

Conventional and Organic Enterprise Net Returns

By Michael Langemeier

Due to continued increases in demand for certified organic grains, crop farmers that have transitioned from conventional to certified organic grains report higher net returns per acre (McBride et al., 2015; Greene et al., 2017; Langemeier et al., 2020; Center for Farm Financial Management, 2021). Despite this, certified organic land accounts for less than 2 percent of U.S. farmland (U.S. Agricultural Census, 2017). Information pertaining to the relative profitability of conventional and organic production is often lacking.

A Purdue Center for Commercial Agriculture article written in September, 2020 ([here](#)) compared net returns for conventional and organic crop enterprises using FINBIN data from 2015 to 2019. This article uses FINBIN data from 2016 to 2020 to update comparisons of crop yields, gross revenue, total expense, and net returns for conventional and organic alfalfa, corn, oats, soybeans, and winter wheat. The organic enterprise data represents farms that have already transitioned to organic production, and thus do not include information pertaining to the transition phase.

CROP YIELDS

Table 1 shows the average conventional and organic crop yields for alfalfa, corn, oats, soybeans, and winter wheat. The ratio illustrated in the last column of the table was computed by dividing the organic crop yield by the conventional crop yield. Alfalfa and oats exhibited the smallest differences in crop yields between conventional and organic crops. The yield drags for corn, soybeans, and winter wheat were 32 percent, 37 percent, and 53 percent, respectively.

 Table 1. Average Conventional and Organic Crop Enterprise Yields, 2016 to 2020			
	Organic	Conventional	Ratio
Alfalfa (tons/acre)	3.71	4.51	0.823
Corn (bushels/acre)	127.1	186.2	0.683
Oats (bushels/acre)	55.8	72.4	0.770
Soybeans (bushels/acre)	35.0	48.2	0.725
Winter Wheat (bushels/acre)	31.8	67.0	0.474

Source: FINBIN Database

GROSS REVENUE, TOTAL EXPENSE, AND NET RETURN TO LAND

Gross revenue, total expense, and net return to land per unit for alfalfa, corn, oats, soybeans, and winter wheat are presented in table 2. Gross revenue includes crop revenue, crop insurance indemnity payments, government payments, and miscellaneous income. Total expenses include all cash and opportunity costs, other than those associated with owned farmland. Farmland costs included in the total expense reported in table 2 were comprised of cash rent, real estate taxes, and interest, which would be lower than the full opportunity cost on owned land. Just to give the reader some idea as to how large this excluded cost may be, you would need to add an estimated \$0.25 per bushel (\$0.85 per bushel) to the total expense for conventional corn (conventional soybeans) if you wanted to account for the full opportunity cost on owned land. Also, note that the per unit net returns presented in table 2 represent a net return to land rather than an economic profit.

			
Table 2. Average Conventional and Organic Gross Revenue and Total Expense per Unit, 2016 to 2020			
	Gross Revenue	Total Expense	Net Return to Land
Alfalfa (\$ per ton)	134.09	96.75	57.09
Organic Alfalfa (\$ per ton)	170.38	131.99	59.97
Corn (\$ per bushel)	3.76	3.76	0.71
Organic Corn (\$ per bushel)	8.94	5.99	3.96
Oats (\$ per bushel)	3.46	3.50	0.56
Organic Oats (\$ per bushel)	6.13	6.11	1.22
Soybeans (\$ per bushel)	10.26	8.81	3.77
Organic Soybeans (\$ per bushel)	20.39	15.47	8.50
Winter Wheat (\$ per bushel)	5.07	5.55	0.40
Organic Winter Wheat (\$ per bushel)	9.43	13.43	-2.67

Source: FINBIN Database

Though conventional and organic crops face different market phenomena, it is common to compare conventional and organic crop prices. Comparing organic to conventional gross return per unit reported in table 2, the smallest ratio of organic to conventional gross return was for alfalfa (1.28) and the largest ratio (2.39) was for corn. Organic oat and soybean prices were approximately double their conventional counterparts, while organic wheat price was approximately 1.75 times higher than conventional wheat price. It is important to note that

these price ratios represent five-year averages. The price ratios for individual crops vary from year to year. For example, during the 2016 to 2020 period, the corn price ratio ranged from 1.84 in 2020 to 2.74 in 2017.

