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**Measuring Farm Household Well-Being:  
*Comparing Consumption- and Income-based Measures***

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**Abstract:** This paper reports estimates of consumption-based measures of well-being for farm households based on new, specially-designed survey questions in USDA's annual, nationally representative survey of farms, the Agricultural Resource Management Survey. With this new data, we show how patterns of consumption-smoothing relative to income levels differ between farm households versus all U.S. households, and between households of operators of large farms vs. "residential-lifestyle" farms, with limited exposure to farm income variability. We then show that the consumption measure provides a different perspective than income and wealth on the well-being of farm households relative to all U.S. households.

**Key words:** household consumption, household income, household well-being measures, farm households, self-employed households

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**Measuring Farm Household Well-Being:**  
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How does farm household economic well-being compare to that of the typical U.S. household? The answer depends upon whether a measure of available resources or of standard of living is employed. Mishra et al (2002) provided an in-depth look at the well-being of farm households, relying primarily on household income and wealth measures. The authors concluded that farm households as a whole were relatively better off than the average U.S. household, but that in 2000 about 6 percent remained economically disadvantaged (based on having both household income and household wealth less than the respective median values for all U.S. households.)

However their study relied primarily on measures of current year money income and wealth, which are indicators of resources available to the household. Many analysts agree that capturing standard of living with a measure of goods and services consumed in the current year provides an alternative measure of well-being, with a number of advantages. (Cutler and Katz; Hurd and Rohwedder; Johnson, Smeeding and Torrey; Jorgenson; Meyer and Sullivan; and Rogers and Gray). Given temporary increases or decreases in income, households tend to smooth consumption over time in order to maintain their standard of living. Consequently consumption provides a better approximation of lifetime well-being than current-year income. As a result of smoothing, household consumption tends to be less dispersed in a given year than household income.

Theory and past empirical evidence imply a more pronounced difference between money income and consumption measures of well-being for households where a substantial share of resources comes from other than money income and/or where income is highly variable across years. The literature has studied two populations where income provides a poor proxy for a consumption measure of well-being: low-income populations, who receive transfers from outside of the household and who may have higher underreporting of income (Jorgenson; Meyers and Sullivan; Slesnick, among others); and the elderly, who have relatively high levels of wealth but low current income (Hurd and Rohwedder).

This paper focuses on another population for which income is a less effective proxy for standard of living: farm households as an exemplar of self-employed households, which typically have more variable income and higher wealth than the average U.S. household. We introduce estimates of consumption-based measures of farm household well-being, using USDA's Agricultural Resource Management Survey (ARMS). With ARMS, USDA collects data annually from a nationally representative sample of farm

operator households, including extensive information on farm finances from which farm business income is calculated, as well as household income, farm and non-farm wealth, and living expenses. (We are not aware of another national dataset for self-employed households with such rich income and consumption data.)

To inform our development of hypotheses about consumption measures for farm relative to all U.S. households, section 1 compares income and wealth well-being measures for farm and all U.S. households over the period 1996-2006. We employ the best available data sets for this purpose: Current Population Survey data for all U.S. households and the full ARMS dataset (across all survey versions) for farm households.

With that context, in section 2 we then develop the hypotheses and introduce the data sets and measurement approach for calculating consumption. In order to capture both consumption and income measures for households, we shift for farm households to a smaller ARMS analysis sample (using the survey instrument with the most detailed household data), for which expenditure data are available, and we shift for all U.S. households to the Consumer Expenditure Survey (CE). Section 3 introduces the ARMS estimates of expenditures and consumption and benchmarks consumption commodity shares against CE estimates.

Section 4 compares two-way distributions of income vs. consumption measures for farm and all U.S. households, to explore patterns of consumption smoothing. The comparison between farm and all U.S. households requires comparisons across surveys with different elicitation approaches for expenditures. To eliminate the noise associated with cross-survey comparisons, we also exploit the diversity of the farm sector to conduct a within-survey comparison (using ARMS only), between farm household sub-groups that vary in their exposure to the variability in self-employment income.

In section 5, we consider what the income- and consumption-based measures tell us about the distribution of relative well-being of farm and all U.S. households. Section 6 provides a summary and identifies some next steps for the research.

## **1. Relative Household Well-being of Farm Operator and all U.S. Households: Income and Wealth Measures, 1996-2006**

First we define who is a farmer, and identify the data sources for our reporting, particularly the less familiar ARMS data set we employ for farm households. We then report on patterns of well-being using income, wealth and joint income-wealth measures.

### ***Who is a Farmer?***

To set the stage, we first define our target farm household population—households of principal operators of family farms. We start with USDA’s definition of a farm (“any place from which \$1000 or more of agricultural products were produced and sold, or normally would have been sold, during the year”). Because we are interested in the households of the principal farm operators, we restrict our analysis to “family farms”, defined as those in which the majority of ownership of the farm business is held by the operator and relatives of the operator. Most farms (96 percent in 2006) are family farms. For family farms, we identify the principal operator of the operation, and collect household information for the principal operator household associated with the farm. Around 60 percent of farms have only one operator. For multiple-operator farms, a principal operator is identified during the annual process of collecting economic information from farm businesses.<sup>1</sup>

### ***Data***

In this section, our reporting for farm households uses the full family farm sample in ARMS. (See Appendix A for more information about data sources.) The calculation of household income in ARMS includes a detailed calculation of farm income, drawing on information collected in ARMS to calculate output, revenue, expenses and depreciation, and to allocate farm income to stakeholders, including the principal operator.<sup>2</sup> ARMS also reports wealth and expenditure data. For all U.S. households, we rely on

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<sup>1</sup> About 40 percent of farms have more than one operator; however, for three-quarters of the farms with multiple operators, the farm is operated by a husband-wife team, so that both operators are part of the principal operator household on which we focus. About 10 percent of family farms have other operator households associated with the farm.

<sup>2</sup> Other net self-employment income is elicited directly from the respondent, analogous to the elicitation procedure in the Current Population Survey. Though the CPS survey manual indicates self-employment income is to be reported net of depreciation, this guidance does not appear on the survey form in CPS. Checks comparing farm self-employment income between CPS and ARMS suggest that the typical respondent does not deduct depreciation, resulting in lower estimates of farm self-employment income in ARMS than in CPS.

the Current Population Survey for income data and the triennial Survey of Consumer Finance for wealth data.

In Tables 1 and 2, respectively, report income- and wealth-based measures of household well-being for principal farm operator and all U.S. households for the period 1996-2006.

### ***Findings: Income-Based Measures***

Following Slesnick (2001), we start with the three standard measures in the well-being literature, all based on money income: the level of income at the mid-point of the population (median household income); the dispersion, or inequality, of income across households (the Gini coefficient<sup>3</sup>); and the share of households below a minimum threshold of income adequacy (the Census poverty rate).

Looking back eight decades for historical context, in the 1930s the per capita income for farm household members was about half that of nonfarm households (Ahearn et al). By the 1970s, median household income had achieved approximate parity – though it varied above and below the U.S. median, reflecting variability in farm sector returns (Ahearn et al). Table 1 illustrates that, since 1998, median income for farm operator households has exceeded median income of all U.S. households by 3 to 21 percent – even as farm sector performance and median farm household income has fluctuated over time.

Farm household income is also more dispersed within years, which is reflected in consistently higher Gini coefficients relative to all U.S. households. For income, the changes over time are in the direction of convergence, though substantial difference remains: the Gini for all U.S. households rose from .455 to .470 from 1996 to 2006; in contrast, the Gini for farm households was .582 at the end of the period. Further, farm households have consistently higher income-based poverty rates (14.4 percent vs 12.3 percent in 2006) and larger shares with negative household income each year (about 5-8 percent of farm households, compared to around 0.1 percent for all U.S. households across the period).

The greater income variability among farm households can be attributed to the greater share of self-employment income among farm households: Self-employment is more likely to have adverse outcomes in a given year due to the variability of business results, but also due to production for inventory rather than sales in a given year, and high depreciation expenses from recent capital expenditures. For all U.S.

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<sup>3</sup> The Gini coefficient is a ratio with values between 0 and 1: 0 corresponds to perfect equality (everyone having exactly the same income) and 1 corresponds to perfect inequality (where one person has all the income, while everyone else has zero income). Consequently, a low Gini coefficient indicates a more equal income or wealth distribution, while a high Gini coefficient indicates a more unequal distribution.

households, the share of income from self-employment is about 5 percent each year during the 1996-2006 period. For farm households, the share of income from self-employment ranges from 18 to 30 percent, with the on-farm share ranging from 5 to 18 percent over the same period. (Many of the other self-employment activities are related to farming, though not part of the farm business.)

However, the economic strategies of farm households are diverse. The average share of household income from farming increases with sales class of farm. Many of the households in the upper and lower ends of the income distribution are from the small set of households operating farms with annual sales over \$100,000. Though only 16 percent of total farms, these large farms produce about 89 percent of total farm sales.

### ***Findings: Wealth-Based Measures***

Farm households clearly dominate all U.S. households in wealth-based measures of well-being. In 2004, median wealth of farm households was about 5 times the estimated median wealth of all U.S. households. (See Table 2.) A large share of household wealth in the farm sector is in farmland, which has increased substantially in value relative to other assets over this period.

In contrast to all U.S. households, where wealth is very concentrated at the top end of the distribution, wealth is more evenly distributed among farm households, with 2004 Gini coefficients of .51 for farm households and .81 for all U.S. households. For wealth, the pattern over time appears to be one of divergence: the Gini for all U.S. households rose from .78 to .80 from 1995 to 2004, a small but significant increase; in contrast, the Gini for farm households declined from .55 in 1996 to .53 in 2006, but has bounced around over the period.

### ***Findings: Joint Income-Wealth (Four-Quadrant) Indicator***

Recognizing the variability of income across years and the importance of wealth to sustain consumption in the context of temporary declines in income, Mishra et al (2002) introduced a four-quadrant well-being indicator taking both income and wealth into account. The indicator variable separates households into low and high income and low and high wealth, using the U.S. household medians for money income and wealth as the dividing lines. The combination of low income and low wealth is interpreted as an indication of “economic disadvantage”. When introduced using 2000 data, 6 percent of the population was in the low-income/low-wealth category. As the relative well-being of farm households (in both income and wealth measures) has improved over the past 6 years, the share has fallen to 3 percent in 2006.

Figure 1 compares the four-quadrant distributions of farm and all U.S. households for 2004, the last year for which household wealth data are available for all U.S. households. The shares with low income are similar (43 percent of farm households, 50 percent of all U.S. households); the striking difference is in wealth, where 96 percent of farm households had high wealth (compared to 50 percent among all U.S. households.)<sup>4</sup> For all U.S. households, income and wealth are positively correlated: more than two-thirds of the low-income group had low wealth, and more than two-thirds of the high-income group had high wealth. The pattern is significantly different for low-income farm households: virtually all of them had high wealth. Notably in 2004, the low-income and low-wealth group represents 3 percent of farm households relative to 37 percent of all U.S. households.

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<sup>4</sup> The 96 percent of farm households with high net worth are split into two groups, with 55 percent having income higher than the U.S. median and 41 percent having income lower than the U.S. median. The major difference appears to be that, on average, the low-income/high-net worth group tended to have incurred farm losses during the year, and some portion of their off-farm income served to offset these losses.



## **2. Developing Consumption Measures of Household Well-being: Hypotheses, Definitions, and Data**

### ***Predictions about Consumption Behavior of Farm Households relative to All U.S. Households***

The simplest form of the permanent income hypothesis (PIH) of consumption and savings behavior states that the choices made by consumers regarding their consumption patterns are determined not by current income but by longer-term income expectations.<sup>5</sup> Though fifteen years ago the literature interpreted the theory as badly dated, more recent research suggests Friedman was more “prescient than primitive.” (Carroll, 2001).

The concept of permanent income is based on the lifetime earning capacity of household real wealth, which includes both physical (real property and financial) and human (education and experience) assets. Measured current income and current outlay for living expenses typically contain a permanent element, which is anticipated and planned, and a transitory, or unexpected, element. The concept of permanent consumption differentiates expenditure outlays that result in current consumption of goods and services, versus those that reflect (at least in part) savings for future consumption, including the purchase of durable goods such as housing, vehicles, and financial assets such as retirement accounts and insurance.

A major implication of the hypothesis is that – in the face of income variability around permanent income - consumers will seek to smooth consumption relative to current income, based on their estimates of permanent income. One application is across groups that vary systematically in the variability of their income: household groups with higher shares of transitory income, such as the households of farm operators and other self-employed individuals, are predicted to have lower propensities to consume from current income. Indeed Friedman (1957) cited this explanation for his finding that the elasticity of consumption with respect to current income was lower for farmers than for nonfarmers.

A number of empirical studies have been conducted exploring predictions from various versions of the permanent income hypothesis. The most closely related study testing the permanent income hypothesis is DeJuan and Seater (2006), which uses the Consumer Expenditure Survey to examine whether the elasticity of consumption is lower for households with greater transitory income. Their tests support the PIH, though they reject the strongest implications of the PIH.

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<sup>5</sup> The permanent income hypothesis is a theory of consumption developed by Milton Friedman (1957). The life cycle hypothesis of consumption patterns was developed by Irving Fisher, Roy Harrod, Alberto Ando, and Franco Modigliani. Because the two theories have similar predictions, they are generally linked.

In this paper, we provide informal tests of the prediction that, as a result of the higher income variability and higher wealth of farm households highlighted in section 1, farm households will smooth consumption to a greater extent than the typical U.S. household. We explore these relationships below in this section 4.

Predictions about the extent of consumption smoothing behavior are based on the extent of income variability over time: ideally we would conduct the test with panel data. However, lacking panel data capturing the same farm households across multiple years, we test for consumption smoothing across income levels in our cross-sectional data for 2006.

