FCC Ag Economics:

Farm Sector Health Drives Farm Equipment Sales

Fall 2015

Introduction

Agriculture is always evolving. Average farm sizes have increased. Technology has expanded the productivity of equipment, and yield potential. To meet the growing pressures for productivity and efficiency, farm equipment has become larger and more complex. Having the right tool for the job has never been more important in agriculture.

Conventional wisdom suggests that farm equipment sales are a reflection of the farm sector's health. If the farm economy softens, producers will reduce new equipment purchases.

But is the opposite also true? That is, are farm equipment sales a leading indicator of future health of the farm sector? After all, expectations that the farm economy will prosper should drive current farm equipment sales as producers position their farm businesses accordingly.

FCC Ag economics looked at the dynamics of new farm equipment sales and cash receipts. The latter was found to be a definite driver of future sales. We project that farm equipment sales will decline in 2016, mostly the result of weaker farm cash receipts and low growth in Canada's Gross Domestic Product (GDP). A moderate rebound is expected for Product 2017.

Overview of the new farm equipment market

For the purpose of this report, farm equipment is categorized into five groups: tractors under 40 HP, tractors between 40 and 100 HP, tractors over 100 HP, 4WD tractors, and self-propelled combines.

All segments of the farm equipment market have grown

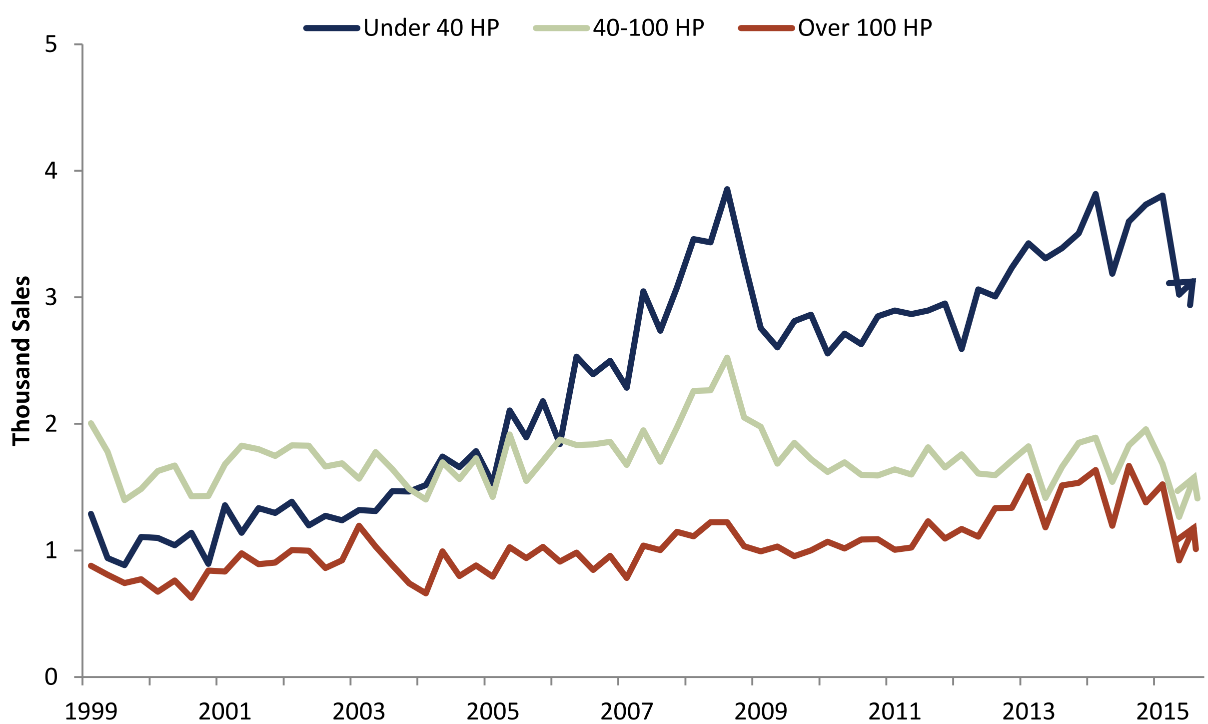
The economic environment in the farm sector has supported growth over the past 15 years: Total new farm equipment sales have increased five per cent per year on average from 1999 to 2014, for a total increase of 82 per cent. Growth in farm equipment sales is led primarily by sales of tractors under 40 HP, increasing by ten thousand units from 1999 to 2014, or 300 per cent growth. Sales of all other types of tractors have also increased, but not at the same rate:

- 40-100 HP tractors: 11 per cent growth
- larger than 100 HP : 79 per cent growth
- 4WD tractor sales 79 per cent growth
- Combines: 96 per cent growth.

The increase in sales has been accompanied by an increase in prices. Since 2002, average combine prices have appreciated 47 per cent, 4WD tractor prices by 71 per cent, and tractors over 100 HP by 39 per cent.

There are strong seasonal patterns in the farm equipment market. Tractor sales are higher in quarters two and four (spring and fall). The data used in Figure 1 has been adjusted for this seasonality in order to see the underlying trends.

Figure 1: Quarterly sales of large tractors increasing at a slower pace than small tractors

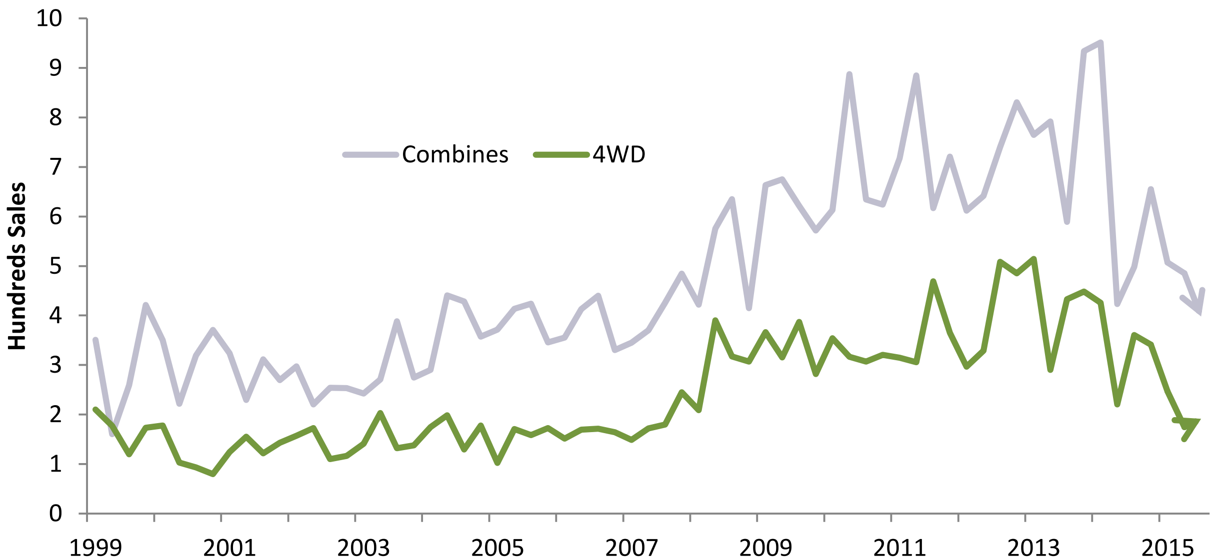


Source: Bloomberg

Sales of new farm equipment were weaker in 2015

Total tractor sales were down eleven per cent, year-over-year in the three quarters of 2015. Year-over-year, combine sales were down 20 per cent, 4WD tractor sales were down 29 per cent, tractors over 100 HP were down 18 per cent, 40-100 HP tractor sales were down 13 per cent. Tractors under 40 HP were the best performing in terms of sales but still had a decline in sales during the first three quarters of 2015 at 6.5 per cent.

