Income, Wealth, and the Economic Well-Being of Farm Households.
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Abstract

Agricultural policy is rooted in the 1930s notion that providing transfers of money to the farm sector translates into increased economic well-being of farm families. This report shows that changes in income for the farm sector or for any particular group of farm businesses do not necessarily reflect changes confronting farm households. Farm households draw income from various sources, including off-farm work, other businesses operated, and—increasingly—nonfarm investments. Likewise, focus on a single indicator of well-being, like income, overlooks other indicators such as the wealth held by the household and the level of consumption expenditures for health care, food, housing, and other items. Using an expanded definition of economic well-being, we show that farm households as a whole are relatively better off than the average U.S. household, but that about 6 percent remain economically disadvantaged relative to the rest of the population.

Keywords: Consumption, farm households, income, wealth, well-being, off-farm employment.

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Executive Summary

Since their inception in the 1930s, price and income support programs have been devised to both raise the level of farm income and close the gap between farm and nonfarm incomes. Concurrent with farm program changes over the years was a dramatic shift in the structure and organization of farms. Current farming operations are complex business entities requiring astute management of contracts, alliances, and ventures. Farm households are faced with wide-ranging decisions about how to allocate their limited resources among farm and nonfarm activities. Just as farms are diverse in their structure, so are households in their employment, investment, and consumption.

This report surveys the factors that affect the economic well-being of farm operator households. We also address pertinent policy issues, such as whether farm households are inherently disadvantaged and whether they have lower incomes, lower wealth, and lower household expenditures than nonfarm households. Our analysis hinges on an economic well-being concept that captures farm household wealth and expenditures in addition to more conventional income measures.

The main findings of this report are:

- *Farm households are no different than other households in pursuing two careers and diversifying earnings*. More than half of all U.S. farm operators work off-farm, with 80 percent of these working full-time jobs. Nearly half of all spouses are also employed off the farm. Off-farm work is no longer viewed as a transitional position between the agricultural and the industrial economy, but as a lifestyle choice, with farming as a second job or investment. As with most households, income flows not only from farm and off-farm employment but also from investments. Off-farm employment is often for the sake of securing retirement and health benefits.

- *The farm business as a source of income has played an increasingly smaller role in determining the well-being of farm households*. Nearly 90 percent of total farm household income in 1999 originated from off-farm sources. The contribution of earned income (off-farm) alone amounted to 53 percent of total farm household income.

- *While farm business income exhibits considerable variability, farm household income is relatively stable*. Fluctuations in farm output, commodity prices, and business cycles, along with macroeconomic policies (as they affect interest rates and exchange rates) all contribute to the variability in farm income. Since these factors are beyond any farmer's control, many farm households have relied successfully on off-farm income to stabilize their total household income.

- *While the age and status of the farm operator (life cycle) most determines the level and sources of household income and wealth, farm type and size, operator education, farm tenure, and family size also factor in.* Of the contributing factors, perhaps most significant is the size of the farming operation.

- *Income available to farm households can support a standard of living equal to or above that of nonfarm households*. Associated with the considerable rise in total farm household income in recent years have been a rise in expenditures (on goods

and services) and a rise in savings and/or investments. Farm households, on average, are better able to support their consumption needs with income.

- *Consumption expenditures of farm households are lower than for all U.S. households*. Farm household expenditures appear to be lower than nonfarm household expenditures, even when the analysis controlled for differences in income, age, location, and size of farm.

- *For most nonfarm households owning businesses, the business is the main source of income; for most farm proprietorship households, the farm detracts from total household income*. Based on a comparison of either median or average incomes, farm operator households are now on par with all U.S. households. The closing of the income gap has been substantially driven by the increase in income from off-farm sources. Despite the convergence of the income levels, farm businesses were much more a household liability than nonfarm businesses. For more than 60 percent of farm households in 1998, the business was a detriment to a household's before-tax-income. Only 4 percent of nonfarm businesses incurred income-reducing losses.

- *Despite conventional thinking, farm households are not financially disadvantaged compared with other U.S. households*. Almost half of farm households have both higher incomes and greater wealth than U.S. households as a whole. Of these households, 98 percent reported household income greater than consumption expenditures.

- *Average wealth of farm households has increased, and farm households have broadened their portfolio to include more nonfarm investments*. Nominal wealth of the average farm household grew by 54 percent over 1993-99. With the growth in average wealth, farm operator households have broadened their investments to include cash, money market accounts, corporate stocks, mutual funds, IRA, and 401K accounts. The share of this wealth in 1999 stood at more than twice its 1993 level, but can be expected to contract as it had expanded with the 1990s booming nonfarm economy.

- *Even for farms located in rural areas, off-farm income is still the dominant source of household earnings.* Income and wealth of farm households based on the location of the farm follow a similar pattern: those households in or near a metro area tend to be significantly better off than nonmetro households. Farm households in metro areas depend heavily on off-farm income (95 percent of total income). Through their off-farm work, these households can invest in nonfarm assets.

Taken together, these findings demonstrate that it is no longer suitable to class all farm households together and consider them either disadvantaged or without financial problems. While the economic well-being of most farm households eclipses that of all households, 6 percent of farm households clearly remain disadvantaged relative to both the farm and nonfarm population in terms of their low income and wealth.

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Introduction

Price and income support programs were implemented 70 years ago to provide financial assistance to farms, farm people, and rural areas. A key stimulus for legislative action was disparity between farm and nonfarm incomes (Gardner, 1992; Houthakker, 1967). In fact, concern over this issue was reflected in references to "income parity" (U.S. Senate, Document No. 44). With some minimal adjustments, the price and income support system enacted then continues apace today.

Recent legislation indicates that Congress still holds a keen interest in farm income. As debate proceeded on the need for emergency assistance to offset low commodity prices in 2001, the discussion settled on "the viability of the American farmer and rancher and all of rural America" (Lancaster, 2001). Today, as with the transfer of income assistance broadly to farming through traditional commodity programs, little distinction is made between the status of farms and farm households. By treating the symptom of low commodity prices or flagging sectorwide incomes, it is assumed the problems of farms across the board are addressed. As evident in press accounts, another assumption is that addressing the income shortfall of farms will simultaneously resuscitate farm households (see "Defining Farm Households," p. 2, for details) and rural areas.

When agricultural programs were devised, most farms were organized such that family members ran the farm, supplied most of the inputs, and earned the income. In today's farming, a farm's organization and operation are not so straightforward. Further, the continuing evolution of production agriculture raises a variety of issues to consider in developing policy for modern farms and farm households. Is the farm problem, as many have argued, still defined by chronic low incomes? Are farm households inherently disadvantaged? Is income variation more problematic for farm households than nonfarm households? If so, what accounts for this and how do farm households adjust? If farm households have higher or lower incomes than nonfarm households, how do wealth levels compare?

An Evolution in Farming, An Evolution in Thinking

Policy analysts, farm investors, and lenders are among those interested in monitoring and forecasting the economic well-being of the farm sector and farm households. Historically, attention has focused on farm incomes. But since farming today is only one of several economic endeavors of farm households, household income is more indicative of an individual's welfare. A meaningful comparison among farm households and between farm and nonfarm households must also include a measure of wealth (Hill, 2000). Hill points out that wealth is important not only because it generates income in a variety of forms but also because it provides security, freedom to maneuver resources, and economic and political power. Wealth is an often neglected but important determinant of the financial status of farms and rural communities.

Estimates of personal income for the U.S. farm population date to 1934 and the first available data on the nonfarm income of farm people. While this income measure was for a subset of the farm population, it provided a basis on which to compare farm and nonfarm incomes. Between the 1930s and 1960s, estimates of personal income showed nonfarm income of farm residents rising as a proportion of total income. Randall and Musucci (1963) noted changes in farm

Defining Farm Households

The households of primary operators of farms can be organized as individual operations, partnerships, and family corporations. These farms are closely held (legally controlled) by their operator and the operator's household. Farm operator households exclude households associated with farms organized as nonfamily corporations or cooperatives, as well as households where the operator is a hired manager. Household members include all persons dependent on the household for financial support, whether they live in the household or not. Students away at school, for example, are counted as household members if they are dependents.

structure and occupation that raised questions about the use of farm population income estimates. Specifically, farm operators and hired workers were moving to town, which, in addition to rural migration, increased the number of rural residents who did not depend on agriculture as a primary occupation. To address these concerns, estimates of income for operator families gained prominence and two major groups of farms emerged (Randall and Musucci, 1963). More commercially oriented farms derived the majority of their income from farming. A second group, accounting for 60 percent of farms, earned most of their income from off-farm sources.

During the 1970s and 1980s, several researchers noted changes in the composition of farm family income (Larson and Carlin, 1974; Hanson and Spitze, 1974; Carlin, 1973; Reinsel, 1974; Larson, 1974; Crecink, 1979). While these studies drew from a wide variety of data, they all noted the improvement of farm household income relative to the incomes of nonfarm households. Instrumental in closing this gap was income from off-farm employment. Larson and Carlin argued that farm income was no longer a reliable barometer of the welfare of farm people. Changed economic conditions in the farm sector often translated into very minor changes in the money incomes of farm households. Reinsel posited substantial differences among households within the farming sector, while Hanson and Spitze uncovered the significant contribution of operators' spouses to household income through their off-farm employment. Off-farm work by farm families has been examined from the perspective of part-time farming and as an employment choice that extends across types and sizes of farms. Allocating labor to both farm and nonfarm activities enables farmers to increase income and raise levels of satisfaction; such a choice does not, by itself, indicate anything about the productivity of the farm (Lee, 1965; Bollman, 1979; Singh and Williamson, 1981).

Generally, part-time farming has been presented as the two-fold occupation of the farm operator (Singh and Williamson, 1981). Dual employment has referred to farm families combining farming activities with off-farm employment (Huffman, 1991; Hanson and Spitze, 1974; Ahearn and Lee, 1991). On some farms, the operator may continue to farm full time while household members take off-farm jobs. On other farms, the primary operator may be the person principally employed in off-farm work. For other farms, both the operator and other household members may choose to combine farm and off-farm work, becoming in effect both part-time and dual-employment operations.

A variety of individual, family, and farm/financial characteristics—as well as local labor markets—affect farm labor choices. Influencing the allocation of labor are age, size of family, size and type of farm, location and employment characteristics of nonfarm labor markets, skills and experiences of household members, and costs of commuting (Huffman, 1991; Sumner, 1982; Lass et al., 1989; Gunter and McNamara, 1990; Huffman and El-Osta, 1997; Mishra and Goodwin, 1997; Kimhi, 2000).

Patterns of income and wealth associated with the life cycle have been examined for differences among age groups of farmers (Ahearn et al., 1993). An inverted–U shape emerges in the age-earning profile for farm operators, whereas net worth is either fairly flat or rises with age to a plateau. This combination tends to overstate (exaggerate) asset values in relation to incomes in the latter stages of life, affirming the adage of live poor/die rich. The high-wealth low-income combination, found particularly among elderly farmers, should draw attention to wealth's role in the assessment of economic status and the criteria for public support. This rethinking may suggest ways in which households can enhance current spending power, avoiding the transfer of income from other sec-

tors of the economy as mandated by traditional policy mechanisms.

To move beyond a single dimension of well-being, measures that consider both income and wealth have been advanced (Weisbrod and Hansen, 1968). Both current income and current net worth are important determinants of a household's economic position (with an economic unit's well-being as a function of the flow of services that it can command). Salant et al. (1986) used this type of approach to build viability ratios for farm households. They defined a viable household as one that generated enough net returns from all sources to cover family expenses, repay debt, and replace capital that has been used up. Other researchers (Bauman, 1999; Smith and Morgan 1970) have introduced consumption into the notion of economic well-being, which can change either due to change in the level of income or to adjustments in family consumption needs.

While the importance of off-farm work in improving household incomes has long been a matter of record, income analyses have typically overlooked variations in source, except for noting whether income was earned by the operator, spouse, or other family member. An exception is a line of research that decomposes the distribution of income among farm households by income source (see Ahearn et al., 1993; Findeis and Reddy, 1987; Boisvert and Ranney, 1990; and El-Osta et al., 1995). These articles looked at the cross-sectional variation in total household income in terms of the importance of income from farm (including government payments) and off-farm sources. While these studies examined the extent of variation in total household income attributable to the farm and off-farm income source, they did not look at income variability over time.

This report fills that void by examining variability in total household income over time by sources of income. To do so, we explicitly examine farm and off-farm sources of income, particularly whether off-farm incomes are derived from earned or unearned sources. Earned sources are either wage/salary or self-employment for both operators and spouses. Farm income, wealth, and consumption are joined to yield an explicit consideration of household well-being. We subsequently demonstrate how perceptions of farm households' well-being that are based solely on income can be significantly altered when wealth and consumption are introduced. The report also examines how the economic status and well-being of farm households compare across groups of farms and farm families and with all U.S. households generally.

Income and Well-Being of Farm Households

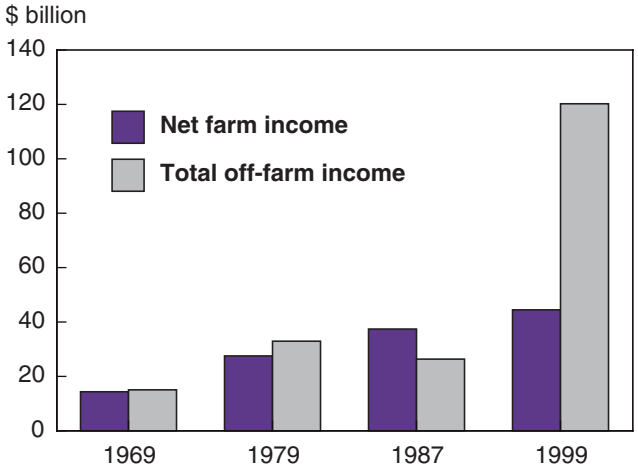
Sectorwide measures of net income traditionally formed the basis of household income estimates for farm families. The farm business and the farm operator's household were viewed as highly intertwined, with production and consumption occurring at a central place. Heady et al. (1953) referred to this farm-household interdependence by describing the farm as "a complete economic unit by itself." Even descriptions of family farms embodied the concept of the unit farm (Brewster, 1979).

When introduced, the concept of the intertwined farm-household unit was a valid one as farm families provided most of the inputs used in production and supplied most of the farm's labor and management. There were few, if any, other claimholders involved in the farm business. Early in the 20th century, farmers and their families did little off-farm work because the costs of such participation were prohibitive. Farm families relied on farming as their primary and usually sole source of income.

This is no longer the case. Off-farm work by farm operators and their spouses has increased steadily since the mid-1960s. In 1969, total net income earned by farm households from farming and off-farm earned income was roughly comparable at $15 billion. Off-farm wages and salaries alone totaled $9 billion. Census data collected for 2000 show about a threefold increase (in nominal terms) in off-farm income from the previous census (1987) and an eightfold increase from 1969 (fig. 1).

With income from the farm business now shared among many parties, and with income from off-farm work, investment, and other sources rising dramatically, income analyses have become dichotomous. Returns from production activities center on the farm. Farm household well-being must focus on the household as the unit of analysis or risk drawing incomplete or incorrect conclusions about farmers' income and households' economic well-being. In addition, structural changes that have occurred in farming and in household labor and investment decisions can be neglected by sectorwide income estimates that disguise the true distribution of income among farm households. For these reasons, we use the farm household as the unit of analysis for considering both income and wealth relative to nonfarm households, and for considering the distribution of income and wealth, including the ability of income to meet household consumption needs.

Figure 1
Sources of income in the agricultural sector
Share of net farm income has decreased from half in 1964 to less than a third in 1999



Source: USDA, Economic Research Service, 1999 Agricultural Resource Management Study (ARMS) and *Economic Indicators of the Farm Sector*, various issues. Off-farm income from 1964, 1969, 1979, 1987 Census of Agriculture, U.S. Department of Commerce.

Farm Households Span Stages of the Life Cycle

Households' allocation decisions drive income levels. These choices are affected by the characteristics of the farm, farm operator, spouse, and household. A review of gender, age, and household composition indicates that farm households span all stages of the life cycle and that farm businesses associated with these households are at various states of startup, development, growth, consolidation, and retirement. Beginning farmers have different demands on their time and face different financial choices and constraints than farmers nearing retirement.[1] Slightly more than 6 percent of farmers, based on the Agricultural Resource Management Survey (ARMS, see Appendix A), are younger than 35 and can be considered beginning farmers (app. table 1). Half of farmers are between ages 45 and 65 and as of 2000, 24 percent planned to retire within the next 5 years.

[1]For a discussion of the family farm life cycle, see Boehlje and Eidman (1984).

The farm family life cycle drives household size as well. Households with two or fewer persons, which represent 59 percent of farm households, tend to be at either end of the life cycle. Large households occupy the middle of the life cycle and are typically commercial farms or are lifestyle farms where the household has chosen to live in a rural area.

Educational attainment and farming experience vary greatly among farm operators and by scale of operation. Only 15 percent of farmers have less than a high school education, which is unchanged from 1978. However, the share with some college has more than doubled since then. Most farm households whose operators have less than a high school education are of retirement age, while those with college degrees or graduate training tend to manage commercial operations or oversee lifestyle farms (see box, p. 9).

Experience, like education, is positively related to farm household income. However, as persons reach retirement, income generated from the use of farming resources becomes less. Like nonfarm households, "retirement" farms begin to depend more on savings and other sources of earnings. In 2000, one in every five farmers had less than 10 years of experience, indicating that they were either relative newcomers to farm communities or that they were just beginning their farming careers. Meanwhile, one-third of farmers reported over 30 years of experience operating a farm (app. table 1).

Near equal numbers of operators reported that spouses did and did not share in farm business decisions. Fifteen percent of farm operators reported no spouse, with the share rising among limited-resource and other small farm operators.

Economic Model of the Farm Household

In addition to family characteristics, the economic well-being of farm households depends on its resources, production and employment levels, and the ability of income to meet consumption, savings, and other household needs (fig. 2). Households allocate time to activities that include the farm, off-farm employment, home production, leisure, and education or other betterment. Likewise, households allocate their savings among farm, household, and nonfarm investments, including sometimes the development of businesses separate from the farm. Mishra and Morehart (1998, 2000, 2001) have compared the savings and off-farm investment behavior of farm households with the behavior of nonfarm households, and find that farm households have a higher savings rate. They maintain a diverse off-farm investment portfolio, and contribute to various retirement and tax-deferred plans. However, the pattern of savings varies with farm, operator, and household characteristics.

The commitment of resources to farming differs greatly among farm families. For example, income generated by the farm business can be shared among multiple households, as it is by an estimated 231,000 nonoperator households today. Household investment income (from interest, dividends, annuities, private pensions, and rents) and government transfers (such as Social Security, retirement, disability, and unemployment) further supplement farm and off-farm income for both operator and nonoperator households.

More sophisticated measures of household well-being draw not only from the absolute levels of income and wealth available to the household but also from the income-consumption relationship depicted in figure 2. Income allocated to savings can enhance future earnings, but this money can also be used to repay existing debt, to grow or modernize the business, or to invest in other financial alternatives like home improvement or stocks.

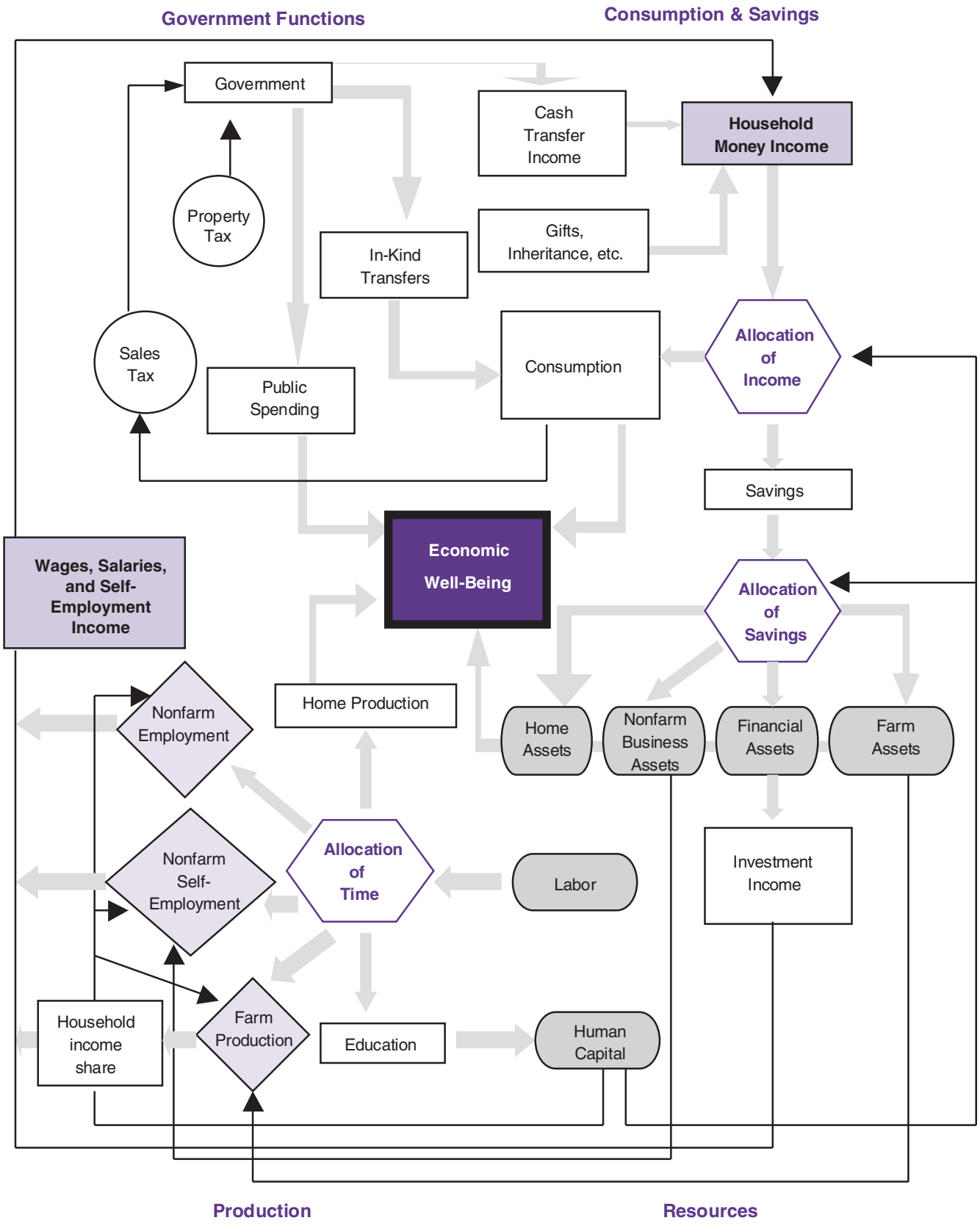
Off-Farm Work: Necessity or Career Choice?

Off-farm work by farm operators has traditionally been viewed as an action necessary to save the farm by providing resources either to pay farm bills or to repay debt. Recent evidence suggests otherwise (Fuller, 1991; Bessant 2000). Conventional views of off-farm work focused on the operator to the exclusion of other household members and regarded operators who worked off-farm as being in a transition either into or out of farming. Thus, off-farm employment was considered temporary and its income supplemental. Ahearn and El-Osta (1993) disproved this notion, recasting off-farm employment as a permanent way of life. Whittaker and Ahearn (1991) found young operators were more likely than older operators to work off-farm jobs, while Barlett (1991) pegged the decision about whether to work off-farm upon completion of schooling. Later, individuals made second career decisions associated with adding a farm. Fewer than one in five operators in Barlett's study worked off-farm simply to pay farm expenses.

Figure 2

Economic model of the farm household

The derivation of farm household well-being.



Source: Adapted from: Thomas, R.William (1977).

Income and lifestyle benefits both emerge from pursuing farm and off-farm work jointly. Dual careerists can generate additional income from the farm, treat the farm as an investment, pursue entrepreneurial opportunities, and enjoy the amenities of rural living (Barlett, 1986). Multiple job holding is also seen as a way to manage land and family resources, and as "a flexible mechanism for adjusting to changes in agriculture, family needs, and shifts in the external environment" (Fuller, 1991, p. 41). Off-farm employment enables farm families to spread income risk and to broaden their social networks (Fuller and Mage, 1976). For example, Mishra and Goodwin (1997) and Mishra (1996) found a positive correlation between off-farm employment and farm income variability. El-Osta and Ahearn (1991) and El-Osta et al. (1995) found the distribution of income among farm households with no off-farm employment to be more concentrated than the distribution of income by farm households with off-farm employment.

Working Off the Farm Grows With Mechanization and Two-Earner Families

Multiple jobholding has been evident on U.S. farms for over 50 years. Whereas a little more than a fourth of operators worked off-farm in the mid-1940s, nearly four-fifths did by 2000, and mostly full-time (app. table 2). This upswing has been maintained ever since the 1970s.

Historically, married women have tended to specialize in household production and married men have tended to specialize in market production. As women's wages have risen, married women have become more likely to work in the paid labor market. Household tasks are now shared between spouses. Combining farm and off-farm work has grown easier as technology and mechanization freed labor from agricultural production and as off-farm compensation became more attractive. Farm specialization (by commodity), particularly in livestock production, has allowed farmers to alter the structure of their farming operation in order to accommodate an off-farm job (Herbst and Hanson, 1971). Dual employment occurs in all sizes of farms and across all regions, but is more or less prevalent based on a State's or region's shifting need for various labor (Ahearn, 1986; Findeis,1985; El-Osta and Ahearn, 1996).

Multiple jobholding has been a subject of research for decades (Hallberg et al., 1992). Today, 71 percent of farm households have either the operator, spouse, or both engaged in off-farm employment. Dual careers are pursued even in households operating very large farms (>$500,000), where nearly half the farms had spouses working off-farm (app. table 3).

Farmers and spouses who work off-farm hold a variety of jobs. In both absolute and relative terms, more worked for private business than for any other type of employer. But the largest increase in off-farm jobs for farmers has been in self-employment (table 1), defined as work not related to the farm. For spouses, the share working in government and self-employment nearly

Table 1—Types of off-farm employment of operators and spouses

Employment	1979	1987	1999	Change, 1979-99
Operators		*Number*		*Percent*
Another farm	34,414	54,924	38,469	11.8
Private business	531,667	349,696	634,797	19.4
Government	172,184	135,324	188,005	9.2
Self-employment	166,040	219,976	261,555	57.5
Other	133,691	145,600	50,058	-62.6
Percent working off the farm	44.3	45.5	55.0	24
Spouses				
Another farm	9,939	17,114	7,077	-28.8
Private business	363,804	267,410	538,463	48.0
Government	142,465	140,012	278,092	95.2
Self-employment	58,142	46,640	113,322	94.9
Other	76,921	97,221	41,081	47.0
Percent working off the farm	27.7	31.3	45.8	65

Source: 1979 and 1987 Census of Agriculture, Special Studies, U.S. Department of Commerce. 1999 Census of Agriculture, Special Studies, U.S. Department of Agriculture.

doubled from 1979 to 1999, while the number of spouses working for private business also increased by nearly half. These jumps in self-employment, government, and private jobholding by operators and spouses are concurrent with the number of farms declining. The 65-percent increase in spouses working off farm in the 1980s and 1990s added more than 325,000 workers in the nonfarm workforce, benefiting both farm households and farm communities.

Savings and Investment Choices

Farm households allocate wealth among competing investments and typically include farm business assets such as land, machinery, and farm equipment, and off-farm financial assets such as stocks, bonds, IRAs, CDs, and mutual funds. Investments selected by farm households affect not only their own financial well-being, but the availability of local venture capital and the competitiveness of financial institutions in rural areas. Farm financial management also has ramifications for liquidity, retirement, solvency, taxation, and profitability for the household.

A number of studies suggest that adding high-risk financial assets with expected higher returns can reduce the overall risk associated with farm investments (Young and Barry, 1987; Irwin et al., 1988; Moss et al., 1987; Crisostomo and Featherstone, 1990; Weldon, 1988). Schnitkey and Lee (1996) contend that stocks and bonds reduced variability in farmland returns more effectively than lower return Treasury bills, and that a risk-efficient portfolio should not have more than 50 percent of its value invested in farmland. Penson (1972) argued that investment in financial assets is an attractive means of diversification for many farmers.

Consistent with these testimonials to diversification, off-farm investment (such as stocks, bonds, CDs, mutual funds) by farm households has increased in recent years. The average farm household possesses both liquid (cash, savings, etc.) and fixed (land, machinery, equipment, etc.) assets on the farm, with fixed assets representing almost 90 percent of the total. The most important asset of the farm business is land, which constitutes more than 70 percent of the total value of farm assets.[2] Other assets include farm machinery (tractor, combine, and other implements), land improvements (e.g., filter strips), buildings, and livestock.