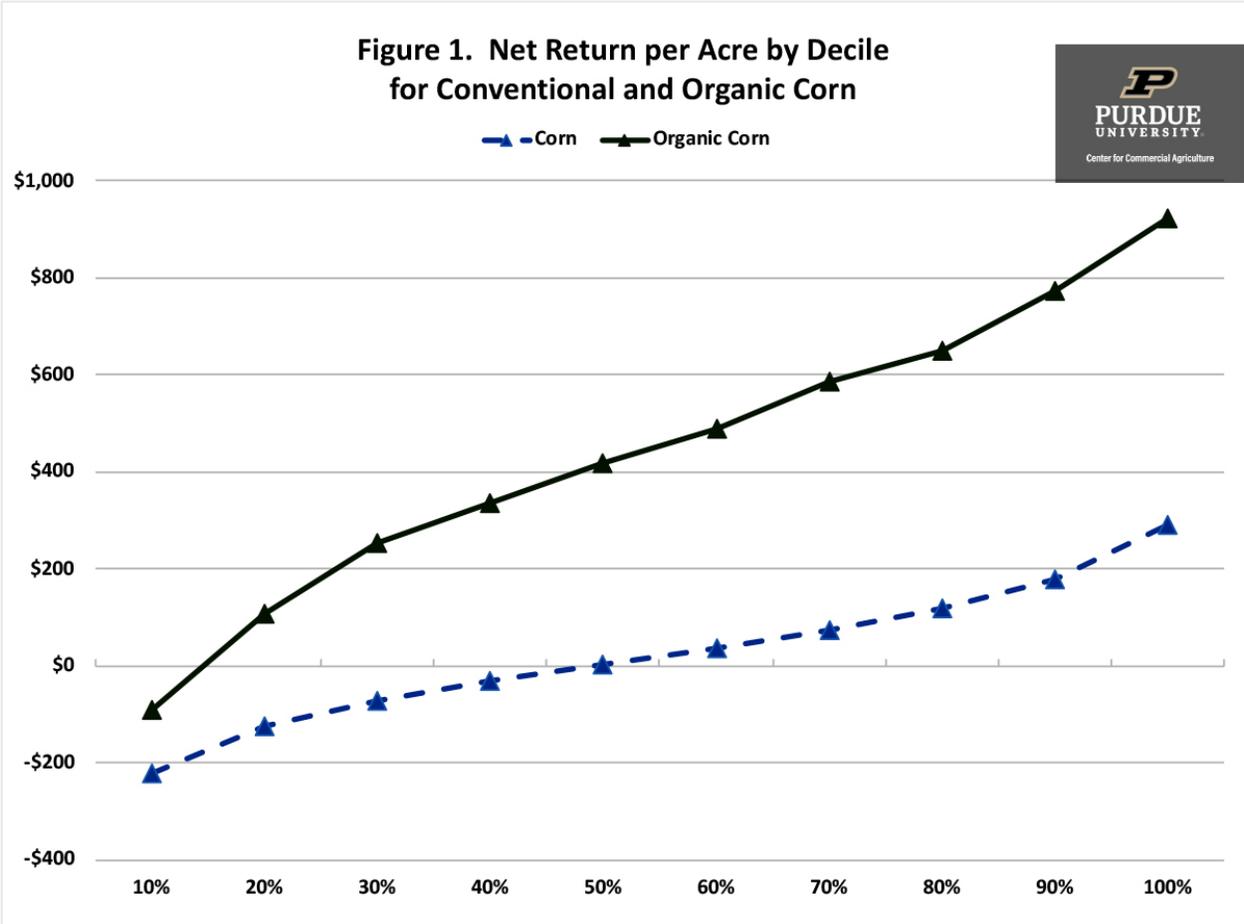
Examining gross revenue and total expense per unit for each enterprise reported in table 2, it is evident that economic losses occurred for oats and winter wheat grown conventionally, and for winter wheat grown in an organic rotation. Economic profit was approximately zero (i.e., breakeven level) for conventional corn and organic oats. The lack of profits for the organic small grains has important implications for organic crop rotations. Numerous organic crop rotations include a small grain in the rotation. Market opportunities for organic small grains vary substantially by region, and it can be difficult to find markets for these crops. It is also useful to examine differences in net returns per unit for each crop (e.g., corn versus organic corn). The largest differences in net return per unit occurred for corn and organic corn, and for soybeans and organic soybeans. The difference in net returns per unit between the two crop rotation systems was very small for alfalfa.

