Prospects for New England Agriculture: Farm to Fork

Samantha Werner, Scott Lemos, Amanda McLeod, John M. Halstead, Todd Gabe, Wei Shi, Lily Harris, Ju-Chin Huang, James McConnon, and Kathleen Liang
USDA/NIFA Sustaining and Enhancing Local Agriculture in Rural Areas: Assessing Key Producer and Consumer Issues in Northern New England, Hatch Multistate 1049/1749 Enhancing rural economic opportunities, community resilience and entrepreneurship
Study Approaches

1. The supply side
   - focus groups w/New England farmers to identify issues and constraints
   - secondary data analysis to assess food production vs. food consumption

2. The Demand side
   - consumer surveys to determine WTP for local and organic
   - restaurant surveys to assess potential for selling options

3. Methodological issues in choice modeling
   - anchoring bias
   - status quo bias
What are the obstacles you would encounter if you decided to expand your operations?

**Time**
- Too much of a time investment to expand
- Would have to quit other jobs

**Financial Restrictions**
- Lack of capital to invest in expansion efforts
- Capital for taxes
- Capital for insurance

**Labor**
- Gaining more laborers & current constraints
Estimating County-Level Capacities

• Capacities to supply local vegetables & melons are based on county-level acres per 1 million people, relative to U.S. benchmark

• E.g., Androscoggin County, Maine, has 158 acres of cucumbers and pickles per 1 million people, which is 24% of U.S. acres per person (i.e., 646 acres of cucumbers and pickles per 1 million people)

• Summary measure can be interpreted as the percentage of vegetables & melons that could be available locally assuming that local residents consume a mix of vegetables & melons that is similar to the mix consumed by all Americans
Estimating County-Level Capacities

• If county-level capacities exceed 100 percent, counties can export products elsewhere (and increase state-level capacity)

• The abundance of potatoes in Aroostook County, Maine, means that all Maine counties have a state-level capacity of 100 percent

• E.g., Cumberland County (Portland), Maine has very little land devoted to producing potatoes, yet it has a 100-percent state-level capacity
Local Food Capacity for Vegetables and Melons: Maine, New Hampshire and Vermont

Note: Bubble sizes represent differences in total acres, per capita, of vegetables and melons. Maine counties are shown in blue, New Hampshire counties in green, and Vermont counties in red.
Surveys

NH, MA: general population (5 convenience samples, n=~200 each)

NH, VT, ME: general population, random sample (n = 6,000, hybrid internet and mail); convenience sample (n = 523)

NH: restaurants (full sample, internet and face-to-face)
Consumer Choice Experiments Design

- Fractional Factorial Orthogonal Main Effects Design (FFOMED)

<table>
<thead>
<tr>
<th>Tomato Bundle A</th>
<th>Tomato Bundle B</th>
</tr>
</thead>
<tbody>
<tr>
<td>Non-Locally grown</td>
<td>Locally grown</td>
</tr>
<tr>
<td>Certified Organically grown</td>
<td>Certified Organically grown</td>
</tr>
<tr>
<td>Purchased directly from the farmer (e.g. farmers market)</td>
<td>Purchased indirectly from the farmer (e.g. grocery store)</td>
</tr>
<tr>
<td>No blemishes or other irregularities</td>
<td>No blemishes or other irregularities</td>
</tr>
<tr>
<td>$4.49/lb.</td>
<td>$1.15/lb.</td>
</tr>
</tbody>
</table>

- Bundle A
- Bundle B
- Neither (prefer to stay with your current practice)
Consumer Considerations When Purchasing Fresh Produce

- Locally Grown
- Organically Grown
- Grown in the U.S.
- Grown Without Pesticides
- Supports Local Economy
- Maintains Local Farmland

Not Important | Somewhat Important | Important | Very Important | Not Considered
Purchasing Barriers for Non-Local and Non-Organic Produce Buyers

- Price
- Hours of Operation
- Variety of Fresh Produce
- Do Not Know About Markets in My Area
- Other

