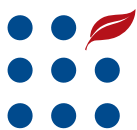




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# Agricultural Income and Finance Outlook

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## Abstract

Net farm income is forecast at \$81.6 billion in 2010, up 31 percent from 2009 and 26 percent higher than the 10-year average of \$64.8 billion for 2000 to 2009. Net cash income at \$92.5 billion would be a nominal record, 2.3 percent above the prior record attained in 2008. Net value added is expected to increase by almost \$20 billion in 2010 to \$132.0 billion. Production expenses are forecast to rise moderately, reversing the significant declines seen in 2009. However, nominal total production expenses in 2010 and 2009 still constitute the second- and third-highest totals ever. Farm business equity (assets minus debt) is expected to rise nearly 4 percent, largely due to an expected 3-percent increase in the value of farm business real estate and a 2-percent decline in farm business debt. The farm business sector's debt-to-asset ratio is expected to decline to 11.3 percent and the debt-to-equity ratio is expected to decline to 12.8 percent in 2010, indicating that the farm sector's solvency position remains strong.

Average net cash income for farm businesses is expected to increase throughout much of the country in 2010. The expected strong recovery in dairy, hog, and cattle receipts will result in much higher average net cash incomes for farm businesses in the Northern Crescent, Basin and Range, and Prairie Gateway. In the Northern Crescent, where dairy is a prominent commodity, average net cash income for farm businesses is forecast to increase by over 58 percent. Incomes are expected to be almost 50 percent higher in 2010 for farm businesses in the Basin and Range region where cattle are an important commodity, a region that showed the largest percentage decline in average net cash income in 2009. Average farm household income of principal farm operators—from farm and off-farm sources—is forecast to be \$83,194 in 2010, up 7.8 percent from 2009. This contrasts with the change for the 2008 to 2009 period, when average farm household income declined by 3.3 percent.

Approved by USDA's  
World Agricultural  
Outlook Board

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## Introduction

In this report, we compare the farm business and farm household outlook in December 2009 with the December 2010 outlook and discuss the key factors underlying the 2010 income and financial outlook. Chapter 1 discusses the farm income outlook and summarizes important drivers influencing the earnings of U.S. farm operations (value of production, direct Government payments, other sources of farm income, production expenses, and payments to stakeholders).

Chapter 2 discusses farm household income, net worth, and well-being. Average farm operator household income is forecast to be \$83,194 in 2010, up 7.8 percent from the 2009 estimate. Current income, however, can be an incomplete indicator of the well-being of farm operator households. Equity, or net worth, is more useful as an indicator of longer term performance of the farm household. In 2009, the average net worth of farm operator households was \$915,019. Although operator households typically derive most of their wealth from farm assets, many farm households have a variety of nonfarm investments, including financial investments and nonfarm real estate.

Chapter 3 presents the farm business income forecasts. U.S. agriculture is a diverse sector represented by a complex mix of business enterprises. Income forecasts highlight the diversity of financial outcomes and are based on applying sector level forecasts and receipts and expenses to the latest Agricultural Resource Management Survey (ARMS) data. ARMS is conducted by USDA's National Agricultural Statistics Service (NASS) in conjunction with the Economic Research Service (ERS). Average net cash income for farm businesses (intermediate- and commercial-sized operations) is projected to be \$79,200 in 2010, 30.7 percent above the 2009 estimate of \$60,600.

Chapter 4 covers the market fundamental affecting farm asset values. Farm sector debt is expected to fall to about \$240 billion in 2010 with real-estate debt dropping about 2 percent and non-real-estate debt dropping by about 3 percent. The favorable financial position of the U.S. agricultural sector is highlighted by two related indicators. First, the share of farms classified as vulnerable—high debt burden (over 40 percent of assets) and negative net income—dropped in this decade to the lowest levels that ERS has recorded. By 2009, only 5 percent of farms were vulnerable, the result of expanding income levels and asset values growing faster than debt. Second, entering 2010, over 60 percent of U.S. farmers reported both positive income and relatively low farm debt and were classified as being in a favorable financial position.

The Special Article assesses the financial performance and solvency of farm businesses in the face of increased financial and commodity market volatility. Agricultural debt at risk remains relatively low but early warning indicators on delinquent and nonperforming loans held by insured commercial banks show a rise in potential loan defaults.

In 2009, livestock farms held the largest share of debt at risk—56 percent. Even so, if interest rates should increase in the near future, ARMS data suggest only a modest impact on the number of financially stressed farms.

## Net Farm Income Forecast Up 31 Percent in 2010

- Net farm income is forecast at \$ 81.6 billion in 2010, up 31 percent from 2009 and 26 percent higher than the 10-year average of \$64.8 billion for 2000 to 2009.
- Farm operations with over \$1 million in 2010 sales receive almost 55 percent of U.S. agriculture's net farm income and account for over 60 percent of U.S. livestock value of production while making up just over 2 percent of U.S. farm operations.
- Production expenses are forecast to rise moderately, reversing the significant declines seen in 2009.

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Net farm income is forecast at \$81.6 billion in 2010, up 31 percent from 2009 and 26 percent higher than the 10-year average of \$64.8 billion for 2000 to 2009. Net cash income at \$92.5 billion would be a nominal record, 2.3 percent above the prior record attained in 2008. Net value added is expected to increase by almost \$20 billion in 2010 to \$132.0 billion. The net value added of agriculture to the U.S. economy in inflation-adjusted terms reached its two highest levels since the mid-1970s in 2004 and 2008. Inflation-adjusted net cash income has reached levels not seen since the mid-1970s. Real net cash income has exceeded \$80 billion three times from 2000 to 2009. The mid-1970s was the last comparable period when U.S. farming enjoyed multiple years of sustained levels of high output and income.

The 2000 to 2009 decade was characterized by high and persistent levels of volatility in agricultural commodity and input (feed, fuel, and fertilizer) markets. This volatility is reflected in year-to-year shifts in farm income during the decade. Net farm income increased in 6 of the 10 years, posting an average increase of 26.6 percent in the years with increases in farm income, and falling an average of 23.5 percent in the 4 years (2002, 2005, 2006, and 2009) when net farm income decreased.

Net cash income includes only cash receipts and expenses and is generally less variable than net farm income. Farmers can manage the timing of crop and livestock sales and of the purchase of inputs to reduce the variability in their net cash income. Nonetheless, during 2000-09, farmers' net cash income showed a significant degree of variability. In the 6 years when net cash income rose, the average increase was 10.4 percent. In years when net cash income decreased, the average decrease was 15.9 percent.

The values of both crop and livestock production have trended steadily upward since 1970. However, the year-to-year movements in the two measures have not always been synchronized. In 2010, the percentage increase in the value of livestock production (16.6 percent) is expected to be more than five times that of crop production (3.1 percent). A primary factor driving the forecast for higher farm income in 2010 is the projected increase in cash receipts for all the livestock categories, led by double-digit growth in meat animals and dairy products. Net value added and net farm income have followed the value of commodity production over both the long term and in

year-to-year fluctuations. Because farmers typically do not vary their production mix dramatically from year to year, purchases of production inputs have been relatively stable. Purchased inputs have been more stable than crop and livestock value of production, except for 2007-08, when they had double-digit increases. Increases in expenses for purchased inputs are projected to show an increase of 2.5 percent in 2010 after posting a 6.4-percent decline in 2009.

The recovery in farm income shows a change in the pattern observed in 2009. The declines in all three measures of U.S. farm income that occurred in 2009 were driven by declines in annual crop cash receipts and declines in cash receipts for all the livestock categories. The 2009 fall in farm income was attributable mostly to large declines in crop and livestock prices at the farm level.

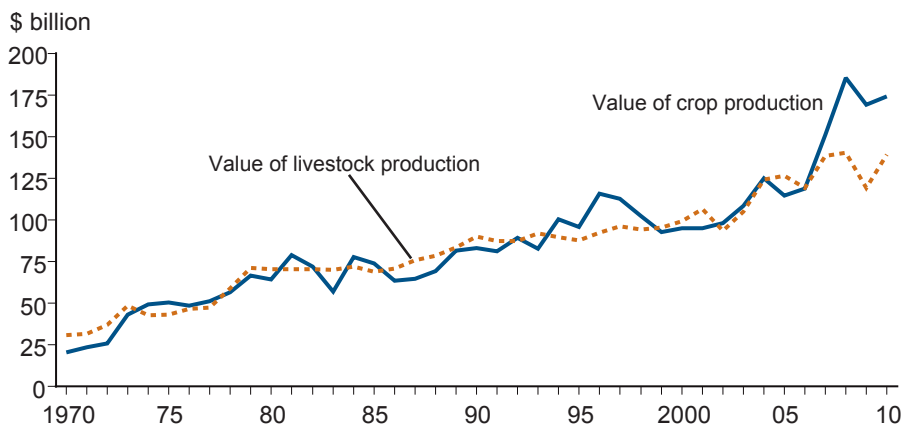
## Livestock and Cotton Receipts Expected To Bounce Back in 2010

Dairy receipts are expected to increase by almost a third in 2010, as milk prices received by dairy farmers are projected to increase more than \$3 per hundredweight (cwt). Cattle and calf cash receipts are expected to increase 13 percent in 2010. Hog cash receipts are expected to increase 26 percent over 2009 cash receipts due to stable pork demand and lower year-over-year pork production. Broiler cash receipts are expected to increase over 11 percent in 2010 due to an increase in prices and to the gradual reopening of exports to Russia. Egg cash receipts are expected to increase slightly in 2010 due to increased exports to Asia and the European Union, more than offsetting losses in exports to Canada and Mexico.

From 2004 through 2010, the nominal value of farm sector production of crops and livestock increased over 25 percent (fig 1.1). Over three-quarters of that increase reflects gains in the value of U.S. crop production. The value of crop production was about 49 percent of the agricultural sector's total value of production in 2004 to 2006, but accounted for 57 percent of the total from 2007 to 2010. Increases in the value of corn and soybean production from 2004 through 2010 accounted for 93 percent of the increase in feed crops and

Figure 1.1

### Value of crop and livestock production, 1970-2010



Note: 2010 forecast.

Source: USDA, Economic Research Service.

94 percent of the rise in oil crops. These increases partially reflect the impact that bioenergy has had on the value added to the U.S. economy by the farm sector (table 1.1). Both corn for grain and soybean receipts are expected to experience solid gains in 2010 reflecting increased quantities sold at higher prices, benefiting from anticipated increases in domestic use and exports (fig 1.2). Crop production is expected to account for about 55.6 percent of the total value of farm sector production in 2010.

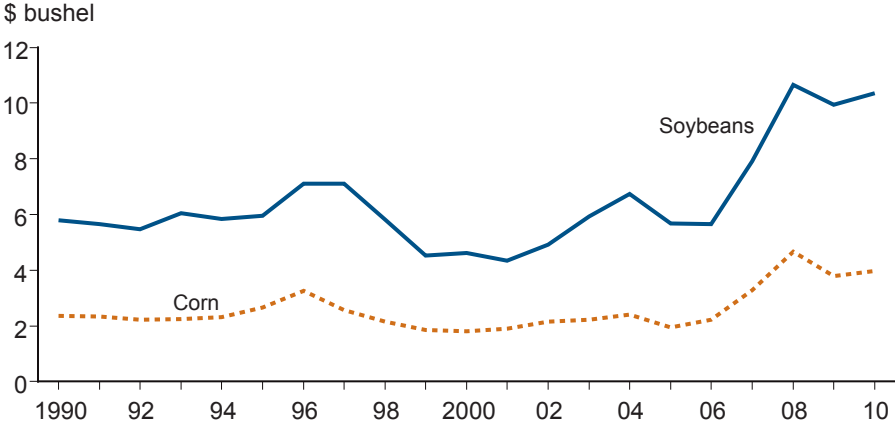
Cotton receipts are expected to experience a sharp increase in 2010. Strong domestic and foreign demand for cotton combined with increased U.S. production, and continued tight global supplies are expected to lead to large increases in prices and quantities sold for both lint and seed. A rise expected in 2010 wheat cash receipts reflects increased domestic use and a projected rise in exports. Declines in production are expected for apples, pears, and grapes, while the cranberry crop is expected to exceed last year's crop. California is expected to produce record navel orange and walnut crops. Total citrus production in Florida is expected to decline. Vegetable and melon receipts overall are expected to increase despite declines in receipts for potatoes. Record yields are expected to produce a large increase in U.S. production of dry beans and higher 2010 cash receipts.

**Crop Farms To Contribute 64 Percent of U.S. Agriculture’s Net Value Added in 2010**

Crop farms account for less than half of U.S. farm operations but make up more than 70 percent of the sector’s payments to stakeholders and more than 57 percent of U.S. agriculture’s net farm income (table 1.2). Crop farms are expected to contribute almost 64 percent of U.S. agriculture’s 2010 net value added, with cash grain and soybean farms accounting for half of that (fig. 1.3). High-value crop farms accounted for less than 7 percent of all U.S. farms in 2009, but accounted for nearly one-third of the value of the sector’s crop production.

Size matters in agriculture. Bigger farm operations, while fewer in number, contribute the bulk of the value of U.S. farm production and receive the lion’s

Figure 1.2  
**Annual average prices for crops, 1990-2010**



Note: 2010 forecast.  
 Source: USDA, National Agricultural Statistics Service.



Table 1.1

**Value added to the U.S. economy by the agricultural sector via the production of goods and services, 2006-10**

United States Component accounts <sup>1</sup>	2006	2007	2008	2009	2010	2000-09 average	Change 2009 to 2010
	<i>\$ billion</i>						
Value of crop production	118.7	151.1	185.1	169.0	174.2	126.0	5.2
Food grains	9.1	13.6	18.7	14.4	14.5	10.1	0.1
Feed crops	29.4	42.3	58.9	50.2	53.0	32.4	2.9
Cotton 5.5		6.5	5.2	3.5	5.7	4.8	2.2
Oil crops	18.5	24.6	28.7	31.9	33.7	20.0	1.7
Fruits and tree nuts	17.3	18.7	19.3	19.0	18.9	15.7	0.0
Vegetables 18.0		19.3	21.0	20.6	21.7	17.7	1.1
All other crops	24.2	25.2	25.0	24.1	25.6	23.2	1.4
Home consumption	0.1	0.1	0.1	0.1	0.1	0.1	0.0
Value of inventory adjustment <sup>3</sup> -3.6		0.9	8.2	5.3	1.0	1.9	-4.2
Value of livestock production	119.3	138.4	140.3	119.2	139.0	117.2	19.8
Meat animals	63.7	65.1	65.0	58.6	68.2	59.0	9.6
Dairy products	23.4	35.5	34.8	24.3	31.5	25.9	7.2
Poultry and eggs	26.6	33.1	36.8	32.5	35.7	27.9	3.2
Miscellaneous livestock	4.8	4.9	4.8	4.3	4.4	4.4	0.1
Home consumption	0.3	0.3	0.3	0.3	0.3	0.2	0.0
Value of inventory adjustment <sup>3</sup>	0.5	-0.4	-1.6	-0.8	-1.1	-0.3	-0.3
Revenues from services and forestry	36.4	38.1	42.0	42.7	42.4	33.1	-0.3
Machine hire and customwork	2.6	2.7	3.0	4.0	4.1	2.8	0.1
Forest products sold	1.0	0.7	0.7	0.7	0.7	0.8	0.0
Other farm income	13.2	14.2	17.7	17.3	16.3	12.4	-1.0
Gross imputed rental value of farm dwellings	19.5	20.6	20.5	20.7	21.3	17.1	0.6
Value of agricultural sector production	274.4	327.6	367.3	330.9	355.7	276.3	24.8
less: Purchased inputs	153.7	184.3	203.0	190.0	194.7	151.4	4.7
Farm origin	61.1	73.4	79.8	77.0	78.7	60.4	1.7
Feed purchased	31.4	41.9	46.9	45.0	44.7	32.5	-0.3
Livestock and poultry purchased	18.6	18.8	17.7	16.5	19.2	17.1	2.7
Seed purchased	11.0	12.6	15.1	15.5	14.8	10.8	-0.8
Manufactured inputs	37.5	46.3	55.0	49.0	49.3	37.0	0.4
Fertilizers and lime	13.3	17.7	22.5	20.1	18.1	13.8	-2.0
Pesticides	9.0	10.5	11.7	11.5	11.1	9.4	-0.4
Petroleum fuel and oils	11.3	13.8	16.2	12.7	15.5	10.0	2.8
Electricity	3.8	4.3	4.5	4.6	4.6	3.8	0.0
Other intermediate expenses	55.2	64.6	68.1	64.0	66.6	54.0	2.6
Repair and maintenance of capital items	12.5	14.3	14.8	14.7	15.4	12.4	0.6
Machine hire and customwork	3.5	3.8	4.1	3.9	3.9	3.8	0.1
Marketing, storage, and transportation expenses	9.1	10.3	10.1	10.3	10.4	8.6	0.2
Contract labor	3.0	4.4	4.7	3.9	3.7	3.4	-0.2
Miscellaneous expenses	27.1	31.7	34.4	31.3	33.2	25.8	1.9
plus: Net government transactions	6.2	0.9	0.9	1.2	1.2	7.6	0.0
Direct Government payments	15.8	11.9	12.2	12.3	12.4	16.4	0.2
Motor vehicle registration and licensing fees	0.6	0.6	0.6	0.6	0.7	0.6	0.0
Property taxes	9.0	10.3	10.7	10.4	10.6	8.3	0.1
Gross value added	126.9	144.3	165.3	142.1	162.3	132.5	20.1

—continued



Table 1.1

**Value added to the U.S. economy by the agricultural sector via the production of goods and services, 2006-10—Continued**

United States Component accounts <sup>1</sup>	2006	2007	2008	2009	2010	2000-09 average	Change 2009 to 2010
	<i>\$ billion</i>						
less: Capital consumption	26.2	27.0	28.7	30.1	30.3	24.3	0.2
Net value added	100.7	117.2	136.6	112.0	132.0	108.1	20.0
less Payments to stakeholders	43.2	46.9	50.0	49.8	50.4	43.3	0.6
Employee compensation (total hired labor)	21.2	24.2	25.0	24.9	25.5	21.0	0.6
Net rent received by nonoperator landlords	7.6	7.6	9.6	9.8	10.0	8.7	0.2
Real estate and nonreal estate interest	14.4	15.1	15.4	15.2	14.9	13.5	-0.2
Net farm income	57.4	70.3	86.6	62.2	81.6	64.8	19.4

Note: 2010 forecast.

<sup>1</sup>For explanation of terms, see box, "Farm Income and Costs: Glossary," p. 9.

Source: USDA, Economic Research Service.

Table 1.2

**Shares of value of production (VOP), stakeholder payments, and net farm income by farm production specialty, 2010**

	Farms in 2009	Crop VOP	Livestock VOP	Stake- holder payments	Equity holder net income
	<i>Percent</i>				
Crops farms:	46.3	95.7	5.5	71.2	57.4
Cash grain and soybean	14.7	52.1	4.0	33.6	30.1
Other field crops	24.9	11.3	1.3	8.7	8.4
High-value crops	6.7	32.3	0.2	28.9	18.9
Livestock farms:	53.7	4.3	94.5	28.8	42.6
Beef cattle	29.6	2.0	32.8	9.8	13.3
Hogs	1.0	1.0	10.9	2.8	3.4
Poultry	2.1	0.3	22.9	2.9	15.5
Dairy	2.3	0.6	22.8	9.5	8.9
General livestock	18.7	0.4	5.1	3.8	1.5
Total	100.0	100.0	100.0	100.0	100.0

Note: 2010 percentages are USDA forecasts while the percent of farms is based on 2009 ARMS.