It is important to note that the net returns reported in table 2 are on a per-unit basis. Given the differences in crop yields between conventional and organic crops, it is often more relevant to examine differences in per acre net returns than per-unit net returns. The average difference in net returns to land between the organic and conventional crops was \$73 per acre. The largest difference was \$370 per acre for corn. The difference for soybeans was \$115 per acre, while the difference for oats was \$27 per acre. The differences for alfalfa and winter wheat were -\$35 and -\$112 per acre, indicating that the conventional alfalfa and winter wheat were more profitable than organic alfalfa and winter wheat.

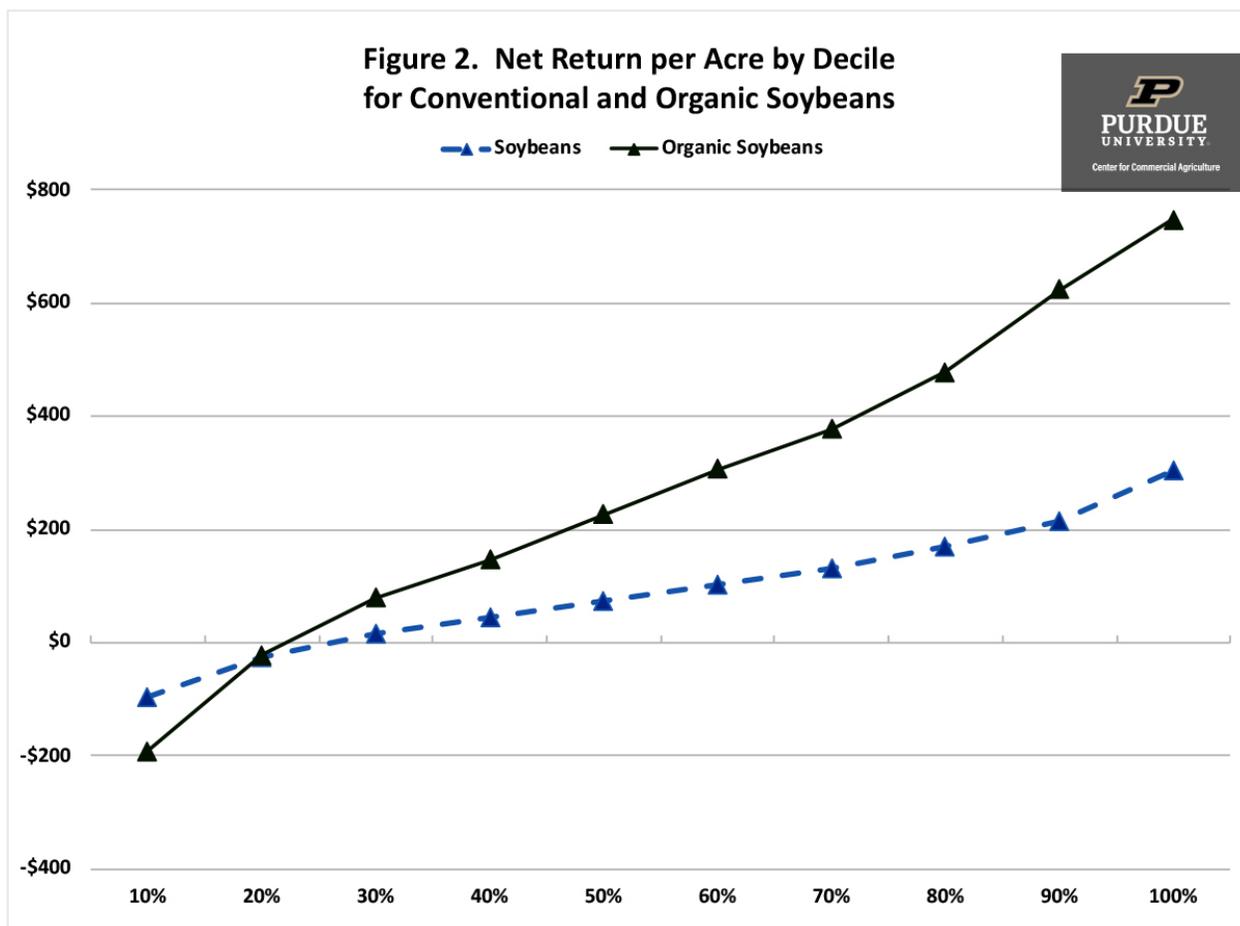
DIFFERENCE IN NET RETURNS AMONG FARMS

The results above focus on differences in average net return to land. Economists have long pointed out the large differences in financial performance among farms. To account for the differences among farms, we used the FINBIN database to examine net returns for conventional and organic corn and soybean enterprises.

Figure 1 presents the comparisons among enterprise deciles (ten equal groups) for conventional and organic corn using 2016 to 2020 FINBIN data. Net return in this figure was computed by subtracting land expenses from net return to land, and exclude government payments, operator labor, and a management charge. The median net returns per acre for conventional corn and organic corn were \$21 and \$450, respectively. The difference in net return per acre for the bottom and top deciles was \$511 for conventional corn and \$1,013 for organic corn. Despite the larger median net return, it is important to note that there were quite a few organic farms with lower net returns for corn than their conventional counterparts in the top deciles.



Comparisons among enterprise deciles for conventional and organic soybeans are presented in figure 2. The median net returns using FINBIN data for the 2016 to 2020 period for conventional soybeans and organic soybeans were \$88 and \$278, respectively. The difference in net return per acre for the bottom and top deciles was \$401 for conventional soybeans and \$938 for organic soybeans. Even though the median net return for organic soybeans is higher than the median net return for conventional soybeans, the organic producers in the lowest decile had lower net returns than the conventional soybean producers in the lowest decile.