- Organic
- Local
## Results: Willingness to Pay

<table>
<thead>
<tr>
<th>Attributes</th>
<th>Tomato</th>
<th></th>
<th>Cucumber</th>
<th></th>
<th>Carrot</th>
<th>VT</th>
</tr>
</thead>
<tbody>
<tr>
<td>Local</td>
<td>.75**  .98***</td>
<td>1.74***</td>
<td>-10.90*  .75</td>
<td>0.9</td>
<td>.69**  0.17</td>
<td>0.21</td>
</tr>
<tr>
<td>Organic</td>
<td>1.27***  .60*</td>
<td>1.97***</td>
<td>-4.36  -0.32</td>
<td>1.24</td>
<td>0.14  0.11</td>
<td>0.15</td>
</tr>
<tr>
<td>Directly</td>
<td>-0.75**  -0.21</td>
<td>-1.03*</td>
<td>-7.9   1.82**</td>
<td>0.2</td>
<td>-0.08 -0.27</td>
<td>-0.4</td>
</tr>
<tr>
<td>Purchased</td>
<td>No Blemish</td>
<td>.55*</td>
<td>1.08***  0.25</td>
<td>1.42***</td>
<td>1.23***  .85***</td>
<td>-0.31</td>
</tr>
<tr>
<td></td>
<td>Attributes</td>
<td>Snap Pea</td>
<td></td>
<td>Green Bean</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Local</td>
<td>0.69  0.14</td>
<td>-23.8</td>
<td>1.42*** 1.23***</td>
<td>0.85***</td>
<td>-0.31  1.87</td>
<td>1.98</td>
</tr>
<tr>
<td>Organic</td>
<td>-0.37 -1.94*</td>
<td>12.3</td>
<td>1.21*** .92**</td>
<td>.78***</td>
<td>0.69  2.33</td>
<td>0.85</td>
</tr>
<tr>
<td>Directly</td>
<td>-0.01  0.97</td>
<td>-9.11</td>
<td>-0.39  -0.54</td>
<td>-.44*</td>
<td>-1.62** -2.25</td>
<td>-1.71</td>
</tr>
<tr>
<td>Purchased</td>
<td>No Blemish</td>
<td>.76*</td>
<td>0.32  8.23</td>
<td></td>
<td>0.03  -0.48</td>
<td>-.4</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>0.3   -0.35*</td>
<td></td>
<td>1.01  -0.43</td>
<td>0.51</td>
</tr>
</tbody>
</table>
 Consumers' Preferred Method for Trying New Fresh Produce

- Recipe Cards
- Taste-Test Station
- Mixed Bags or Bundles of Produce
- Discounted Specials
- Other
Preferred Methods for Receiving Information About Local Vendors by Age Group

Whole Sample | 18 - 49 Years of Age | 50+ Years of Age
--- | --- | ---
Newspaper Ads |  |  |
Social Media |  |  |
Email Newsletter |  |  |
Road Signs |  |  |
Town Websites |  |  |
Local Event Calendars |  |  |
Word of Mouth |  |  |
Other |  |  |
Overview of Intermediate Markets

- Intermediate Markets include: restaurants, grocery stores, food hubs and catering services
- Retailers such as Wal-Mart, Safeway, and Publix have all announced plans to increase support for locally grown produce (Martinez et al. 2010).

- Restaurants:
  1) Do not require price-look up codes
  2) Offer flexibility
  3) Are better equipped to utilize the diverse nature of local foods

Source: Allie Bauman et al., 2014
Respondents sourcing $\geq 41\%$ locally
**Where Buyers make the majority of their purchases**

- **Direct from a farmer**: 20%
- **Farmer’s co-op**: 7%
- **Farmer’s market**: 7%
- **National food distributor**: 28%
- **Regional food distributor**: 20%
- **Local manufacturer or processor**: 13%
- **Food Hub**: 5%

**Most preferred food suppliers**

- **Direct from a farmer**: 45%
- **Regional food service**: 14%
- **National food service**: 9%
- **Food Hub**: 2%
- **Other**: 4%
- **Local manufacturer or processor**: 9%
- **Farmer’s market**: 3%
- **Farmers’ co-op**: 14%
- **Local manufacturer or processor**: 9%
Results

**Reasons for Making Local Food Purchases**

- High Quality: 24
- Supporting local business: 17
- Freshness: 15
- Customers enjoy it: 11
- “Right thing to do” sustainability: 9
- Knowing who and where: 6
- Competitive advantage: 5
- Profitable: 2
- Others: 1

**Reasons for Not Buying Locally**

- Cost: 27%
- Lack of convenience: 9%
- Hard to connect with farmers: 9%
- Availability: 55%
Variables

- Business type (independent, chain, corporate, franchise)
- # Meals served; purchasing volume
- # of stores owned; Autonomy; # of years of autonomy
- Supplier attributes (delivery, relationships, knowledge)
- Production (how/where grown, processing/packaging)
- Food attributes (personally know grower, etc.)
- Challenges (quality, price, availability, delivery)
- Impacts (Reducing C footprint, sustain the environment, and support local economy)
## Binary Logit Model Results

