



Economic Report

Office of Regulatory Policy
Agricultural and Economic Policy Team

March 22, 2016

Summary

The farm equipment market is following the downward trajectory of the agricultural commodity markets. After peaking in 2013, farm equipment sales have tumbled, with 2015 self-propelled combine and large tractor sales down 50 percent and 39 percent from 2013, respectively. The decline in the market is closely tied to the steep decline in farm incomes since 2013.

Farm equipment is the second largest asset class on the farm sector's balance sheet totaling \$244 billion at the end of 2012. As such, farm equipment serves as a significant source of lending volume and collateral for System institutions. During the recent years of prosperity, farmers invested heavily in new farm equipment, with the inventory value of farm equipment jumping 79 percent during the 10 years ending in 2012. The inventory value is now heavily concentrated on larger farms, Midwestern farms, and those that grow major grains and oilseed crops.

The outlook for the 2016 farm equipment market is for continued weak demand, especially for large equipment used in row crop production, and softer pricing for new and used farm equipment. If the correction continues and deepens, the valuations of equipment inventory will have a broad impact on farmer balance sheets and equipment financing.

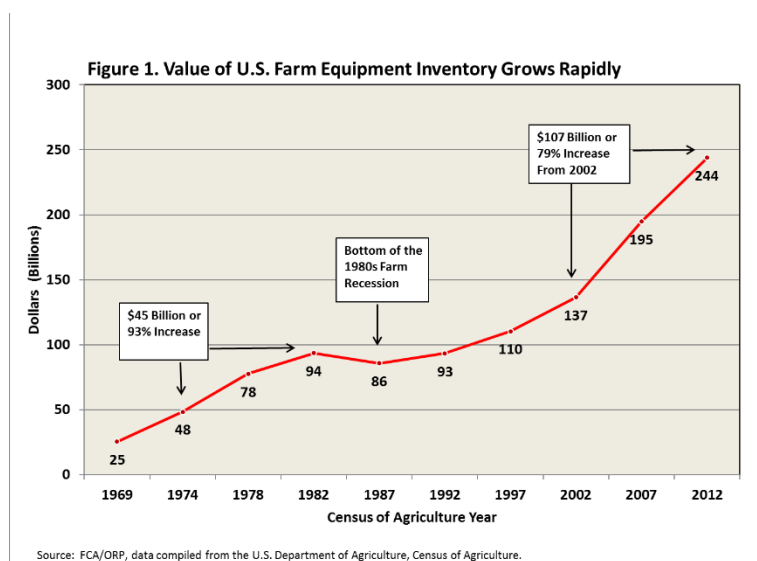
Author: Steven Koenig, Sr. Economist
(703) 883-4056

Update on U.S. Farm Equipment Trends

Farm equipment is the second largest asset class on the farm sector's balance sheet, after farm real estate.¹ The financing of this asset class is a substantial business segment for Farm Credit System institutions. In addition to direct portfolio lending, the System provides equipment financing through dealer financing programs, such as AgDirect LLP, and through leasing programs of the Farm Credit Leasing Services Corporation. In addition, farm equipment not directly financed by the System often serves as a source of collateral for other farm loans, particularly those not backed by farmland or ranchland. This research discusses major trends in the U.S. farm equipment market.

Inventory Value Grows Rapidly Through 2012

During periods of prosperity, U.S. farmers typically increase their investments in farm equipment. From 2002 to 2012 farmers enjoyed a 166 percent increase in their net cash farm incomes. Likewise, from the end of 2002 to the end of 2012, U.S. Census of Agriculture data indicate the total market value of the inventory of U.S. farm equipment grew by 79 percent or \$107 billion to \$244 billion (Figure 1).² While substantial, this increase is less than the 93 percent rise in inventory values that occurred from 1974 to 1982, another period of farm prosperity. During the farm recession that followed 1982, farm inventory values fell as farmer investment waned and existing inventory lost value.