The underlying assumption is that greater income dispersion at a point in time is associated with greater inter-temporal variability as well, so that current incomes at the low and high ends of the distribution are less likely to be representative of long-term, or “permanent”, income for farm households than for all U.S. households. Mishra and Sandretto (2002) document the substantial inter-temporal variability of farm household income over the past seven decades, and suggest that the variability has not diminished over this period. We conduct tests by comparing how patterns of consumption-smoothing relative to income levels differ between farm households versus all U.S. households and between households of operators of large farms vs. “residential-lifestyle” farms, with limited exposure to farm income variability.

### ***Creating Consistent Expenditure and Consumption Measures with ARMS and CE Data***

In our analysis, the concept of consumption we employ (referred to as “permanent consumption” in the Permanent Income/Life-Cycle Hypothesis literature) is *own* household consumption during the *current year*. As noted above, the household consumption measure of material well-being – the value of service flows received by the household in the current period – is closely related to living expenses (current expenditures), but differs in key ways. We identify three types of adjustments to expenditures that are required.

One challenge is separating the investment or savings component of some categories of expenditures from current consumption. For consumer durables such as housing and vehicles, this can be done by replacing current outlays with the estimated annual flow of consumer services. Also categories of expenditures that explicitly represent savings, such as expenditures on disability and life insurance and retirement plans, are excluded from the consumption measure. Some authors also argue that education and health expenditures are more appropriately interpreted as investments and should be excluded.

A second challenge is separating out net expenditures on other households, such as alimony and child support, gifts and charitable contributions. A third challenge is to capture goods and services consumed without private economic transactions – including leisure, public goods, and in-kind transfers (such as Medicare direct payments to health providers.)

#### *Mapping ARMS to CE Survey Data to Create Consistent Expenditures and Consumption Measures*

The categories in the current ARMS living expense (or household expenditure) questions were modeled after the major categories used in the major, nationally-representative Consumer Expenditures (CE) Survey, the most comprehensive source of expenditure data for U.S. households. Since the ARMS questions were not originally designed to calculate consumption, we adjusted the categories of expenditures elicited in 2005 and further in 2006, to allow us to separate out items that belong in a consumption measure from those that do not. (See Appendix B for more details of the mapping between CE and ARMS categories and other aspects of the construction of the consumption measures.)

However a major difference is that CE collects data on over 200 expenditure items, whereas the ARMS survey now collects data on 10 items. Survey research literature indicates that the estimated value of an aggregate that depends on summing many components varies with the number of components that are measured. The reasoning is that each component is composed of sub-components, and respondents will not remember all the subcomponents when reporting the value of the component (Weinberg, et al 1999). Thus increasing the number of components that are queried will increase the aggregate of the components. Consequently we recognize that ARMS may be subject to a downward bias, particularly for the aggregated category “all else”. In its official reporting of CE data, BLS does not report a consumption measure. However, many researchers before us have calculated a consumption measure from CE data. Our approach most closely follows that of Johnson, Smeeding and Boyle.

We make parallel adjustments to expenditure data in CE and ARMS in order to calculate consumption measures that are as consistent as possible using the two surveys. The first set of adjustments relate to separating out savings components of expenditures. For the durables housing and vehicles, we replace expenditures with the value of estimated service flows for shelter and vehicle services. We retain education expenditures (in “all else”) and health expenditures (as a separate item). Finally we drop expenditures on personal insurance and retirement plans in both.

In addition to the two noted categories of durable goods, housing and vehicles, we have three categories treated as disposable goods and services (ie, their expenditures are included directly in the consumption measure) – food, health care, and all else.

To drop contributions to other households, we exclude the ARMS expenditure category “charitable contributions and contributions to other households” and the CE category, “cash contributions.”<sup>6</sup> Our ability to capture goods and services consumed without private economic transactions is limited – our measure does not include leisure and public goods. Conceptually, one in-kind transfer captured in the food category in both measures is food purchased with food stamps. In addition, we include for farm households “in-kind farm production for household consumption”.

### *Calculating Per-Person Equivalence Measures*

To measure well-being for individuals, we adjust the household income and consumption measures with an equivalence scale. Following Johnson, Smeeding and Torrey (2005), we use the single-parameter, constant-elasticity equivalence scale reviewed by Buhmann et al and Ruggles, which are most often used in international comparisons of inequality (Johnson and Shipp). This particular scale is given by the square root of family size and indicates that the resources for a two-person household must be 41 percent more than that of a single-person household for the two households to have an equivalent standard of living.

### *Data Analysis Samples and Descriptive Statistics*

For our analysis of consumption-based measures of well-being, we construct analysis samples from ARMS data for households of principal farm operators and from CE data for all U.S. households. As explained in Appendix A, the expenditure data are only collected on one of the five ARMS surveys; consequently, the sample used to analyze consumption data is a sub-set (N= 4,683) of the full sample (N=20,342). In appendix A, we benchmark the smaller analysis samples used in this section against the larger samples used in the income and wealth analysis above (CPS for U.S. households, and the ARMS full sample for farm households), reporting comparisons across various key variables. In this section we simply note any differences for the income variables between our analysis samples and their benchmarks.

Table 3 provides a comparison across the two analysis samples of the various demographic and economic characteristics that are expected to affect the consumption measures. We start with demographics. The households of principal farm operators are essentially the same size on average as all U.S. households (2.7 relative to 2.5 persons). Looking at the age composition, the very small difference is reflected in the higher average number of farm household members over 65 years of age (0.5 relative to 0.3 persons). Not

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<sup>6</sup> However, we do not reflect in our measure the fact that some purchases may be given to other households as gifts, and analogously households may receive in-kind gifts.

surprisingly, the average age of principal farm operators is greater than for the reference person in CE households (57 years relative to 49 years old). Farm operators are less likely to be minority, and less likely to have some college education.

Turning to income, we observe the familiar pattern of higher household income for farm operator relative to all U.S. households. However, the income distribution for U.S. households in the CE data appears shifted downward relative to the distribution in CPS; in contrast, the income distribution for farm households in the smaller analysis sample tracks the full sample closely. (See Appendix A for further discussion.) The ratio of self-employment income to non-self-employment income received by all households is of course much higher for farm households (.29) relative to all U.S. households (.06).

The CE collects limited information on wealth, but it does report whether the residence is rented or owned by the household and the market value of an owned home. The first critical difference regarding home ownership between the two populations is that three-quarters of principal operator farm households report that they live in a residence owned by the farm. Virtually all of the rest (around 20 percent) report owning their own home, with only 2 percent reporting that they rent their dwelling. In contrast, among all U.S. households, two-thirds report owning their own home and one-third report renting. Market value of homes is comparable across the two groups for households that own their own home, but for the larger share of farm households whose home is owned by the farm, the market value of their residence is 72 percent of those owned by households.

### **3. Introducing and Benchmarking the ARMS Measure of Consumption and Expenditures**

Table 4 reports estimated means by expenditure and consumption components for farm and all U.S. households. We focus first on farm households, exploring which components contribute the most to the difference between consumption and expenditures for farm households. We then turn to benchmarking the new ARMS measure against the CE measure.

#### ***Comparing Expenditure and Consumption Measures for Farm Households***

Figure 2 illustrates the expenditures and consumption measures, by component, for farm households. Mean household consumption is 14 percent higher than mean household expenditures (\$42.4K relative to \$37.3K). On a per-person equivalency basis, equivalent consumption was also 14 percent higher than mean equivalent expenditures (\$27.1K relative to \$23.8K).

The largest difference is attributable to the housing component. The ARMS expenditure measure is substantially lower than consumption because three-quarters of farm households report they live in residences owned by the farm, and so incur no outlays for shelter. By including a value for housing services for that group, the consumption measure of housing shelter services jumps to \$11.0K from \$1.5K in mean expenditures, and the value of total housing (which also includes operating costs) increases from \$6.1K in expenditures to \$15.7K in consumption services. The increase represents 26 percent of mean expenditures.

Replacing current outlays for vehicle purchases with estimated vehicle services was about a wash, resulting in a reduction relative to total expenditures of less than 0.5 percent. Including the market value of farm production for household consumption adds less than 1 percent. (The value of food purchased with food stamps, another in-kind source, cannot be distinguished from other food expenditures.) The deductions of (1) retirement savings and life/disability insurance and (2) contributions to individuals outside the household represent 8.6 percent and 5.6 percent of expenditures, respectively.

#### ***Benchmarking Farm Household Estimates from ARMS with All U.S. Household Estimates from CE***

Figure 3 illustrates the expenditures and consumption measures, by component, for both farm and all U.S. households. The CE estimated mean household expenditures for all U.S. households is about one-third higher than the ARMS estimate mean for farm households, when housing values are included in the accounting for reasons noted above. When we exclude housing from the measure, U.S. household expenditures are only 10 percent higher on average than farm household expenditures, and the difference between per-person equivalency measures is comparable.

The mean and median values of the household consumption measure are quite similar for the two populations. The gap in means between farm and all U.S. households decreases to 4 percent for total consumption (\$42,368 relative to \$44,190); on a per-person equivalency basis, the gap is 8 percent (\$27,141 relative to \$29,333). As noted above, consumption is higher than expenditures for farm households. The reverse is the case for all U.S. households: the consumption measure of housing is higher than the expenditure measure (in part because one-quarter own their homes without a mortgage), but the difference is smaller than for farm households, and does not compensate for dropping outlays on savings and on expenditures on other households. For medians, the difference is smaller and the ranking reversed.

Because the two populations differ in their distributions of income, in Table 5 we compare how the patterns of consumption shares, by component, vary across specific income categories for the two populations to provide a benchmark for the ARMS consumption measure.

The lowest income group (with household income less than \$5,000) is a special case in both populations, because it includes self-employed households with negative self-employment income. Interpreting negative self-employment income to be transitory in most cases, we expect that permanent income may be substantially higher for these households. The effect is particularly pronounced for farm households. Of the 6.9 percent of total households in the category, 5.7 percent have negative household income (where negative self-employment income dominates other sources of income, which are positive on average). However, average household net worth for the category (\$1.1 million) is comparable to that of the highest income group (\$1.2 million). Similarly average age of principal operator is younger and household size is larger than the second lowest income group – their values are closer to the highest income groups.

Negative self-employment income is also reflected in the low average income (\$439) among all U.S. households with income less than \$5,000. The demographic characteristics of this group reflect a more typical pattern of low-income households (including smaller households, lower market value of owned-home), consistent with a lesser role of transitory negative shocks relative to farm households.

Trends across income levels in consumption shares by commodity type are comparable in the two populations.

Further, absolute levels of the consumption shares for food, housing and transportation tend to differ only by a few percentage points between farm and all U.S. households for a given income group. The pattern of food consumption shares is very close for the two groups, though the farm shares are about 2 percent higher in each income group. The shares are slightly decreasing across income categories, consistent with

the prediction of Engels Law that the budget share of necessities will decrease with income. (The decline is not large – the traditional pattern may be mitigated in contemporary life by a greater propensity for higher-cost eating outside the home among upper-income groups.) The housing budget shares are very close – both in levels and in their decreasing patterns across income groups. The transportation budget shares are similar both in levels and in a slightly increasing pattern across income groups.

Health care shares consistently decrease across income for both groups; however, farm household shares are 1.5-2 times higher than for all U.S. households, as a result of both higher insurance and higher out of pocket expenses. However, CE estimates of health care are low relative to estimates from the Medical Expenditure Panel Survey. (Jones et al) A comparison of MEPS data against ARMS is consistent with expectations that self-employed individuals will have higher insurance costs along with lower insurance coverage, resulting in higher out of pocket expenses – though the divergence is lower than observed with the CE data. Health care is the only category for which the lowest-income farm group has the highest budget share.

Finally the “all else” budget category is increasing across income groups for both populations, but the level is higher for all U.S. households. The latter is consistent with under-reporting of expenditures in the ARMS “all-else” question relative to the detailed questions for subcomponents of this category in CE.



#### **4. Comparing the Relationship between Consumption and Income for Farm and All U.S. Households**

In this section we examine the patterns in the relationship between income and consumption for farm and all U.S. households to see if they are consistent with the prediction that households exposed to greater income variability U.S. households will smooth consumption to a greater extent. As noted earlier, the concept of consumption smoothing to align consumption to permanent income, rather than current income, is inherently an intertemporal one, requiring panel data on individual households through time. As stated earlier, absent panel data on farm households, we examine patterns of consumption smoothing across income levels in our cross-sectional data for farm and all U.S. households.

Our tests take into account that the two populations differ in both the level and variability of income. The first test is to look at average consumption (compared to average income) across specific income categories. We first explore this for all U.S. vs. all farm households. To avoid problems associated with cross-survey comparisons, we then compare for two sub-groups within the farm population. The second test will look at the joint rankings (by quintiles) for each household in the distributions of consumption and income.

##### ***Consumption-smoothing: All Households Operating Farms vs. All U.S. Households***

In Table 6, we break down households in each population by equivalent-income categories, and report mean equivalent-income and mean equivalent consumption pairs for each category. As expected, we observe a declining ratio of equivalent-consumption to equivalent-income for both population groups. Also as expected, we observe greater consumption smoothing for farm households, the group with greater income variability. Figure 4 clearly illustrates the flatter consumption-income relationships of farm households, using the equivalent measures. At the low end of the distribution, the ratio of consumption to income is higher for farm households, whereas at the high end, the ratio is lower: the pivot point appears to be around the medians for both.

