of Adj. Gini Coefficients across 10 Regions	6.69	6.05	6.67	7.12		6.51	5.61	5.49	14.56	8.74	

1993 to 0.604 in 2002 (or a 7.74% increase, see last column of Table 2). Another way of looking at the Delta's worsened wealth distribution is to note that while in 1993 large farming operations (those with $250,000 or more in annual sales) controlled 11.2% ($5.55 billion) of the total wealth ($49.48 billion), farms in this category were in control of 13.2% ($8.12 billion) of the wealth ($61.37 billion) in 2002. The increase in the proportion of farms in the large-size category from nearly 6.7% (7,565 farms) to 9.3% (11,065 farms) along with the increase in the level of wealth dispersion indicates a restructuring in the Delta's agriculture over the two time periods, namely a trend toward larger and wealthier farming operations.[14] It is interesting to note that corresponding to the increase in the share of wealth among farms in the large-size category in this region between 1993 and 2002 was a sizeable increase in the share of government payments that was received (from 54.2% of the total to 69.7%), this despite the modest increase in program participation rates (54.3% to 56.7%). The last column of Table 2 and Figure 5 both illustrate that, while the Del-

[14] The increase in the proportion of larger-sized operations in the Delta between 1993 and 2002 has occurred as a likely outcome of farm consolidation, primarily of farms in the mid-size ($100,000 to $250,000) category, growing larger as indicated by the decline in their proportion from 9.2% (10,409 farms) in 1993 to 5.7% (6,746 farms) in 2002. Data from ARMS further show that of the 5,432 farms in the Delta in 2002 (difference in farm number from 118,901 in 2002 and 113,469 in 1993) that had newly entered into farming, the great majority of these farms were in the small-sized category (sales of $100,000 or less). Despite the increase in the number of small farms in this region due to newly entering farms, their proportion relative to the total number of farms grew only but minutely, from 84.2% (or 95,494 farms) in 1993 to 85.0% (or 101,089 farms). Furthermore, as one reviewer has pointed out, a possible explanation for the worsening in wealth distribution, in addition to the change in the structure of farming toward a larger-sized farm, is a change in the type of farm specialization. Data from the 1993 and 2002 ARMS show the Delta region—which has exhibited the most deterioration in wealth disparity—to be one where the proportion of farms whose specialty was reported as 'Other crops' to have increased from 14.4% in 1993 to 27.4% in 2002, which may indicate a proliferation of hobby farms with their heterogeneous farm and nonfarm asset base.

