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IMPACT OF BIOFUEL DEMAND ON ACREAGE ALLOCATION AND ITS IMPLICATIONS ON LAND USE

Background

- According to the USDA Regional Road Map, 43.3% of the 20 billion gallons of advanced biofuels will be produced in the central east region.
- It will open new markets for biomass products of corn, switch grass and others and creates an incentive to expand area allotted to energy crops.
- Examining producers’ response to prices and the historical relationship between prices and acreage allocations is necessary.
- But, little research has been done on how changes in crop price or return would affect acreage allocation in Nebraska state.

Motivation & significance

- To estimate acreage response elasticities for crops being produced in the state.
- The study is important as change in acreage allocation affects carbon sequestrations, emission level and creates competition between food and fuel.

Data and Methods

- Data used for estimation were annual observations for the period 1980 to 2009.
- Duality framework – multi-output profit function.
- Normalized quadratic profit function specification.

Results and Discussion

SUR Estimates: Acreage response elasticities

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<tr>
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<th>ACNT</th>
<th>AWHT</th>
<th>ASBT</th>
<th>ALFT</th>
<th>AHAY</th>
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<tbody>
<tr>
<td>Own price</td>
<td>0.1214</td>
<td>0.1512</td>
<td>0.3487</td>
<td>0.3939</td>
<td>0.0373</td>
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ACNT = Area of Corn; AWHT = Area of Wheat; ASBT = Area of Soybeans; ALFT = Area of Alfalfa; AHAY = Area of Hay.

- All own and cross price acreage elasticities are inelastic.
- At least in the short run acreage allocation of crops is not very price responsive.
- Own cross price elasticities verifies competition between the crops for land.
- Corn has own price acreage elasticities of 0.12, (doubling the price of corn increase the area allotted to corn by about 12 percent).
- Similar percentage change in price of wheat and soybeans increase area allotted to the respective crops by 15 and 35 percent.
- Hay is the least price responsive compared to all other crops.
- Additional land needed for crop production comes from pasture and other lands.

Conclusion

- Our result demonstrates how divergence in crop prices alters crop mix and creates an incentive to use pasture and marginal lands.
- If CHP plants substitute fossil fuel with biomass such as corn Stover it would certainly affect crop mix and land use in the state.
- We noticed that the amount of pasture land diverted to crop production varies with the crop.

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