Connecting Regional Supply Chains
Presentation to the Greater Philadelphia Food System Stakeholder Committee
November 7, 2014
The Reinvestment Fund builds wealth and opportunity for low-wealth people and places through the promotion of socially and environmentally responsible development.

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- 48,395 education seats
- 13.3 million sq. ft of commercial space
- 356,732 patient visits
- 64,265 jobs
A division of The Reinvestment Fund that combines rigorous data analysis with a distinctive ability to help clients think spatially.

- Real Estate Market Analysis
  - Market Value Analysis (MVA)
  - Limited Supermarket Access (LSA)
  - Commercial corridors analysis
  - Food Systems Research
- Program & Social Impact Assessment
  - Estimating Supermarket Access, School Lunch Analysis, Grantmaker Advisory

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- National data mapping and analysis tool
- Easy, online access to data and analytical tools in a sophisticated yet user-friendly web platform
- Over 15,000 data indicators as well as proprietary TRF analytics, with frequent additions
- CNET award winner for best of location-based services Web 2.0 products
- Economic Impacts of Supermarkets
- FFFI Rural Grocery Case Study
- Limited Supermarket Access (LSA) Study
- Food Supply Chain Research
Welcome to the nation’s first comprehensive healthy food access retail portal.

Find resources designed to improve healthy food access in communities, build local economies, and enhance public health. Tap into a learning network that’s using retail strategies to connect consumers to healthy food.

Join the Discussion

Farmers’ Markets are Increasing Access with Incentives, by Yael Lehmann, The Food Trust.

WEBINAR-Food Policy Councils: 'Treme's' Wendell Pierce opens first Michigan

www.healthyfoodaccess.org
Research Objectives

- Existing research primarily focuses on global supply chains - we want to explore “what if regional” opportunities
- Facilitate regional economic development
- Expand access to capital for producers and processors
- Supplement anecdotal evidence of limited slaughter facilities with quantitative data
Methodology

1. SIC Code matrix of buyers/sellers
2. Minimum distance between buyer/seller
3. USDA price spreads
4. Allocation of buyer’s inputs purchased from seller(s)
5. No preference for scale in supply chain
6. Multiple processing stages
7. Theoretical and not actual
Meat Supply Chain

- **PRODUCER**: Livestock Farmer
  - Sells cattle to a...

- **1ST-STAGE PROCESSOR**: Meatpacker
  - Who slaughters the cattle and sells the cuts of meat to a...

- **2ND-STAGE PROCESSOR**: Meat Processor
  - Who converts the cuts into ground beef (or other meat products) and sells it to either...

- **3RD-STAGE PROCESSOR**: Another Meat Processor
  - Who processes the ground beef into meat pies or other products and sells the products to a...

- **WHOLESALE OR RETAIL DISTRIBUTION**: Distributor or Grocer
### SIC Code Buyer/Seller Matrix