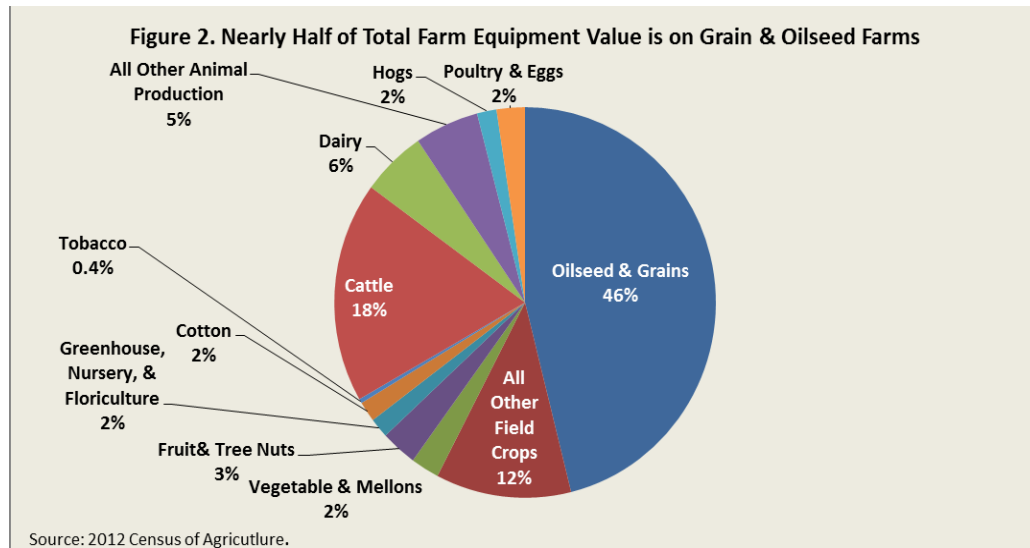


¹The term “farm equipment” or “farm machinery” includes tractors, trucks, harvesting equipment, implements, irrigation systems, milking equipment, and similar investments used in the production of food and fiber.

²The estimated values made by operators include both owned and leased equipment located on the farm at yearend.

Inventory Value is Greatest on Grain and Oilseed Farms

At the end of 2012, two-thirds of the \$244 billion in equipment inventory was located on crop farms and one-third was located on livestock farms. Figure 2 shows that farms where grains and oilseeds are the primary enterprises accounted for 46 percent of the total equipment value in 2012. Grain and oilseed farms have even higher shares of the inventory of higher powered farm tractors and self-propelled combines. At the end of 2012, these farms accounted for 54 percent of all farm tractors with at least 100 horsepower and 75 percent of all self-propelled combines. Therefore, much of the variability in the demand, supply, and values of farm equipment is tied closely to the economics of the major crop enterprises.



Inventory is Geographically Concentrated in the Midwest

As expected from the predominate location of oilseed and grain farms, the total inventory value of farm equipment was concentrated in Midwestern States in 2012. Table 1 shows just over half of the total U.S. inventory value was in just 10 states. California is the only state in the top ten that is outside the Midwest. Iowa and Illinois, the two top corn and soybean producing states, together accounted for over 14 percent of the U.S. total. Seven of these top 10 states are within the AgriBank District. Moreover, the 15 states within the AgriBank District accounted for 56 percent of the total value of U.S. farm equipment.

State	Dollar Amount (000)	Cumulative Dollar Amount (000)	Cumulative Share of the Total (%)
IOWA	18,954,910	18,954,910	7.8
TEXAS	17,958,942	36,913,852	15.1
ILLINOIS	15,256,459	52,170,311	21.4
MINNESOTA	14,737,084	66,907,395	27.4
NEBRASKA	11,503,486	78,410,881	32.1
CALIFORNIA	9,709,545	88,120,426	36.1
KANSAS	9,682,116	97,802,542	40.1
NORTH DAKOTA	9,297,134	107,099,676	43.9
WISCONSIN	9,037,376	116,137,052	47.6
MISSOURI	8,822,239	124,959,291	51.2
All Other States	119,007,394	243,966,685	100.0

Source: FCA-ORP compiled data from the 2012 Census of Agriculture.