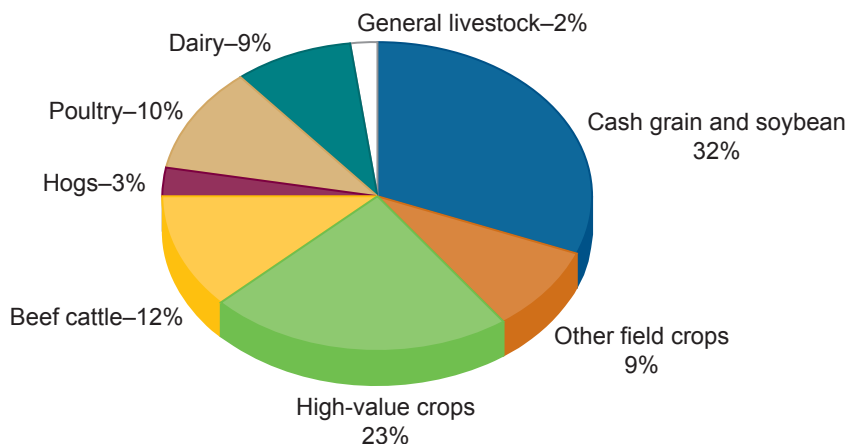
Source: USDA, Agricultural Resource Management Survey, NASS and ERS.

share of agriculture's net farm income (see box, "Measuring Agriculture's Value Added and Net Farm Income"). For example, farm operations with over \$1 million in 2010 sales are expected to account for over 60 percent of U.S. livestock value of production and almost 54 percent of U.S. agriculture's 2010 net farm income (table 1.3).

Commercial farms—those with over \$250,000 in annual sales—are expected to account for over 80 percent of U.S. agriculture's net value added in 2010 (fig. 1.4). Very large commercial farms—those with annual sales exceeding \$1 million—alone generate more than half of U.S. value of production and net farm income (table 1.4) (see box, "Farm Types," p. 10). Family farms, which include both commercial and noncommercial farms, are expected to account for almost 85 percent of net farm income (see box, "Farm Income and Costs: Glossary," p. 9).

Figure 1.3

**Distribution of U.S. net value added by farm production specialty, 2010**



Note: 2010 forecast.

Source: USDA, Agricultural Resource Management Survey, NASS and ERS.

**Measuring Agriculture’s Value Added and Net Farm Income: Farm-Sector and Farm-Level Approaches**

USDA measures U.S. agriculture’s value added and net farm income using two approaches: one based on aggregate farm-sector data and the second based on farm-level data. Both approaches generate data used in this publication’s tables and figures. Tables and figures relying on value-added measures from the farm-level accounts have as a source line “USDA, Agricultural Resource Management Survey, NASS and ERS.”

**Farm-sector approach**

The farm-sector approach relies on farm-sector data obtained from a wide variety of sources, including farm-level data from ARMS, USDA’s survey of individual farm-level operations conducted by the National Agricultural Statistics Service (NASS) in conjunction with the Economic Research Service (ERS). In general, sectorwide data neither identify nor distinguish individual farms. Therefore, the sector approach is restricted to constructing sector totals for different value-added measures for the United States.

**Farm-level approach**

The farm-level approach relies almost entirely on ARMS surveys of individual farm operations. The advantage of using farm-level data is that it allows ERS to look at the distribution of value-added at the farm level rather than estimating a single farm-sector estimate. Farm-level data make it possible to identify and distinguish the differing contributions of U.S. value added among stakeholders and equity holders, specialization of farm output, and sizes of farm operation. Each year, ARMS produces a farm-level estimate of value added that is as consistent as possible with sectorwide measures of value added and its components. Weighted estimates of farm-level value added are compared with sectorwide estimates produced from multiple sources of data as a check for consistency.

Table 1.3

**Share of net value added (NVA), value of production (VOP), net farm income, and stakeholder payments by sales class, 2010**

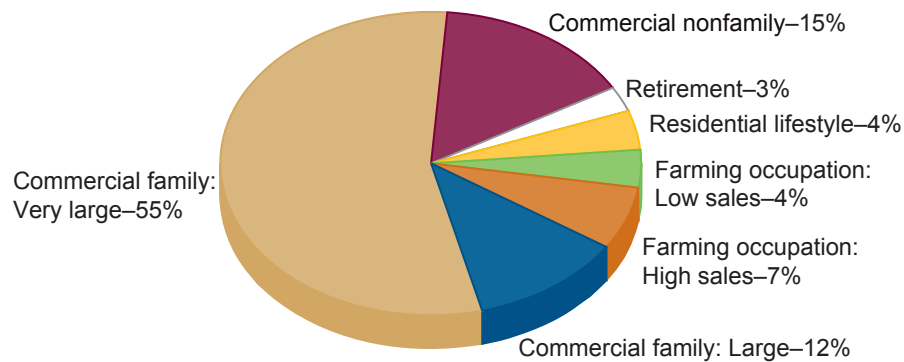
	Farms in 2009	NVA	Crop VOP	Livestock VOP	Stake- holder payments	Equity holder net income
<i>Percent</i>						
\$1 million and above	2.3	51.4	43.7	61.4	47.7	53.9
\$500,000 - \$999,999	3.4	17.8	21.2	14.2	17.9	17.7
\$250,000 - \$499,999	4.5	12.3	16.0	8.4	13.0	11.9
\$100,000 - \$249,999	6.7	8.7	10.4	6.9	9.0	8.5
Below \$100,000	83.1	9.8	8.7	9.1	12.4	8.0
Total	100.0	100.0	100.0	100.0	100.0	100.0

Note: 2010 percentages, columns 2-6, are USDA forecasts; farms in 2009 is based on 2009 data.

Source: USDA, Agricultural Resource Management Survey, NASS and ERS.

Figure 1.4

**Distribution of U.S. net value added by farm typologies, 2010**



Note: 2010 forecast.

Source: USDA, Agricultural Resource Management Survey, NASS and ERS.

Table 1.4

**Shares of value of production (VOP), stakeholder payments, and net farm income by farm typologies, 2010**

Farm typology	Farms in 2009	Crop VOP	Livestock VOP	Stake- holder payments	Equity holder net income
<i>Percent</i>					
Rural residence family	61.4	6.1	5.9	8.3	6.3
Retirement	20.1	1.9	1.4	1.5	3.4
Residential/lifestyle	41.3	4.2	4.5	6.8	2.9
Intermediate family	26.3	12.2	9.7	12.2	9.8
Farming occupation—low sales	21.3	4.4	4.2	5.6	3.0
Farming occupation—high sales	5.0	7.8	5.5	6.6	6.8
Commercial family	9.5	68.5	68.0	63.5	69.0
Large	4.3	15.2	8.1	12.2	11.6
Very large	5.2	53.3	59.9	51.3	57.4
Family farms	97.2	86.8	83.6	84.0	85.1
Nonfamily	2.8	13.2	16.4	16.0	14.9
Total	100.0	100.0	100.0	100.0	100.0

Note: 2010 percentages, columns 2-5, are USDA forecasts; farms in 2009 is based on 2009 data.

Source: USDA, Agricultural Resource Management Survey, NASS and ERS.

A full glossary is available at [www.ers.usda.gov/Data/FarmIncome/Finfidmu.htm](http://www.ers.usda.gov/Data/FarmIncome/Finfidmu.htm).

### ***Net Value Added***

Net value added represents:

- the total value of the farm sector's production of goods and services, less payments to other (nonfarm) sectors of the economy
- production agriculture's addition to the national economy
- the sum of the economic returns to all the providers of factors of production; farm employees, lenders, landlords, and farm operators.

ERS value-added estimates are used by the U.S. Department of Commerce's Bureau of Economic Analysis in the development of the National Income Accounts and Gross Domestic Products as well as by the Organization for Economic Cooperation and Development in its international agricultural accounts.

### ***Net Farm Income***

Net farm income is the portion of the net value added by agriculture to the national economy earned by farm operators (i.e., the entrepreneurial earnings of those individuals who share in the risks of production and materially participate in the operation of the business). Farm operators typically benefit most from the increases and assimilate most of the declines arising from short-term, unanticipated weather and market conditions.

### ***Net Cash Income***

Net cash income is the cash earnings realized within a calendar year from the sales of farm production and the conversion of assets, both inventories (in years in which reduced) and capital consumption, into cash.

### ***Stakeholders***

Stakeholders are individuals and institutions that contribute factors of production (land, labor, and capital) to farming operations for a rate of return fixed in advance of the production factors' use in production. Land is rented from landlords, laborers are paid a wage, and interest is paid on money borrowed from lenders. In each case the earnings are agreed upon in advance, so the contributor bears no risks of the uncertainties inherent in production and marketing of the output.

### ***Farm Operators***

Farm operators, contractors, partners, and other investors also contribute factors of production but are distinguished from stakeholders because they do so in order to share in the profits and thereby assume the risks of production and markets. Profits are determined as the residual after payment for purchased inputs, making allowances for replacing the capital consumed in the production processes. Managerial skills in production and marketing are another factor contributed by stakeholders that affects the profits and thus their earnings.

Prominent among other investors are family members, particularly parents and siblings, who have an ownership interest in the farm or family corporation but don't perform the management functions of the principal operator. They may manage a particular function (bookkeeping, fieldwork, tending to the livestock, etc.), work only in critical stages in production, or have full-time work off the farm and contribute only their owned capital. The remuneration for their contributions of land, labor and/or capital will be a share of the profits (if any) that are not known until production processes and marketing are completed.

### ***Returns to Operators***

Returns to operators, as with net farm income, is a measure of the earnings of farm operators (defined as those individuals who share in the risks of production and materially participate in the operation of the business) from production of commodities and farm business activities.

### ***Inventory Change***

The inventory components of crop and livestock output represent the value of the change in inventories as opposed to the change in the value of inventories. Under the concept of national income accounting, income is a measure of the net value of production occurring within the calendar year. Changes in the value of stocks produced in prior years as a consequence of price changes are not appropriate for inclusion as income. Thus, the quantity changes in inventories are computed and then valued at calendar-year weighted-average market prices in order to avoid the inclusion of the effects of capital gains and losses on stocks of farmer-owned commodities held in inventory.

### ***Farm-Related Income***

Farm-related income is the value derived from those economic activities reliant on resources of the farm enterprise in addition to crop and livestock output. Examples are custom harvesting for cash, forestry sales, and the imputed rental value of the farmhouse.

U.S. agriculture's annual net value added is split among its equity holders and stakeholders. Farm-equity holders' share is referred to as net farm income. Equity holders can expect their share of U.S. agriculture's net value added to increase in 2010 (table 1.5). Contractors (who contract with farmers to receive animals and products at the farm level and move them to slaughter/whole-sale) are expected to accrue the greatest annual share increase, reflecting the large expected increase in livestock value of production. Geographically, the Heartland and Fruitful Rim regions contribute half of U.S. agriculture's net value added (fig. 1.5).

## Farm Types

### *Small family farms (gross farm sales less than \$250,000)<sup>1</sup>*

**Retirement farms.** Small farms whose operators report they are retired, although they continue to farm on a small scale. These operations sell enough farm products (at least \$1,000 worth) to qualify as farms under the current farm definition.<sup>2</sup>

**Residential/lifestyle farms.** Small farms whose operators report a major occupation other than farming.<sup>3</sup> The category also includes a small number of farms—8 percent of the group in 2007—whose operators are not in the labor force.

**Farming-occupation farms.** Small family farms whose operators report farming as their major occupation.<sup>3</sup>

- Low-sales farms. Gross sales less than \$100,000.
- Medium-sales farms. Gross sales between \$100,000 and \$249,999.

### *Large-scale family farms (gross farm sales of \$250,000 or more)*

**Large family farms.** Farms with gross sales between \$250,000 and \$499,999.

**Very large family farms.** Farms with gross sales of \$500,000 or more.

### *Nonfamily farms*

Any farm where the operator and persons related to the operator do not own a majority of the business.

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Note: Limited-resource farms are no longer a separate category in the classification, starting with the 2005 Agricultural Resource Management Survey.

<sup>1</sup>USDA's National Commission on Small Farms selected \$250,000 in gross sales in a given year as the cutoff between small and large-scale farms (USDA, NCSF, 1998, p. 28).

<sup>2</sup>A farm is defined as any place that produced and sold—or normally would have produced and sold—at least \$1,000 of agricultural products during a given year (USDA, NASS, 2008).

<sup>3</sup>Major occupation is defined as the occupation at which operators spent the majority of their work time.

U.S. Department of Agriculture, National Commission on Small Farms (USDA, NCSF). *A Time to Act: A Report of the USDA National Commission on Small Farms*. Miscellaneous Publication 1545 (MP-1545). January 1998.

Table 1.5

**Distribution of net value added among resource owners, 2006-10**

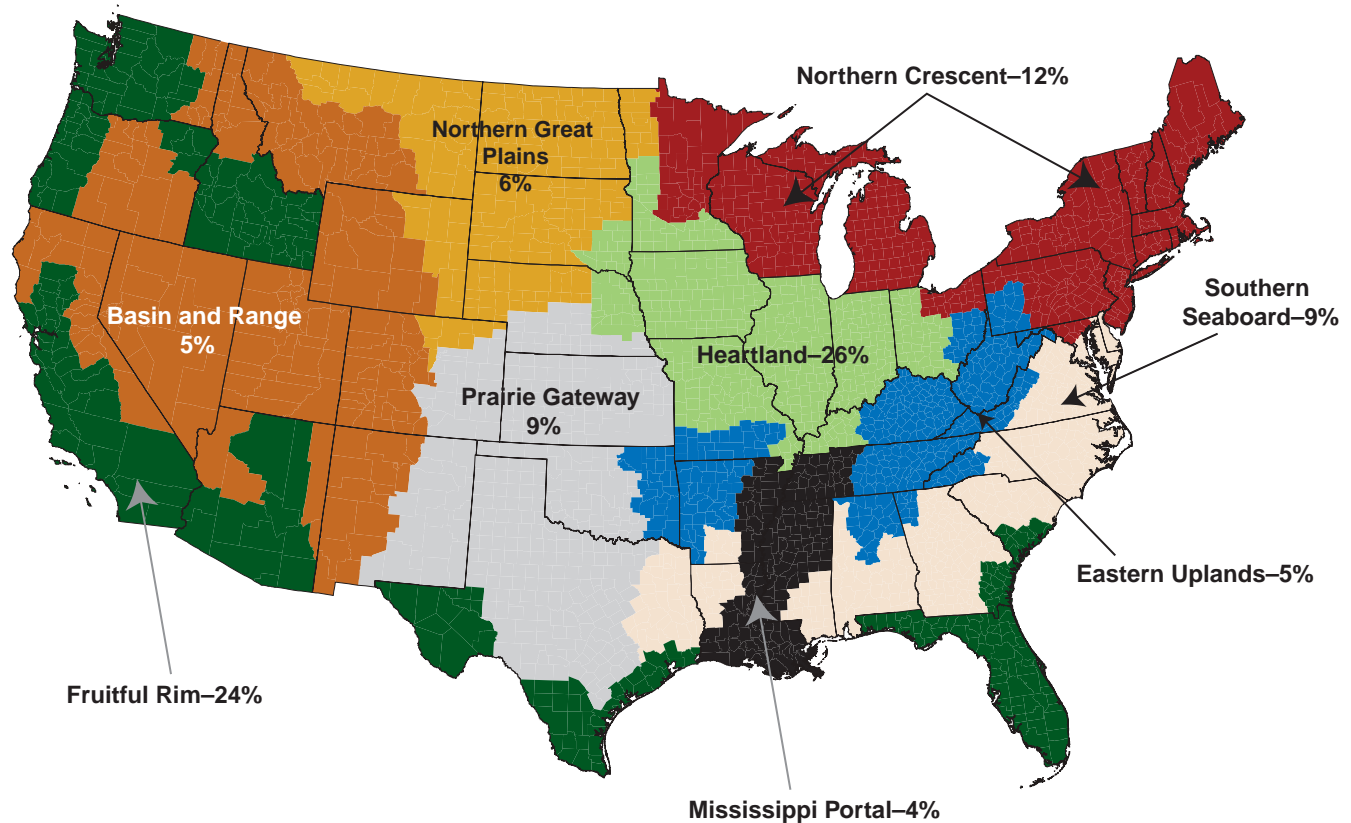
	2006	2007	2008	2009	2010
	<i>Percent</i>				
Stakeholders:	44.3	35.1	40.0	44.9	38.1
Hired labor	21.9	16.9	20.0	22.8	19.6
Lenders	11.3	9.1	9.4	10.3	8.5
Nonoperator landlords	11.1	9.1	10.6	11.8	10.0
Equity holders	55.7	64.9	60.0	55.1	61.9
Family farm operators	34.4	44.6	44.1	40.8	43.3
Nonfamily farm operators	9.3	8.4	7.0	6.7	7.2
Contractors	12.0	11.9	8.9	7.6	11.4
Total	100.0	100.0	100.0	100.0	100.0

Note: 2010 forecast.

Source: USDA, Agricultural Resource Management Survey, NASS and ERS.

Figure 1.5

**Regional distribution of value added, 2010**



Note: 2010 forecast.

Source: USDA, Agricultural Resource Management Survey, NASS and ERS.



## Government Payments Forecast at \$12.4 Billion

Government payments paid directly to U.S. agricultural producers are expected to total \$12.4 billion in 2010, a 1.5-percent increase from \$12.3 billion paid out in 2009. This level would be 19 percent below the 5-year average for 2005-09. Direct payments under the Direct and Counter-cyclical Program (DCP) and the Average Crop Revenue Election Program (ACRE) are forecast at \$4.81 billion for 2010. Direct payment rates are fixed in legislation and are not affected by the level of program crop prices. The 4-percent decline in direct payments forecast in 2010 relative to the 5-year average is due to producers, receiving revenue insurance payments from the ACRE program. Those payments are expected to be \$430 million in 2010. Authorized under the 2008 Farm Act, ACRE provides revenue insurance to participating producers in exchange for a 20-percent reduction in producers' annual direct-payment allotments beginning with the 2009 crop year. Low producer participation in the ACRE program—only about 1 in 11 direct-payment recipients signed up for ACRE by the August 2009 deadline—has led to this smaller than expected decrease in actual direct payments.

Counter-cyclical payments are forecast to decrease by 82 percent from \$1.17 billion in 2009 to \$210 million in 2010. Strong cotton prices are responsible for this projected decrease. Only producers of upland cotton and peanuts are expected to receive counter-cyclical payments in 2010.

