WASHINGTON STATE UNIVERSITY EXTENSION

Tree Fruit Extension Economics Research Highlight

Interactions Between Organic and Conventional Markets from Pest and Disease Outbreaks: The Case of the U.S. Apple Industry

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This study uses a dynamic economic model to show what happens when pests and diseases affect the production of regular and organic apples in the United States. We used a model that predicts changes in how much land is used for growing organic and regular apples when pests attack. We looked at different scenarios to see how these pest shocks affect the amount of apples grown, and how it impacts trade.

In the scenarios where pests and diseases reduce yields and bearing acres, one can observe decreases in the net welfare for both producers and consumers. The study also found that pests and diseases affect regular and organic apple farming in different ways. The study suggests that policymakers should use models like this to plan ahead and find better ways to deal with pests and diseases, especially given climate change and the increasing popularity of organic apple production.

The model shows that the impact of these problems on producers and consumers depends on whether they're growing regular or organic apples and by the incidence of the pest and disease shock. Producers can use this study to figure out how much money they might lose if they switch their land from regular to organic apple farming. And to make things work better, policymakers should delineate policies to help producers be in a better position to deal with the likelihood in the increasing recurrence of pests and diseases, based on the impact on consumers, producers, and crop losses.

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Table. Welfare changes under different scenarios

Organic production			
Scenarios	**Change in consumer's surplus U.S. million dollars**	**Change in producer's surplus U.S. million dollars**	**Net change in surplus U.S. million dollars**
Reduction of bearing acres: Organic by 5% and conventional by 2%	-73.52	1.29	-72.23
Reduction of yield: Organic by 10% and conventional by 2%	13.00	-23.56	-10.56
Organic apple face pest and disease and transition to conventional	-1.33	-9.93	-11.26
Response of apple-importing countries to pest and disease outbreaks	26.73	-4.53	22.20
Conventional production			
Scenarios	**Change in consumer's surplus U.S. million dollars**	**Change in producer's surplus U.S. million dollars**	**Net change in surplus U.S. million dollars**
Reduction of bearing acres: Organic by 5% and conventional by 2%	-161.39	54.48	-106.91
Reduction of yield: Organic by 10% and conventional by 2%	-266.83	-45.45	-312.28
Organic apple face pest and disease and transition to conventional	-35.02	-42.17	-77.18
Response of apple-importing countries to pest and disease outbreaks	805.34	-332.97	472.36
Entire industry			
Scenarios	**Change in consumer's surplus U.S. million dollars**	**Change in producer's surplus U.S. million dollars**	**Net change in surplus U.S. million dollars**
Reduction of bearing acres: Organic by 5% and conventional by 2%	-234.92	55.77	-179.14
Reduction of yield: Organic by 10% and conventional by 2%	-253.82	-69.01	-322.84
Organic apple face pest and disease and transition to conventional	-36.35	-52.10	-88.44
Response of apple-importing countries to pest and disease outbreaks	832.07	-337.51	494.56

Notes: The discount rate is set as 4%.