Large Farms Account for Most of the Total Value

Given the structure of U.S. agriculture, the total value of U.S. farm equipment inventory primarily resides on farms with large production volumes. Large farms, those farms with at least \$500,000 in total farmsales, accounted for nearly half of the total \$244 billion value at the end of 2012 (table 2). These 110,000 farms accounted for just 5 percent of the total 2.1 million U.S. farms in the Ag Census that year. Large farms have average equipment inventories of nearly \$1.1 million, which compares to just \$63,000 for the other 2 million U.S. farms.

Not only is the majority of inventory value held on large farms, these farms also accounted for most of the 25 percent growth (\$50 billion) in total inventory values that occurred between 2007 to 2012. Equipment inventory on large farms rose 86 percent from \$63.5 billion to \$118 billion, whereas inventory value on all other farms actually fell 4 percent over those same five years. The extended period of higher-than-normal equipment investment and resultant upgrading of farm equipment is evident in the data. For example, the inventories of large tractors and combines less than 5 years old grew by 39 percent and 41 percent, respectively, from 2007 to 2012.

2012 Ag Census	Number	Share of All Farms	Dollar Value of Inventory (000)	Share of Total Inventory Value	Average Inventory per Farm (\$)
Farms with \$500,000 or more in farmsales	110,176	5.2%	118,360,074	48.5%	1,074,282
Farms with less than \$500,000 in farmsales	1,998,330	94.8%	125,606,614	51.5%	62,856
All U.S. Farms	2,108,506	100%	243,966,688	100%	115,706

Source: 2012 Census of Agriculture.

Farm Equipment Sales Tumble after 2013

The farm equipment market is dominated by a few full-line manufacturers, such as John Deere, but there are also a large number of short-line manufacturers serving various market segments. Full-line manufacturers reported that 2014 and 2015 sales of equipment to row crop farms fell across North America, while sales to farms in the livestock sector were more stable. For example, AGCO (Massey Ferguson Brand) reported in January its farm equipment sales in North America for 2015 fell 16 percent from that of 2014.³ In January, CNH Industrial (Case IH Brand) indicated that its 2015 North American sales declines were led by a 31 percent decline in large tractors (over 140 horsepower) and a 28 percent decline in its combines.⁴ Weak sales carried into 2016, with John Deere reporting its worldwide agricultural equipment sales volume slumped 12 percent in its last fiscal quarter, which ended on January 31.⁵ Global manufacturers report that farm equipment sales are also particularly weak in South America.

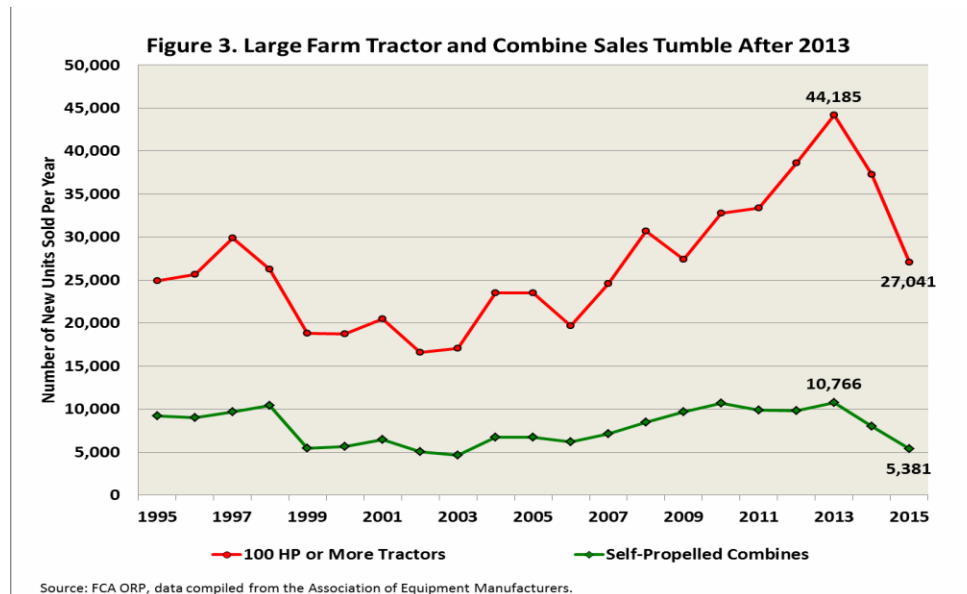
³ AGCO Fourth Quarter 2015 Earnings News Release (2/2/2016).

