An Introduction to Economic Impact Assessment
Topics

• Kinds of Economic Measures and Key Terminology

• The Organization of Information in Input-Output Models

• The Economic Assessment Process

• Case Studies and Group Exercises
Objectives

• Understanding of key terms and procedures
• Understanding of regional economic complexities
• Appreciation for the process and appropriateness of these kinds of measures
• Some practical experience developing and critiquing a study scenario
• Reference materials
FIRST, A RE-INTRODUCTION TO REGIONAL ECONOMICS
Regional economics

• Branch of economics mainly concerned with the *geographic* distribution of population and economic activities

• Regional economics recognizes that there are *regional variations* in economic performance
  – Or events that differentially impact different regions or types of places (rural vs. urban)
Why should we care about regions?

• The same policy can have different impacts in different regions.

• Regions have different resource endowments;
  – Differences in comparative advantages.

• Regions at different stages of economic development have different structures.
**Structure matters**

- Key assumptions: economic development is accompanied by …
  - Changes in consumption patterns (demand);
  - Changes in production structure (supply);
  - Change in linkages among sectors;
  - Changes in capital/labor availability/consumption.
Economic model

• Need to measure the **general equilibrium** impact of an exogenous shock
  – Why general equilibrium?
    • Because there are **indirect** as well as direct effects

• **Direct** impact is one-directional transmission of influence in the first round
  – Incomplete!

• **Indirect** repercussions (second and higher rounds) generate significant indirect effects
Input-output model

• I-O model is known as an inter-industry model because it focuses on interdependence of industries.

• Main idea: the output of industry X is used as input for industry Y. In turn, output of Y is used as input for X.
IO Math Quick Review: The Leontief Transformation – Otherwise Known as Making the Multipliers
Basic terms

1. We start with a table of transactions among industries (previous picture)
2. That table is transformed into a “production recipe”
3. With the help of a nifty formula that operationalizes the production recipe, we do what is called a Leontief transformation to the data
4. And we get a set of economic multipliers

I’m going to spend a few minutes describing and showing how we get to the multipliers..
The nifty formula

We are using a spreadsheet to build the components to populate the standard IO (or Leontief) equation of:

\[ X = AX + Y \]

Which can (eventually) be re-written for our purposes as

\[ X = (I - A)^{-1}Y \]

Where:

- \( X \) = matrix of outputs,
- \( A \) = matrix of coefficients,
- \( Y \) = matrix of final demand,
- \( I \) = an identity matrix that emerged from transforming the first equation into the second, operational equation
First the Math

\[ X = AX + Y \]

Need to get the Xs together on the left side, so

\[ X - AX = Y \]

And we have X in common to both terms on the left side, so

\[ X(I - A) = Y \]

“\( I \)” is an identity, not “1” in this equation. When you divide a matrix by itself, you get an identity matrix with “1s” on the diagonals.

Finishing with X on left,

\[ X = (I - A)^{-1} Y \]

This equation lets us build our input output model because we can make all of the parts if we have a statement of inter-industrial transactions.
And we all built a rudimentary, but fully functioning I-O model
I. Kinds of Economic Measures and Key Terminology

• Input-output accounts
  – Industries/commodities
  – Households
  – Institutions
  – Linkages among all of these entities

• Impact Information Produced/Measured
  – Total industrial output – Usually Analogous to Gross Sales
  – Value added
    • Employee compensation
    • Proprietors’ incomes
    • Property incomes
    • Indirect tax payments
  – Jobs
Measures and Terms (cont’d)

- **Direct effects** – the industry or set of activities that we are interested in
- **Indirect effects** – the sets of industrial linkages evident in the region: the purchase of production inputs
- **Induced effects** (household effects) – what happens when workers spend their paychecks locally
- **Total effects = direct + indirect + induced**
A Visual Representation