Figure 2: Combine and 4WD tractor sales strong through 2000's



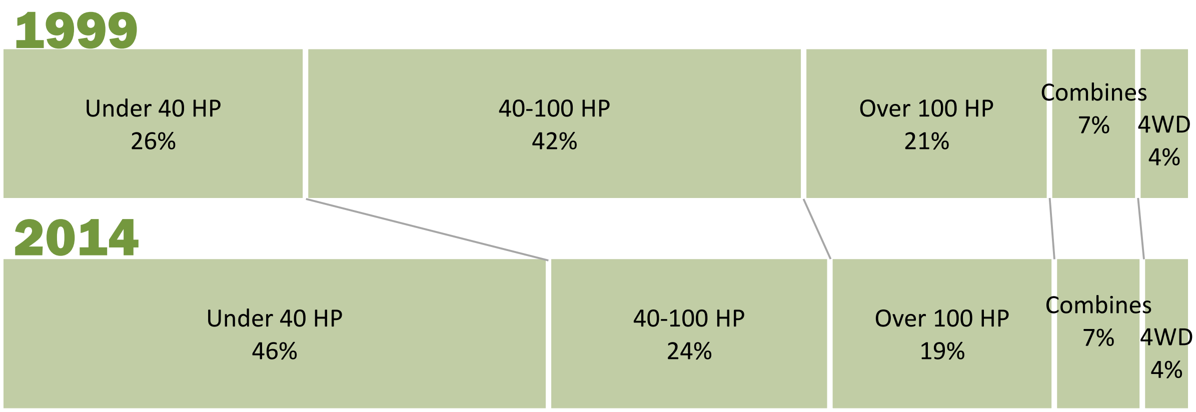
Source: Bloomberg

What are the drivers behind this decline? Unusually high sales in 2013 and 2014 can partially explain why the market has softened. Farm cash receipts and other macro-economic variables also played a role.

Medium sized tractors losing popularity

Sales of under 40HP tractors in 1999 made up 26 per cent of all tractor sales. In 2014 they made up 46 per cent of all tractor sales. Market share was picked up from the 40-100 HP tractor market (where market share dropped from 42 to 24 per cent from 1999-2014). Combines, tractors over 100 HP and 4WD tractors have kept a steady market share over the 15 year period.

Figure 4: Share of sales in 40-100 HP tractors declines



Source: Bloomberg

Value of farm equipment increases, but represents a smaller portion of all producers' assets

We measure sales in units sold, but it is also useful to look at the dollar amount spent. As large equipment is more expensive than smaller equipment, this would shift the distribution of sales in each category.

Since 1999, the value of machinery has appreciated by 51 per cent on Canadian farms. This was driven by large increases in the value of machinery in Saskatchewan (58 per cent), Alberta (55 per cent), Quebec (55 per cent), and Manitoba (49 per cent).

The significant increase in equipment values is because equipment is becoming more complex. As more features are added to a tractor, it becomes more expensive to build.

Despite this increase in the value of machinery, farm equipment represents a declining percentage of all farm assets. Increasing land values dominate more and more the balance sheet of producers.

What are the drivers that help project future new farm equipment sales?

For the purpose of this study, we distinguish three distinct farm equipment markets:

- Overall market, including sales of all equipment sizes.
- Market of 4WD tractors
- Market for self-propelled combines.