Marketing loan benefits—including loan deficiency payments, marketing loan gains, and certificate exchange gains—are projected at \$120 million in 2010, down 89 percent from 2009 levels. Because of the high durum-wheat loan rate, durum-wheat producers are expected to receive 93 percent of these benefits, despite the recent rise in global wheat prices. Other wheat classes do not qualify for marketing loan benefits. Prior to 2010, upland cotton producers received almost 91 percent of total marketing loan benefits. However, strong 2010 cotton prices are expected to remain too high for cotton producers to qualify. Other commodities receiving marketing loan benefits are barley, wool, mohair, and pelts.

The Milk Income Loss Contract Program (MILC) compensates dairy producers when domestic milk prices fall below a specified level. Milk prices declined in 2009 due to the global recession, leading to \$880 million in MILC payments being made in 2009. For 2010, rebounding milk prices are expected to reduce MILC payments to \$55 million.

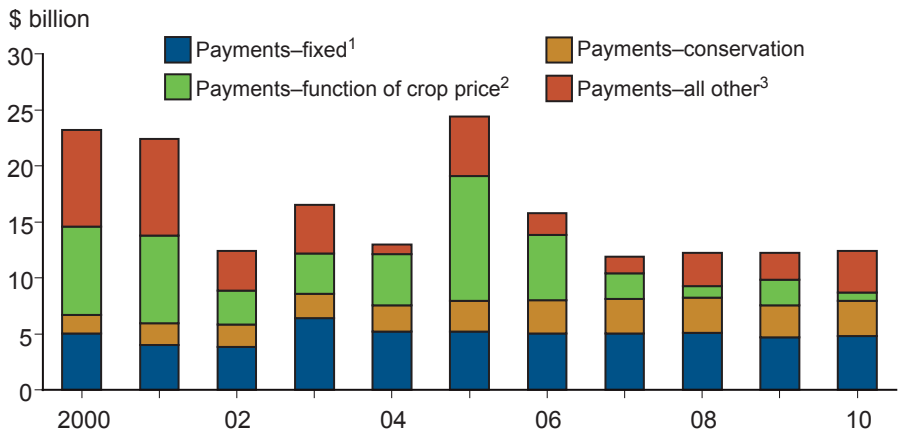
Forecast at \$820 million in 2010, Tobacco Transition Payment Program (TTP) payments are expected to continue a declining trend beyond 2010. Begun in 2005, this program provides annual payments over a 10-year period to eligible tobacco quota owners and producers of tobacco. Since the program's start, lump-sum payments to individuals have been made through agreements with third parties in return for the producers' and tobacco quota owners' rights to the 10-year TTP payment stream. Payments for 2010 include both Commodity Credit Corporation (CCC) payments and lump-sum payments received by farm operators during the year (f.g. 1.6).

Conservation programs operated by USDA's Farm Service Agency (FSA) and Natural Resources Conservation Service (NRCS) provide direct payments to



Figure 1.6

### Government payments, 2000-10



Note: 2010 forecast.

<sup>1</sup>Production flexibility contract payments and direct payments whereby payment rates are fixed by legislation.

<sup>2</sup>Counter-cyclical payments, loan deficiency payments, marketing loan gains, certificate exchange gains, and ACRE payments whereby commodity payment rates vary with crop prices.

<sup>3</sup>All other payments include disaster relief payments, tobacco transition payments, and dairy program payments.

Source: USDA, Farm Service Agency, Natural Resources Conservation Service, and Commodity Credit Corporation.

producers as well. Estimated conservation payments of \$3.15 billion in 2010 reflect programs being brought up toward funding levels authorized by the 2008 Farm Act.

Ad hoc and emergency-disaster program payments are forecast to be \$2.82 billion in 2010, an increase of 335 percent over the \$648 million paid out in 2009. The 2008 Farm Act created a permanent fund for disaster assistance, the Agricultural Disaster Relief Trust Fund. Supplemental Revenue Assistance Payments (SURE) from this fund and from the 2009 American Recovery and Reinvestment Act are expected to amount to \$1.93 billion in 2010. Crop Assistance Program payments are expected to amount to \$420 million in 2010. Other disaster programs aimed at agricultural producers include the Emergency Conservation Program, Livestock Forage Program, Livestock Indemnity Program, and Noninsured Assistance Program. Producers' eligibility for financial help from these programs depends on the extent to which their crop or livestock losses meet a particular program's threshold for payments, once a county is declared eligible for disaster relief.

### Spatial Concentration and Program Coverage Overlap of Direct Payments and Crop Insurance Subsidies

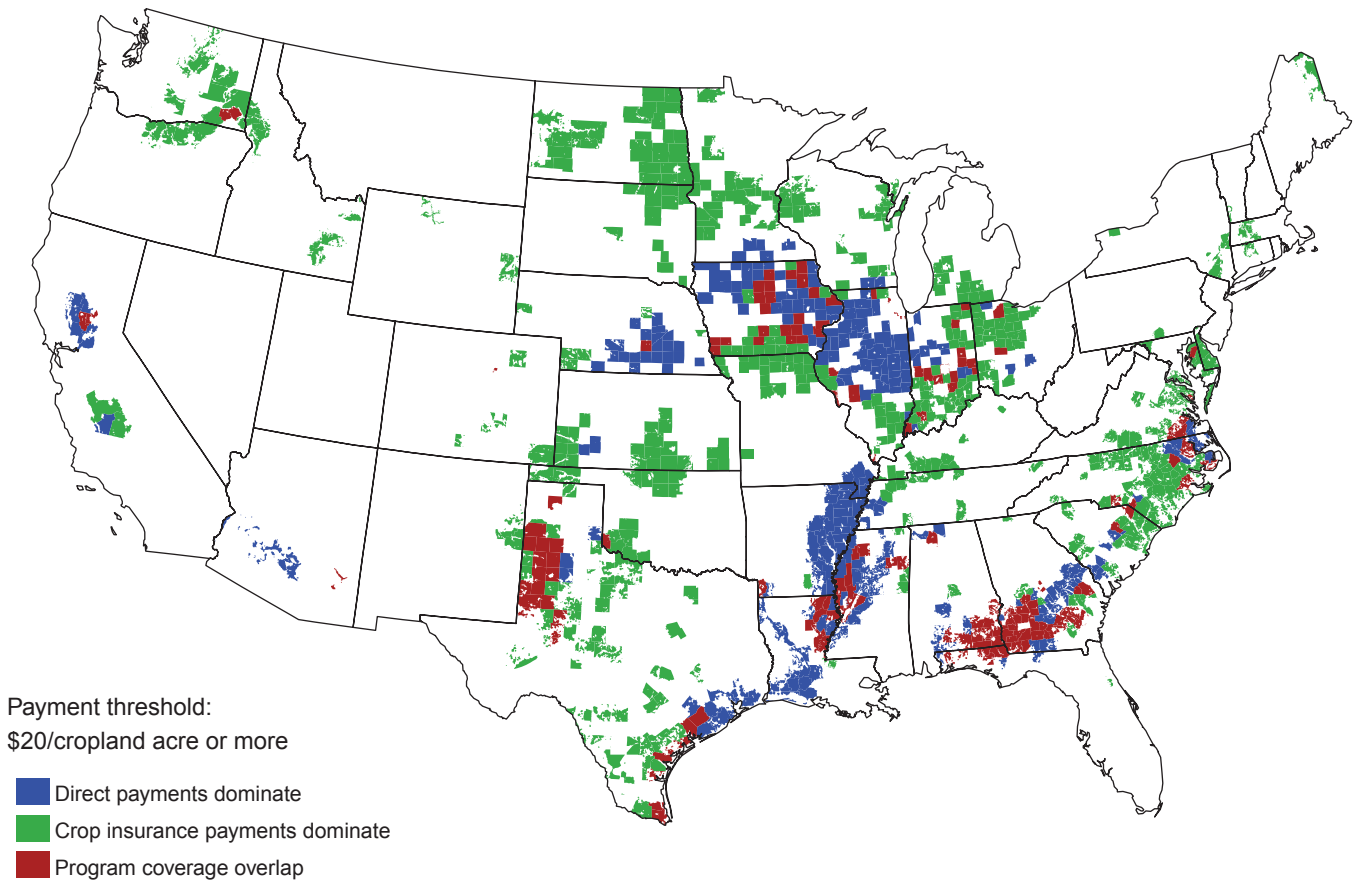
USDA, congressional representatives, and farm organizations have held discussion forums with farmers around the country in 2009-10 to discuss the upcoming 2012 Farm Bill. One proposal that has been discussed would replace direct payments with a new system based on a "revenue assurance" program to provide insurance against crop and livestock losses. The impetus for this proposal is to address current Federal budget pressures and the criticism that direct payments are made to farmers even when commodity prices are high. Farmers' level of support for this proposal varies by region (Good, 2010).

Figure 1.7 displays the spatial concentrations of direct payments from the Direct and Counter-cyclical Program and indemnity payments from the crop-insurance program. For a particular county, if producers received direct payments in 2008 equal to or above \$20 per cropland acre and crop insurance indemnity payments averaged over 2007 to 2009 of less than \$20 per cropland acre, then direct payments are said to be dominant. If producers received direct payments below \$20 per cropland acre and crop-insurance indemnity payments equal to or above this amount, then crop-insurance indemnity payments are said to be dominant. If producers received both direct payments and crop-insurance indemnity payments at or above \$20 per cropland acre, then there is program coverage overlap.

The spatial concentration of direct payments differs from that of crop-insurance indemnity payments. Direct payments are dominant in the Corn Belt (corn and soybeans), Mississippi Delta (cotton and rice), and the Texas-Louisiana Gulf Coast (cotton and rice). Direct payment dominance is also found in Arizona (cotton), California (cotton and rice), and parts of the Southern Atlantic Seaboard. Crop insurance indemnity payments dominate the wheat-growing regions in the Northern Plains and parts of the Southern Plains, as well as North and South Carolina. Program coverage overlap

Figure 1.7

**Direct payment and crop insurance indemnity payments: Spatial concentration and program coverage overlap**



Risk Management Agency payments 3-year average, 2007-09.

Source: USDA, Economic Research Service.

occurs primarily in the Texas Panhandle (cotton and wheat) and across Alabama and Georgia (cotton and peanuts).

## Why ARMS and Sector Accounts Estimates of Government Payments Differ<sup>1</sup>

The Economic Research Service uses two types of data on Government payments—data from administrative records maintained by USDA’s Farm Service Agency, Natural Resources Conservation Service, and Risk Management Agency, as well as survey data. Administrative data serves as a complete accounting of Government payments to program participants and are used to generate official estimates of Government payments by the State and program categories in ERS’s U.S. and State Farm Income data series (also known as the sector accounts). Sector accounts are preferable for understanding the size and composition of Government payments made to the farm sector, but they cannot be linked to individual farm and farm-operator characteristics. The sector accounts also include payments made to nonoperator landlords who do not farm but receive Government payments associated with their farmland.

The Agricultural Resource Management Survey (ARMS) collects information directly from farmers. ARMS data are useful in understanding the farm and farm-operator characteristics of producers receiving various payments, but like all surveys, ARMS is subject to respondent error.

For 2006 to 2009, ARMS estimates of total Government payments are lower than the corresponding estimates from the sector accounts, on average by about \$3.3 billion, or about 75 percent of the sector estimates of total Government payments (table 1.6). One reason for the difference is that ARMS excludes farm program payments made to nonoperator landlords—approximately \$2.3 billion per year over this period—while the

<sup>1</sup>For a more detailed comparison of the 2007 Government payments estimates, see appendix IV of *Structure and Finances of U.S. Farms: Family Farm Report, 2010 Edition*, <http://www.ers.usda.gov/Publications/EIB66/EIB66.pdf>.

Table 1.6

### Average estimates of Government payments by program for ARMS and the sector accounts, 2006-09

Farm typology	Total Government payments	Direct payments	Counter-cyclical payments	Marketing loan benefits <sup>1</sup>	Conservation Programs	Other Program Payments <sup>2</sup>
	<i>Million dollars</i>					
Average of annual ARMS estimates, 2006-09	9,722.1	4,202.9	1,372.5	260.4	2,314.5	1,571.7
Average of annual sector accounts estimates, 2006-09 <sup>3</sup>	13,049.1	4,987.1	1,760.6	1,087.9	3,009.3	2,204.2
	<i>Percent</i>					
Average of annual ARMS capture rates, 2006-09 <sup>4</sup>	74.7	84.3	89.4	25.1	77.0	72.9
Potential variability from year to year <sup>5</sup>	3.9	2.3	29.2	37.5	7.8	17.2
Average shares by program of the sector accounts estimates of total Government payments not captured by ARMS, 2006-09	100.0	24.7	9.2	24.2	21.1	20.7

<sup>1</sup> Loan deficiency payments, marketing loan gains, and net value of commodity certificates.

<sup>2</sup> Disaster and market loss payments, peanut quota compensation, milk income loss contract payments, other Federal program payments, and State and local program payments.

<sup>3</sup> From the U.S. and State Farm Income Data series—the farm sector accounts—prepared by ERS.

<sup>4</sup> The ratio of ARMS estimates to the sector estimates, expressed as percentages.

<sup>5</sup> Coefficient of variation of the ARMS capture rates, expressed as percentages.

Sources: USDA, Agricultural Resource Management Survey, Phase III, NASS and ERS; USDA, ERS, U.S. and State Farm Income Data at [www.ers.usda.gov/data/farmincome/finfidmu.htm](http://www.ers.usda.gov/data/farmincome/finfidmu.htm).

sector accounts estimates include such payments. If the ARMS estimates are compared only to the farm share of the sector accounts estimates, ARMS captures about 90 percent of payments in the administrative records.

For 2006 to 2009, ARMS estimates of Government payments by program category are close to the annual estimates, with average capture rates ranging from 73 percent for other programs to almost 90 percent for counter-cyclical payments (see table 1.6). The sole exception is marketing loan benefits: ARMS estimates capture on average only 25 percent of the corresponding sector estimates. During this period, nearly all of those payments went to cotton producers who sold their output through cooperatives. Cotton cooperatives in many States did not separate out marketing loan gains from other receipts when sending payments to member producers. This made it difficult for those cotton farmers to provide accurate information on marketing loan benefits in their survey responses.

ARMS capture rates for total Government payments, direct payments, and conservation programs are very stable. In any given year, these capture rates vary from their 4-year averages by 2 to 8 percent (see table 1.6).<sup>2</sup> Direct payments depend on producers' historical yields and acreages of given commodities, not current prices. Conservation payments are largely from the Conservation Reserve Program, paid as fixed rents through 10- or 15-year contracts.

In contrast, ARMS capture rates for counter-cyclical payments, marketing loan benefits, and the miscellaneous category "other program payments" are much less stable and vary from their 4-year averages by 17 to 38 percent. During this period, the year-to-year variation in other programs was due to large swings in disaster relief and milk program payments. Variability in counter-cyclical payments, and to a lesser extent, in marketing loan benefits, was influenced by significant changes in corn and cotton prices.

The sources of the \$3.3 billion in sector estimates not accounted for by ARMS, that is, the missing 25 percent, are spread fairly evenly across the different programs. Direct payments and marketing loan benefits each account on average for about one-fourth of the ARMS measurement error, while conservation program and other program payments each account on average for about one-fifth. The only exception is counter-cyclical payments, which account on average for about 9 percent of the ARMS measurement error.

## **Moderate Rise Expected for U.S. Farm Production Expenses**

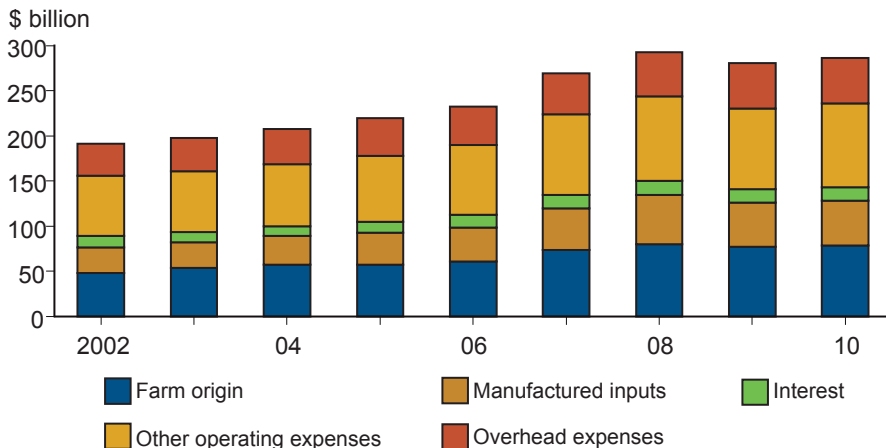
Production expenses began to rise steeply in 2003 and continued that trend throughout 2004-08. Expenses then fell significantly in 2009 and are forecast to rise moderately in 2010 (f.g. 1.8). Even at the high level reached in nominal production expenses in 2008, inflation-adjusted expenses remained lower than the peaks they reached in 1979 and 1980 (f.g. 1.9).

Table 1.7 shows how much a number of selected expenses grew from 2002 to 2008. The increases in expenses during the period were caused primarily by large increases in prices farmers paid for inputs. Quantity factors—such as annual output levels or acres planted—usually changed by only a small

<sup>2</sup>The coefficient of variation  $[(\sigma/\mu)*100]$  measures how much an ARMS capture rate for a particular year potentially may vary from the capture rate's 4-year average. Small measures imply that year-to-year changes in the ARMS capture rate are likely to be minimal. Large measures imply that year-to-year changes in the ARMS capture rate may be significant, making the 4-year average ARMS capture rate a much less reliable measure.

Figure 1.8

**Production expenses by group, 2002-10**

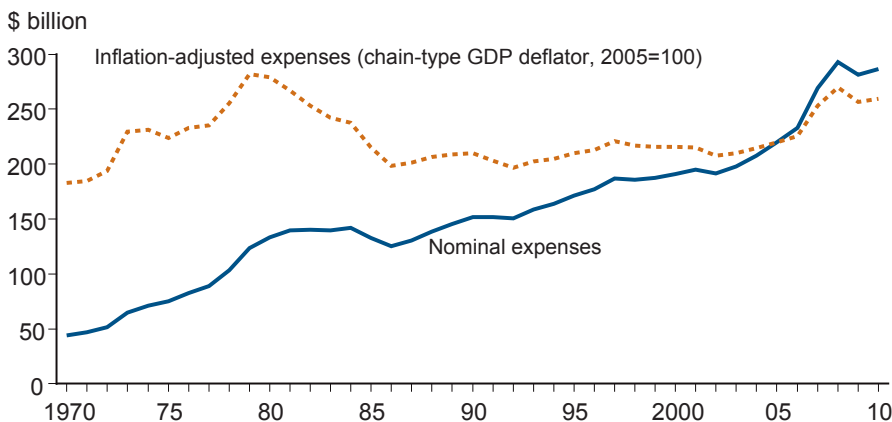


Note: 2010 forecast.

Source: USDA, Economic Research Service.

Figure 1.9

**Total production expenses for U.S. farms, 1970-2010**



Note: 2010 forecast.

GDP = Gross Domestic Product.

Source: USDA, Economic Research Service.

amount and not consistently in the same direction as expenses. Even in the long term, quantity factors do not necessarily have a great impact on expenses. For example, the 25-percent increase in field crop and oilseed production from 2003 to 2009 may have been accomplished with the same or even smaller amount of seed as yields improved.