⁴ CNH Industrial 2015 Fourth Quarter and Full 2015 Results Press Release (1/29/2016).

⁵ John Deere January 31st 2016 Quarterly Earning Media Release (2/19/2016).

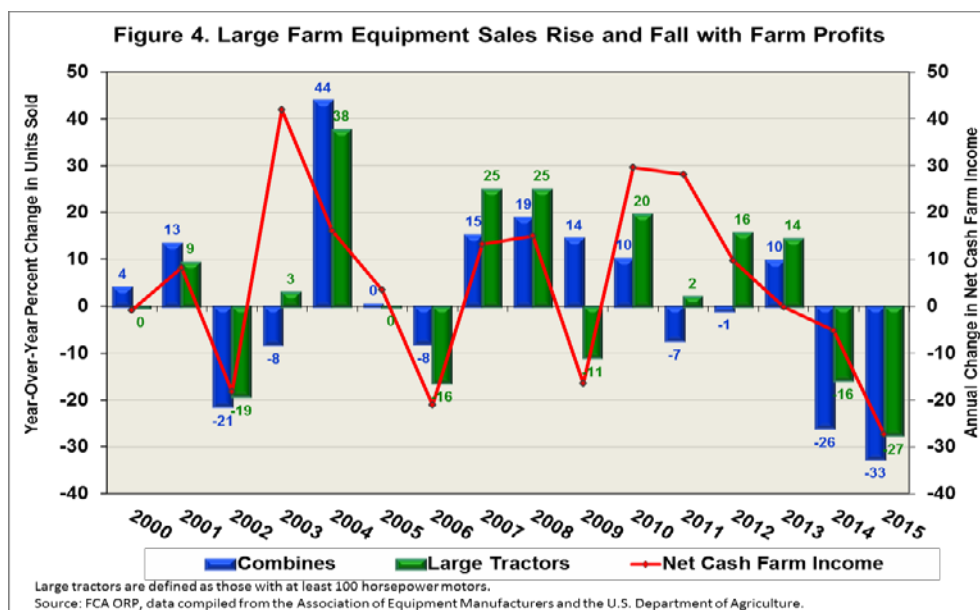
Large Equipment Sales Tumble

Data from the Association of Equipment Manufacturers provides more detailed information on U.S. farm tractor and self-propelled combine sales. Figure 3 shows the sharp decline in annual unit sales of larger row crop tractors (those with at least 100 horsepower motors) and self-propelled combine sales that occurred over the last 2 years. The decline in self-propelled combines has been particularly steep, with 2015 sales just half of the 2013 peak and at the lowest level since 2003. For larger farm tractors, sales fell 39 percent over the past 2 years. In general, tractor sales are considered a good barometer of other farm equipment sales by the industry.