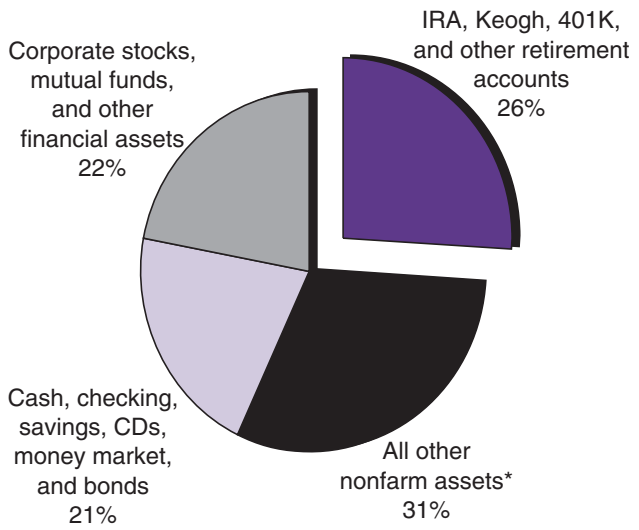
The total assets of an average farm household increased from $423,659 in 1993 to $633,525 in 1999 (34 percent in nominal terms). Farm business assets increased 23 percent, from an average of $354,747 in 1993 to $435,438 in 1999. Meanwhile, average household nonfarm assets almost tripled during the same period ($67,912 in 1993 to $198,087 in 1999). Most farm households have a diverse portfolio of nonfarm assets (fig. 3). Residential/lifestyle households, however, hold a slightly different mix of assets than other households (see typology box, p. 9). A large share of their nonfarm assets is in retirement accounts (28 percent), and they hold a smaller share in cash (16 percent).

[2]For many small farms, with gross sales of $250,000 or less, the farm dwelling contributes 15 percent or more to the total value of farm assets (Hoppe, 1998).

Figure 3

Nonfarm asset holdings for average farm operator household, 1999

Farm operator households have a balanced portfolio on average



*Includes real estate and businesses not part of the farm, off-farm houses, recreational vehicles, and household share of trucks and cars.

Source: USDA, Economic Research Service, 1999 Agricultural Resource Management Study, version 1, for farm operator household data.

Farm Typology

Small Family Farms
(sales less than $250,000)

- **Limited-resource farms.** Small farms with sales less than $100,000, farm assets less than $150,000, and total operator household income less than $20,000. Operators may report any major occupation, except hired manager.
- **Retirement farms.** Small farms whose operators report they are retired.*
- **Residential/lifestyle farms.** Small farms whose operators report a major occupation other than farming.*
- **Farming-occupation farms.** Small farms whose operators report farming as their major occupation.*
  - ***Lower sales farms.*** Sales less than $100,000.
  - ***Higher sales farms.*** Sales between $100,000 and $249,999.

Other Farms

- ***Large family farms.*** Sales between $250,000 and $499,999.
- ***Very large family farms.*** Sales of $500,000 or more.
- **Nonfamily farms.** Farms organized as nonfamily corporations or cooperatives, as well as farms operated by hired managers.

* Excludes limited-resource farms whose operators report this occupation.

Composition of Farm Household Income and Wealth

Today it is rare for any household to receive all of its income from a single source. Even when only one household member is employed, it is possible to earn income from investments, such as interest received from bank accounts. Farm households, aside from their ownership of a business, also rely on a variety of income sources. The ability to distinguish between alternative income sources is necessary in order to appreciate farm household differences. Understanding the components of income is also important for monitoring the sensitivity of farm household income to economic events and evaluating the effectiveness of farm policy in supporting income.

Farm household wealth is also derived from a variety of sources. It ranges from physical assets of both the business and household to various types of financial assets, all differing in degree of liquidity, capital certainty, and visibility. For example, wealth held in a bank account is highly liquid, capital certain, and visible. In contrast, wealth held in real estate is illiquid, or not readily available on demand. Wealth not only reflects the collective value of assets but also considers the business and consumer debt of households. Distinguishing between the various sources of farm household wealth allows a more comprehensive assessment of household well-being. The composition of household wealth may also be important in determining how changes in wealth affect household consumption.

Sources of Farm Household Income

Farm household income (see "Defining Operator Household Income and Net Worth" below) originates from both farm and off-farm sources (fig. 4). Off-farm income includes income from off-farm businesses, wages and salaries, interest and dividends, and sources such as Social Security. While off-farm wages predominate, income from other businesses—such as a machinery repair shop, seed agency, or insurance agency—can also shore up household income. Income from interest and dividends includes the interest income from savings and investment accounts. Dividends earned by the household are from investments in equities such as stocks or mutual funds. Additional sources of nonfarm income include pensions, annuities, military retirement, unemployment, Social Security, veterans' benefits, other public retire-

Defining Operator Household Income and Net Worth

Household Income. The Current Population Survey (CPS), conducted by the Bureau of the Census, is the source of official U.S. household income statistics. Thus, calculating an estimate of farm household income from the Agricultural Resource Management Survey (ARMS) that is consistent with CPS methodology allows income comparisons between farm operator households and all U.S. households.

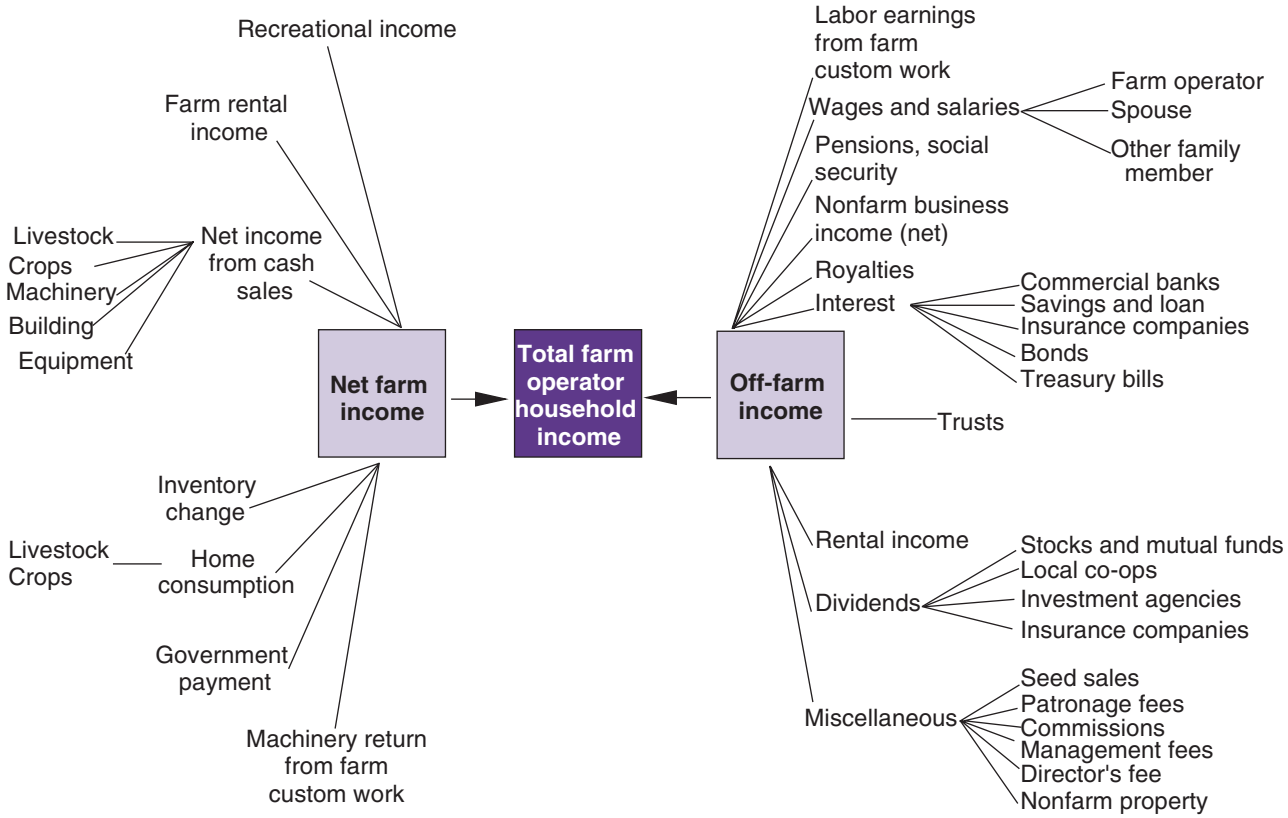
The CPS definition of farm self-employment income is net money income from the operation of a farm by a person on his own account, as an owner or renter. CPS self-employment income includes income received as cash, but excludes in-kind or nonmoney receipts. No adjustments are made to the CPS income measure to reflect inventory changes, since inventory change is a nonmoney item. The CPS definition departs from a strict cash concept by deducting depreciation, a noncash business expense, from the income of self-employed people.

Farm self-employment income from the ARMS is the sum of the operator household's share of farm business income (net cash farm income less depreciation), wages paid to the operator, and net rental income from renting farmland. Adding other farm-related earnings of the operator household yields earnings of the operator household from farming activities. (Other farm-related earnings consist of net income from a farm business other than the one being surveyed, wages paid by the farm business to household members other than the operator, and commodities given to household members for farm work.)

Net Worth. ARMS is also the source of data for estimates of operator households' net worth. Farm operator household net worth is defined as the difference between the operator household's assets and liabilities. It is calculated as the sum of the operator household's farm net worth and nonfarm net worth. If the net worth of the farm is shared with other households (such as the households of shareholders in a family corporation), only the operator household's share is included.

Note that household income and net worth are calculated only for family farms, defined as farms organized as proprietorships, partnerships, and family corporations. Family farms exclude farms organized as nonfamily corporations or cooperatives, as well as farms with hired managers. Family farms are closely held (legally controlled) by their operator and the operator's household.

Figure 4
Sources of farm household income



ment and public assistance programs, and rental income from nonfarm properties.

The composition of farm household income has remained reasonably stable in recent years. For example, the share of off-farm income increased only two percentage points from 1993 (88 percent) to 1999 (90 percent) (fig. 5). The contribution of wages and salaries increased from 46 percent to 53 percent over this period. There was only a modest rise (1 percent) in the share of household income from off-farm businesses. The share of household income from the farm business decreased by 2 percentage points, remaining a small contributor to average household income.

The share of household income from farming increases with farm size (app. table 4), ranging from 50 percent of total household income for higher sales small farms to 60 percent for large family farms and 82 percent for very large family farms (see "Farm Typology," p. 9). Even households associated with commercial farms earn substantial off-farm income. Households operating small (rural residence) farms often have a loss from the farm business and rely on off-farm sources for virtually all income.

Uses of Farm Household Income

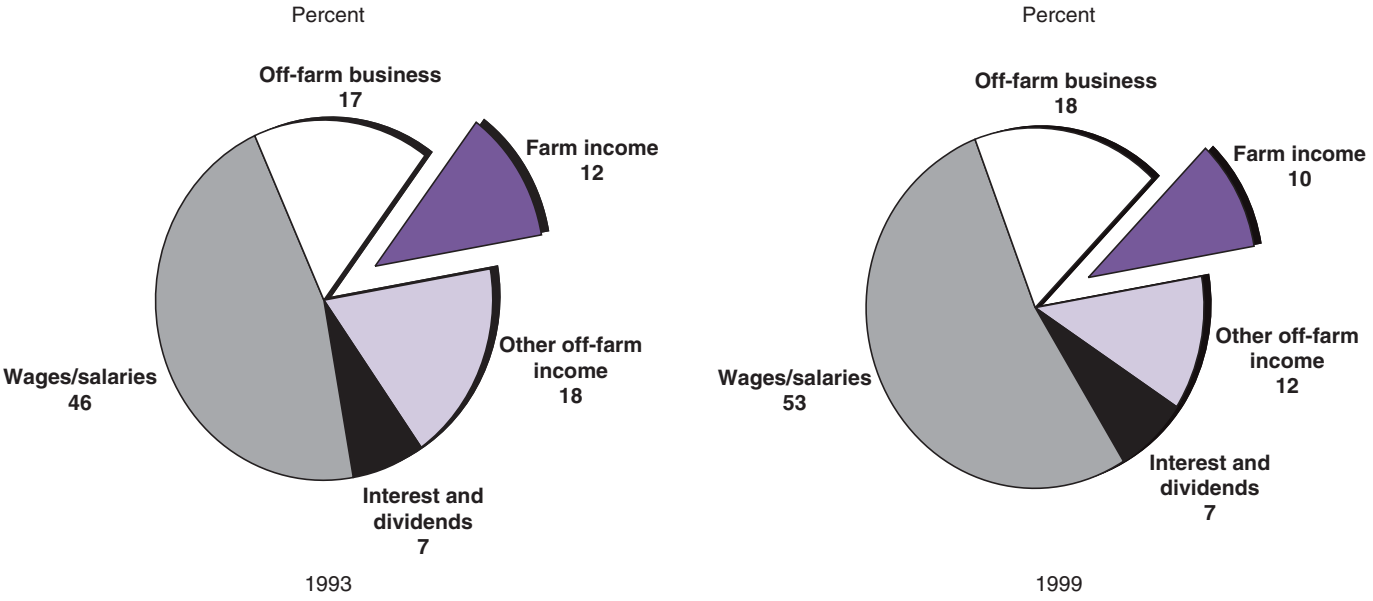
Even though the living standards of farm families have become comparable to those of nonfarm families, farm households appear to manage expenditures differently from nonfarm households in several ways. For example:

- Family housing expenditures, like mortgage and utility bills, often are lower than for nonfarm families because these costs and rental costs may be considered as farm business expenses.
- Food expenditures may be lower for families that produce some food for their own use, although in recent years farm families have tended to, like nonfarm families, buy personal and convenience foods.
- Health insurance coverage is usually more costly since there is no employer to absorb a portion of the

Figure 5

Sources and share of total household income, 1993 and 1999

Most operator households receive a majority of their income from off-farm sources, and this share has been increasing.



Source: USDA, Economic Research Service, Agricultural Resource Management Study (ARMS) survey, 1993 and 1999.

insurance premium. The need for insurance is magnified because farmers face a greater risk of injury, disability, or death.

- Self-employed and farm households are more prone to save out of current income (precautionary motive).
- While some transportation expenses can be allocated to the business, overall costs may be higher for rural farm families because of the greater distances they must travel to reach services in the local community.
- Any differences in consumption expenditures could be due to preference, social, and other demographic factors.

Farm households spend the majority of their income on food and household supplies, followed by household rent/mortgage and other household expenditures such as clothing, education, recreation, hobbies, and charitable contributions (fig. 6). The share spent on medical expenses, insurance, and retirement increased from 18 percent in 1996 to approximately 22 percent in 1998.

On average, farm families spent $25,073 on goods and services in 1999, up 7 percent from $23,512 in 1996.[3] This is about 50 percent of the average income earned from off-farm sources. The $25,073 spent by farm families on living expenditures in 1999 was approximately $11,000 lower than the average U.S. household. The size of the farm business was positively related to family living expenses: limited-resource farms spent just $5,922 and very large family farms spent $32,095 in 1999. Farm families do not adjust living expenditures in reaction to shortrun income changes since many costs are relatively fixed. However, families with low or negative family income have to finance living expenditures by reducing inventories, selling farm assets, withdrawing savings, or borrowing.

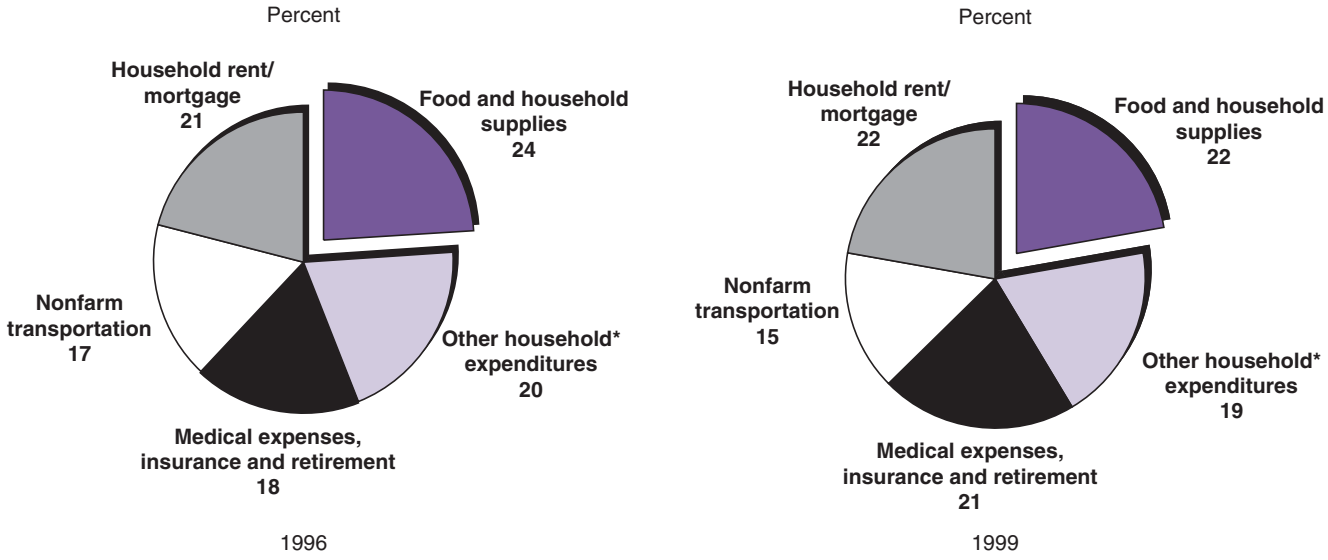
Expenditures of farm households track similarly by income level with those of nonfarm households. Farm households earning less than $5,000 spent $11,594, while equally poor nonfarm households spent $17,983. On the other hand, farm households with $100,000 or

[3]These estimates are comparable to those found in the *1999 Family Living Expenditures of Iowa Farm Families* (Iowa State University, 2000) and in farm business management records from Minnesota and Illinois (see Center for Farm Financial Management).

Figure 6

Composition of household expenditures, 1996 and 1998

Farm household expenditures have risen, but their makeup is largely unchanged.



*Includes expenditures on clothing, education, hobbies, recreation, and charitable contributions.

Source: USDA, Economic Research Service, Agricultural Resource Management Study (ARMS) survey, 1996 and 1998.

more in income had $67,531 in household expenditures, while equally prosperous nonfarm households spent $76,742. Generally, expenditures of farm households were lower than those of nonfarm households in 1999. Whether this reflects a long-term trend or the economic environment during 1999 is yet to be determined.

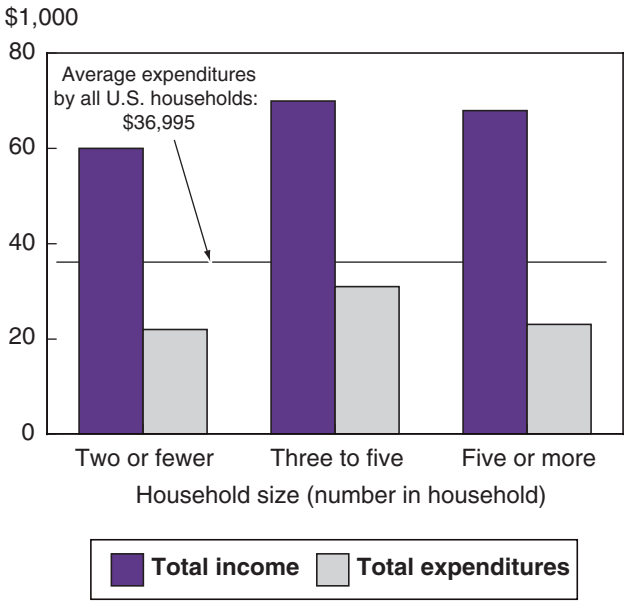
Farm household consumption trends were somewhat different than income over the life cycle. Instead of starting at low levels, rising gradually, peaking, and then declining slowly toward the latter stages, consumption is high at the beginning of the life cycle and declines gradually. Households headed by operators 35 or younger had the highest average living expenditures ($35,652); households headed by those 65 or older had the lowest ($10,079). Younger households, which are accumulating goods and members, face higher expenses for education, clothing, and personal items. On the other hand, families nearing retirement are better able to align their minimal consumption needs with income.

Total expenditures were highest in farm households with three to five people (fig. 7). This group spent an average of $31,011, compared with $21,503 for house-

Figure 7

Total income and expenditures per operator household, by household size, 1999

Expenditures were highest in households with three to five people.



Source: USDA, Economic Research Service, 1999 Agricultural Resource Management Study, version 1, for farm operator household data.

holds of one or two members. Average living expenditures for households with five or more members was $22,501. This is expected since this size group has lower average household income, whether farm or nonfarm.

Income not used for consumption is available for savings and other investment opportunities both on and off the farm. Savings can be used to finance unexpected future needs in agriculture, retirement income, or unexpected health expenditures. Mishra and Morehart (1998) investigated factors affecting farm household savings, especially the important role of farm income uncertainty. The marginal propensity to save (MPS) for farm households was 0.81 (consistent with Langemeier and Patrick (1993) and Leon and Rainelli (1976)), while average propensity to save (APS) for their sample of U.S. farm households was 0.45 (Mishra and Morehart, 1998) (Leon and Rainelli in their study found an APS of 0.42 for Swiss farmers and 0.56 for French farmers). An MPS higher than an APS ensures a high degree of responsiveness of savings to disposable income changes. The relatively high MPS found in the Mishra and Morehart study is attributed to production uncertainties coupled with strong precautionary motives.

Sources of Farm Household Wealth

Household wealth may be acquired through savings, inheritance, or appreciation of household assets. Farm household wealth combines farm assets (minus farm debt) and nonfarm assets (minus nonfarm debt) (fig. 8). Farm household wealth is dominated by farm real estate (76 percent), while physical assets (e.g., nonfarm real estate, off-farm houses, recreational vehicles, etc.) capture the biggest share of nonfarm wealth (31 percent).

In 1993, the total net worth of an average farm household was $365,445, with farm net worth comprising 85 percent (fig. 9). By 1999, a farm household averaged $563,562 in total net worth, with farm net worth contributing 69 percent. The dramatic increase in the share of nonfarm wealth, which is partly attributed to a strong economy, may also indicate that farm households are becoming more astute at recognizing the

Figure 8
Sources of farm household wealth

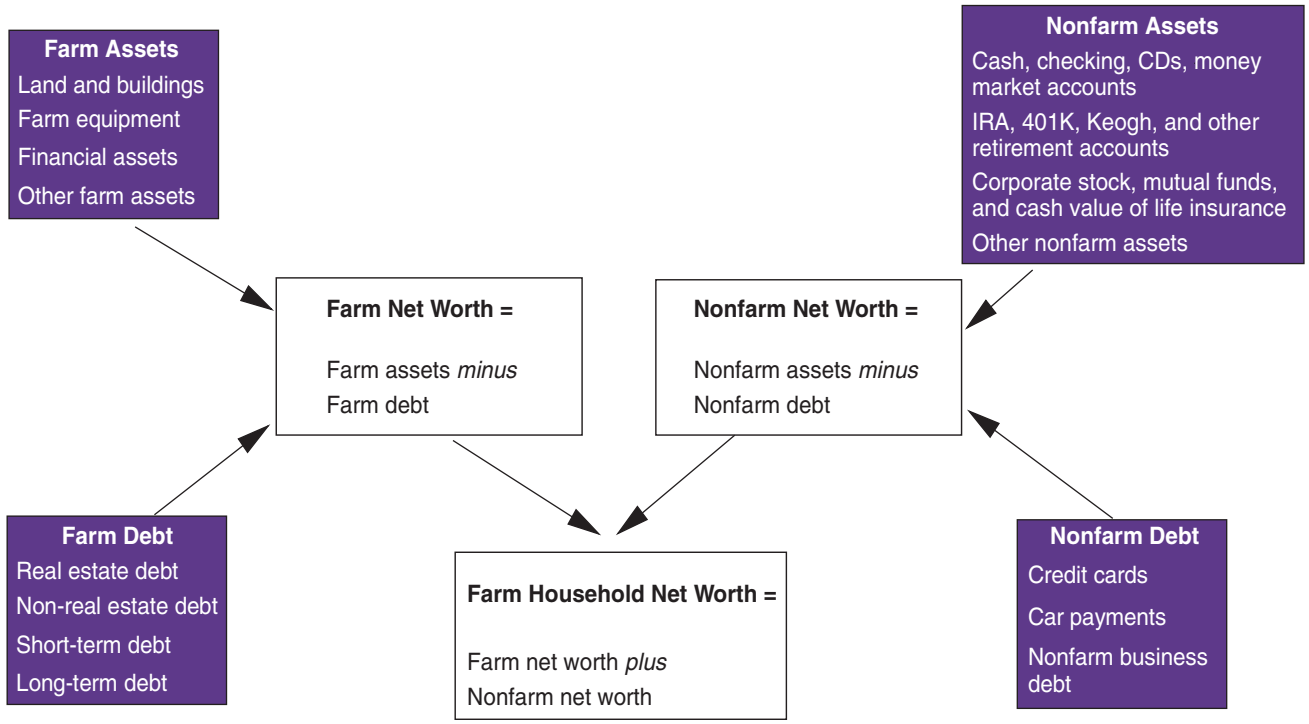
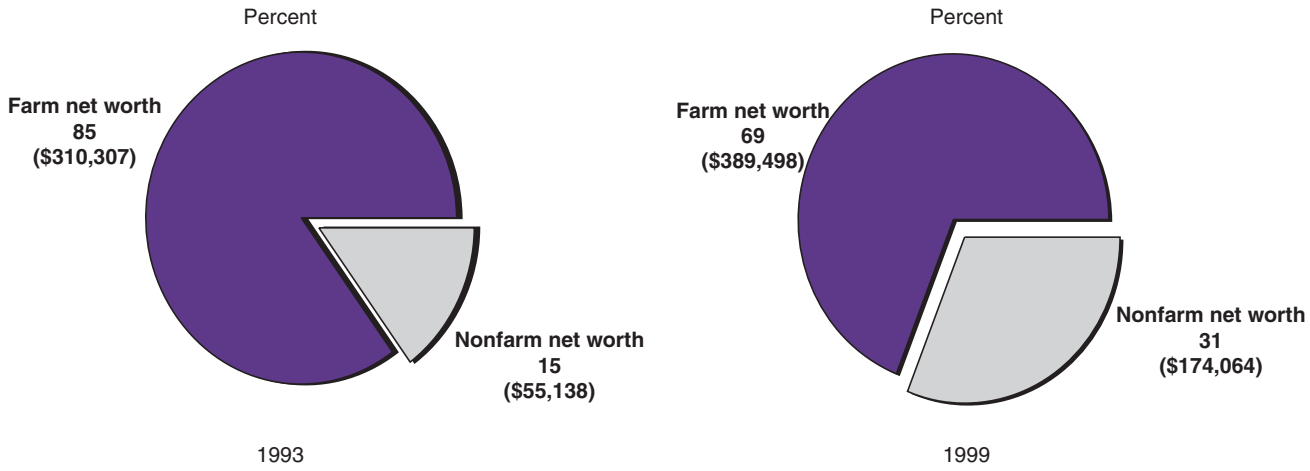


Figure 9

Sources and share of farm household wealth, 1993 and 1999

Most operator households derive the majority of their wealth from farms assets; however, the share of nonfarm net worth has increased of late.



Source: USDA, Economic Research Service, Agricultural Resource Management Study (ARMS) survey, 1993 and 1999.

opportunity for higher returns from their stock of wealth by investing off-farm. The low interest rates and rapid economic growth of the 1990s were especially favorable to wealth accumulation.

The relative shares of farm and nonfarm net worth vary with size of farm. Although most farm households rely heavily on off-farm sources for income, much farm household wealth comes from the farm, regardless of size or type. The farm operation accounts for the smallest share of household net worth in the limited-resource, retirement, and residential/lifestyle farms. At the other extreme, 85 percent of the household net worth of higher sales farms, large family farms, and very large farms comes from the farm business.

Farm Household Heterogeneity

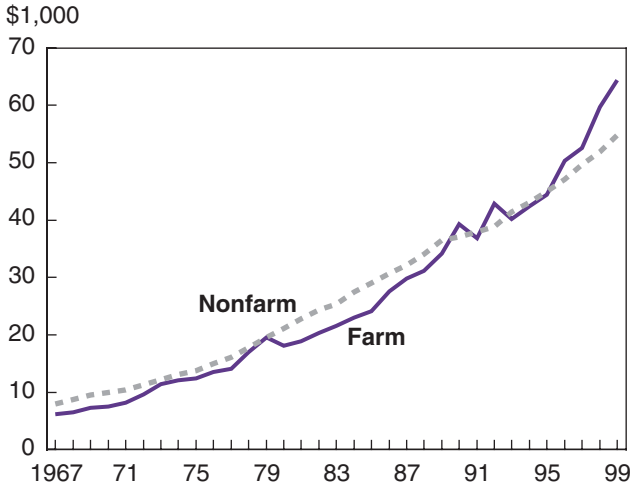
Economic growth and technological efficiency have changed the way farm families approach employment choices (Binswanger, 1974, 1978; Thirtle, 1985a, 1985b). A byproduct of the labor-saving technologies adopted by farmers was greater potential for increased household income from multiple job holdings by household members. Economic growth—which has upgraded communication services, reduced transportation costs, and improved education levels of farm operators—has also facilitated interactions between farm and nonfarm labor markets.

