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Farm Operator Households:

Moving Beyond Money Income Measures to Assess Level and Inequality in Economic Well-being

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Summary

This paper reports the first results comparing inequality measures for all US households relative to farm households, using after-federal-tax measures of household income estimated for 2004 from the new ERS farm household tax model. Because federal taxes are calculate on money income plus capital gains, we report comparisons for both money income and the money income and capital gains measures. We find that:

- Before taking into account federal income and payroll taxes, farm household income in 2004 was higher at every decile than household income for all US households. In addition, it was more dispersed (unequal) than household income for US households.

- Federal taxes have a greater income redistributive effect on all US households than on farm households. After federal taxes, the income of farm households remains more dispersed, as well as higher at every decile relative to all US households, with the exception of the first decile (where the levels are approximately the same).
  - Below their respective medians, US household income declines less after federal taxes (income and payroll) than farm households; above the median, US household income declines more.
  - Quantifying the effect by comparing the after-federal-tax income measure relative to money income plus capital gains measure, we find that for farm households and for all US households, the Gini coefficients decline by 4% and 8% respectively, and the 80:20 income ratios decline by 12% and 15%, and the 90:10 income ratios decline by 11% and 20%, respectively.

Considering farm households as an indicator for self-employed households, we also identify weaknesses in the after-tax income as a measure of household wellbeing due to the variety of tax provisions that reduce the self-employed income tax base relative to households without businesses, as well as the high levels of wealth among self-employed households.

I. Introduction

Traditionally, annual household income has been a standard measure of economic well-being. Recognizing the limitations of this measure, statistical agencies and experts in many countries have been developing alternatives that incorporate other important elements, including government taxes, transfers (both in money and in-kind), and expenditures; returns from capital; and non-market benefits. Empirical implementation of these concepts is in progress.

Along these lines, the Economic Research Service (ERS) of the U. S. Department of Agriculture (USDA) has a project to estimate improved measures of farm household well-being, in tandem with its annual data collection through the USDA survey of farm business/households (Agricultural Resource Management Survey, ARMS). A project goal is to better understand the economic well-being of farm households, based on consistent and informative comparisons of economic indicators for farm households relative to all US households (and other self-employed households). Developing more complete measures of economic returns to farm households is also intended to help unravel the apparent puzzle about the economic rationality of farm household behavior, where consistently 50-80% of farms (depending upon the state of the farm economy) have losses in a given year. Two major thrusts of ERS activity are developing the capacity to estimate (1) after-tax farm household income, and (2) appreciation in value of farm business/household capital (unrealized, as well as realized), the majority of which is farm land.

In this paper we report the first results from the new ERS model estimating after-federal-tax income of farm households. Because the households of farms (and other businesses) receive various forms of special treatment under the tax laws, the tax system may have a different effect on households with and without businesses – shifting the relative economic well-being of the two groups after taking into account taxes. The tax model allows us to capture the impact of farm economic activity on after-tax household income, including any tax benefits that farm losses may provide to the household. The model also will enhance our ability to evaluate the effect of future changes in Federal tax policies on farm household well-being

In addition to income, wealth is a key element in the economic wellbeing for households that operate businesses. For example, characterizing low economic status of farm households solely with income measures is challenging, since farming is characterized by variable income and high wealth. During periods of low or negative income, farm households may be able to maintain living standards by borrowing against, or liquidating assets. Also wealth is an important source of unmeasured economic returns to the household.

The paper is organized as follows. Section II outlines what we know about the relative distribution of pre-tax income and wealth for farm households relative to all US households. Section III briefly summarizes the findings of the broader literature on the effect of government taxes, transfers and expenditures on redistributing wellbeing across households. Section IV lays out the different elements of the tax system that affect the self-employed in general and farmers in particular, and hypotheses about the potentially differential effects of the tax system on farm households. Section V summarizes the data sources, the ERS tax model, and the measures of after-tax income employed in our analysis. Section VI presents our findings.

II. Distributions of income and wealth for farm operator households relative to all US households

Background context

To set the stage, we first provide a few definitions of the farm business/household population and a brief description of the dataset on farm operator households. USDA defines a farm as any place from which $1000 or more of agricultural products were produced and sold, or normally would have been sold, during the census year. Because we are interested in the households of farm operators, we restrict our analysis to "family farms", which excludes farms organized as nonfamily corporations or cooperatives, or farms with hired managers. Family farms represent about 98% of all farms.

U. S. farms are diverse. A primary dimension of diversity is sales class. USDA defines "small" farms as those farms with annual sales of less than $250,000. Farms with greater sales are referred to as "large" or "commercial" farms. ERS also distinguishes farm by whether their operators report farming as their primary occupation.

To characterize farm operator households, we use the Agricultural Resource Management Survey (ARMS), the only national survey that provides annual observations of field-level farm practices, the economics of the farm business, and the characteristics of the American farm household for a nationally representative sample of all US farms. The sample is drawn from the population of all farms. Our analysis sample consists of 6,706 family farms and their households reporting information for 2004.

Data are collected in the ARMS to estimate a money income variable equivalent to the Current Population Survey (CPS) money income measure. USDA recently added a question eliciting realized capital gains from the sale of both farm and nonfarm assets, which we use to calculate the expanded income measure, money income plus capital gains. With CPS data, we calculated analogous income measures for 2004. The household wealth measure in ARMS, the market value of farm and non-farm assets minus farm and non-farm debt, is designed to be analogous to the measure in the Survey of Consumer Finance. [See the Appendix for more information on data sources and income and wealth measures.]

Income distribution

Average income of farm operator households had increased from half of nonfarm household income (per capita) in the 1930s to relative parity by the 1970s. [Jones et al] In every year since 1996, mean income for farm households has exceeded the mean US household income by 5-35%, despite the greater variability in farm household income from year to year. [See Figure 1. Tables and figures appear at the end of the paper.]