A Simple Multiplier Illustration

- Local Spending
- Leakage

<table>
<thead>
<tr>
<th>Stage</th>
<th>Local Spending</th>
<th>Leakage</th>
<th>Total Impact</th>
</tr>
</thead>
<tbody>
<tr>
<td>Export Sale</td>
<td>$1.00</td>
<td></td>
<td>$1.00</td>
</tr>
<tr>
<td>Initial Local Spending &amp; Leakage</td>
<td>$0.40</td>
<td>$0.60</td>
<td>$0.40</td>
</tr>
<tr>
<td>Next Round</td>
<td>$0.16</td>
<td>$0.24</td>
<td>$0.16</td>
</tr>
<tr>
<td>Next Round</td>
<td>$0.06</td>
<td>$0.10</td>
<td>$0.06</td>
</tr>
<tr>
<td>Next Round</td>
<td>$0.03</td>
<td></td>
<td>$0.03</td>
</tr>
<tr>
<td>Last Round</td>
<td>$0.01</td>
<td></td>
<td>$0.01</td>
</tr>
</tbody>
</table>

Initial Impact:
- $1.00
- $0.40
- $0.16
- $0.06
- $0.03
- $0.01
Full Impact: $1.66
More complete models have more initial detail on direct multipliers

<table>
<thead>
<tr>
<th>Factor</th>
<th>Jobs (Per $million)</th>
<th>Employee Compensation</th>
<th>Proprietors Income</th>
<th>Property Income</th>
<th>Indirect Taxes</th>
<th>Value Added</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ag oilseed and grain crops</td>
<td>1.2417</td>
<td>0.0084</td>
<td>0.1327</td>
<td>0.3026</td>
<td>(0.0713)</td>
<td>0.3723</td>
</tr>
<tr>
<td>Vegetable and melon farming</td>
<td>3.3876</td>
<td>0.0966</td>
<td>0.4382</td>
<td>0.2962</td>
<td>0.0072</td>
<td>0.8382</td>
</tr>
<tr>
<td>Fruit farming</td>
<td>8.1544</td>
<td>0.1358</td>
<td>0.4122</td>
<td>0.3327</td>
<td>0.0141</td>
<td>0.8948</td>
</tr>
<tr>
<td>Tree nut farming</td>
<td>4.0016</td>
<td>0.1595</td>
<td>0.3781</td>
<td>0.3869</td>
<td>0.0141</td>
<td>0.9385</td>
</tr>
<tr>
<td>Ag vegetable, melon, &amp; fruit</td>
<td>4.8803</td>
<td>0.1602</td>
<td>0.3137</td>
<td>0.3185</td>
<td>0.0052</td>
<td>0.7975</td>
</tr>
<tr>
<td>Ag all other crops</td>
<td>8.7645</td>
<td>0.1322</td>
<td>0.2214</td>
<td>0.3301</td>
<td>0.0071</td>
<td>0.6907</td>
</tr>
<tr>
<td>Ag beef</td>
<td>3.7015</td>
<td>0.0131</td>
<td>0.1894</td>
<td>0.2369</td>
<td>0.0441</td>
<td>0.4835</td>
</tr>
<tr>
<td>Ag Dairy</td>
<td>1.4880</td>
<td>0.0313</td>
<td>0.2548</td>
<td>0.2555</td>
<td>0.0072</td>
<td>0.5488</td>
</tr>
<tr>
<td>Ag Poultry</td>
<td>0.8987</td>
<td>0.0408</td>
<td>0.1282</td>
<td>0.2548</td>
<td>0.0030</td>
<td>0.4267</td>
</tr>
<tr>
<td>Ag Swine and Other</td>
<td>5.0726</td>
<td>0.0577</td>
<td>0.3877</td>
<td>0.3862</td>
<td>0.0156</td>
<td>0.8471</td>
</tr>
<tr>
<td>Ag services, logging, fishing</td>
<td>19.1183</td>
<td>0.3283</td>
<td>0.3210</td>
<td>0.0507</td>
<td>0.0355</td>
<td>0.7356</td>
</tr>
<tr>
<td>Min</td>
<td>4.8275</td>
<td>0.1365</td>
<td>0.0274</td>
<td>0.1784</td>
<td>0.0214</td>
<td>0.3637</td>
</tr>
<tr>
<td>Util</td>
<td>0.8662</td>
<td>0.1005</td>
<td>0.0023</td>
<td>0.1710</td>
<td>0.0783</td>
<td>0.3522</td>
</tr>
<tr>
<td>Construction</td>
<td>5.8740</td>
<td>0.2060</td>
<td>0.1136</td>
<td>0.0715</td>
<td>0.0066</td>
<td>0.3977</td>
</tr>
<tr>
<td>Food &amp; kindred mfg</td>
<td>0.8622</td>
<td>0.0568</td>
<td>0.0031</td>
<td>0.0724</td>
<td>0.0046</td>
<td>0.1370</td>
</tr>
<tr>
<td>Meat &amp; poultry processing</td>
<td>1.8470</td>
<td>0.0920</td>
<td>0.0011</td>
<td>0.0443</td>
<td>0.0095</td>
<td>0.1468</td>
</tr>
<tr>
<td>Other nondurable mfg</td>
<td>1.6007</td>
<td>0.1017</td>
<td>0.0921</td>
<td>0.0885</td>
<td>0.0098</td>
<td>0.2921</td>
</tr>
<tr>
<td>Durable mfg</td>
<td>2.3411</td>
<td>0.1662</td>
<td>0.0017</td>
<td>0.1058</td>
<td>0.0071</td>
<td>0.2808</td>
</tr>
<tr>
<td>Wholesale</td>
<td>4.6580</td>
<td>0.3076</td>
<td>0.0392</td>
<td>0.1513</td>
<td>0.1015</td>
<td>0.5997</td>
</tr>
<tr>
<td>Retail auto, furniture, electronics</td>
<td>10.9263</td>
<td>0.4361</td>
<td>0.0375</td>
<td>0.0933</td>
<td>0.1020</td>
<td>0.6688</td>
</tr>
</tbody>
</table>
We’ve already produced a basic total multiplier table