At the same time, U.S. farms have grown increasingly different in the size, specialization, location (relative to urban influence in the surrounding area), and level of commitment to farming by the operator. Recent publications by the Economic Research Service, USDA (Gundersen et al.; Offutt, 2000; Kuhn and Offutt, 1999) have cited heterogeneity as a key consideration in providing a farm safety net. How farm families differ has been examined by many researchers. However, analyses of the diversity in U.S. farming today as it relates to nonfarm households are generally inadequate.

Farm Households Working More Off the Farm and Accumulating Wealth

The average money income of U.S. farm households first exceeded that of all U.S. households in the early 1990s and has been higher ever since (table 2, fig. 10). Average farm household income in 1999 was $64,347, compared with $54,842 for the average nonfarm household. Median income for farm households has also been roughly on par with the median income of all U.S. households in recent years.[4]

Figure 10
Average income of farm and nonfarm households, 1967-99
In recent years farm household income has exceeded nonfarm household income.



Source: Ahearn (1986) and Agricultural Resource Management Survey (ARMS) 1988-1999.

What accounts for the closing of the income gap for farm households? Since 1964, earnings from off-farm sources have grown from $10.1 billion to $114 billion (in nominal terms). Meanwhile, sectorwide net cash farm income has increased three-fold (fig. 11). Thus,

[4]Average levels of income can be overly influenced by unusually large or small values. Estimates of median income help guard against these influences.

Table 2—Income of farm operator households, by source

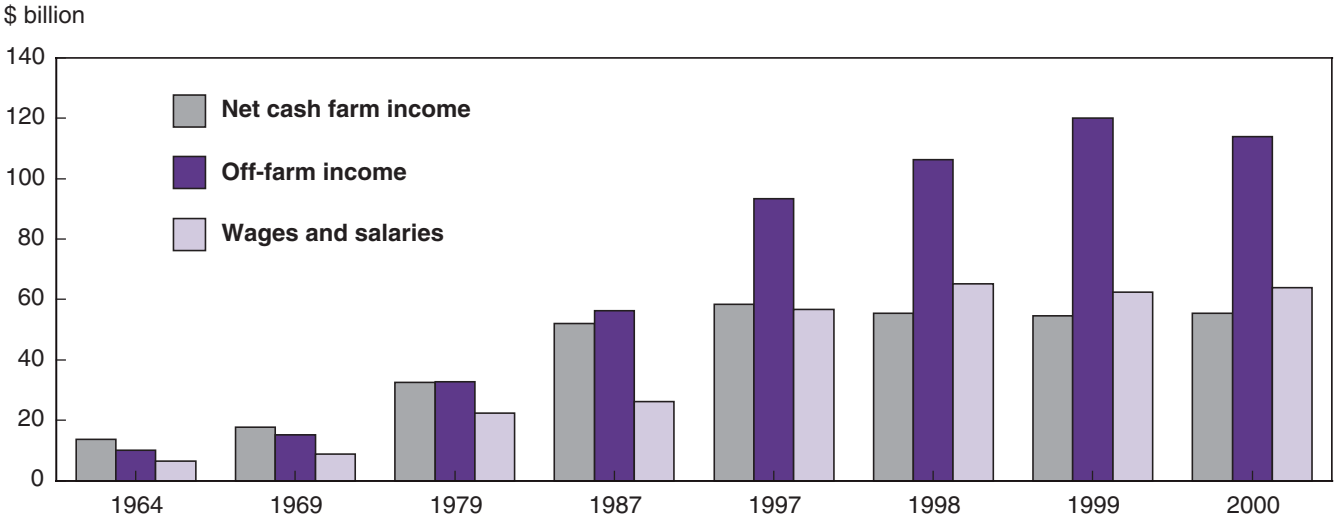
Year	Farm	Off-farm	Total	Off-farm share	Farm household income as a share of U.S. average household income
	----------*Dollars*----------			*Percent*	
1960	1,913	2,141	4,054	52.8	65.0
1964	2,323	3,367	5,689	59.2	77.5
1969	3,472	5,537	9,009	61.5	94.4
1979	4,857	13,884	18,742	74.1	95.8
1987	15,659	25,449	41,108	61.9	127.0
1997	6,205	46,358	52,562	88.2	105.8
1998	7,106	52,628	59,734	88.1	115.2
1999	6,359	57,988	64,347	90.1	117.3
2000	3,329	58,709	61,947	94.8	109.0

Source: 1964, 1969, 1979, 1987 Census of Agriculture, U.S. Department of Commerce. USDA, Economic Research Service, Agricultural Resource Management Study (ARMS) for 1998-2000. 1997, Census of Agriculture, U.S. Department of Agriculture.

Figure 11

Farm sector net cash income and income of farm households from off-farm sources

The increase in farm household earnings has been driven by the increase in off-farm earnings.



Source: Census of Agriculture, 1964-1997, and Agricultural Resource Management Survey (ARMS), 1998-2000.

the increase in farm household earnings has been driven by the increase in off-farm earnings. Wages and salaries still make up a significant proportion of off-farm earnings, even though they declined from 65 percent in 1964 to 56 percent in 2000. Nonetheless, nominal wage earnings (off the farm) of farm households was nearly nine times larger in 2000 than in 1964.

There are several reasons for this growth, primarily an increase in off-farm labor. Off-farm labor force participation rates for rural residents rose from approximately 51.5 percent in 1960 to 65 percent in 1990 (table 3). Participation of rural farm women more than doubled during the same period. More farm operators also worked off the farm, and increasingly full time (200 days or more off the farm) (fig. 12). Finally, the economic boom of the 1990s helped to create more jobs and higher wages in the local commuting areas of farm households.

Farm households appear to be relatively wealthy compared to society in general. Wealth represents potential spending power, and two individuals with the same income but differing assets will have different consumption possibilities. For example, the average net worth of farm families in 1999 was $563,563, compared with $88,000 for all U.S. households. However, a majority of the wealth (net worth) is in farm assets, which cannot be liquidated in the short run. Average farm household net worth (which constitutes about two-thirds of total wealth) increased 26 percent from 1993 to 1999.

Table 3—Labor force status of rural and urban persons age 16 and over, 1960-90

	All persons			Women		
	Urban	Rural	Rural farm	Urban	Rural	Rural farm
	Percent in labor force					
1960[1]	57.0	51.3	51.5	37.3	28.8	22.9
1970	59.4	54.7	54.4	43.1	36.0	31.6
1980	63.6	59.4	60.0	52.1	45.4	40.3
1990	65.9	63.3	65.2	57.6	54.2	52.3

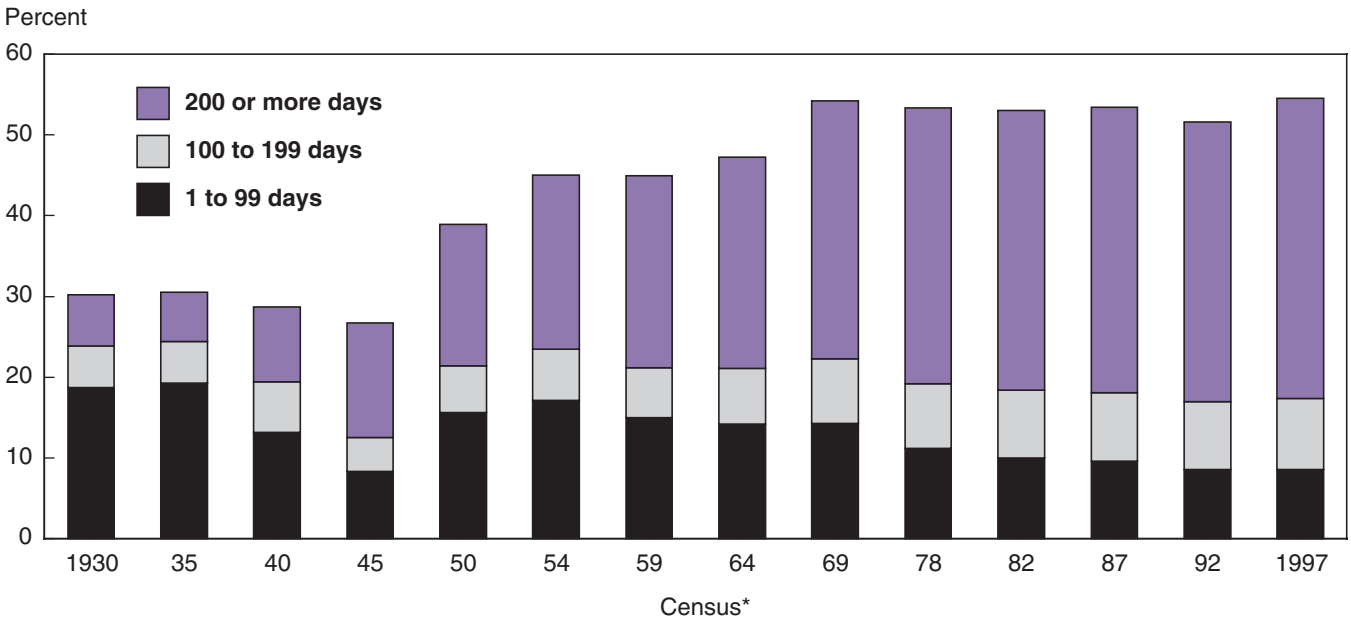
[1]Employment status is reported for persons 14 and over for this year.

Source: Census of Population, U.S. Department of Commerce.

Figure 12

Farm operators reporting off-farm work, 1930-97

One-third of farm operators work off-farm essentially full-time.



*Data for 1974 are unavailable.

Source: Census of Agriculture, various years.

All Operators Have Diverse Income Streams, Older Ones Enjoy More Wealth

Farm household income, grouped by operator age, follows the traditional life cycle, cresting at age 45-54 (fig. 13). The farm's contribution to household income diminishes with the operator's age. For example, average income from farming decreases from $10,000 for operators under 35 to approximately $2,800 for those 65 and older. Conversely, the share of off-farm income (regardless of source) increases with age. This is consistent with the findings of Mishra and Morehart, 2001; Ahearn et al., 1993; Gasson et al.,1988; and Hill, 2000. Younger farm operators (up to age 44) earn more than 85 percent of their income from off-farm sources (fig. 13). There could be several reasons for this. First, with the strong nonfarm economy of recent years, younger farm operators have been able to establish the farm business while pursuing other work opportunities. Second, younger farm operators are in the wealth accumulation phase and are doing so by diversifying their portfolio, both on and off the farm. Third, modern technology enables farmers to increase their productivity and efficiency, which allows more time to work off-farm. Finally, younger farm operators, motivated by expansion plans or raising a family, are more aggressive in exploring earning alternatives.

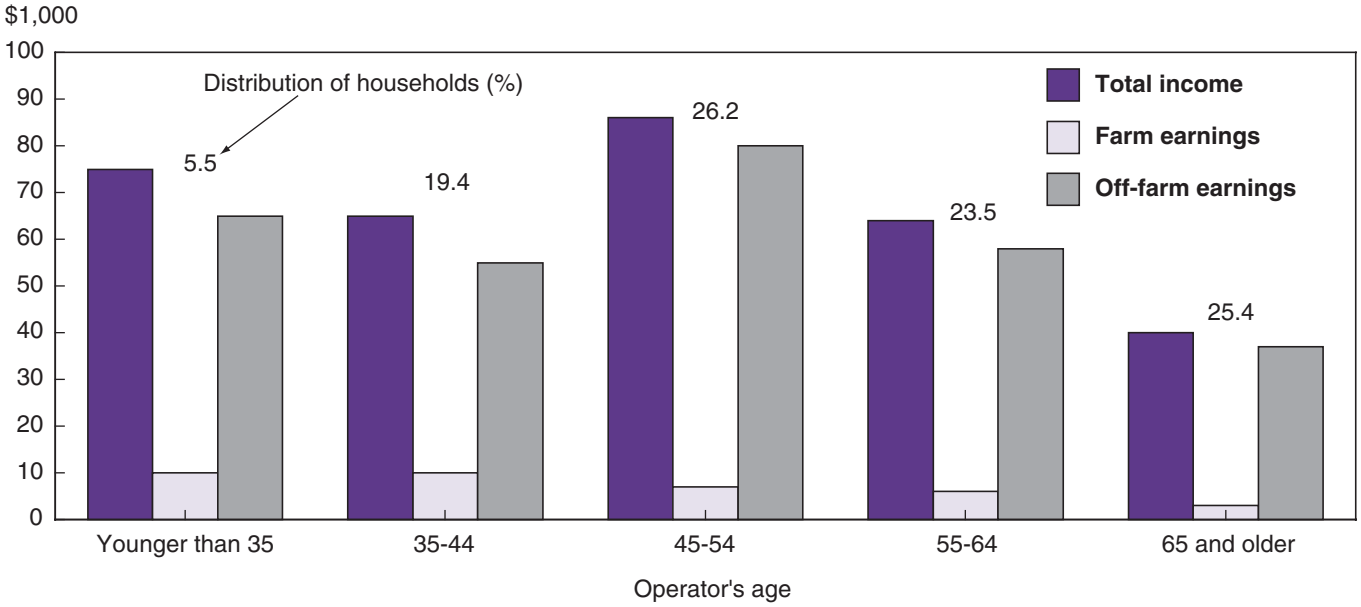
Meanwhile, farm operators 65 or older, while earning much less than younger operators and the average U.S. household, still have incomes 14 percent higher than nonfarm households headed by a person in the same age group ($39,625 farm versus $34,671 nonfarm in 1999). For these households, the majority of income is from unearned (passive) sources (such as interest and dividends, off-farm business income, annuities, military and other retirement).

Farm household wealth also follows a distinct pattern, though it peaks later in the life cycle than income. The households of operators age 55-64 tend to have almost 50 percent of their total net worth in nonfarm assets (highest among all groups). Farm net worth's share of household net worth increases with age. For example, the average net worth from farming increases from $216,121 for operators under 35 to $447,029 for those 65 and older. Beginning farmers/farm households have the highest debt, both farm and nonfarm. This erodes their net worth and demonstrates that unless a farm is inherited, beginning farmers borrow capital to finance farming operations.

Figure 13

Total, farm-related, and off-farm income per household, by operator's age, 1999

Farm operators depend less on farm earnings as they age.



Source: USDA, Economic Research Service, Agricultural Resource Management Study (ARMS) survey, 1999

Education Promotes Income and Wealth

The most valuable of all capital is that invested in human beings (Marshall, 1949). Theory predicts a direct correlation between educational level, earnings, and wealth (Becker, 1975). Studies by Nelson and Phelps (1966) and Welch (1970) point out that education enhances one's ability to receive, interpret, and understand new information. Huffman (1977), Lin (1991), and El-Osta and Morehart (1999) show that higher levels of farm operator education are likely to induce adoption of new technology and, ultimately, boost productivity.

Farm household income increases with the level of education. For example, households headed by operators who have attended or completed graduate school ($97,633) earned 2.6 times more than operators who had less than a high school education ($37,375). Households headed by operators with a high school education, on average, had income ($56,270) 1.32 times higher than all U.S. households in the same cohort ($44,246) in 1999.

Farmers with more education tend to work more off-farm. As the level of education of farm operators increases, income from farming decreases and income from off-farm sources increases (fig. 14). These results suggest that farm operators allocate time and seek jobs that improve their earning capabilities (Huffman, 1977).

As with income, education and wealth (net worth) are positively related. More educated farm operators tend to have higher levels of wealth. For example, operators with college degrees or higher levels of education run households with nearly twice as much wealth as those led by operators who have not completed high school. Further, higher education is associated with a more diversified portfolio of assets. In 1999, operators with graduate degrees (6.4 percent) had a total net worth of $768,546, of which half was in nonfarm net worth ($351,715). However, this group also had almost all of its income from off-farm sources, which is consistent with Mishra and Morehart (2001).

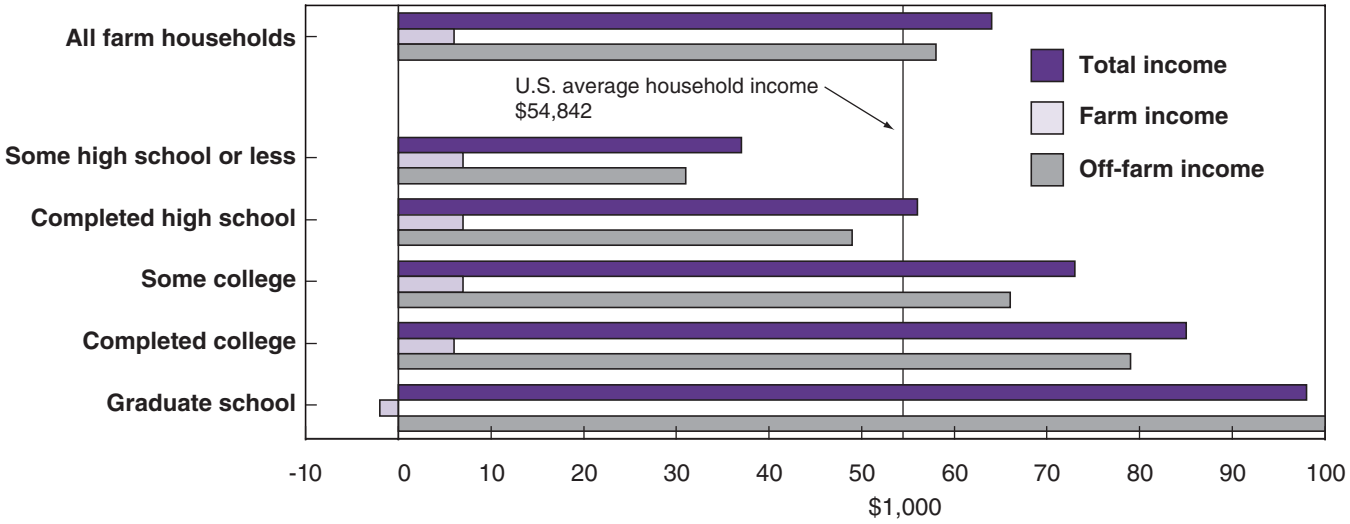
Larger Households Bring in More Income, Smaller Ones Enjoy Greatest Wealth

Heavily influencing household income is household size. Families with members who are eligible to work, it is reasoned, could both work on or off the farm and bring in added income. Therefore, the number of family members would be positively related with household income. Farm households with three to five mem-

Figure 14

Total, farm-related, and off-farm income per household, by educational level, 1999

More educated farm operators earn most of their household income from off-farm sources



Source: USDA, Economic Research Service, Agricultural Resource Management Study (ARMS) survey, 1999

bers had the highest income ($70,023) among farm households in 1999. These households had income 27 percent higher than the average U.S. household (but comparable to U.S. households with five or more members). Farm operator households with one or two members ($60,491) were the most dependent on income from off-farm sources. Farm households with five or more members ($67,857) earned 27 percent of their income from farming and 73 percent from off the farm.

Household size also factors into accumulation of wealth. The two should be inversely related since a large household demands more expenditures and leaves less money for savings and wealth accumulation (Leon and Rainelli, 1976; Noda, 1970; Mishra and Morehart, 1998). As it turns out, level of wealth and size of farm household are negatively related. Farm households with one or two members (59 percent of households) have the most wealth (net worth of $595,920) including farm and nonfarm assets. These households have one-third of their assets invested off the farm. Farm households with five or more members had the lowest total wealth ($453,054) and nonfarm net worth. Across all farm sizes, farm debt was the major source of debt, and this increased with family size. Large households may be more involved in farming (and less likely to be retired), thus incurring more farm debt.

Sources of Income and Wealth Vary With Specialization

Dairy, grain, and soybean farms produce commodities covered by traditional commodity programs. These farm types are relatively prominent among full-time operators (those working 2,000 hours or more on the farm, see app. table 4). Beef, cattle, and other livestock farms not covered by traditional commodity programs are prominent among part-time operators who work 200 days or more off the farm.

Dairy farm households received less than a third of their income from off-farm sources, followed by hog and cash grain, cotton, and oilseed farm households. Farm households with specialized enterprises such as dairy tend to have higher average farm income, and farm income makes up a larger share of total household income (Mishra and Sandretto, 2002). Dairy is a labor-intensive operation, limiting the hours that operators can devote to off-farm work. Despite this high dependence on farm income, dairy households had income above that of the average U.S. household.

Even though cash grain households have benefited most from farm programs through capitalization of government payments into land values (Schmitz, 1995; Phipps, 1984; Featherstone and Baker, 1988; Just and Miranowski, 1993), producers of high-value crops (fruit, tree nuts, vegetables, nursery and greenhouse)

had the largest net worth ($742,208) among farm households. Their nonfarm net worth accounted for a third of their total net worth. On the other hand, "other" livestock (includes poultry and general livestock) farm households had the least wealth ($479,332) in 1999. This is consistent with the fact that much of poultry production occurs on relatively small farms excluding the poultry operation itself, which is on a contract basis. In addition to lowering the capital requirements, these arrangements enable farm households to work more off the farm. This is reflected in the total off-farm earnings of livestock households. In fact, off-farm earnings represent 102 percent of household income for farm households specializing in beef and other livestock production. As a result, one-third of their total net worth (wealth) is comprised of nonfarm assets (Mishra and Morehart, 2001).

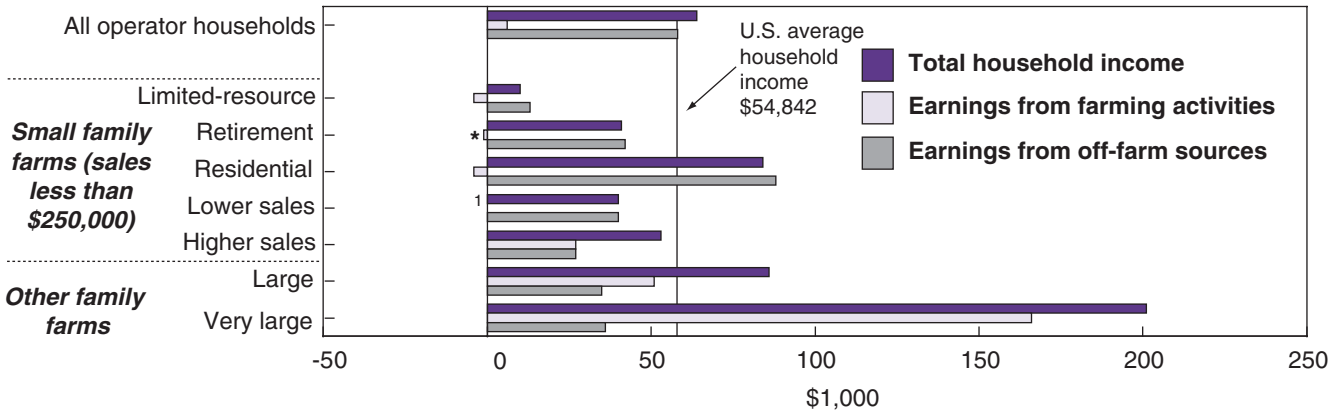
Largest Farms Have Most Income, Wealth, Debt

Although 90 percent of U.S. farms are classified as small farms, agricultural production is highly concentrated among large and very large family farms (see "Farm Typology," p. 9). These two groups together made up only 8 percent of all farms, but accounted for 57 percent of production in 1999 (fig. 15). Households operating very large farms had the highest average household income, $210,206, about four times the average for all U.S. households. These farms received only 18 percent of their income from off-farm sources (app. table 4).

Households operating residential/lifestyle farms or large family farms also had average income above the U.S. average, but the sources of income differed between the two groups. Residential/lifestyle households received virtually all of their income from off-farm sources, while large farms received just 40 percent from off the farm. Households operating higher sales small farms had an average income very near the U.S. average, and half came from off-farm sources.

Limited-resource, retirement, and lower sales farm households had average household incomes below the U.S. average and relied heavily on off-farm income. Households operating lower sales small farms averaged $39,764 in 1999, or 73 percent of the average for all U.S. farm households. Practically all of their income came from off-farm sources. Nearly all the income of households with retirement farms came from off the farm, and 62 percent of off-farm income was from unearned sources such as Social Security and investment income. For 21 percent of retirement farms, the Conservation Reserve Program (CRP) was the primary source of farm income. Off-farm income averaged $13,114 for households with limited-resource

Figure 15
Total, farm-related, and off-farm income per household, by farm typology group, 1999
Small farm households depend heavily on off-farm income.



Note: Household income data are not collected for nonfamily farms. Earnings from off-farm sources can be larger than total household income if earnings from farming are negative.
* The relative standard error exceeds 25 percent but is no more than 50 percent.
[1]Earnings from farming activities supressed because the standard error exceeds 75 percent.
Source: USDA, Economic Research Service, 1999 Agricultural Resource Management Study, version 1, for farm operator household data. U.S. Bureau of the Census, Current Population Survey, for all U.S. households.

farms, but they lost an average of $3,500 from farming. As a result, these small farms averaged only $9,534 in total household income, about one-sixth the U.S. average.

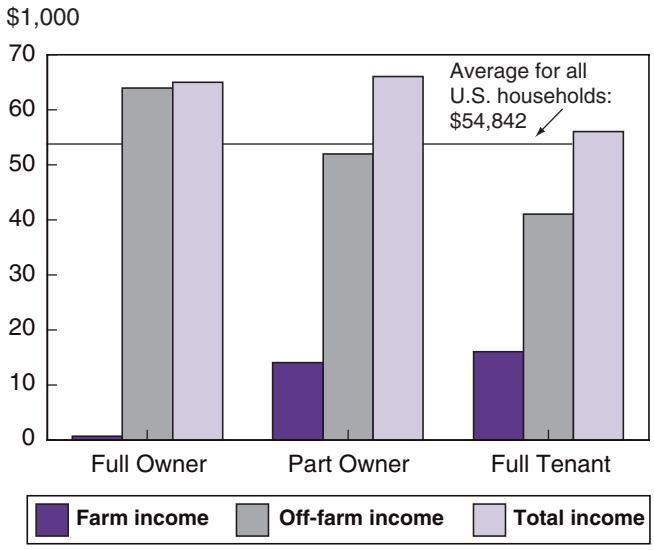
Farm size and wealth are positively related. The value of farm assets increases from $76,995 for limited resource farms to $1,431,288 for very large farms. Only limited-resource, retirement, and residential/lifestyle farms have farm assets below the level of the average farm household ($389,498). Farm debt follows a similar pattern. It increased from $6,557 for limited-resource farms to $368,129 for very large farms. Households operating very large farms had the highest wealth, both farm and nonfarm. Interestingly, the wealth of residential/lifestyle farm households is equally divided into farm and nonfarm sources, reflecting the importance of nonfarm assets to these households.

Renters Depend Most on Farm Income, Own Least Wealth

Farm tenure describes the farm operator's ownership interest in the land he or she farms. They can be (1) full-owners, who own all the land they operate; (2) part-owners, who own some and rent the remainder of their land; and (3) tenants, who rent all of their land or work on shares for others (see "Landlords in U.S. Agriculture," p. 23). The majority of farms (58 percent) reported full ownership in 1999, while 34 percent owned part and rented part of the farmland they operated. Only 8 percent of operations rented all of their land.

The composition of farm household income differs significantly among tenure groups. In 1999, average full-owner households earned $64,556 with nearly all of their income coming from off-farm sources (fig. 16). This is consistent with full-owners comprising a large share of the limited-resource (64 percent), residential/lifestyle (62 percent), and lower sales (50 percent) groups, whose households depend primarily on off-farm income. The average part-owner household earned the highest total income ($65,815) among tenure types. Part ownership was the most common form of tenure among higher sales small farms, large family farms, and very large family farms, accounting for about two-thirds of each group. Full tenants earned $56,382, slightly higher than the average for all U.S. households.

Figure 16
Total, farm-related, and off-farm income per household, by farm tenure, 1999
Full owners earn almost all their income off the farm; part-owners have both farm and off-farm income.



Source: USDA, Economic Research Service, 1999 Agricultural Resource Management Study, version 1, for farm operator household data.

Leasing land has been traditionally viewed as the bottom rung of the tenancy ladder. Young farmers would begin their careers by leasing land, often from relatives. As they grew older, they would buy some land, but continue to rent. The oldest farmers would cut back on farming by no longer leasing and concentrate on the land they owned (Hoppe et al., 1995; Wunderlich, 1991). However, recent studies by Mishra et al. (1999a, 1999b) concluded that farmers who rent/lease land had higher net farm income per dollar of asset (in farming) than other farmers, partly from lesser need for capital financing. About 30 percent of the total income of full tenants is from farming (fig. 16), but even they depend on off-farm income.

Since land is the principal farm business asset, the composition of farm household wealth differs significantly among farm tenure groups. In 1999, only part-owner households had above-average (for farm households) farm net worth. They also had the highest level of net worth ($658,860), with 76 percent in farm and 24 percent in nonfarm net worth. However, these farm households have the largest farm debt. Full-tenant households have the least amount of wealth ($241,772), and it is equally split between farm and

Landlords in U.S. Agriculture

According to the 1999 Agricultural Economics and Land Ownership Survey (AELOS), a follow-on survey to the 1997 Census of Agriculture, there are 2.26 million owners of agricultural land in the United States (excluding public owners, Federal and State Governments, Indian reservations, railroads, and institutions). Landlords are owners who rent land to others for farm use. They include the 1.99 million owners who do not farm themselves, and nearly 264,000 owner-operators who farm part of their land and rent part to other farmers. Private landlords have approximately 393 million acres rented.