Figure 1 clearly illustrates that, on average, income from farming represents a relatively small share of average household income across all farm households. However, farms households are following diverse paths to economic wellbeing. Large farms are the only sales class earning (as a group) a majority of household income from farming. Representing about 9% of US family farms, large farms produce about 60% of total farm sales from a base of about 23% of total farm sector assets. In an average year, their average operating profit margin is greater than 10%, and average return on assets is around 4%. [MacDonald et al.] Across all other farm sales-classes, family farms average negative operating profits and their households draw most of their income from off-farm sources in an average year. Indeed, two-thirds of small farms (those with annual sales < $250,000) indicate their primary occupation is something other than farming. [See Jones et al, Hoppe and Banker]

Looking first at the money income measure, we see that farm households have both higher levels and greater dispersion in money income in a given year than do all US households. [See columns 1-3, Table 1] Comparing income at the decile cutpoints for 2004, we see that household money income is consistently higher - at every decile - for farm households, relative to all US households. In 2004, median farm household income ($53,000) exceeded median US household income ($44,400) by 20%. The greatest difference is at the 90th percentile, where income of farm

households exceeds that of all US households by 33% ($161,200 relative to $120,900). The smallest difference is at the 10th percentile: in the first decile, 4.5% of farm households have negative household income, attributable to farm losses, compared to 0.5% for all US households. Reflects this greater dispersion at the high and low ends, the Gini coefficient for farm households is .573 relative to .465 for all US households.

Households operating commercial farms are over-represented at both ends of the extremes. For example, as we will see below [in Table 5], their average household income is at the 90th percentile of the farm household distribution, in addition, they have the highest incidence of negative household income.

Interestingly, the 80:20 decile income ratios are approximately the same for farm (4.70) and all US households (4.77), despite the higher levels of farm income at each decile cutpoints. However, the 90:10 ratio is much higher for farm households (14.02 relative to 11.09). The greater dispersion at the high end of the farm household distribution is also reflected in the income shares by quintiles: relative to US households, the first four farm quintiles have lower income shares, and the highest has a higher income share. We report shares calculated with actual household income (including negative income where relevant), which yields a negative income share (-0.5%) for the first quintile for farm households, relative to 3.4% for all US households.

After tax income is calculated on money income plus capital gains. As an intermediate step to the after-tax income measure, we create a second pre-tax measure by adding capital gains to money income (reported in columns 4-6 in Table 1). The percentage increase in income is the same or greater at each decile for farm households except at the 90th percentile. Nonetheless, the relative dispersion for all US households increases as captured in the 80:20 and 90:10 ratios, which increase at a greater rate for all US households; however, the Gini coefficients remain approximately constant for both groups.

Household income has strengths and weaknesses as an indicator of economic well-being for a typical household that derives the overwhelming share of its income from labor earnings. It is less informative for self-employed business operators, who typically have more variable income and higher wealth than the average household. As noted above, during periods of low income, farm (and other self-employed) households may be able to maintain living standards by borrowing against, or liquidating, assets. And wealth is particularly important for the retired and near-retired, who may be supporting their standard of living by drawing down wealth accumulated

over their lifetime, rather than spending current income. For a more complete picture, we now consider the distributions of wealth for farm and all US households.

Wealth distribution

In 2004, median farm household wealth ($488,200) was more than five times median US household wealth ($91,700) – reflecting the different circumstances of households that own businesses relying on land and physical capital for production, relative to the average US household, which relies primarily on wage income. And the distribution of farm wealth is less variable (less concentrated) than for all US households, with a Gini of .520 for farm households and of .840 for all US households. The divergence in wealth between farm and all US households is greatest at the lower deciles, and decreases as we move up the distribution.

Joint income and wealth distribution

To create a well-being indicator that accounts for both income and wealth, we separate households into low and high income and low and high wealth, using the US household medians for money income and wealth as the dividing lines. Because of our interest in understanding the well-being of households with negative income, we further divide the low-income households into two groups, those with negative income and those with positive income. [See Table 2]

In 2004, 50.8% of all US households had low income (below the median), and more than two-thirds of that group had low wealth as well.[1] In contrast, 42.3% of total farm households had low income, and virtually all of those had high wealth. Among the 0.5% of total US households with negative income, about one-third (36.7%) had high wealth. In contrast, 4.5% farm households with negative income, virtually all (95.6%) had high wealth.

Low income and low wealth – where "low" refers to below US median levels - can be considered an indication of relatively low economic well-being. This group included 2.7% of farm households, relative to 36.5% of all US households in 2004. Within these groups, about the same share of total farm and total US households had negative income and low wealth (0.2% and 0.3%, respectively.)

[1] The slight discrepancy (by definition, 50% of households are below the median) appears to be due to rounding error in the use of the cutpoints.

III. Literature review: Effects of expanded income measures on economic well-being

Money income has long been the traditional measure of economic well-being. [See the Glossary in the Appendix for the CPS definition of money income.] Recently increasing interest in the development of better measures of economic well-being for national public policy purposes both in the U.S. and internationally has led to the development and evaluation of more comprehensive measures of income and other well-being indicators.

In the U.S., the Census Bureau highlights four alternative measures of income to assess well-being and income inequality. Their most comprehensive measure, disposable income, *includes* money income, the value of noncash transfers, realized capital gains and losses, an imputed rate of return on home equity and *subtracts* work expenses and Federal and State taxes (U.S. Census Bureau, 2004). With this broader measure of disposable income, well-being is more equally distributed than money income: for 2004, the Gini index declined from .45[2] to .40 and the share of income for the lowest quintile increased from 3.42 percent to 4.68 percent.