#### Selected Industries in the Meat Supply Chain Matrix

**Column Industries Purchase from Row Industries**

<table>
<thead>
<tr>
<th>8-Digit SIC Code</th>
<th>Industry Description</th>
<th># Firms</th>
<th>% All Firms</th>
<th>Meat packing plants</th>
<th>Sausages, from meat slaughtered on site</th>
<th>Beef stew, from purchased meat</th>
<th>Sausages and related products, from purchased meat</th>
<th>Cooked meats, from purchased meat</th>
</tr>
</thead>
<tbody>
<tr>
<td>02110000</td>
<td>Beef cattle feedlots</td>
<td>892</td>
<td>17.9%</td>
<td>0.8457</td>
<td>0.7771</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>02120000</td>
<td>Beef cattle, except feedlots</td>
<td>2,351</td>
<td>47.2%</td>
<td>0.8457</td>
<td>0.7771</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>02130000</td>
<td>Hogs</td>
<td>325</td>
<td>6.5%</td>
<td>0.8457</td>
<td>0.6509</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>02139901</td>
<td>Hog feedlot</td>
<td>36</td>
<td>0.7%</td>
<td>0.8457</td>
<td>0.6509</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>02140000</td>
<td>Sheep and goats</td>
<td>53</td>
<td>1.1%</td>
<td>0.8457</td>
<td>0.7771</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>02140100</td>
<td>Goats</td>
<td>8</td>
<td>0.2%</td>
<td>0.8457</td>
<td>0.7771</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>02140101</td>
<td>Goat farm</td>
<td>34</td>
<td>0.7%</td>
<td>0.8457</td>
<td>0.7771</td>
<td>0</td>
<td>0</td>
<td>0</td>
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<tr>
<td>02140102</td>
<td>Goats' milk production</td>
<td>11</td>
<td>0.2%</td>
<td>0.8457</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>02140103</td>
<td>Mohair production</td>
<td>2</td>
<td>0.0%</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
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<tr>
<td>02140200</td>
<td>Sheep</td>
<td>73</td>
<td>1.5%</td>
<td>0.8457</td>
<td>0.7771</td>
<td>0</td>
<td>0</td>
<td>0</td>
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<tr>
<td>02140201</td>
<td>Lamb feedlot</td>
<td>7</td>
<td>0.1%</td>
<td>0.8457</td>
<td>0.7771</td>
<td>0</td>
<td>0</td>
<td>0</td>
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<tr>
<td>02140202</td>
<td>Sheep feeding farm</td>
<td>3</td>
<td>0.1%</td>
<td>0.8457</td>
<td>0.7771</td>
<td>0</td>
<td>0</td>
<td>0</td>
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<tr>
<td>02140203</td>
<td>Sheep raising farm</td>
<td>72</td>
<td>1.4%</td>
<td>0.8457</td>
<td>0.7771</td>
<td>0</td>
<td>0</td>
<td>0</td>
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<tr>
<td>02140204</td>
<td>Wool production</td>
<td>8</td>
<td>0.2%</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
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<tr>
<td>02190000</td>
<td>General livestock, nec</td>
<td>547</td>
<td>11.0%</td>
<td>0.8457</td>
<td>0.7771</td>
<td>0</td>
<td>0</td>
<td>0</td>
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<tr>
<td>20110000</td>
<td>Meat packing plants</td>
<td>194</td>
<td>3.9%</td>
<td>0</td>
<td>0</td>
<td>0.7085</td>
<td>0.624</td>
<td>0.7085</td>
</tr>
<tr>
<td>20110100</td>
<td>Beef products, from beef slaughtered on site</td>
<td>20</td>
<td>0.4%</td>
<td>0</td>
<td>0</td>
<td>0.7085</td>
<td>0.624</td>
<td>0.7085</td>
</tr>
<tr>
<td>20110101</td>
<td>Boxed beef, from meat slaughtered on site</td>
<td>3</td>
<td>0.1%</td>
<td>0</td>
<td>0</td>
<td>0.7085</td>
<td>0.624</td>
<td>0.7085</td>
</tr>
<tr>
<td>20110102</td>
<td>Corned beef, from meat slaughtered on site</td>
<td>0</td>
<td>0.0%</td>
<td>0</td>
<td>0</td>
<td>0.7085</td>
<td>0</td>
<td>0.7085</td>
</tr>
<tr>
<td>20110103</td>
<td>Veal, from meat slaughtered on site</td>
<td>11</td>
<td>0.2%</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0.624</td>
<td>0.7085</td>
</tr>
<tr>
<td>20110200</td>
<td>Pork products, from pork slaughtered on site</td>
<td>6</td>
<td>0.1%</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0.624</td>
<td>0.624</td>
</tr>
<tr>
<td>20110201</td>
<td>Bacon, slab and sliced, from meat slaughtered on site</td>
<td>2</td>
<td>0.0%</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0.624</td>
</tr>
<tr>
<td>20110202</td>
<td>Hams and picnics, from meat slaughtered on site</td>
<td>3</td>
<td>0.1%</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0.624</td>
</tr>
<tr>
<td>20110300</td>
<td>Lamb products, from lamb slaughtered on site</td>
<td>2</td>
<td>0.0%</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0.624</td>
</tr>
<tr>
<td>20110301</td>
<td>Mutton, from meat slaughtered on site</td>
<td>1</td>
<td>0.0%</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0.624</td>
<td>0.7085</td>
</tr>
<tr>
<td>20110400</td>
<td>Meat by-products, from meat slaughtered on site</td>
<td>6</td>
<td>0.1%</td>
<td>0</td>
<td>0</td>
<td>0.7085</td>
<td>0.624</td>
<td>0.7085</td>
</tr>
<tr>
<td>20110403</td>
<td>Lard, from carcasses slaughtered on site</td>
<td>1</td>
<td>0.0%</td>
<td>0</td>
<td>0</td>
<td>0.7085</td>
<td>0.624</td>
<td>0.7085</td>
</tr>
</tbody>
</table>
### 2010 USDA Beef Price Spreads