##### ***Consumption Smoothing: Households Operating Large Farms vs. Households Operating Residential Lifestyle Farms***

The comparison between farm and all U.S. households requires comparisons across the ARMS and CE surveys, which have different elicitation approaches for expenditures. To avoid the noise introduced into the comparison as a result of using two different surveys, we exploit the diversity of the farm sector to conduct a comparison using only the ARMS survey, comparing two farm household sub-groups – one

which is not extensively exposed to the risks of self-employment income variability (households operating residential-lifestyle farms) and one which is (households operating farms with sales to \$100,000 or more). By residential lifestyle farms, we refer to farms of less than \$10,000 in sales, whose principal operators indicate their principal occupation is something other than farming. Though the residential lifestyle farms represent about 40 percent of farms, they produce a negligible portion of total sales. On average, farm income in this group is negative; combined with other business income, on average the total business income share of household income for our nonelderly operators is less than 10 percent. In contrast, farms with \$100,000 sales or greater represent 16 percent of farms, and produce 89 percent of total sales. On average, farm income represents 60 percent of total household income for our nonelderly operators, with other business income adding another 10 percent. And to eliminate the effects associated with elderly dissavings, we drop all elderly operators.

In Table 7, we can see that the medians of equivalent income are essentially the same for the two populations, though the distribution is substantially more dispersed for nonelderly households operating large farms. As expected, the large-farm households smooth consumption to a much greater extent than the residential-lifestyle farm households – such that the distributions of equivalent-consumption are very close – not only at the median, but throughout the distribution. Figure 5 clearly illustrates these patterns.

### ***Consistency in Household Ranks in Income and Consumption Distributions***

The second result that follows from greater consumption smoothing by farm households is the lack of a close mapping between the income and consumption well-being measures for farm households. This finding implies that income is a less effective proxy for consumption for farm (and other self-employed households) relative to all U.S. households.

Our two-way distributions in Table 8 were inspired by the earlier work of Rogers and Gray (1994), who compared quintiles of income to quintiles of outlays for all U.S. households using 1992 CE data. If current income were a good predictor of consumption, we would expect households to be concentrated along the diagonals; alternatively if the two were uncorrelated, a random distribution would suggest 20 percent in each row cell. (The numbers in each cell are shares of households in row, ie, in a specific income quintile).

***Income vs. consumption quintiles:*** For U.S households, the diagonal cells have the largest share of households along each row in the income-consumption table. The effect is strongest for the first and fifth quintiles: notably 60 percent of households in the lowest income quintile are in the lowest consumption

quintile, and 59 percent of households in the highest income quintile are in the highest consumption quintile. The other diagonal cells have about one-third of their row totals.

For farm: farm households are more likely to be off-diagonal. For example, we observe farm households shifting to a far greater rate than all U.S. households from the lowest income quintile to the highest three consumption quintiles (38 percent of farm, relative to 18 percent of all U.S. households) and from the highest income quintile to the lowest three consumption quintiles (29 percent of farm, relative to 14 percent of all U.S. households).

***Income- equivalent and consumption-equivalent quintiles:*** For all U.S. households, the diagonal pattern remains strong, though concentration along the diagonals falls slightly (less than 10 percent in each.) For farm households, we no longer observe the diagonal cells having the largest share of the row – except for the highest and lowest income quintiles. By implication then, the shifting across quintiles is greater.

***Income-wealth quintiles:*** The final two-way comparison in table 9 is income vs. net worth quintiles for farm households. The shifting is particularly strong for the first income quintile (53 percent of which are in the top 3 wealth quintiles). This is consistent with households that operate commercial farms with an extensive asset base experiencing large negative transitory income in a given year – which could be due to variability of business results, retaining production as inventory in a given year (for future sales), or high depreciation expenses from recent capital expenditures.

In sum, the extensive shifting across quintiles when switching from income to consumption measures of well-being is consistent with current farm household income being more divergent from the long-term or permanent household income that drives consumption. Since wealth provides a source of assets to draw down or to borrow against during temporary income shortfalls relative to permanent income, the even stronger pattern of divergence between income and wealth quintiles for farm households further supports this inference.

## **5. Relative Well-being of Farm and All U.S. Households: How Does the Story Differ between Income and Consumption Measures?**

We turn now to compare the distributions of the well-being measures across farm and all U.S. households. Table 9 reports the values of income and consumption at decile cutpoints for the two populations, for both total and equivalent versions of the well-being measures. (Section A reports farm household data, B reports all U.S. household data, and Section C of the table reports the ratio for each variable of the values for farm households relative to all US households.) We focus on the equivalency versions of the income and consumption measures. (The patterns are very similar for the totals and equivalency versions.)

Column 4 of Table 9 reports the distribution of equivalent-income, using CPS for all U.S. households, and the full ARMS sample (using data from all five survey versions) for farm households. Farm household Equivalent-income is more dispersed for farm households than for all U.S. households, lower at the low end of the distribution and higher at the high end. Specifically, farm household income is substantially lower (29 percent) than all U.S. household income at the 10<sup>th</sup> percentile, comparable at the 20 percentile, 6-14 percent higher at the third to eighth deciles, and jumping up to 27 percent higher at the 90<sup>th</sup> percentile.

Column 5 reports equivalent-income, alternatively based on data from the CE and ARMS consumption samples. Comparing columns 4 and 5, we are reminded that the ARMS consumption sample understates farm household income (relative to the full ARMS sample) at the 90<sup>th</sup> percentile and the CE income distribution understates all U.S. household income (relative to CPS) throughout the distribution. As a result the farm household dominance in household income appears even greater in column 5 relative to column 4, except at the 90<sup>th</sup> percentile (which is now within the range observed for other deciles).

For both populations, the distribution of consumption is less dispersed than the distribution of income – but as discussed earlier, the reduction in dispersion between income and consumption is greater for farm households. The net result is that the consumption distributions for the two populations (column 6) are similar, particularly between the 20<sup>th</sup> and 70<sup>th</sup> deciles of the distribution where the differences are between +/- 6 percent. At the tails of the distributions, the pattern appears to be reversed from that of the income distribution: farm households appear better off at the low end of the distribution and worse off at the high end of the distribution, relative to all U.S. households.

Several summary indicators of dispersion consistently indicate that household income is more dispersed and household consumption is less dispersed among farm households relative to all U.S. households. The 80:20 and 90:10 ratios focus on the tails of the distributions. The effects are noticeable at the 80:20 ratio

(+ 11 percent for equivalent-income and -14 percent for equivalent-consumption, for farm household relative to all U.S. households) and stronger at the 90:10 ratio (+ 78 percent for equivalent-income and - 25 percent for equivalent-consumption). [The Gini coefficients, characterizing dispersion throughout the dispersion (where a value of 0 implies all have equal income), similarly support the pattern of greater income dispersion in the farm household population, and for farm households, the lower dispersion in farm household consumption relative to farm household income. (We have not calculated the Gini coefficients for the CE data.) ]

Our final indicator of well-being focuses on the low end of the distribution – income and consumption poverty rates. Consumption poverty is calculated for each individual by comparing their household consumption level to the Census poverty threshold for the composition of their household. If consumption is a better indicator of household well-being for households where a substantial share of resources comes from other than money income and/or where income is highly variable across years, then consumption poverty may be a better measure of economic disadvantage than the official Census income-based measure. (Jorgenson; Meyers and Sullivan; Slesnick) The Census poverty threshold incorporates an adjustment for household size (including age composition), one that is different from the equivalency measure employed in our data analysis. Consequently poverty rates are calculated on total income and total consumption measures.

For the farm population, poverty drops from 14.4 percent based on the official Census income-poverty measure to 7.8 percent for the consumption poverty measure. For all U.S. households, consumption poverty is lower than income poverty – but again, the reduction is smaller for all U.S. households than for farm households. But again farm households perform better at the low end: estimates from the literature suggest that the US household consumption poverty rate is higher than the farm household consumption poverty rate. (Meyer and Sullivan, 2009) <sup>7</sup>

To examine further the low-end of the distribution, in Table 10 we breakout well-being measures for the four quadrants of the joint income-wealth indicator introduced earlier (where the dividing lines are the respective medians of household income and wealth for all U.S. households). Of particular interest is how the patterns of income and consumption poverty vary across the quadrants.

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<sup>7</sup> The decline from income to consumption poverty for farm households is greater than the decline estimated for 2005 in Meyer and Sullivan (2009), from the official income poverty rate of 12.6 percent to a consumption-poverty rate of 10.2 percent.

Income-based poverty is limited to the two quadrants with low-income households, and consumption poverty is concentrated there as well – at lower rates. Interestingly, a small share (3 percent) of the high-income/high-wealth quadrant also is consumption-poor. As expected, the poverty rates are highest for the low-income and low-wealth quadrant designated as an indicator of economic disadvantage: with income poverty at 70 percent, and consumption poverty at 41 percent. With high wealth and low income, the poverty rates are substantially lower: 33 percent income-poverty, and 13 percent consumption-poverty. A very small share of farm households is in the low-income/low-wealth quadrant in 2006: the share has declined from 6 percent in 2000, when the indicator was first introduced, to 3 percent of in 2006; consequently, over two-thirds of the consumption poor (and virtually all of the income-poor) are in the low-income/high wealth quadrant, which covers 41 percent of all farm households.

We have to consider that measurement error in the ARMS consumption variable may lead to a systematic understatement of farm household consumption. If we posit that the understatement is a constant (or even increasing) percentage of reported consumption, then the absolute size of the effect will be less on the low end of the distribution than on the high end. Such a pattern of measurement error would further reinforce the preliminary finding of higher farm standard of living relative to all U.S. households at the low end of the distribution (contrary to the income measure), but could qualify the preliminary finding that farm household standard of living is lower at the high end of the distribution.

## 6. Summary and Next Steps

ERS publishes indicators of economic well-being of farm operator households. To date the focus has been on income- and wealth-based measures calculated from the annual survey of farm households conducted by USDA (ARMS). In this report, we have introduced a consumption measure for farm households calculated with revised ARMS expenditure questions, and benchmarked the measure against the BLS Consumer Expenditure Survey.

Citing extensive literature on household well-being, we argue on conceptual grounds that current consumption of goods and services provides an important complement to income and wealth in characterizing household economic well-being. Whereas income and wealth are important indicators of resources, current consumption is a more informative indicator of current material standard of living, as well as a better approximation of lifetime standard of living.

We find that consumption-smoothing appears greater for households that experience greater income volatility, in comparisons between all farm households and all U.S. households and within farm household groups. The comparison across farm households avoids the problems introduced by comparing consumption across the CE and ARMS surveys. We also find that there is not a close mapping between the income and consumption well-being measures for farm households, compared to that for all U.S. households.

As a result, it is not surprising that income and consumption-based measures of well-being provide different perspectives about the relative well-being of farm and all U.S. households. Farm households appear to have higher equivalent-income than all U.S. households at all deciles but the first. In contrast, the distributions of equivalent-consumption appear to be much more similar for the two populations – except the patterns at the tails are reversed relative to income: for farm households, equivalent consumption appears to be higher at the low end of the distribution, and lower at the high end of the distribution relative to all U.S. households.

An important next step in this research is to explore the implications of measurement error in the surveys for our results. One element is possible measurement error in ARMS that is leading to a systematic understatement of farm household consumption. A pattern of increasing downward bias with the level of consumption would further reinforce the preliminary finding of higher farm standard of living at the low end of the distribution, but could qualify the preliminary finding that farm household standard of living is lower at the high end of the distribution.

## References

- Buhmann, B., L. Rainwater, G. Schmauss, and T. M. Smeeding, (1998) "Equivalence Scales, Well-being, Inequality, and Poverty: Sensitivity Estimates across Ten Countries Using the Luxembourg Income Study Database," *Review of Income and Wealth*, Vol.34:115-142.
- Burkhauser, R. V., S. Feng, S. Jenkins, and J Larrimore, (2008) "Estimating Trends in U.S. Income Inequality using the Current Population Survey: The Importance of Controlling for Censoring", *NBER Working Paper 14247*.
- Burkhauser, R. V., S. Feng, and S. Jenkins, (2007) "Using the P90/10 Index to Measure U.S. Inequality Trends with Current Population Survey Data: A View from Inside the Census Bureau Vaults", *ISER Working Paper 2007-147*. Colchester: University of Essex.
- Carroll, Christopher D. "A Theory of the Consumption Function, With and Without Liquidity Constraints." *Journal of Economic Perspectives* 15(3):23–46 Summer 2001.
- Carroll, Christopher D. and Miles S. Kimball. "Precautionary Saving and Precautionary Wealth." *Palgrave Dictionary of Economics and Finance*, 2nd Ed. 2007.
- Cutler, D. and L. Katz, (1991) "Macroeconomic performance and the disadvantaged", *Brookings Papers on Economic Activity*, 2.
- DeNavas-Walt, C., B. D. Proctor, and J. Smith, U.S. Census Bureau, Current Population Reports, P60-233, *Income, Poverty and Health Insurance Coverage in the United States: 2006*, U.S. Government Printing Office, Washington DC 20007.
- DeJuan, Joseph, and J.J. Seater, (2006) "A Simple Test of Freidman's Permanent Income Hypothesis, *Economica* 73:27-46.
- Federman, M. et al, (1996), "What Does It Mean to be Poor in America?", *Monthly Labor Review*, 119(5), 3-17.
- Fernandez-Villaverde, J. and D. Krueger, (2002), "Consumption over the Life Cycle: Some Facts from the Consumer Expenditure Survey Data," *NBER Working Paper 9382*.
- Fisher, Jonathan D. and David S. Johnson, Consumption Mobility in the U.S.: Evidence from Two Panel Data Sets, *Topics in Economic Analysis and Policy*, Brookings Economic Press, Article 16, Vol. 16, issues 1, 2006.
- Friedman, M., (1957) *A Theory of the Consumption Function*, Princeton University Press, Princeton NJ.
- Hoppe, Robert, and David Banker, *Structure and Finance of U.S. Farms: 2005 Family Farm Report*, EIB-12, Economic Research Service, USDA, May 2006.
- Hurd, M.D., et al (1998) "Consumption and Savings Balances of the Elderly: Experimental Evidence on Survey Response Bias," in D. Wise ed., *Frontiers in the Economics of Aging*, Chicago: U. of Chicago Press, pp. 353-387.
- Hurd, M.D., and S. Rohwedder, (2006) Economic Well-being at Older Ages: Income and Consumption-based Poverty Measures in the HRS, NBER Working Paper 12680.