Research on the effects of a more complete measure of income that includes taxes, noncash transfers and income from wealth demonstrates the contributions of these elements to both level and distribution of economic well-being. While inclusion of income from wealth has a significant positive effect on well-being, it also increases income inequality. In contrast, both government spending and taxes reduce inequality, with government spending having the greater impact (Levy Economics Institute, 2004). This is consistent with findings by the Census Bureau that government transfers reduce income inequality more than taxes. In 2002, subtracting taxes from the basic money income measure reduced the Gini index by 4.1 percent while adding government transfers reduced the index by 16.8 percent (U.S. Census Bureau, 2002).

At the international level, the "Canberra Group", which has been working to develop standards on conceptual and practical issues related to the development of income distribution statistics, has identified a number of issues. Their report suggested that income offers only a partial view of economic well-being and that to better capture economic well-being it is desirable to examine other indicators including levels of wealth and changes in the value of such wealth. The report also noted that due to fluctuations in income for farmers, consumption expenditures may be a better measure of the sustainable standard of living relative to a single year measure of income (Canberra Expert Group on Household Income Statistics, 2001).

[2] Note that the reference, US Census, 2006, [cited here] reports a different Gini for money income for all US households than the DeNavas-Walt, 2005. Our CPS calculations are consistent with DeNavas-Walt.

Our analysis in this paper represents a first step in expanding beyond the basic money income measure - to include realized capital gains and losses, as well as Federal income and payroll taxes.

IV. Tax policy for self-employed in general, and farms in particular

Farmers, like other self-employed individuals, benefit from both general tax provisions available to all taxpayers and from provisions specifically applicable to farmers. Some of the most significant provisions specifically targeted to farmers include the current-year deductibility of certain capital costs, capital gains treatment of proceeds from the sale of farm assets for which development costs have been deducted against regular income, and cash accounting. These and other provisions reduce the farm household income tax base relative to other nonfarm businesses.

Land is the primary input in farming, and most of farm household wealth is in farmland. Thus, the tax policies that affect investment in land are particularly important for self-employed farmers. Federal income tax provisions that are most important for farmland include the deductibility of nominal interest and real estate tax payments, the capital gains treatment of appreciation in land values, and the deferral of taxes on capital gains until they are realized from sale or other disposition. Historically, a large share of the return to investment in farmland has been through appreciation of the asset (relative to production of current income from farm operations). With relatively long holding periods, this income may never be recognized for income tax purposes. The new after-tax measure does include *realized* capital gains on farmland as a result of sales. However, unrealized capital appreciation is not reported in any current USDA farm business income measures.

Agriculture is a capital-intensive industry. In addition to the large investment in land, farming requires substantial investments in buildings, machinery, and equipment. As a result, the system governing the recovery of these capital costs is particularly important for self-employed farmers. While these costs are generally recovered through depreciation deductions over a period of years, under current law, farmers and other businesses may elect to deduct in the purchase year up to $108,000 of their investment in farm machinery, equipment and other qualifying property. This option is especially important to farmers since it allows most to write-off the full amount of their investment in the current year.

Another feature of the Federal income tax that applies specifically to farmers is the ability to deduct the cost of developing certain farm assets in the tax year in which the costs are incurred or paid. Examples of preproductive development costs include raising dairy, breeding, or sporting livestock to their age for mature use, caring for orchards and vineyards before they are ready to produce crops, and clearing land and building long-term soil fertility by applying lime, fertilizer, and other materials. Expensing of development costs results in a mismatch across years of expenses and the associated income. This mismatch has been used to generate deductions or losses that can be written off against income from other sources, reducing taxes on such income. This tax benefit provides a return to farming which - along with the appreciation in farm assets, primarily farmland (which is not recognized until the assets are sold) - can help to explain why households remain in farming despite reporting losses year after year.

The composition of current income and capital gains and favorable tax treatment for farm income is reflected in the size of farm profits and losses reported for income tax purposes. To some extent, it is also reflected in the USDA measures of farm household income. Overall, farm sole proprietors have reported a net loss for tax purposes from farming activities since 1980. The proportion of farm sole proprietors reporting a farm loss has been increasing, with around 66 percent of farms reporting losses in 1996, compared with 56 percent in 1989. In 2003, the last year complete Internal Revenue Service (IRS) tax data are available, over 70 percent of farm sole proprietors reported a farm loss. This compares to only about 27 percent for nonfarm sole proprietors. These self-employed farmers reported over $ 19.8 billion in losses with an overall net loss from all farm sole proprietors of $12.3 billion.

In contrast, about 54% of farm households report a loss based on the ARMS survey. Also ARMS data suggest that farm businesses on net are profitable. These differences can be attributed to a number of factors including differences in the definition of a farmer for USDA and tax purposes. While USDA requires a business have the potential for sales of $1,000 to be considered a farm, for federal tax purposes any household with farm income or expenses can file a schedule F farm return and be considered a farmer. Income tax reporting rules and underreporting of farm income for tax purposes can also help to explain the differences between the two measures.

In summary, these losses suggest that self-employed farmers are somewhat different from other nonfarm households, including nonfarm business households. The losses reported reflect not only the variability of income, but the composition and timing of the receipt of such income as well. For those households for which farm income represents a significant component of income,

this pattern of losses suggests a greater inequality in household money income, which is consistent with the data reported above.

At the same time, to the extent that favorable tax provisions reduce the tax burden on farm income, those farm households that receive a larger share of income from farming may experience a smaller difference between the basic income measure and the new disposable income measure that includes taxes. Since these households may not be disproportionately represented in the higher income quintiles, the effect on income inequality is less certain.

V. ERS tax model and after-federal tax income measure

The ERS farm household federal-tax simulation model uses Agricultural Resource Management Survey (ARMS) farm business/household level survey data to estimate an after-tax income measure for farm operator households. The tax model incorporates the Internal Revenue Service (IRS) income tax rules applicable to individual taxpayers. The model simulates Federal income and payroll taxes, including both social security and self-employment taxes. The current version of the model does not estimate State income taxes or incorporate the alternative minimum tax. Without information on State income taxes, all taxpayers are simulated based on a standard deduction.