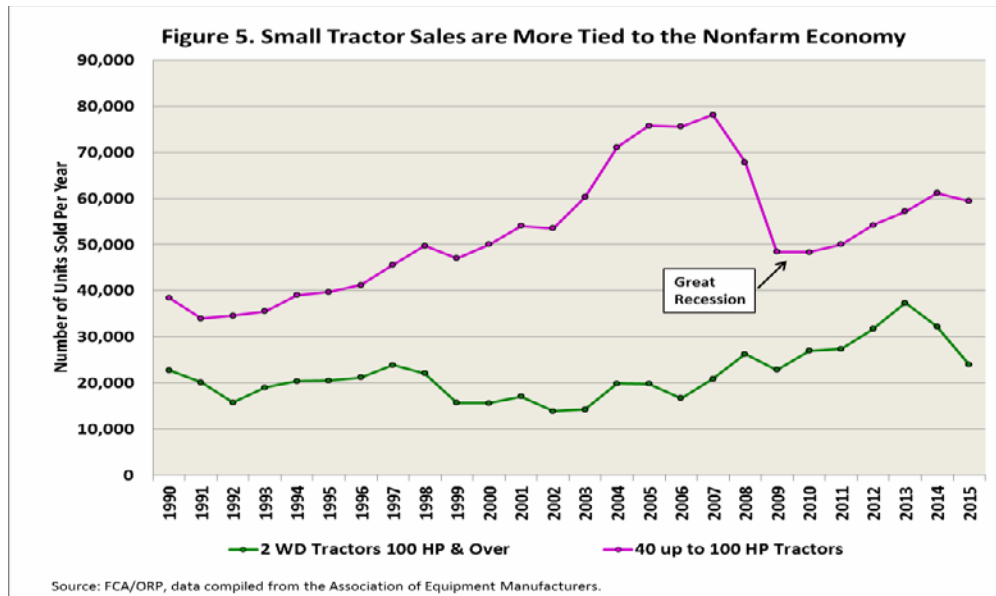
Large Equipment Sales Driven by Farm Incomes

The long rise of sales from the mid-2000s to 2013 was influenced by a number of factors, including strong farm incomes, federal tax incentives that encourage capital investment, low capitalization rates (low interest rates), and abundant credit. Yet, the biggest driving factor in the rise and the recent collapse in farm equipment investments is farm profitability. Figure 4 shows how sales of large farm equipment closely track changes in net cash farm incomes.



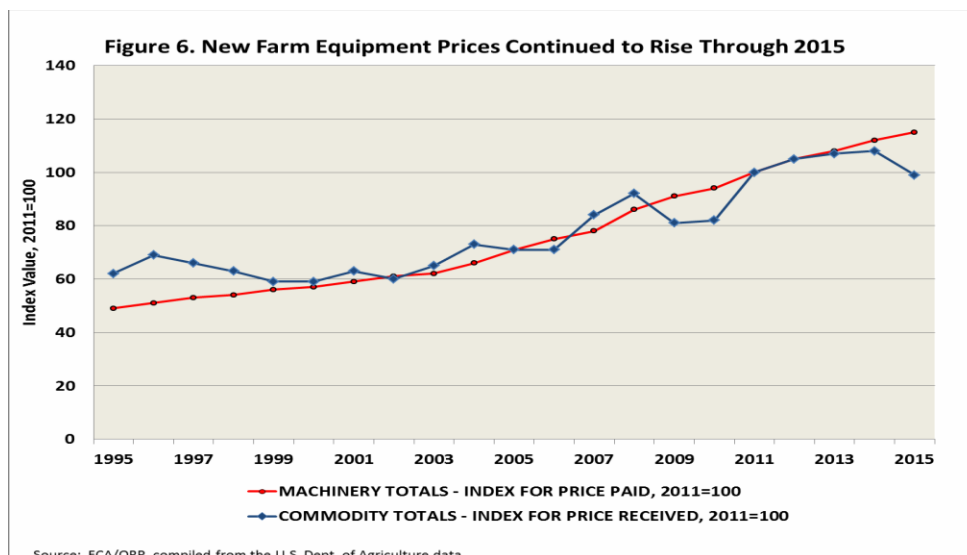
Small Equipment Sales Are More Dependent on the Nonfarm Economy