While the producer price index rose 27.5 percent between 2003 and 2008, the prices paid index (PPI) from USDA's National Agricultural Statistics Service's *Agricultural Prices* for farm sector production items, interest, taxes, and wage rates (PITW) climbed 55 percent. The prices paid index for fertilizer rose 264 percent, the index for fuels and oils went up 207 percent, the index for feed was up 73 percent, and the index for seeds rose 83 percent. Real estate taxes were driven up by a 79-percent increase in land values.

Farm sector expenditures on fuels and oils followed the rise in oil prices. From 2003 to 2008, the annual average refiner's acquisition cost (RAC) went

from \$23.63 to \$94.68 per barrel. Since fuels, especially natural gas, are the major input for many fertilizers, the rise in RAC and natural gas prices were the primary reason for the increase in fertilizer expenses. During this period, the annual average wellhead price for natural gas went from \$2.95 per 1,000 cubic feet (mcf) to \$8.08 per mcf. Expenses did not rise as much as prices for these two inputs because farmers employed steps to hold down production costs. For example, with both inputs, operators reduced quantities used. To lessen fuel use, they reduced trips over fields. To cut fertilizer use, they conducted soil tests to optimize applications.

Commercial production of red meats and poultry expanded 10 percent during this period, but the increase in feed expenses was due primarily to the increases in grain and oilseed prices. Prices received for feed grains rose 107 percent from 2003 to 2008 and prices received for oil crops rose 131 percent. Part of the upward push on corn prices came from the greater use of corn for ethanol production, resulting in historically high corn prices.

Seed expenses have risen, in part, because farmers have been making greater use of genetically modified seeds for corn, cotton, and soybeans, which are relatively expensive. For example, since NASS began collecting information on prices for biotechnology-derived corn seeds in 2001, seed expenses have risen 67 percent.

The increase in pesticide expenses was notable because the expense had been rising slowly through the early 2000s. In 2007-08, however, during that time, pesticide expenses jumped by \$2.7 billion (30 percent), as prices paid rose 15.5 percent and producers increased their use of these materials.

This generalized rise in prices came to an abrupt halt in 2009, when total production expenses fell, then rebounded moderately in 2010. However, nominal total production expenses in 2010 and 2009 still constitute the second- and third-highest totals ever (fig. 1.9).

In 2009, production expenses dropped \$12.0 billion (4.1 percent). Given the magnitude of the growth in costs experienced from 2003 to 2008, the reduction in 2009 was welcomed by farmers, especially since gross farm income fell nearly 10 percent during the year. The reason for the fall was again

Table 1.7

**Increase in selected production expenses, 2002-08**

Expense item	Increase	
	<i>Billion dollars</i>	<i>Percent</i>
Total production expenses	101.5	53.0
Cash expenses	92.3	54.5
Operating expenses	85.7	60.0
Purchased inputs	77.8	64.3
Farm origin expenses	31.5	65.3
Feed	22.0	88.3
Seed	6.2	69.4
Manufactured inputs	26.6	93.5
Fertilizer	12.9	134.3
Fuels and oil	9.6	146.0
Pesticides	3.4	40.9
Real estate taxes	3.9	57.3

Source: USDA, Economic Research Service.



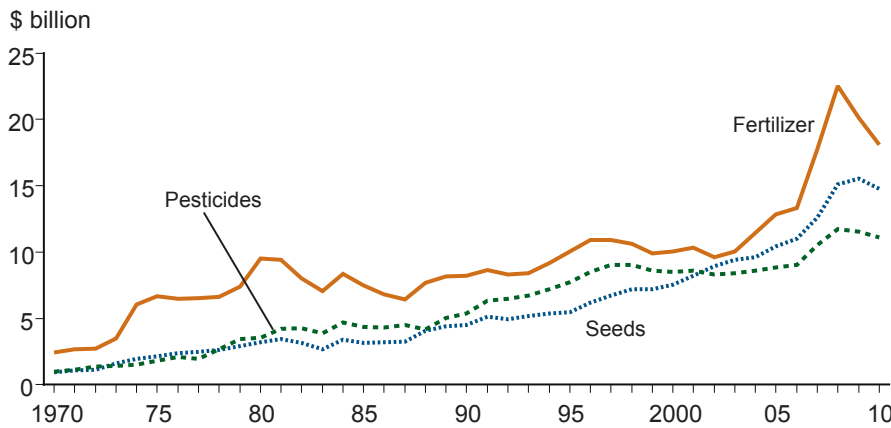
mostly price-related. For the first time since 2002, the PITW index fell, dropping almost 3 percent.

In 2010, production expenses are forecast to rise \$5.6 billion (2.0 percent), a modest movement following the many years of substantial changes. Again, the overarching PITW index correlates with the small increase, as it is forecast to rise 2.3 percent. In contrast with 2009, only four expense categories change more than \$1 billion and three are positive. In 2009, seven categories changed by more than \$1 billion, and six expense categories showed a decline (fig. 1.10).

Table 1.8 shows the movement in individual expenses along with their associated prices-paid indexes for 2009 and the 2010 forecast. A number of large changes switch direction in 2010: livestock and poultry purchases, fuels and oils, labor, and miscellaneous expenses. Fertilizer and lime expenses fall significantly in both years.

Figure 1.10

**Crop-related expenses, 1970-2010**



Note: 2010 forecast.

Source: USDA, Economic Research Service.

Table 1.8

**Changes in production expenses and associated prices paid indexes, 2009 and 2010**

Expense	Production expenses				Prices paid indexes	
	2009	2010	2009	2010	2009	2010
	<i>Billion dollars</i>		<i>Percent</i>			
Total production expenses <sup>1</sup>	-12.0	5.6	-4.1	2.0	-2.8	2.3
Feed	-1.9	-0.3	-4.1	-0.6	-3.9	-1.6
Livestock and poultry	-1.3	2.7	-7.1	16.5	-7.3	14.6
Seeds	0.4	-0.8	2.6	-4.9	15.5	-3.9
Fertilizer and lime	-2.4	-2.0	-10.6	-10.1	-29.7	-11.5
Fuels and oils	-3.5	2.8	-21.7	22.0	-33.6	23.2
Pesticides	0.2	-0.4	-1.7	-3.6	7.6	-2.7
Hired and contract labor	-1.0	0.5	-3.3	1.7	1.9	1.7
Miscellaneous expenses	-3.1	1.9	-8.8	6.1	na	na
Capital consumption	1.4	0.5	5.0	0.6	na	na

2010 forecast. na = not applicable.

<sup>1</sup>Price index for total production expenses is the production items, interest, taxes, and wages (PITW) index.

Source: USDA, Economic Research Service.



## Farm Household Income, Net Worth, and Well-Being

- Average farm-operator household income is forecast to be \$83,194 in 2010, up 7.8 percent from the 2009 estimate.
- Equity, or net worth, can reflect economic well-being better than current income. In 2009, the average net worth of farm-operator households was \$915,019.
- Although operator households derive most of their wealth from farm assets, many farm households have nonfarm investments, including financial investments and nonfarm real estate.

### Trends in Farm Household Income and Net Worth

Average farm household income of principal farm operators—from farm and off-farm sources—is forecast to be \$83,194 in 2010, up 7.8 percent from 2009. This contrasts with the change from 2008 to 2009, when average farm household income declined by 3.3 percent (table 2.1). (See box, “How Does USDA Define Farm Operator Households?” p. 22.)

Both off-farm and farm income sources are forecast to increase in 2010. Average household income from farming activities is forecast to increase 58.0 percent between 2009 and 2010, from \$6,866 to \$10,850. This increase follows a 2008-09 decline of 29.7 percent in income from farming activities. In 2010, household income from off-farm income sources is forecast to increase 2.9 percent to \$72,344 (see box, “How Is Farm Household Income Defined?” p. 23).

The average share of farm-household income from farming activities is forecast to increase from 8.9 percent in 2009 to 13.0 percent in 2010. About 60 percent of farm-operator households include either an operator and/or operator’s spouse who work off the farm. The modest increase in off-farm income in 2009-10 reflects economywide slow growth and weak labor markets. In 2008, the increase in off-farm income was less than 1 percent. Households that operate the largest 10 percent of farms (with sales of \$250,000 or more) are the only U.S. farm households for which the average farm income is greater than off-farm income in a typical year.

For 2008 to 2009, average farm-household income declined by 3.3 percent while the median farm household had a slight increase of 1.6 percent, to \$52,235. (Median household incomes are not available for 2010 until August 2011.) The median is the income level at which half of all households have lower incomes and half have higher incomes. As a result, median incomes are less influenced by very high-income and very low-income households than are averages; median income is generally lower and less variable than average income.

Table 2.1

**Farm operator household income and net worth, 2005-10**

Item	2005	2006	2007	2008	2009	2010
	<i>Number</i>					
Number of family farms	2,034,048	2,021,903	2,143,398	2,129,869	2,131,007	n.a.
	<i>Average dollars per farm household<sup>1</sup></i>					
Net earnings of the household from farming activities	14,227	8,541	11,364	9,764	6,866	10,850
Off-farm income of the household	67,091	72,502	77,432	70,032	70,302	72,344
Earned income	46,034	51,674	58,933	50,761	50,852	52,621
Off-farm wages and salaries	34,876	38,481	48,947	42,606	43,852	n.a.
Off-farm business income	11,158	13,193	9,986	8,155	7,000	n.a.
Unearned income	35,283	20,827	18,499	19,271	19,450	19,724
Household income of farm operators	81,317	81,043	88,796	79,796	77,169	83,194
U.S. household income	63,344	66,570	67,609	68,424	67,976	n.a.
	<i>Median dollars</i>					
Household income of farm operators	54,550	56,274	54,428	51,431	52,235	n.a.
U.S. household income	46,326	48,201	50,233	50,303	49,777	n.a.
	<i>Percent</i>					
Farm income as a percent of total farm household income	17.5	10.5	12.8	12.2	8.9	13.0
Average farm household income as a percent of U.S. household income	128.4	121.7	131.3	116.6	113.5	n.a.
Median farm household income as a percent of U.S. household income	117.8	116.7	108.4	102.2	104.9	n.a.
	<i>Dollars per farming operation<sup>1</sup></i>					
Net cash business income of farming operation	19,891	15,611	21,099	21,449	18,526	n.a.
Farming operation depreciation expenses	7,588	7,612	8,192	10,584	9,889	n.a.
Ratio of depreciation expense to net income	0.38	0.49	0.39	0.49	0.53	n.a.
	<i>Balance sheet, dollars per household</i>					
Total household assets, average	915,210	1,026,389	1,006,020	988,156	1,031,000	n.a.
Farm assets	677,118	764,485	739,905	749,190	761,894	n.a.
Non-farm assets	238,092	261,905	266,115	238,966	269,106	n.a.
Total household debt, average	99,345	99,766	106,874	112,705	115,981	n.a.
Farm debt	54,855	59,731	56,859	61,131	66,149	n.a.
Non-farm debt	44,491	40,035	50,015	51,574	49,832	n.a.
Household net worth, average	815,864	926,623	899,146	875,451	915,019	n.a.
Farm net worth	622,264	704,754	683,046	688,059	695,745	n.a.
Non-farm net worth	193,601	221,869	216,101	187,392	219,274	n.a.
Household net worth, median	496,719	558,710	534,727	525,879	541,544	n.a.
Household debt to asset, ratio	0.11	0.10	0.11	0.11	0.11	n.a.

Note: 2010 forecast

<sup>1</sup>See box, "How Is Farm Household Income Defined?" p. 23.

Source: USDA, Agricultural Resource Management Survey, NASS and ERS; ERS forecast model.

In discussing the importance of farming income to households, it is useful to consider what the indicator measures. The farm share of farm-operator household income captures the cash returns from farming after accounting for the depreciation of farm capital. The measure excludes in-kind income like the rental value of the farm dwelling. More than three-quarters of principal farm operators reside in households on their farming operation. So, in addition to the farm yielding cash earnings and capital gains from farmland appreciation—to the extent that the household owns the farmland—households benefit by having their housing cost borne by the farm business. The typical U.S. household spends more than 20 percent of its expenditures (excluding principal payments on home loans) for housing. USDA's net farm income measure includes an estimate of the rental value of farm dwellings;

the imputed rental value of farm dwellings is expected to be 6 percent of gross income of the farm sector in 2009 and accounted for more than 25 percent of net farm income. This rather stable in-kind source of farm income helps farm families better manage their low-farm income years.

While income from farming activities excludes the noncash rental value of the farm dwelling, it does reflect a farm expense for depreciation. Since farming is capital intensive, this expense can be sizable, especially for large farms. There are several ways to calculate depreciation. The approach ERS uses in estimating farm income is tax-based depreciation, which is affected by changes in tax laws. An alternative to tax-based depreciation is economic depreciation, which captures the value of capital consumed during the accounting period. While changes in tax laws can affect

### How Does USDA Define Farm Operator Households?

The farm operator household population includes everyone who shares the dwelling unit with a principal operator of a family farm. This includes students away at school who are supported by the principal operator household and, if not away at school, would be sharing a dwelling unit with the principal operator. A farm is defined as any place from which \$1,000 or more of agricultural products were produced and sold, or *normally would have* been sold, during the year.

Since the definition allows farms to be included even if they did not have at least \$1,000 in sales, but *normally would have*, USDA's National Agricultural Statistics Service (NASS) developed a system for determining how much a farm *normally would have* sold in a given year. If a place does not have \$1,000 in sales, a "point system" assigns dollar values for acres of various crops and head of various livestock species to estimate a normal level of sales. "Point farms" are farms with less than \$1,000 in sales but have points worth at least \$1,000. More than one-quarter of farms have no sales in a typical year, and at least another 30 percent have positive sales of less than \$10,000.

The current definition of a family farm (beginning with the 2005 estimates) is based on the Agricultural Resource Management Survey, and is a farm where the majority of the business assets are owned by individuals related by blood, marriage, or adoption. In 2009, 97.2 percent of U.S. farms were classified as family farms, and although the definition has changed slightly over time, this share has been stable for at least a decade. The farm operator is the person who runs the family farm, making the day-to-day management decisions. In the case of multiple operators, the respondent for the farm survey identifies who the principal farm operator is during the data collection process.

USDA provides financial information for principal farm operators of family farms and their households, referred to as farm-operator households in this publication. For farms where there are more than one operator and the multiple operators do not share a housing unit, detailed household data and off-farm income are not collected for the additional operators on either the NASS Census of Agriculture or the ARMS—household data are collected only for a single principal operator. However, for the family farms operated by more than one operator, the majority have two operators who are husband and wife. In 2009, 42 percent of family farms had more than one principal operator, of which 79 percent were operated by a husband-wife team alone. For the remaining 21 percent of family farms with multiple operators, household information is not available for the secondary operators. In addition, USDA does not provide information on the financial position of farm-operator households who operate nonfamily farms.

economic depreciation by altering the incentives to buy capital goods, tax laws likely affect the tax-based measure more because, for a given farm size, only a certain amount of capital can be consumed in a single calendar year. In recent years, the tax code has increased incentives for farmers to invest in capital by increasing the amount of capital purchases that can be expensed against taxable income. In 2005, the maximum amount was \$105,000. It then rose to \$108,000 for 2006, \$125,000 for 2007, and then doubled to \$250,000 for 2008 through 2010. During this short period, the tax depreciation expense of family farm operations has increased by 30 percent (see table 2.1). Only the largest farms benefit from higher limits

## How Is Farm Household Income Defined?

USDA's definition of farm household income parallels that of the U.S. Census Bureau's definition of household income for all U.S. households in the Current Population Survey (CPS). The CPS definition includes all cash income of the household, except in the case of self-employment income (like farming) the definition departs from a strictly cash concept by deducting depreciation, a noncash business expense, from the income of self-employed people. There are several factors that affect how much of the farm business income is earned by the household of the principal operator, including:

- Some farms have multiple operators who do not share a single household. In such cases, household income is calculated only for the principal farm operator's household and includes only that household's share of farm business income.
- Also, if a farm is organized as a C-corporation, the profit that the farm generates is retained by the business until the business pays out those earnings in the form of dividends. For C-corporations, farm business dividends paid to the principal operator household are included in household farm income. (The remaining profit of C-corporations is retained by the farm business or paid to other shareholders and not reflected in the principal farm operator household income.)
- Operators of C- and S-corporations may also pay themselves a wage for operating the farm and those payments are included both as an expense to the business and an income to the farm household when they are paid. In addition, other farm-related earnings, such as rental income from another farming operation or the net income of operating additional farms, are included as income in the calculation of earnings of the operator household from farming activities.
- Earnings of the operator household from farming activities as defined in the USDA measure are not a complete measure of the returns provided by the farm. For example, depreciation is an expense deducted from income that may not actually be spent during the current year. Increases in inventories are excluded from the

earnings measure, but they could be sold to raise cash. Nonmoney income, such as the rental value of a farm-owned dwelling, represents a farm business contribution to household income, but is not considered cash income for the household.

- In order to calculate total operator household income, the earnings of the operator household from farming activities are added to the income from off-farm sources. Off-farm income may come from a variety of sources, including wages and salaries, off-farm self-employment, interest, dividends, private pensions, Social Security, or veterans' benefits.
- USDA's measure of farm household income does not account for income taxes paid by farm households. Numerous provisions of Federal income tax law allow taxpayers to reduce their tax liability if they undertake certain tax-favored activities. Farmers benefit from both general tax provisions available to all taxpayers and from provisions specifically designed for farmers. These tax benefits generally accrue to those with higher incomes—generally households with large farms with high farm income and households with very small farms with high levels of off-farm income. Although very small farms do not generate enough farm income to support a family, most small farms benefit from farm losses for tax purposes because these losses reduce taxes on nonfarm income. At the same time, many farmers devoting full time to the farming operation do not generate enough taxable income—either farm or nonfarm—to fully utilize a available tax benefits. Examples of special tax treatment for farmers include cash accounting, farm income averaging, depreciation, the current deductibility of certain capital costs, and capital gains treatment for certain assets used in farming. These and other provisions reduce the farm income tax base. Since 1980, IRS data indicate that farmers have reported negative aggregate net farm income for tax purposes. These farm losses reduce tax liabilities on taxable household income from nonfarm sources.

because the majority of family farms make capital investments below the permitted levels. With the current \$250,000 limit, the vast majority of capital investments can be expensed in the year acquired, thereby lowering income from farming activities for that year.

## **Farm Household Net Worth**

Current income can be an unreliable indicator of the financial well-being of farm operator households. Many farm households generate low earnings, or even losses, from the farm business in a given year, but may experience much better farm returns over the long run. Equity, or net worth, which is the difference between assets and debts as of the last day of the year, reflects this longer term performance, since a net worth position captures the accumulation of wealth over time. Moreover, depending on its liquidity or value as loan collateral, net worth can serve to sustain the household in years of lower income.