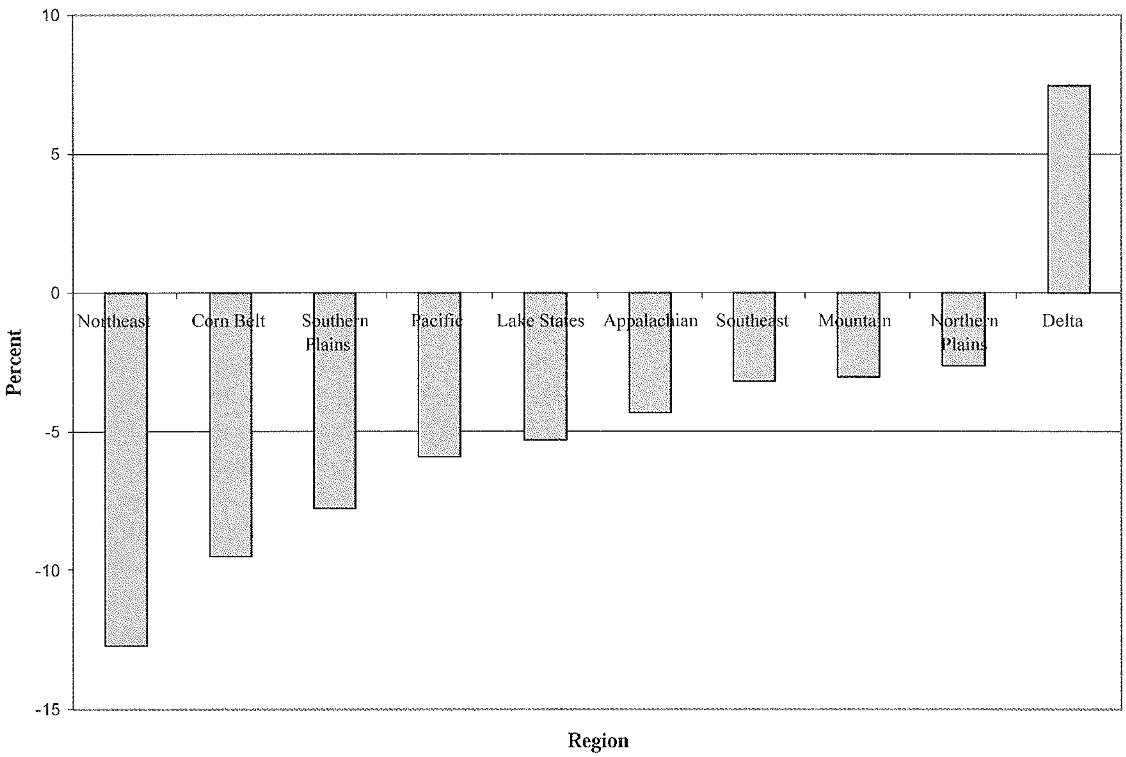

Figure 5. Relative Percentage Change (1993 to 2002) in Adjusted Gini Coefficients of Farm Household Wealth by Region (Source: 1993 and 2002 Agricultural Resource Management Survey and Computation by Authors)

ta region was the only region that exhibited increase in the level of wealth dispersion between 1993 and 2002, the Northeast region stood out as the one with the most improved wealth distribution when compared to the wealth distributions of the other eight regions.

Results in Table 2 show the coefficient of variation (CV) of G_i^* in 2002 as being larger than its 1993 counterpart (i.e., 8.74% compared to 6.69%), which indicates that the variation in wealth dispersion among the 10 regions was wider in 2002 than in 1993. The results further illustrate that while the extent of regional variation in the level of wealth disparity among farm households as measured by the CV was the least in 2000 (5.49%), it was the highest in 2001 (14.56%). These findings then beg the question with regard to which farm or household characteristics including farmer's own characteristics contribute to this cross-regional and temporal variation in wealth disparity. Table 3 shows the definition and the grand means of the variables (before centering) used in the fixed-effects regression model that attempts to answer such a question [see Equation (5)].

There are potentially important omitted variables such as soil quality and the urban influence with their attending impact on regional land values, farm management, unpredictable weather and the biological risks inherent in agricultural production, and preferences of farm households for risk taking, among others, that may influence the dispersion in farm household wealth. The concern of this paper is that these primarily unobserved variables, which are represented by the individual fixed effect, α_i, may be correlated with the key independent variable *GOVPAYMT*, hence the need for using the fixed-effects regression model rather than OLS to estimate without any bias the coeffi-

Table 3. Variable Definition and Summary Statistics, 1993–1996 and 1998–2002, Combined[a]

Variables	Variable Definition and Units	Mean	Std. Dev.	Min.	Max.
Adj. Gini	Adjusted Gini coefficient (G)	0.5135	0.0431	0.4410	0.7330
y	log[G/(1 − G)]	0.0553	0.1778	−0.2371	1.0099
GOVPAYMT	Government payments per farm ($1,000)	5.352	4.076	0.502	20.126
SOLEPROP	Proportion of farms organized as sole proprietorships	0.9088	0.0405	0.7634	0.9622
PARTNERS	Proportion of farms organized as partnerships	0.0576	0.0267	0.0165	0.1743
FULLOWN	Proportion of farm with land fully owned	0.5729	0.0971	0.3169	0.7932
FULLTEN	Proportion of farms with land fully rented	0.0856	0.0349	0.0235	0.1770
VALUEPROD	Value of production, ($1,000)	84.507	31.660	32.170	172.750
CASHG	Proportion of farms specializing in cash grains	0.0885	0.1124	0.0001	0.4633
OTHCROP	Proportion of farms specializing in other crops	0.3280	0.1293	0.0990	0.6013
DAIRY	Proportion of farms specializing in dairy	0.0537	0.0704	0.0013	0.2873
NFNW	Proportion of household wealth origination from off-farm sources	0.1963	0.0601	0.0136	0.3897
GRATIO	Gross ration (Cash operating expense/Gross cash farm income)	0.8338	0.0494	0.7519	1.0350
ROACI	Rate of return on assets (Returns to farm assets/Farm business assets)	−0.0030	0.0133	−0.0371	0.0320
D_A	Debt to assets ratio (Farm business debt/Farm business assets)	0.1160	0.0364	0.0449	0.2049
OFFWORK	Proportion of households receiving income from off-farm sources	0.6370	0.0586	0.4993	0.7932
OPOCUPF	Proportion of farm operators with occupation as farming	0.4252	0.1006	0.2589	0.6507
OP_AGE	Farm operator's age	55	2	48	59
EDYEARS	Farm operator's education (years)	13.04	0.49	11.93	14.05

[a] Sample size = 90.

cients of Equation (5). Table 4 presents the result of the estimation of this regression model, which includes controls for farm operator's and farm household's specific characteristics (i.e., operator age and education, operator occupation, proportion of income from off-farm sources, etc.), along with controls for farm's specific characteristics (i.e., farm type, farm organization, farm's financial position, etc.).[15] For this regression model, which was solved by means of *ML* methods, a positive and significant explanatory variable indicates that an increase in the respective variable while holding all other variables at their mean levels increases wealth dispersion (as defined by its logarithmic-transformed form y), whereas a negative coefficient indicates a reduction in wealth dispersion.