- Johnson, D. (2004) "Measuring Consumption and Consumption Poverty: Possibilities and Issues," conference paper presented at "Reconsidering the Federal Poverty Measure, American Enterprise Institute, Washington Dc, November 2004.
- Johnson, D. and S. Shipp, (1999), "Inequality and the Business Cycle: A Consumption Viewpoint," *Empirical Economics*, Vol. 24, issue 1.
- Johnson, D., T. Smeeding, and B. Torrey, (2005), "Economic Inequality through the Prisms of Income and Consumption," *Monthly Labor Review*, April, pp. 11-24.
- Jones, Carol A., Hisham El-Osta and Robert Green, *Economic Well-Being of Farm Households*, Economic Brief #7, Economic Research Service, USDA, March 2006.  
<http://www.ers.usda.gov/Publications/EB7/>
- Jones, Carol A., et al. *Health Status and Health Care Access of Farm and Rural Households*, Economic Research Report, Economic Research Service, USDA, Forthcoming.
- Jorgenson, D. (1998) "Did We Lose the War on Poverty?" *Journal of Economic Perspectives* 12:1, 79-96.
- Kennickell, Arthur B. (2006) "Current and Undercurrents: Changes in the Distribution of Wealth, 1989-2004". Federal Reserve Board.  
<http://www.federalreserve.gov/pubs/oss/oss2/papers/concentration.2004.5.pdf>
- Meyer, B.D. and J.X. Sullivan (2003), "Measuring the Well-being of the Poor Using Income and Consumption," *Journal of Human Resources*, XXVIII Supplement 1180-1220. (plus NBER Working Paper 9760.)
- Meyer, B.D. and J.X. Sullivan (2009), "Five Decades of Consumption and Income Poverty," NBER Working Paper 14827.
- Mishra, Ashok, Hisham S. El-Osta, Mitchell J. Morehart, James D Johnson, and Jeffrey W. Hopkins, *Income, Wealth and the Economic Well-Being of Farm Households*, Agricultural Economics Report-812, Economic Research Service, U.S. Dept. of Agriculture, July 2002.
- Mishra, Ashok and Carmen L. Sandretto (2002) "Stability of Farm Income and the Role of Nonfarm Income in U.S. Agriculture," *Review of Agricultural Economics*, Vol. 24, No. 1 (Spring - Summer, 2002), pp. 208-221
- Rogers, J. and M. Gray (1994), "CE Data: Quintiles of Income versus Quintiles of Outlays," *Monthly Labor Review*, 118(8), 32-37.
- Ruggles, P., (1990), *Drawing the Line*, Washington DC: Urban Institute Press.
- Sablehaus, J. and J. Groen, (2000), "Can Permanent Income Theory Explain Cross-Section Consumption Patterns?" *Review of Economics and Statistics*, 82(3):431-438.
- Short, K., M. Shea, D. Johnson, and T. Garner, (1998), "Poverty-Measurement Research Using the Consumer Expenditure Survey and the Survey of Income and Program Participation," *American Economic Review*, 88(2), 352-356.
- Slesnick, D. (2001), *Consumption and Social Welfare*, Cambridge: Cambridge University Press.

Slesnick, D., (1994), "Consumption, Needs, and Inequality," *International Economic Review*, Vol 35, no. 3.

Weinberg, D. et al (1999) "Fifty Years of U.S. Income Data from the Current Population Survey: Alternatives, Trends and Quality," *American Economic Review*, Vol. 89, No. 2, Papers and Proceedings of the 111<sup>th</sup> Annual Meeting of the American Economic Association. (May), pp. 18-22.

## **Appendix A: Data Sources and Variable Definitions**

### **Agricultural Resource Management Survey (ARMS)**

USDA's Agricultural Resource Management Survey (ARMS) provides annual observations of field-level farm practices, the economics of the farm business, and the characteristics of the farm household for a nationally representative sample in the 48 contiguous states of all U.S. farms. The official USDA definition of a “farm” is any place from which \$1,000 or more of agricultural products were produced and sold, or normally would have been sold, during the year.

The survey data support estimation of farm business income and performance measures, farm sector income and value-added, production costs for crop and livestock enterprises and chemical use by farmers in the production of crop and livestock commodities, as well as of household characteristics of the principal farm operator, including demographic and financial well-being measures. Continuous data series for household income and wealth measures exist from 1996, when the current format for data collection was introduced.

ARMS is a large multi-phase and multi-version survey, employing stratified sampling procedures suited to collecting the different kinds of information. The sample is screened for continued operation and commodity coverage in Phase I, conducted in the summer of the reference year. In the fall, randomly selected Phase I farms are surveyed in Phase II concerning their crop production practices and chemical use at the field or production unit level. Phase III, initiated during the winter following the reference year, draws information on farm income and expenditures, farm financial transactions, and the farm operator household.

Several versions of the Phase III survey are distributed. One enumerated version (version 1), employing personal interviews with trained enumerators, covers farms of all types, and asks more in-depth questions than in other versions – including household questions on living expenses needed for this analysis. Survey weights are developed to generate nationally representative estimates from version 1 data alone. In addition, typically two to three other personally-enumerated versions are designed to capture detailed characteristics of specific commodity enterprise types; survey weights are developed to generate nationally representative estimates from these versions for the enterprise types surveyed. Finally, a short “core” version, which is distributed and returned by mail, supports state-level estimates for the 15 states with the highest values of farm production. Another set of weights provides nationally representative data from the pooled sample across all five versions of the survey (the “full sample.”)

The system of weights developed for each observation to create nationally representative samples for individual and pooled surveys address sampling, nonresponse, and undercoverage (calibrating to independent USDA estimates).<sup>8</sup>

***Analysis samples:***

**Full family farm sample:** To report household income and wealth measures, we use data from a pooled sample of all five questionnaires. Because we are interested in farm households, we restrict our analysis to “family farms”, defined as those in which the majority of ownership of the farm business is held by the operator and relatives of the operator. Most farms (96 percent in 2006) are family farms. Most farms have only one operator. For multiple-operator farms, a principal operator is identified during the annual process of collecting economic information from farm businesses.<sup>9</sup> The unit of observation then is the household of the principal operator.

**Expenditure/Consumption analysis sample:** To analyze consumption and expenditures, we use a sample constructed from questionnaire version 1, the only version in which detailed household expenditure data are elicited. Currently, USDA does not impute values of the living expense component variables. The set of variables is subject to substantial non-reporting, resulting in a net loss of 28 percent of the farm population.

**Cross-sample comparison:** To assess the implications of using the smaller version 1 sample, plus attrition from the sample due to missing data, we report in Table A1 descriptive statistics for key demographic and economic variables for the expenditure/consumption analysis sample (N=4,683), the full version 1 sample (N=6,457), and the full sample across the 5 versions of the survey (N=20,342). We found that the values in the analysis sample generally were very similar to the larger samples.

Among the demographic variables, the analysis-sample values of all variables, including operator age, household composition by age category, and education, were within +/- 5 percent of the full-sample values.

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<sup>8</sup> For more information about the ARMS, see <http://www.ers.usda.gov/Data/ARMS/>

<sup>9</sup> About 40 percent of farms have more than one operator; however, for three-quarters of the farms with multiple operators, the farm is operated by a husband-wife team, so that both operators are part of the principal operator household on which we focus. About 10 percent of family farms have other operator households associated with the farm.

In the farm typology classification variable, which combines the stated major occupation of the principal operator in combination with farm sales class, the farming–occupation/lower sales group has 6 percent fewer, but the difference is spread out across the other categories. Here is a sketch of the ERS typology of family farms:

- **Small family farms:** annual sales of less than \$250,000
  - **Retirement farms:** operators report they are retired.
  - **Residential/lifestyle farms:** operators report a major occupation other than farming.
  - **Farming-occupation farms:** operators report farming as their major occupation
    - **Lower sales:** annual sales of less than \$100,000
    - **Higher sales:** annual sales of \$100,000-\$249,999
- **Commercial family farms:** annual sales of \$250,000 or more
  - **Large:** annual sales of \$250,000-\$499,999
  - **Very large:** annual sales of GTE \$500,000

Among the variables characterizing the distributions of farm household income and wealth, the only variable that was substantially different was median debt levels – because on average, debt is a small fraction of assets, the difference is not reflected in net wealth.

### **Current Population Survey, Annual Social and Economic Supplement**

The Annual Social and Economic Supplement (ASEC) of the Current Population Survey (CPS) is designed to provide timely and detailed estimates of income, poverty and health insurance coverage and to measure change in those estimates at the national level. Conducted by the Bureau of the Census for the Bureau of Labor Statistics, the CPS ASEC is the official source of the national poverty estimates calculated in accordance with the Office of Management and Budget’s Statistical Policy Directive 14. (Though the Census Bureau also reports income and poverty estimates based on the American Community Survey, part of the 2010 Decennial Census Program, it recommends people use ASEC/CPS for national estimates because it provides more complete and thorough estimates of income and poverty.)

The sample is scientifically selected to represent the civilian noninstitutional population living in the U.S. The unit of observation is the household. About 70,000 households are interviewed each year.

*Analysis sample:* Because CPS collects data for a larger sample relative to CE, we use CPS to calculate estimates of well-being measures based on household money income for all U.S. households (Tables 1 and 2). We also use it to benchmark the CE data, including the estimates of household income. Appendix Table A2 compares descriptive statistics for the two samples.

### **Survey of Consumer Finance (Federal Reserve Board)**

The Survey of Consumer Finance (SCF), a triennial survey published since 1989, is the major source of wealth estimates for the U.S. population.

The SCF unit of analysis differs somewhat from that in ARMS, CPS and CE. Most of the data in the survey are intended to represent the financial characteristics of a subset of the household unit referred to as the "primary economic unit" (PEU). In brief, the PEU consists of an economically dominant single individual or couple (married or living as partners) in a household and all other individuals in the household who are financially interdependent with that individual or couple. Typically around 4500 economic units are interviewed for the main portion of the survey.

*Analysis sample:* This survey is the source of data for household wealth distributions for all U.S. households in Table 2.

## **Consumer Expenditure Survey**

The Consumer Expenditure Survey (CE) is a nationally representative sample conducted by the Bureau of Labor Statistics, designed to provide a continuous summary of the spending habits of U.S. households. Expenditure data are reported at the level of the consumer unit, which is defined as either a group of individuals who are related by blood or marriage, a single or financially independent individual, or two or more persons who share resources. Interview data are collected from consumer units five times over a 13-month period, every 3 months over five calendar quarters. In the first interview, data on demographic characteristics for each member of consumer unit aged 14 and over and an inventory of major durable goods of the consumer unit are collected. In interview 2-5, expenditure data for the consumer unit for the prior quarter are collected. Employment and income information are collected in interview 2 (which is carried over to interviews 3 and 4) and interview 5. (CE also includes a separate diary survey providing more detailed information on smaller or more frequent expenditures that are more difficult to recall.) In total, around 7100 households participated each quarter in 2006.

Expenditures consist of the transaction costs, including excise and sales taxes, of goods and services acquired during the interview or recordkeeping period. Expenditure estimates include expenditures for gifts, but exclude purchases or portions of purchases directly assignable to business purposes. Also excluded are periodic credit or installment payments on goods or services already acquired; however, interest applied to these balances is included in expenditures. The full cost of each purchase is recorded, even though full payment may not have been made at the date of purchase. CE elicits consumer-unit totals for multiple categories of income, using an open-ended format. If respondents indicate they do not know the exact amount they are asked a follow up question by a value-code elicitation format (the top code is \$50,000 and up).

Many articles have documented measurement error in the income measure reported in CE, resulting in substantial underestimates of income on average. More recently, the Consumer Expenditure Survey has implemented multiple imputation of income data, starting with the publication of the 2004 tables. In multiple imputation, several estimates are made for the same consumer unit, and the average of these estimates is published.

***Analysis sample:*** We use the CE survey to report household expenditures and consumption measures for all U.S. households, and for comparisons of consumption and income within individual households.

Virtually all of the CE data reported here are derived from tables published on the CE website, which are based on both interview and diary data. The exceptions are the income-equivalence and consumption-

equivalence measures in Tables 6, 8, and 9, as well as the decile cutpoints reported in Table 9. (Our BLS author has created an analysis sample from the individual interview data, and is in the process of developing an improved estimate of vehicle service flows for the consumption measure. We will be reporting revised analysis based on that new dataset shortly.)

To benchmark the CE sample, we compare CE and CPS estimates of key variables in Table A2. In particular we are interested in the comparison of the income distribution. We observe in Table A2 that the demographic and family composition characteristics have similar values in the CPS and CE samples. However, at each of the decile cutpoints, the values of income are underestimated between 6-12 percent, with the greatest underestimate occurring at the 10<sup>th</sup> decile.



## **Appendix B: Constructing Consumption and Expenditure Measures in CE and ARMS**

Appendix B Box illustrates the mapping of the CE expenditure categories into the common major categories used in the parallel consumption measures we calculate for ARMS and CE data. Column 2 identifies the categories of ARMS variables. To make transparent the mapping between ARMS and CE categories, we identify in column 3 the sub-categories of items in CE reflected in each ARMS variable (as well as in variables calculated for CE data designed to be comparable).

(A table with estimates of the detailed sub-categories of the expenditure and consumption measures for the two populations is available from the authors.)

We make parallel adjustments to expenditure data in CE and ARMS in order to calculate consumption measures that are as consistent as possible using the two surveys. Three components merit particular attention. Here we explain the procedures for calculating services flows for housing and vehicles, and the composition of the “All else” category in the CE and ARMS measures.