State income taxes and other features of the Federal individual income tax will be incorporated into the next version of the model. The model is in the development stage and estimates are regularly evaluated against available statistics, including Internal Revenue Service (IRS) statistics, to identify areas for improvement.

In order to make the after-tax comparison based on equivalent measures, we constructed with Current Population Survey data and the ASEC 2005 Tax Model a measure of after-federal-tax income analogous to the measure we calculate with ARMS data for farm households. (The measure equals money income, plus realized capital gains and losses, minus federal payroll taxes and federal income taxes, plus EITC and childcare credit).

VI. Results

First, we consider – in the aggregate - the effect of the federal tax system on the levels and dispersion of income on all farm households relative to all US households. Subsequently, we consider who benefits from tax losses across the diversity of farms, and what factors are associated with farm losses. This discussion leads to implications regarding the limits of the current after-tax measure as an indicator of well-being for farm (and other self-employed) households.

Inequality in the impact of federal taxes: farm households relative to all US households

Table 3 illustrates that the redistributive effect of federal taxes from high-income to low-income households appears to be greater for US households than for farm households. With the introduction of the new after-federal-tax measure, median household income drops from $53,067 to $47,955 for farm households (columns 1 and 3), and from $44,214 to $39,850 for all US households (columns 6 and 8). Looking at the decile cutpoints, the percent reduction in income of farm households is higher at each decile below the median and lower at each decile above the median relative to all US households. Incorporating federal taxes (and capital gains income) reduces the 90:10 percentile income ratio proportionately more for US households (to .82 of the money income ratio) than for farm households (to .89); the effects on the 80:20 percentile income ratios are about the same (.89 for farm households and .87 for all US households.) Separating out the federal tax effect by comparing post-federal tax income to money income plus capital gains, the tax bit is greater at all deciles for both groups, with the exception of the lowest two deciles for all US households. Consequently, federal taxes reduce dispersion relative to money income plus capital gains more for all US households than for farm households.

For the quintile income shares, the proportional increase in the first two quintiles with the shift from pre-tax to after-tax income was greater for all US households (13% relative to 7%). Farm households have lower income shares for the third and fourth quintiles; only the farm share of fifth is higher than for US households. When we use money income plus capital gains as the base, the redistributive effect on income shares increases (comparing columns 4 and 5, and 9 and 10); the effect is more pronounced for farm households, which receive higher capital gains on average.

Finally in Table 4, we look at the effect of federal taxes on the joint distributions of farm household income and wealth. The shares of high wealth and low wealth households do not

change.[3] Within the low wealth group (4.2% of the total), there is very little change: on net, a few households shift out of the low income group to the high income group after federal taxes. Among the high wealth group (95.9% of the total), 1.8% of total households shift from the low (and positive) income group to the high income group.

Comparison across the diversity of farm households

In table 5, we explore the effect of taxes across the diversity of farms within the sector. But first we review some basic income and tax statistics. Across all farm households, household money income (pre-capital gains/losses) averaged $78,800, and capital gains averaged $2,300. Payroll taxes averaged $5,100, and federal income taxes, $10,200; the combination of the child credit and the EITC reduced the average household federal income tax bill by approximately 4%, with three-fourths of the reduction due to the child credit.

Who incurs farm losses (and the associated tax benefits)?

2004 was a good year for farm income. Both crop and livestock commodities experienced favorable market and/or production conditions. This was the second consecutive year of high corn production, large harvests for other major crops, and unusually high prices for livestock and milk. This combination generated record earnings for the farm sector. Across all farms, average farming earnings were $12,587, representing 16% of total household income. Nonetheless, 54% of all farms still had negative farm income in 2004.

To capture some of the heterogeneity across the sector, we classify farms into four types – commercial farms (with sales > $250,000) and three small farms groups (with sales <$250,000, and different operator self-reported primary occupations – retired, farming and "other"). [See the Glossary in the appendix for definitions.] The shares of households with negative farm income, with the potential for benefits in the form of reduce tax writeoffs, are substantially different for commercial farms relative to the small farms. Of the three small-farm types, residential/lifestyle farms most frequently had negative farm income (66%), followed by retirement (55%) and farming-occupation (47%). Commercial farms experienced a substantially lower rate of negative farm income (16%); however these households were much more likely to have negative

[3] To parallel the shift in farm household income variable to our after-tax measure, we also shift the income cutpoints to the median of US household after-tax income. We use the same median as in Table 2 for the wealth cutpoint, so the shares of high wealth and low wealth households do not change.

household income if the farm incurred losses, than households operating small farms.[4] Small farms on average earn most of their income from off-farm activities. The likelihood of negative farm income translating into negative household income is low for retirement farms and negligible for residential/lifestyle farms. Among farms run by "farming-occupation" operators, the likelihood of negative farm income generating negative household income increases with farm size.[5]

The average loss among farms with farm losses was $15,400.[6] The rate of tax reduction accruing per dollar of farm losses will vary with the level of non-farm household income (ie, before taking into account farm losses): the higher the income level, the greater the marginal tax rate of taxes thereby avoided. However, when farm losses result in negative farm income (which occurs for 4.5% of 2004 farm households), then the full amount of losses will not yield tax benefits in the current year; it is possible they can be used to offset income in prior years or shifted to future years. The households of commercial farms, which are the most likely to have negative household income, are also the households with the greatest levels of net worth.

What factors contribute to farm losses?
Or, the limits of the after-tax money income measure as an indicator of wellbeing

While an after-tax measure of farm household income provides an improved measure of economic well-being, it still has significant shortcomings. This is especially true for self-employed farmers where, as discussed above, the nature of farming and various tax accounting provisions tend to result in a mismatch in the timing of reporting income and the expenses associated with the production of such income. While the expenses can be deducted in the year they are incurred, the recognition of income may be deferred for many years - or even permanently, for example in the case of farm land held until death.