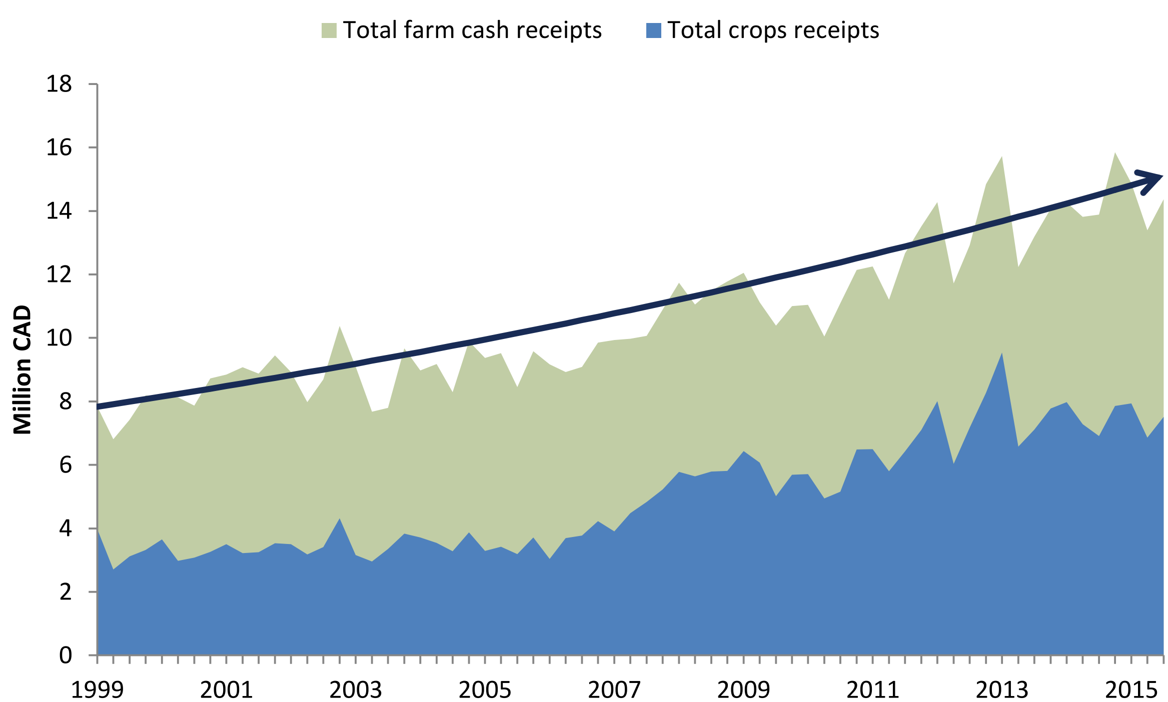
We found that farm cash receipts are an important predictor in all three markets. However, farm crop receipts (a subset of farm cash receipts) are more useful for predicting 4WD tractors and combine sales. GDP and exchange rates also have an important predictive role.

Farm cash receipts are an indication of the health of the farm sector

Higher receipts support stronger farm income, allowing farmers to purchase new equipment as well as other farm assets. Farm cash receipts are comprised of three components: crop receipts, receipts from livestock and livestock products, and receipts from government payments.

On average, farm crop receipts make up about 46 per cent of total farm cash receipts (from 1999-2015). The overall share of crop receipts declined significantly in 2014 as annual livestock receipts reached a record-high value ($25.6 billion). Since 1999, total farm cash receipts have increased 90 per cent, while crop receipts have increased 127 per cent.