### ***Expenditures on “All else”:***

**ARMS:** The survey question used to measure “all else” is at the end of the list, and asks for “all other family living expenses, such as clothing, and personal care products and services; house furnishings and equipment, education and child (or adult) care, entertainment (hobbies, recreation, and vacations).

**CE:** The CE categories that are combined into the common “all else” category for the farm and all U.S. household consumption measures are: Shelter (other lodging); Household furnishings and equipment; Apparel; Entertainment; Personal care products and services; Reading, Education; Tobacco products, smoking supplies; Alcohol; and Miscellaneous.

### ***Housing (“shelter”) service flows:***

**ARMS:** To calculate shelter services from housing from ARMS data for farm households, we apply the BEA rent-to-value ratios used in the USDA Farm Income Sector Accounts to account for the asset value of the household residence. The BEA rent-to-value ratios are conditional on value of residence and cover imputed rent only; no expenses are deducted or added, such as utilities.<sup>10</sup> We calculate values for households living in a residence owned by the farm as well as households that own their residence.

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<sup>10</sup> Source: Denise McBride, BEA, personal communication, June 18, 2008.

In 2006, ARMS does not collect expenditure outlays for mortgages and related expenses for owned houses or for purchase of vehicles, so we imputed values based on 2005 data. For housing, the imputations for mortgage and related expenditures were needed for the 20 percent of the sample that owned their residence through the households rather than through the farm business. For home owners, we allocated the 2005 variable for total housing expenses into components, based on CE shares for detailed household income groups, and then carried that number over to 2006. For vehicle purchases, we used the same approach.

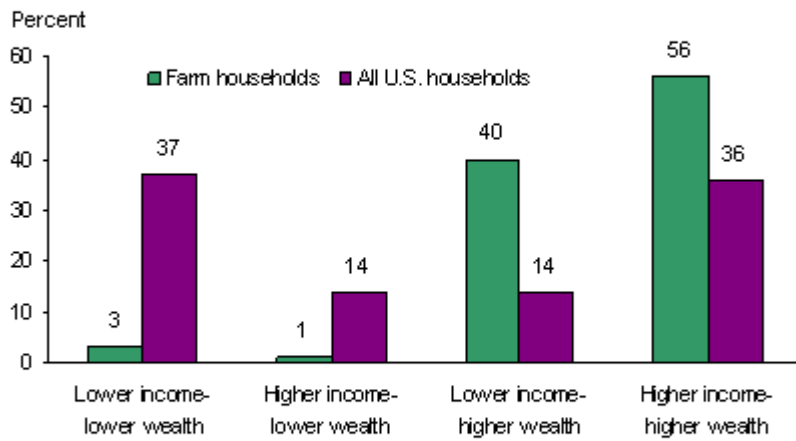
**CE:** To calculate housing shelter services for all U.S. households from CE data, we follow standard practice and use the self-reported rental equivalence value obtained from the consumer unit. Consumer units who own their own home are asked, “If someone were to rent your home today, how much do you think it would rent for monthly, unfurnished and without utilities?” For respondents who do not know the rental equivalence of their home, CE reported an imputed value.

***Transportation service flows:***

**ARMS:** To calculate transportation services for farm households, we calculate the user cost of capital based on Slesnick (1994, 2001) and others. In their formulation, the service flow in a given year from an asset =  $(r+d)$ , where  $r$  = interest rate and  $d$  = depreciation rate. Starting with the original purchase price reported in CE, their formula is:  $S_t = (r+d)(1-d)^s * P_0$ , where  $P_0$  is the original purchase price and  $s$  = age of the vehicle. We assume, as Slesnick does, that  $r = .05$  and  $d = .10$ . Since our data include the current asset value, our calculation becomes  $.15 * \text{household-owned current asset value}$ .

**CE:** For all U.S. households, we employ the same approach in principle. Because we have been working from the BLS published tables, we apply the ratio between expenditures and consumption reported in Johnson et al, 2005, Table 1. We are in the process of calculating a consumption measure using the individual record interview data, which will allow us to perform the calculation directly.

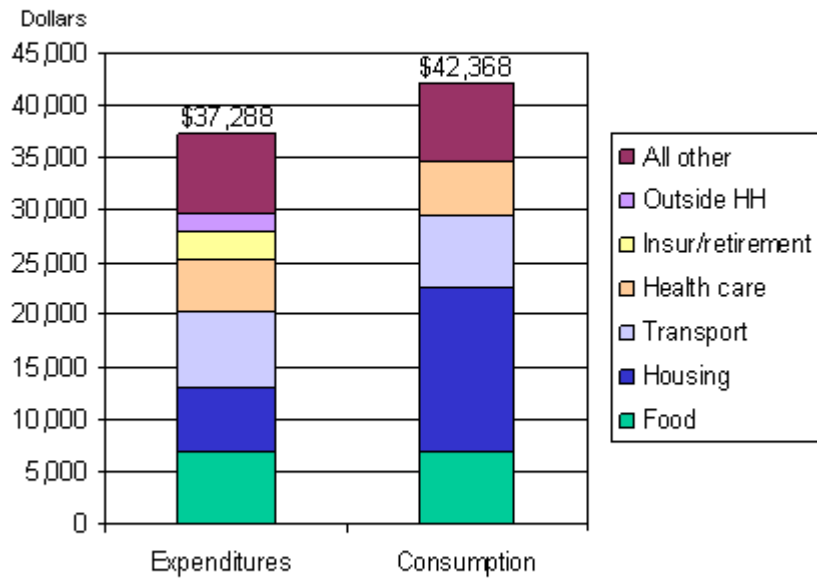
**Figure 1:**  
**Joint household income and wealth distribution relative to US household medians, for farm and all US households, 2004**



"Lower" and "higher" income and wealth are defined relative to the US household medians: in 2004 dollars, \$45,817 for income, and \$91,700 for wealth.

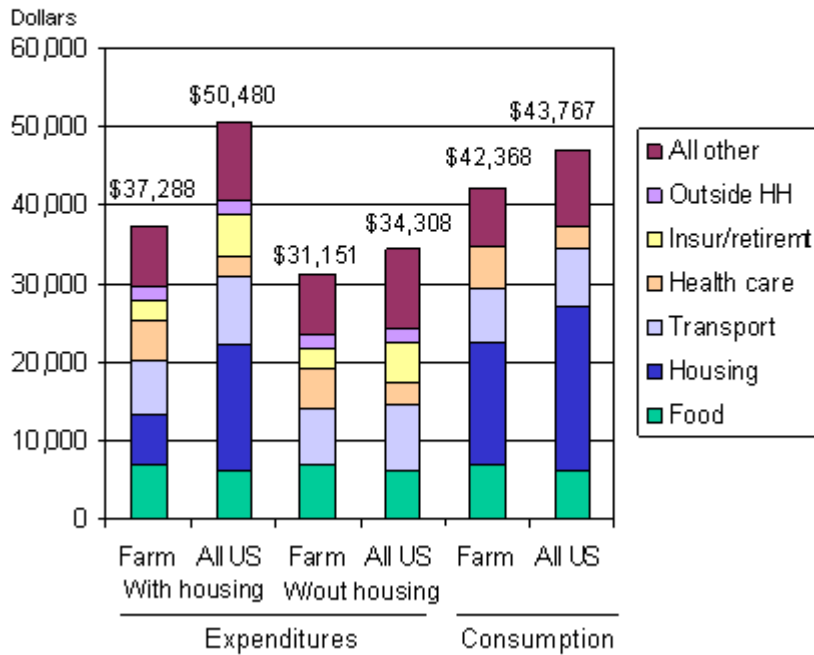
**Sources:** ARMS; USDA; Current Population Survey, Bureau of Labor Statistics, US DOL; Survey of Consumer Finances (SCF), Federal Reserve Board.

**Figure 2.**  
**Average expenditures and consumption, by**  
**component, for farm primary operator households, 2006**



Source: ARMS analysis sample, ERS calculations.

**Figure 3.**  
**Average expenditures and consumption, by**  
**component, of farm operator and all US households, 2006**



Source: ARMS analysis sample, ERS calculations.

Figure 4.

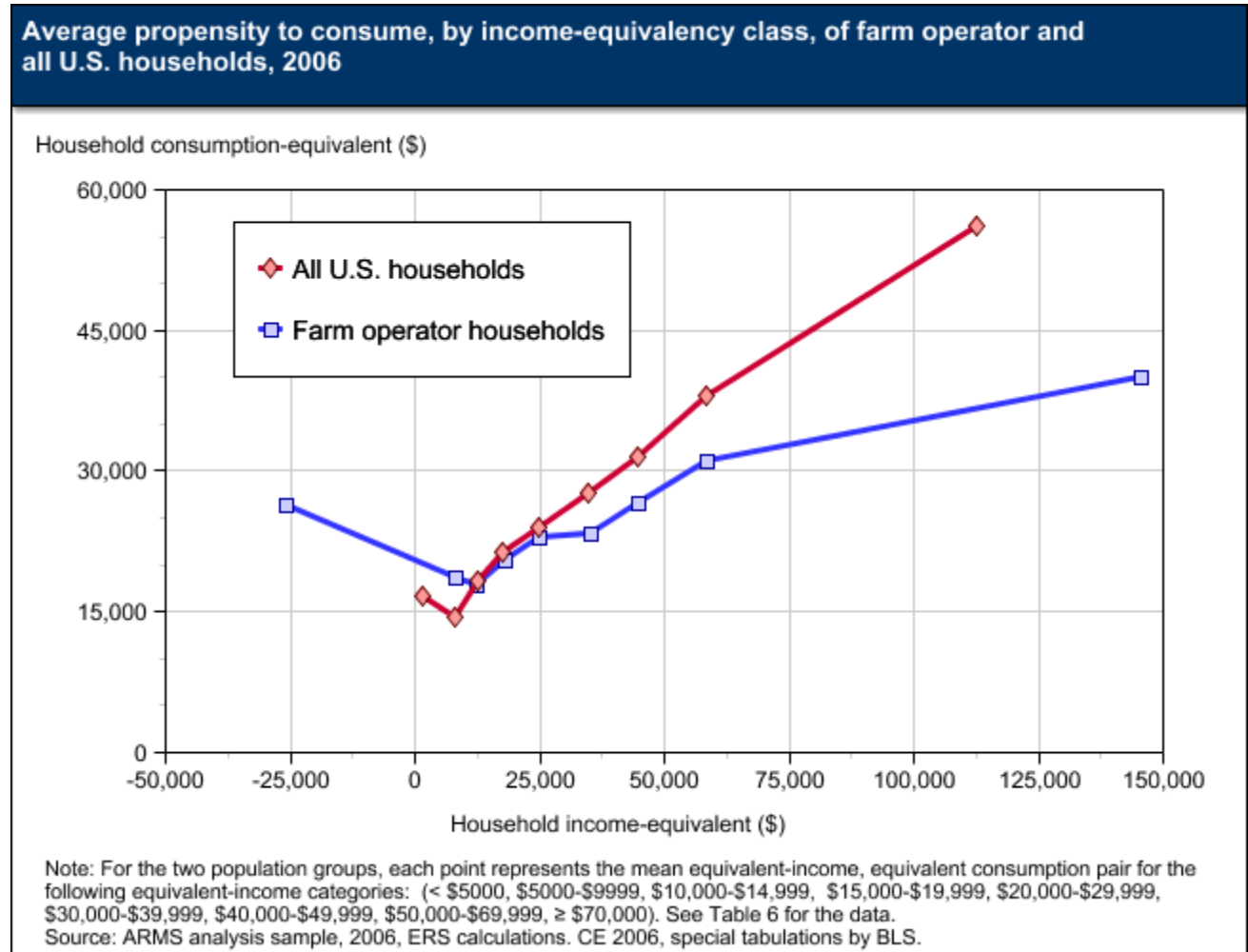


Figure 5.