What can we make of the results in figures 1 and 2? First, there is a larger difference in net returns between the organic producers than there is between the conventional producers. This result could be due to learning effects or the more complicated rotations associated with organic crop production. Second, obtaining a boost in net returns from organic soybean production appears to be much more difficult than it is for organic corn. This could be due to weed control issues often encountered when producing organic soybeans. The results in figures 1 and 2 stress the importance of examining the sensitivity of budgeted net returns for organic crops to changes in price, yield, and cost assumptions before transitioning acres.

SUMMARY AND CONCLUSIONS

This article compared crop yields, gross revenue, total expense, and net returns for conventional and organic corn and soybeans. FINBIN data (Center for Farm Financial Management, 2021) were used to make the comparisons in this article. Consistent with previous work, organic corn and soybean enterprises had lower crop yields, higher crop prices and gross returns, and higher net returns. However, there was a much wider difference in enterprise net returns among organic corn and soybean enterprises than there was among conventional corn and soybean enterprises. It is also important to note that the difference in net return to land for oats was relatively small, and that conventional alfalfa and winter wheat exhibited higher net return to land than organic alfalfa and winter wheat.

This article summarized net returns for conventional and organic crop enterprises. Organic crop rotations tend to include small grains and/or forages as well as crops grown while in transition to organic production. For comparisons of conventional and organic crop rotations see Langemeier et al. (2020) and Langemeier and O'Donnell (2021).

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