<table>
<thead>
<tr>
<th>Stage</th>
<th>Value</th>
<th>Percentage of Sales Spent on Inputs from Previous Stage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Farm Value (Producer)</td>
<td>$204</td>
<td></td>
</tr>
<tr>
<td>1st-Stage Wholesale</td>
<td>$241</td>
<td></td>
</tr>
</tbody>
</table>
| (1st-Stage Processor) |                                                      | 85%  
| 2nd-Stage Wholesale   | $340      |                                                       |
| (2nd-Stage Processor) |                                                      | 71%  
| Retail Value           | $440      |                                                       |
| Percentage of Sales    |                                                      | 77%  
| Spent on Inputs from   |                                                      |      
| 2nd-Stage Processor    |                                                      |      |

Sales Allocation – Minimum Distance

Meat Industry Supply Chain Matrix

Meatpackers (Buyers)
- Sales in Millions
  - < $8 million
  - $8 - $27
  - $27 - $54
  - $54.1 - $156
  - $156.1 - $280

Meatpacker Network $ Sales from Seller to Buyer
- $10,000,001 or More
- $2,000,001 - $10,000,000
- $500,000 - $2,000,000
- $200,001 - $500,000
- $100,001 - $200,000
- $20,001 - $100,000

Farms/Feedlots (Sellers)
- Farms/Feedlots (Sellers)

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Multiple Processing Stages

Meat Industry Supply Chain Matrix

Sales Seller to Buyer

- 10,000,001 or More
- 2,000,001 - 10,000,000
- 500,000 - 2,000,000
- 100,001 - 500,000
- 200 - 100,000

All Buyers

- < 8 million
- $8 - $27
- $27 - $64
- $64 - $156
- $156 - $290

Sales in Millions

All Sellers

- < 8 million
- $8 - $27
- $27 - $64
- $64 - $156
- $156 - $290
Economic Development Strategies

- Import substitution
- Expand and attract businesses
- Connect existing food businesses
- Food aggregation facilitating economies of scale
- Incentive programs
- Targeted infrastructure investments
- State and federal funding
  - Location Quotients
  - Economic Multipliers
# Location Quotients