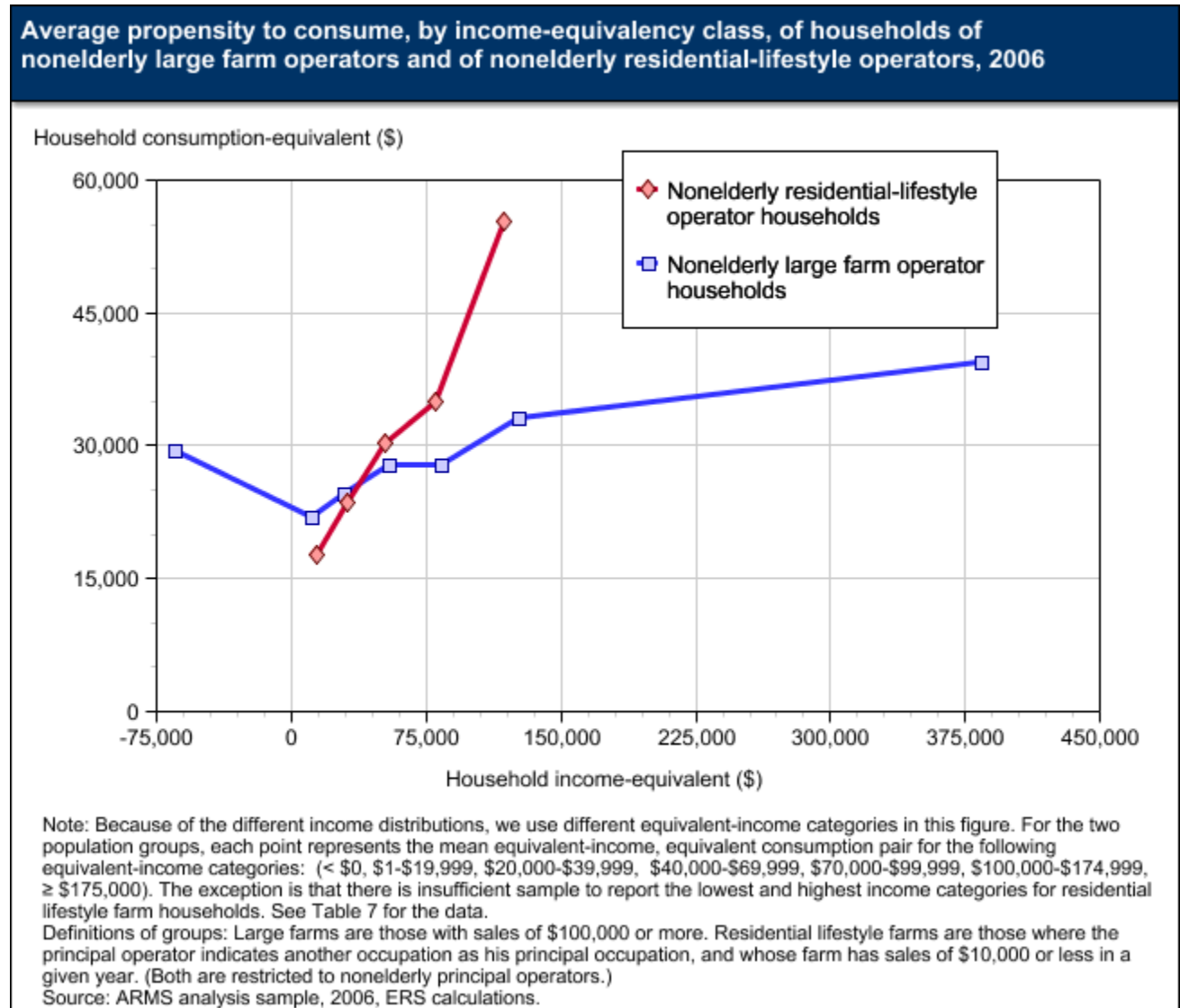


Table 1. Income measures of well-being for farm operator and all U.S. households, 1996-2006 (in 2006 dollars)											
	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006
<b>HOUSEHOLD INCOME MEASURES</b>											
<b>Farm primary operator households</b>											
Number of households (000s)	1,717	2,012	1,872	2,148	2,121	2,094	2,115	2,085	2,061	2,034	2,022
<b>Total household income</b>											
<b>median</b>	\$35,149	\$42,588	\$49,635	\$52,983	\$50,954	\$51,026	\$52,105	\$52,283	\$57,268	\$55,822	\$56,022
SE	1,667	1,915	2,191	2,074	1,633	1,781	1,159	1,938	2,395	1,587	1,043
<b>10 percentile</b>	5,745	3,006	7,702	9,860	8,809	7,715	7,482	8,375	10,865	10,438	9,859
<b>20 percentile</b>	15,291	15,547	19,103	21,030	19,814	21,677	21,172	20,760	23,218	23,165	22,400
<b>80 percentile</b>	83,668	87,897	96,695	100,791	97,649	98,508	102,876	99,179	114,872	114,105	108,713
<b>90 percentile</b>	133,148	130,028	153,214	153,688	151,321	140,884	151,410	145,950	181,948	178,559	167,570
<b>80:20</b>	5.5	5.7	5.1	4.8	4.9	4.5	4.9	4.8	4.9	4.9	4.8
<b>90:10</b>	23.2	43.3	19.9	15.6	17.2	18.3	20.2	17.4	16.7	17.1	16.0
<b>Gini index</b>	0.647	0.624	0.590	0.582	0.587	0.591	0.589	0.587	0.578	0.583	0.582
SE	0.0188	0.0136	0.0124	0.0130	0.0102	0.0134	0.0162	0.0093	0.0140	0.0052	0.0092
<b>poverty rate per person</b>	20.4%	na	na	14.3%	na	na	16.0%	15.1%	13.3%	na	14.4%
<b>% hh with hh income LT 0</b>	6.0%	7.5%	5.8%	5.2%	6.0%	6.5%	6.4%	5.8%	5.0%	5.4%	5.9%
<b>farm income share</b>	13.3%	11.8%	10.2%	9.6%	4.6%	8.3%	5.3%	11.5%	17.5%	18.1%	11.4%
<b>farm + other self-employment income share</b>	26%	24%	22%	27%	na	na	18%	23%	30%	na	26%
<b>All U.S. households</b>											
Number of households (000s)	101,018	102,528	103,874	106,434	108,209	109,294	111,278	112,000	113,343	114,384	116,011
<b>Total household income</b>											
<b>median</b>	\$45,416	\$46,350	\$48,034	\$49,244	\$49,163	\$48,091	\$47,530	\$47,488	\$47,323	\$47,845	\$48,201
SE	229	214	284	230	155	147	156	206	209	160	207
<b>10 percentile</b>	11,401	11,542	11,982	12,519	12,390	12,170	11,902	11,550	11,641	11,658	12,000
<b>20 percentile</b>	18,897	19,289	19,908	20,735	20,981	20,465	20,079	19,715	19,732	19,807	20,035
<b>80 percentile</b>	87,032	89,556	92,647	95,875	95,733	95,094	94,160	95,229	93,934	94,712	97,032
<b>90 percentile</b>	117,787	122,325	125,135	130,417	131,132	129,405	127,890	129,578	129,014	130,224	133,000
<b>80:20</b>	4.6	4.6	4.7	4.6	4.6	4.7	4.7	4.8	4.8	4.8	4.8
<b>90:10</b>	10.3	10.6	10.4	10.4	10.6	10.6	10.8	11.2	11.1	11.2	11.1
<b>Gini index</b>	0.455	0.459	0.456	0.458	0.462	0.466	0.462	0.464	0.466	0.469	0.470
SE	0.0043	0.0043	0.0042	0.0041	0.0030	0.0030	0.0029	0.0028	0.0029	0.0028	0.0028
<b>% with hh income LT 0</b>	0.011%	0.116%	0.135%	0.130%	0.097%	0.124%	0.129%	0.131%	0.129%	0.104%	0.058%
<b>poverty rate per person</b>	13.7%	13.3%	12.7%	11.9%	11.3%	11.7%	12.1%	12.5%	12.7%	12.6%	12.3%
<b>self employment income share</b>	4.9%	5.4%	5.4%	5.2%	5.1%	4.5%	4.7%	4.9%	4.7%	5.2%	5.3%
Income is in 2006 CPI-U-RS adjusted dollars, for households current as of March the following year.											
na = Estimate does not comply with ERS disclosure limitation practices, is not available, or is not applicable.											
<b>Sources:</b> All US households' income: Current Population Report P60-233, US Census Bureau; median and mean income, Table A-1; Gini of income, Table A-3.											
Farm households, ARMS survey (full sample, with all survey versions), USDA, 1996-2006.											



**Table 2. Wealth measures of well-being for farm operator and all U.S. households, 1995-2006 (in 2006 dollars)**

	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006
<b>HOUSEHOLD NET WORTH MEASURES</b>												
<b>Farm primary operator households</b>												
<b>median</b>		283,006	na	337,133	435,098	375,174	386,321	376,474	455,853	487,715	517,467	557,000
SE		25,215		11,449	7,971	15,383	12,400	13,077	17,072	20,348	13,122	1
<b>10 percentile</b>		74,092	na	88,940	129,346	102,187	92,951	97,571	118,008	148,731	142,269	160,000
<b>25 percentile</b>		149,326	na	174,956	237,968	193,724	191,933	198,548	241,037	266,800	264,448	300,000
<b>75 percentile</b>		590,570	na	647,789	799,004	712,052	730,290	716,503	868,634	907,271	971,913	1,020,000
<b>90 percentile</b>		1,116,774	na	1,277,634	1,471,502	1,254,751	1,303,669	1,303,156	1,576,273	1,616,857	1,732,255	1,770,000
<b>75:25</b>		4.0		3.7	3.4	3.7	3.8	3.6	3.6	3.4	3.7	
<b>90:10</b>		15.1		14.4	11.4	12.3	14.0	13.4	13.4	10.9	12.2	
<b>Gini index</b>		0.549	na	0.559	0.505	0.521	0.565	0.528	0.532	0.517	0.538	
SE		0.0097		0.0101	0.0070	0.0138	0.0339	0.0094	0.0133	0.0129	0.0089	
<b>All US households</b>												
<b>median**</b>	\$75,573	\$79,985		\$88,809			\$97,882			\$99,376		
SE	2,562			3,416			3,522			4,590		
<b>10 percentile</b>	107			53			107			213		
<b>25 percentile</b>	13,129			12,275			14,517			14,197		
<b>75 percentile</b>	211,348			258,527			322,038			350,645		
<b>90 percentile</b>	500,616			611,520			834,929			887,660		
<b>75:25</b>	16.1			21.1			22.2			24.7		
<b>90:10</b>	4,690			11,458			7,822			4,158		
<b>Gini</b>	0.784			0.794			0.803			0.805		
SE	0.0043			0.0051			0.0041			0.0049		

na = Estimate does not comply with ERS disclosure limitation practices, is not available, or is not applicable.

\*\* 1996 all US wealth median estimate is interpolated from 1995 and 1998 estimates.

**Sources:** All US households' wealth: Survey of Consumer Finances (Kennickell, Jan 2006). Farm households, ARMS survey (full sample-all versions), USDA, 1996-2006.

**Table 3. Demographic and economic characteristics of ARMS and CE analysis sample, 2006.**

	<b>CE: all US consumer units</b>	<b>ARMS: primary farm operator households</b>
Number of households in 1000s*	118,843	1,463
<b>Demographics</b>		
<b>Age of reference person*</b>	49	57
<b>Average number of persons in consumer unit:</b>		
Total	2.5	2.7
Children under 18	0.6	0.6
Persons 65 and over	0.3	0.5
<b>Black: *</b>	12%	2%**
<b>Hispanic or Latino origin: *</b>	11.0%	3.2%
<b>Education:*</b>		
<i>Highest grade completed was in:</i>		
Elementary (1-8).	5.0%	
High school (9-12)	36.0%	
College - at least some	59.0%	
<i>Highest schooling completed was:</i>		
Less than high school		11.7%
High school		39.2%
Some college		23.1%
College grad and beyond		26.0%
<b>Economics</b>		
<b>Income before taxes - mean</b>	\$60,533	\$75,080
<b>Median</b>	\$44,616	\$55,330
Share from wages & salaries	79.5%	53.6%
Self-emp/non-self-emp income	0.06	0.29
20th percentile (cutpoint)	\$18,370	\$22,871
40th	\$35,095	\$45,064
60th	\$56,222	\$67,662
80th	\$88,774	\$102,710
<b>Household dwelling</b>		
Farm owns residence	--	77.1%
Household owns residence	67.0%	20.4%
With mortgage	43.0%	
Without mortgage.	24.0%	
Rental (or NA)	33.0%	2.4%
Mean value dwelling, owned by hh	\$183,212	\$192,914
Mean value dwelling, owned by farm	--	\$138,089
<b>Vehicles</b>		
At least one vehicle owned or leased	88.0%	
At least one vehicle owned		82.8%

\* Applies to reference person in CE, primary operator in ARMS.

\*\* Indicates that CV is greater than 25 and less than or equal to 50.

Sources: CE 2006; ARMS 2006, analysis sample.

Table 4.		Comparison of mean household expenditures and consumption by component, across farm operator and all US households, 2006							
		Farm households (ARMS)				All U.S. households (CE)			
		Expenditures		Consumption		Expenditures		Consumption	
Category	Sub/category	\$	% (with hsg)	\$	% (with hsg)	Expenditures	% (with hsg)	\$	% (with hsg)
Food		6,968	18.7%	6,968	16.4%	6,111	12.1%	6,111	13.8%
Housing	<b>Total</b>	<b>6,137</b>	<b>16.5%</b>	<b>15,658</b>	<b>37.0%</b>	<b>16,172</b>	<b>32.0%</b>	<b>20,955</b>	<b>47.4%</b>
	Shelter services	1,472	3.9%	10,993	25.9%	11,187	22.2%	15,970	36.1%
	Operating expenses	4,665	12.5%	4,665	11.0%	4,985	9.9%	4,985	11.3%
Transport	<b>Total</b>	<b>7,091</b>	<b>19.0%</b>	<b>6,919</b>	<b>16.3%</b>	<b>8,507</b>		<b>7,477</b>	<b>16.9%</b>
	Vehicle services	3,414	9.2%	3,242	7.7%	4,408		3,378	7.6%
	Operating expenses	3,677	9.9%	3,677	8.7%	4,099	8.1%	4,099	9.3%
Health care	<b>Total</b>	<b>5,097</b>	<b>13.7%</b>	<b>5,097</b>	<b>12.0%</b>	<b>2,766</b>	<b>5.5%</b>	<b>2,766</b>	<b>6.3%</b>
	Health and dental insurance (paid by hh)	2,991	8.0%	2,991	7.1%	1,465	2.9%	1,465	3.3%
	Out of pocket medical care expenditures	2,106	5.6%	2,106	5.0%	1,301	2.6%	1,301	2.9%
Personal insurance and retirement plans		2,690	7.2%	-		5,270	10.4%	-	-
Contributions (outside of household)		1,756	4.7%	-	-	1,869	3.7%	-	-
All other		7,549	20.2%	7,549	17.8%	9,785	19.4%	9,785	22.1%
Home consumption: farm produce		-		177	0.4%	-		na	
<b>TOTAL (mean)</b>		<b>\$37,288</b>	<b>100%</b>	<b>\$42,368</b>	<b>100%</b>	<b>\$50,480</b>	<b>100%</b>	<b>\$44,190</b>	<b>100%</b>
<b>TOTAL (median)</b>				<b>\$36,000</b>				<b>\$34,638</b>	
<b>TOTAL- HH-Equivalent (mean)</b>		<b>\$23,810</b>		<b>\$27,141</b>		<b>\$31,911</b>		<b>\$29,333</b>	
<b>TOTAL- HH-Equivalent (median)</b>				<b>\$23,092</b>				<b>\$23,670</b>	
<b>Sources:</b>	Farm households: ARMS analysis sample, 2006.								
	All US households: CE, 2006.								