Figure 5: Quarterly farm cash receipts increase

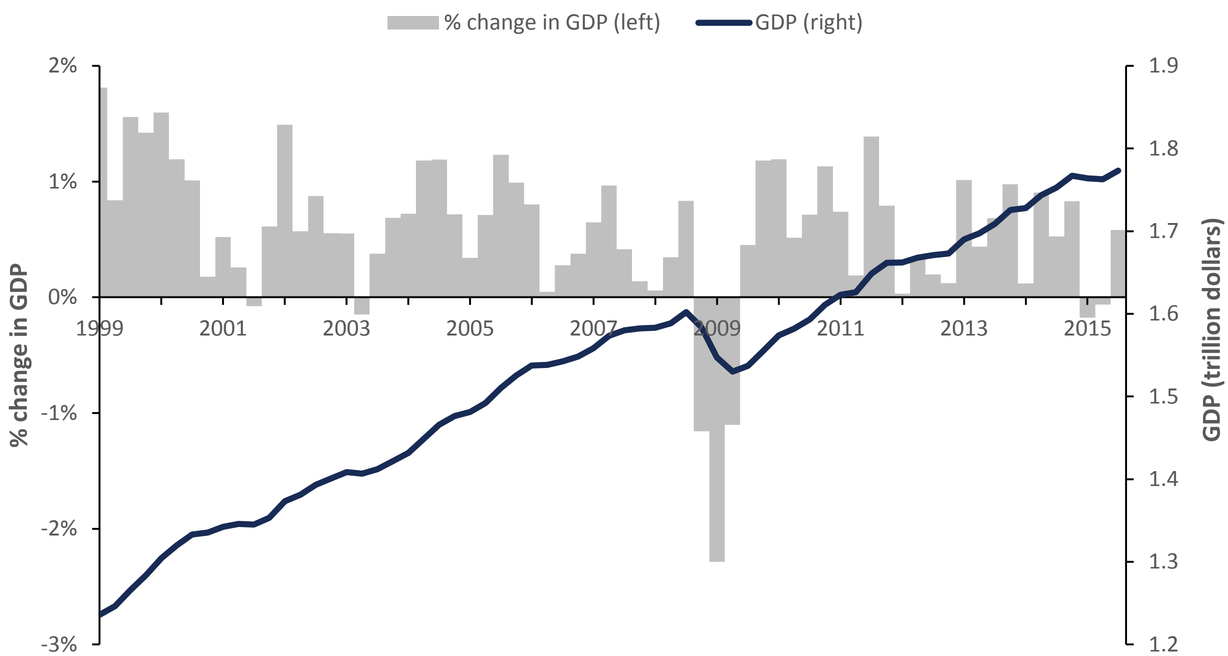


Source: Statistics Canada, CANSIM table 002-0002

Gross Domestic Product (GDP) influences the market for smaller tractors

Increases in Canadian GDP are expected to support farm equipment sales, especially in the small tractor category as 46 per cent of total sales are small tractors under 40 HP. These tractors are often not used for agricultural purposes. Small tractors are more common to acreage owners and small businesses for cutting grass, moving snow, and a variety of other tasks. GDP measures the overall economy, making it a better predictor of sales that are not related to agriculture. GDP growth in Canada has been moderate since 2009, between one and three per cent per year.

Figure 6: GDP shows slight decline, but continues to increase



Source: Statistics Canada, CANSIM table 380-0063

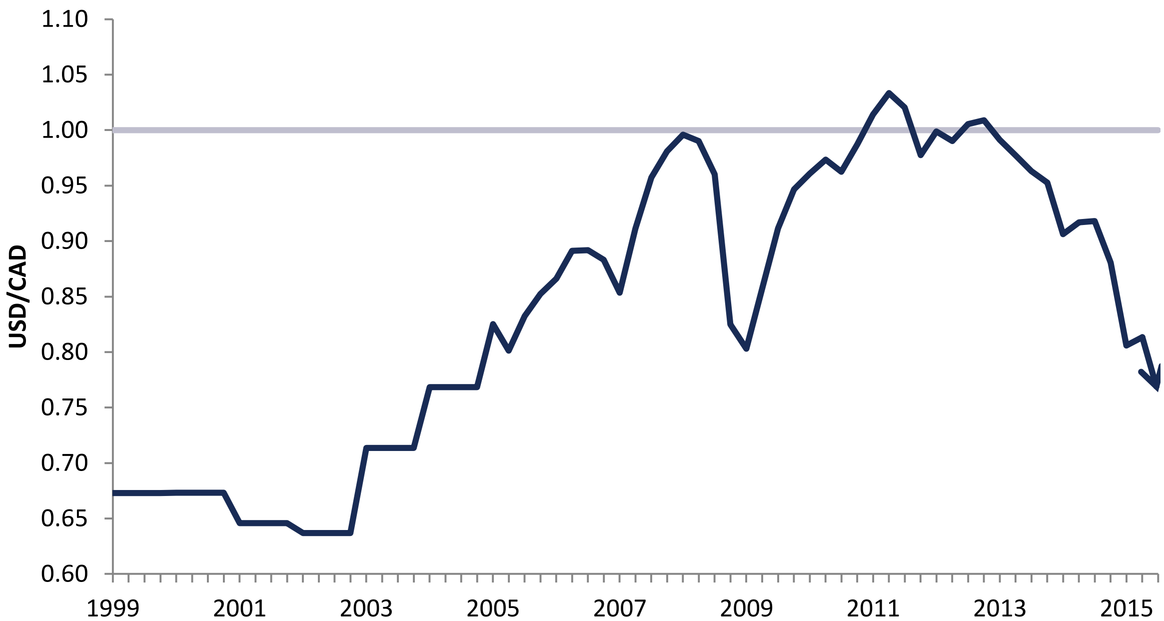
The Canadian dollar has mixed impacts on farm equipment sales