Differential use of these provisions by different farms/households will lead to greater variability in the level of farm income reported in a given year for a given level of production and farm prices. We explore this by looking for different patterns of expenses for businesses with farm losses relative to those with farm profits. In the lower portion of Table 5, we compare various

[4] Given the strength of the farm economy this year, only the residential-lifestyle farms (41% of all farms) averaged negative farm income across the group. [For the pattern over time, see Table 8, Covey & Green, 2005]
[5] See Jones, et al, Figure 3, for the breakdown by more detailed size classes.
[6] The average losses for commercial farms with losses were substantially higher: -$108,000.

performance measures (and elements of the income statement) across those two groups, which are split out in columns 5 and 6.[7]

Relative to farms with profits, farms with losses are more likely to have higher operating expense ratios.

- Across all farm types, the ratio of operating expenses for farms with losses is more than twice (2.1) that for farms with profits.
- This pattern holds when comparing within farm types, though the effect is slightly lower for small farm/farming occupation (1.75) and for commercial farms (1.5).[8]

Relative to farms with profits, farms with losses are more likely to have a higher share of capital investments that are given favorable treatment by the tax code.

- The ratio of real estate and property tax to cash income for farms with losses is about three times higher than for farms with profits; the ratio of interest expenses to cash income is almost four times higher than for farms with losses. (This pattern is consistent across farm types.)
- Livestock income as a share of cash income is not different between the two groups, but livestock expenses were close to twice as high in farms with losses. (This differential was attenuated for commercial farms, where the ratio was closer to 1.3.)
- The ratio of depreciation to cash income was almost three times as high in farms with losses (2.7) – the differential is lower for commercial farms and higher for retirement farms.

These results suggest that farms with losses may be less efficient than farms with profits. They also suggest that capital investment is a critical element in the effect of taxes on a household's wellbeing in a given year. Further, a critical unmeasured return is unrealized capital gains, for example in farmland. Of all the returns to farming, these are the least likely to be realized. Others, such as investments in the development of a livestock herd, are subject to time-shifting.

Consequently for self-employed farmers, any measure of economic well-being that relies exclusively on an annual income flow, and does not consider wealth or changes in the value of business and other assets, could significantly understate the level of economic well-being of farm households.

In our future work on the economic well-being of farm households, we will be refining the tax model to include state taxes and additional features of the federal income tax system, including

[7] Half of farms with loss are residential/lifestyle farms, though they make up only 40% of all farms. (As noted above, their incidence of farm losses is 66% in 2004, highest of any type.) Only 3% of farms with a loss are commercial farms, though they represent 9% of all farms. So the indicators for the "farms with loss" and the "farms with profit" represent the small farms – to understand commercial farm performance requires breaking out the patterns by type.

[8] More detailed tables with the comparisons within farm types are available from the authors.

itemized deductions. We are also exploring alternatives for capturing the returns to wealth, including unrealized capital gains. Finally, we are also exploring measures of consumption flows.

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Appendix: Glossary and Data Sources

Farm Definitions

Official USDA 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 census year.

Official USDA definition of "small farms": annual sales of less than $250,000

ERS typology of family farms:
Family farm is any farm organized as a sole proprietorship, partnership, or family corporation. Family farms exclude farms organized as nonfamily corporations or cooperatives, as well as farms with hired managers. Family farms are about 98% of all 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

Major occupation classification is based on the answer of the survey respondent (farm operator or spouse) to the question, what was your (operator, spouse) major occupation? (Options are: farm or ranch work; hired manager; retired but still farming, work other than farming/ranching).

Large (commercial) family farms: annual sales of $250,000 or more
(All farms with annual sales of $250,000 or more are classified as "large" farms, regardless of self-reported major occupation.)

For more information, see Banker and Hoppe, 2006.

Data sources:

Agricultural Resource Management Survey (ARMS): Sponsored jointly by Economic Research Service (ERS) and the National Agricultural Statistics Service (NASS) of the US Department of Agriculture, ARMS is the only national-level US survey that provides annual observations of field-level farm practices, the economics of the farm business, and the characteristics of the American farm household for a nationally representative sample of all US farms [as defined by USDA] in the 48 contiguous states. Information about farm production, business, and households is reported for the 15 States with the highest farm production, as well as for the nation as a whole. The survey data support estimation of household income and wealth, business income and performance measures, sector farm income and value-added, production costs for crop and livestock enterprises and chemical use by farmers in the production of crop and livestock commodities. To collect the different kinds of information, ARMS employs a complex, multi-phase, stratified sampling procedures. NASS creates weights for each observation to address sampling, nonresponse, and undercoverage (calibrating to independent USDA estimates).[9]

[9] For more information about the ARMS, see http://www.ers.usda.gov/Data/ARMS/

In our analysis, we employ records from the most complete questionnaire version (administered in person) from phase 3, which focuses on the farm business and the farm household.[10] The sample is drawn from the population of all farms, as defined by USDA (any place from which $1000 or more of agricultural products were produced and sold, or normally would have been sold, during the census year.) About 98% of all farms are "family farms", with a household attached.

We report income and wealth data for the household unit, consisting of all members of the residence. The survey elicits components of income separately for the operator, spouse, and all other members of the household.

Current Population Survey: For US household income data**,** we used the Current Population Survey, including the variables from the 2005 ASEC Tax Model, to calculate money income and an after-federal tax income measure comparable to what is available for farm households. In the survey, components of income are elicited for each member of the household 15 years and older.

Survey of Consumer Finance 2004 (Federal Reserve Board): To calculate the joint income and wealth distributions for all US population, we used the 2004 SCF. The SCF unit of analysis differs from that in ARMS and CPS. 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.

Income measures

Money income: all money income received by individuals in the household [CPS: 15 years or older], including income before deductions for taxes and other expenses; it does **not** include lump-sum payments or capital gains. Nor does it include non-cash benefits such as food stamps. [Reported for CPS and ARMS data.]