Sales geared for small scale farms and the country living segments of the market are more dependent on the level of off-farm incomes than the level of farm incomes. This can be seen in the sales of small tractors (40 and 100 horsepower) over the last 25 years. Notice in figure 5 that small farm tractor sales plunged nearly 40 percent from the start of the last recession in 2008 to a bottom in 2010. This was also a period of poorer returns for livestock producers, which are also a significant demand source for this segment.

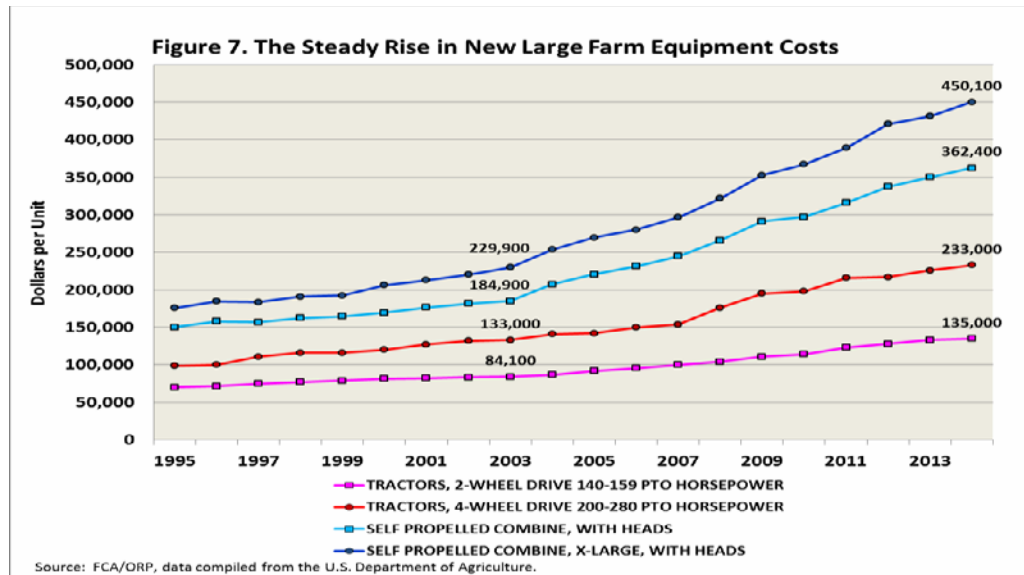


New Farm Equipment Prices Show Strength at End of 2015

Despite declining sales over the past 2 years, a USDA index of prices paid by farmers for new farm equipment indicates that equipment prices actually rose through 2015. Figure 6 shows prices rose 85 percent from 2003 to 2015 or about 5 percent annually. It also shows that the rise is generally consistent, although less volatile, with an index of commodity prices received by farmers over the same period. In times of weakening demand, manufacturers generally resist cutting prices on new equipment due to fears it will undercut margins and hurt equipment trade-in values. Thus, at least initially, they may try to boost sales with various marketing and financing incentive programs as opposed to heavily discounting prices.