Average net worth of farm households increased 4.5 percent from 2008 to 2009, to \$915,019, owing largely to an increase in nonfarm asset values and a decrease in nonfarm debt. However, farm assets also increased from 2008 to 2009. With the exception of 2008, farmland values have been increasing for more than 20 years, leaving the typical farm-operator household in a historically strong financial position. (USDA does not forecast farm-operator household net worth for 2010. The 2009 estimate is based on farm survey data collected in 2010 for the end of the calendar year 2009.) In 2009, the average farm operator household had \$1.03 million in assets and \$115,981 in debt.

About three-quarters of the value of assets owned by farm operator households is associated with the farm, on average, including the household's personal dwellings on the farm. In 2009, farm-owned operator dwellings represented 10 percent of the average household's assets and all other farm assets represented 64 percent. The high share of value in dwellings shows that many farms are small and a major portion of their value is in the farm operator's dwelling. Although operator households have most of their wealth in farm assets, farm households have a broad portfolio of nonfarm investments, including financial investments and nonfarm real estate. The portion of household debt associated with the farm (57 percent) is smaller than the portion of assets associated with the farm (76 percent). There are likely a variety of reasons for this, including the fact that the major portion of farm assets, farmland, has been appreciating at a relatively consistent positive rate, compared to nonfarm assets in the general economy. The major source of nonfarm debt is from nonfarm personal dwellings. Mortgages on other real estate and nonfarm business loans are also major sources of household debt.

## **Household Income Sources and Financial Portfolios, by Farm Size**

The farm-operator household population is economically diverse, in part because of the USDA's encompassing definition of a farm as any operation with the potential for at least \$1,000 in sales of agricultural products in a year. One way to think about economic diversity is to distinguish households for whom agriculture makes important contributions to household income from those where it does not.



Dividing farm households into categories based on the gross sales of their farms and calculating the average net income from farming activities for each category reveals that a household's net income from farming is negative for sales categories below \$50,000, and so to simplify our presentation, we divide farm households into two groups using a cutoff of \$50,000 in annual farm sales. High-sales farm households (those operating farms with \$50,000 or more in gross sales) accounted for 95 percent of the value of sales of family farms in 2009.

In 2009, the median income for both the low- and high-sales farm households was the second lowest over the period 2005 to 2009. However, low-sales farm households saw a 2-percent increase in median total income from 2008-09 while median income decreased by 6.7 percent for high-sales farm households. The increase for low-sales farm households came from higher off-farm and farm income in contrast to high-sales farm households where off-farm income increased but farm income dropped substantially owing to broad decreases in commodity prices.

Table 2.2 reveals fundamental differences between low- and high-sales farm households. For one, high-sales farm households tend to have higher incomes. For 2005 to 2009, median total income for high-sales farm households ranged from 1.2 to 1.6 times greater than that of low-sales farm households. Another key difference is that median farm income is negative every year for low-sales farm households, though because of depreciation costs and the value of housing, this does not necessarily mean that farming is a drain on household finances. It does highlight that households operating farms with modest gross sales depend on off-farm activities for their economic well-being. High-sales farm households, on the other hand, earn similar amounts from farm and off-farm sources.

As a farm's gross sales increase, the operator's total household income and dependence on farm income also tend to increase. High-sales farm households, as a group, had a median income of \$70,084 while those with farms having sales of at least \$250,000 had a median total household income of \$105,850. And while all high-sales farm households had a similar dependence on income from farm and off-farm sources, households with farms having at least \$250,000 in sales had a farm income more than double its off-farm income (i.e., a median of \$70,373, compared with \$27,500).

Principal operators of low-sales farms with off-farm jobs tend to work in diverse industries. The top three industries providing employment are construction (15 percent), retail and other services (15 percent) and agriculture, forestry, fishing or mining (14 percent). In contrast, the share of operators of high-sales farms who also work at off-farm jobs were far more likely to have an off-farm job in agriculture, forestry, fishing, or mining (28 percent did in 2009) than any other industry category. For both low- and high-sales households, the spouses of operators are most likely to work in the retail, education, or health care sectors, with each of the sectors responsible for a similar share of the jobs (fig. 2.1).

The median net worth of high-sales farm households is \$1,075,460, almost 2.4 times the net worth of low-sales farm households, \$452,650. (Average 2009 net worth of low- and high-sales farm households was \$649,606 and \$1.61 million, respectively).

Table 2.2

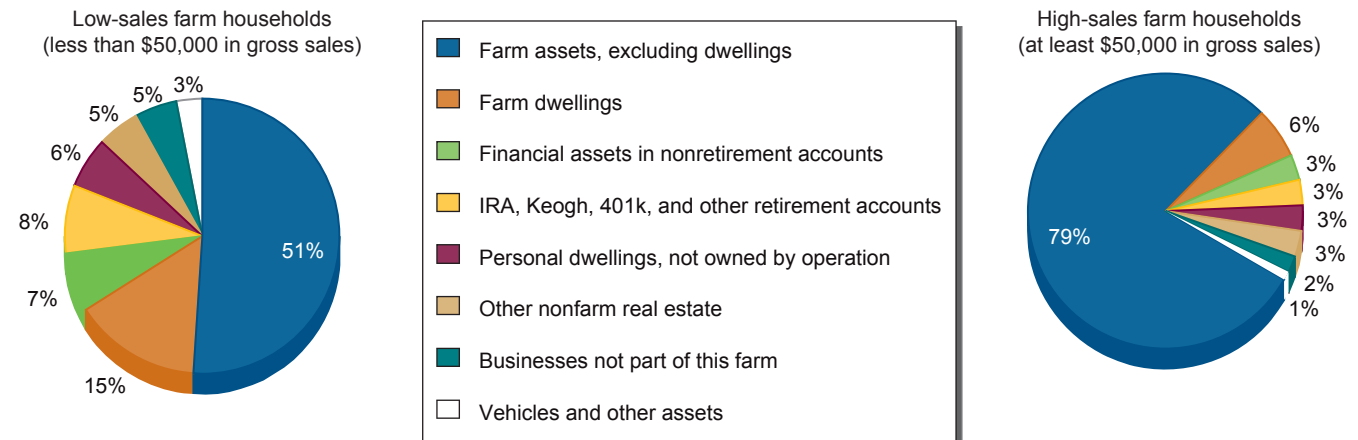
**Farm operator household income by gross farm sales, 2005-09**

		2005	2006	2007	2008	2009
<i>Dollars</i>						
<b>Gross sales less than \$50,000</b>						
Median <sup>1</sup>	Farm	-2,291	-3,357	-3,350	-4,633	-4,110
	Off-farm	55,000	58,250	55,000	54,500	55,000
	Total Income	50,871	54,835	50,838	47,936	48,915
Mean	Farm	-2,302	-4,002	-6,349	-6,849	-7,607
	Off-farm	72,408	76,656	81,697	74,218	74,652
	Total Income	70,106	72,654	75,348	67,368	67,045
<b>Gross sales greater than or equal to \$50,000</b>						
Median <sup>1</sup>	Farm	32,736	23,673	29,596	28,551	23,729
	Off-farm	29,250	33,000	34,000	32,750	34,002
	Total Income	73,507	67,089	76,528	74,781	70,084
Mean	Farm	68,059	50,016	71,127	63,850	53,312
	Off-farm	49,774	58,766	63,042	56,407	56,343
	Total Income	117,832	108,782	134,169	120,257	109,655
<b>Gross sales greater than or equal to \$50,000 and less than \$250,000</b>						
Median <sup>1</sup>	Farm	23,700	17,378	18,671	13,752	12,169
	Off-farm	32,500	35,001	38,500	36,250	39,422
	Total Income	63,667	57,167	62,500	61,705	57,769
Mean	Farm	23,690	16,167	16,543	11,670	9,887
	Off-farm	53,910	58,213	75,833	62,098	60,837
	Total Income	77,600	74,381	92,376	73,768	70,724
<b>Gross sales greater than or equal to \$250,000</b>						
Median <sup>1</sup>	Farm	91,433	60,281	74,851	77,071	70,373
	Off-farm	22,500	27,750	27,500	28,458	27,500
	Total Income	119,725	100,552	115,600	115,723	105,850
Mean	Farm	160,577	116,656	147,821	136,154	114,609
	Off-farm	41,148	59,854	45,071	48,521	49,999
	Total Income	201,726	176,509	192,892	184,675	164,609

<sup>1</sup>The sum of median farm and off-farm income will generally not equal the median total income. Source: USDA, Agricultural Resource Management Survey, NASS and ERS.

Figure 2.1

**Distribution of asset holdings, 2009**



Source: USDA, Agricultural Resource Management Survey, NASS and ERS.



The distribution of a household's wealth across asset types reflects livelihood orientation and also the extent that changes in particular asset markets would affect a household's net worth. For low-sales farm households, about half of household assets consist of farm assets, not including dwellings. Dwellings and financial assets (retirement and nonretirement) compose another 30 percent. As expected given the greater importance of farm income, households associated with larger farms have a greater share of their assets (79 percent) in farm assets. Even though high-sales farm households have more than double the net worth of low-sales farm households, those with low sales have, on average, about \$7,000 more in financial assets like stocks.

## Farm Households Compared With the U.S. Population

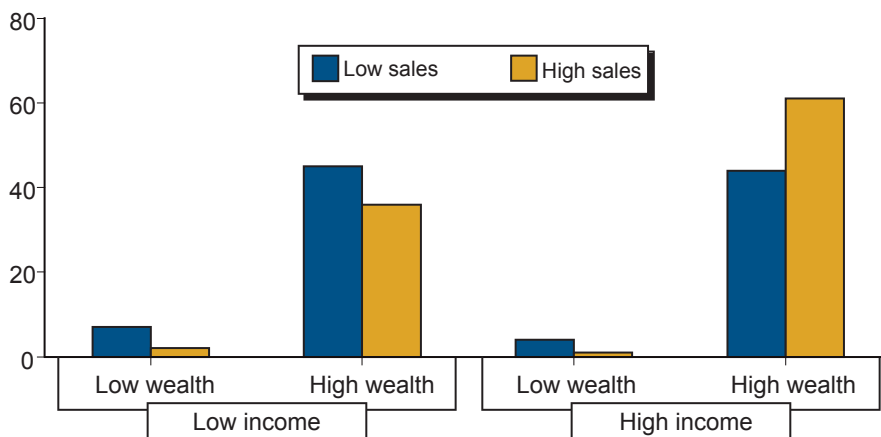
For 2005 to 2009, the average and median household income for low-sales farm households were close to those for U.S. households. For 2009, in particular, low-sales farm households had slightly lower incomes than U.S. households. In contrast, high farm-sales households had significantly higher incomes than both U.S. households and low-sales farm households, regardless of the year.

Figure 2.2 shows the percent of low- and high-sales farm households in one of four wealth-income categories defined by median U.S. household income and net worth. A household in the low income-low wealth group, for example, would have an income and net worth less than the median values for U.S. households. Only a small share of farm households falls into either of the low-wealth categories, regardless of farm sales. High-sales farm households are largely concentrated in the high income-high wealth category. In contrast, low-sales farm households are equally likely to be in either the low income-high wealth or the high income-high wealth categories. The former group of low-sales farm households have lower off-farm incomes, compared with the latter group with more significant off-farm incomes.

Figure 2.2

### The income and wealth of low- and high-sales farm households, 2009

Percent households



Note: The bars associated with the high-sales farm households represent percents based on all high-sales farms, not all farms in general.

Source: USDA, Agricultural Resource Management Survey, NASS and ERS.

## Earnings Differ Among Farm Businesses and Enterprises

- U.S. agriculture is a diverse sector encompassing a complex mix of business enterprises.
- Income forecasts highlight the diversity of financial outcomes and are based on applying sector level forecasts, receipts, and expenses to the latest Agricultural Resource Management Survey (ARMS) data.
- Average net cash income for farm businesses is expected to increase throughout much of the country in 2010. The expected strong recovery in dairy, hog, and cattle receipts will result in much higher average net cash incomes for farm businesses in the Northern Crescent, Basin and Range, and Prairie Gateway regions.

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Agriculture is a diverse sector represented by a complex mix of business enterprises. This section focuses on the 850,000 farm businesses that are responsible for the majority of economic activity in the sector (see box, “Defining Farm Businesses,” p. 29, for more detail). Results reported here are designed to highlight the diversity of financial outcomes. We apply sector-level forecasts of receipts and expenses to the latest ARMS data to forecast net cash farm income for various types of farms. Estimates of farm-level income reported by USDA from ARMS have been developed to reflect both the contributions of factor providers, such as creditors and landlords, and the use of business arrangements such as contracts. The net cash income reported for farms is the income available to share among owners and operators who participate in the farm’s financing, production, and marketing outcomes. Cash flow projections can be summarized across various groups of farms, based on regional location, commodity specialization, or size. The model is static and therefore does not account for changes in crop rotation, weather, and other local production impacts that occurred after the base year.

The livestock sector experienced the brunt of the financial downturn in 2009, with dairy farm businesses sustaining the most severe losses (table 3.1). During 2009, prices for livestock and dairy products declined much faster than for feed costs, which strained net earnings for livestock and dairy producers. The strengthening U.S. economy and lower levels of hog products in the marketplace have helped support hog prices in 2010. Milk prices have recovered from recent lows. More important, feed prices have fallen from the peaks of 2008 and export demand for livestock products looks stronger for 2010. Reflecting this potential for an improved economic environment, average net cash income of hog farm businesses is forecast to rebound to almost \$276,100. Dairy farm businesses are forecast to have average incomes of \$214,000 which, like hogs, would represent an increase from average incomes earned during 2007 and could be the strongest percentage rebound from 2009 of any major commodity group. With inventories of breeding cattle at their lowest levels in decades, average net cash income of cattle farm businesses is forecast to increase 37 percent and would be at the highest level since 2007. Poultry farm businesses are expected to have the lowest increase in net cash income (17 percent). Poultry and turkey farm business

are expected to show smaller percentage price increases than other major livestock groups. In addition, poultry farm businesses are projected to have the largest increase in cash expenses due to their greater intensity of energy-related input use.

In contrast to the outlook for a strong (\$20 billion) recovery in livestock receipts, crop cash receipts are forecast to increase by half as much—\$9.4 billion in 2010. Uncertainty regarding corn yields and production, continued demand for ethanol, and strong exports have contributed to significant price increases for corn, many feed grains, and soybeans in the second half of 2010. Crop farm businesses' bottom lines also will be enhanced by continued reductions in input costs. Fertilizer expenses are forecast to decline by 10 percent in 2010, after declining by almost 11 percent in 2009. Farm businesses that employ debt financing will benefit from relatively low interest rates, with interest expense forecast to be 1.4 percent lower in 2010. Higher expenses for fuel, labor, and taxes will likely offset some of the potential for lower total cash expenses in 2010. The projected increase in average income for corn, soybean, and wheat farm businesses ranges from 11-14 percent in 2010. Average incomes of cotton and rice farm businesses are forecast to increase by 33 percent on the strength of cotton price increases combined with modest increases in expenses.

Average net cash income for farm businesses is expected to increase throughout much of the country in 2010. The expected strong recovery in dairy, hog, and cattle receipts will result in much higher average net cash incomes for farm businesses in the Northern Crescent, Basin and Range, and Prairie Gateway regions. In the Northern Crescent, where dairy is a prominent commodity, average net cash income for farm businesses is forecast to increase by over 58 percent. Incomes are expected to be almost 50 percent higher in 2010 for farm businesses in the Basin and Range region, where cattle are an important commodity. This region had the largest percentage decline in average net cash income in 2009. Areas of the country where grain and oilseed production are prominent—such as the Heartland, Northern

## Defining Farm Businesses

The official USDA farm definition (an operation with \$1,000 of gross agricultural sales or the potential to generate such sales) encompasses a widely diverse 2.1 million operations. Farms vary in their level of business activity, resource allocation, goals, and a host of other attributes. ERS developed a typology of farms to categorize farms into more similar groups based on gross sales, major occupation of the farm operator, and total household earnings (for more information see *Structure and Finances of U.S. Farms: Family Farm Report, 2007 Edition*, [www.ers.usda.gov/Publications/EIB24/](http://www.ers.usda.gov/Publications/EIB24/)). In order to concentrate analysis of business performance on those farms with significant labor allocation to farming and household dependence on business income, several of the farm typology classifications are excluded. These include limited-resource farms, retirement farms, and residential/lifestyle farms. A majority of these farms have negative business income and depend on off-farm sources of income to support their household (see information in household income section). Farm businesses, for purposes of performance analysis in this chapter, include the more than 800,000 remaining family and nonfamily farms who indicated that farming was the primary activity of the operator.

Table 3.1

**Change in net cash income by type of farm operation, 2010**

Commodity specialization	Percent change in net cash income	Key determinants of change
<b>Program crops</b>		
Mixed grain	17.0	Crop receipts 5.2% above 2009. Total cash expenses unchanged. Fuel up 22%, while fertilizer down 10% and seed down 5%.
Wheat	10.7	Crop receipts up 4.7%. Cash expenses forecast to increase by 0.5%. Fuel and utilities had the largest increases. Seed and fertilizer expenses are forecast to decline.
Corn	14.3	Crop receipts are forecast to increase by 4.8%. Cash expenses forecast to remain similar to 2009. Fuel and utilities were the expense items with the largest increases.
Soybeans and peanuts	13.0	Crop receipts up 4.9%. Cash expenses forecast to decline by 0.3%. Seed and fertilizer, which together represent 42% of cash expenses decline by 5% and 8%, respectively.
Cotton and rice	32.5	Crop receipts up 15.5%. Government payments project to drop 14%. Cash expenses similar to 2009.
<b>Nonprogram crops</b>		
Other field crops	18.7	Crop receipts forecast up by 7.4%. Cash expenses projected to increase by 1.7%. Fuel and utilities had the largest increases.
Specialty crops	7.5	Crop receipts up 3.8%. Cash expenses forecast to increase by 1.4%. Labor, which represents 40% of cash expenses, is projected up by 1.7%.
<b>Livestock</b>		
Beef cattle	36.7	Livestock receipts up 11.9%. Cash expenses 6% higher. Fuel and utilities had the largest increases from 2009. Feed costs similar to 2009.
Hogs	61.8	Livestock receipts up 22.3%. Cash expenses projected up by 2.6%. Feed similar to 2009 and interest expense down 1.4% from 2009.
Poultry	16.7	Livestock receipts up 16.7%. Cash expenses 4.2% higher. Other farm related income 3.7% lower than 2009.
Dairy	205.0	Livestock receipts up 26.3%. Government payments up 38%. Cash expenses 1.3% higher. Feed which represents 42 percent of cash expenses is expected to decline by 0.6% from 2009.
Other livestock	-61.9	Livestock receipts up 12.3%. Cash expenses 3.9% higher.

Note: 2010 forecast.