After-federal tax income: money income, *plus* realized capital gains and losses, *minus* federal payroll taxes, federal income taxes, plus EITC and childcare credit. [Reported for CPS and ARMS data.]

Census disposable income: money income,
- plus imputed realized capital gains and losses,
- minus federal payroll taxes, federal income taxes (including EITC and childcare credit),

*[The items **below** are **not** included in ARMS disposable income, the items above are]*
- plus noncash transfers (food stamps, public or subsidized housing, school lunches)
- plus imputed rate of return on home equity
- minus work expenses
- minus state income taxes, and property taxes on owner-occupied homes

[We do not report data for this measure.]

[10] Phase 1 refers to the screening surveys, and each Phase 2 survey collects detailed data about production for a given commodity, with targeted commodities rotated across the years. For a copy of the questionnaire for the data in this analysis, go to http://www.ers.usda.gov/Data/ARMS/app/FarmDocumentation.aspx, and select 2004 All Phase3 costs and returns questionnaire

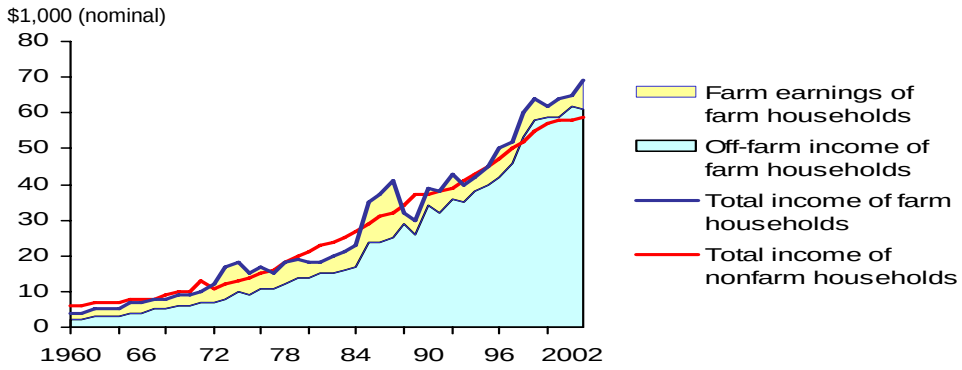
Wealth measures

ARMS: Net worth equals market value of farm assets minus farm debt, plus market value of non-farm assets minus non-farm debt, as of the last day of the year for which the data are collected (2004 in this case).

- *Farm:* Farm assets include (if ***owned*** by the operation): real estate (buildings, including residence where relevant, and land), inventory (crop, livestock, inputs), vehicles, stocks in cooperatives and Farm Credit System, and financial assets. Farm debt includes: debt held by the business as of Dec. 31, 2004.
- *Non-farm:* Non-farm assets include financial (transactions accounts, CDs, savings bonds, government securities, mortgages on land sold, corporate stock, mutual funds, pooled investment funds, retirement accounts, cash value of life insurance, other financial assets) and non-financial (primary residence – if not owned by the business, other real estate, business equity not part of the farm, and other assets, including vehicles) and debt includes debt secured by residential property, lines of credit not secured by residential property, installment loans, credit card balances and other.

Survey of Consumer Finance: Net worth equals *assets* minus *debt*, as of the day of the survey. Assets include financial (transactions accounts, CDs, savings bonds, bonds, stocks, pooled investment funds, retirement accounts, cash value of life insurance, other managed assets) and non-financial (vehicles, primary residence, other real estate, business equity, and other).
Debt includes debt secured by real estate (not owned by the business), loans on businesses not part of this farm operation, lines of credit not secured by residential property, and personal loans (credit card balances, auto loans, etc).

Figure 1: Average household income for farm households and all U.S. households, 1960-2004



Source: Various sources. For details, see http://www.ers.usda.gov/Briefing/FarmStructure/Data/historic.htm

Table 1

Comparison of Income and Wealth Distributions for Farm and All US Households, 2004

	Money income			Money income + capital gains			Wealth		
	Farm hh:	All US hh:	Farm/ all US	Farm hh:	All US hh:	Farm/ all US	Farm hh:	All US hh:	Farm/ all US
	1	2	3	4	5	6	7	8	9
			col. 1/col. 2			col. 4/col.5			col. 7/col. 8
Mean:	$78,807	$60,530	1.30	$83,601	$61,631	1.36	$802,594	$448,200	1.79
Percent with negative household income:									
	4.5%	0.5%	9.00		0.5%				
Decile maximum:									
10	$11,500	$10,927	1.05	$11,680	$10,934	1.07	$148,755	$200	743.78
20	$22,120	$18,500	1.20	$22,430	$18,556	1.21	$233,863	$6,300	37.12
30	$31,298	$26,000	1.20	$31,860	$26,247	1.21	$316,013	$23,050	13.71
40	$42,000	$34,761	1.21	$42,453	$35,000	1.21	$399,974	$51,700	7.74
50	$53,067	$44,214	1.20	$54,130	$45,000	1.20	$488,127	$91,700	5.32
60	$64,624	$55,600	1.16	$66,010	$56,490	1.17	$606,150	$153,200	3.96
70	$79,000	$69,760	1.13	$80,693	$70,400	1.15	$786,003	$247,200	3.18
80	$104,000	$88,334	1.18	$105,922	$90,000	1.18	$1,051,363	$426,900	2.46
90	$161,200	$121,166	1.33	$165,170	$125,000	1.32	$1,616,227	$830,200	1.95
100									
Decile ratios:									
80:20	4.70	4.77	0.98	4.72	4.85	0.97	4.50	67.76	0.07
90:10	14.02	11.09	1.26	14.14	11.43	1.24	10.87	4151.00	0.00
Gini:	0.573	0.465	1.23	0.575	0.468	1.23	0.520	0.840	0.62
Share of income in quintiles (includes negative household incomes):									
First	-0.5	3.4		-0.5	3.3				
Second	8.1	8.7		7.9	8.7				
First + second	7.6	12.1	0.63	7.5	12.0	0.62			
Third	13.7	14.7	0.93	13.3	14.6	0.91			
Fourth	20.8	23.2	0.90	20.4	23.2	0.88			
Fifth	57.9	50.0	1.16	58.8	50.2	1.17			
Source:	ARMS, ERS calculations	CPS, ERS calculations		ARMS, ERS calculations	CPS, ERS calculations		ARMS, ERS calculations	SCF, ERS calculations	