The majority of tractors and combines sold in Canada are manufactured outside of Canada and are thus initially priced in U.S. dollars. The U.S. is the largest exporter of farm equipment to Canada. A rising loonie improves affordability of U.S. imports, supporting farm equipment sales.

The value of the Canadian dollar can impact sales of new farm equipment through another channel – the market for used farm equipment. A lower loonie makes the Canadian used farm equipment inventory more attractive to U.S. buyers and can help move new farm equipment in Canada.

The mid 2000's witnessed an appreciation of the Canadian dollar. The exchange rate has been at or near parity from 2008-2013 with the exception of a drop in 2009 caused by the global recession. The exchange rate of the USD per CAD started falling in the middle of 2013 due to weakness in oil prices and sluggish GDP growth in Canada.

Figure 7: The value of the Canadian dollar against the U.S. dollar fell over the last two years



Source: Bank of Canada

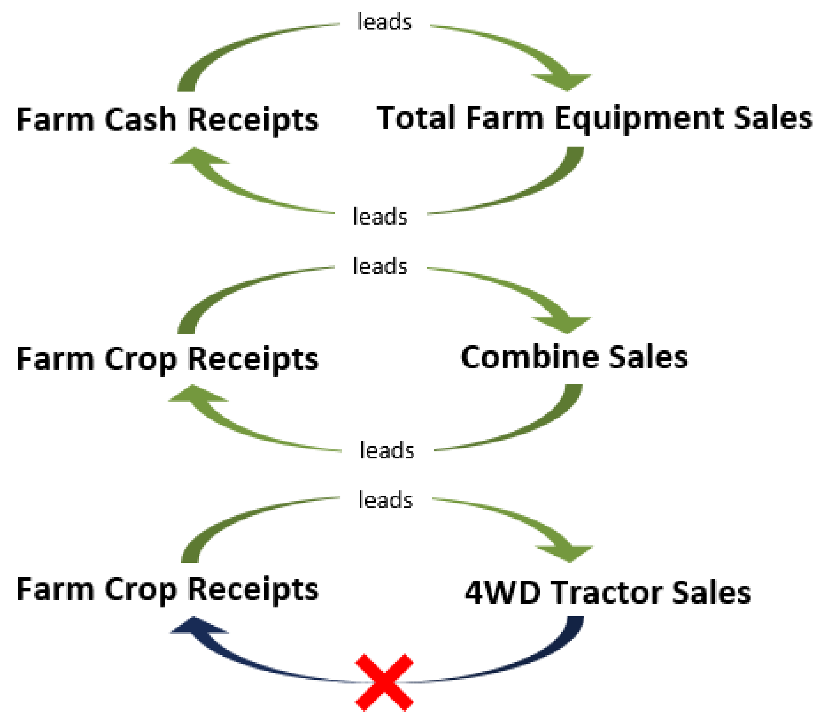
Does farm health drive equipment sales?

Our statistical analysis reveals that farm crop receipts are a strong *leading indicator* of 4WD tractor sales. Crop receipts are a weaker indicator for overall total equipment sales and combine sales compared to 4WD tractor sales. A positive shift in crop receipts triggers a positive bump in sales of cropping equipment. Conversely, softer crop receipts suggest that 4WD tractor sales will decline. A similar argument applies to farm cash receipts and overall new farm equipment sales.

We also looked at whether producers buy farm equipment on the basis of their expectations of future market conditions (production and prices) and thus farm receipts. We find that stronger overall equipment sales are consistent with stronger <u>future</u> farm cash receipts.

