

2024 REPORTS

Farm Equipment Economics

By Matt Clark

When it comes to purchasing new farm equipment, prices matter. And from 1990 to 2024, the average price of a new tractor has outpaced the rate of inflation, according to my research. (The average price of a 200-horsepower tractor has risen 287%, while the price of a new 300-horsepower tractor is up 275%. Meanwhile, inflation over the same period is only 139% higher.)

However, the value of the tractor to the operation, or efficiency, is more important than the nominal price when it comes to deciding when to purchase farm equipment. And from 1990 to 2024, the efficiency gains of newer tractor models have increased significantly.

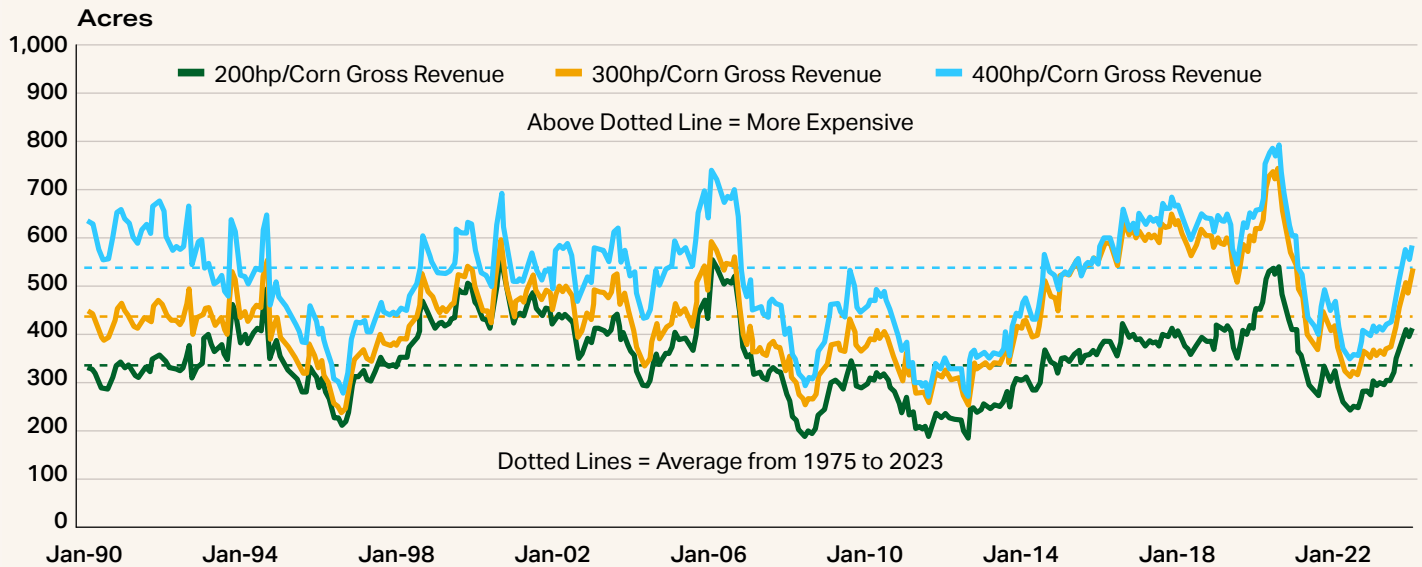
My research indicates that since 1975, the average tractor with 300 to 399 horsepower costs about 440 acres of corn income.

One common way to think about efficiency gains is the increase in how many acres a modern tractor can “farm per hour” compared with older models. However, this methodology does not factor in changes in farming practices such as heavy tillage vs. no-till. I have devised two alternative methods that help clarify tractor efficiency:

METHOD 1: ACRES OF INCOME

Dividing new tractor prices by the gross revenue of an acre of corn provides a proxy for how many acres of corn income you would sacrifice to purchase a new tractor. Using the gross revenue of an acre of corn as a denominator combines metrics of farm efficiency (such as more bushels) and farm finances. My research indicates that since 1975, the average tractor with 300 to 399 horsepower costs about 440 acres of corn income. Importantly, this method also shows the cyclical nature of when a new tractor may be undervalued in the market. For example, from 2022 to mid-2023, the cost of a new tractor relative to the gross

Tractor Price Divided by Gross Revenue of an Acre of Corn



Note: Gross revenue of an acre of corn is calculated by national corn yield x national average price on a monthly basis.
Sources: Tractor Data, University of Illinois, University of Minnesota, USDA, Terrain

income of corn was well below the historical average (meaning it was priced under the market), but the ratio has since increased well above the historical average due to both falling corn prices and rising new tractor prices.

Using this methodology, the average price of a new 300- to 399-horsepower tractor is just above 80 acres of cropland.