• For every $1 of final demand change in agriculture in Carroll County, we have these multipliers:

```
<table>
<thead>
<tr>
<th>Multipliers:</th>
<th>Value Added</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total Requirements</td>
<td>1.51140</td>
</tr>
<tr>
<td>Employee Compensation</td>
<td>0.11716</td>
</tr>
<tr>
<td>Proprietor Income</td>
<td>0.18305</td>
</tr>
<tr>
<td>Other Income</td>
<td>0.21033</td>
</tr>
<tr>
<td>Indirect Bus. Taxes</td>
<td>(0.01345)</td>
</tr>
</tbody>
</table>
```

• We add fixed job factors (per, say, $million of direct output) to get those, as well
Multiplier or Multiplier Effect

Type I (or Inputs) Multiplier

\[ \text{Multiplier} = \frac{\text{direct} + \text{indirect}}{\text{direct}} \]

Type Total (or Type II) Multiplier

\[ \text{Multiplier} = \frac{\text{direct} + \text{indirect} + \text{induced}}{\text{direct}} \]
## Hog Slaughter Facility Economic Impacts Per 1,000 Jobs: Wright County

<table>
<thead>
<tr>
<th>Impact Type</th>
<th>Jobs</th>
<th>Labor Income</th>
<th>Value Added</th>
<th>Output</th>
</tr>
</thead>
<tbody>
<tr>
<td>Direct</td>
<td>1,000</td>
<td>47,809,151</td>
<td>83,923,102</td>
<td>609,769,870</td>
</tr>
<tr>
<td>Indirect</td>
<td>86</td>
<td>4,277,281</td>
<td>6,543,188</td>
<td>12,787,117</td>
</tr>
<tr>
<td>Induced</td>
<td>107</td>
<td>2,999,374</td>
<td>6,455,411</td>
<td>12,136,100</td>
</tr>
<tr>
<td>Total</td>
<td>1,193</td>
<td>$55,085,806</td>
<td>$96,921,701</td>
<td>$634,693,087</td>
</tr>
</tbody>
</table>

| Total Multiplier | 1.19 | 1.15 | 1.15 | 1.04 |
### Hog Slaughter Facility Economic Impacts $1 Million in Direct Output: Wright County

<table>
<thead>
<tr>
<th>Impact Type</th>
<th>Jobs</th>
<th>Labor Income</th>
<th>Value Added</th>
<th>Output</th>
</tr>
</thead>
<tbody>
<tr>
<td>Direct</td>
<td>1.64 $78,405</td>
<td>$137,631</td>
<td>$ 1,000,000</td>
<td></td>
</tr>
<tr>
<td>Indirect</td>
<td>0.14 $7,015</td>
<td>$10,731</td>
<td>$ 20,970</td>
<td></td>
</tr>
<tr>
<td>Induced</td>
<td>0.18 $4,919</td>
<td>$10,587</td>
<td>$ 19,903</td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>1.96 $90,339</td>
<td>$158,948</td>
<td>$ 1,040,873</td>
<td></td>
</tr>
</tbody>
</table>