So producers are reacting to current market conditions, but they also plan ahead and adjust their purchasing behaviour to what they expect market conditions to be. It is possible to witness stronger farm equipment sales in a depressed environment for cash receipts if expectations are that cash receipts will improve.

Figure 8: Farm receipts lead sales of equipment



What is a leading indicator?

A leading indicator is a predictive variable. For example, job performance is usually a leading indicator of salary changes in the workplace. Good job performance could suggest future increases in salary, while poor job performance indicates the opposite. A lagging indicator is reactive rather than predictive. Salary changes are a reaction to job performance, and therefore a lagging indicator of job performance.

The relationship between two variables can be described in three ways:

1. A variable can be a leading **or** lagging indicator of another variable
2. A variable can be **neither** a leading nor lagging indicator of another variables.
3. A variable can be a leading **and** lagging indicator of another variable

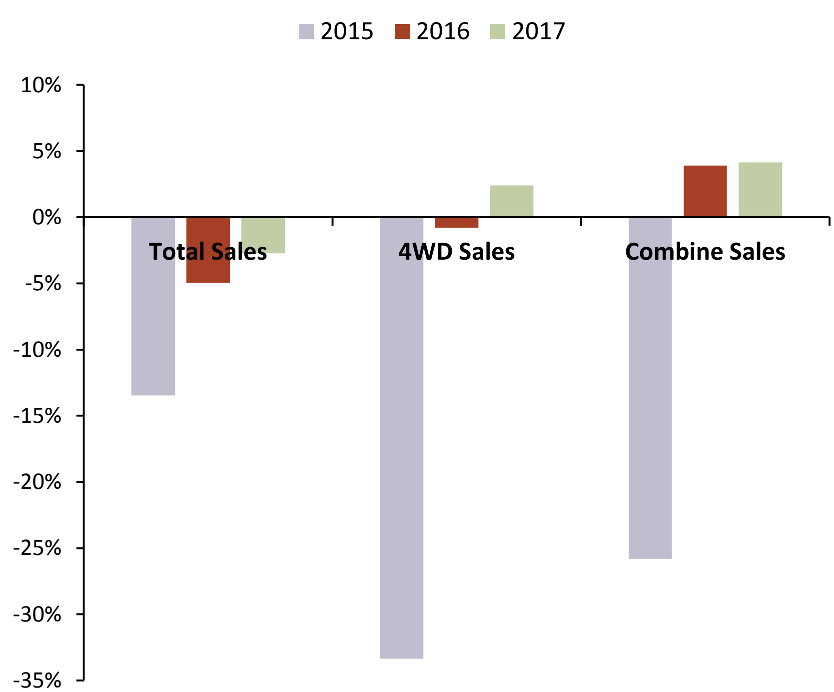
Projections of farm equipment sales

Assumptions about farm cash receipts, GDP, and exchange rates suggest future patterns in farm equipment sales. As macroeconomic conditions shift, so too will the likelihood of these predictions being realized. For example, the size and quality of the 2015 crop will impact 2016 farm receipts. For the purpose of the projections, we assumed muted growth in GDP and a weak loonie in accordance with the October 2015 projections of the Bank of Canada. We also projected crop receipts in line with the 2014-15 trend.

Our statistical model reveals that total farm equipment sales could decrease five per cent in 2016 compared to 2015 level. This is due to unusually high sales in 2014, and weak GDP growth through 2016. Sluggishness in the market is projected to continue into 2017, with a decrease of 2.7 per cent in sales over the projected 2016 level.

Combine and 4WD tractor sales depend mostly on farm crop receipts. Combine sales are projected to increase by approximately four per cent in both 2016 and 2017 as crop receipts project slightly higher. 4WD tractor sales are projected to decrease by nearly a full per cent in 2016, and increase by 2.4 per cent in 2017. Lower sales in 2015 are mostly the result of unusually high sales in 2014.