Note: negative household incomes are included in all calculations

Table 2

Joint household income and wealth distributions: based on US median income and wealth, 2004

(i) All US households:

	Money Income (Y)				
	LOW			HIGH	TOTAL
Wealth (W):	Y≤ 0	0<Y<US hh median	Subtotal LOW	Y≥ US hh median	
HIGH: W>US hh median					
col %	36.7%	28.0%	28.1%	72.0%	
% of total	0.2%	14.1%	14.3%	35.5%	49.7%
LOW: W<US hh median					
col %	63.3%	72.0%	71.9%	27.9%	
% of total	0.3%	36.2%	36.5%	13.8%	50.3%
Subtotals					
col %	100.0%	100.0%	100.0%	100.0%	
% of total	0.5%	50.3%	50.8%	49.2%	100.0%

Source: Survey of Consumer Finance, 2004.
Household income data are for calendar year 2003, wealth data are for the day the was conducted during May-Dec. 2004.

(ii) Farm households:

	Money Income (Y)				
	LOW			HIGH	TOTAL
Wealth	Y≤ 0	0<Y<US hh median	Subtotal LOW	Y≥ US hh median	
HIGH					
Number	88,938	730,286	819,224	1,161,637	1,980,861
col %	95.6%	93.4%	93.6%	97.6%	
% of total	4.3%	35.3%	39.6%	56.2%	95.9%
LOW					
Number	5,112	52,359	57,471	29,041	86,512
col %	4.4%	6.6%	6.4%	2.4%	
% of total	0.2%	2.5%	2.7%	1.4%	4.2%
Subtotals					
Number	94,050	782,645	876,695	1,190,678	2,067,373
col %	100.0%	100.0%	100.0%	100.0%	
% of total	4.5%	37.8%	42.3%	57.6%	100.0%

Source: ARMS data. Income data are for calendar year 2004, wealth data are are for Dec. 31, 2004

Table 3 Effect of federal taxes on income for farm and all US households, 2004

	Farm households					All US households					Farm/All US hh ratios:		
	Money income	Money income + capital gains (KG)	Post federal-tax income	Post-fed-tax inc/ money income	Post-fed-tax inc/ money income + KG	Money income	Money income + capital gains (KG)	Post federal-tax income	Post-fed-tax inc/ money inc	Post-fed-tax inc/ money income + KG	Farm hh/ all US hh: money income	Farm hh/ all US hh: money inc +KG	Farm hh/ all US hh: post-fed tax income
	1	2	3	4	5	6	7	8	9	10	11	12	13
				col3/col1	col3/col2				col 8/col6	col8/col7	col1/col6	col2/col7	col3/col8
Mean	$78,807	$81,137	$65,762	0.83	0.81	$60,530	$61,631	$51,568	0.85	0.84	1.30	1.32	1.28
Decile maximum income:													
10	$11,500	$11,680	$10,650	0.93	0.91	$10,927	$10,934	$10,895	1.00	1.00	1.05	1.07	0.98
20	$22,120	$22,430	$21,026	0.95	0.94	$18,500	$18,556	$18,121	0.98	0.98	1.20	1.21	1.16
30	$31,298	$31,860	$29,200	0.93	0.92	$26,000	$26,247	$24,962	0.96	0.95	1.20	1.21	1.17
40	$42,000	$42,453	$38,724	0.92	0.91	$34,761	$35,000	$32,160	0.93	0.92	1.21	1.21	1.20
50	$53,067	$54,130	$47,955	0.90	0.89	$44,214	$45,000	$39,850	0.90	0.89	1.20	1.20	1.20
60	$64,624	$66,010	$57,212	0.89	0.87	$55,600	$56,490	$49,158	0.88	0.87	1.16	1.17	1.16
70	$79,000	$80,693	$69,526	0.88	0.86	$69,760	$70,400	$60,151	0.86	0.85	1.13	1.15	1.16
80	$104,000	$105,922	$87,315	0.84	0.82	$88,334	$90,000	$75,037	0.85	0.83	1.18	1.18	1.16
90	$161,200	$165,170	$133,300	0.83	0.81	$121,166	$125,000	$99,373	0.82	0.79	1.33	1.32	1.34
Decile maximum income ratios:													
80:20	4.70	4.72	4.15	0.88	0.88	4.77	4.85	4.14	0.87	0.85	0.98	0.97	1.00
90:10	14.02	14.14	12.52	0.89	0.89	11.09	11.43	9.12	0.82	0.80	1.26	1.24	1.37
Share of income in quintiles (includes negative hh incomes):													
First	-0.5	-0.5	-0.9	--	--	3.4	3.3	4.0	1.17	1.21	--	--	--
Second	8.1	7.9	9.0	--	--	8.7	8.7	9.7	1.12	1.11	--	--	--
First + Second	7.6	7.5	8.1	1.07	1.09	12.1	12.0	13.7	1.13	1.14	0.63	0.62	0.59
Third	13.7	13.3	14.5	1.06	1.09	14.7	14.6	15.6	1.06	1.07	0.93	0.91	0.93
Fourth	20.8	20.4	21.4	1.02	1.05	23.2	23.2	23.6	1.02	1.02	0.90	0.88	0.91
Fifth	57.9	58.8	56.0	0.97	0.95	50.0	50.2	47.1	0.94	0.94	1.16	1.17	1.19
Gini	0.573	0.575	0.551	0.96	0.96	0.465	0.468	0.432	0.93	0.92	1.23	1.23	1.28
Sources:	ARMS - ERS calculations					CPS - ERS calculations							