## Location Quotients for Food Manufacturing

<table>
<thead>
<tr>
<th>State</th>
<th>County</th>
<th>Location Quotient Northeast Region Benchmark</th>
<th>Location Quotient Nationwide Benchmark</th>
<th># Employees in WPF Target Region</th>
</tr>
</thead>
<tbody>
<tr>
<td>NJ</td>
<td>Atlantic</td>
<td>0.21</td>
<td>0.17</td>
<td>173</td>
</tr>
<tr>
<td>NJ</td>
<td>Burlington</td>
<td>1.10</td>
<td>0.92</td>
<td>1,375</td>
</tr>
<tr>
<td>NJ</td>
<td>Camden</td>
<td>1.73</td>
<td>1.45</td>
<td>2,169</td>
</tr>
<tr>
<td>NJ</td>
<td>Cumberland</td>
<td>8.18</td>
<td>6.85</td>
<td>2,411</td>
</tr>
<tr>
<td>NJ</td>
<td>Gloucester</td>
<td>2.38</td>
<td>1.99</td>
<td>1,356</td>
</tr>
<tr>
<td>NJ</td>
<td>Mercer</td>
<td>0.49</td>
<td>0.41</td>
<td>632</td>
</tr>
<tr>
<td>NJ</td>
<td>Monmouth</td>
<td>0.92</td>
<td>0.77</td>
<td>1,515</td>
</tr>
<tr>
<td>NJ</td>
<td>Ocean</td>
<td>0.73</td>
<td>0.61</td>
<td>680</td>
</tr>
<tr>
<td>PA</td>
<td>Berks</td>
<td>3.37</td>
<td>2.82</td>
<td>3,357</td>
</tr>
<tr>
<td>PA</td>
<td>Bucks</td>
<td>0.48</td>
<td>0.40</td>
<td>880</td>
</tr>
<tr>
<td>PA</td>
<td>Chester</td>
<td>0.84</td>
<td>0.70</td>
<td>1,295</td>
</tr>
<tr>
<td>PA</td>
<td>Delaware</td>
<td>0.53</td>
<td>0.44</td>
<td>745</td>
</tr>
<tr>
<td>PA</td>
<td>Lancaster</td>
<td>4.73</td>
<td>3.96</td>
<td>7,493</td>
</tr>
<tr>
<td>PA</td>
<td>Lehigh</td>
<td>1.70</td>
<td>1.42</td>
<td>1,563</td>
</tr>
<tr>
<td>PA</td>
<td>Philadelphia</td>
<td>1.17</td>
<td>0.98</td>
<td>5,004</td>
</tr>
<tr>
<td>PA</td>
<td>York</td>
<td>5.12</td>
<td>4.29</td>
<td>5,524</td>
</tr>
</tbody>
</table>

Source: U.S. Census County Business Patterns, 2010
Economic Multipliers

Employment Multipliers for Meat Production and Processing

<table>
<thead>
<tr>
<th>NAICS</th>
<th>NAICS Description</th>
<th>PA</th>
<th>NJ</th>
</tr>
</thead>
<tbody>
<tr>
<td>311611</td>
<td>Animal, except poultry, slaughtering</td>
<td>7.9</td>
<td>3.7</td>
</tr>
<tr>
<td>311612</td>
<td>Meat processed from carcasses</td>
<td>6.4</td>
<td>3.4</td>
</tr>
<tr>
<td>311613</td>
<td>Rendering and meat byproduct processing</td>
<td>4.1</td>
<td>3.4</td>
</tr>
<tr>
<td>311990</td>
<td>All other food manufacturing</td>
<td>3.0</td>
<td>4.3</td>
</tr>
<tr>
<td>Average</td>
<td>Average All Industries</td>
<td>3.0</td>
<td>2.9</td>
</tr>
</tbody>
</table>

Source: Bureau of Economic Analysis RIMS II, 2010
Practical Applications

- Food aggregators (hubs)
- Departments of agriculture
- Food industry councils and trade groups
- Processors at numerous stages
- Producers (farms and feedlots)?

*How well does our theory match reality?...*
Potential Features and Improvements

- Road network connectivity
- Matching buyers/sellers by scaled cohorts
- Wholesale distribution
- International import/export data (state level)
- Other food industries (poultry, vegetables)
- Incorporate supplier industries (animal feed, veterinary services, plant growth regulators)
- Others?
Food System Planning Strategies

Farming and Sustainable Agriculture

- **Access to Capital** (pg. 32): help borrowers create business plans to support loan applications; help lenders underwrite loans to support food systems development

Ecological Stewardship and Conservation

- **Farmland Preservation** (pg. 39): facilitate demand for regional foods, potentially increasing selling price per pound and increasing the opportunity cost of converting farmland
Food System Planning Strategies

Economic Development

- **Business Development** (pg. 44): market intelligence can help new food businesses identify optimal locations and develop economies of scale through collaboration.

- **Food Procurement** (pg. 45): help food hubs to identify new producers and processors to aggregate and, in turn, sell to the region’s institutional buyers.

- **Supply Chain Efficiencies** (pg. 51): help maximize the efficiency of regional supply chains.
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