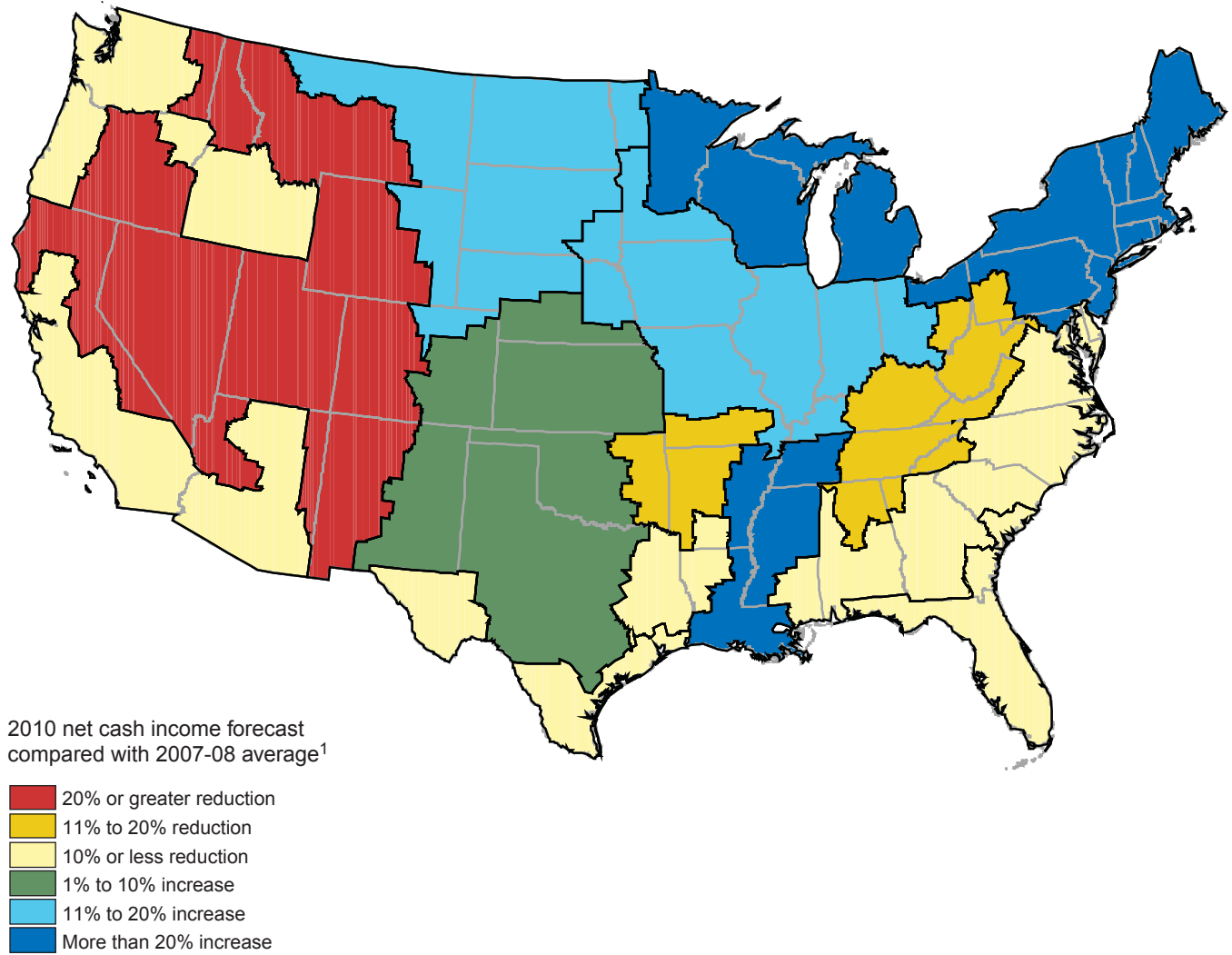
Source: USDA, Economic Research Service, farm-level forecast model.

Great Plains, and Mississippi Portal—are expected to have the smallest increases in average net cash farm business income ranging from 21-25 percent.

One way to gauge the relative strength of the income recovery across regions is to compare the 2010 forecast with the 2007-08 average. In all but four regions, average farm business income is projected to be higher than the 2007-08 average (f.g. 3.1). Even among regions with improved earnings, there is disparity in the strength of the recovery. The Mississippi Portal has the highest average farm business income relative to 2007-08 (49 percent higher in 2010) compared with incomes higher than the 2007-08 average by 26 percent in the Northern Crescent, 18 percent in the Heartland, and 14 percent in the Northern Great Plains. Average incomes are projected to be 24 percent below the 2007-08 average in the Basin and Range region.

Figure 3.1

**Change in average net cash income by resource region, 2010**



Note: 2010 forecast. See ERS Resource Regions map, p.11.

<sup>1</sup>The farm level forecasts are derived from partial budget modeling on the 2009 ARMS using parameters from the sector forecasts. The model is static and therefore does not account for changes in crop rotation, weather, and other local production impacts that occurred after the base year.

Source: USDA, Agricultural Resource Management Survey, NASS and ERS.

## Farm Business Balance Sheet and Financial Performance

- Increases in farm asset and equity values, together with decreases in farm sector debt affect the overall solvency of the sector. Declining debt-to-asset and debt-to-equity ratios improve the ability of farmers and other investors to finance purchases of farmland and other assets.
- Factors that have contributed to the rise in farm-asset values include farm investors' higher expected future net returns, rising cash flow, and generally favorable credit conditions for credit-worthy borrowers.
- Unused debt repayment capacity is expected to increase in 2010 due to a projected decrease in farm debt and increase in farm income.

Asset values and outstanding farm debt are fundamentally driven by expected returns on investments in farmland and other farm capital, and by interest rates. These factors vary across the country, reflecting differences in expected net returns on the mix of crops and livestock produced locally, in credit market conditions, and in opportunities for off-farm employment and investments. Forecasts of rising net returns on farm investments are primarily due to rising cash receipts for crops and livestock, and to low interest rates. As a result, the value of farm business sector assets is expected to rise in 2010.

Farm business sector assets and equity (assets minus debt) values are forecast to rise modestly in 2010, while farm debt is forecast to decline from 2009 levels (table 4.1). Farm sector asset values are expected to rise by about \$63 billion to \$2.12 trillion in 2010 (a 3.1-percent increase). The values of real estate, crop inventories, livestock and poultry inventories, purchased inputs, machinery and equipment, and financial assets are all expected to rise modestly in 2010.

Interest rates in 2010 have remained low and stable, and credit has generally remained available through major agricultural lenders. Nonetheless, some farm businesses could be facing tightened credit requirements in 2010 as a consequence of increased loan collateral requirements and/or decreased loan repayment time periods. While debt capital is likely to be available to highly qualified borrowers at relatively low costs, less qualified borrowers could be facing higher interest rates.

Farm sector debt is expected to fall from about \$245 billion in 2009 to about \$240 billion in 2010 (fig. 4.1). The decline in real-estate debt is expected to be about \$2 billion (-1.7 percent) while the decline in nonreal-estate debt is forecast to be about \$3 billion (-2.6 percent).

Farm business equity is expected to rise from \$1.8 trillion in 2009 to \$1.9 trillion in 2010 (a 3.8-percent increase), due to an expected 3.1-percent increase in the value of farm assets and a 2.1-percent decline in farm business debt (fig. 4.2). The farm business sector's debt-to-asset ratio is expected to decline to 11.3 percent and debt-to-equity is expected to decline to 12.8 percent in 2010, indicating an overall increase in the farm sector's solvency (fig. 4.3).



Table 4.1

**Balance sheet of the U.S. farming sector, 2004-2010**

Financial measures	2004	2005	2006	2007	2008	8/4/2010 2009	11/16/2010 2010
				<i>\$ million</i>			
Farm assets	1,588,033	1,779,376	1,923,596	2,055,276	2,023,302	2,057,140	2,120,117
Real estate	1,305,188	1,486,960	1,625,835	1,751,386	1,702,961	1,727,173	1,781,925
Livestock and poultry	79,420	81,097	80,747	80,649	80,607	79,785	81,372
+/- change in value of inv. adjust.							
Machinery and motor vehicles <sup>1</sup>	107,789	113,071	114,200	114,706	123,380	125,971	129,121
Crops stored <sup>2</sup>	24,435	24,291	22,699	22,703	27,610	32,887	35,595
+/- change in value of inv. adjust.							
Purchased inputs	5,701	6,491	6,460	7,019	7,167	7,217	7,243
Financial assets	65,500	67,465	73,656	78,812	81,577	84,106	84,862
Total farm debt <sup>3</sup>	181,917	196,377	203,581	214,063	242,677	245,360	240,265
Real estate	95,653	104,768	108,048	112,682	133,582	134,514	132,261
Farm Credit System	37,078	41,173	43,448	46,793	57,124	58,423	
Farm Service Agency	2,395	2,453	2,374	2,281	2,313	2,343	
Commercial banks	34,630	37,904	40,149	41,884	49,705	50,338	
Life insurance companies	10,726	11,307	12,001	12,750	14,736	14,246	
Individuals and others	10,598	11,682	9,790	8,657	9,552	8,695	
Storage facility loans	226	250	285	316	151	469	
Nonreal estate	86,265	91,609	95,533	101,382	109,096	110,846	108,004
Farm Credit System	22,040	24,279	27,811	31,622	37,290	39,883	
Farm Service Agency	3,244	3,008	2,736	2,808	2,652	2,823	
Commercial banks	45,849	48,405	51,253	54,129	57,313	57,027	
Individuals and others	15,132	15,917	13,733	12,823	11,841	11,113	
Farm equity	1,406,115	1,582,999	1,720,015	1,841,212	1,780,625	1,811,779	1,879,852
Selected ratios:							
Debt-to-equity	12.9	12.4	11.8	11.6	13.6	13.5	12.8
Debt-to-asset	11.5	11.0	10.6	10.4	12.0	11.9	11.3

Note: 2010 forecast and 2009 preliminary. Numbers may not add due to rounding. Balance sheet is as of December 31.

<sup>1</sup>Includes only farm share of value for trucks and automobiles.

<sup>2</sup>Non-CCC crops held on farms plus value above loan rates for crops held under CCC.

<sup>3</sup>Includes CCC storage and drying facilities loans but excludes debt on operator dwellings and for nonfarm purposes.

The current forecast and historic information can always be found at <http://www.ers.usda.gov/data/farmincome/finfidmu.htm>

Information contacts: For assets -- Ken Erickson, (202) 694-5565, e-mail: [erickson@ers.usda.gov](mailto:erickson@ers.usda.gov) and for debt -- Bob Williams, (202) 694-5053, e-mail: [williams@ers.usda.gov](mailto:williams@ers.usda.gov)

## Unused Debt Repayment Capacity Expected To Increase in 2010

A projected decrease in farm debt in 2010, combined with an increase in farm income, should increase the sector's maximum feasible farm debt and unused debt repayment capacity in 2010 (f.g. 4.4). Debt repayment capacity utilization (DRCU) is the ratio of actual farm debt outstanding relative to the maximum feasible farm debt in any given year. As farmers do not necessarily use all their debt repayment capacity, the DRCU is a measure of the extra cushion the farm sector has to repay farm debt over time solely through the production and sale of farm products and services (see box, "Components of Sectorwide DRCU Calculations," p. 35). A DRCU estimate exceeding 100 percent indicates that debt payments must be made by drawing on additional cash sources, such as taking on additional debt, earning off-farm income, drawing down household assets, or selling farm business assets. By the end of



2010, farm sector DRCU is expected to fall to about 45 percent, down from 59 percent in 2009 (fg. 4.5).

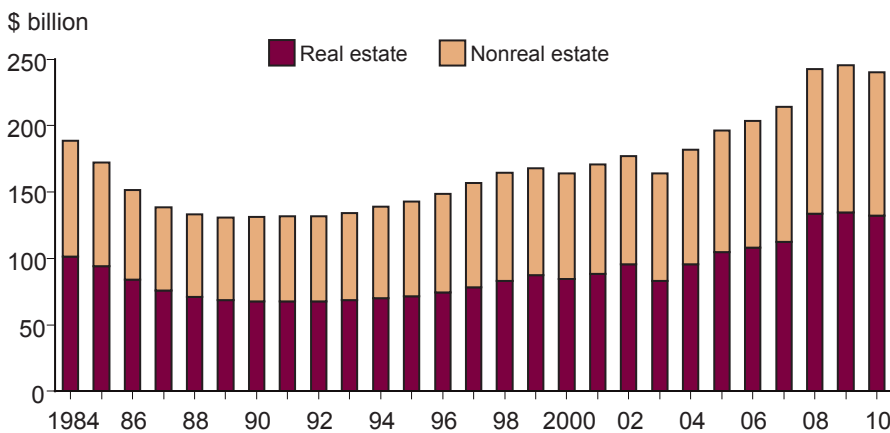
## Net Cash Flow

The net cash flow measure helps farm financial analysts to better understand the process of farm capital formation. It expands on the net cash income concept to account for internal and external sources of funds, and thus net cash flow provides a broader indication of the resources available to farm businesses to invest in the sector, and to meet current debt obligations (see box, “Net Cash Flow (After Interest Expenses),” p. 36).

Net cash flow after interest expenses fell by nearly \$45 billion in 2009 but is expected to rise by nearly \$11 billion in 2010. The debt-to-net cash flow ratio is inversely related to the farm business sector’s ability to finance farm investments in land and other farm capital—a lower ratio shows a higher ability to do so. This ratio is expected to improve from 5.2 in 2009 to 4.1 in 2010 (fg. 4.6).

Figure 4.1

### U.S. farm sector debt, 1984-2010

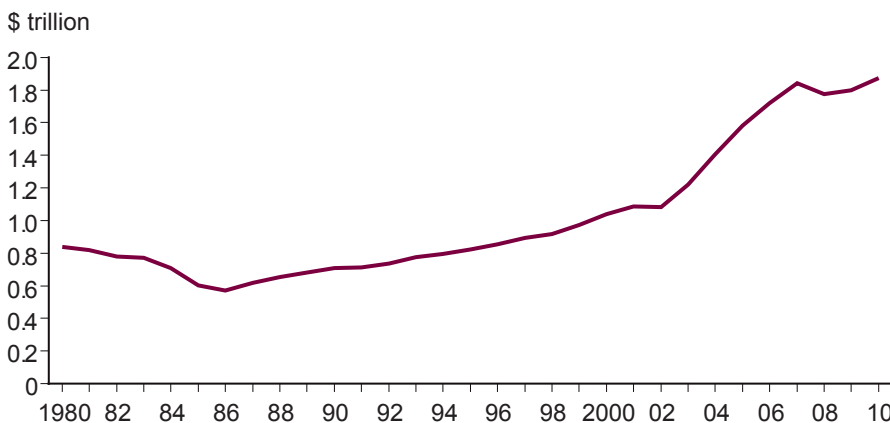


Note: 2010 forecast.

Source: USDA, Economic Research Service.

Figure 4.2

### Farm sector equity (net worth), 1980-2010



Note: 2010 forecast.

Source: USDA, Economic Research Service.

## Components of Sectorwide DRCU Calculations

*Income for debt coverage* = Net farm income + interest on capital debt

*Debt repayment* = Principal and interest on capital debt + capital lease payments

*Total debt coverage ratio* = Income for debt coverage / debt repayment

*Debt coverage margin* = Income for debt coverage – debt payment

*Minimum debt coverage ratio* = lender requirement; based on a coverage ratio of 1.25, which requires that no more than 80 percent of the loan applicant's income be used for repayment of principal and interest on loans.

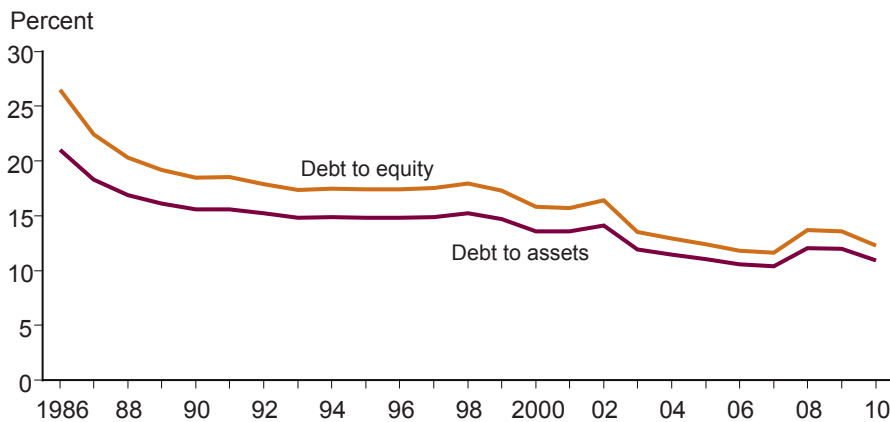
*Maximum loan payment* = Income for debt coverage / minimum debt coverage ratio

*Debt repayment capacity* = Maximum loan payment  $\times (1 - (1+r)^{-n})/r$ , where  $(1 - (1+r)^{-n})/r$  = present value of an annuity of \$1, at r percent for n periods.

*Debt repayment capacity utilization* = Debt / debt repayment capacity.

Figure 4.3

### U.S. farm sector debt-to-asset and debt-to-equity ratios, 1986-2010

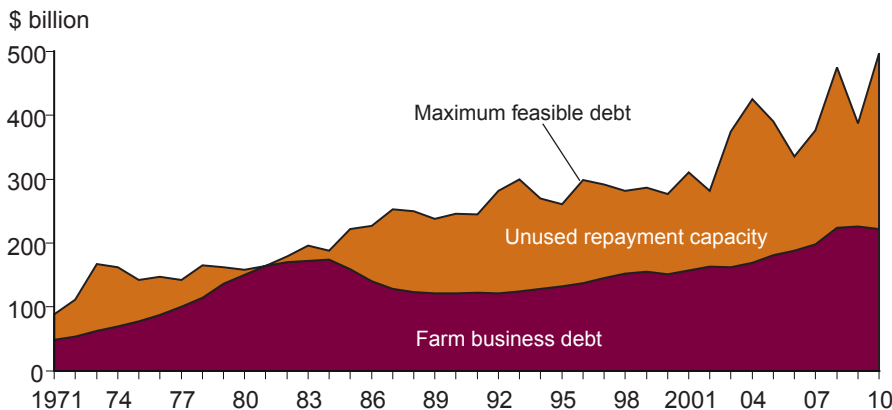


Note: 2010 forecast.

Source: USDA, Economic Research Service.

Figure 4.4

### Farm sector debt and repayment capacity, 1971-2010



Note: 2010 forecast.

Source: USDA, Economic Research Service.

## Net Cash Flow (After Interest Expenses)

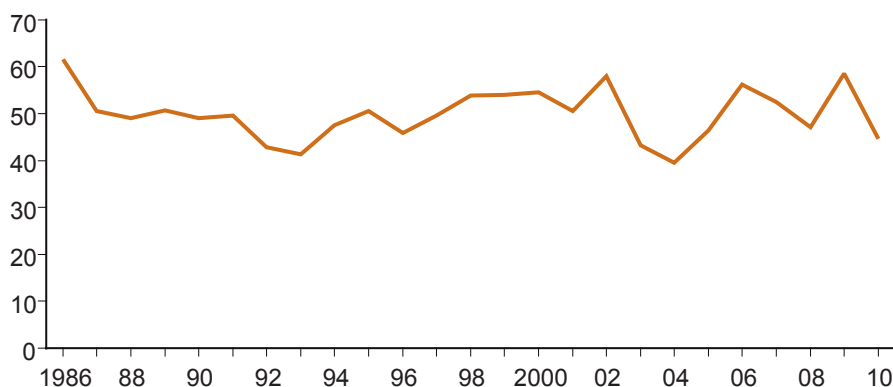
*Net cash flow* (after interest expenses) is defined as:

- = net cash income
- + change in loans outstanding
- + net rent to nonoperator landlords (excluding capital consumption)
- + net change in farmers' currency and demand deposits
- capital expenditures (excluding operator and other dwellings)
- interest expenses (excluding operator and other dwellings)

Figure 4.5

### Sector debt repayment capacity utilization (DRCU), 1986-2010

Percent



Note: 2010 forecast. DRCU for farm operators = actual debt / debt that could be repaid from current income.

