The Food–Fuel Tradeoff: An Economic Analysis

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Rising prices for liquid fossil fuels has led to a substantial increase in the sourcing of such fuels from food items such as corn, soybean, and others. This has resulted in an increase in the demand for such crops, leading to higher prices for food, feed, livestock and dairy products. As prices for liquid fossil fuels increase, the need for more biofuels also increases. This involves a tradeoff for society in terms of the quantity of crops to be used for fuel versus that used for food. The optimal tradeoff for society is that combination of food and fuel enterprises that equate the opportunity costs. Consequently the optimal combination is expected to change as the prices of food and biofuel change. Recent evidence suggests that food and biofuel prices are affected by changes in fossil fuel prices (Ejimakor and Kyei 2011). The nature of the tradeoff between food and biofuel uses of corn could be useful in estimating how much of the crop to use for biofuels.

This study is assessing the tradeoff between the use of corn for food and ethanol. Time series data are used to estimate the production functions for corn ethanol (CE) and high fructose corn syrup (HFCS) with corn as the input. The preliminary estimates indicate that the elasticity of production for corn is 0.94 in CE production and 1.26 in HFCS production. Following Doll and Orazem (1984), the estimated production functions will be used to estimate an equation for the production possibility curve (PPC) for CE and HFCS based on the available corn supply. The optimal use of corn in CE and HFCS will be determined by equating the slope of the PPC to the ratio of the average prices of CE and HFCS. Past prices of CE and HFCS will be used to estimate the optimal combination for each year of the study period. The predicted combinations will be compared to observed combinations and used to ascertain how the allocation of corn to CE and HFCS differed from those predicted by the model. Results from the study are expected to provide useful insights for formulating policies on renewable energy and food.

References

Doll, J. P. and F. Orazem. 1984. *Production Economics: Theory with Applications*, 2nd ed. New York: John Wiley and Sons.

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