The resulting significant intercept, which proxies the overall mean of y if all the explanatory variables are held at their grand mean levels, is estimated as -0.159. This implies that in the unlikely event that all the farming households in the 10 regions considered are characterized as 'average' (i.e., in terms of their farm, household, or operator characteristics); the corresponding wealth disparity as measured by y is lower by nearly 0.16 point.

The significance of the regional fixed effects (the α_i values in Equation [5], combined) was tested using an F-test where F is distributed as $F(9, 73)$.[16] Findings in Table 4 show that the regional location of the farm, based on F-value of 7.21 ($p < 0.0001$), does have a significant impact on wealth disparity among farm households. In fact, when tested separately, findings point toward a more dispersed wealth distribution for households whose farms are located in the Northern Plains, Southern Plains, Delta, or the Mountain region. In contrast, a lower level of wealth dispersion emerges if households' farms are located in the Appalachian region.

In terms of the role of government payments, the significant and negative coefficient on the variable *GOVPAYMT* means that a \$1,000 increase in payments tends to decrease wealth dispersion. The findings in Table 4 further show the existence of a differential regional effect for payments on wealth dispersion as indicated by the significance of payments by nearly all the regional interaction terms. Specifically, relative to the Pacific region, and unlike in the case where all 10 regions were considered, government payments tend to increase rather than decrease wealth dispersion in seven regions, with the greatest impact (both in magnitude of coefficient and extent of statistical significance) occurring in the Mountain region.

Of the general farming and household characteristics, increases in the proportion of fully owned farms or in the extent of specialization in 'cash grains' or in 'other crops' tend to increase wealth dispersion among farm households, in contrast to the reduction in wealth dispersion shown to be associated with an increase in the proportion of wealth originating from off-farm sources. Next, the paper explored the potential impact of three additional farm-related variables on wealth disparity; all are indicative of farm's financial position in terms of efficiency (*GRATIO*), profitability (*ROACI*), and solvency (*D_A*). The positive and statistically significant coefficient of *GRATIO* indicates that a higher proportion of gross cash income absorbed by cash operating expenses, which tends to be more prevalent among small farms, has an adverse effect on wealth dispersion. By the same token, a bigger *ROACI*, which symbolizes a higher return to farm assets from current income relative to farm business assets as evident among many larger-sized opera-

[15] Because of the suspected high intercorrelations between the explanatory variables, diagnostic tests to evaluate the possibility of multicollinearity among the variables were performed using SAS. The values encountered in the variance inflation factor (a scaled version of the multiple correlation coefficient) were all (without including OP_AGE^2 and OP_AGE^3) less than 7.00, well below the critical value of 20.0, which would have indicated the presence of significant multicollinearity (see Belsley, Kuh, and Welsch).

[16] As noted by the SAS manual (see Littell et al.), the F-test used is computed as follows: $F = [(L\hat{\alpha})'(L\hat{C}L')^{-1}L\hat{\alpha}]/\text{rank}(L)$, where $\hat{C} = (D'\Sigma^{-1}D)$, $\Sigma =$ variance (ε_i), and where the matrix L is a set of contrasts between the means in $\hat{\alpha}$.

Table 4. Fixed-Effect Estimation Results for Overall Sample, 1993–1996 and 1998–2002, Combined[a]