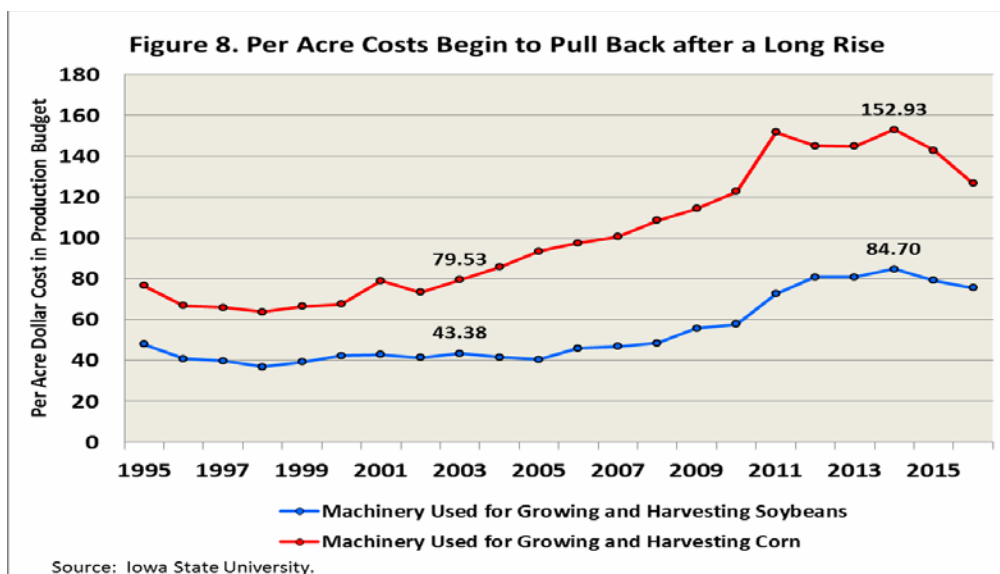


The relatively steady rise in new equipment prices is most apparent in the prices paid by farmers for large tractors and self-propelled combines (figure 7). The percentage rise in large tractor prices is in line with increases experienced for farm equipment in general. However, large 4-wheel drive tractors typically used by large grain and oilseed farms saw somewhat greater price increases, rising 75 percent since 2003. New self-propelled combines nearly doubled in price since 2003, a cyclical low in the sales of this equipment, with the very largest class reaching \$450,000 by 2014 (most currently available data).



Per Acre Costs of Farm Equipment Begins to Decline

Growth in new farm equipment prices and purchase volumes, especially since 2003, has translated into rising production costs for producers. When farm equipment is purchased it becomes part of the fixed cost or overhead of the farm business. This is illustrated in Figure 8 which shows the estimated per acre costs of farm equipment used to grow corn and soybeans in Iowa from 1995 to 2015. The figure shows per acre equipment costs used to grow corn or soybeans nearly doubled between 2003 and 2014. This is consistent with the near doubling of equipment values typically used by larger scale producers. But, note that costs began declining in 2015 as machinery depreciation and less investment began to occur.



Industry Outlook Remains Weak

Most industry observers anticipate continued weakness in the farm equipment market during 2016, particularly for equipment used in row crop production. In February, John Deere, the global leader in farm equipment manufacturing, forecasted industry sales in the U.S. and Canada to be down 15 to 20 percent in 2016. John Deere indicated that the decline reflects the impact of low commodity prices and stagnant farm incomes, which they anticipate will impact sales of higher-horsepower tractors the most. AGCO forecasts call for a 10 to 15 percent decline in North American non-compact farm tractor sales.

Along with the decline in new sales has been a slide in used equipment sales, a buildup of equipment inventories, and weaker used machinery prices. Like the new equipment market, high-valued used farm equipment has seen greater declines in sales and in pricing than equipment geared for hobby farmers or country living market segments. Weaker farmer demand for used row crop equipment is expected in 2016.

Lender Surveys Confirm a Weak Capital Spending Outlook

Outside the manufacturing industry, further weakness in the machinery market for 2016 appears in a January survey of farm bankers within the Chicago Federal Reserve Bank District.⁶ Farm bankers expect a downward trend for capital spending by farmers in 2016, including spending on machinery and equipment. As a result, they expect loan volumes for capital purchases in the first quarter of 2016 to be down compared with a year earlier. Moreover, a survey of Midwestern bank CEOs conducted by Creighton University continues to show weakness in the farm equipment market.⁷ In February this Creighton University farm equipment-sales index sank to a record low of 6.7. Three years prior the index stood at nearly 65. Values below 50 in the index indicate negative growth is occurring.

