Adjustment of Import Demand for Corn in Mexico: Implications for U.S. Ethanol Mandate

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# Introduction

- The expansion of ethanol production in the United States is widely considered to be a major contributor to the recent surge in corn prices (Abbott et al., 2011; Mitchell, 2008).
- High corn prices caused by ethanol expansion may have a direct impact on the corn import of developing countries, which are highly dependent on outside sources for basic food commodities (Dyer and Taylor, 2011; Runge and Senauer, 2007; Valero-Gil and Valero, 2008).
- High corn prices caused by ethanol expansion may also cause livestock producers in developing countries to face substantial pressures with regard to feed cost because of their high dependency on corn for livestock feed.
- In particular, Mexico may be vulnerable to a surge in corn prices because it has the highest dependency on imported corn among developing countries; Mexico imports more than 30% of its corn from the United States.
- As the Renewable Fuel Standard (RFS) has led to a dramatic increase in the price of corn under the Energy Policy Act of 2005, the U.S. ethanol mandate also has the potential to influence the import demand for corn in Mexico.
- The objective is therefore to provide a comprehensive analysis of the import demand for corn in Mexico before and after the period of the U.S. ethanol mandate.

# Ethanol Consumption and Feed Grains’ Prices

![Graph of Ethanol Consumption and Feed Grains’ Prices](Image)

Source: FAS, USDA.

# Estimation Procedure

- The Generalized Method of Moments (GMM) is used to estimate the differential import demand system; the amount of ethanol consumed is used as an instrumental variable for the price of corn.
- Bootstrap Method (Terrell, 1996)
  - The bootstrap method is applied to obtain the estimates satisfying all theoretical conditions, such as homogeneity, symmetry, and concavity.
  - The bootstrapped estimates are checked if they obey the concavity and retain the estimates in the vector. The mean and variance of the estimated vector are used to obtain the robust estimates of the parameters and their respective standard errors.
- To identify the changes in Mexico’s demand for U.S. feed grains before and after the ethanol mandate, the estimates between 1994 and 2005 are compared with those between 2006 and 2012, as the U.S. ethanol mandate has been effective since 2006 as a result of the Energy Policy Act of 2005.

<table>
<thead>
<tr>
<th>Divisia Elasticity</th>
<th>Corn Price</th>
<th>Sorghum Price</th>
<th>Wheat Price</th>
<th>Soybeans Price</th>
</tr>
</thead>
<tbody>
<tr>
<td>1999-2005</td>
<td></td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>Corn Demand</td>
<td>2.1612**</td>
<td>-3.2153***</td>
<td>1.0497**</td>
<td>0.6835</td>
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<td>1.4465**</td>
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<td>-0.1581</td>
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<tr>
<td>Wheat Demand</td>
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<td>1.1686**</td>
<td>-0.1962</td>
<td>-1.0874**</td>
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<tr>
<td>Soybeans Demand</td>
<td>0.9373***</td>
<td>1.0752***</td>
<td>-0.2030</td>
<td>0.0488</td>
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<td>2006-2012</td>
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<tr>
<td>Corn Demand</td>
<td>1.1262***</td>
<td>-1.8683***</td>
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<td>0.5613</td>
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<td>-1.0959**</td>
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<tr>
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<td>1.4128**</td>
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<td>-1.8614**</td>
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<td>Soybeans Demand</td>
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<td>0.9936</td>
<td>-1.1248</td>
<td>0.4131</td>
</tr>
</tbody>
</table>

Note. Bootstrapped standard errors are in parentheses; **Significant at 1%; ***Significant at 5%; *Significant at 10%.

# References