Most (84 percent) farmland owners who lease land to others are individuals or families. These landowners lease out 70 percent of all leased acres and earn 73 percent of the total value of farmland rent received. Eleven percent of all landlords are partnerships. Corporations, both family and nonfamily, make up 3 percent of all owners who lease land to others. These corporations, however, lease out 9 percent of all acres leased to others and they earn 8 percent of the total value of rent received. Landlords also receive part of the income from the sale of agricultural products. They receive government subsidies, which are capitalized into the farmland (Barnard et al., Ryan et al.). Contrary to popular belief, a majority of landlords are people who have retired from nonfarm-related activities (27 percent), followed by retired farm operators (21 percent) and private business employees (21 percent).

Share of landlord owners, acres rented, and rent

Source: Economic Research Service, USDA.

nonfarm sources. Tenant households have lower farm assets (one-third lower than the average farm household) in general as they are starting farmers and mostly renting/leasing land for farming.

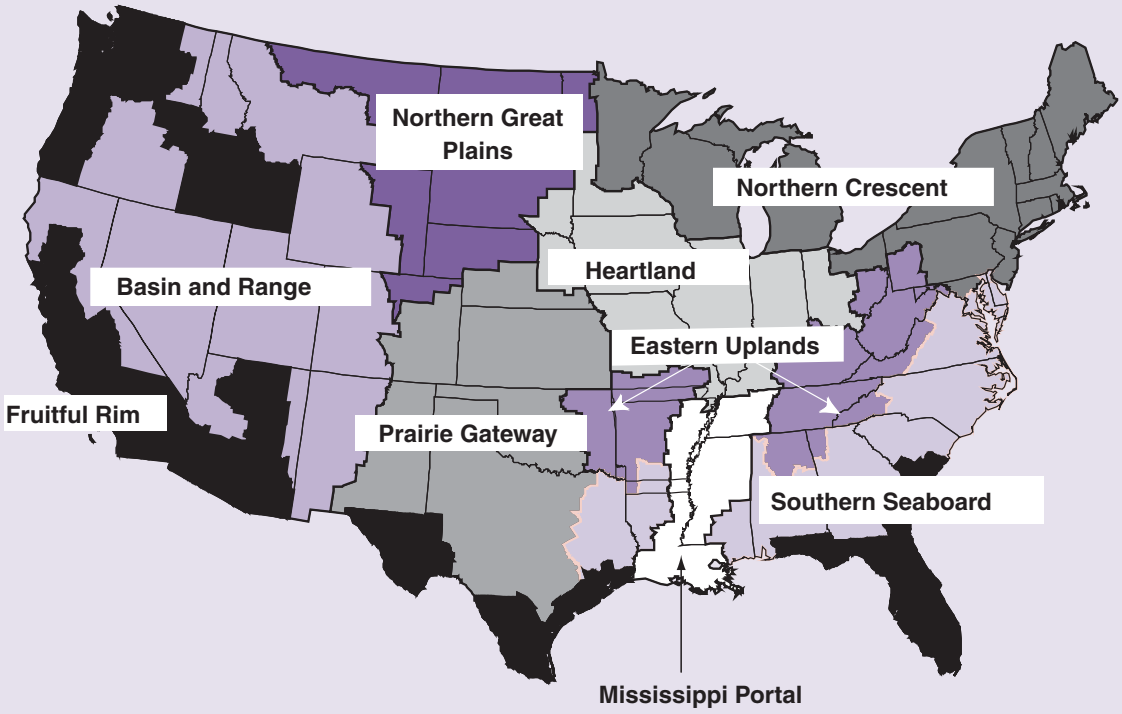
Location Influences Household Income and Wealth

Since off-farm income is a major source of income to farm households, location of the farm relative to off-farm employment opportunities is vital. Many studies have investigated the potential effects of the availability and accessibility of off-farm jobs (Cogan, 1981; Buttel et al., 1982; Sumner, 1982; Sander, 1983; Streeter and Saupe, 1986; Findeis et al., 1987; Mishra and Goodwin, 1997). Farmers near urban areas likely have access to more active labor markets, and would be expected to supply more labor hours off the farm.

Two-thirds of all U.S. farms are located in nonmetro counties (see box, "Geographic Units," p. 24). About

Geographic Units

Resource Regions. The Economic Research Service (ERS) has developed new resource regions based on characteristics of the land and the commodities produced (Lipton, 1999). These regions cross State boundaries, but are more homogeneous with respect to resources or production than regions based on combinations of States.



Metro-Nonmetro Status. ***Metro*** areas are defined by the U.S. Office of Management and Budget (OMB) as geographic areas with a large population nucleus (generally at least 50,000 inhabitants), plus adjacent communities that are socially and economically integrated with that nucleus (U.S. Dept. Comm., Cen. Bur., 1993, pp. A8-A9). Metro designations as of 1993, which identified 813 metro counties, are used in this report.

Nonmetro counties are a residual, that part of the Nation lying outside metro areas. Nonmetro counties are diverse, however, and the 2,276 nonmetro counties can be categorized into smaller groups with common characteristics. Nonmetro counties are sorted into two groups: those ***adjacent*** to metro areas (991 counties) and those that are ***not adjacent*** (1,285 counties) (Butler and Beale, 1994). Adjacent counties are physically adjacent to one or more Metropolitan Statistical Areas (MSA) and have at least 2 percent of the employed labor force in the nonmetro county commuting to central metro counties. Nonmetro counties that do not meet these criteria fall into the "not adjacent" category. One would expect urban influences to be stronger in adjacent counties than in nonadjacent counties.

Economic Specialization. Nonmetro counties can also be categorized according to their economic specialization. There are 556 ***farming-dependent*** counties where farming accounted for at least 20 percent of earned income over the 3 years from 1987 to 1989 (Cook and Mizer, 1994, pp. 6-7).

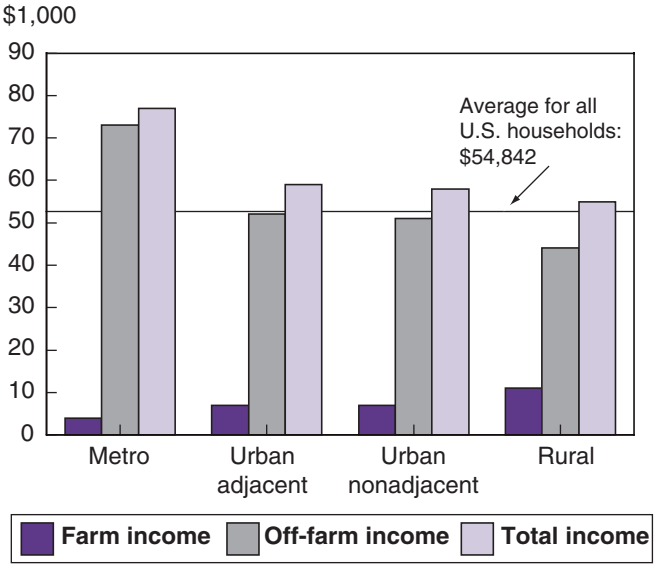
three-fourths of small farms (farming-occupation) and large family farms are in nonmetro counties. In addition, about two-fifths of higher sales (small) farms and large family farms are in rural counties not adjacent to a metro area, compared with one-third of all farms.

On average, one-fifth of the total income of farm households located in rural areas (both adjacent and nonadjacent) came from farming in 1999, indicating a high level of dependence (80 percent) on off-farm work even here. The total household incomes of these farms are on par with all U.S. households (fig. 17). Farm households in metro areas (central city, fringe, medium metro, and small metro) have the highest level of income ($76,982) among farms by location, and 95 percent of this income is derived through off-farm sources (mostly wages and salaries). In these households, both the farm operator and the spouse tend to work off-farm.

Farm households located in urban (adjacent and nonadjacent) areas tend to be similar—they have some income (almost $7,000) from farming, and off-farm income again is the major contributor to total household income (fig. 17). These results reaffirm that location and composition of income in a farm household are related. Still, farm households in remote rural areas depend heavily on off-farm employment.

Wealth for farm households in different locations follows the same pattern as income. Farm households in or near a metro area had the highest level of wealth (a net worth of $650,120), one-third from nonfarm

Figure 17
Total, farm-related, and off-farm income per household, by farm location, 1999
Even farm households in rural areas draw substantial income from off-farm employment.



Source: USDA, Economic Research Service, 1999 Agricultural Resource Management Survey, version 1, for farm operator household data.

sources. These farm households also had the highest farm assets and lowest farm debt. This suggests they may be full-owners renting land and machinery to part-owners and tenants. At the other extreme, farm households in rural areas have one-fourth of their net worth in off-farm assets. Rural farm households had the highest farm debt and considerable farm assets ($378,665) in 1999.

Variability in Farm Household Income and Wealth

The various sources of farm household income and wealth and their relative importance explain only part of the "farm income problem." In addition to the level of income and wealth, the economic well-being of the farm household is influenced by variability in its income, which can hamper its ability to maintain consumption and accumulate wealth.

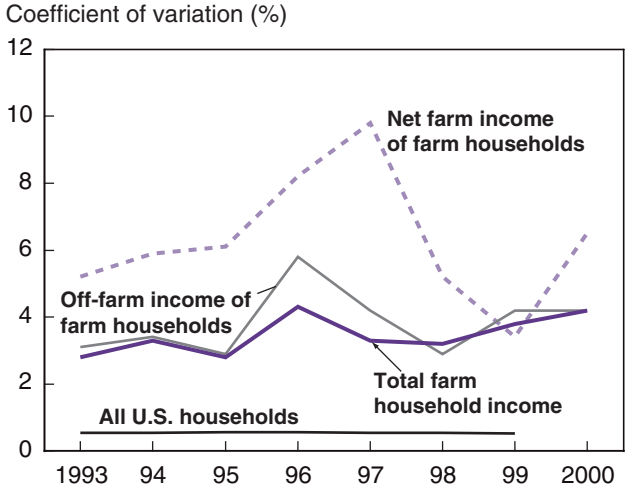
Both unpredictable weather and the biological risks inherent in agricultural production contribute to price volatility in agricultural commodity markets. The 20th century witnessed a range of farm policies aimed at mitigating the adverse effects of price fluctuations and production shortfalls. The recent consolidation of farms and growth in the value of farmland has brought more attention to wealth. Variability in the returns from farming can cause fluctuations in farm household wealth, and especially in the value of farm real estate. Many have argued that government programs have contributed to higher levels of wealth for farmers and that uncertainty about future programs puts this wealth at risk (Schmitz, 1995; Phipps, 1984; Featherstone and Baker, 1988; Just and Miranowski, 1993).

Wealth from the farm business is also unique in that equipment and other forms of capital are not easily transferred to other uses. This "asset fixity" also has implications for the distribution of wealth among farm households and changes in the level of wealth over time (Hathaway, 1963; Johnson and Quance, 1972; Johnson and Pasour, 1981; Pindyck, 1988). Given the importance of wealth to farm households, determining the sources of its variability may improve policies that influence income and underpin farm real estate values. In addition, decomposing (variability of) wealth into components will help relate the vulnerability of farm households to changes in the general economy.

Income Variability, Year to Year, Due Mostly to Farm Earnings

Variability of farm household income far exceeds that of all U.S. households (fig. 18), mostly due to variability in income from farming. Reasons for the variability in farm income across time include fluctuations in farm output, commodity prices, and business cycles (Firch, 1975; Schultz, 1945; Cochrane, 1979; and Tweeten, 1979). Price trends have not followed a consistent pattern. Furthermore, export demand tends to be more unstable than domestic demand (Johnson, 1977). As a principal residual supplier of grain, cotton, and soybeans on the world market, U.S. farmers have become more vulnerable to decisions made in Russia, China, and/or the European Union (EU). Policy actions such as agricultural trade embargoes in the 1970s and 1980s, alterations in set-aside requirements, and the introduction of the Payment-in-Kind (PIK) program in 1983 further contributed to income variability. Macroeconomic policies, as they affect interest rates and exchange rates, also cause income instability in agriculture (Schultz, 1945; Schuh, 1974; and Johnson, 1977). All these factors are beyond the control of any individual producer, and can make predicting annual income of farm households very difficult.

Figure 18
Income variability in farm and all U.S. households
Farm household income is more variable, mostly due to income from farming.



Note: Coefficient of variation is defined as the ratio of standard deviation of income to the mean of income.
Source: USDA, Economic Research Service, 1993-1999 Agricultural Resource Management Survey. U.S. Bureau of the Census, Current Population Survey for all U.S. Households.

While income variability of farm versus nonfarm households is important, so is the variability of farm household income over time. Mishra and Sandretto (2002) measured variability in yearly real net farm income to determine if it had diminished over the period 1933-99. The post-Depression period (1933-38), for example, showed annual variation in aggregate real net farm income of 34 percent. During the farm crisis years of 1979-84, farm income varied 39 percent annually. In contrast, aggregate real net farm income varied

only 12 percent annually during and after World War II, and from 1985 to 1995 (table 4).[5]

Over the years, income instability per farm has differed both in terms of variation in actual dollar amounts and percentage (table 4). By this measure, the years 1964-99 were markedly unstable, compared with 1933-63. The average farm enjoyed relatively stable earnings around World War II, with only a 6-percent yearly fluctuation (table 4). The Vietnam War and post-FAIR Act (1996-99) periods experienced similar variation in real net farm income per farm (21-23 percent), while 1985-95 (post farm crisis) was a relatively stable period for recent times, at 17 percent. In contrast, the farm crisis era (1979-84) was true to its name, with real net farm income fluctuating $6,019 per farm, or 47 percent.

In addition, Mishra and Sandretto (2002) examine the role of off-farm income in reducing the variability in total farm household income. They decomposed the variance in total farm household income into farm household income from farming and off-farm income and found that income from farming accounts for a greater absolute (measured by variance) and relative variation in total household income than does off-farm income (table 5). The overall variability in farm household income was lowest during 1960-63, with farm income contributing most to this variability.

A similar result was obtained when the aggregate series for 1960-99 was divided into specific periods, based on data availability, similar to the ones in table 4. Except for the post-FAIR Act period (1996-99), income from farming contributed more to total varia-

[5]During 1985-95, agriculture was moving toward becoming more market oriented, as mandated by the Food Security Act of 1985 and the Food, Agriculture, Conservation, and Trade Act of 1990 (FACT, 1990).

Table 4—Variation in aggregate real net farm income

Period	Description[1]	Average yearly variation in real net farm income			
		± $ Million	± Percent	± Dollars	± Percent
		(Aggregate)		*(Per farm)*	
1933-1938	Post-depression recovery	8,784	34	1,859	34
1939-1948	World War II	7,812	12	994	6
1949-1959	Post-WWII boom, Korean war and postwar readjustment	8,093	12	1,157	9
1960-1963	Kennedy years	572	3	572	5
1964-1973	Vietnam War8.457	16		4,183	23
1979-1984	Farm crisis 12,159	39		6,019	47
1985-1995	Post-Farm crisis	5,202	12	3,538	17
1996-1999	Post-FAIR Act2	7,034	18	3,648	21

[1]Selection of periods was based on the landmark dates in U.S. history, both in terms of agriculture and the economy as a whole.
[2]Federal Agricultural Improvement and Reform Act of 1996, also called the Farm Bill of 1996.

Source: Mishra and Sandretto (2002).

Table 5—Components of estimated variance of U.S. farm household income from all sources, 1960-99

Variance source	1960-99	1960-63	1964-73	1974-78	1979-84	1985-95	1996-99
				$1,000			
Variance in net income from farming (CV, %)	84.84 (50.51)	2.37 (14.18)	23.86 (38.64)	6.16 (20.69)	2.65 (22.85)	29.99 (67.82)	0.62 (12.97)
Variance in income from off-farm employment (CV, %)	23.92 (35.99)	0.25 (5.61)	10.82 (17.55)	0.75 (3.73)	2.12 (6.43)	7.58 (8.30)	14.22 (8.80)
Covariance in net farm income and off-farm income	-13.49	0.37	11.02	0.18	0.75	-8.83	-1.36
Variance in total farm household income (CV, %)	95.27 (26.96)	2.99 (2.62)	45.70 (29.58)	7.09 (16.56)	5.52 (30.83)	28.74 (7.64)	13.48 (6.84)

Source: Mishra and Sandretto, 2002.

tion in total farm household income than did off-farm income. The relative and absolute variations were lower for nonfarm income than for income from farming. In the post-FAIR Act period, results are different. Table 5 shows that off-farm income accounted for a greater absolute variation in total farm household income than farming income did. However, when relative variation is taken into consideration, income from farming accounts for greater variation in total household income. One possible reason could be that the sustained economic growth and strong demand for workers in the nonfarm economy encouraged households to work more off the farm.

Income Variation Among Farm Households Due More to Off-Farm Choices

Unlike the previous section on income variability, this section uses farm-level household data instead of aggregate household data. It also uses a normalized variance decomposition method (see appendix B) to assess the importance of each income component to the variability in total household income. The analysis of variation in farm household income focuses on two time periods (1993 and 1999) to represent circumstances before and after the 1996 FAIR Act.

Variation in farm household income originated primarily from farm income in both 1993 (49.6 percent) and 1999 (46.5 percent) (table 6). Variance sprang much less from off-farm business income and off-farm wages/salaries, though by 1999 off-farm wages and salaries contributed more than double (23.2 percent) their contribution to variance in 1993 (11.0 percent). The amount of variation in household income originating from interest and dividends and from other sources of off-farm income was minimal.

Off-farm income components (especially income from off-farm businesses and wages/salaries) appeared to have a greater variance in the 1990s than one might expect. This may follow from how the farm operator or farm household chooses to allocate time. When the nonfarm economy is doing well, a farmer who typically does not work off the farm may seek nonfarm employment. Additionally, farmers (and their spouses) more accustomed to off-farm work may be expanding hours worked there. This tendency to seek the highest return for their labor is consistent with the finding of Mishra and Goodwin (1997). Several other factors may add to variation in off-farm income components.

Table 6—Normalized variance decomposition of farm operator households' income and wealth, 1993 and 1999[1]

Income and wealth sources	1993	1999
	Percent	
Income:		
Farm income	49.6	46.5
Off-farm business income	31.6	19.2
Off-farm wages/salaries	11.0	23.2
Interest and dividends	3.9	6.2
Other off-farm income	3.9	4.9
Wealth:		
Farm equity	92.8	85.8
Nonfarm equity	7.2	14.2

[1]Source: USDA, Economic Research Service, 1993 and 1999 Agricultural Resource Management Study.

First, households tend to differ in their off-farm earnings potential (both from each other and over time) due to disparity in the level of human capital. Second, variation in demographics (i.e., age, marital status of operators, presence of children) is likely to affect the level of participation in (and income from) off-farm employment. Finally, the level of technology greatly determines how households allocate their time, and technology adoption varies widely among farm types.

Sources of Variation in Farm Household Income

Differences in farm income among households may arise due to variations in climate, productivity of the land base, and type/size of the operation. These factors affect how farmers allocate their time between on- and off-farm work. As the size of the farm increases and farming income grows, so too does the proportion of income variation originating from farming (app. table 5). Farming occupation/high-sales, large farm, and very large farm households have more than half the variation in their income originating from farming. Along the same lines, retirement households show the most variation in their income from interest and dividends (and this variation has increased over time).

Farm households in the Northeast and West (app. table 6) tend to have a larger portion of income variation originating from farming than those in other regions. Farming's contribution to household income variability over time has gone in opposite directions in these regions—rising in the Northeast and falling in the West and North Central. Farm households in the South show much of their income variation originating from off-farm businesses and wages/salaries. Farms in the

South tend to be smaller, and many households report significant off-farm income.

The type of commodities produced can have a significant effect on variation in farm household income. Households specializing in cash grains, other specialty crops (such as tobacco, cotton, fruits and vegetables, and floriculture), and dairy have farming as a major source of income variability (app. table 7). Dairy households had the highest variation in income originating from farming in both 1993 and 1999. Dairy farming is labor intensive, and so its participants have less time for off-farm employment. In the case of cash grain and "other" livestock (such as poultry, beef, hogs, eggs, and sheep/goats) households, the variation in income from farming has fallen.

Farmers who own all of the land they farm tend to operate smaller farms and generally comprise a large share of limited-resource, retirement, residential/lifestyle, and lower sales farms. Therefore, variation in their household income originates mainly from earned income sources such as off-farm business income and off-farm wages and salaries. In contrast, significant variation in the household income of tenants (and part-owners) originates from farming. Farm income makes up a substantial portion of the household income for tenants and its contribution to income variation increased from 1993 to 1999 (app. table 8).

When decomposing variability in household income by age of farm operator, a familiar life-cycle pattern emerges. For young farm households (operator age 44 or younger), income from farming is the main source of variation in total income. As the operator ages, other sources of variation emerge. For example, by age 45-54, variation in income originates more from off-farm business income and wages/salaries. Aside from differences in sources of income during different phases of life, the cost of searching for a job also factors in. The present value of the returns to investing in the search for off-farm jobs will likely be greater for young farm operators, since the payoff period for such activities is much longer.

Education plays an important role in how operators allocate their time between farm and nonfarm work. Farmers with the highest level of education are more likely to have off-farm employment and thus a greater proportion of income from off-farm sources. Much of the income variability of households whose operator has a graduate degree originates from different sources, depending upon the relative strength of the nonfarm economy (app. table 10). For example, in 1999 when the nonfarm economy was enjoying a record performance, many farm operators and members of their household earned higher off-farm wages. At the same time, nonfarm business income rose. Consequently, much of the variability in their income (and more than in 1993) originated from off-farm earnings.

Farming is the largest component of income variability for operators whose education has not advanced beyond high school. However, the contribution of farming toward this variability decreased from 1993 to 1999. This decline not only reflects greater stability in farm earnings from government support, but also suggests that such operators also took advantage of the booming nonfarm economy by reallocating their time between farm and nonfarm work.

Variation in Farm Household Wealth, 1993 and 1999

Farm operator households' wealth, measured as proprietors' equity (current market value of assets minus debt), amounted to more than $1 trillion in 1999. The vast majority of this wealth (87 percent) is controlled by farm households organized as sole proprietorships, which also manage 93 percent of farming units. Sole proprietorships averaged over $500,000 in wealth in 1999, of which nearly two-thirds came from farm equity. Sole proprietorships are more active than partnerships or family corporations in determining how the farm's wealth is managed.

The mere reporting of farm operator wealth, on average, masks the significant differences in wealth levels and in factors contributing to wealth accumulation among farm households. For example, the range in wealth between sole proprietorships with below-average equity (low wealth) and those with above-average equity was nearly $1 million. Farms with low wealth were much smaller (200 acres versus 568 acres) and received significantly less in government payments ($3,167 per year versus $10,699). Operators of these less wealthy proprietorships were younger and less educated. There is considerable variation in farm households' wealth over the period 1993-99.

Government farm programs contribute to the income and wealth of more than 40 percent of U.S. farms. The Federal Agriculture Improvement and Reform Act

(FAIR), which became law on April 4, 1996, gave participating farmers much greater flexibility in terms of crops that could be grown, while guaranteeing decreased payments over a 7-year period. Because the values of fixed production flexibility contract (PFC) payments as provided by FAIR are known over the 7-year program and are tied to land ownership, these outlays are capitalized into land values (Bierlen et al., 2000; Schertz and Johnston, 1997, 1998). To the extent that nearly 75 percent of U.S. farms' total assets are tied to real estate holdings, including land and buildings, variations in payments received by farm households contribute to variation in household wealth.

Many of the perceived impacts of government payments on the distribution of farm wealth are related to the life cycle of farmers. Lins et al. (1982) assert that while capitalization of program payments into land values tends to benefit existing landowners, it may also make it harder for young people to enter farming. Gale (1994) has shown that young and new entrants, due to financial constraints, tend to have smaller farms, and are less likely to own farmland than are older, more experienced farmers. Schultze (1971) suggested capitalization may provide incentives for retirement and exits from farming as owners "cash out" capital gains. Examining variation in farm households' wealth in light of the operator's life cycle is practical since farmers, in addition to saving for retirement, tend to take on less labor- and capital-intensive production activities as they grow older. Consequently, older farmers have different asset portfolios than younger farmers. Similarly, because older farmers have a shorter planning horizon and are more averse to risk than young farmers, they tend to be less inclined to adopt new technology or to purchase newer equipment (Haden and Johnson, 1989; Batte et al., 1984; Gale, 1994). As a result, they hold fewer physical capital stocks than do younger farmers.

Variation in farm household wealth has not received much attention in the literature. Weldon et al. (1993) examined changes in U.S. farm wealth over 1960-91 and cited farm income, government payments, and increased off-farm income as generating a more uniform wealth distribution. Skees et al. (1995) used simulation to illustrate how relative price changes in land, returns, and interest rates affect wealth for differently structured (i.e., size) corn-soybean farms in Illinois. Larger farms were found to be more sensitive to changes in land inflation, especially when the land was owned, interest rates were lower, and the farm had less debt.

Average wealth of the U.S. farm household grew by 54.2 percent from 1993 ($365,465) to 1999 ($563,563). Meanwhile, variability of wealth declined (table 7, column 2). To the extent that size largely determines the composition of wealth, it is not surprising to see that the allocation of wealth into its farm and nonfarm components has also changed over time. With the growth in average wealth (and farm size), farm operator households have broadened their investments to include more nonfarm wealth (e.g., cash, money market accounts, corporate stocks, mutual funds, IRA, 401k accounts), with its share in 1999 rising to more than twice its 1993 level (Mishra and Morehart, 2001). Despite this growth, nonfarm wealth's contribution to the variability in total wealth remained relatively minor at 14.2 percent.

Sources of Variation in Farm Household Wealth

Using Mishra and El-Osta's (2001) methodology we decompose variation in household wealth into its components (farm and nonfarm). Variation in farm household wealth is attributed primarily to variation in farm equity (wealth); this component, compared with the nonfarm (wealth) component, commands the bigger share of wealth and dictates more of its variability. We have also intimated that life-cycle differences and level of physical assets may explain part of the variation in household wealth. The purpose of this section is to quantify these effects.

Also contributing to variation in farm household wealth are size of farm, type and location of farm, and operator's level of educational attainment. For example, the capital requirements of a dairy farmer (cows,

Table 7—Variability in farm operator households' income, wealth, and expenditures, 1993-99

Year	Household income	Household equity	Household expenditures
	Coefficient of variation (percent)		
1993	2.8	2.4	2.9
1994	3.3	5.2	1.7
1995	2.8	2.1	1.7
1996	4.3	5.3	4.0
1997	3.3	NA	NA
1998	3.2	4.1	2.8
1999	3.8	1.7	7.3

NA = data are not available.

milking machines, etc.) far exceed those of a cash grain producer. Farm location also determines wealth in that land values vary greatly across geographic areas. The average value of farm real estate in 1999 ranged from $219 per acre (New Mexico) to $7,000 (New Jersey) (USDA, 1999). The high cost of real estate in New Jersey, as in other Northeast States, reflects greater competition for land from nonfarm uses. Finally, those farmers with more education, consistent with human capital theory (Mincer, 1974), are expected to earn more than less educated farmers when working off-farm, thereby gaining access to additional funds to use toward either onfarm or off-farm investment.

Appendix tables 11-16 report wealth decomposition results based on data disaggregated by operator characteristics (e.g., age and education), size of farm, farm location, and type and tenure arrangement of farm. Regardless of the classification used, the pattern that persistently emerges (with one exception: full tenants) is that farm wealth is strongly and positively associated with total household wealth. It appears that the higher the households' commitment to farming and the higher the proportion of farm wealth to total wealth, the higher is the contribution of the farming component of wealth to the overall variation of total household wealth.

A case in point is the group of farm operator households identified as very large farms (annual farm sales over $500,000). While these households represent less than 3 percent of farms, they account for half of all farm output. As a share of household wealth (between farm and nonfarm sources), their farming component was highest of all groups at 86 percent. In comparison, limited-resource farms represent about 6 percent of U.S. farms, produce less than 1 percent of output, and devote just 58 percent of household wealth to farming assets. This demonstrates why the farming component contributed nearly 99 percent to variation in wealth in very large farms (app. table 5) and just 16 percent in households operating limited-resource farms.

Farm Household Consumption Less Variable Than Income and Wealth

The most common indicators of household economic well-being are income and wealth. Because of the stochastic nature of income caused by weather conditions and commodity markets, many farm families rely on savings and/or on borrowing to maintain their consumption in the face of large income shocks. Table 7 shows the extent of variability in household expenditures relative to the variability in total household income and total household wealth over the 1993-99 period. Expenditures exhibited, with 1999 the exception, less variability (based on coefficients of variation) than total household income and total household wealth (equity). This finding is important to this report's goal of determining farm households' true well-being and how best to ensure it.

As noted by Mishra and Morehart (1999) in their examination of the life-cycle/permanent income hypothesis, expenditures tend to provide a more stable accounting of households' long-term welfare since they reflect a household's own assessment of its permanent income. As such, expenditures provide a better proxy for households' long-term welfare. The fact that table 7 (column 3) shows a sizeable rise in the variability of total household expenditures between 1998 and 1999, coupled with a modest rise in the variability of total household income, suggests a lesser degree of consumption smoothing in 1999 than in 1998. This proposition is consistent with the fact that average farm operator household income and wealth in 1999 ($64,347 and $563,563) were also higher than in 1998 ($59,562 and $492,195).