Dependent Variable: LGINI	Estimate	Std. Error	t-statistic	P-value
Effect				
INTERCEPT	−0.159	0.0741	−2.15	0.035
NORTHEAST	0.072	0.1529	0.47	0.638
LAKE STATES	−0.050	0.1317	−0.38	0.704
CORN BELT	0.090	0.1008	0.90	0.373
NORTHERN PLAINS	0.336	0.1399	2.40	0.018
APPALACHIAN	−0.425	0.1272	−3.35	0.001
SOUTHEAST	0.114	0.1057	1.08	0.282
DELTA	0.539	0.1057	5.10	0.000
SOUTHERN PLAINS	0.615	0.1280	4.81	0.000
MOUNTAIN	0.264	0.0709	3.72	0.000
GOVPAYMT	−0.073	0.0226	−3.23	0.001
GOVPAYMT*NORTHEAST	0.081	0.0423	1.92	0.058
GOVPAYMT*LAKE STATES	0.088	0.0258	3.43	0.001
GOVPAYMT*CORNBELT	0.052	0.0243	2.14	0.036
GOVPAYMT*NORTHERN PLAINS	0.073	0.0241	3.02	0.003
GOVPAYMT*APPALACHIAN	−0.024	0.0315	−0.76	0.451
GOVPAYMT*SOUTHEAST	0.041	0.0356	1.15	0.253
GOVPAYMT*DELTA	0.048	0.0234	2.07	0.042
GOVPAYMT*SOUTHERN PLAINS	0.091	0.0338	2.70	0.008
GOVPAYMT*MOUNTAIN	0.126	0.0294	4.30	0.000
SOLEPROP	0.332	0.6053	0.55	0.584
PARTNERS	0.289	0.7567	0.38	0.703
FULLOWN	1.085	0.2595	4.18	0.000
FULLTEN	0.715	0.4401	1.63	0.108
VALUEPROD	−0.001	0.0008	−1.63	0.107
CASHG	1.590	0.3067	5.19	0.000
OTHCROP	1.513	0.2463	6.14	0.000
DAIRY	0.695	0.5730	1.21	0.229
NFNW	−1.410	0.1980	−7.12	0.000
GRATIO	1.037	0.3656	2.84	0.005
ROACI	3.523	1.5241	2.31	0.023
D_A	−2.885	0.7029	−4.10	0.000
OFFWORK	−0.202	0.2107	−0.96	0.339
OPOCUPF	−0.120	0.2070	−0.58	0.564
OP_AGE	−13.412	4.5733	−2.93	0.004
OP_AGE^2	0.244	0.0841	2.90	0.004
OP_AGE^3	−0.002	0.0005	−2.87	0.005
EDYEARS	−0.034	0.0451	−0.75	0.455

Note: Sample size = 90.

[a] All explanatory variables are centered about their grand means. Baseline category for which dummy variables are estimated against is the Pacific region.

tions, is shown, on the basis of the sign and the statistical significance of its coefficient, to increase wealth disparity. The negative and statistically significant coefficient of *D_A* suggests an inverse relationship between the level of indebtedness and wealth disparity (i.e., an equalizing effect), which may be explained by the fact that many of the smaller-sized farms that compromise the majority of farms, due to lack of access to credit, usually owe less in debt (relative to assets) than do smaller farms.[17]

A secondary focus of the paper is to investigate the role of the life cycle in explaining wealth dispersion. On the basis of the results in Table 4, which point to *AGE*, OP_AGE^2 and OP_AGE^3 as being statistically significant, it appears that the life cycle has an important role in determining wealth dispersion. The nonlinear relationship between age and wealth dispersion based on the signs of the coefficients of *AGE*, OP_AGE^2 and OP_AGE^3 suggests a decrease in wealth disparity early in the operator's life cycle, and then an increase in disparity with age at a decreasing rate after a maximum level of dispersion is reached at a later stage in the life cycle. This finding of the life cycle being a good predictor of wealth disparity is consistent with economic theory that points to variation in wealth holdings resulting from differences in income, in savings rates, in rates of returns on assets, and in inheritance; all are factors that contribute to the creation and the exacerbation of wealth disparity (see Greenwood). Available data from the 1999 ARMS on the components of farm household nonfarm assets reveal a hump-shaped pattern of asset accumulation in three of the four major components (IRA, Keogh, 401K, etc.; corporate stocks, mutual funds, life insurance, etc.; 'all other' nonfarm assets excluding cash, checking, savings, etc.) over the life cycle. For the component labeled 'cash, checking, savings, etc.', the trend over the life cycle of the farm operator was one of a general steady rise. Similarly, in the case of farm assets, the pattern of wealth accumulation over the life cycle based on the same data had the same upward trend. The extent of variation in wealth holdings, a conduit for wealth dispersion, can further be ascertained by noting that while in the same year that 37% of the farm households of young operators (younger than 35 years) reported full ownership of their acreage, full ownership of land by households of older operators (65 years or older) was at 72%. In terms of variation in the rates of returns on farm assets, the 1999 ARMS data show these rates at 0.0139 and −0.0079 for farm households operated by younger and by older farmers, respectively.