Multiplier Per $1 Million in Direct Output Change
Economic Impacts and Non-impacts

• I-O models initially identify sets of economic values or economic effects
• We need to distinguish, therefore, between effects that describe the strength and extent of linkages versus the effects that imply causality or economy expansion or contraction
• Economic impacts are generally reserved for describing a discernible change in regional production, employment, or household spending, either positive or negative
Factors to Consider

• Export production
  – Base industries (manufacturing, agriculture, resources, regional trade concentrations, tourism and recreation)
  – Import substitution
  – Government institutions and payments

• Regional industrial structures and changes

• Regional consumption and demand

• Interstate dynamics (RAC example)
Additional Factors

- Industrial structures and relationships over time.
  - Model does well with traditional commodities – ag, mining, forestry, manufacturing.
  - Model does less well in other areas – technology sectors, computer programming, business and producer services – especially if technical inputs are changing rapidly
- Consequently, strong on historical relationships but poorer on emerging relationships
- Is forced to compute average effects – what you see is what we’ll get
- Is not an appropriate tool for forecasting – at best it is describing the current structure, not the future structure
Limitations / Assumptions

1. No substitutes
2. I & O proportions are fixed (no price, scale, or technology changes)
3. Ignorant of external scale economies
4. M and X proportions are fixed
5. No resource constraints (input and factor supplies are perfectly elastic)
6. No slack in the economy – all regional resources are perfectly employed
Most Common Impact Analysis Mistakes

- Inaccurately specifying the final demand change
  - Often happens with new industrial development
  - Many unknowns, plus regional production may react to a new industry (fertilizer example)
- Improper use or interpretation of multipliers
  - Implying causality versus contribution
  - Using the wrong region of analysis
  - Misunderstanding rules internal to I/O analysis
Economic Regions

- Counties
- Groups of counties
  - Contiguous
  - Noncontiguous
- State
- States
- Nation
Primary Trade Regions

Iowa City, IA MSA
Cedar Rapids, IA MSA
Northwest Iowa
Functional Economic Territories

- Trade Centers
- Spencer
- Dickinson County
- Sioux City
- LeMars
- Sioux County
- Storm Lake

Scale: 50 0 50 100 Miles
North Central Iowa
Functional Economic Territories

Trade Centers
- Ames
- Hardin County
- Boone
- Marshalltown
- Fort Dodge
- Mason City

Clear Lake
Mason City
Iowa Falls
Bdora
Boone
Marshalltown

50
0
50
100 Miles
Northeast Iowa Functional Economic Territories
Mississippi River - South Functional Economic Territories

- Trade Centers
  - Quad Cities
  - Burlington
  - Muscatine
  - Lee County

Cities:
- Mount Pleasant
- Clinton
- Muscatine
- Quad Cities
- Burlington
- Fort Madison
- Keokuk

Scale: 50 0 50 100 Miles
Multiplier Misuse

- Wrong industry
- Wrong region
- Wrong time
- Wrong type
- Wrong conclusion
- Wrong promotion
- Wrong headed
The Data

• Benchmark Input-Output Accounts
• National Income and Product Accounts
• Quinquennial surveys of industry
• County Business Patterns
• ES 202 files (QCEW – quarterly census of employment and wages)
• All compiled and “smoothed” by MIG (IMPLAN)
II. The Organization of Information in Input-Output Models

- Social accounts
- Total requirements and direct coefficients
- Regional purchases and regional purchase coefficients (RPCs)
- Primary data and surveys
# Initial Industrial Summary

Table 1. Iowa Industrial Output, Jobs, Labor Income and Value Added by Industrial Sector, 1998