Sources of Variation in Household Consumption

Expenditures on household rent/mortgage, utilities, and appliances and furnishings accounted for nearly 39 percent of the variation in total household expenditures in 1998 (table 8). Next in importance were medical expenses, insurance, and contributions to retirement plans, which contributed nearly 36 percent of the variation in total household expenditures.

Results of decomposing variation in total household expenditures based on selected farm characteristics (e.g., farm typology, location, specialization, and tenure) and operator characteristics (e.g., age and education) are presented in appendix tables 17-22. Most notable is how individual expenditure components contribute so differently, by characteristic, to overall variation in total household expenditures. For example, while nearly 85 percent of the variation in expenditures by limited-resource farms in 1998 originated from medical expenses, insurance, and retirement, this component contributed only one-fifth of the expenditure variation by the farming groups identified as

Table 8—Normalized variance decomposition of farm operator households' expenditures, 1998

Expenditure sources	Percent
Food and household supplies, excluding utilities	6.8
Household rent/mortgage, utilities, appliances, and furnishings	38.5
Nonfarm transportation	11.9
Medical expenses, insurance, and contributions to retirement plans	36.3
All other family living expenses such as clothing, education, hobbies, recreation, gifts, magazines, charitable contributions, etc.	6.4

Source: USDA, Economic Research Service, 1998 Agricultural Resource Management Study

"farming occupation-lower sales" and "farming occupation-higher sales" households (app. table 17). By region and by farm type, the contribution of medical expenses toward variation in overall expenditures remained most important only for farm households in the Northeast (77.3 percent) and those specializing in "other crops" (47.6 percent).

Another component contributing greatly to variation in expenditures is household rent/mortgage, utilities, and furnishings. So, for "part-owners," this component amounted to 63 percent of variation (app. table 20). When the 1998 sample was categorized based on farm operator's age and level of educational attainment, the two components that appeared to contribute most to the variation in total expenditures—across all cohorts—were "medical expenses, etc." and "household rent/mortgage, etc."

Farm and Nonfarm Household Comparability

Aside from operating a farm, U.S. farm households differ widely in most circumstances, including financial. But how and why are they unique from other U.S. households? In agriculture, the majority of farm households are proprietorships, meaning that, unlike most U.S. households, some portion of the household's income and wealth is associated with the business. Since this may affect the comparability of well-being, we begin by comparing farm households with nonfarm proprietorship households.

An estimated 1.9 million farms (of 2.2 million total) were organized as sole proprietorships in 2000. This is a useful group to study since the owner and operator of the business are the same and there is a direct relationship between the household and the business. The owner has total control of the business and exclusive entitlement to its capital and profits. Because sole proprietorships are relatively easy to set up and maintain, this form of business ownership is also common among nonfarm businesses. The 1998 Survey of Consumer Finances found nearly 6 million nonfarm businesses organized as sole proprietorships (appendix C). These represent a variety of establishments including dry cleaners, hotels, construction companies, and an assortment of retail stores.

The 1990s were characterized by business prosperity. According to the Small Business Administration (SBA), new business formation reached a record level in 1998 with 898,000 new firms (SBA, 1999). Between 1982 and 1998, the number of business tax returns increased by over 70 percent to nearly 25 million (SBA, 1999). About 21 million Americans are engaged in some type of entrepreneurial activity.

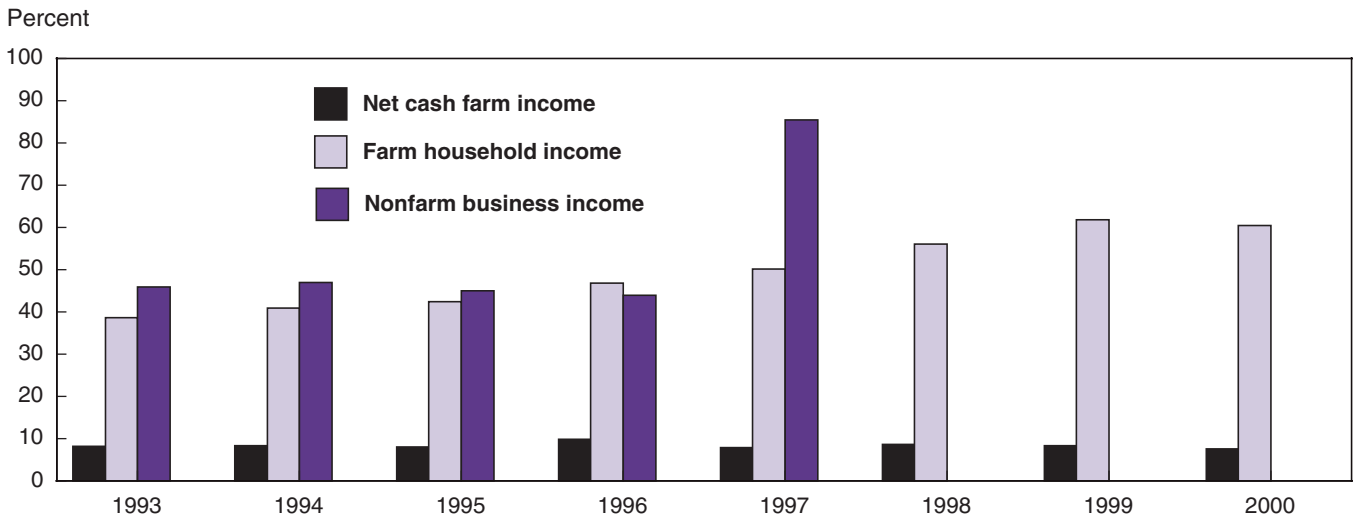
Not only has the number of small businesses grown, but the income derived from them has as well. Income from nonfarm sole proprietors and partners, who operate the vast majority of small businesses, increased by over 6 percent from 1997 to 1998 (SBA, 1999). Meanwhile, average net worth of nonfarm proprietors increased by 24 percent.

Many farm proprietorship households shared in the strong performance of the nonfarm economy because of their reliance on off-farm employment and other sources of nonfarm income. While farm business earnings were relatively stagnant during 1993-99 (and declining when adjusted for inflation), average household income increased by 60 percent, reaching nearly $62,000 per farm by 1999 (fig. 19).

Farm and Nonfarm Businesses Vastly Different Contributors to Sponsoring Households

There are stark differences between farm and nonfarm proprietorship households in the importance of the

Figure 19
Average business net cash income and household income for farm and nonfarm proprietorships, 1993-2000



Source: Agricultural Resource Management Survey (ARMS), 1993-2000; and Survey of Consumer Finances (SCF), 1997.

business as a source of household income. These differences occur largely at the extremes where the business either detracts from household income or contributes the majority of household income. For more than 60 percent of farm households in 1997, the business siphoned money income away from the household (fig. 20). On average, before-tax household income was reduced by more than 25 percent to compensate for farm business losses. In contrast, only 4 percent of nonfarm businesses incurred losses that reduced before-tax household income. The business was the principal source of income (80 percent or more) for nearly half of nonfarm proprietorship households, versus 7 percent of farm proprietorship households.

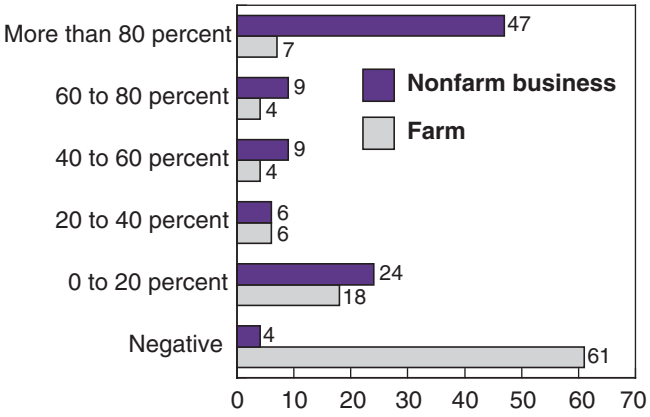
Disparity in the size structure of farm and nonfarm businesses helps to explain this result. Most nonfarm proprietorships are large in terms of gross revenues. The majority of farm proprietorships (95 percent) are small businesses with gross annual sales below $250,000. For 45 percent of larger farm businesses (>$250,000), the farm was the primary source of household income.

Wealth is another story. For two-thirds of farm proprietorship households, farm business net worth represents over 80 percent of household net worth. Only 9 percent of nonfarm proprietorship households depended on the business for the majority of household wealth. The business contributed less than 20 percent of household wealth for over half of all nonfarm proprietorships (fig. 21).

While there is little difference between current incomes of farm and nonfarm households, this is partly due to many farm households' straddling the farm and the nonfarm sectors. Isolating business performance from household well-being is important because business performance is only a contributor to household well-being, although it matters greatly whether it adds to or subtracts from well-being. But is comparability between farm and nonfarm households in income and wealth justified when returns to agriculture are low compared with returns to alternative investments? Economic theory suggests that capital will flow between the farm and nonfarm sector and arbitrage away differences in returns, with any remaining differential compensating for varying levels of risk associated with a given rate of return.

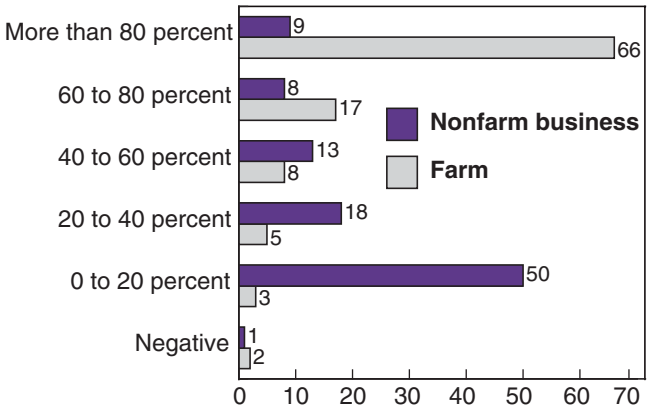
Although equality in returns can be measured using benchmarks such as stock prices over time, comparing

Figure 20
Ratio of business income to total income for farm and nonfarm proprietorship households, 1997



Source: Agricultural Resource Management Survey (ARMS), 1997; and Survey of Consumer Finances (SCF), 1997.

Figure 21
Ratio of business equity to household net worth for farm and nonfarm proprietorship households, 1997



Source: Agricultural Resource Management Survey (ARMS), 1997; and Survey of Consumer Finances (SCF), 1997.

farm businesses with other small, family-owned businesses may be more useful because they are exposed to the same macroeconomic shocks, types of risk, and asset immobility that affect farm businesses. Because all family-owned businesses can add to as well as drain a significant portion of family income and wealth, using the nonfarm entrepreneurial class as a reference group for farm businesses will deepen our understanding of the farm household.

In general, nonfarm businesses achieved a median rate of return on assets that was slightly greater than that of all farm businesses and slightly less than that of farm businesses with sales greater than $250,000. For firms with a negative return on assets, nonfarm businesses

performed worse than farm businesses. The entire distribution of nonfarm returns, surprisingly, is more dispersed than farm returns despite the common emphasis on the complexity and heterogeneity of farming.

Return on assets can be further decomposed into two measures that indicate gross profitability (operating profit margin) and efficiency (asset turnover). Large farms fare well relative to nonfarm businesses regarding profitability, with equal or greater operating profit margin for farm businesses over much of the distribution (although high-return large farms under-performed high-return nonfarm businesses). Smaller farms, on the other hand, have lower operating profit margins than nonfarm businesses at every point in the distribution (table 9). Smaller commercial farms may accept a lower return in part because of perceived noneconomic benefits of farming as a way of life. The most compelling difference between farm and nonfarm businesses is in the ability of nonfarm businesses to generate much higher sales from assets relative to farm businesses.

Table 9 also shows the return on assets for the same population, but this time weighted by the volume of sales rather than the population. This focuses on output rather than on the firm itself. For example, 50 percent of the agricultural output for all farms returned at least 1.8 percent of the value of the assets used in producing the output, while 50 percent of the farm businesses realized a profit of at least 0.2 percent. The output-weighted numbers are higher than the farm-weighted distribution because less profitable farms also tend to produce less output than more profitable farms. Likewise, 50 percent of the output of nonfarm businesses netted a return of 3.9 percent or higher, one percentage point higher than the rate of return earned by 50 percent of the nonfarm businesses themselves.

There is a clear distributional outcome when government payments are given to farmers. Government payments are not evenly distributed because they go only to farms producing certain commodities, and, among those eligible for payments, the actual payment amounts are determined by past production levels. As might be expected, then, government payments accrue disproportionately to large producers. The effect on income distribution, then, is to disproportionately increase the incomes of the top 20 percent of farm households by up to twice the amount of the middle 60 percent of households. A similar phenomenon exists at the lowest quintile of the income distribution, as government payments increased the incomes of the lowest 20 percent of farm households up to twice the amount of the middle 60 percent (Hopkins and Taylor, 2001).

In 2000, 17 percent of U.S. farm households reported lower incomes than in 1999, citing mainly a drop in farm prices and farm production. Larger and farming occupation households reported reduced incomes more commonly than limited-resource, retirement, and residential-type farms, implying that farm households mostly attribute income shortfalls to uncertainty in the farm economic portion of their earnings portfolio (fig. 22).

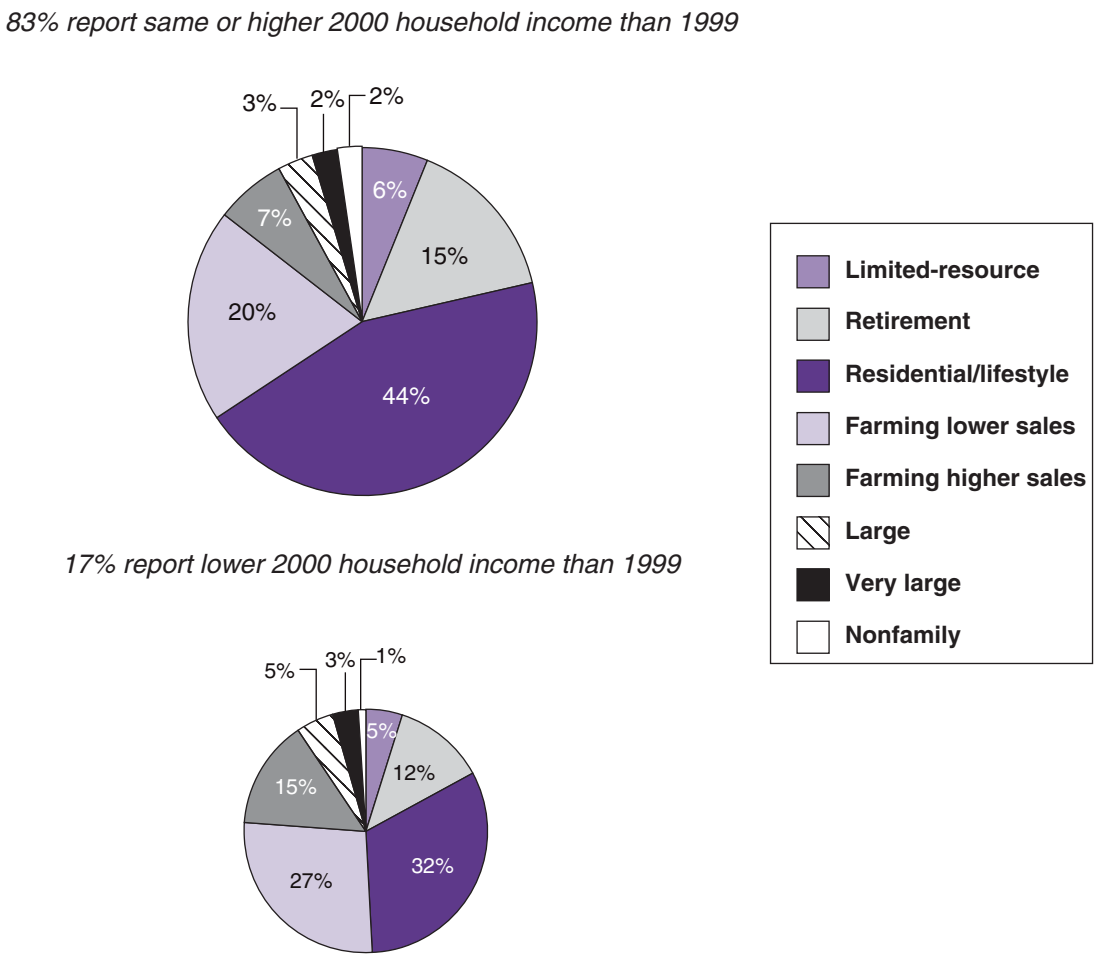
Farm household wealth is disproportionately invested in the physical capital used for farming. Two-thirds of U.S. farm households have 80 percent or more of their wealth invested in the farm business. In contrast, only 9 percent of nonfarm proprietorships have this high a level of specialization in their investments. In fact, half of these proprietorship households hold less than 20

Table 9—Rate of return on business assets for agriculture and nonagriculture sectors

Group	25th percentile	50th percentile	75th percentile
		Percent	
Return on assets, population weights:			
Small farms	-7.6	-0.5	5.7
Large farms	-0.3	6.7	18.7
All farms	-7.2	0.2	6.5
Nonfarm businesses	-21.3	2.9	37.4
Return on assets, weighted by sales:			
Small farms	-6.8	0.0	7.0
Large farms	0.7	7.7	19.4
All farms	-4.8	1.8	10.7
Nonfarm businesses	-26.7	3.9	37.4

Source: 2000 USDA Agricultural Resource Management Survey and Survey of Consumer Finances.

Figure 22
Change in household income by farm type, 1999-2000



Source: Agricultural Resource Management Survey (ARMS), 1999.

percent of their total wealth in their businesses. This disparity is because physical capital in farming is used both in production and as an investment, whereas most nonfarm households hold wealth in both physical capital and financial capital.

Comparing Farm and Nonfarm Income and Wealth

In general, farm and nonfarm household income is similar at several points within the overall distribution (Gundersen et al.). Average incomes are similar for nonfarm and farm households. On the other hand, average wealth for farm households exceeds that of nonfarm households all along the continuum.

Income and wealth distribution is more noteworthy in demonstrating the inequality within the overall farm and nonfarm population. This may indicate underlying differences in a population that reflect larger structural change. In the case of farm and nonfarm households, there is an interesting reversal in the potential for inequality to be important. For farm households, wealth is more equally distributed than income. For nonfarm households, income is more equally distributed than wealth (table 10, appendix D).

Farm Households Save More, Spend Less Than Nonfarm Households

Empirical data (ARMS, 1998 and 1999) show that farm household expenditures are lower than nonfarm household expenditures even when controlling for differences in income, age, location, and size of population. Low levels of expenditure indicate low consump-

Table 10—Quintile ratios and adjusted Gini coefficients for household income and wealth by region, 1997

Regions	P20 (Low)	P80 (High)	P80/P20[1] (quintile ratio)	Gini coefficient
Income:				
Nonfarm households (1997)	43	215	5.00	0.572
Northeast	39	198	5.08	0.538
North Central	39	216	5.54	0.554
South	36	188	5.22	0.536
West	39	208	5.33	0.552
All households				
Farm households (1997)				
Northeast	33	205	6.21	0.699
North Central	36	201	5.58	0.596
South	37	202	5.46	0.604
West	36	242	6.72	0.700
All households	37	206	5.57	0.624
Wealth:				
Nonfarm households (1997)				
Northeast	5	315	63.00	0.785
North Central	7	333	47.57	0.772
South	8	349	43.63	0.809
West	5	583	116.60	0.817
All households	7	371	53.00	0.799
Farm households (1996)[2]				
Northeast	46	236	5.13	0.520
North Central	43	232	5.40	0.520
South	48	279	5.81	0.536
West	38	256	6.74	0.571
All households	42	253	6.02	0.541

[1]P20 and P80 measure, in percentage terms, the ratios of the wealth of a farm operator household at the 20th percentile and a farm operator household at the 80th percentile to median wealth, respectively.
[2] Data not available for 1997.

tion by farm households and could be interpreted as low levels of economic well-being.

While household income and wealth measured in any particular year is affected by economic conditions, the level of household expenditures is determined by that household's beliefs about total income and wealth over a lifetime. Household spending can exceed income by borrowing or liquidating financial capital. One would expect this to occur most at very low levels of income.

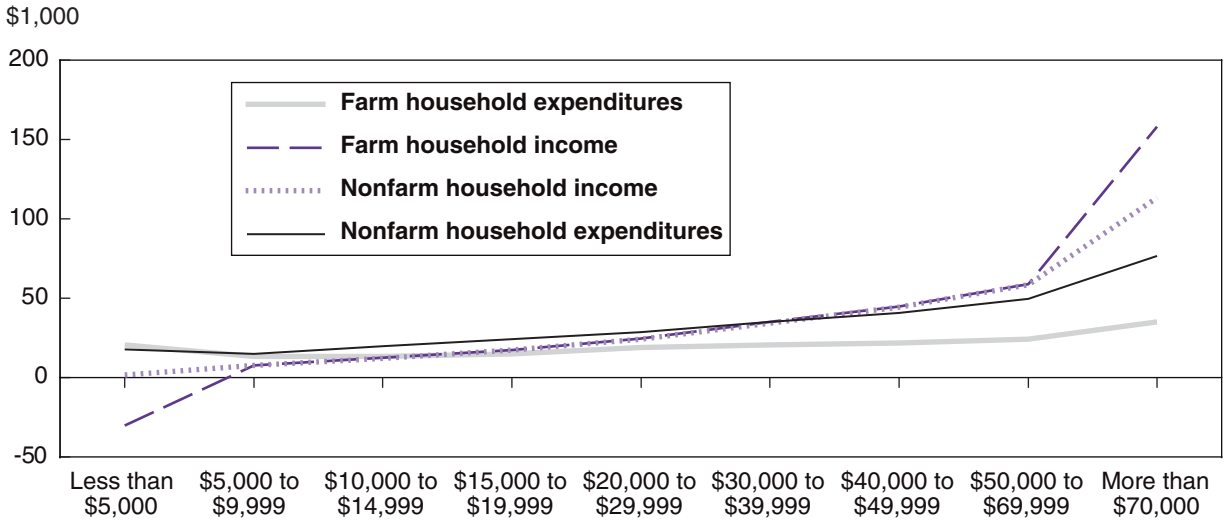
At very low levels of income (below $5,000), farm households consumed more than nonfarm households (fig. 23). Many farms in this category likely had low incomes due to weather or other factors and normally consume that amount. Generally, farm household expenditures were lower than nonfarm household expenditures in 1999. The spending trended upward along with income levels over much of the income distribution for both farm and nonfarm households.

Expenditures for farm and nonfarm households track with the earnings profile, increasing with age and then decreasing after age 45-54. The gap between income and expenditures (fig. 24), always positive, is greatest for farm households age 45-54. The gap between income and expenditures is relatively constant for farm households, and although both income and expenditures peak at age 45-54, neither expenditures nor incomes are monotonically increasing in age.

Although expenditures for farm and nonfarm households are similar in the West, in the other three regions farm expenditures are much smaller than nonfarm expenditures, despite the fact that farm household income exceeds nonfarm household income.

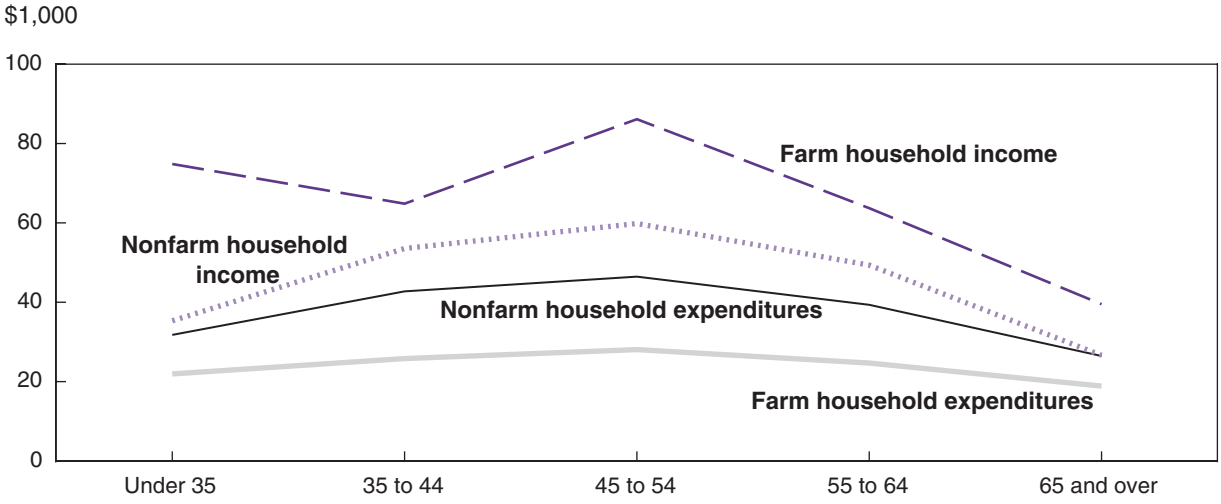
Farm and nonfarm households had comparable expenditure profiles for different household sizes. In general, households with more members had greater expenditures, although a plateau was reached at about four members for nonfarm households and was still rising at five members for farm households. All households, on average, spent less than their earnings, but savings (earnings - expenditures) was much greater for farm households.

Figure 23
Income and expenditures for farm and nonfarm households by income class, 1999



Source: Agricultural Resources Management Survey (ARMS), 1999; and Survey of Consumer Finances (SCF), 1999.

Figure 24
Income and expenditures for farm and nonfarm households by age class, 1999



Source: Agricultural Resources Management Survey (ARMS), 1999; and Survey of Consumer Finances (SCF), 1999.

The trend for farm household expenditures to be lower than nonfarm household expenditures is sustained by simple summary analysis. For example, farm households may more readily categorize their expenses as business versus personal household expenses. As such, nonfarm households may be required to assume more transportation and work-related expenses directly relative to farm households, whose expenses are often commingled with the business. Farm households may also be able to spend less by providing a portion of their own consumption from their farm. Although food is the most obvious savings, in some parts of the country a farm's oil and gas expenses are waived in return for resource extraction agreements with utilities.

Or perhaps farm households simply choose to save, rather than consume, a greater portion of their income. This portion may be invested into the farm or some other business, or saved in more liquid accounts. Many farm households choose to save so that they can help their son or daughter get a start in farming. Finally, a farm's debt servicing forces a higher savings rate.

Findings and Policy Implications

Despite the importance of income and wealth to farm households' economic well-being, existing literature on the subject has often emphasized the role of one measure to the exclusion of the other. For studies addressing the economic standing of a farm household relative to a household in the general population, the economic indicator of choice has been income. Analyses have typically focused on average income without considering variations in contributing sources.

This report advances the literature by framing farmers' well-being in the context of income, wealth, and consumption at the household level. In doing so, the report provides a broader basis from which to compare the economic status and well-being of farm operator households among different farm groups and with all U.S. households in general. Data from the USDA's Agricultural Resource Management Survey were used to examine the economic well-being of U.S. farm households. Comparison with nonfarm households is undertaken with data from the Federal Reserve Board's Survey of Consumer Finances and Current Population Survey (CPS). Among our findings:

- Farm households are no different than other households in pursuing two careers and diversifying earnings.
- The farm business as a source of income has become increasingly less important to farm households, especially noncommercial farms (sales less than $250,000 per year).
- While farm income exhibits considerable variability, farm **household** income is relatively stable.
- Income available to farm households can support a standard of living equal to or above that of the average nonfarm household.
- For most nonfarm proprietorship households, the business is the main source of income; for most farm proprietorship households, the farm detracts from total household income.
- The average wealth of farm households has increased, and farm households have broadened their investment portfolio to include more nonfarm components.
- While the life cycle is a dominant influence on differences in the level and source of household income and wealth, other contributing factors include farm type and size, operator education, farm tenure, and household size.
- Even for farms in rural areas, off-farm income is still the dominant source of household earnings.
- Consumption expenditures by farm households are lower than for nonfarm households.
- Despite the fact that average incomes are similar for farm and nonfarm households, the corresponding income distributions are significantly different.
- Considerable differences in wealth exist between farm and nonfarm households both in terms of the reported averages and in how the wealth is distributed.
- The conventional wisdom that farm households are financially disadvantaged compared with other U.S. households does not hold.

Household Well-Being

Farm household economic well-being is affected both by the level of income and wealth available to the household and by its influence over the consumption of goods and services. In this context, well-being has both an absolute component, which compares income and wealth to a selected standard, and a relative component, which measures the ability of households to meet consumption needs. Traditionally, assessments of farm household economic well-being have had a singular focus: determining how income levels of farm households compared with incomes of nonfarm households. This analysis develops a joint distribution of income and wealth for farm households. This more inclusive view better captures well-being since household income is subject to shocks such as falling or rising prices for agricultural commodities, changes in production due to weather, or changes in employment status or conditions in off-farm jobs. Access to financial or other assets, including savings, by the household can be used to level consumption. Assets can be drawn down to offset temporary shortfalls in income. Likewise, income that exceeds consumption can be added to savings or used to pay down debt.