METHOD 2: VALUE OF ACRES

Dividing new tractor prices by the value of an acre of cropland gives the farmer a sense of how many potential acres they would sacrifice in lieu of a new tractor. In other words, how many acres could you buy for the cost of a new tractor? The price of cropland should also incorporate factors such as interest rates, farm balance sheets, inflation and changes in farming systems.

Using this methodology, the average price of a new 300- to 399-horsepower tractor is just above 80 acres of cropland. The cycles in this methodology are similar

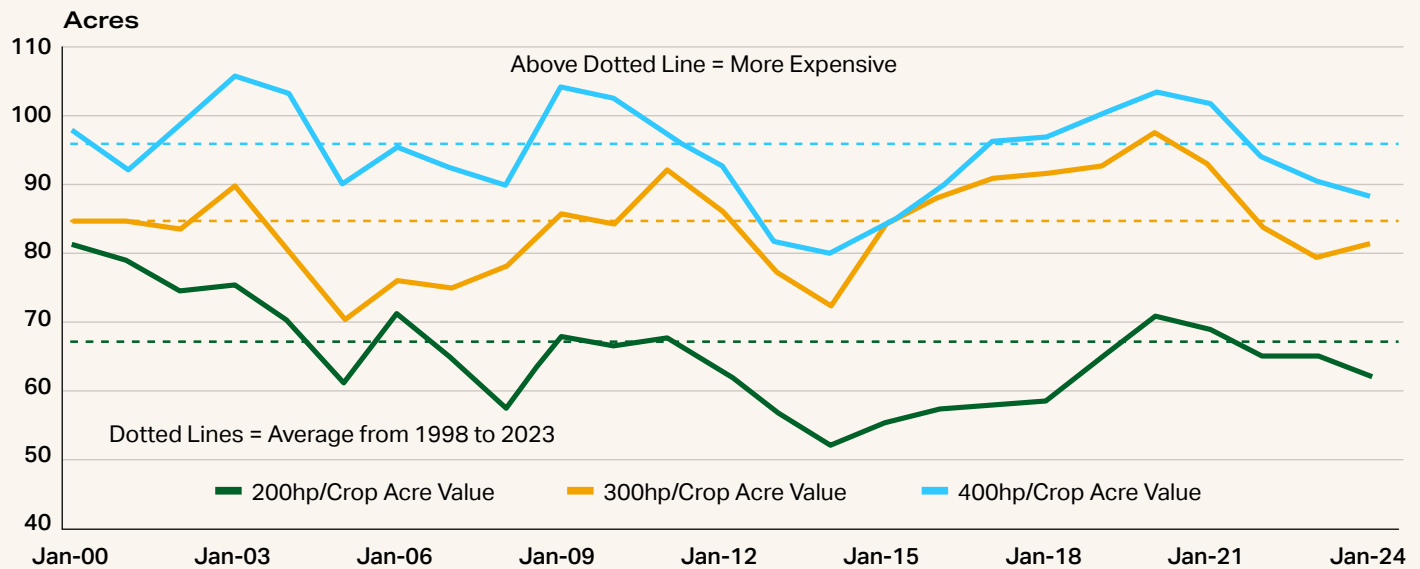
to the gross revenue of corn methodology, but the turns are a little slower as land values are both slower to move and tend to appreciate long term. Purchasing a new tractor requires cash flow that could be allocated to other long-term assets that would build one's balance sheet. Therefore, calculating the tractor price in terms of acres forfeited is a good methodology to assess if new tractor prices are undervalued relative to hypothetical balance sheet strength.

WHICH METHOD IS BEST FOR YOU?

Both the gross corn revenue and land price methodologies can be useful when considering a new tractor purchase. It's a good idea for farmers to run both calculations before assessing their financial capacity to buy a new tractor.

For example, the gross corn revenue methodology can be an excellent tool to assess if tractor prices are in line with expected liquidity, whereas the farmland value methodology can assess if prices are in line with hypothetical balance sheet (asset) strength. If both these methodologies pass, the farmer then has a better understanding of their window of opportunity

Tractor Price Divided by Value of an Acre of Cropland



Note: National cropland values only go back until 1998.

Sources: Tractor Data, University of Illinois, University of Minnesota, USDA, Terrain

to purchase when equipment is “undervalued,” before moving on to evaluating their purchasing ability.

Farm finances and cash flow projections will dictate timing, terms and capacity, but these two

methodologies can help farmers consider the purchasing cycles of new tractors in an environment where the nominal price continues to rise.

ABOUT THE AUTHOR



Matt Clark is Terrain’s senior rural economy analyst, focusing on the impacts of interest rates, land values and other macroeconomic trends on agriculture. He previously worked as a senior industry analyst with American AgCredit and as an assistant economist at the Federal Reserve Bank of Kansas City. Matt earned his B.S. and M.S. degrees in agricultural economics from Kansas State University.

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