<table>
<thead>
<tr>
<th>Industry</th>
<th>Output</th>
<th>Percent of Total</th>
<th>Jobs</th>
<th>Percent of Total</th>
<th>All Labor Income</th>
<th>Percent of Total</th>
<th>Value Added</th>
<th>Percent of Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Agriculture</td>
<td>11,505.8</td>
<td>7.2%</td>
<td>129,378.5</td>
<td>6.8%</td>
<td>3,485.7</td>
<td>6.5%</td>
<td>5,315.0</td>
<td>6.6%</td>
</tr>
<tr>
<td>Mining</td>
<td>299.9</td>
<td>0.2%</td>
<td>2,508.0</td>
<td>0.1%</td>
<td>96.7</td>
<td>0.2%</td>
<td>204.6</td>
<td>0.3%</td>
</tr>
<tr>
<td>Construction</td>
<td>11,477.5</td>
<td>7.2%</td>
<td>118,108.1</td>
<td>6.2%</td>
<td>3,921.8</td>
<td>7.3%</td>
<td>4,403.0</td>
<td>5.4%</td>
</tr>
<tr>
<td>Food Processing</td>
<td>18,293.4</td>
<td>11.4%</td>
<td>50,781.5</td>
<td>2.7%</td>
<td>1,857.9</td>
<td>3.5%</td>
<td>3,098.9</td>
<td>3.8%</td>
</tr>
<tr>
<td>All Other Manufacturing</td>
<td>39,050.8</td>
<td>24.4%</td>
<td>217,526.8</td>
<td>11.4%</td>
<td>8,942.3</td>
<td>16.7%</td>
<td>13,297.3</td>
<td>16.4%</td>
</tr>
<tr>
<td>TCPU</td>
<td>10,714.3</td>
<td>6.7%</td>
<td>79,012.1</td>
<td>4.1%</td>
<td>2,957.2</td>
<td>5.5%</td>
<td>5,987.4</td>
<td>7.4%</td>
</tr>
<tr>
<td>Trade</td>
<td>19,487.6</td>
<td>12.2%</td>
<td>415,396.1</td>
<td>21.8%</td>
<td>8,473.4</td>
<td>15.8%</td>
<td>14,075.2</td>
<td>17.4%</td>
</tr>
<tr>
<td>Finance, Ins., &amp; Real Est.</td>
<td>15,914.6</td>
<td>10.0%</td>
<td>124,353.1</td>
<td>6.5%</td>
<td>3,867.0</td>
<td>7.2%</td>
<td>11,253.3</td>
<td>13.9%</td>
</tr>
<tr>
<td>Services</td>
<td>22,446.5</td>
<td>14.0%</td>
<td>510,159.1</td>
<td>26.7%</td>
<td>11,591.1</td>
<td>21.7%</td>
<td>13,693.0</td>
<td>16.9%</td>
</tr>
<tr>
<td>Government</td>
<td>10,269.7</td>
<td>6.4%</td>
<td>248,702.9</td>
<td>13.0%</td>
<td>8,174.9</td>
<td>15.3%</td>
<td>9,307.7</td>
<td>11.5%</td>
</tr>
<tr>
<td>Other</td>
<td>328.4</td>
<td>0.2%</td>
<td>11,675.0</td>
<td>0.6%</td>
<td>99.4</td>
<td>0.2%</td>
<td>328.4</td>
<td>0.4%</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td>159,788.6</td>
<td>100%</td>
<td>1,907,601.1</td>
<td>100.0%</td>
<td>53,467.5</td>
<td>100.0%</td>
<td>80,963.8</td>
<td>100.0%</td>
</tr>
</tbody>
</table>

Note: All financial amounts in $millions.
Direct and Total Requirements

• When industries make a product or service, they require inputs
• We are interested in the kinds of purchases that industries make
• They allow us to discern their “production recipe”
• They then allow us to figure out sets of direct coefficients
• And from this, we use the Leontief transformation to produce a regional table of total requirements
Table 2. Industry Balance Sheet

