

THREE ESSAYS ON THE LINKS BETWEEN AGRICULTURE AND ENERGY POLICIES
IN THE U.S.

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ABSTRACT

The first essay develops and applies a structural, partial equilibrium model of United States biomass supply and demand. The aim is to examine the biomass price and expenditure effects of domestic biofuel policies. The results indicate that the cellulosic biofuel sub-mandate alone could increase biomass prices by an average of 50% to 100% over the baseline values. Biomass expenditures by sectors competing with biofuel producers increase by an average of 26% relative to the baseline suggesting those sectors cannot fully shift away from biomass energy sources. A sensitivity analysis focusing on supply response indicates that the results are not very sensitive to the supply elasticity. This study contributes to the literature by providing policymakers and other energy policy stakeholders with a forward looking analysis of potential policy effects on the U.S. biomass market.

The second essay develops a similar type of model applied toward the domestic and international petroleum and petroleum products markets as well as the domestic biofuel market and the domestic light-duty vehicle sector. The goal is to investigate the impact of CAFE standards and alternative-fuel vehicle production incentives on the biofuel market and RFS compliance, in particular. The results suggest that holding CAFE standards at the 2010 level could significantly reduce the blendwall problem in the U.S. ethanol market. Furthermore, the alternative fuel production incentives appear to have only minimal effects. However, there is

much uncertainty surrounding the appropriate level of automaker response to those incentives, and a sensitivity analysis indicates the model is fairly sensitive to the assumed level of response.

The third essay highlights a few of the theories put forth regarding the expected price behavior of Renewable Identification Numbers (RINs). The theories are tested both observationally and empirically with a dataset containing daily RIN price observations going back to January 2009. The behavior does not always match expectations, although the exact causes remain uncertain. In addition, the information provided by RIN prices is used to test the implications of a binding renewable fuel standard (RFS) versus a non-binding RFS on the ethanol-gasoline price relationship. Cointegration tests provide some evidence that the relationship between conventional ethanol and gasoline prices at the wholesale level is weaker in the presence of a binding RFS.