\* Though the CE accounting does not count mortgage principal as an expenditure (but rather as a change in household assets), we do count it as expenditure in our accounting here.

**Table 5. Demographic and economic characteristics plus consumption shares by household income categories for farm operator and all US households, 2006**

<i>Total income categories:</i>	<b>LT \$5000</b>	<b>\$5000-19,999</b>	<b>\$20,000-39,999</b>	<b>\$40,000-69,999</b>	<b>GTE \$70,000</b>	<b>ALL</b>
<b>PRIMARY OPERATOR FARM HOUSEHOLDS</b>						
<b>SAMPLE/POPULATION</b>						
Number of sample farms	664	355	608	893	2,163	4,683
Number of farm households	101,583	148,372	266,517	381,664	565,177	1,463,313
Percent of farm households	6.9%	10.1%	18.2%	26.1%	38.6%	100.0%
<b>INCOME</b>						
Total hh income - median	-\$10,462	\$13,375	\$30,299	\$53,982	\$103,501	\$55,330
<b>Total hh income--mean</b>	<b>-\$45,248</b>	<b>\$13,523</b>	<b>\$30,274</b>	<b>\$54,271</b>	<b>\$148,048</b>	<b>\$75,080</b>
<i>Self-emp/non-self emp income</i>	-4.21	-0.24	-0.06	0.04	0.60	0.29
<b>NET WORTH</b>						
Total household net worth--mean	\$1,174,342	\$701,253	\$693,087	\$780,168	\$1,224,385	\$955,240
Percent with farm-owned dwelling	81.6	87.2	80.6	79.9	69.6	76.9
<i>Market value of hh dwelling:</i>						
If owned by the operation	140,837	103,838	115,857	131,210	166,106	138,089
If owned by operator hh	155,371	164,204	122,139	179,866	229,992	192,914
<b>HH COMPOSITION</b>						
Age of primary operator	56	63	60	57	54	57
Average # persons in hh: total	2.6	2.3	2.5	2.7	2.9	2.7
Children under 18	0.6	0.4	0.6	0.5	0.7	0.6
Persons 65 and over	0.3	0.8	0.7	0.5	0.3	0.5
<b>HH CONSUMPTION (\$):</b>						
<b>Total consumption</b>	<b>\$38,723</b>	<b>\$28,991</b>	<b>\$31,044</b>	<b>\$38,137</b>	<b>\$54,732</b>	<b>\$42,368</b>
<b>HH CONSUMPTION (SHARES):</b>						
Food	0.17	0.19	0.17	0.17	0.16	0.16
Housing	0.39	0.41	0.40	0.38	0.35	0.37
Transportation	0.12	0.14	0.15	0.16	0.18	0.16
Health care	0.15	0.13	0.13	0.12	0.11	0.12
All other	0.17	0.13	0.14	0.17	0.20	0.18
Market value of farm produce for home consumption	0.01	0.01	0.01	0.01	0.00	0.00
<b>Total consumption</b>	<b>1.00</b>	<b>1.00</b>	<b>1.00</b>	<b>1.00</b>	<b>1.00</b>	<b>1.00</b>
<b>ALL US HOUSEHOLDS</b>						
<b>SAMPLE/POPULATION</b>						
# consumer units in 1000s	4,572	21503	27536	29120	36,112	118,843
Percent of households	3.85%	18.09%	23.17%	24.50%	30.39%	100.00%
<b>INCOME</b>						
<b>Total hh income -mean</b>	<b>\$439</b>	<b>\$12,983</b>	<b>\$29,630</b>	<b>\$53,501</b>	<b>\$125,688</b>	<b>\$60,533</b>
<i>Self-emp/non-self-emp inc</i>	-0.89	0.00	0.03	0.04	0.09	0.06
<b>NET WORTH</b>						
Percent with rental dwelling	64	55	43	28	12	33
Percent with owned home	36	45	57	72	88	67
With mortgage	14	12	28	49	71	43
Without mortgage.	22	33	30	23	17	24
Est. market value of owned home	\$78,098	\$72,440	\$103,766	\$160,022	\$341,752	\$183,212
<b>HH COMPOSITION</b>						
Age of reference person	43.2	54.8	49.7	47.0	46.4	48.7
Avg # persons - Total	1.6	1.7	2.2	2.7	3.0	2.5
Children under 18	0.3	0.4	0.6	0.7	0.8	0.6
Persons 65 and over	0.2	0.4	0.4	0.2	0.2	0.3
<b>HH CONSUMPTION (\$):</b>						
<b>Total consumption</b>	<b>\$20,264</b>	<b>\$19,996</b>	<b>\$29,301</b>	<b>\$40,778</b>	<b>\$69,633</b>	<b>\$44,190</b>
<b>HH CONSUMPTION (SHARES):</b>						
Food	0.15	0.16	0.15	0.15	0.13	0.14
Housing	0.40	0.41	0.39	0.38	0.38	0.41
Transportation.	0.14	0.14	0.18	0.18	0.18	0.17
Health care	0.05	0.08	0.08	0.07	0.05	0.06
All else	0.26	0.20	0.20	0.22	0.25	0.22
<b>Total consumption</b>	<b>1.00</b>	<b>1.00</b>	<b>1.00</b>	<b>1.00</b>	<b>1.00</b>	<b>1.00</b>

**Sources:**

Farm households: ARMS analysis sample, 2006.  
All US households: CE, 2006.

**Table 6. Average propensity to consume by equivalent-income groups, farm operator and all US households, 2006**

*Both income and consumption measures are reported in equivalent form.*

<i>Income-equivalent categories:</i>	Less than \$5,000	\$5,000 to \$9,999	\$10,000 to \$14,999	\$15,000 to \$19,999	\$20,000 to \$29,999	\$30,000 to \$39,999	\$40,000 to \$49,999	\$50,000 to \$69,999	\$70,000 and more	All
<b>Farm Operator Households</b>						Median Y				
Percent of households	7.9%	5.2%	5.9%	7.9%	13.3%	16.6%	11.6%	14.6%	17.0%	100.0%
Cumulative percent of hh	7.9%	13.1%	19.0%	26.9%	40.2%	56.8%	68.4%	83.0%	100.0%	
HH income-equiv - mean	-\$26,083	\$7,854	\$12,252	\$17,851	\$24,839	\$34,972	\$44,636	\$58,554	\$145,465	\$48,060
HH consumption-equiv - mean	\$26,424	\$18,693	\$17,865	\$20,481	\$23,003	\$23,408	\$26,641	\$31,152	\$40,145	\$27,141
<i>C-equiv (mean)/Y-equiv(mean)</i>	-1.01	2.38	1.46	1.15	0.93	0.67	0.60	0.53	0.28	0.56
<b>All US Households</b>					(median)	median				
Percent of households	4.9%	7.7%	9.8%	9.8%	17.1%	14.5%	10.8%	12.6%	12.9%	100.0%
Cumulative percent of hh	4.9%	12.6%	22.4%	32.2%	49.2%	63.7%	74.5%	87.1%	100.0%	
HH income-equiv - mean	\$1,407	\$7,828	\$12,593	\$17,507	\$24,831	\$34,650	\$44,567	\$58,328	\$112,440	\$39,558
HH consumption-equiv - mean	\$ 16,771	\$ 14,403	\$ 18,281	\$ 21,381	\$ 23,951	\$ 27,623	\$ 31,529	\$ 37,963	\$ 56,148	\$ 29,333
<i>C-equiv (mean)/Y-equiv(mean)</i>	11.92	1.84	1.45	1.22	0.96	0.80	0.71	0.65	0.50	0.74
<b>Ratio: farm operator to all US households</b>										
HH Income-equiv (mean)	-18.53	1.00	0.97	1.02	1.00	1.01	1.00	1.00	1.29	1.21
HH C-equiv (mean)	1.58	1.30	0.98	0.96	0.96	0.85	0.84	0.82	0.71	0.93

**Note:** To adjust for household size, we adjust total household income and total household consumption by an equivalence scale. The scale we use is the square root of household size. (The household total measures are divided by this scale to get the equivalent versions.)

**Sources:** Farm households, 2006 ARMS analysis sample, ERS calculations; All US households, 2006 CE, BLS special tabulations.

**Table 7. Average propensity to consume of households of nonelderly farm operators of large vs residential-lifestyle farms, by equivalent-income groups, 2006.**

*Both income and consumption measures are reported in equivalent form.*

<i>Income-equivalency class:</i>	LTE \$0	\$1- \$19.9K	\$20K-\$39.9K	\$40K-\$69.9	\$70K-\$99.9	\$100K-\$174.9	GTE \$175K
<b>Large farms</b>							
Percent of households	14.8	13.2	22.2	21.7	11.1	8.1	9.0
Cumulative percent of households	14.8	28.0	50.2	71.9	83.0	91.1	100.1
HH income-equivalent- mean	-\$65,580	\$10,550	\$29,265	\$54,539	\$83,419	\$126,266	\$383,557
HH consumption-equivalent - mean	\$29,483	\$21,966	\$24,629	\$27,858	\$27,894	\$33,098	\$39,407
<i>C-equiv (mean)/Y-equiv(mean)</i>	-0.45	2.08	0.84	0.51	0.33	0.26	0.10

<i>Income-equivalency class:</i>	LTE \$0	\$1- \$19.9K	\$20K-\$39.9K	\$40K-\$69.9	\$70K-\$99.9	\$100K-\$174.9	GTE \$175K
<b>Residential-lifestyle farms</b>							
Percent of households	<i>na</i>	14.9	32.3	32.4	12.1	5.1	<i>na</i>
Cumulative percent of households	<i>na</i>	16.22	48.57	81.02	93.07	98.17	<i>na</i>
HH income-equivalent- mean	<i>na</i>	\$14,123	\$30,960	\$52,416	\$80,054	\$118,565	<i>na</i>
Household consumption-equivalent	<i>na</i>	\$17,679	\$23,517	\$30,330	\$34,934	\$55,273	<i>na</i>
<i>C-equiv (mean)/Y-equiv(mean)</i>		1.25	0.76	0.58	0.44	0.47	

**Notes:** To adjust for household size, we adjust total household income and total household consumption by an equivalence scale. The scale we use is the square root of household size. (The household total measures are divided by this scale to get the equivalent versions.)

*Definitions:* Large farms: farms with sales of \$100,000 in sales or more. (Restricted to nonelderly principal operators.)

Residential lifestyle farms: farms where the principal operator indicates another occupation is his principal occupation, and whose farm has sales of \$10,000 or less this year. (Restricted to nonelderly principal operators.)

Median household equivalent income is \$39,548 for residential-lifestyle farms, and \$40,595 for large farms in this sample.

*na* indicates insufficient sample to report.

**Source:** ARMS analysis sample, 2006, ERS calculations.

Table 8. Two-way distributions of household well-being measures by quintiles, 2006

**A. Farm operator households**

*Total measures*

Income	Consumption				
Quintiles	20	40	60	80	100
20	39.5	22.3	16.8	12.7	8.6
40	28.6	29.2	20.9	14.0	7.3
60	15.6	24.0	24.9	21.0	14.4
80	8.4	15.2	25.4	25.6	25.5
100	7.7	9.5	12.0	26.8	44.1

**B. All US households**

*Total measures*

Income	Consumption				
Quintiles	20	40	60	80	100
20	60.3	21.3	9.2	6.1	3.0
40	28.4	34.7	21.0	10.9	5.0
60	8.8	28.6	31.8	20.5	10.2
80	2.1	12.4	27.5	35.6	22.4
100	0.3	3.0	10.5	26.8	59.4

*Equivalency measures*

Income-equiv	Consumption - equivalent				
Quintiles	20	40	60	80	100
20	38.0	22.8	11.9	14.2	13.1
40	28.1	22.1	26.7	13.4	9.7
60	18.5	26.5	21.8	22.8	10.5
80	6.8	17.2	24.9	23.2	28.0
100	8.4	11.5	15.1	27.2	37.9

*Equivalency measures*

Income-equiv	Consumption - equivalent				
Quintiles	20	40	60	80	100
20	57.32	21.00	10.31	6.47	4.90
40	26.88	31.29	22.41	12.13	7.29
60	11.68	28.30	28.83	19.58	11.62
80	3.33	15.72	26.91	33.07	20.96
100	0.73	3.72	11.54	28.71	55.29

*Income-wealth*

Income	Household net worth				
Quintiles	20	40	60	80	100
20	24.7	21.9	18.2	20.3	14.9
40	28.2	22.9	22.7	12.2	14.0
60	18.7	25.5	21.9	20.7	13.2
80	19.0	16.8	22.5	21.3	20.4
100	9.7	13.3	14.3	25.3	37.5

Percentages in each cell represent shares of the households in the row.

Sources: Farm households, 2006 ARMS analysis sample, ERS calculations;

All US households, 2006 CE, BLS special tabulations.