<table>
<thead>
<tr>
<th>Industry Commodity Demand</th>
<th>Direct Coefficients</th>
<th>Total Requirements (millions)</th>
<th>Value Added</th>
<th>Coefficients</th>
<th>Value Added (millions)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Real Estate</td>
<td>0.07847</td>
<td>227.62</td>
<td>Employee Compensation</td>
<td>0.01621</td>
<td>47.03</td>
</tr>
<tr>
<td>Wholesale Trade</td>
<td>0.06045</td>
<td>175.37</td>
<td>Proprietary Income</td>
<td>0.32977</td>
<td>956.63</td>
</tr>
<tr>
<td>Agriculture Services, Etc.</td>
<td>0.05615</td>
<td>162.87</td>
<td>Other Property Income</td>
<td>0.18113</td>
<td>525.43</td>
</tr>
<tr>
<td>Other Agricultural Chemicals</td>
<td>0.05401</td>
<td>156.68</td>
<td>Indirect Business Taxes</td>
<td>0.05180</td>
<td>150.27</td>
</tr>
<tr>
<td>Nitrogenous and Phosphatic Fertilizers</td>
<td>0.04301</td>
<td>124.77</td>
<td>Total Value Added</td>
<td>0.57891</td>
<td>1,679.35</td>
</tr>
<tr>
<td>Maintenance and Repair Other Facilities</td>
<td>0.01169</td>
<td>33.91</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Motor Freight Transport and Warehousing</td>
<td>0.01076</td>
<td>31.20</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Petroleum Refining</td>
<td>0.00915</td>
<td>26.54</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Lubricating Oils and Greases</td>
<td>0.00825</td>
<td>23.93</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Feed Grains</td>
<td>0.00673</td>
<td>19.53</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Miscellaneous Repair Shops</td>
<td>0.00668</td>
<td>19.38</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Sanitary Services and Steam Supply</td>
<td>0.00590</td>
<td>17.12</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>All Other Costs</td>
<td>0.06984</td>
<td>202.60</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Total Commodity Demand</strong></td>
<td><strong>0.421088</strong></td>
<td><strong>1,221.52</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Regional Purchases and RPCs

• Regional Purchase estimates are both the strength and weakness of I-O models
• RPCs are the adjustments that we make to the direct coefficients to account for the availability of commodities locally
• It is always legitimate to question the accuracy of the RPCs that we are using
### Table 3. Regional Purchases and Coefficients -- Feed Grains

<table>
<thead>
<tr>
<th>Industry Commodity Demand</th>
<th>Total Requirements (millions)</th>
<th>Regional Purchase Coefficients</th>
<th>Estimated Regional Purchases (millions)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Real Estate</td>
<td>227.62</td>
<td>44.0%</td>
<td>100.05</td>
</tr>
<tr>
<td>Wholesale Trade</td>
<td>175.37</td>
<td>81.3%</td>
<td>142.57</td>
</tr>
<tr>
<td>Agriculture Services, Etc.</td>
<td>162.87</td>
<td>55.5%</td>
<td>90.37</td>
</tr>
<tr>
<td>Other Agricultural Chemicals</td>
<td>156.68</td>
<td>48.1%</td>
<td>75.41</td>
</tr>
<tr>
<td>Nitrogenous and Phosphatic Fertilizers</td>
<td>124.77</td>
<td>45.6%</td>
<td>56.91</td>
</tr>
<tr>
<td>Maintenance and Repair Other Facilities</td>
<td>33.91</td>
<td>96.5%</td>
<td>32.74</td>
</tr>
<tr>
<td>Motor Freight Transport and Warehousing</td>
<td>31.20</td>
<td>71.2%</td>
<td>22.22</td>
</tr>
<tr>
<td>Petroleum Refining</td>
<td>26.54</td>
<td>0.9%</td>
<td>0.23</td>
</tr>
<tr>
<td>Lubricating Oils and Greases</td>
<td>23.93</td>
<td>39.8%</td>
<td>9.54</td>
</tr>
<tr>
<td>Feed Grains</td>
<td>19.53</td>
<td>26.4%</td>
<td>5.15</td>
</tr>
<tr>
<td>Miscellaneous Repair Shops</td>
<td>19.38</td>
<td>58.6%</td>
<td>11.37</td>
</tr>
<tr>
<td>Sanitary Services and Steam Supply</td>
<td>17.12</td>
<td>76.8%</td>
<td>13.14</td>
</tr>
</tbody>
</table>

| All Other Industries (Wtd Avg) | 202.60 | 41.9% | 84.85 |

<table>
<thead>
<tr>
<th>Total Commodity Demand</th>
<th>Total Requirements</th>
<th>Regional Totals (52.8%)</th>
<th>All Imports (1-RPC) (47.2%)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>1,221.52</td>
<td>644.55</td>
<td>576.97</td>
</tr>
<tr>
<td></td>
<td></td>
<td>100.0%</td>
<td>1,221.52</td>
</tr>
</tbody>
</table>
Amending the RPCs