Source: USDA, Economic Research Service.

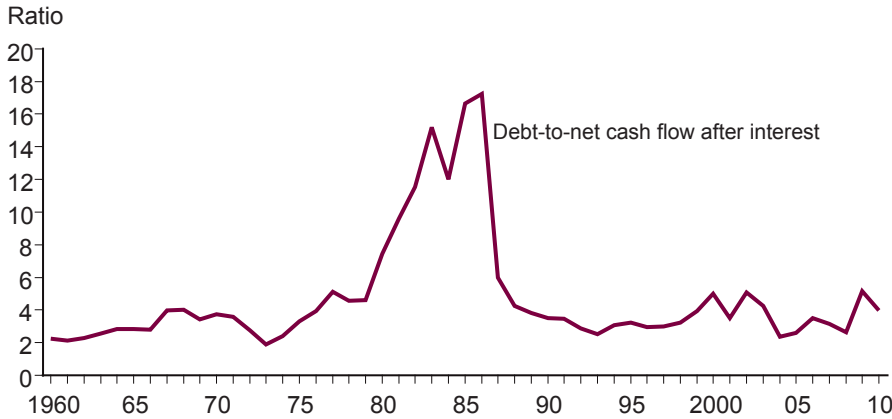
## Profitability of Farm Sector Investments Rising

Total return to farm assets includes both current income (returns to farm assets realized in the current year) and capital gains accruing to farm assets. Capital gains contributed the major share of total returns from 2003 through 2007. However, as the appreciation in farm asset values (principally farmland) declined from 2004 to 2009, returns from current income (returns actually realized each year) have grown as a share of total returns to farm business assets.

Returns on farm assets and equity are indicators of the profitability of farm sector investments. Total returns on farm business assets (from current income plus capital gains) are estimated at \$60.3 billion in 2009 (with \$26.4 billion from current income and \$33.9 billion from capital gains) (fig. 4.7).

Figure 4.6

### Farm business debt to net cash flow, 1960-2010

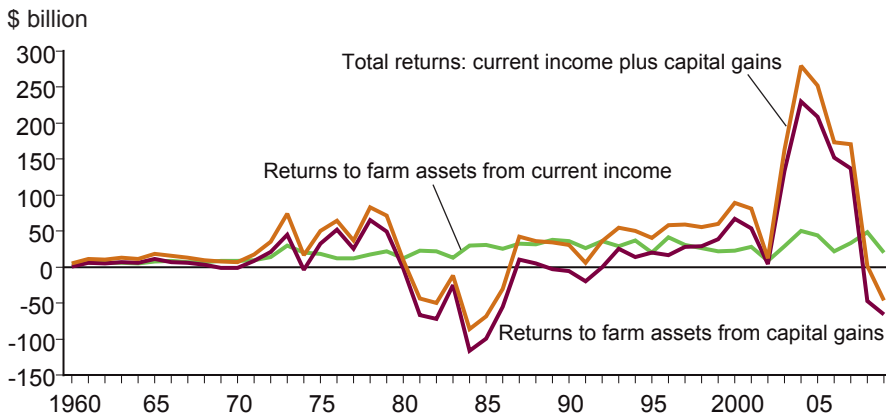


Note: 2010 forecast.

Source: USDA, Economic Research Service.

Figure 4.7

### Total returns to U.S. farm business assets, 1960-2009



Source: USDA, Economic Research Service.

## Farms' Net income and Solvency Position

Five percent of farms were classified as being in a vulnerable position on December 31, 2009, having both negative net cash income and a debt-to-asset ratio over 0.40 (see fig. 4.8 and box, "Definition of Solvency Measures," p. 38). More farms (27 percent) were classified as being in a marginal-income position as a result of having negative net cash incomes, but a debt-to-asset ratio of 0.4 or less.

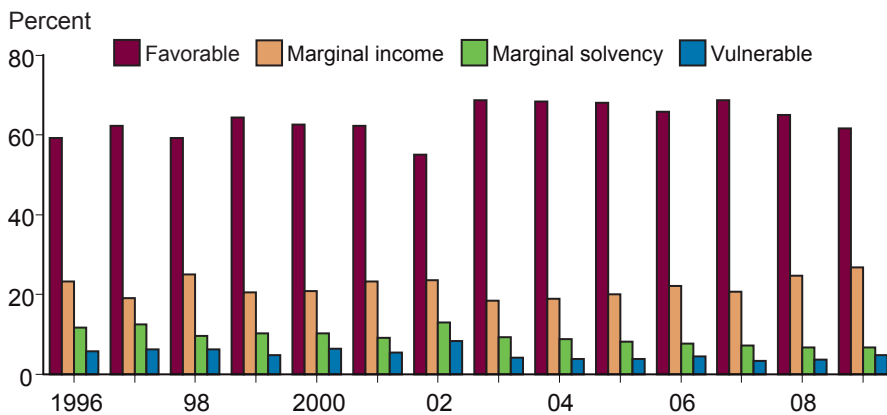
The share of all U.S. farms classified as vulnerable has dropped since 1986 (the year when combined net farm income and balance sheet statements were first available for farm businesses), when nearly 12 percent of farms were in this financial position. The share of farms classified as being in a vulnerable position had a fairly sizable drop between 1986, when the 1980s farm crisis was ongoing, and the late 1980s and early 1990s, as debt was pared relative to asset values and incomes improved. More recently, the share of farms classified as vulnerable has dropped in this decade to the lowest levels that ERS

has recorded, as a result of expanding income levels and shrinking debt in relation to asset values.

At the other extreme, about 62 percent of farms were in a favorable financial position entering 2010. These farms had both positive income and relatively low farm debt. For comparative purposes, 48 percent of farms were classified as favorable in 1986. In addition to a smaller share of farms being classified as vulnerable, another striking change has occurred in the share of farms with a high debt burden (over 40 percent of asset values) and positive net income (marginal solvency). This measure is down from 10 percent of farms in the mid-1980s to around 7 percent in 2009. This change in classification reflects both the larger share of farms that report no yearend debt and the farms that do report debt use being in a less leveraged position. The substantial rise in asset values, particularly land, over the past two decades has contributed to the reduction in financial leverage borne by farms.

Figure 4.8

**Share of farm businesses by overall financial performance position, 1996-2009**



Source: USDA, Agricultural Resource Management Survey, NASS and ERS.

**Definition of Solvency Measures**

- Favorable: Net Farm Income > 0, Debt to Asset Ratio ≤ 40%
- Marginal Income: Net Farm Income < 0, Debt to Asset Ratio ≤ 40%
- Marginal Solvency: Net Farm Income > 0, Debt to Asset Ratio > 40%
- Vulnerable: Net Farm Income < 0, Debt to Asset Ratio > 40%

## Low Levels of At-Risk Farm Business Collateral Security and Debt

- The number of “at risk” agricultural loans held by farm businesses increased slightly from 2008 to 2009, while remaining at modest levels.
- Simulations suggest that a sudden devaluation of farm assets or a sudden increase in interest rates would have little effect on agricultural collateral security and the riskiness of farm debt in the short run.

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Despite the recent global recession and continuing U.S. economywide credit problems, the financial health of the farm sector has been excellent in recent years. The farm sector’s financial stability has been largely unaffected by the global financial crisis despite unstable input prices and variable output prices. However, given the widespread impacts of the global economic crisis, there have been concerns raised about the debt repayment ability of farmers and the future stability of asset values—especially for livestock farmers, whose net farm incomes declined in 2009 due to higher feed costs and weakened domestic and international demand.

Questions about the impacts of changes in asset values and interest rates must take into account how they relate to farm business stress and debt at risk (see box, “Estimating Debt at Risk” for a description of how we measure such debt). A decline in farm asset values could raise concerns about financial stress since such assets represent the collateral security backing farm business loans. A rise in interest rates could raise concerns about the ability of borrowers to repay existing debt. Financial stress and debt repayment are intertwined since a common lender reaction to increasing financial stress or loan delinquencies is to tighten credit standards, including requiring greater collateral reserves. Thus far, while growing asset values (see chapter 4) have increased the value of collateral backing farm business loans, farm business debt at risk has been slowly rising since 2007. In this Special Article, we examine recent changes in various measures of troubled agricultural debt, the types of farm businesses currently experiencing financial stress, and the potential impact on debt repayment problems should farm businesses suddenly face decreases in the market value of farm assets or increases in interest rates.

Before simulating the impacts of potential declines in asset values or increases in interest rates, we examine recent trends in debt at risk. Three sources of data are used: data from the Farm Credit System (FCS) and commercial banks (which together account for more than 85 percent of farm debt), and data from the Agricultural Resource Management Survey (ARMS). Data for agricultural loans that are not paying their stated interest rate or are more than 90 days past due from the FCS, and delinquent and nonperforming loans from insured commercial banks show a 89-percent increase (\$3.1 billion) in potential loan defaults in 2009 compared to 2008 (f.g. 1). Since 2007, troubled farm debt reported by these two groups of lenders has more than tripled, increasing by \$4.6 billion. Nevertheless, the share of farm debt outstanding that is experiencing



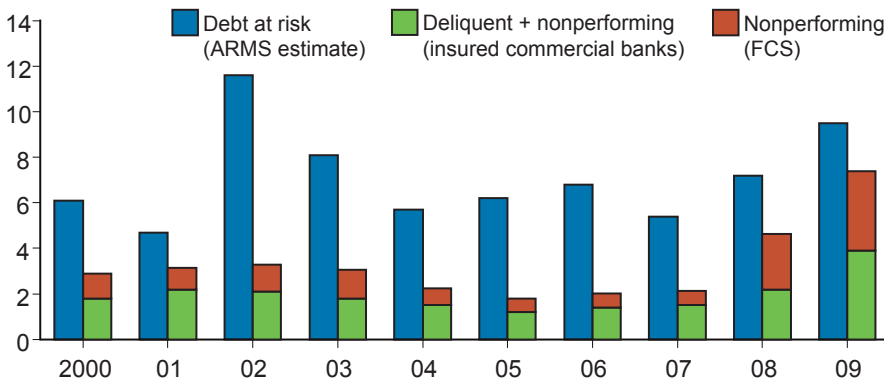
repayment problems remains relatively low (less than 4 percent), and farm business debt at risk estimates developed with ARMS data are forecast to decline slightly in 2010. If we compare the current situation in farming with that in the housing market, delinquency rates on housing loans are more than double the rates on farm loans.

While the debt-at-risk estimates developed with ARMS data generally track movements in the amount of troubled agricultural debt reported by lending institutions, there are a number of reasons why these two measures differ. The results from ARMS reflect only farm business earnings. When business earnings are insufficient to service debt, farm operators often rely on income from other sources (such as off-farm jobs and businesses) to service their debt (see chapter 2 for a discussion of off-farm sources of income available to farm

Figure 1

**Agricultural loans currently at risk are high relative to 2007**

\$ billion



Note: FCS = Farm Credit System; ARMS = Agricultural Resource Management Survey.  
 Source: Farm Credit System (FCS) data, Federal Reserve data, and USDA, Agricultural Resource Management Survey data.

**Estimating Debt at Risk**

Using information reported by farm businesses in the Agricultural Resource Management Survey (ARMS), we estimate the amount of “debt at risk” of delinquency or delayed/negotiated repayment. Farm businesses with negative equity (technically insolvent) pose the greatest risk of debt repayment difficulties, particularly when the farm does not have positive cash flow from annual operations. So, the first component of our “debt at risk” estimate is the amount of debt owed by technically insolvent farms with negative farm business income. We use the debt repayment capacity utilization (DRCU) measure described in chapter 4 to determine additional current debt in danger of not being repaid in a timely manner. The DRCU measures the amount of debt an operator can borrow based on existing net income and interest rates plus current existing principal and interest payments. In most cases, lenders become increasingly reluctant to lend to a farm operation when the minimum principal and interest payments on all the operation’s debt exceed 80 percent of its income. Therefore, the second component of our debt at risk measure is the amount of current debt obligations (interest and principal due in the current calendar year) for farm businesses with a DRCU above 120 percent.

households). Farm operators can also continue servicing their debt by liquidating current assets (or inventories). In addition, some of the discrepancy between the ARMS estimate of debt at risk and what is reported by commercial banks and the FCS may be attributed to other lenders (such as equipment dealers and input suppliers). There could also be a lag between when banks report delinquent loans and when we measure that potential based on annual survey data.

Financial stress is not evenly distributed among farm businesses. According to 2009 ARMS data, livestock farms held 55 percent of total farm business debt at risk. This included large shares held by dairy farms (24 percent) and beef cattle farms (18 percent). Dairy and beef farms (including feedlot activities) tend to have higher capital requirements than other types of farms. Among crop farms, specialty crop farms accounted for 17 percent and corn farms followed with 14 percent of total debt at risk (fig. 2).

### Fixed vs. Variable Rate Loans

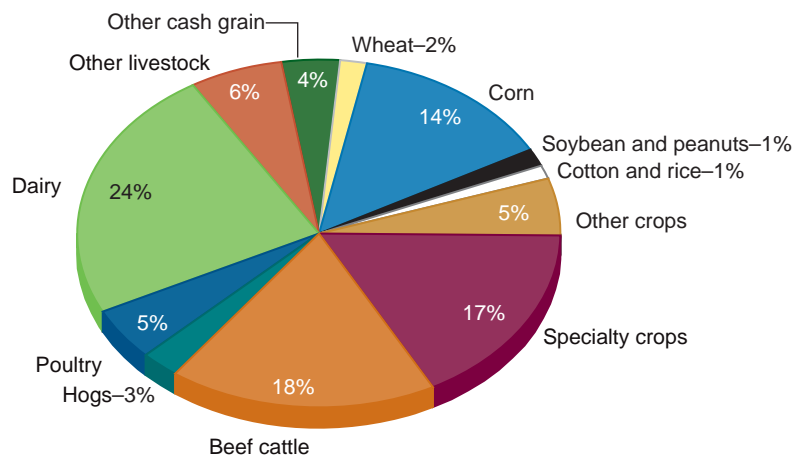
In the current economic environment, the prospects for a significant increase in interest rates at some point in the near future are rising, if for no other reason than they are currently at historically low levels. The farm enterprises under greatest short-term risk are those holding variable rate loans.

Figure 3 shows the number (and percent) of farm businesses that reported variable interest rate loans for 2009. Eighteen percent of farm businesses had a variable rate loan during the survey year compared with 59 percent of farms that had no loans. An additional 29 percent of farm businesses had fixed rate loans. Some farm businesses can have fixed and variable rate loans or several loans of the same type.

The average interest rate for all loan types was 5.6 percent in 2009. The lowest average interest rate was 4.6 percent for monthly adjustable loans and

Figure 2

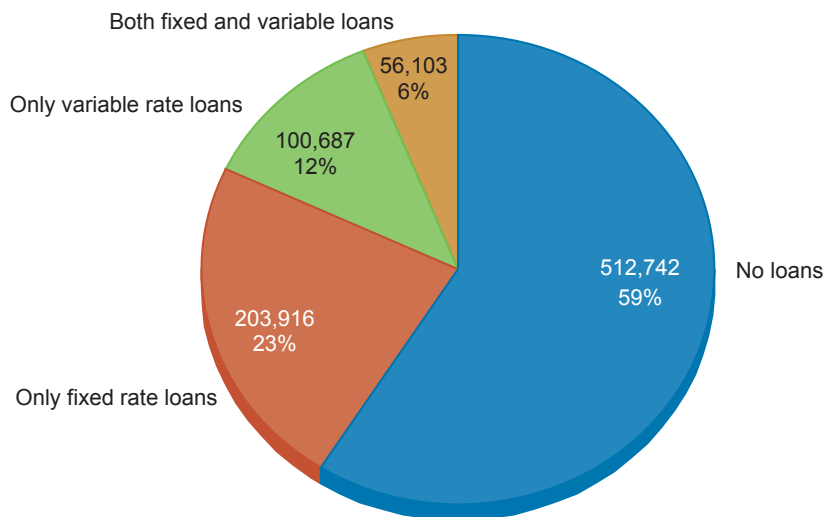
#### Percent of total debt at risk is not uniformly distributed across farm types, 2009



Source: USDA, Agricultural Resource Management Survey, NASS and ERS.

Figure 3

### Number of farm businesses with fixed and variable rate loans, 2009



Source: USDA, Agricultural Resource Management Survey, NASS and ERS, 2009.

the highest average rate was 6.3 percent for variable rate loans adjusted at periods exceeding 1 year.

### Potential Impact of Reductions in the Market Value of Farm Assets on Farm Business Debt-to-Asset Ratios

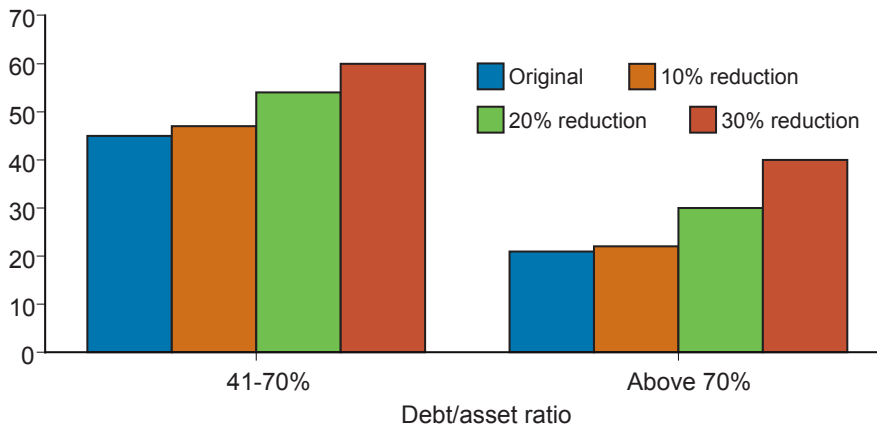
Given uncertainty in the current economic environment, there are concerns about the possibility of future declines in the value of farm assets. Such a decline would reduce agricultural collateral security. To evaluate how declining asset values could affect loan collateral, we examine the number of farms with debt-to-asset ratios greater than 40 percent. The debt-asset ratio measures the proportion of farm assets financed through debt. As the debt-asset ratio increases, farm operations are likely to face increasing difficulty securing additional debt obligations. We define higher leveraged farms as those with a debt-asset ratio above 40 percent and highly leveraged farms as those with a debt-asset ratio above 70 percent. Farms with a high debt-asset ratio are said to be “highly leveraged” and are particularly susceptible to financial difficulties if creditors demand repayment or credit market conditions suddenly change. In 2009, 66,000 farm businesses were highly leveraged. If farm asset values decline, the number of highly leveraged farm businesses will increase, holding debt levels constant. Figure 4 shows the estimated impact of a 10-, 20- and 30-percent decrease in the value of farm assets.