**Table 9. Distributions of household income and consumption, 2006**

**A. Farm operator households**

	1	2	3	4	5	6
<b>Total measures</b>			<b>Equivalency measures</b>			
	<i>ARMS full sample</i>	<i>ARMS analysis sample</i>		<i>ARMS full sample</i>	<i>ARMS analysis sample</i>	
	Household income	Household income	Household consumption	Household equiv-income	Household equiv-income	Household equiv-consumption
<b>Mean</b>	\$81,251	\$75,080	\$42,368	\$51,878	\$48,060	\$27,141
<b>Median</b>	\$56,022	\$55,330	\$36,000	\$35,560	\$36,117	\$23,092
<b>Decile maximum</b>						
10	\$9,859	\$10,735	\$17,610	\$6,691	\$8,060	\$11,866
20	\$22,400	\$22,679	\$22,807	\$15,405	\$15,710	\$15,037
30	\$34,515	\$34,370	\$27,227	\$22,339	\$22,098	\$17,645
40	\$45,064	\$44,990	\$31,259	\$29,397	\$29,840	\$20,720
50	\$56,022	\$55,330	\$36,000	\$35,560	\$36,117	\$23,092
60	\$67,801	\$67,425	\$41,895	\$41,911	\$41,936	\$26,267
70	\$84,350	\$82,000	\$48,935	\$53,007	\$51,626	\$30,214
80	\$108,713	\$102,347	\$57,166	\$70,035	\$64,114	\$35,779
90	\$167,570	\$143,392	\$72,987	\$107,390	\$89,795	\$44,250
<b>ratio 80:20</b>	4.85	4.51	2.51	4.55	4.08	2.38
<b>ratio 90:10</b>	17.00	13.36	4.14	16.05	11.14	3.73
<b>Gini</b>	0.582	0.556	0.313	0.580	0.556	0.305
<b>Poverty *</b>	14.4%	13.8%	7.8%	X	X	X

\* Consumption poverty rate is calculated by comparing total household consumption against the Census poverty threshold (based on household size.)

**B. All US households**

	<b>Total measures</b>			<b>Equivalency measures</b>		
	<i>CPS</i>	<i>CE analysis sample</i>		<i>CPS</i>	<i>CE analysis sample</i>	
	Household income	Household income	Household consumption	Household equiv-income	Household equiv-income	Household equiv-consumption
<b>Mean</b>	\$66,575	\$60,533	\$43,767	43227	\$ 39,558	\$ 29,333
<b>Median</b>	\$48,054	\$44,616	\$34,638	32067	\$30,281	\$23,670
<b>Decile maximum</b>						
10	\$12,000	\$10,594	\$14,257	9,384	\$8,440	\$10,614
20	\$20,037	\$18,333	\$19,767	14,962	\$13,729	\$14,151
30	\$28,982	\$26,316	\$24,645	20,162	\$18,777	\$17,368
40	\$37,888	\$35,044	\$29,398	25,786	\$24,288	\$20,392
50	\$48,054	\$44,616	\$34,638	32,067	\$30,281	\$23,670
60	\$60,022	\$56,153	\$40,749	39,659	\$36,902	\$27,481
70	\$75,427	\$70,350	\$48,671	48,988	\$45,334	\$32,248
80	\$97,462	\$88,687	\$60,041	61,327	\$56,564	\$39,203
90	\$133,799	\$122,707	\$81,362	84,400	\$77,610	\$52,642
<b>ratio 80:20</b>	4.86	4.84	3.04	4.10	4.12	2.77
<b>ratio 90:10</b>	11.15	11.58	5.71	8.99	9.20	4.96
<b>Gini</b>	0.470					
<b>Poverty *</b>	12.3%			X	X	X



**Table 9. Distributions of household income and consumption, 2006 (cont'd)**

**C. Ratio of farm to all US households**

	1	2	3	4	5	6
	<b>Total measures</b>			<b>Equivalency measures</b>		
	Household income	Household income	Household consumption	Household equiv-income	Household equiv income	Household equiv-consumption
<b>Mean</b>	1.22	1.24	0.97	1.20	1.21	0.93
<b>Median</b>	1.17	1.24	1.04	1.11	1.19	0.98
<b>Decile maximum</b>						
<b>10</b>	0.82	1.01	1.24	0.71	0.96	1.12
<b>20</b>	1.12	1.24	1.15	1.03	1.14	1.06
<b>30</b>	1.19	1.31	1.10	1.11	1.18	1.02
<b>40</b>	1.19	1.28	1.06	1.14	1.23	1.02
<b>50</b>	1.17	1.24	1.04	1.11	1.19	0.98
<b>60</b>	1.13	1.20	1.03	1.06	1.14	0.96
<b>70</b>	1.12	1.17	1.01	1.08	1.14	0.94
<b>80</b>	1.12	1.15	0.95	1.14	1.13	0.91
<b>90</b>	1.25	1.17	0.90	1.27	1.16	0.84
<b>ratio 80:20</b>	1.00	0.93	0.83	1.11	0.99	0.86
<b>ratio 90:10</b>	1.52	1.15	0.73	1.78	1.21	0.75
<b>Gini</b>	1.24					
<b>Poverty *</b>	1.17					

Sources: Farm households, 2006 ARMS analysis sample, ERS calculations;  
All US households, 2006 CE, BLS special tabulations.

<b>Table 10. Farm household well-being measures, by joint income-wealth</b>			
<b>4-quadrant indicator, 2006.</b>			
	<b>Money income</b>		
	<b>LOW</b>	<b>HIGH</b>	<b>TOTAL</b>
<b>Wealth</b>	<b>Y &lt; US hh median</b>	<b>Y ≥ US hh median</b>	
<b>LOW: W &lt; US hh median</b>			
<b>% of total hh</b>	<b>2%</b>	<b>2%</b>	
Income (median)	\$19,277	\$83,304	
Consumption (median)	\$17,112	\$29,625	
Share with income < 0	6%	0%	
Income-poverty rate	70%	0%	
Consumption-poverty rate	41%	na	
Wealth (median)	\$56,730	\$70,608	
<b>HIGH: W &gt; US hh median</b>			
<b>% of total hh</b>	<b>41%</b>	<b>56%</b>	
Income (median)	\$25,720	\$84,020	
Consumption (median)	\$29,131	\$43,761	
Share with income < 0	14%	0%	
Income-poverty rate	33%	0%	
Consumption-poverty rate	13%	3%	
Wealth (median)	\$509,350	\$700,911	
<b>TOTAL</b>			
<b>% of total hh</b>	<b>43%</b>	<b>58%</b>	<b>100%</b>
Income (median)			\$55,330
Consumption (median)			\$36,000
Share with income < 0			6%
Income-poverty rate			14%
Consumption-poverty rate			8%
Wealth (median)			\$578,650
Farm household income and wealth were compared with estimated median income (\$48,201) and net worth (\$100,075) of all U.S. households for 2006, to create four groups of farm households (lower income-lower wealth; lower income-higher wealth; higher income-lower wealth; higher income-higher wealth)			
Source: 2006 USDA ARMS consumption analysis sample.			

<b>Appendix Table A1</b>			
<b>Comparison of ARMS analysis sample to ARMS total version 1 and</b>			
<b>ARMS versions 1-5 samples, 2006</b>			
	<b>Analysis sample</b>	<b>Full vn-1 sample</b>	<b>Full v. 1-5 sample</b>
col #	1	2	3
Number of sample farm households	4,683	6,457	20,342
Number of farms (w/population weights)	1,463,313	2,022,535	2,022,501
<b>Demographics</b>			
Age of operator	57	57	57
Average number in household - Total	2.7	2.7	2.7
Children under 18	0.6	0.6	na
Persons 65 and over	0.5	0.5	na
Education - highest degree			
High school	62.3%	66.6%	64.8%
College and beyond	26.0%	25.0%	25.0%
<i>Farm typology</i>	100.0	100.0	100.0
Retirement	20.6	20.4	20.0
Residential /lifestyle	45.2	43.9	44.7
Farming occupation /lower-sales	19.9	21.8	21.3
Farming occupation /higher-sales	6.2	6.0	6.2
Large	4.3	4.3	4.3
Very large	3.7	3.6	3.6
<b>Economics</b>			
<i>Household income</i>			
Mean	\$75,080	\$76,224	\$77,654
Median	\$55,330	\$55,696	\$55,102
Self-emp/non-self emp income	0.29	0.33	0.34
10th percentile	\$10,735		\$9,859
20th percentile	\$22,871	\$23,310	\$22,400
40th percentile	\$45,064	\$45,930	\$45,064
60th percentile	\$67,662	\$67,370	\$56,022
80th percentile	\$102,710	\$104,349	\$108,713
90th percentile	\$143,392		\$167,570
80:20		4.48	4.49
90:10	13.36		17.00
Gini coefficient	0.556	0.568	0.576
Share with income < 0	5.7	5.9	5.9
Share of individuals in poverty	13.8%	13.5%	13.8%
HH poverty rate	12.5%	13.0%	12.5%
<i>Household net worth</i>			
Net worth, median	\$578,650	\$578,650	\$548,193
Assets, median	\$629,900	\$656,375	\$602,750
Debt, median	\$12,750	\$23,400	\$23,400
Net worth, mean	\$955,240	\$955,240	\$895,756
Assets, mean	\$1,033,288	\$1,047,245	\$982,672
Debt, mean	\$104,846	\$101,641	\$98,625
Gini coefficient	0.512		0.529
<i>Household dwelling</i>			
Mean value, owned by farm	\$138,089	\$143,052	\$142,951
Mean value, owned by household	\$192,914	\$192,539	na
Share owned by farm	77.1%	80.1%	73.2%
Share owned by household	20.4%	18.0%	26.8%*
Share rented	2.4%	1.9%	
<i>Household-owned autos</i>			
Mean value	\$24,542	\$25,455	na
Share of households owning vehicle (in part or in whole)	83%		na
na means not available in survey versions other than version 1. * includes rental share as well.			
Sources: 2006 ARMS, ERS calculations.			

**Appendix Table A2. Comparison of characteristics for CE and CPS, 2006**

	<b>CE: all US consumer units</b>	<b>CPS</b>
Number of households in 1000s*	118,843	113,687
Sample size		73,629
<b>Demographics</b>		
<b>Age of reference person</b>	49	49
<b>Average number of persons in consumer unit:</b>		
Total	2.5	2.5
Children under 18	0.6	0.7
Persons 65 and over	0.3	0.3
<b>Black: *</b>	12%	12%
<b>Hispanic or Latino origin: *</b>	11%	11%
<b>Education:*</b>		
<i>Highest grade completed was in:</i>		
Elementary (1-8).	5.0%	
High school (9-12)	36.0%	
College - at least some	59.0%	
<i>Highest level attained was:</i>		
Less than high school degree		14.4%
High school		
HS degree and some college		57.6%
College grad and beyond		28.0%
<b>Economics</b>		
<b>Income before taxes - mean</b>	\$60,533	\$66,575
<b>Median</b>	\$44,616	\$48,054
Self-employment income share	6.4%	5.3%
10th percentile (cutpoint)	\$10,594	\$12,000
20th	\$18,333	\$20,037
40th	\$35,044	\$37,888
60th	\$56,153	\$60,022
80th	\$88,687	\$97,462
90th	\$122,707	\$133,799
80:20	4.84	4.86
90:10	11.58	11.15

\* Asked of reference person in CE, CPS.

Source: CE 2006 published data (except 10th and 90th income percentiles);  
CPS ASEC, Feb-April 2007 (for 2006 data).

Appendix B BOX: Mapping of expenditures and consumption components between CE and ARMS, 2006

Category	ARMS Variable Sub-category	CE Sub-category	ARMS Included in Expenditures Measure?	ARMS Included in Consumption Measure?	CE Included in Expenditures Measure?	CE Included in Consumption Measure?
<b>Food</b>	<b>(total)</b>	<b>Food</b>	yes	yes	yes	yes
<b>Housing</b>	<b>Shelter</b>					
	- <i>Owned dwellings:</i>					
	-- Principal payments on mortgage	-- Principal payments on mortgage*	yes (use imputed estimate)	no	yes*	no
	-- Other mortgage-related expenses:		yes (use imputed estimate)	no	yes	no
		-- Mortgage interest and charges;				
		-- Property taxes;				
		-- Maintenance, repairs, insurance, other				
	-- Shelter annual service flow	Rental value of owned home (Self-report)	no	yes (use BEA rental factors)	no	yes (use self-report of rental value)
	- <i>Rented dwellings</i>		yes	yes	yes	yes
	<b>Operating expenses</b>		yes	yes	yes	yes
		<b>Utilities, fuels and public services</b> (electricity, gas, water, telephone, ...)				
		<b>Household operations</b> (personal services, other hh exp)				
		<b>Housekeeping supplies</b>				
<b>Transport</b>	<b>Vehicle services</b>					
	<i>Owned vehicles</i>					
	Net outlays	<b>Vehicle purchases (net outlay)</b>	yes (imputed)	no	yes	no
	Vehicle annual service flow	n/a	no	yes (use imputed user cost of capital)	no	yes (use imputed user cost of capital)
	<i>Leased vehicles and public transportation</i>		yes	yes	yes	yes
		<b>Other vehicle expenses:</b> vehicle rental, leasing, licensing, other				
		<b>Public transportation</b>				
	<b>Operating expenses</b>		yes	yes	yes	yes
		<b>Gas and motor oil</b>				
		<b>Other vehicle expenses:</b> finance charges, maintenance and repairs, vehicle insurance)				
<b>Health care</b>	<b>Health and dental insurance (paid by hh)</b>	<b>Health insurance (paid by hh)</b>	yes	yes	yes	yes
	<b>Out of pocket household medical expenditures</b>		yes	yes	yes	yes
		<b>Medical services</b>				
		<b>Drugs</b>				
		<b>Medical supplies</b>				
			yes	yes	yes	yes
<b>All other</b>		<i>Shelter: Other lodging</i>				
		<i>Housing: HH furnishing &amp; eqpmt (appliances, etc)</i>				
		<b>Apparel</b>				
		<b>Entertainment</b>				
		<b>Personal care products and services</b>				
		<b>Reading</b>				
		<b>Education</b>				
		<b>Tobacco products, smoking supplies</b>				
		<b>Miscellaneous</b>				
		<b>Alcohol</b>				
<b>Personal insurance and retirement plans</b>		<b>Life and other personal insurance</b>	yes	no	yes	no
		<b>Pensions and Social Security</b>	yes	no	yes	no
<b>Contributions (outside of hh)</b>		<b>Cash Contributions</b>	yes	no	yes	no
<b>Home consumption</b>		n/a	no	yes	no	na
* CE does not consider mortgage principal as an expenditure (but rather as a change in household assets).						