Inventory Adjustments Are Underway

Market observers anticipate more public auctions of farm equipment are likely for 2016. One factor driving this may be older farmers who had delayed retirement during the extended period of good profits but are now moving into retirement. Also, with increasing financial pressures, more farms may move to trim costs and reduce associated debt burdens by selling equipment. While such actions may boost balance sheet liquidity and lower costs, the additional supply would be expected to lower used equipment prices. Some producers might be able to trim costs by leasing needed equipment rather than buying. Indeed, during the past year many manufacturers have been using leasing programs as an alternative to their financing programs as a way to move equipment out of inventory.

In past years, export markets have provided an outlet for some segments of good quality used U.S. farm equipment and thus help prevent a buildup of inventories. This is currently not much of an option. Low worldwide crop prices coupled with the high value of the U.S. dollar have reduced export demand for both new and used farm equipment. In addition, equipment with new Tier 4 low emission engines now required in the United States have minimal demand in countries where these standards are not required.

Favorable Tax Rules Passed

In 2002 Congress made a series of changes to income tax deduction provisions (both new and used purchases) under Section 179 of the U.S. Tax Code and introduced a bonus depreciation allowance for qualified new

⁶ Federal Reserve Bank of Chicago, *AgLetter*, No. 1971 (February 2016).

⁷ Creighton University, *The Mainstreet Economy Report* (March 2016).

property that was placed into service by businesses, including farm business.⁸ Use of the provisions can reduce taxable income in the year of purchase and hence lower tax liabilities. Therefore, these tax rules encourage capital investments by producers facing significant income tax liabilities. These tax provisions were a significant factor in influencing equipment purchases during the years of heightened row crop profitability prior to 2014.

Since first introduced, Section 179 and the bonus depreciation provisions were temporary rules that required frequent reauthorization by Congress. In many years the reauthorization came late within the tax year and made retroactively. In late December 2015, Congress passed the *Power of Protecting Americans from Tax Hikes Act of 2015*, making Section 179 provisions permanent and extending the bonus depreciation provisions through 2019. The new Section 179 provision allows a first-year depreciation deduction of up to \$500,000, which begins to phase out as annual asset purchases exceed \$2 million. The thresholds are inflation adjusted for the first time. A 50 percent bonus provision was authorized through 2017 with a 40 percent amount for 2018 and 30 percent for 2019.

Rising Interest Rates Going Forward

Farm equipment values are affected by interest rates through increased financing costs and the opportunity cost of capital. Historically low interest rates since 2008 have reduced the cost of ownership of capital assets and hence bolstered both purchase demand and values. A significant uptick in interest rates would have an opposite effect on equipment demand and valuations. The Federal Reserve made the first step in raising interest rates last December after holding rates constant for 7 years. If U.S. economic growth and inflation accelerate, further rate increases are more likely to occur.

Conclusions

Farm equipment financing and leasing is a substantial business segment for FCS institutions and is often a primary source of collateral for agricultural loans. Farmer purchases of farm equipment, along with the value of equipment inventory, rose rapidly for an extended period beginning in the mid-2000s, encouraged by hefty farm profits, historically low interest rates, ample credit, and tax policies.

After peaking in 2013, farm equipment markets began to retract in 2014 as farm income dropped sharply. Like the farmland market, farm equipment markets are in a period of correction. The correction is being driven primarily by a large decline in farm earnings (particularly for crop producers). The outlook for the 2016 farm equipment market is for continued weak demand, especially for large equipment used in row crop production, and softer pricing for new and used farm equipment. If the correction continues and deepens, future valuations of equipment will have a broad impact on farmer balance sheets and the financing of farm equipment.

⁸ For agriculture, qualified property includes farm machinery, specialized ag buildings, grain storage bins, farm drainage systems, fencing, certain livestock, and other similar assets.