The Insect Effect: Phyto sanitary Treatments and U.S. Fresh Fruit and Vegetable Trade

Chaoping Xie, Jason Grant, and Everett Peterson

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The Insect Effect: Phytosanitary Treatments & US Fresh Fruit and Vegetable Trade

Chaoping Xie (Virginia Tech)
Jason Grant (Virginia Tech)
Everett Peterson (Virginia Tech)

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Clearwater Beach, Florida
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Fumigation & Cold Treatment

Other Treatment
Motivation

WTO reports nearly 300 disputes related to SPS measures since 1995

- Over 20% of these are related to fruits and vegetables
Literature Review

• Major obstacle of previous work:
  a. Comprehensive database
  b. Limitations of TRAINS data

• Peterson et al. (2013) and Grant et al. (2015) built novel US-World bilateral import and export datasets, respectively.

• Average phytosanitary treatment has negative effect on fresh fruits and vegetables trade (increase cost).
Purpose: Robustness Check

- Peterson et al. (2013) Data: Import Data Only.
- Grant et al. (2015) Data: Nine Export Commodities
- Our data: Complete Import and Export Data
- Difference between export side and import side:
  US impose regulations on import
  ROW impose on US export side
Data Comparison


• Product Categories: 9 (6 fruit, 2 vegetable, 1 nut)

• Export Ratio: 65% and 8% US total export of fresh fruits, and of fresh vegetables, respectively

Our Export Data

• Product Categories: 59 (30 fruit, 27 vegetable, 2 nut)

• Export Ratio: 95% and 85% US total export of fresh fruits, and of fresh vegetables, respectively
Data Description

Data Type: Panel Data

Sample Period: 1999-2008

Number of Countries: 114

Number of Commodities: 59

Number of Observations: 30,516
Key Variables

• ID: Import/Export Indicator variable (1=import)

• Treatment: dummy variable
country-year-commodity triplet
any phytosanitary treatment

• Learning by doing effect:
  • Experience: cumulative number of commodities
    that an exporter must treat
  • \( \text{Treat} \times \text{Exper} \): captures learning-by-doing
    effects
## Data

### Import Side

<table>
<thead>
<tr>
<th>Type</th>
<th>Treat</th>
<th>Total</th>
<th>Ratio</th>
</tr>
</thead>
<tbody>
<tr>
<td>fruit</td>
<td>1,024</td>
<td>4,048</td>
<td>25.30%</td>
</tr>
<tr>
<td>nut</td>
<td>0</td>
<td>0</td>
<td>0.00%</td>
</tr>
<tr>
<td>veg</td>
<td>442</td>
<td>4,949</td>
<td>8.93%</td>
</tr>
<tr>
<td>Total</td>
<td>1,466</td>
<td>8,997</td>
<td>16.29%</td>
</tr>
</tbody>
</table>

### Export Side

<table>
<thead>
<tr>
<th>Type</th>
<th>Treat</th>
<th>Total</th>
<th>Ratio</th>
</tr>
</thead>
<tbody>
<tr>
<td>fruit</td>
<td>748</td>
<td>13,454</td>
<td>5.56%</td>
</tr>
<tr>
<td>nut</td>
<td>62</td>
<td>2010</td>
<td>3.08%</td>
</tr>
<tr>
<td>veg</td>
<td>46</td>
<td>10,866</td>
<td>0.42%</td>
</tr>
<tr>
<td>Total</td>
<td>856</td>
<td>26,330</td>
<td>3.25%</td>
</tr>
</tbody>
</table>
1. Holding countries, commodities, and time period the same, US requires more phytosanitary treatments on its import than other countries require on our exports.
2. US requires more cold treatment than others do.
Empirical Model

• Gravity model: Baldwin and Taglioni (2006)

• Variable of interests:
  a. Treatment
  b. Experience & Treat*Exper
  c. Interactions of ID and above
Empirical Model

\[ V_{odk} = \exp[\pi_d + \pi_k + \pi_t + \beta_1 \ln GDP_{dt} + \beta_2 FTA_{dt} + \beta_3 \ln(1)] \]

- \( V_{odk} \) is trade value (US import or export)
- \( \pi_d, \pi_k, \text{and} \pi_t \) are country, commodity, and year fixed effect dummies.
- \( exper \) is the cumulative experience variable.
- \( treat_{dkt} \) is the aggregated treatment dummy.
Estimation Method:

- OLS: Benchmark
- Poisson Regression
- Zero Inflated Poisson Regression
- Heckman Model
<table>
<thead>
<tr>
<th>Variable</th>
<th>OLS</th>
<th>Poisson</th>
<th>ZIP</th>
<th>Heckman</th>
</tr>
</thead>
<tbody>
<tr>
<td>Treatment</td>
<td>-2.06***</td>
<td>-1.21***</td>
<td>-1.20***</td>
<td>-1.47***</td>
</tr>
<tr>
<td>ID*Treat</td>
<td>-1.70***</td>
<td>0.04</td>
<td>0.04</td>
<td>-0.66***</td>
</tr>
<tr>
<td>LogExper</td>
<td>0.73***</td>
<td>0.35***</td>
<td>0.35***</td>
<td>0.29***</td>
</tr>
<tr>
<td>ID*lexper</td>
<td>-0.33***</td>
<td>-0.25***</td>
<td>-0.25***</td>
<td>-0.19***</td>
</tr>
<tr>
<td>lexper*Treat</td>
<td>1.41***</td>
<td>0.56***</td>
<td>0.56***</td>
<td>0.40***</td>
</tr>
</tbody>
</table>
Conclusion

- More treatments required on import side.

- Most of the treatments are on fruit.

- Our results are consistent with previous research, which give a good robustness check.

- In the case of US, the import side is more restricted than the export side in terms of phytosanitary treatments.
Thanks For Your Attention

Any Question?

or

Comments?