- Surveys
  - Costly
  - Industries hate them
  - Skewed incentives
    - Industries won’t reveal costs
    - Economic developers tend to paint rosy pictures
- University research
- Census of industry
- Industry trade publications
- Your own experience/expertise

Not to be confused with LPCs used for certain I/O analysis
The Economic Assessment Process

- The study scenario
- Getting the numbers
- Specifying the region
- Running the model and interpreting output
- Just saying No!
The Scenario

• Plant opening, closing, expanding, contracting
• Change in output, workers, compensation
• Change in household spending
• Offsets and other factors
• Figuring out what you can know, what you can’t
• Managing client expectations
Getting the Numbers

• Total output or gross annual sales
• Number of employees
• Total payroll and benefit costs (earnings)
• Ideally, major production
  – By prices paid
  – Percentage purchased locally
• Whether locally (proprietor) or externally owned and controlled
Information about the workers
   Number eligible for social insurance (unemployment compensation) and the value and duration of those benefits
   Other severances and offsets
   Residence of the workers
Information about the community economic structure
   Regional distribution of jobs by industry (competitive strengths or weaknesses)
   Recent changes in jobs and industrial activity (trends and transformations)
   Characteristics of local trade and commerce (pull factors, change over time)
   Demographics – what’s been going on with the regional population and its composition
The Study Region

• Initial effects might be localized/nodal
• Long-term effects often have regional consequences
• Specifying the region to narrowly or too broadly can lead to problems
• Need to have compelling reason to produce non-contiguous regions
Retail and Wholesale Margining

• In IO analysis, retail and wholesale output excludes the cost of goods sold. Those payments are allocated upstream to the ...
  – Wholesaler (in the case of retail)
  – Transporters (between manufacturers and final sellers)
  – Manufacturers
• That means that we do not use the value of cash register sales when modeling retail or wholesale activities
## Margin examples

<table>
<thead>
<tr>
<th>IMPLA Sector</th>
<th>Description</th>
<th>Margin</th>
</tr>
</thead>
<tbody>
<tr>
<td>395</td>
<td>Wholesale trade</td>
<td>17.40 %</td>
</tr>
<tr>
<td>396</td>
<td>Retail - Motor vehicle and parts dealers</td>
<td>20.60 %</td>
</tr>
<tr>
<td>400</td>
<td>Retail - Food and beverage stores</td>
<td>27.90 %</td>
</tr>
<tr>
<td>398</td>
<td>Retail - Electronics and appliance stores</td>
<td>28.20 %</td>
</tr>
<tr>
<td>402</td>
<td>Retail - Gasoline stores</td>
<td>10.80 %</td>
</tr>
</tbody>
</table>
Other Special Rules or Considerations

- Construction impacts must be properly specified and expressed for the years in which the construction activity takes place.

- Construction temporary impacts must be reported distinct from and never combined with the ongoing operational impacts of the finished activity.
Here is how I displayed multi-year construction data in a recent hydroelectric dam project

For the construction of the hydro-electric dam at Lake Red Rock, along with all transmission line additions, these are the job impacts by year.
Here is how I displayed multi-year construction and ongoing operations data in a recent study of wind energy deployment strategies.
## Interpreting the Output: Summary Tables

Table 4. Economic Values by Category for Veterinary Services in Iowa

<table>
<thead>
<tr>
<th></th>
<th>Direct</th>
<th>Indirect</th>
<th>Induced</th>
<th>Total</th>
<th>Multiplier Type I</th>
<th>Multiplier Type II</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total Industrial Output $</td>
<td>138,040,320</td>
<td>42,260,737</td>
<td>58,403,485</td>
<td>238,704,542</td>
<td>1.31</td>
<td>1.73</td>
</tr>
<tr>
<td>Labor Income</td>
<td>70,417,330</td>
<td>14,583,573</td>
<td>23,843,027</td>
<td>108,843,931</td>
<td>1.21</td>
<td>1.55</td>
</tr>
<tr>
<td>Value Added $</td>
<td>74,252,103</td>
<td>24,218,946</td>
<td>35,375,433</td>
<td>133,846,481</td>
<td>1.33</td>
<td>1.80</td>
</tr>
<tr>
<td>Employment</td>
<td>2,826.0</td>
<td>569.3</td>
<td>1,109.3</td>
<td>4,504.6</td>
<td>1.20</td>
<td>1.59</td>
</tr>
</tbody>
</table>
Interpreting the Output: Industry Summaries