<table>
<thead>
<tr>
<th>VARIABLE</th>
<th>COEFFICIENT</th>
<th>P-VALUE</th>
<th>MARGINAL EFFECT</th>
<th>P-VALUE</th>
</tr>
</thead>
<tbody>
<tr>
<td>MEALS (&lt;750)</td>
<td>-2.278</td>
<td>.021</td>
<td>-.190</td>
<td>.003***</td>
</tr>
<tr>
<td>MODERATE AUTONOMY</td>
<td>3.185</td>
<td>.067</td>
<td>.381</td>
<td>.033**</td>
</tr>
<tr>
<td>PRODUCTION</td>
<td>.463</td>
<td>.064</td>
<td>.044</td>
<td>.046**</td>
</tr>
<tr>
<td>AUTONOMY LENGTH</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>3 (5-7 YRS)</td>
<td>-2.437</td>
<td>.101</td>
<td>-.268</td>
<td>.045**</td>
</tr>
<tr>
<td>4 (8-10 YRS)</td>
<td>-2.952</td>
<td>.099</td>
<td>-.305</td>
<td>.025**</td>
</tr>
<tr>
<td>5 (&gt;10 YRS)</td>
<td>-2.695</td>
<td>.017</td>
<td>-.288</td>
<td>.006***</td>
</tr>
<tr>
<td>IMPACTS</td>
<td>.488</td>
<td>.067</td>
<td>.047</td>
<td>.055*</td>
</tr>
</tbody>
</table>

*** Chi-square significant at p<.01     N=106
**Status Quo Bias**

- Question: Does previous market experience have an impact on status quo bias in the CE framework?
- Survey
  - Massachusetts *(Spring 2016)*
  - Snap Peas, Green Beans, Cucumbers
  - n = 216

### WTP ($/lb.) After Correcting for Market Experience

<table>
<thead>
<tr>
<th></th>
<th>Snap Peas</th>
<th>Green Beans</th>
<th>Cucumbers</th>
</tr>
</thead>
<tbody>
<tr>
<td>Local</td>
<td>1.50</td>
<td>1.40</td>
<td>0.31</td>
</tr>
<tr>
<td>Organic</td>
<td>0.73</td>
<td>0.79</td>
<td>0.57</td>
</tr>
<tr>
<td>Direct</td>
<td>-0.92</td>
<td>-0.14</td>
<td>-0.55</td>
</tr>
<tr>
<td>Blemish</td>
<td>0.57</td>
<td>-0.13</td>
<td>-0.54</td>
</tr>
</tbody>
</table>

**Results**

- Status quo effect exists in consumer’s choice behavior
- Market experience in purchasing locally grown fresh produce significantly reduces status quo bias
  - Testing for self-reported knowledge has no significant mitigating effects
Anchoring Bias

- Question: Can cheap talk mitigate anchoring bias in CE framework?
- Survey
  - Double split-sample design
    - (1) High Price Vector (HC)/Low Price Vector (LC)
    - (2) Cheap Talk Treatment (CT)/ No Cheap Talk Control (NoCT)
  - Tomato, Green Bean, Cucumber
  - Convenience Sample (Summer 2017)
    - n = 523 (NH: 197, ME: 202, VT: 124)

### Reduction in Anchoring Bias after Cheap Talk Treatment ($/lb. and \%)

<table>
<thead>
<tr>
<th></th>
<th>Tomato</th>
<th>Green Bean</th>
<th>Cucumber</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>$</td>
<td>%</td>
<td>$</td>
</tr>
<tr>
<td>Local</td>
<td>-0.57</td>
<td>-62.6%</td>
<td>-5.13</td>
</tr>
<tr>
<td>Organic</td>
<td>-0.34</td>
<td>-54.8%</td>
<td>-1.41</td>
</tr>
<tr>
<td>Direct</td>
<td>-0.33</td>
<td>-55.0%</td>
<td>1.12</td>
</tr>
<tr>
<td>No Blemish</td>
<td>-0.80</td>
<td>-56.3%</td>
<td>1.84</td>
</tr>
</tbody>
</table>

- Results
  - Anchoring effects exist in this CE (some positive, some negative)
    - Largest anchoring effects for tomatoes and green beans
  - Anchoring-specific Cheap Talk associated with varying levels of effectiveness
    - Reduced bias across tomato attributes from 55%-63%
Closing Thoughts

• New Englanders Value
  - Maintaining local farmland
  - Supporting the local economy
  - Produce grown w/o pesticides
  - Quality & Healthy Produce
• New England farmland is highly limited in ability to supply population w/fresh produce
• Restaurants are open to buying more produce from local producers
• Anchoring and status quo effects are present in survey samples
• Premiums that consumers are WTP vary widely by produce type and location, indicating spatial issues to consider