Figure 9: Farm equipment sales predicted to decrease in 2016, but rebound in 2017



Source: FCC Calculations

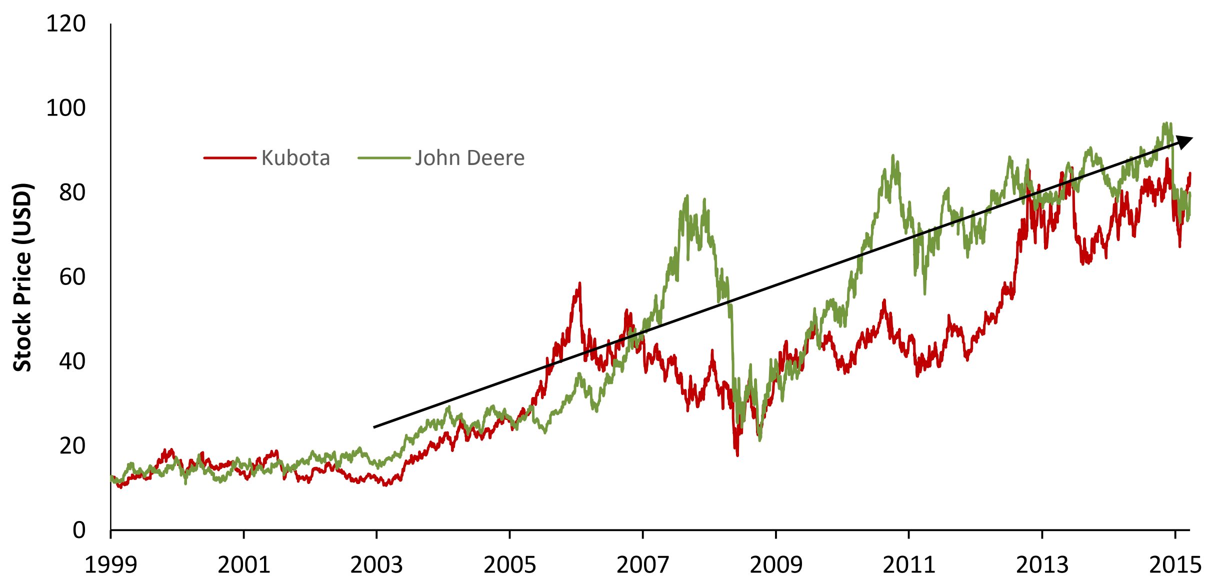
Farm equipment stocks are strong

Data reveal a strong growth in the market for farm equipment over the past 15 years. Stronger demand for tractors has underscored the increasing importance of machinery for farming operations. Strength in the farm equipment market is supported by higher stock prices of large equipment manufacturers like John Deere and Kubota. Since 2003, John Deere stocks have increased by 329 per cent and Kubota stocks have increased by 524 per cent.

Compared to the overall performance of the stock market over the same period, this growth is amazing.

Are lower farm equipment sales in 2015 a sign of weakness in the farm equipment market? The value of both stocks declined slightly during the third quarter of 2015 reflecting third quarter sales results. The stock prices appear to be recovering suggesting the farm equipment market is projected to be relatively healthy by investors going into 2016.

Figure 3: Equipment manufacturer stocks rise



Source: Bloomberg

Three important takeaways from our analysis

1. High equipment sales in 2013 and 2014 were a reflection of strong farm cash receipts and expectations that the ag sector was going to remain healthy.
2. Sales of farm equipment slumped in 2015 because of previous strong sales and expectations of weaker farm cash receipts.
3. Farm equipment sales are projected to remain weaker in 2016 and 2017, but the slowdown should be moderate with some improvement in 2017 because of a recovery in farm cash receipts and GDP.

Technology has changed how Canadian agriculture operates. The introduction of GPS has revolutionized seeding while GMOs have changed the plants farmers grow. From tilling to planting to spraying and harvesting, technology has improved the productivity of Canadian farmers. Farmers will continue to adopt new technologies as they become available, improving productivity and efficiency, protecting their competitive position in the global marketplace. The market for farm equipment remains a reflection of the pressures to increase productivity in farming operations.

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