Summary and Conclusions

The paper has examined the dimensions of wealth dispersion among farm operator households on the basis of national data from the 1993 to 1996 and from the 1998 to 2002 ARMS. The paper has also examined the extent of wealth dispersion across the nine time periods based on 10 production regions in the 48 contiguous states, and assessed the role of federal subsidies, among others, in explaining the variation in wealth dispersion. Using the concept of adjusted Gini coefficient, the paper pointed to a general decline in wealth dispersion among farm operator households, notwithstanding the levels of wealth dispersion in 1993 and 2001, a situation that was also evidenced in the majority of the regions considered. Whereas the Lake States region was the region in 1993 and 2002, respectively, with the lowest wealth disparity, wealth disparity was at its highest level in both years in the Delta region. The regional- and temporal-level analyses of wealth dispersion among farm operator households quantified the extent of the diversity in wealth accumulation that exists among the 10 production regions considered over a span of nine time periods. This, in and by itself, raises interest in discerning how farm or household characteristics contribute to this cross-regional and temporal variation in wealth disparity.

Using fixed-effects regression procedure, findings show that an increase in government payments (based on the full 90 region-year observations) would lessen wealth dispersion. However, once the heterogeneity among the 10 production regions is taken into account by allowing for the fixed effects to come into play, a positive and a significant correlation

[17] To demonstrate the extent of difference in the levels of *GRATIO, ROACI,* and *D_A* between small (sales less than $50,000; 76% of farms) and larger-sized farms (sales at $500,000 or more; 3.0% of farms), the 2002 ARMS show these levels for small farms at 1.40, −0.03, and 0.06, respectively, and for larger farms at 0.76, 0.06, and 0.26.

between wealth dispersion and government payments was found in eight of the regions, with the biggest impact (both in significance and in size of estimated coefficient) in the Mountain region. Type of farm specialization, particularly if it is tailored toward crop production; and full ownership of farmland; along with increases in farm's gross ratio and farm's rate of returns on assets, were all factors associated with an increase in wealth dispersion. On the other hand, increased investments in nonfarm wealth and increased capitalization levels were negatively correlated with disparity in wealth among farm households. Perhaps the most revealing finding in this paper was the role of farmers' age (both in the size of the coefficient of *OP_AGE* and in the curvilinear relationship between age and wealth dispersion), which points to the continued presence of at least some level of wealth dispersion due to continued variation in farm operators' position in the life cycle.

Of the other determinants considered, an increase in the extent of farm families' participation in off-farm employment is shown to be insignificant in affecting wealth dispersion. Policies aimed at developing rural areas, at increasing wage rates, and at enhancing off-farm work opportunities may have the effect of reducing poverty and in equalizing the income distribution of farm households, but on the basis of the findings of this paper, are apt to do little in terms of reducing the level of wealth dispersion.

Foremost, the findings add another dimension to the debate among economists and policymakers alike concerning the likely impact of farm subsidies on production agriculture. Whereas most of the previous studies have concentrated on the consequence of farm program payments on land prices, planting decisions, market prices, domestic use, and exports, among others, examination of the potential impact of these payments on the distribution of household wealth remains almost nonexistent. This paper has attempted to remedy this with results pointing to their potential significant but regionalized adverse impact on wealth dispersion among farm families. This is particularly important for the seven production regions for which wealth disparity increased as a result of payments, since wealth has the potential of affecting not only the spending and income-generating power of farm households in addition to their retirement living standards, but also the productivity and the growth potential of their operations.

In that the study has also examined the impact of farm subsidies on the wealth distribution on a region-by-region basis, its findings should prove helpful from a policy-making perspective as they set a benchmark with regard to how the wealth distributions have evolved before and since the inception of FAIR. Future data collection by ARMS will allow for a larger national sample of surveyed farms. The larger national sample, in turn, will make it possible for a similar and statistically reliable analysis to be undertaken for a number of selected states, thereby improving the potential usefulness of the findings by lessening the level of aggregation as evident in certain parts of this research. Future research should utilize the enlargement in ARMS' sample size to replicate a similar type of analysis by assessing the importance of government payment on the distribution of yet another indicator of financial well-being, namely, one that combines annualized wealth to farm household income. This is particularly important since farm households depend on income as a means to cover their expenses and as a source of savings, and for a large number of these households, wealth is used to protect against downward swings in income and to smooth consumption. For farm households that participate in government programs but lack financial wealth, government payments could be utilized for land improvement, to smooth consumption, to fund unexpected expenses, or to fund retirement accounts. To the extent that government payments are received by about one-third of farm households, it is likely that payments will continue to be an important part of the incomes of many of these households, particularly ones running small farming-dependent operations. The considerable heterogeneity in preferences among farm households in terms of how to expend payments is likely to have a direct impact on the distribution of a measure of financial well-being that combines both income and wealth, as proposed originally by Weisbrod and Hansen, and ultimately on the relevance of such research.

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