Definition: Post federal tax income = money income + capital gains -capital losses - federal income taxes - federal payroll taxes + EITC +child care credit

Table 4

Joint disposable income and wealth distribution for farm households: based on US median disposable income and wealth, 2004

	After federal tax income (Y_{ft})				
	LOW			HIGH	TOTAL
Wealth	$Y_{ft} \leq 0$	$0 < Y_{ft} <$ US hh median	Sub-total LOW	$Y_{ft} \geq$ US hh median	
HIGH					
Number	90,395	691,847	782,242	1,198,619	1,980,861
% of total	4.4%	33.5%	37.8%	58.0%	95.8%
Chg in % of total*	0.1%	-1.8%	-1.8%	1.8%	0.0%
LOW					
Number	5,128	51,347	56,475	30,037	86,512
% of total	0.2%	2.5%	2.7%	1.5%	4.2%
Chg in % of total*	0.0%	0.0%	0.0%	0.1%	0.0%
Subtotals					
Number	95,523	743,194	838,717	1,228,656	2,067,373
% of total	4.6%	35.9%	40.6%	59.4%	100.0%
Chg in % of total*	0.1%	-1.9%	-1.7%	1.8%	

Notes: * Change relative to shares for household money income (with median US household money income as the income cutpoint). (*See Table 2 (ii)*)

Table 5: Characteristics of Farm Operator Households by Farm Typology, 2004.

	Item	Retirement	Residential /lifestyle	Small/farm occupation	Large	All farms with loss	All farms with profit	All farms
		1	2	3	4	5	6	7
	Household Income and Taxes:							
1	Number of farms/households	# 398,742	839,224	@ 645,953	183,455	* 1,106,774	* 960,599	2,067,373
2	Percent of total farms/households	19.3	40.6	* 31.2	8.9	53.5	46.5	100
3	Earnings from farming activities	$2,275	-$927	$5,831	$120,610	-$15,404	$44,838	$12,587
4	Farm earnings share of hh income	4.3	0.0	10.7	70.6	0.0	42.0	15.5
5	Percent hh with negative farm income	54.9	66.0	47.1	16.0	100.0	0.0	53.5
6	Percent hh with negative hh income	2.8	0.6	9.2	9.9	8.5	0.0	4.5
7	**Money income**	**$50,475**	**$93,156**	**$52,441**	**$167,579**	**$57,680**	**$103,148**	**$78,807**
8	Capital Gains (losses)	$2,101	$2,520	$1,968	$3,239	$1,230	$3,599	$2,330
9	Federal payroll taxes	$1,683	$6,449	$3,883	$11,133	$3,908	$6,732	$5,143
10	Federal income tax	$3,737	$12,172	$5,570	$31,887	$3,764	$14,041	$10,232
11	Contribution of child credit	-$31	-$673	-$13	-$621	-$410	-$257	-$338
12	Contribution of EITC	-$21	-$33	-$118	-$207	-$58	-$89	-$72
13	**Total Federal Tax (9+10)**	**$5,420**	**$18,621**	**$9,452**	**$43,020**	**$6,925**	**$20,773**	**$15,378**
14	Average Tax Rate (13/7)	10.7	20.0	18.0	25.7	12.0	20.1	19.5
15	**Disposable Income (7+9-13)**	**$47,157**	**$77,055**	**$44,957**	**$127,799**	**$48,220**	**$85,973**	**$65,762**
16	Farm Assets	$515,513	$459,726	$785,242	$2,167,815	$563,847	$860,054	$701,478
17	HH net worth	$683,167	$623,717	$803,720	$1,876,490	$783,921	$916,282	$802,594
	Farm Income Statement and Performance Measures:							
18	Total cash farm business income	$14,212	$15,404	$62,820	$694,282	$31,948	$157,384	$90,231
19	*Less* Total cash expenses	$12,004	$16,575	$53,080	$499,339	$43,118	$100,841	$69,939
20	*Equals* Net cash farm business income	$2,208	-$1,172	$9,740	$194,944	-$11,170	$56,543	$20,292
21	*Less* depreciation	$1,818	$2,629	$8,123	$54,376	$6,210	$11,744	$8,781
22	*Less* oper wages,land rental income,etc	$1,487	$307	$1,463	$36,226	-$891	$9,814	$4,083
23	*Equals* adjusted farm business income	-$1,097	-$4,109	$154	$104,341	-$16,490	$34,985	$7,428
24	Operating income to expense ratio (18/17)	0.84	1.08	0.84	0.72	1.35	0.64	0.78
25	Real est&prop tax/cash income	0.12	0.09	0.04	0.01	0.06	0.02	0.03
26	Interest on farm debt/cash income	0.04	0.15	0.06	0.03	0.11	0.03	0.05
27	Livestock income/cash income	0.36	0.45	0.38	0.38	0.39	0.38	0.38
28	Livestock expenses/cash income	0.11	0.21	0.14	0.18	0.27	0.15	0.17
29	Depreciation/gross cash income (21/18)	0.13	0.17	0.13	0.08	0.19	0.07	0.10
30	Depreciation/net cash bus income(21/20)	0.82	-2.24	0.83	0.28	-0.56	0.21	0.43

Source: 2004 USDA Agricultural Resource Management Survey.

* indicates that the standard error of the estimate is greater than 25 percent and less than or equal to 50 percent.

# indicates that the standard error of the estimate is greater than 50 percent and less than or equal to 75 percent.

@ indicates that the standard error of the estimate is greater than 75 percent.