The number of farm businesses with debt-asset ratios between 41 and 70 percent increases by 4.4, 20.0, and 33.3 percent respectively given a 10-, 20-, or 30-percent reduction in farm asset values. The share of farms with the largest susceptibility to loan repayment issues, those with a debt-asset ratio above 70 percent, increases more dramatically, by 4.8, 42.9, and 90.5 percent, respectively. Therefore, holding all other things equal, a reduction in asset values greatly increases immediate concerns of solvency for more farm businesses and lenders. Increasing numbers of highly leveraged farm businesses are “at risk” if lenders demand repayment or farm businesses have to obtain

Figure 4

**A decrease in asset values may lead to increased financial leverage by farm businesses**

Number of farms (thousands)



Source: USDA, Agricultural Resource Management Survey, NASS and ERS, 2009.

new loans. However, for the 59 percent of farms that had no debt in 2009, there is no change in the value of their debt-to-asset ratio. Nonetheless, they could be affected by reduced equity and increased collateral requirements for future loans.

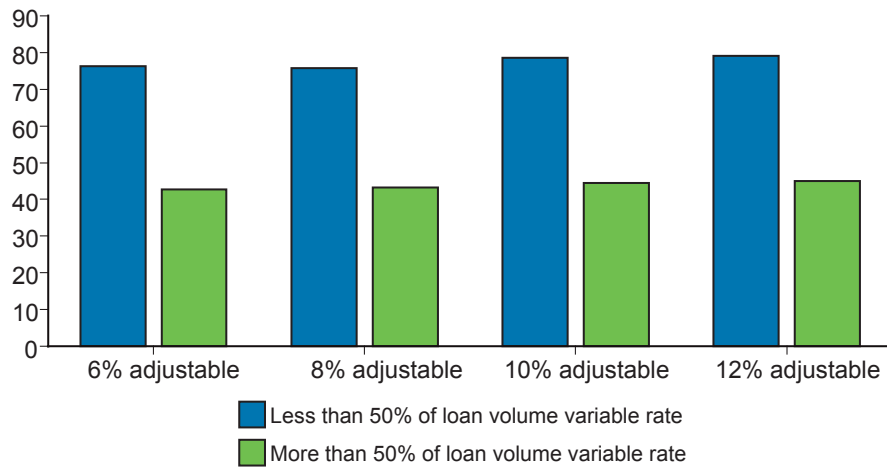
**Potential Impacts of Changes in Interest Rates on Debt At Risk**

Figure 5 shows the number of farm businesses with debt at risk, as measured by a debt repayment capacity utilization ratio exceeding 120 percent (see box, “Estimating Debt at Risk”). Figure 5 suggests that increasing interest rates on variable rate loans would have only a modest immediate impact on the number of farms experiencing financial stress (holding everything else constant). In the extreme case, if interest rates increased from 6 percent to 12 percent, the number of farms with “at risk debt” would increase by roughly 5 percent for farms that owe more than half of their current debt as variable rate loans. In essence, if interest rates on variable rate loans increase, higher principal and interest payments are required to service existing debt. This means that an increasing number of farm businesses would be unable to meet debt service requirements out of current business income, putting their debt “at risk.” The 59 percent of farm businesses with no debt in 2009 would not be affected immediately but could face higher interest rates for future loans. Farms with debt at fixed interest rates would also not be affected immediately but could face higher rates on new or consolidated loans.

Figure 5

### An increase in interest rates yields modest short-term changes in farm debt repayment capacity

Number of farms (thousand)<sup>1</sup>



<sup>1</sup>Farms in the "Above 120%" DRCU class at varying adjustable interest rate levels and variable loan volume packages.

Source: USDA, Agricultural Resource Management Survey, NASS and ERS.

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## Appendix: Forecast Methods and Accuracy

- USDA's short-term farm-income forecast model had mean forecast errors for cash receipts in 2009 ranging from 0.02 percent for crop receipts to 16.83 percent for livestock receipts.
- Forecast errors for the farm-level partial-budgeting model, using ARMS data, decreased in magnitude from 7.3 percent in 2005 to 5.5 percent in 2009, showing a more accurate forecast.
- The 2006-to-2008 commodity-price boom probably affected forecasts in following years.

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The USDA short-term farm-income forecast model forecasts receipts for individual commodities, Government payments, and production expenses. The model operates on individual farm-level data from the most recent NASS data available to ERS. Agriculture can be severely affected by many factors, as any farmer knows, and thus the difference between the initial forecast of annual income and the initial estimate, which are released 18 months apart, can be large. The model creates quarterly forecasts of individual commodity items and annual forecasts of various production expenses, noncommodity items, and Government payments. It also forecasts annual prices-paid indexes, used principally in forecasting production expenses. To measure commodity output, it uses a Törnqvist output index model. See box, "The ERS Short-Term Farm Income Forecast Model" for a basic description of the forecast model. The model is explained in depth in "Forecasting Farm Income: Documenting USDA's Forecast Model," <http://www.ers.usda.gov/Publications/TB1924/>.

The purpose of reviewing forecasting accuracy is to determine and discuss trends and events that have influenced prices and quantities of agricultural inputs and outputs, such as economic or weather changes affecting production. The last review of forecast accuracy was completed for the *Agricultural Income and Finance Outlook, 2006 Edition*, <http://usda.mannlib.cornell.edu/usda/ers/AIS//2000s/2006/AIS-11-30-2006.pdf>.

Forecast performance in three areas—commodity items, production expenses, and farm-income measures—are examined from 2005 to 2009. Finally, the trends and events that have influenced variations between the initial forecast and the initial estimate are discussed.

Appendix table A-1 shows forecast percentage errors for the USDA short-term farm income forecast model. The mean forecast error for net cash income in 2009 was 8.21 percent but was lower than the mean forecast error for net farm income by about 3 percentage points. This may reflect that net cash income includes only cash receipts and expenses and is generally less variable than net farm income. Mean forecast errors from 2005 to 2009 ranged in magnitude from \$427 million for livestock cash receipts to -\$61.6 billion for total gross income. Forecast percentage errors in 2009 ranged from 0.02 percent for crop cash receipts to -131.82 percent for the value of inventory adjustment. The large percentage forecast error for the value of inventory adjustment reflects relatively smaller dollar amounts than smaller percentage errors in other categories corresponding to larger dollar amounts. The mean percentage error of -299.92

## The ERS Short-Term Farm Income Forecast Model

The ERS model described in this report presents 5 calendar years of farm income data. When the forecast for the current calendar year is first presented each February, the values for the current and immediately previous calendar years in the model are both forecasts and the values for the first 3 calendar years are estimates. At this point, the forecast for the fourth (i.e., previous) year is the base year for the fifth (i.e., current) year's forecast. The model results are first updated in August. At this point, the model presents 4 years of estimates, releasing, for the first time, estimates of farm income for the fourth (i.e., previous) year and revisions to estimates for the previous 3 years.

The current year in the model is still a forecast, which has been updated with new data and revised, using the new estimates for the fourth year as its base. The forecast year in the model is again updated in November, using any data that have been revised since August. The final forecast is presented in February of the following year. By February 2011, the forecast for 2010 will include all the final information (production, trade, prices received) for 2009/10, plus the latest forecasts for 2010/11. The 12-month average annual prices paid indexes published by USDA's National Agricultural Statistics Service (NASS) will also be substituted for the forecasts in the model.

Appendix table A-1

### Forecast error for USDA short-term farm income forecast model

Income statement	Mean forecast error 2005-09	Forecast percentage error					Mean percentage error 2005-09
		2005	2006	2007	2008	2009	
	<i>\$ billion</i>	<i>Percent</i>					
<b>Cash income statement:</b>							
1. Cash receipts	-54.537	-6.91	-3.16	-9.18	-7.56	7.13	-3.94
Crops <sup>1</sup>	-54.964	-8.25	-8.80	-9.16	-11.78	0.02	-7.60
Livestock	0.427	-5.68	2.51	-9.21	-2.08	16.83	0.48
2. Direct Government payments	1.601	-0.97	17.12	4.46	7.19	-18.57	1.85
3. Farm-related income <sup>2</sup>	-2.756	-4.61	3.25	12.45	-2.40	-18.70	-2.00
4. Gross cash income (1+2+3)	-55.695	-6.25	-1.57	-7.52	-6.77	4.35	-3.55
5. Cash expenses <sup>3,4</sup>	-31.418	-7.22	-0.57	-1.49	-7.96	3.27	-2.79
6. NET CASH INCOME (4-5)	-24.275	-3.85	-4.59	-23.09	-3.61	8.21	-5.39
<b>Farm income statement:</b>							
7. Gross cash income (1+2+3)	-55.695	-6.25	-1.57	-7.52	-6.77	4.35	-3.55
8. Nonmoney income <sup>5</sup>	-2.905	-27.49	-24.74	-0.79	5.91	28.81	-3.66
9. Value of inventory adjustment	-3.023	-1059.86	-206.86	15.40	-116.49	-131.81	-299.92
10. Total gross income (7+8+9)	-61.623	-8.81	-2.08	-6.79	-5.29	4.08	-3.78
11. Total expenses	-38.225	-7.54	-1.40	-1.19	-7.58	2.52	-3.04
12. NET FARM INCOME (10-11)	-23.398	-12.72	-4.77	-23.21	2.32	11.14	-5.45

Note: Forecast error = (forecast-estimate)/estimate

<sup>1</sup>Includes CCC loans.

<sup>2</sup>Income from custom work, machine hire, recreational activities, forest product sales, and other farm sources.

<sup>3</sup>Excludes depreciation and perquisites to hired labor.

<sup>4</sup>Excludes farm households.

<sup>5</sup>Value of home consumption of farm products plus the imputed rental value of operator dwellings.

Source: USDA, Economic Research Service.

**Forecast error for farm-level partial-budgeting model, comparing forecasts for 2005 and 2009  
(from February 2006 and February 2010) to actual ARMS survey results (November 2006 and November 2010)**

Income statement	Net cash income		Livestock receipts		Crop receipts		Government payments		Cash operating expenses		Farm assets		Farm debt	
	2005	2009	2005	2009	2005	2009	2005	2009	2005	2009	2005	2009	2005	2009
	<i>Percent difference</i>													
All farms	6.5	3.5	-10.6	-6.6	3.6	-1.2	-9.2	4.0	-4.6	-2.3	4.5	-4.3	-3.2	-2.4
Commercial farms	6.5	2.2	-9.3	-6.0	7.4	0.7	-8.1	5.9	-0.9	-0.5	3.6	-5.3	5.1	-0.3
Intermediate farms	26.3	23.3	3.9	-9.3	10.1	-15.1	-3.6	1.3	-0.1	-11.9	11.4	-6.1	-6.8	-16.3
All farm businesses	13.3	2.8	-2.7	-6.8	11.4	-1.4	-3.7	4.6	2.7	-2.7	8.9	-5.8	4.6	-4.2
Rural residence farms	10.5	4.5	-15.6	-12.3	-15.6	-9.2	-1.1	-1.7	-7.9	-4.5	4.4	-2.5	-8.6	2.1
Resource region:														
Heartland	0.8	-8.6	-26.1	-21.1	8.5	-8.8	-6.0	12.8	-4.3	-9.7	10.0	-7.1	5.7	0.9
Northern Crescent	12.6	-10.2	-8.9	4.4	-0.3	-0.8	-4.5	-42.2	-10.7	3.0	3.7	-6.1	-4.3	-5.3
Northern Great Plains	12.8	5.4	14.2	-11.7	16.6	4.6	16.1	10.8	11.5	-1.4	25.5	-1.3	4.2	-9.5
Prairie Gateway	21.0	-4.6	-13.3	-18.1	8.9	-18.9	-4.5	9.6	-11.6	-16.3	24.3	0.7	-10.2	-9.6
Eastern Uplands	23.0	-19.0	11.9	25.1	22.8	9.6	17.9	-41.9	13.3	11.6	5.1	-1.7	-17.2	-12.5
Southern Seaboard	-48.0	27.8	11.1	21.5	-23.7	-8.7	0.1	20.8	3.5	-2.9	3.8	-12.1	7.0	-10.1
Fruitful Rim	30.1	23.0	18.4	4.3	23.6	22.2	-5.7	18.1	19.2	17.0	6.6	10.6	25.2	0.5
Basin and Range	64.9	126.6	31.7	22.1	36.0	57.6	1.7	-6.0	18.8	31.4	0.0	-22.7	4.9	62.8
Mississippi Portal	-19.2	-13.2	42.6	-4.1	-18.4	-37.6	-57.5	-6.2	-6.4	-40.5	-29.6	-23.7	2.8	-40.6
Production specialty:														
Other cash grain	12.4	10.5	-26.6	-20.4	12.7	4.2	-2.1	41.1	2.9	0.4	1.4	-8.4	-3.0	8.9
Wheat	42.0	-13.3	41.7	4.8	-3.6	-7.5	-10.6	2.6	-17.5	-2.2	4.1	-7.9	-4.7	-7.0
Corn	12.9	8.1	-46.9	7.5	-2.6	-9.4	-8.5	19.1	-7.1	-12.4	-2.9	-0.2	-13.6	-4.6
Soybean and peanuts	-55.6	-19.6	-1288.3	-27.0	-1.1	-27.2	-22.4	6.0	-17.8	-27.3	4.9	-23.1	-10.3	-20.4
Cotton and rice	9.8	32.9	55.2	-10.2	22.3	1.2	-16.8	30.6	20.3	-8.7	-6.3	-7.2	35.8	44.5
Other field crops	22.5	59.4	-14.0	-4.5	-1.8	9.5	23.4	15.0	-0.5	-1.9	31.9	2.3	24.7	12.3
Specialty crops	29.3	20.8	44.1	-26.9	19.4	11.8	34.0	-1.2	17.8	6.9	14.6	-4.1	7.8	-3.4
Beef cattle	19.6	-40.8	-5.9	-18.0	12.9	-9.4	-10.4	-8.8	-11.5	-10.8	1.8	-18.0	4.0	-5.5
Hogs	-21.3	-74.0	7.3	-10.2	-9.6	4.5	-2.7	43.6	12.2	15.5	10.7	-6.8	-7.0	-12.4
Poultry	-30.2	-2.6	-148.2	-34.5	49.2	-27.4	-25.2	-20.0	-60.6	-23.2	4.9	-11.3	-7.5	-17.9
Dairy	-6.1	-65.3	-0.8	-13.8	14.5	8.4	-82.5	-56.9	-0.7	-7.3	3.8	-9.1	0.4	-26.7
Other livestock	70.9	-366.3	38.9	41.6	25.6	7.8	13.5	-22.4	22.8	13.9	13.3	38.6	3.2	6.4

Note: Percentage differences are calculated as (forecast-actual)/actual.

Source: USDA, Agricultural Resource Management Survey, NASS and ERS.

percent from 2005 to 2009 is associated with a \$10-million forecast error for inventory adjustments, while the -7.60-percent forecast error for crop receipts is associated with a forecast error of \$7.24 billion. The mean forecast errors from 2005 to 2009 were primarily plus or minus 5 percent compared with the estimate, with the exception of cash receipts from crops and value of inventory adjustment. These trends were not surprising as an unexpected commodity price boom occurred in the study period as investors increasingly speculated in commodities, and as fuel prices fluctuated greatly (Baffes and Hanjotis, 2010).

Appendix table A-2 reports forecast errors for selected components of the farm business financial statements. The forecast error is based on a comparison (in percentage terms) of the February 2006 forecast and the actual 2005 ARMS results (as the base), and of the February 2010 forecast and the actual 2009 ARMS results (as the base). The estimates for farm business income

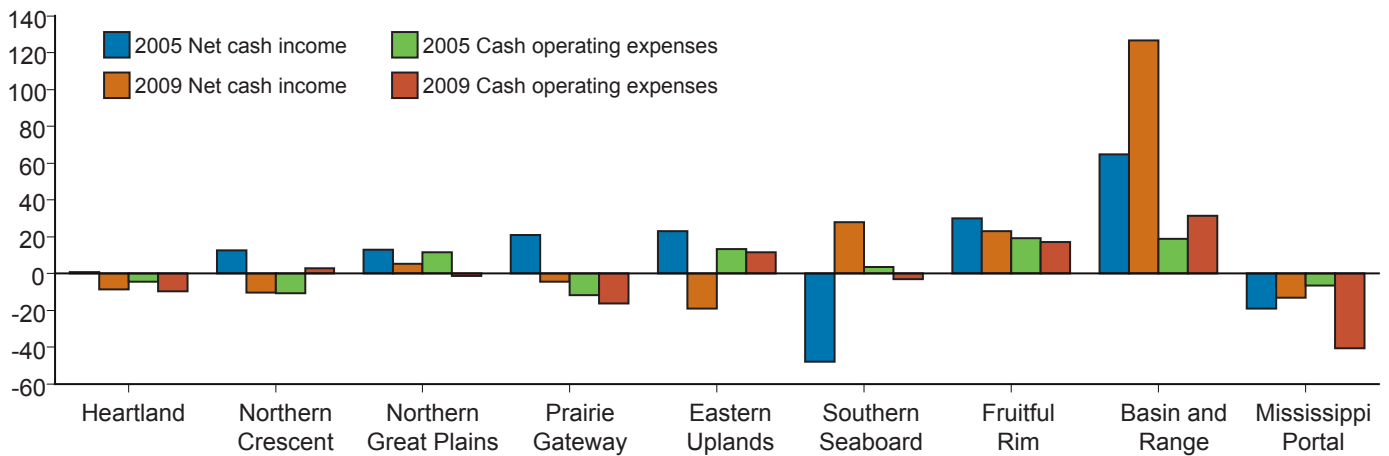
are for intermediate and commercial farms. Across the selected components for all farm businesses in 2009, forecast errors ranged from 1.4 percent for crop receipts to 6.8 percent for livestock receipts. Forecast errors derive from two sources. First, they can result from different outcomes than the index reflecting quantity and price changes predicts for the sector as a whole. They can also result from the static nature of the partial budgeting model where farms adapt and/or structural changes occur from one survey year to the next. The forecast model was more accurate in 2009 than in 2005, with the mean magnitude for forecast error for All Farms, Commercial Farms, Intermediate Farms, All Farm Businesses, and Rural Residence Farms decreasing from 7.3 percent in 2005 to 5.5 percent in 2009.

Appendix figure A-1 shows the percentage error by resource region. The greatest percentage forecast errors occurred in resource regions with smaller shares of farms or businesses, such as the Mississippi Portal and Basin and Range regions, suggesting that a smaller sample survey size leads to greater forecast errors in those regions. The more accurate percentage forecast errors occurred in regions with greater shares of U.S. farms and farm businesses (and larger sample survey sizes), such as the Heartland, Northern Crescent, Fruitful Rim, and Prairie Gateway.

Appendix figure A-1

**Forecast accuracy of farm-level partial-budgeting model**

Percent difference



Note: See map, p. 11, for ERS Resource Regions.

Source: USDA, Agricultural Resource Management Survey, NASS and ERS.

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