In 2000, almost half of U.S. farm households had both higher incomes and greater wealth than all U.S. households (table 11). Of these farms, 97.5 percent reported household income greater than consumption expendi-

Table 11—Characteristics of farm operator households (based on U.S. median income and U.S. median wealth), 2000, by economic well-being

Item	Economic well-being				U.S. total
	Lower income-lower wealth	Lower income-higher wealth	Higher income-lower wealth	Higher income-higher wealth	
Number of farms	127,501	903,802	56,123	1,034,151	2,121,576
Percent of farms	6.0	42.6	2.6	48.7	100.0
Percent of total value of production	2.2	34.1	1.3	62.4	100.0
Percent of crop value of production	2.6	32.4	1.5	63.4	100.0
Percent of livestock value of production	1.8	35.8	1.0	61.4	100.0
Distribution by farm typology:					
Limited-resource/retirement/residential farms	77.0	56.8	85.7	67.7	64.1
Farming occupation (low sales/high sales) farms	21.3	38.9	d	23.6	29.6
Large/very large/nonfamily farms	1.7	4.3	*4.1	8.7	6.3
Farm size (operated acres)	175	435	*197	455	423
Average government payment ($)	3,523	6,115	*3,143	9,014	7,294
Farm income	*-5,325	-10,551	@1,351	15,530	2,791
Depreciation	3,398	7,561	*3,131	7,800	7,310
Change from 1999 in accounts receivable	@561	916	#-1,192	*-882	@-38
Change from 1999 in value of inventory	#1,805	3,878	@557	2,744	3,113
Off-farm income	23,321	24,800	82,269	92,493	59,228
Wages and salaries	18,338	11,495	63,340	52,236	33,137
Off-farm business income	*627	1,843	*5,718	17,429	9,470
Interest and dividends	*204	1,856	*1,719	6,863	4,194
Social Security and other public programs	3,009	7,010	#4,828	5,341	5,898
Other passive sources of income	#525	1,554	*5,334	*7,992	4,730
Farm operator household income	17,995	14,249	83,619	108,023	62,019
Total household expenditures	17,118	19,994	29,018	32,073	25,948
Distribution of households (percent):					
Household income < Household expenditures	31.8	42.4	d	2.5	21.3
Household income < Household expenditures (income adjusted for government payments)	37.0	47.6	d	6.7	25.9
Household income < Household expenditures (income adjusted for accounts receivable and inventories)	28.1	37.5	d	4.6	20.1
Household income < Household expenditures (income adjusted for depreciation)	24.2	30.8	d	3.4	16.4
Household net worth ($)	39,503	449,521	*21,034	656,040	514,212
Household farm net worth	43,145	387,396	38,897	517,587	420,950
Household nonfarm net worth	@-3,643	62,125	#-17,863	138,453	93,263
Farm operator age	48	59	44	53	55
Farm operator education (percent):					
Some high school or less	*21.1	22.0	d	8.7	15.1
Completed high school	34.5	47.3	44.9	35.2	40.6
Some college	30.0	20.8	*26.5	28.4	25.2
Completed college (BA, BS)	*11.5	6.6	*18.7	17.8	12.7
Graduate school	d	3.3	d	9.9	6.5

Source: 2000 USDA Agricultural Resource Management Study. * Standard error of estimate > 25 percent and less than or equal to 50 percent. # Standard error of estimate > 50 percent and less than or equal to 75 percent. @ Standard error of estimate > 75 percent. d indicates insufficient information.

tures, on average three times higher ($102,000 versus $32,000). "Higher-income, higher-wealth" farms reported net worth of $656,000, of which $138,000 was nonfarm assets. An income measure that transcends cash to consider changes in inventory or accounts receivable would substantially increase resources available to farm households. Higher-income, higher-wealth farm households contained a disproportionate share of larger farm operations and farm operators who reported a primary occupation other than farming. On average, this group of farm households operated the largest farms (455 acres), accounted for 62 percent of U.S. farm output, and received 60 percent of government payments. This group of operators also had, by far, the highest educational standing.

About 43 percent of U.S. farm households reported lower incomes and greater wealth than all U.S. households in 2000. Even so, a majority (58 percent) reported household expenditures below household incomes (table 11). "Lower-income, higher-wealth" households contain a disproportionate share of intermediate-size farms and farmers who report that they are retired. More than 40 percent of farm operators in this group were 65 or older.

The group also contains a disproportionate share of limited-resource farm households. For many limited-resource farms, self-employment income is often negative. Yet, as a part of normal business operations, some may be owed money and others may hold crop and livestock outputs as additions to their business inventories at year-end. On average, money owed from sales and additions to inventory would have been sufficient to offset half of this group's income shortfall. Taking these assets into account, the proportion of households with incomes less than consumption expenditures drops from 42 percent to 38 percent. Thus, for farm households, as with other self-employed households, it is important to consider decisions with regard to stockholding, as well as funds owed the business from prior economic actions. Without taking these sources of liquid or near-liquid assets into account, the proportion of households considered disadvantaged could be substantially higher. This would have been particularly so for younger operators where money owed for crops or additions to farm inventories would have offset most farm income losses and helped fund household consumption needs without depleting savings or other sources of funds.

Meanwhile, lower-income, higher-wealth farms had the second highest level of household net worth, by far, of any group ($450,000). Much of it is held in business assets. For the more elderly or retired farmers in this group who did not have sufficient current earnings from farming, two options are available to supplement current household incomes. They can secure access to their accumulated assets or they can begin to depreciate capital assets, such as their machinery or equipment whose useful life is either extended or not replaced as it wears out. Generating a flow of income from the household's asset base to support consumption would require either disposing of the farm or finding alternative ways, such as renting and leasing to other farms or participating in government programs. A substantial share of lower-income, higher-wealth farm households do receive government payments, especially for conservation (land retirement).

Commercial-size farms in the lower-income, higher-wealth group likely reside there after a subpar production year. As such, income from farm self-employment likely eroded overall household incomes. For many of these households, this is likely a short-term farm earnings issue. Meanwhile, we would expect these households to maintain consumption levels that, on average, exceed current household incomes by drawing on savings or other assets.

Results of the joint income and wealth analyses also revealed a group of higher-income, lower-wealth households and a group of lower-income, lower-wealth households. The 2.6 percent of farms with higher incomes and lesser wealth are almost entirely focused on off-farm activities, with 84 percent reporting a primary occupation other than farming. This group of households is younger than average, and more had attended or completed college. Household incomes are almost entirely from off-farm sources and exceed consumption expenditures.

Six percent of U.S. farm households suffer both lower income and lower wealth. This group, which consists principally of small and limited-resource farms, on average, has little give between household incomes and consumption expenditures. Of this group of households, 21 percent report a farming occupation and nearly 38 percent are limited-resource households. Lower-income, lower-wealth households have a small asset base with which to counter an unexpected shortfall in household earnings. Nearly one out of three households

reported income less than consumption expenditures in 2000. So, for about 2 percent of U.S. farm households, reported income and wealth levels imply a very difficult set of economic circumstances, with insufficient income to support even meager consumption and few assets to meet or enhance it (fig. 25).

On average, farm households have higher incomes, greater wealth, and lower consumption expenditures than all U.S. households. Incomes of farm households are, on average, sufficient to support a standard of living (defined as meeting consumption and basic household needs) that either is comparable to or exceeds that for all U.S. households. No longer do farm households inhabit one all-defining group that is considered either disadvantaged or without problems.

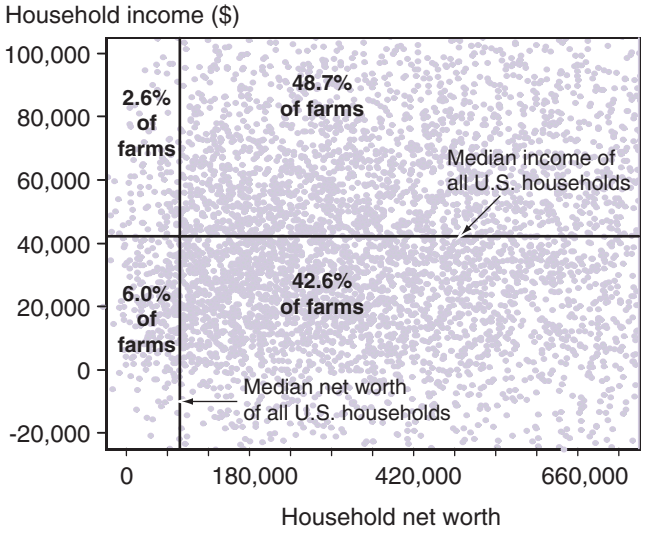
When the ability of income to support current consumption expenditures is taken as the measure of well-being, approximately 21 percent of U.S. farm households might be considered to have some short-term disadvantage. As our analysis revealed, however, the vast majority of these households have wealth levels, including liquid or near-liquid assets held in their businesses, that could be used to sustain consumption. For the lower-income, lower-wealth households, this is not so. These households, some of which appear to be beginning farmers, have relatively low levels of consumption, low incomes, and few resources to offset any unexpected income shortfall.

Policy Implications

Using Houthakker's (1967) definition of the farm problem, which is precipitated by low and stagnant incomes, resources must leave agriculture for growth to occur. Farm programs, while unable to prevent this transition, compensate for the resistance to this shift and have eased the movement of human resources out of agriculture. During the 20th century the number of U.S. farms fell by more than 60 percent. Today, less than 3 percent of the population is engaged in farming. At the same time, there has only been a small decline in productive acres as expanding operations absorbed farmland. Rapid technological advancements have made it possible to substitute machines and other forms of capital for people. Farm programs made it possible for most of the migration away from agriculture to occur through the retirement of farm operators and other types of voluntary business closures. Recent evidence on farm business closures suggests that the annual dissolution rate for farming is 2 to 3 percent,

Figure 25
Economic well-being of farm households compared to all U.S. households

A small proportion of farm households are disadvantaged when using income and wealth jointly as a measure of economic well-being.



Source: Economic Research Service, USDA.

much lower than for nonfarm businesses (*Agricultural Outlook*, June/July 2001). In recent history, the highest farm bankruptcy filings (4.2 percent) and closures (6.0 percent) occurred in the aftermath of the 1980s farm financial crisis.

The migration away from agriculture has been broader than the closure of farm businesses. Younger farm family members often moved to more promising economic opportunities long before their parents retired. More importantly, dual career choices by farm operators and the explosion of off-farm employment by spouses brought about an even larger shift of human resources to nonagricultural employment. Rural population growth and relative stability in farm numbers suggests net migration to rural areas in the 1990s, reversing what was believed to be a dominant long-term trend. Many of these newcomers made farming a second career choice.

Today, farm households are virtually indistinguishable from nonfarm households in their levels of income and the diversity of employment. As a result, government policies that influence general economic conditions have a much more profound impact on farm families. Even though farm families may suffer low incomes in a given year, policy must look to whether low incomes

are chronic and involuntary. For example, the seeming immobility of farmers may in fact be voluntary and simply reflect the nonmonetary valuation of farm ownership and rural living in comparison with wages and benefits from nonfarm employment. Similarly, a relatively low household income may result from an unusual weather event in that particular year.

Federal support of farm income warrants continued scrutiny. A limited number of households depend on farming for a majority of farm household income. In addition, household incomes for the farms most dependent on farming are well above the average for all households. Given the large size of these farms and their use of labor, it would be difficult to characterize those most dependent on farming as the traditional small family farms. During low-income years, many farms are able to maintain consumption by using their own savings or borrowing. In fact, government policies that reduce credit constraints or increase farm household wealth may better address a farm household's yearly needs. Some may even argue that by reducing market risk, government programs create a disincentive for farmers to accumulate cash reserves for unexpected income shortfalls.

Farm families with off-farm employment (the majority), like everyone else, are protected by a social safety net comprised of unemployment insurance, the earned income tax credit, and food stamps. One way to minimize any adverse and unintended effect of farm payments is to pursue policies aimed at increasing off-farm job opportunities. One such policy tool is the 1997 tax legislation that increased the number of Empowerment Zones (i.e., areas with pervasive poverty and unemployment targeted for economic development where tax incentives are provided for the purpose of attracting private-sector investment).

A related issue is the role of human capital. This report reinforces the importance of education to the income and the wealth of farm operator households. Yet, nearly one-quarter of U.S. farm operators, particularly older farmers, have less than a high school education. Less educated farmers tend to miss out on higher paying jobs and job advances. This suggests the need to revisit legislative authority for USDA to administer national grants to promote public secondary education curricula and enrollments in agriculture-related studies. Such programs might provide for formal off-farm job preparation, particularly by older and less educated farmers.

The results of this study also have implications for policies aimed at income stabilization as well as redistribution. Much of the acknowledged risk associated with commodity production is now insurable. Both the scope of commodities covered and the available levels of coverage are increasing. Minimum levels of coverage are subsidized through Federal crop insurance programs. While farm income variability surely exists and can jeopardize farm household income in any given year, we do not have empirical evidence on how insurance affects both farm and household income variability.

Our study highlighted the importance of the life cycle when examining the economic well-being of farm households. With nearly 70 percent of farm household assets currently tied to real estate, the question of succession and of the tax laws governing it, particularly for older farmers, is important. Our findings that "medical expenses, etc." contribute the largest portion of variability in expenditures among farmers 55 and older shows that the burden of medical insurance is not equal across the population. Policy might consequently focus on the health care needs of this segment of the farming population.

Whether intended or not, the capitalization of government payments into higher prices for farmland, production and marketing rights, production facilities, and other specialized resources has helped to create wealth (*Agricultural Outlook*, Nov. 2001). Farm operators only see a portion of this additional wealth, and those who do are often the same operations that receive the largest share of direct payments. In addition to further concentrating wealth, the capitalization of payments into farm real estate values creates a larger gulf between asset values and the market returns that are required to support them. Higher farm real estate values also make it more difficult for new and beginning farmers. Thus, direct income transfers that ultimately make purchasing farmland more expensive are at odds with other programs designed to assist beginning farmers.

Because so much of the value (estimates range between 8 and 25 percent) of farmland is attributable to government payments, a key concern is that removing the direct link could cause severe adjustment problems. Interestingly, this study demonstrates that farm families have diversified their asset holdings beyond

the farm business, in effect helping to insulate them from potential impacts of farm asset deflation.

Rural development policy is not synonymous with agricultural policy, yet the results of this study suggest that perhaps more important than the price of corn (or any other commodity) is the vulnerability of farm families to recession in the general economy. Recognition of the importance of household income diversity and the contribution of off-farm employment should not underestimate the overall benefits and opportunities that agriculture provides to local economies. This balance is ultimately found through the free flow of resources creating an environment that will attract and sustain private investment, job growth, and income generation activities in rural America.

There is a need for further study. The importance of joint household-farm decision-making will challenge analysts to organize data and research issues into manageable and comprehensible frameworks. By showing how all these decisions are related to each other and to the economic environment surrounding the household, household economics models will provide analysts with a conceptual understanding of the multifaceted lives that rural people live. At the level of full empirical specification, however, household economics models have only hinted at the quantitative significance of the internal decisionmaking relationships. This shortcoming results partly from the difficulty in obtaining precise data on actual time allocations within households. More important, judging the real opportunity cost of time is both conceptually and empirically difficult because its true value lies within the mind of the decisionmaker.

This study shows that farm households have a higher propensity to save than nonfarm households. Current efforts by the USDA to collect more thorough information on the decisionmaking processes of the household should shed some light on the reasons behind farm households' affinity toward savings. While this report posits production uncertainties and a stronger precautionary motivation to save, additional information from ARMS survey responses should provide the means to test this hypothesis more fully.

In addition, there is a need to collect additional information that will be rich enough to reveal from among U.S. farm households who were the winners and losers under the 1996 Farm Act, and who are most vulnerable to nonfarm economic shocks. While the metric that will be used to assess the economic well-being of farm households will be similar to what has been used in this report, future data collection will have to anticipate this more meaningful concept of well-being. Specifically, it would be prudent that information collected to allow for the measurement of the household's economic well-being be supplemented to assess whether the resources used to generate households' income and wealth also contributed toward improving rural amenities. This issue is becoming more relevant as farm size and absentee ownership continue to increase and the number of family farms dwindles.

Information collected in future ARMS surveys with regard to the type and location of off-farm employment should remedy some of the shortcomings inherent in this report. In particular, in the face of rising levels of self-employment, our data do not allow for an assessment of whether this self-employment is farm related or not. Data limitations also mask whether the growth in self-employment is a reflection of growth in value-added enterprises related to the farm, or whether the growth is more likely to be in nonfarm enterprises. Yet another important question left unanswered here because of a lack of survey information concerns the manner in which farm program payments get used by the farm household. Policy options could be more enlightened with information on whether farm program payments are used to expand the size of the operation, repay existing debt, invest in new machinery, or mitigate some of the risks from farming.

Appendix A—Agricultural Resource Management Survey (ARMS)

The Agricultural Resource Management Survey (ARMS) is USDA's primary vehicle for data collection of information on a broad range of issues about agricultural resource use and costs, and farm financial conditions. The ARMS is a flexible data collection tool with several versions and uses.

Specifically, the ARMS is conducted to:

(1) Gather information about the relationships among agricultural production, resources, and the environment.

(2) Determine what it costs to produce various crop and livestock commodities, and the relative importance of various production expense items.

(3) Help determine farmers'/ranchers' net farm income and provide data on the financial situation of farm/ranch businesses, including the amount of debt they have.

(4) Help determine the characteristics and financial situations of farm/ranch operators and their households, including collecting information on management strategies and their off-farm income.

ARMS data provide the only national perspective on the annual changes in the financial conditions of production agriculture. Farm organizations, commodity groups, agribusiness, Congress, and the USDA use the information in evaluating the financial performance of farm/ranch businesses and in making policy decisions affecting agriculture.

Appendix B—Decomposing Sources of Variation in Household Income and Wealth

Total income of the farm household is defined as income from farming operations (this includes all cash income, net of cash expenses, depreciation, and in-kind benefits to hired labor), off-farm business income, income from off-farm employment (off-farm wages/salaries), interest and dividend earnings, and other off-farm income (such as military retirement, unemployment, private assistance programs, rental income from nonfarm properties). Farm capital gains (or losses) are not included in farm income, although they contribute significantly to the well-being of operator households.

To minimize income variability for farm operator households in each of the subgroups, the factors are identified that contribute the most to the variance of total income. To determine this, let total income of the *i*th farm operator household (THI_i) be described as in the following:

$$THI_i = \sum_{g=1}^{k} X_{g,i}, \quad (i = 1,\ldots,n), \tag{1}$$

where X_1,..., X_5 are net farm income, off-farm business income, off-farm wage/salaries, income from interest and dividends, and income from other off-farm sources (e.g., Social Security and public assistance, unemployment and veteran's benefits, etc.), respectively. The variability in *THI* is measured as:

$$\begin{aligned} \sigma_{THI} = \; & \sigma_{11} + \sigma_{12} + \sigma_{13} \cdots\cdots + \sigma_{1k} + \\ & \sigma_{21} + \sigma_{22} + \sigma_{23} \cdots\cdots + \sigma_{2k} + \\ & \sigma_{31} + \sigma_{32} + \sigma_{33} \cdots\cdots + \sigma_{3k} + \\ & \sigma_{k1} + \sigma_{k2} + \sigma_{k3} \cdots\cdots + \sigma_{kk}, \end{aligned} \tag{2}$$

where σ_{THI} is the weighted variance of *THI*, and σ_{gg} and σ_{gh} ($g \neq h$) are the weighted variance of component X_g ($g = 1,..,k$) and the weighted covariance of components X_g and X_h, respectively. The variability of *THI* as described in equation 2 is approximated by the sum of variance-covariance effects attributed to the components of *THI*.

The relative importance of the additive components of *THI* to the variability in *THI* is measured by:

$$\begin{aligned} C_1 &= (\sigma_{11} + \sigma_{12} \cdots + \sigma_{1k}) / \sigma_{THI} \\ C_2 &= (\sigma_{21} + \sigma_{22} \cdots + \sigma_{2k}) / \sigma_{THI} \\ . &= \cdots \quad \cdots \quad \cdots \quad \cdots \\ . &= \cdots \quad \cdots \quad \cdots \quad \cdots \\ C_k &= (\sigma_{k1} + \sigma_{k2} + \cdots + \sigma_{kk}) / \sigma_{THI}, \end{aligned} \tag{3}$$

where C_1 ,...,C_k are relative measures of the contribution of income components to the normalized variance of *THI* (PHI sub THI), respectively. The summation of these relative measures yields unity as in[6]:

$$\Phi_{THI} = \sum_{g=1}^{4} C_g = 1. \tag{4}$$

A similar analysis can be performed to decompose sources of variation in farm household wealth (see Mishra and El-Osta, 2001).

References

Burt, O.R., and R.M. Finley. "Statistical Analysis of Identities in Random Variables," *American Journal of Agricultural Economics*, Vol. 50, (Nov. 1986), pp. 734-744.

Ezekiel, M., and K.A. Fox. *Methods of Correlation and Regression Analysis*, 3rd edition, New York: John Wiley, 1959.

Mishra, A.K., and H.S. El-Osta. "Decomposition of Variability in Assets and Debt of Farm Household in the United States." Selected paper presented at the 2001 AAEA meetings in Chicago, IL, Aug. 5-8, 2001.

[6]The method described here is an adaptation of the method of coefficient of separate determination (see Ezekiel and Fox; Burt and Finley).

Appendix C—
Survey of Consumer Finances

The Survey of Consumer Finances (SCF) is conducted every 3 years to provide detailed information on the finances of U.S. families. No other U.S. study collects comparable information. Data from the SCF are widely used, from analysis at the Federal Reserve and other branches of government to scholarly work at the major economic research centers.

The study is sponsored by the Federal Reserve Board in cooperation with the Department of the Treasury. Since 1992, data have been collected by the National Opinion Research Center at the University of Chicago (NORC). To ensure the representativeness of the study, respondents are selected randomly using procedures described in the technical working papers. A strong attempt is made to select families from all economic strata.

Participation in the study is strictly voluntary. However, because only about 4,500 families are interviewed in the main study, every family selected is very important to the results. To retain the scientific validity of the study, interviewers are not allowed to substitute respondents for families that do not participate. Thus, if a family declines to participate, it means that families like theirs may not be represented clearly in national discussions.

Appendix D—
Adjusted Gini Coefficient

The adjusted Gini index (G^*), which was originally proposed by Chen, Tsaur, and Rhai (1982) and was further developed by Berrebi and Silber (1985), is a statistical index that allows for the measurement of inequality in the presence of negative observations. This measure has a lower bound of 0 and an upper bound of 1. When applied to farm household income, a Gini value of 0 indicates perfect equality (that is, all households are receiving equal shares of income). A Gini value of 1 indicates perfect inequality (that is, one household is receiving all the income and all other households are receiving none). The benefit of using the adjusted Gini coefficient, instead of what is commonly known as the standard Gini coeffient (G), is its ability to mitigate the possibility of overstating inequality when the data contain a large number of observations with negative values. Since the 1997 Agricultural Resource Management Survey shows 6.5 percent of farm households reporting negative income, G^* is the preferred choice. The G^*, which normalizes the distribution of income when a large number of observations are negative so that the value of Gini has an upper bound of unity, is computed as follows:

$$G^* = \frac{(2/\mathrm{n})\sum_{j=1}^{n} \mathrm{j}\, \mathrm{y}_j - \frac{\mathrm{n}+1}{\mathrm{n}}}{\left[1+(2/\mathrm{n})\sum_{j=1}^{m} \mathrm{j}\, \mathrm{y}_j\right] + (1/\mathrm{n})\sum_{j=1}^{m} \mathrm{y}_j \left[\frac{\sum_{j=1}^{m} \mathrm{y}_j}{\mathrm{y}_{m+1}} - (1+2m)\right]},$$

where

$$\mathrm{y}_j = \mathrm{Y}_j / \mathrm{n}\overline{\mathrm{Y}} \quad \text{and} \quad \overline{\mathrm{Y}} = \sum_{j=1}^{n} \mathrm{Y}_j / n > 0.$$

In these equations, n is the total number of households, y_j is the income share of the j^{th} household, Y_j is the household's total income where $Y_1 \leq ... \leq Y_n$ with some $Y_j < 0$, and m is the size of the subset of the households whose combined income is zero with $Y_1 \leq ... \leq Y_m$. For computational purposes, m is determined where the sum of incomes over the first m households is negative and the first m + 1 households is positive.

References

Berrebi, Z.M., and Jacques Silber. "The Gini Coefficient and Negative Income: A Comment," *Oxford Economic Papers*, Vol. 37, pp. 525-26, 1985.

Chen, C., T. Tsaur, and T. Rhai. "The Gini Coefficient and Negative Income," *Oxford Economic Papers*, Vol. 34, pp. 473-78, 1982.

Appendix table 1—Household characteristics, by farm typology group, 2000

Item	Farm typology group						
	Limited-resource	Retirement	Residential/lifestyle	Low-sales	High-sales	Large farms	All
				Number			
Total households	129,810	319,297	911,925	454,728	172,720	133,097	2,121,576
Number of households sharing income	133,854.1	338,111.2	100,8147.8	489,951.5	200,490.1	182,059.1	2,352,613.8
				Percent			
Distribution of households	6.12	15.05	42.98	21.43	8.14	6.27	100.00
Percent farm income to operator household	95.31	95.77	97.62	100.86	90.25	85.03	68.62
Operators in age class:							
Less than 35 years	na	na	7.39	5.06	12.78	6.03	6.34
35 to 44	*13.68	**L**	22.93	8.75	24.11	27.00	16.31
45 to 54	na	na	38.88	21.07	30.42	35.83	27.58
55 to 64	15.58	17.74	24.75	27.81	20.27	20.97	23.19
65 years or older	50.22	74.85	6.05	37.31	12.42	10.16	26.58
Operators in education class:							
Some high school or less	42.12	27.65	7.91	18.40	7.21	6.89	15.10
Completed high school	30.59	37.77	39.72	44.84	48.37	37.96	40.56
Some college	20.50	18.99	28.91	20.44	27.68	32.51	25.21
Completed college (BA, BS)	na	8.85	14.87	10.73	14.36	19.99	12.67
Graduate school	na	*6.74	8.58	*5.59	2.37	2.66	6.45
Operators in gender class:							
Male	73.70	87.93	91.65	90.11	95.85	97.45	90.37
Female	na	12.07	8.35	9.89	na	2.55	9.63
Persons in household:							
Refused to answer	**L**	na	na	na	na	na	*0.99
Two or fewer	69.94	83.20	44.97	69.52	45.77	40.81	57.32
Three to five	27.67	15.21	49.55	26.05	46.05	49.54	37.72
Five or more	na	na	4.37	3.88	6.99	8.56	3.97
Farming experience:							
Refused to answer	na	na	*3.09	na	na	1.08	2.24
Less than 10 years	29.46	10.19	28.69	13.59	15.34	10.55	20.49
11-20 years	*16.89	15.07	26.23	15.62	23.38	21.18	21.16
21-30 years	na	17.95	23.23	20.50	28.38	37.26	22.50
Over 30 years	41.05	53.96	18.75	48.84	31.59	29.94	33.61
Spouse a decision maker:							
Refused to answer	na	na	na	na	na	na	*0.68
Spouse a decision maker	25.67	34.78	43.40	43.85	41.74	46.42	41.17
No spouse	40.67	18.23	11.80	13.84	13.91	7.62	14.88
Spouse not a decision maker	33.66	46.14	44.04	41.79	43.50	45.27	43.27

Based on 7,712 observations.(7,712 households). Expansion factor=ver1wt0. Version=1 only.
Coefficient of variation = (Standard error/estimate)*100. * indicates that CV is greater than 25 and less than or equal to 50.
na indicates value is not available due to no observations, an undefined statistic, or reliability issues.
Rounded percents may not add to 100.
L = Legal disclosure edit required. Two estimates had less than three observations or had dominance concerns.
POSSIBLE ERROR: one minus ones that could be refusal codes were found.

Source: 2000 USDA Agricultural Resource Management Study.

Appendix table 2—Allocation of operator and spouse labor hours to farm and off-farm work by farm typology group, 2000[1]

Item	Limited-resource	Retirement	Residential/lifestyle	Farming occupation/ lower sales
Number of household farms	127,390	319,297	913,088	455,984
Percent of farms	6.0	15.1	43.0	21.5
Operator hours worked:				
Farm	958	854	935	1,947
Off-farm	463	*101	1,977	381
Total	1,421	954	2,912	2,328
Share reporting off-farm hours	28.9	11.1	94.2	31.8
Of off-farm working operators, share reporting > 35 hours	67.3	46.4	88.7	51.1
Spouse hours worked:				
Farm	212	189	250	405
Off-farm	*231	288	1,049	666
Total	444	477	1,299	1,070
Share reporting off-farm hours	*13.5	18.9	59.9	38.5
Of off-farm working spouses, share reporting > 35 hours	66.6	64.9	73.3	69.5

	Farming occupation/ higher sales	Large	Very large	All
Number of household farms	172,720	78,256	54,841	2,121,57
Percent of farms	8.1	3.7	2.6	100.0
Operator hours worked:				
Farm	2,945	2,970	2,958	1,433
Off-farm	262	229	195	1,011
Total	3,208	3,199	3,153	2,443
Share reporting off-farm hours	26.2	22.9	17.1	54.2
Of off-farm working operators, share reporting > 35 hours	55.4	57.5	46.3	79.9
Spouse hours worked:				
Farm	673	720	795	337
Off-farm	724	686	582	751
Total	1,398	1,406	1,377	1,089
Share reporting off-farm hours	47.8	47.2	39.4	44.3
Of off-farm working spouses, share reporting > 35 hours	60.7	59.6	64.9	70.1

[1]Analysis excludes farms operated by hired manager.

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

Rounded percents may not add to 100.

Source: 2000 USDA Agricultural Resource Management Study, version 1 only.

Appendix table 3—Off-farm work by operator and spouse by farm typology group, 2000[1]

	Limited-resource	Retirement	Residential/lifestyle	Farming occupation/ lower sales
Number of farms	128,674	320,055	913,876	453,791
Percent of farms	6.1	15.1	43.1	21.4
Number of farms with off-farm work:				
Operators only	26,861	*22,947	328,907	71,098
Spouses only	d	47,631	d	104,235
Both	d	d	531,423	70,902
Neither	84,201	236,757	37,897	207,556
			Percent	
Distribution of farms by typology:				
Operators only	5.6	4.8	68.7	14.8
Spouses only	d	17.5	d	38.3
Both	d	d	79.5	10.6
Neither	12.0	33.7	5.4	29.6
Distribution of farms within typology:				
Operators only	20.9	*7.2	36.0	15.7
Spouses only	d	14.9	d	23.0
Both	d	d	58.2	15.6
Neither	65.4	74.0	4.1	45.7
Share of farms:				
Operators only	1.3	1.1	15.5	3.4
Spouses only	d	2.2	d	4.9
Both	d	d	25.0	3.3
Neither	4.0	11.2	1.8	9.8

	Farming occupation/ higher sales	Large	Very large	All
Number of farms	171,824	78,382	54,886	2,121,489
Percent of farms	8.1	3.7	2.6	100.0
Number of farms with off-farm work:				
Operators only	17,053	7,765	4,212	478,843
Spouses only	54,210	26,779	16,501	272,194
Both	28,842	9,354	5,028	668,691
Neither	71,719	34,485	29,145	701,760
		Percent		
Distribution of farms by typology:				
Operators only	3.6	1.6	0.9	100.0
Spouses only	19.9	9.8	6.1	100.0
Both	4.3	1.4	0.8	100.0
Neither	10.2	4.9	4.2	100.0
Distribution of farms within typology:				
Operators only	9.9	9.9	7.7	22.6
Spouses only	31.5	34.2	30.1	12.8
Both	16.8	11.9	9.2	31.5
Neither	41.7	44.0	53.1	33.1
Share of farms:				
Operators only	0.8	0.4	0.2	22.6
Spouses only	2.6	1.3	0.8	12.8
Both	1.4	0.4	0.2	31.5
Neither	3.4	1.6	1.4	33.1

[1]Analysis excludes farms operated by a hired manager.
d indicates value is not available due to no observations, an undefined statistic, or reliability issues.
Rounded percents may not add to 100.

Source: 2000 USDA Agricultural Resource Management Study.

Appendix table 4—Distribution of farm operator household income among farms, 1999

	Number of households	Distribution of households	Total household income	Income relative to U.S. average
All operator households	2,147,576	100.0	64,347	117.3
Farm typology:				
Limited-resource	126,920	5.9	9,534	17.4
Retirement	297,566	13.9	40,643	74.1
Residential/lifestyle	931,561	43.4	83,788	152.8
Farming occupation/lower sales	480,441	22.4	39,764	72.5
Farming occupation/higher sales	175,370	8.2	53,322	97.2
Large	77,314	3.6	85,685	156.2
Very large	58,403	2.7	201,206	366.9
Major source of income:				
Farm income less than off-farm income	1,243,803	57.9	53,172	97.0
Farm income equal to or greater than off-farm income	903,773	42.1	79,726	145.4
Sales class of farm:				
Less than $50,000	1,656,492	77.1	60,139	109.7
$50,000 - $249,999	355,366	16.5	56,824	103.6
$250,000 - $499,999	77,314	3.6	85,685	156.2
$500,000 - $999,999	35,754	1.7	124,683	227.3
$1,000,000 or more	22,648	1.1	322,011	587.2
Farm type:				
Cash grain, cotton, and oilseed	334,098	15.6	60,098	109.6
Other crop	572,078	26.6	67,820	123.7
Beef	802,416	37.4	57,286	104.5
Hog	29,906	1.4	59,916	109.3
Dairy	91,272	4.3	65,781	119.9
Other livestock	317,805	14.8	80,394	146.6
ERS resource regions:				
Heartland	447,286	20.8	62,743	114.4
Northern Crescent	302,631	14.1	55,962	102.0
Northern Great Plains	85,806	4.0	58,707	107.0
Prairie Gateway	308,890	14.4	67,148	122.4
Eastern Uplands	353,101	16.4	59,174	107.9
Southern Seaboard	233,622	10.9	59,446	108.4
Fruitful Rim	249,491	11.6	90,936	165.8
Basin and Range	81,964	3.8	59,345	108.2
Mississippi Portal	84,784	3.9	59,874	109.2
County type:				
Farming-dependent counties	277,103	12.9	59,711	108.9
Other counties	1,870,473	87.1	65,033	118.6
Operator's age:				
Younger than 35 years	118,565	5.5	74,831	136.4
35 to 44 years	416,610	19.4	64,826	118.2
45 to 54 years	563,188	26.2	86,194	157.2
55 to 64 years	504,631	23.5	63,784	116.3
65 years or older	544,582	25.4	39,625	72.3
Operator's major occupation:				
Farming	819,887	38.2	55,294	100.8
Nonfarm work	976,595	45.5	81,897	149.3
Retired, still farming	351,093	16.3	36,670	66.9
Hours operator worked on farm:				
Less than 500 hours	454,724	21.2	76,532	139.5
500 to 999 hours	486,813	22.7	62,557	114.1
1,000 to 1,999 hours	606,234	28.2	61,434	112.0
2,000 hours or more	599,805	27.9	59,505	108.5

—continued

Appendix table 4—Distribution of farm operator household income among farms, 1999—continued

	Farm income	Off-farm income	Off-farm income as share of total
All operator households	6,359	57,988	90.1
Farm typology:			
Limited-resource	-3,580	13,114	137.5
Retirement	*-1,348	41,991	103.3
Residential/lifestyle	-4,007	87,796	104.8
Farming occupation/lower sales	@-128	39,892	100.3
Farming occupation/higher sales	26,700	26,621	49.9
Large	51,087	34,598	40.4
Very large	165,634	35,572	17.7
Major source of income:			
Farm income less than off-farm income	-13,171	66,343	124.8
Farm income equal to or greater than off-farm income	33,237	46,489	58.3
Sales class of farm:			
Less than $50,000	-3,786	63,925	106.3
$50,000 - $249,999	17,737	39,087	68.8
$250,000 - $499,999	51,087	34,598	40.4
$500,000 - $999,999	88,232	36,452	29.2
$1,000,000 or more	287,828	34,183	10.6
Farm type:			
Cash grain, cotton, and oilseed	18,484	41,614	69.2
Other crop	6,200	61,620	90.9
Beef	@-567	57,853	101.0
Hog	*23,738	36,178	60.4
Dairy	46,676	19,105	29.0
Other livestock	@-1,830	82,224	102.3
ERS resource regions:			
Heartland	10,771	51,971	82.8
Northern Crescent	5,326	50,637	90.5
Northern Great Plains	15,212	43,495	74.1
Prairie Gateway	5,752	61,396	91.4
Eastern Uplands	@642	58,532	98.9
Southern Seaboard	@412	59,033	99.3
Fruitful Rim	12,021	78,915	86.8
Basin and Range	#5,068	54,278	91.5
Mississippi Portal	*4,797	55,077	92.0
County type:			
Farming-dependent counties	17,429	42,282	70.8
Other counties	4,719	60,315	92.7
Operator's age:			
Younger than 35 years	10,043	64,788	86.6
35 to 44 years	10,032	54,793	84.5
45 to 54 years	6,641	79,553	92.3
55 to 64 years	5,928	57,856	90.7
65 years or older	2,854	36,771	92.8
Operator's major occupation:			
Farming	21,255	34,038	61.6
Nonfarm work	-3,497	85,394	104.3
Retired, still farming	#-1,014	37,684	102.8
Hours operator worked on farm:			
Less than 500 hours	@-345	76,876	100.5
500 to 999 hours	#-1,694	64,252	102.7
1,000 to 1,999 hours	@74	61,359	99.9
2,000 hours or more	24,328	35,177	59.1

* = the standard error of the estimate is greater than 25 percent, and is no more than 50 percent.
# = the standard error of the estimate is greater than 50 percent, and is no more than 75 percent.
@ = the standard error of the estimate is greater than 75 percent.

Source: 1999 USDA Agricultural Resource Management Study.

Appendix table 5—Normalized variance decomposition of farm operator household's income, by farm typology, 1993 and 1999

Income source	1993	1999
	Percent	
Limited-resource farms:		
Farm income	80.5	69.3
Off-farm business income	1.6	5.1
Off-farm wages/salaries	2.1	14.7
Interest and dividends	1.0	0.5
Other off-farm income	14.8	10.4
Retirement farms:		
Farm income	5.8	7.0
Off-farm business income	7.3	5.1
Off-farm wages/salaries	243	12.5
Interest and dividends	38.8	46.0
Other off-farm income	23.8	29.4
Residential lifestyle farms:		
Farm income	2.5	1.5
Off-farm business income	78.9	43.0
Off-farm wages/salaries	14.3	43.7
Interest and dividends	1.6	10.5
Other off-farm income	2.7	1.3
Farming occupation-lower sales:		
Farm income	32.0	16.1
Off-farm business income	14.2	13.0
Off-farm wages/salaries	11.9	26.4
Interest and dividends	14.4	2.5
Other off-farm income	27.5	42.0
Farming occupation-higher sales:		
Farm income	54.1	63.1
Off-farm business income	23.3	6.8
Off-farm wages/salaries	16.2	22.8
Interest and dividends	4.8	4.5
Other off-farm income	1.5	2.8
Large farms:		
Farm income	68.3	57.5
Off-farm business income	7.1	7.4
Off-farm wages/salaries	16.9	11.0
Interest and dividends	0.8	7.5
Other off-farm income	6.9	16.6
Very large farms:		
Farm income	92.5	97.7
Off-farm business income	5.2	0.3
Off-farm wages/salaries	0.2	0.6
Interest and dividends	1.4	0.9
Other off-farm income	0.7	0.4

Source: USDA, Economic Research Service, 1993 and 1999 Agricultural Resource Management Study.

Appendix table 6—Normalized variance decomposition of farm operator household's income, by farm location, 1993 and 1999

Income source	1993	1999
	Percent	
Northeast:		
Farm income	49.2	65.0
Off-farm business income	4.3	13.1
Off-farm wages/salaries	19.1	15.5
Interest and dividends	22.5	3.5
Other off-farm income	4.9	2.9
North Central:		
Farm income	65.8	46.9
Off-farm business income	10.5	23.0
Off-farm wages/salaries	17.5	23.1
Interest and dividends	3.1	6.0
Other off-farm income	3.1	0.9
South:		
Farm income	23.1	24.7
Off-farm business income	56.9	28.2
Off-farm wages/salaries	10.7	28.9
Interest and dividends	4.7	9.9
Other off-farm income	4.6	8.3
West:		
Farm income	81.7	77.0
Off-farm business income	9.1	3.9
Off-farm wages/salaries	5.0	15.3
Interest and dividends	1.1	1.1
Other off-farm income	3.1	2.6

Source: USDA, Economic Research Service, 1993 and 1999 Agricultural Resource Management Study.

Appendix table 7—Normalized variance decomposition of farm operator household's income, by farm type, 1993 and 1999

Income source	1993	1999
	Percent	
Cash grains:		
Farm income	65.5	56.8
Off-farm business income	7.4	15.1
Off-farm wages/salaries	21.5	22.5
Interest and dividends	2.2	3.0
Other off-farm income	3.4	2.6
Other crops:		
Farm income	47.1	55.9
Off-farm business income	37.9	19.2
Off-farm wages/salaries	8.7	20.3
Interest and dividends	4.3	2.3
Other off-farm income	2.0	2.3
Dairy:		
Farm income	82.5	91.1
Off-farm business income	6.7	1.7
Off-farm wages/salaries	7.3	5.1
Interest and dividends	2.0	2.0
Other off-farm income	1.5	0.1
Other livestock:		
Farm income	34.1	32.0
Off-farm business income	42.1	22.8
Off-farm wages/salaries	12.2	27.8
Interest and dividends	4.7	9.7
Other off-farm income	6.8	7.6

Source: USDA, Economic Research Service, 1993 and 1999 Agricultural Resource Management Study.

Appendix table 8—Normalized variance decomposition of farm operator household's income, by farm tenure, 1993 and 1999

Income source	1993	1999
	Percent	
Full owner:		
Farm income	24.3	26.2
Off-farm business income	52.9	24.2
Off-farm wages/salaries	14.1	41.6
Interest and dividends	5.1	2.8
Other off-farm income	3.5	5.2
Part owner:		
Farm income	66.2	60.4
Off-farm business income	17.6	16.6
Off-farm wages/salaries	8.0	7.1
Interest and dividends	3.5	10.4
Other off-farm income	4.8	5.4
Full tenant:		
Farm income	77.5	83.9
Off-farm business income	8.0	4.6
Off-farm wages/salaries	11.2	10.2
Interest and dividends	1.1	0.6
Other off-farm income	2.2	0.6

Source: USDA, Economic Research Service, 1993 and 1999 Agricultural Resource Management Study.

Appendix table 9—Normalized variance decomposition of farm operator household's income, by age of operator, 1993 and 1999

Income source	1993	1999
	Percent	
Younger than 35 years:		
Farm income	79.1	20.4
Off-farm business income	3.9	27.0
Off-farm wages/salaries	12.2	48.8
Interest and dividends	1.1	2.0
Other off-farm income	3.7	1.9
35 to 44 years:		
Farm income	83.3	75.3
Off-farm business income	5.7	14.1
Off-farm wages/salaries	5.4	8.2
Interest and dividends	2.4	0.9
Other off-farm income	3.2	1.5
45 to 54 years:		
Farm income	32.4	36.9
Off-farm business income	53.0	26.5
Off-farm wages/salaries	10.8	25.7
Interest and dividends	1.7	9.0
Other off-farm income	2.2	2.0
55 to 64 years:		
Farm income	52.3	53.7
Off-farm business income	27.5	9.8
Off-farm wages/salaries	11.1	21.3
Interest and dividends	2.0	3.5
Other off-farm income	7.1	11.7
65 years or older:		
Farm income	41.2	50.5
Off-farm business income	15.7	9.4
Off-farm wages/salaries	10.2	7.7
Interest and dividends	22.0	14.2
Other off-farm income	11.0	18.2

Source: USDA, Economic Research Service, 1993 and 1999 Agricultural Resource Management Study.

Appendix table 10—Normalized variance decomposition of farm operator household's income, by education of operator, 1993 and 1999

Income sources	1993	1999
	Percent	
Some high school or less:		
Farm income	67.5	54.1
Off-farm business income	23.5	27.7
Off-farm wages/salaries	4.5	11.5
Interest and dividends	1.9	2.4
Other off-farm income	2.6	4.3
Completed high school:		
Farm income	67.5	58.7
Off-farm business income	12.1	19.2
Off-farm wages/salaries	14.4	13.8
Interest and dividends	2.7	3.1
Other off-farm income	3.2	5.2
Some college:		
Farm income	29.2	36.6
Off-farm business income	55.2	26.4
Off-farm wages/salaries	7.0	25.4
Interest and dividends	2.7	11.9
Other off-farm income	5.9	-0.3
Completed college:		
Farm income	52.4	54.9
Off-farm business income	30.1	9.8
Off-farm wages/salaries	10.9	24.1
Interest and dividends	4.0	4.4
Other off-farm income	2.5	6.8
Graduate school:		
Farm income	63.3	22.5
Off-farm business income	6.9	11.7
Off-farm wages/salaries	14.7	44.3
Interest and dividends	11.7	5.7
Other off-farm income	3.4	15.7

Source: USDA, Economic Research Service, 1993 and 1999 Agricultural Resource Management Study.

Appendix table 11—Normalized variance decomposition of farm operator household's wealth, by farm typology, 1993 and 1999

Wealth source	1993	1999
	Percent	
Limited-resource:		
Farm equity	58.8	15.8
Nonfarm equity	41.2	84.2
Retirement:		
Farm equity	69.9	51.8
Nonfarm equity	30.1	48.2
Residential lifestyle:		
Farm equity	72.7	48.6
Nonfarm equity	27.3	51.4
Farming occupation—lower sales:		
Farm equity	94.5	78.3
Nonfarm equity	5.5	21.7
Farming occupation—higher sales:		
Farm equity	91.6	85.0
Nonfarm equity	8.4	15.0
Large farms:		
Farm equity	99.2	87.8
Nonfarm equity	0.8	12.2
Very large farms:		
Farm equity	98.6	98.6
Nonfarm equity	1.4	1.4

Source: USDA, Economic Research Service, 1993 and 1999 Agricultural Resource Management Study.

Appendix table 12—Normalized variance decomposition of farm operator household's wealth, by farm location, 1993 and 1999

Wealth source	1993	1999
	Percent	
Northeast:		
Farm equity	90.3	73.0
Nonfarm equity	9.7	27.0
North Central:		
Farm equity	84.6	77.9
Nonfarm equity	15.4	22.1
South:		
Farm equity	92.8	68.1
Nonfarm equity	7.2	31.9
West:		
Farm equity	96.2	95.0
Nonfarm equity	3.8	5.0

Source: USDA, Economic Research Service, 1993 and 1999 Agricultural Resource Management Study.

Appendix table 13—Normalized variance decomposition of farm operator household's wealth, by farm type, 1993 and 1999

Wealth source	1993	1999
	Percent	
Cash grains:		
Farm equity	89.6	80.4
Nonfarm equity	10.4	19.6
Other crops:		
Farm equity	85.5	86.7
Nonfarm equity	14.5	13.3
Dairy:		
Farm equity	94.3	89.3
Nonfarm equity	5.7	10.7
Other livestock:		
Farm equity	95.0	85.8
Nonfarm equity	5.0	14.2

Source: USDA, Economic Research Service, 1993 and 1999 Agricultural Resource Management Study.

Appendix table 14—Normalized variance decomposition of farm operator household's wealth, by farm tenure, 1993 and 1999

Wealth source	1993	1999
	Percent	
Full owner:		
Farm equity	91.4	74.2
Nonfarm equity	8.6	25.8
Part owner:		
Farm equity	94.1	92.4
Nonfarm equity	5.9	7.6
Full tenant:		
Farm equity	73.4	46.9
Nonfarm equity	26.6	53.1

Source: USDA, Economic Research Service, 1993 and 1999 Agricultural Resource Management Study.

Appendix table 15—Normalized variance decomposition of farm operator household's wealth, by age of operator, 1993 and 1999

Wealth source	1993	1999
	Percent	
Younger than 35 years:		
Farm equity	98.8	92.3
Nonfarm equity	1.2	7.7
35 to 44 years:		
Farm equity	96.3	83.1
Nonfarm equity	3.6	16.9
45 to 54 years:		
Farm equity	94.8	93.6
Nonfarm equity	5.2	6.4
55 to 64 years:		
Farm equity	88.8	67.6
Nonfarm equity	11.2	32.4
65 years or older:		
Farm equity	90.2	79.7
Nonfarm equity	9.8	20.3

Source: USDA, Economic Research Service, 1993 and 1999 Agricultural Resource Management Study.

Appendix table 16—Normalized variance decomposition of farm operator household's wealth, by education of operator, 1993 and 1999

Wealth source	1993	1999
	Percent	
Some high school or less:		
Farm equity	84.2	81.0
Nonfarm equity	15.8	19.0
Completed high school:		
Farm equity	92.4	89.4
Nonfarm equity	7.6	11.6
Some college:		
Farm equity	92.1	92.5
Nonfarm equity	7.9	7.5
Completed college:		
Farm equity	96.9	73.2
Nonfarm equity	3.1	26.8
Graduate school:		
Farm equity	81.5	59.9
Nonfarm equity	18.5	40.1

Source: USDA, Economic Research Service, 1993 and 1999 Agricultural Resource Management Study.

Appendix table 17—Normalized variance decomposition of farm operator household's expenditures, by farm typology, 1998

Expenditure	*Percent*
Limited-resource farms:	
Food and household supplies, excluding utilities	4.2
Household rent/mortgage, utilities, appliances, and furnishings	4.1
Nonfarm transportation	4.6
Medical expenses, insurance, and contributions to retirement plans	84.9
All other family living expenses such as clothing, education, hobbies, recreation, gifts, magazines, charitable contributions, etc.	2.2
Retirement farms:	
Food and household supplies, excluding utilities	25.1
Household rent/mortgage, utilities, appliances, and furnishings	18.1
Nonfarm transportation	10.1
Medical expenses, insurance, and contributions to retirement plans	27.2
All other family living expenses such as clothing, education, hobbies, recreation, gifts, magazines, charitable contributions, etc.	19.5
Residential lifestyle farms:	
Food and household supplies, excluding utilities	5.6
Household rent/mortgage, utilities, appliances, and furnishings	45.3
Nonfarm transportation	12.9
Medical expenses, insurance, and contributions to retirement plans	32.2
All other family living expenses such as clothing, education, hobbies, recreation, gifts, magazines, charitable contributions, etc	4.0
Farming occupation—lower sales:	
Food and household supplies, excluding utilities	15.3
Household rent/mortgage, utilities, appliances, and furnishings	24.1
Nonfarm transportation	18.1
Medical expenses, insurance, and contributions to retirement plans	20.2
All other family living expenses such as clothing, education, hobbies, recreation, gifts, magazines, charitable contributions, etc.	22.3
Farming occupation—higher sales:	
Food and household supplies, excluding utilities	18.6
Household rent/mortgage, utilities, appliances, and furnishings	20.4
Nonfarm transportation	16.5
Medical expenses, insurance, and contributions to retirement plans	21.1
All other family living expenses such as clothing, education, hobbies, recreation, gifts, magazines, charitable contributions, etc.	23.4
Large farms:	
Food and household supplies, excluding utilities	8.1
Household rent/mortgage, utilities, appliances, and furnishings	24.9
Nonfarm transportation	6.1
Medical expenses, insurance, and contributions to retirement plans	49.9
All other family living expenses such as clothing, education, hobbies, recreation, gifts, magazines, charitable contributions, etc.	11.1
Very large farms:	
Food and household supplies, excluding utilities	2.6
Household rent/mortgage, utilities, appliances, and furnishings	10.0
Nonfarm transportation	2.4
Medical expenses, insurance, and contributions to retirement plans	78.4
All other family living expenses such as clothing, education, hobbies, recreation, gifts, magazines, charitable contributions, etc	6.7

Source: USDA, Economic Research Service, 1993 and 1999 Agricultural Resource Management Study.

Appendix table 18—Normalized variance decomposition of farm operator household's expenditures, by region, 1998

Expenditure	*Percent*
Northeast:	
Food and household supplies, excluding utilities	6.1
Household rent/mortgage, utilities, appliances, and furnishings	5.5
Nonfarm transportation	2.4
Medical expenses, insurance, and contributions to retirement plans	77.3
All other family living expenses such as clothing, education, hobbies, recreation, gifts, magazines, charitable contributions, etc.	8.6
North Central:	
Food and household supplies, excluding utilities	8.0
Household rent/mortgage, utilities, appliances, and furnishings	9.8
Nonfarm transportation	57.2
Medical expenses, insurance, and contributions to retirement plans	12.5
All other family living expenses such as clothing, education, hobbies, recreation, gifts, magazines, charitable contributions, etc.	12.4
South:	
Food and household supplies, excluding utilities	6.3
Household rent/mortgage, utilities, appliances, and furnishings	47.9
Nonfarm transportation	3.4
Medical expenses, insurance, and contributions to retirement plans	38.6
All other family living expenses such as clothing, education, hobbies, recreation, gifts, magazines, charitable contributions, etc	3.8
West:	
Food and household supplies, excluding utilities	12.2
Household rent/mortgage, utilities, appliances, and furnishings	39.9
Nonfarm transportation	11.2
Medical expenses, insurance, and contributions to retirement plans	16.4
All other family living expenses such as clothing, education, hobbies, recreation, gifts, magazines, charitable contributions, etc.	20.3

Source: USDA, Economic Research Service, 1993 and 1999 Agricultural Resource Management Study.

Appendix table 19—Normalized variance decomposition of farm operator household's expenditures, by farm type, 1998

Expenditure	*Percent*
Cash grains:	
Food and household supplies, excluding utilities	15.4
Household rent/mortgage, utilities, appliances, and furnishings	27.0
Nonfarm transportation	17.5
Medical expenses, insurance, and contributions to retirement plans	15.7
All other family living expenses such as clothing, education, hobbies, recreation, gifts, magazines, charitable contributions, etc.	24.3
Other crops:	
Food and household supplies, excluding utilities	10.7
Household rent/mortgage, utilities, appliances, and furnishings	20.1
Nonfarm transportation	8.6
Medical expenses, insurance, and contributions to retirement plans	47.6
All other family living expenses such as clothing, education, hobbies, recreation, gifts, magazines, charitable contributions, etc.	13.0
Dairy:	
Food and household supplies, excluding utilities	11.2
Household rent/mortgage, utilities, appliances, and furnishings	24.2
Nonfarm transportation	12.1
Medical expenses, insurance, and contributions to retirement plans	38.3
All other family living expenses such as clothing, education, hobbies, recreation, gifts, magazines, charitable contributions, etc	14.2
Other livestock:	
Food and household supplies, excluding utilities	5.4
Household rent/mortgage, utilities, appliances, and furnishings	43.5
Nonfarm transportation	12.3
Medical expenses, insurance, and contributions to retirement plans	35.1
All other family living expenses such as clothing, education, hobbies, recreation, gifts, magazines, charitable contributions, etc.	3.7

Source: USDA, Economic Research Service, 1993 and 1999 Agricultural Resource Management Study.

Appendix table 20—Normalized variance decomposition of farm operator household's expenditures, by farm tenure, 1998

Expenditure	*Percent*
Full owner:	
Food and household supplies, excluding utilities	4.9
Household rent/mortgage, utilities, appliances, and furnishings	27.7
Nonfarm transportation	14.8
Medical expenses, insurance, and contributions to retirement plans	47.3
All other family living expenses such as clothing, education, hobbies, recreation, gifts, magazines, charitable contributions, etc.	5.3
Part owner:	
Food and household supplies, excluding utilities	10.2
Household rent/mortgage, utilities, appliances, and furnishings	63.0
Nonfarm transportation	6.1
Medical expenses, insurance, and contributions to retirement plans	12.9
All other family living expenses such as clothing, education, hobbies, recreation, gifts, magazines, charitable contributions, etc.	7.8
Full tenant:	
Food and household supplies, excluding utilities	13.3
Household rent/mortgage, utilities, appliances, and furnishings	16.7
Nonfarm transportation	10.4
Medical expenses, insurance, and contributions to retirement plans	41.1
All other family living expenses such as clothing, education, hobbies, recreation, gifts, magazines, charitable contributions, etc	18.5

Source: USDA, Economic Research Service, 1993 and 1999 Agricultural Resource Management Study.

Appendix table 21—Normalized variance decomposition of farm operator household's expenditures, by age of operator, 1998

Expenditure	*Percent*
Younger than 35 years:	
Food and household supplies, excluding utilities	12.4
Household rent/mortgage, utilities, appliances, and furnishings	38.9
Nonfarm transportation	17.6
Medical expenses, insurance, and contributions to retirement plans	15.9
All other family living expenses such as clothing, education, hobbies, recreation, gifts, magazines, charitable contributions, etc.	15.2
35 to 44 years:	
Food and household supplies, excluding utilities	17.0
Household rent/mortgage, utilities, appliances, and furnishings	22.2
Nonfarm transportation	17.2
Medical expenses, insurance, and contributions to retirement plans	19.8
All other family living expenses such as clothing, education, hobbies, recreation, gifts, magazines, charitable contributions, etc.	23.8
45 to 54 years:	
Food and household supplies, excluding utilities	6.5
Household rent/mortgage, utilities, appliances, and furnishings	66.2
Nonfarm transportation	3.8
Medical expenses, insurance, and contributions to retirement plans	17.4
All other family living expenses such as clothing, education, hobbies, recreation, gifts, magazines, charitable contributions, etc	6.0
55 to 64 years:	
Food and household supplies, excluding utilities	4.8
Household rent/mortgage, utilities, appliances, and furnishings	6.3
Nonfarm transportation	21.3
Medical expenses, insurance, and contributions to retirement plans	64.4
All other family living expenses such as clothing, education, hobbies, recreation, gifts, magazines, charitable contributions, etc.	3.1
65 years or older:	
Food and household supplies, excluding utilities	11.3
Household rent/mortgage, utilities, appliances, and furnishings	30.4
Nonfarm transportation	11.3
Medical expenses, insurance, and contributions to retirement plans	36.3
All other family living expenses such as clothing, education, hobbies, recreation, gifts, magazines, charitable contributions, etc.	10.7

Source: USDA, Economic Research Service, 1993 and 1999 Agricultural Resource Management Study.

Appendix table 22—Normalized variance decomposition of farm operator household's expenditures, by education of operator, 1998

Expenditure	*Percent*
Some high school or less:	
Food and household supplies, excluding utilities	7.6
Household rent/mortgage, utilities, appliances, and furnishings	29.7
Nonfarm transportation	7.2
Medical expenses, insurance, and contributions to retirement plans	50.3
All other family living expenses such as clothing, education, hobbies, recreation, gifts, magazines, charitable contributions, etc.	5.3
Completed high school:	
Food and household supplies, excluding utilities	8.0
Household rent/mortgage, utilities, appliances, and furnishings	14.3
Nonfarm transportation	10.0
Medical expenses, insurance, and contributions to retirement plans	53.8
All other family living expenses such as clothing, education, hobbies, recreation, gifts, magazines, charitable contributions, etc.	13.9
Some college:	
Food and household supplies, excluding utilities	14.0
Household rent/mortgage, utilities, appliances, and furnishings	22.4
Nonfarm transportation	14.5
Medical expenses, insurance, and contributions to retirement plans	32.5
All other family living expenses such as clothing, education, hobbies, recreation, gifts, magazines, charitable contributions, etc	16.6
Completed college:	
Food and household supplies, excluding utilities	2.4
Household rent/mortgage, utilities, appliances, and furnishings	57.4
Nonfarm transportation	31.6
Medical expenses, insurance, and contributions to retirement plans	4.4
All other family living expenses such as clothing, education, hobbies, recreation, gifts, magazines, charitable contributions, etc.	4.1
Graduate school:	
Food and household supplies, excluding utilities	6.8
Household rent/mortgage, utilities, appliances, and furnishings	40.1
Nonfarm transportation	1.9
Medical expenses, insurance, and contributions to retirement plans	49.1
All other family living expenses such as clothing, education, hobbies, recreation, gifts, magazines, charitable contributions, etc.	2.2

Source: USDA, Economic Research Service, 1993 and 1999 Agricultural Resource Management Study.

References

Burt, O.R., and R.M. Finley. "Statistical Analysis of Identities in Random Variables," *American Journal of Agricultural Economics.* Vol. 50, (Nov. 1986), pp. 734-744.

Ezekiel, M., and K.A. Fox. *Methods of Correlation and Regression Analysis*, 3rd edition. New York: John Wiley, 1959.

Mishra, A.K., and H.S. El-Osta. "Decomposition of Variability in Assets and Debt of Farm Households in the United States." Selected paper presented at the 2001 AAEA meetings in Chicago, IL. Aug. 5-8, 2001.

Ahearn, M.C. *Financial Well-Being of Farm Operators and Their Households*. U.S. Department of Agriculture, Economic Research Service, AER-563, Sept. 1986.

Ahearn, M.C., and H.S. El-Osta. "The Role of Off-Farm Employment: Permanent or Transitional State." Selected paper presented at the American Agricultural Economics Association (AAEA) annual meetings, Baltimore, MD, Aug. 1993.

Ahearn, M.C., and J.E. Lee, Jr. *Multiple Job-Holding Among Farm Operator Households in the United States.* M.C. Hallberg, J.L. Findeis, and D.A. Lass (eds.), Iowa State University Press, Ames, IA, 1991.

Ahearn, M.C., J.E. Perry, and H.S. El-Osta. *The Economic Well-Being of Farm Operator Households, 1988-90.* U.S. Department of Agriculture, Economic Research Service, AER-666, Jan. 1993.

Barlett, P.F. "Motivations of Part Time Farmers," *Multiple Job-Holding Among Farm Families*. M.C.Hallberg, J.L. Findeis, and D.A. Lass (eds.), Iowa State University Press, Ames, IA, 1991.

Barlett, P.F. "Part-Time Farming: Saving the Farm or Saving the Life-Style," *Rural Sociology,* Vol. 51, No. 3, Fall 1986, pp. 289-313.

Barnard, C., R. Nehring, J. Ryan., and R. Collender. "Higher Cropland Values from Farm Program Payments: Who Gains?" *Agricultural Outlook,* AGO-286. U.S. Department of Agriculture, Economic Research Service, Washington DC, Nov. 2001.

Batte, M.T., E. Jones, and G.D. Schnitkey. "Computer Use by Ohio Commercial Farmers." *American Journal of Agricultural Economics.* 66 (Aug. 1984):342-350.

Bauman, K.J. "Extended Measures of Well-Being: Meeting Basic Needs," *Current Population Reports*, P70-67, U.S. Census Bureau, U.S. Department of Commerce, June 1999.

Becker, G.S. *Human Capital: A Theoretical and Empirical Analysis with Special Reference to Education*. New York: National Bureau of Economic Research and Columbia University Press, 1975.

Bessant, K.C. "Part-time Farming Situations among Manitoba Farm Operators: A Typological Approach," *Canadian Journal of Agricultural Economics*, Vol. 48, No. 3, Nov. 2000, pp. 259-277.

Bierlen, R., L.D. Parsch, B.L. Dixon, and B.L. Ahrendsen. "The 1996 FAIR Act: Measuring the Impacts on Land Leasing," *Review of Agricultural Economics*, Vol. 22, No. 2 (2000):336-354.

Binswanger, H.P. "The Measurement of Technical Change Biases with Many Factors of Production," *American Economic Review,* Vol. 64, 6 (Dec. 1974): 964-976.

Binswanger, H.P. "Measurement of Technical Change: The United States," *Induced Innovation, Technology, Institutions and Development.* H.P. Binswanger, V.W. Ruttan et al. (eds.), Baltimore, MD and London: Johns Hopkins University Press, 1978.

Boehlje, M.D., and V. Eidman. *Farm Management.* John Wiley and Sons, New York, 1984.

Boisvert, R.A., and C. Ranney. "Accounting for the Importance of Nonfarm Income on Farm Family Income Inequality in New York," *Northeastern Journal of Agricultural Economics* 19 (1990): 1-11.

Bollman, R.D. "Off-Farm Work by Farmers: An Application of the Kinked Demand Curve for

Labor," *Canadian Journal of Agricultural Economics*, Vol. 27, No. 1, 1979, pp. 37-61.

Brewster, D.E. "The Family Farm: A Changing Concept," *Structure Issues of American Agriculture*. U.S. Department of Agriculture, Economics, Statistics, and Cooperative Service, AER-438. Nov. 1979.

Butler, M.A., and C.L. Beale. "Rural-Urban Continuum Codes for Metro and Nonmetro Counties, 1993." U.S. Department of Agriculture, Economic Research Service, Staff Report AGES 9425, Sept. 1994.

Buttel, F.H., B.F. Hall, O.W. Larson III, and J. Kloppenburg. "Manpower Implications of Part-time Farming in New York State." Unpublished report prepared for the Employment and Training Administration, U.S. Department of Labor, Ithaca, NY, Cornell University, 1982.

Carlin, T.A. "Farm Families Narrowed the Income Gaps in the 1960's," *Agricultural Finance Review*, Vol. 33, July 1973, pp. 22-26.

Center for Farm Financial Management, University of Minnesota. http://www.cffm.umn.edu/farmmgt.asp

Cochrane, W.W. *The Development of American Agriculture: A Historical Analysis*. Minneapolis: University of Minnesota Press, 1979.

Cogan, J.F. "Fixed Costs and Labor Supply," *Econometrica,* Vol. 49 (1981): 945-963.

Cook, P.J., and K.L. Mizer. *The Revised ERS County Typology*. U.S. Department of Agriculture, Economic Research Service, RDRR-89, Dec. 1994.

Crecink, J.C., *Families With Farm Income, Their Income, Income Distribution and Income Sources*, Economic Development Division, Economics, Statistics, and Cooperative Service, U.S. Department of Agriculture, Nov. 1979.

Crisostomo, M.F., and A.M. Featherstone. "A Portfolio Analysis of Returns to Farm Equity and Assets," *North Central Journal of Agricultural Economics* 12 (1990):9-21.

El-Osta, H.S., and M.C. Ahearn. *Estimating the Opportunity Cost of Unpaid Farm Labor for U.S. Farm Operators*. U.S. Department of Agriculture, Economic Research Service, TB-1848, March 1996.

El-Osta, H.S., G. Bernat, and M.C. Ahearn. "Regional Differences in the Contribution of Off-Farm Work to Income Inequality," *Agricultural and Resource Economics Review,* Vol. 24 (April 1995): 1-14.

El-Osta, H.S., and M.C. Ahearn. "A Regional Analysis of the Role of Off-Farm Income in the Size and Distribution of Personal Income." Selected paper presented at the Western Agricultural Economics Association (WAEA) annual meetings, Portland, OR, July 1991.

El-Osta, H.S., and M.J. Morehart. "The Dynamics of Wealth Concentration Among Farm Operator Households," *Agricultural and Resource Economics Review,* April 2002.

El-Osta, H.S., and M.J. Morehart. "Technology Adoption Decisions in Dairy Production and the Role of Herd Expansion," *Agricultural and Resource Economics Review,* Vol. 28 (April 1999): 84-95.

Featherstone, A.M., and T.G. Baker. "Effects of Reduced Price and Income Supports on Farmland Rents and Values," *North Central Journal of Agricultural Economics* 10 (July 1988): 177-90.

Findeis, J.L. "The Growing Importance of Off-Farm Income," *Farm Economics.* University Park: Pennsylvania Sate University and Cooperative Extension Service, U.S. Department of Agriculture, 1985.

Findeis, J.L . and V.K. Reddy. "Decomposition of Income Distribution Among Farm Families," *Northeastern Journal of Agricultural Economics* 16 (1987): 165-173.

Findeis, J.L., M.C. Hallberg, and D.A. Lass. "Off-Farm Employment: Research and Issues." Staff Paper No. 146, University Park: Department of Agricultural Economics and Rural Sociology, Pennsylvania State University, 1987.

Firch, R. "Inflation, Price Controls and Marketing Margins," *Proceedings: Western Agricultural Economics Association* 48 (1975): 27-34.

Firch, R. "Sources of Commodity Market Instability in U.S. Agriculture," *American Journal of Agricultural Economics*, Vol. 59, (Feb. 1977): 164-69

Fuller, A.M. "Multiple Job-Holding Among Farm Families in Canada," *Multiple Job-Holding Among Farm Families*, M.C. Hallberg, J.L. Findeis, and D.A. Lass (eds.), Iowa State University Press, Ames, IA, 1991.

Fuller, A.M., and J.A. Mage. "Part-time Farming: Problem or Resource in Development," Norwich, England: GeoAbstract Limited (1976), for University of Guelph, Canada.

Gale, H.F., Jr. "Longitudinal Analysis of Farm Size Over the Farmer's Life Cycle," *Review of Agricultural Economics* 16 (Jan. 1994): 113-123.

Gardner, B.L. "Changing Economic Perspectives on the Farm Problem," *Journal of Economic Literature,* Vol. XXX, March 1992, pp. 62-101.

Gardner, B.L. "Demythologizing Farm Income," *Choices*, First Quarter, 1995, pp. 22-23.

Gasson, R., G. Crow, A. Errington, J. Huston, T. Marsden, and M. Winter. "The Farm as a Family Business: A Review," *Journal of Agricultural Economics,* Vol. 39 (Jan. 1988): 1-42.

Gauld, B.W., and W.E. Saupe, "Off-Farm Labor Market Entry and Exit," *American Journal of Agricultural Economics*, Vol. 71, No. 4, Nov. 1989, pp. 960-969.

Gundersen, C., M. Morehart, L. Whitener, L. Ghelfi, J. Johnson, K. Kassel, B. Kuhn, A. Mishra, S. Offutt, and L. Tiehen. "A Safety Net for Farm Households," U.S. Department of Agriculture, Economic Research Service, AER-788, Oct. 2000.

Gunter, L., and K.T. McNamara, "The Impact of Local Labor Market Conditions on the Off-Farm Earnings of Farm Operators," *Southern Journal of Agricultural Economics*, Vol. 22, No. 1, July 1990, pp. 155-165.

Haden, K.L., and L.A. Johnson. "Factors Which Contribute to the Financial Performance of Selected Tennessee Dairies," *Southern Journal of Agricultural Economics,* Vol. 21 (July 1989):105-112.

Halcrow, H.G. *Agricultural Policy of the United States*. Prentice-Hall Inc., Englewood Cliffs, NJ, 1953.

Hallberg, M.C. *Policy for American Agriculture: Choices and Consequences*. Iowa State University Press, Ames, IA, 1992.

Hallberg, M.C., J.L. Findeis, and D.A. Lass, eds. *Multiple Job-Holding Among Farm Families*. Iowa State University Press, Ames, IA, 1991.

Hanson, R.J., and R.G.F. Spitze. "Increasing Incomes of Farm Families Through Dual Employment," *Agricultural Finance Review* Vol. 35, Oct. 1974, pp. 59-64.

Hathaway, D.E. "Agriculture in an Unstable Economy Revisited," *Journal of Farm Economics* 41 (August 1959):487-99.

Hathaway, D.E. *Government and Agriculture: Public Policy in a Democratic Society.* New York: Macmillan and Co., 1963.

Heady, E.O., W.B. Back, and G.A. Peterson. *Interdependence Between the Farm Business and the Farm Household with Implications on Economic Efficiency*. Research Bulletin 398, Department of Economics and Sociology, Iowa State College, Ames, IA, 1953.

Herbst, J.H., and R.J. Hanson. "Nonfarm Work as a Substitute for Farm Enterprise," *Journal of American Society of Farm Managers and Rural Appraisers*, Vol. 35, No. 1, April 1971, pp. 63-68.

Hill, B. *Farm Incomes, Wealth and Agricultural Policy.* Ashgate Publishing Co., Brookfield, VT, 2000.

Hoppe, R.A., "Operator Household Income," *Agricultural Income and Finance, Situation and Outlook Report,* AIS-70, Dec. 1998: pp. 13-16.

Hoppe, R.A., R. Green, and G. Wunderlich. "Farmland Rentals: Central to Farming," *Agricultural Outlook,* AO-220. U.S. Department of Agriculture, Economic Research Service, July 1995.

Hopkins, J., and M. Taylor. "Are U.S. Farm Programs Good Public Policy?: Taking Policy Performance

Seriously." Selected paper presented at the American Agricultural Economics Association annual meetings, Chicago, IL, Aug. 5-8, 2001.

Houthakker, H.S. *Economic Policy for the Farm Sector*. American Enterprise Institute for Public Policy Research, Washington, DC, Nov. 1967.

Huffman, W.E. "Allocative Efficiency: The Role of Human Capital." *Quarterly Journal of Economics* 59(5):1054-61, 1977.

Huffman, W.E. "Agricultural Household Models: Survey and Critique," *Multiple Job Holding Among Farm Families*, M.C. Hallberg, J.L. Findeis, and D.A. Lass (eds.), Iowa State University Press, Ames, IA**,** 1991.

Huffman, W.E., and H.S. El-Osta, "Off-Farm Work Participation, Off-Farm Labor Supply and On-Farm Labor Demand of U.S. Farm Operators." Staff Paper No. 290, Department of Economics, Iowa State University, Ames, IA, Dec. 1997.

Iowa State University, University Extension. "1999 Family Living Expenditures of Iowa Farm Families," FM 1790, Ames, IA, Nov. 2000.

Irwin, S., D.L. Forster, and B.J. Sherrick. "Returns to Farm Real Estate Revisited," *American Journal of Agricultural Economics* 70 (1988): 580-87.

Johnson, P. "The Elasticity of Foreign Demand for U.S. Agricultural Products," *American Journal of Agricultural Economics* 59 (Nov. 1977): 735-736.

Johnson, G.L., and C.L. Quance. *The Overproduction Trap in U.S. Agriculture.* Johns Hopkins Press, Baltimore, MD, 1972.

Johnson, M.A., and E. C. Pasour. "An Opportunity Cost View of Fixed Assets Theory and the Overproduction Trap," *American Journal of Agricultural Economics* 63 (Feb. 1981): 1-7.

Just, R.E, and J.A. Miranowski. "Understanding Farmland Price Changes," *American Journal of Agricultural Economics* 75 (Feb. 1993): 156-168.

Kimhi, A. "Is Part-time Farming Really a Step in the Way Out of Agriculture?" *American Journal of Agricultural Economics*, Vol. 82, No. 1, Feb. 2000, pp. 38-48.

Kuhn, B., and S. Offutt. "Farm Policy in an Era of Farm Diversity," *Choices*, Third Quarter, 1999, pp. 37-38.

Lancaster, J. "Farm Aid Benefits Lawmakers," *The Washington Post*, Sept. 1, 2001, p A1.

Langemeier, M.R., and G.F. Patrick. "Farmer's Marginal Propensity to Consume: An Application to Illinois Grain Farms," *American Journal of Agricultural Economics,* Vol. 72 (May 1993): 309-16.

Larson, D.K. "Wage and Salary Income: 'Big Crops' for People with Farm Earnings," *Journal of the Northeastern Agricultural Economics Council*, Vol. III, No. 1, May 1974, pp. 64-75.

Larson, D.K., and T.A. Carlin, "Income and Economic Status of People with Farm Earnings," *Southern Journal of Agricultural Economics*, Vol. 6, No. 2, Dec. 1974, pp. 73-79.

Lass, D.A., J.L. Findeis, and M.C. Hallberg. "Off-Farm Labor Participation Decisions by Massachusetts Farm Households." Research Paper Series No. 88-2. Department of Agricultural and Resource Economics, University of Massachusetts, Amherst, MA, 1988.

Lass, D.A., J.L. Findeis, and M.C. Hallberg, "Off-Farm Employment Decisions by Massachusetts Farm Households," *Northeastern Journal of Agricultural and Resource Economics*, Vol. 18, No. 2, Oct. 1989, pp. 149-159.

Lee, J.E., Jr. "Allocating Farm Resources Between Farm and Nonfarm Users," *Journal of Farm Economics*, Vol. 47, No. 1, 1965, pp. 83-92.

Leon, Y., and P. Rainelli. "Savings of Farmers: A Cross-Sectional Analysis," *European Review of Agricultural Economics,* Vol. 3 (1976): 501-21.

Lin, J.Y. "Educational and Innovation Adoption in Agriculture: Evidence from Hybrid Rice in China," *American Journal of Agricultural Economics,* Vol. 73 (1991): 713-723.

Lins, D.A., N.E. Harl, and T.L. Frey. *Farmland.* Agricultural Business Publications, Skokie, IL, 1982.

Lipton, K. "New U.S. Farm Resource Regions." (http://www.econ.ag.gov/whatsnew/issues/regions/index.htm). U.S. Dept. of Agriculture, Economic Research Service, updated June 28, 1999.

Marshall, A. *Principles of Economics,* New York, Macmillan and Co., 1949.

Mincer, J. *Schooling, Experience and Earnings.* Columbia University Press, New York, 1974.

Mishra, A.K. "Farm Income Variability and the Off-Farm Labor Supply of Farmers and Their Spouses," Unpublished Ph.D. Dissertation, Department of Economics, North Carolina State University, Raleigh, NC (1996).

Mishra, A.K., and H.S. El-Osta. "Decomposition of Variability in Assets and Debt of Farm Households in the United States" Selected paper at the American Agricultural Economics Association annual meetings, Chicago, IL, Aug. 5-8, 2001.

Mishra, A.K., and B.K. Goodwin. "Income Risk and Allocation of Labour Time: An Empirical Investigation," *Applied Economics* 30(12) 1998: 1549-1555.

Mishra, A.K., and B.K. Goodwin. "Farm Income Variability and the Supply of Off-farm Labor," *American Journal of Agricultural Economics***,** Vol. 79, Aug. 1997: 880-887.

Mishra, A.K., and M.J. Morehart. "Tax-Deferred Savings and Off-Farm Investment of Farm Households," *Proceedings of Regional Committee NC-221*, Minneapolis, MN. Oct. 2-3, 2000.

Mishra, A.K., and M.J. Morehart. "Off-Farm Investment of Farm Households: A Logit Analysis," *Agricultural Finance Review,* Vol. 61, No. 1 (Spring 2001): 87-101.

Mishra, A.K., and M.J. Morehart. "Farm Household Savings," *Financing Agriculture and Rural America: Issues of Policy, Structure, and Technical Change. Proceedings of Regional Committee NC-221*, Louisville, KY, Oct. 5-6, 1998.

Mishra, A.K., and C.L. Sandretto. "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): 208-221.

Mishra, A.K., H.S. El-Osta, and C.J. Steele. "Factors Affecting the Profitability of Limited Resource and Other Small Farms," *Agricultural Finance Review*, Vol. 59 (1999a): 77-91.

Mishra, A.K., H.S. El-Osta, and J.D. Johnson. "Factors Contributing to Earnings Success of Cash Grain Farms," *Journal of Agricultural and Applied Economics*, Vol. 31 (Dec. 1999b): 623-637.

Mishra, A.K., C.B. Moss, and K.W. Erickson. "Changes in the Distribution of Farm Wealth in the United States." Selected paper presented at the 2001 Western Agricultural Economics Association annual meetings, Logan, UT, July 2001.

Monke, J.M. "The 1997 Tax Law: New Incentives for Farmers to Invest for Retirement," *Agricultural Outlook*: 24-26, December 1998.

Moss, C.B., A.M. Featherstone, and T.G. Baker. "Agricultural Assets in an Efficient Multiperiod Investment Portfolio," *Agricultural Finance Review,* Vol. 47 (1987): 82-94.

Nelson, R.R., and E.S. Phelps. "Investment in Humans, Technological Diffusion, and Economic Growth," *American Economic Review*, Vol. 56 (May 1966): 69-75.

Noda, T. "Saving of Farm Households," *Agriculture and Economic Growth: Japan's Experience,* K. Ohkawa, B.F. Johnston, and H. Kaneda, eds. University of Tokyo Press, Tokyo, 1970, pp. 352-73.

Offutt, S. "Can the Farm Problem be Solved?" M.E. Lecture, The Pennsylvania State University, October 18, 2000.

Penson, J.B. "Demand for Financial Assets in the Farm Sector: A Portfolio Balance Approach," *American Journal of Agricultural Economics,* Vol. 54 (1972): 163-173.

Phipps, T.T. "Land Prices and Farm-Based Returns," *American Journal of Agricultural Economics,* Vol. 66 (Nov. 1984): 422-429.

Pindyck, R.S. "Irreversible Investment, Capacity Choice, and the Value of the Firm," *American Economic Review,* Vol. 78 (Dec. 1988): 969-985.

Randall, C.K., and R.H. Musucci, "Farm and Nonfarm Income Comparisons," *Journal of Farm Economics*, Vol. 45, No. 2, May 1963, pp. 359-366.

Reinsel, E.I. "Farm Family Incomes and Farmers' Income Improve at Different Rates," *Agricultural Finance Review*, Vol. 35, Oct. 1974, pp. 31-35.

Robison, L.J., and P.J. Barry. *The Competitive Firm's Response to Risk*. Macmillan Publishing Co., New York, 1987.

Robinson, K.L. *Farm and Food Policy and Their Consequences.* Prentice-Hall Inc., Englewood Cliffs, NJ, 1989.

Ryan, J., C. Barnard, and R. Collender. "Government Payments to Farmers Contribute to Risisng Land Values," *Agricultural Outlook,* AGO-282. U.S. Department of Agriculture, Economic Research Service, June-July 2001.

Salant, P., M. Smale, and W. Saupe. *Farm Viability: Results of the USDA Family Farm Surveys*, U.S. Department of Agriculture, Economic Research Service, Rural Development Research Report 10-60, July 1986.

Sander, W. "Off-Farm Employment and Incomes of Farmers," *Oxford Agrarian Studies,* Vol. 12 (1983): 34-47.

Schertz, L., and W. Johnston. "Farm Act '96: Managing Farm Resources in a New Policy Environment," *Agricultural Outlook*, AGO-243. U.S. Department of Agriculture, Economic Research Service, Aug. 1997.

_____. "Landowners: They Get the 1996 Farm Act Benefits," *Choices* (first quarter 1998): 4-7.

Schmitz, A. "Boom/Bust Cycles and Ricardian Rents," *American Journal of Agricultural Economics,* Vol. 77 (Dec. 1995): 1110-25.

Schnitkey, G., and W. Lee. "Farmers Should Own More Financial Assets—Even if it Means Owning Less Land," *Regulatory, Efficiency, and Management Issues Affecting Rural Financial Markets*. Proceedings of Regional Committee NC-207, Staff Paper SP-0196, Dept. of Agricultural Economics and Rural Sociology, University of Arkansas, Fayetteville, AK, 1996.

Schuh, G.E. "The Exchange Rate and U.S. Agriculture," *American Journal of Agricultural Economics,* Vol. 56 (Feb. 1974): 1-13.

Schultz, T.W. *Agriculture in an Unstable Economy*. Mcgraw-Hill Book Co., New York, 1945.

Schultze, C.L. "Farm Subsidies and Farmland Prices," *The Distribution of Farm Subsidies: Who Gets the Benefits?* The Brookings Institution, Washington, DC, 1971.

Singh, S.P., and H. Williamson, Jr. "Part-Time Farming: Productivity and Some Implications of Off-Farm Work by Farmers," *Southern Journal of Agricultural Economics*, Dec. 1981, pp. 61-67.

Skees, J.R., M.R. Reed, and G.D. Pederson. "Some Distribution Effects of Changing Price Level on Farm Wealth," *North Central Journal of Agricultural Economics,* Vol. 7 (Jan. 1985): 94-104.

Smith, J.D. and J.N. Morgan. "Variability of Economic Well-Being and its Determinants," *The American Economic Review*, Vol. 60, No. 2, May 1970, pp. 286-295.

Streeter, D., and W.E. Saupe. "Nonmonetary Considerations in Farm Operator Labor Allocations," A.E. Research 86-28. Department of Agricultural Economics, Cornell University, Ithaca, NY, 1986.

Sumner, D.A. "The Off-Farm Labor Supply of Farmers," *American Journal of Agricultural Economics*, Vol. 64. No. 3, Aug. 1982, pp. 499-509.

Thirtle, C.G. "Induced Innovation in United States Field Crops, 1939-78," *Journal of Agricultural Economics*, Vol. 36, 1 (Jan. 1985a): 1-14.

Thirtle, C.G. "Technological Change and the Productivity Slowdown in Field Crops: United States, 1939-1978," *Southern Journal of Agricultural Economics,* Vol. 17, 2 (Dec. 1985b): 33-42.

Thomas, R.W. *A Review of Income Concepts Used in Economic Analysis*. Report prepared by Abt Associates for the Office of the Assistant Secretary for Planning and Evaluation, Department of Health, Education, and Welfare, May 1977.

Tweeten, L.G. *Foundations of Farm Policy,* Second Edition. University of Nebraska, Lincoln, NE, 1979.

Tweeten, L.G. "Economic Instability in Agriculture: The Contributions of Prices, Government Programs and Exports," *American Journal of Agricultural Economics,* Vol. 65, (Dec. 1983): 922-31

United States Code, Title 7, Chapter 55, Section 2266. Congressional reaffirmation of policy to foster and encourage family farms; annual report to Congress (Public Law 99-198, Section 144, Dec. 23, 1985).

U.S. Department of Agriculture, *Major Statistical Series of the U.S. Department of Agriculture, Volume 3. Gross and Net Farm Income*, AH-365, Sept. 1969.

U.S. Department of Agriculture, National Agricultural Statistics Service and Economic Research Service. *Agricultural Land Values.* Sp 3(99), 1999.

U.S. Small Business Administration. "Small Business Economic Indicators for 1999," Office of Advocacy, U.S. Small Business Administration, Washington, DC, 2001.

U.S. Senate, 90th Congress, 1st Session. "Party Returned Position of Farmers," Document No. 44, Aug. 1967.

Weisbrod, B.A., and W.L. Hansen. "An Income-Net Worth Approach to Measuring Economic Welfare," *The American Economic Review*, Vol. 58, No. 5, Part 1, Dec. 1968, pp. 1315-1329.

Welch, F. "Education in Production," *Journal of Political Economy* 78 (Jan./Feb.), 1970: 35-39.

Weldon, R.N. "Farm Risk and Diversification: A Capital Markets Approach," Ph.D. Dissertation, University of Minnesota, 1988.

Weldon, R.N., C.B. Moss, and K.W. Erickson. "The Distribution of Farm Wealth in the United States," *Agricultural Finance Review,* Vol. 53 (1993): 100-109.

Whittaker, G.W., and M.C. Ahearn. "Life Cycle and Expectations of Farmers," *Agricultural Income and Finance Situation and Outlook Report*, AFO-43, Dec. 1991.

Wunderlich, G. *Owning Farmland in the United States*. U.S. Department of Agriculture, Economic Research Service, AIB-637, July 1991.

Young, R., and P.J. Barry. "Holding Financial Assets as a Response to Risk Response: A Portfolio Analysis of Illinois Cash Grain Farms," *North Central Journal of Agricultural Economics* 9 (1987): 77-84.