Table 5. Total Economic Values by Major Industry for Veterinary Services in Iowa, 1998

<table>
<thead>
<tr>
<th>Industry</th>
<th>Total Industrial Output</th>
<th>Labor Income</th>
<th>Value Added</th>
<th>Employment</th>
</tr>
</thead>
<tbody>
<tr>
<td>Agriculture</td>
<td>1,148,148</td>
<td>359,871</td>
<td>496,250</td>
<td>13.6</td>
</tr>
<tr>
<td>Mining</td>
<td>8,501</td>
<td>2,367</td>
<td>5,644</td>
<td>0.1</td>
</tr>
<tr>
<td>Construction</td>
<td>2,468,477</td>
<td>1,253,010</td>
<td>1,272,580</td>
<td>37.4</td>
</tr>
<tr>
<td>Manufacturing</td>
<td>13,404,767</td>
<td>2,854,227</td>
<td>4,658,264</td>
<td>74.6</td>
</tr>
<tr>
<td>Transp., Commun., &amp; Uti</td>
<td>9,001,278</td>
<td>2,438,412</td>
<td>5,501,139</td>
<td>57.2</td>
</tr>
<tr>
<td>Trade</td>
<td>19,492,369</td>
<td>9,258,006</td>
<td>13,498,695</td>
<td>546.5</td>
</tr>
<tr>
<td>Finance, Ins., &amp; Real Est.</td>
<td>21,090,721</td>
<td>3,813,266</td>
<td>14,676,754</td>
<td>135.2</td>
</tr>
<tr>
<td>Services</td>
<td>29,646,349</td>
<td>15,755,360</td>
<td>16,891,418</td>
<td>734.1</td>
</tr>
<tr>
<td>Veterinary Services</td>
<td>139,243,493</td>
<td>71,006,540</td>
<td>74,885,668</td>
<td>2,850.6</td>
</tr>
<tr>
<td>Government</td>
<td>3,074,988</td>
<td>1,931,112</td>
<td>1,834,618</td>
<td>39.2</td>
</tr>
<tr>
<td>Other</td>
<td>125,451</td>
<td>171,759</td>
<td>125,451</td>
<td>16.1</td>
</tr>
<tr>
<td>Total</td>
<td>238,704,542</td>
<td>108,843,931</td>
<td>133,846,481</td>
<td>4,504.6</td>
</tr>
</tbody>
</table>
Economic Impact Topics

• Large Construction/Capital Development
  – Bakken pipeline
  – Oramsco fertilizer plant
  – Data centers
  – Wind / solar energy
  – Hydroelectric
  – Other civil engineering activities
Economic Impact Topics

• Tourism / entertainment
  – Arts / entertainment districts
  – New attractions (nature preserve)
  – Amenities (bike trails)
  – Events and spectacles
  – Sporting venues
Economic Impact Topics

• Value Added Agriculture / Local Foods / Buy Local
  – Enhanced regional value added opportunities
  – Import substitution
  – Local food promotion / production
  – Farmers’ markets
  – Food hubs
  – Organized “shop local” campaigns
Distinguishing between an impact analysis and a contribution analysis

- Contribution (footprint) analysis usually involves an industry class or a specified group of industries
  - All area health care
  - A food production cluster in CR
  - A university
  - A retail or service sector
  - A broadly defined set of linked industries (forestry)
- Impacts are reserved for instances where we can discern increased final demand gains as a result of the industry we are studying
- Impacts can be a distinct subset of a contribution analysis
Case

The hospital in a medium sized Iowa community is moving lock, stock, and bedpan from the center of town to a new state-of-the-art facility in an adjacent, smaller community about two miles away. We are asked to isolate the economic damage that would accrue to the original city and the region as a result of the move. We tell them that, overall, there might be more economic gains to the region than losses. They call me names and tell me that I am stupid.
Case

In another Iowa city, a discount store has applied for and received assistance from the city to build a new store downtown. The city, feeling quite proud of this economic development coup would like us to do an economic impact study (they are willing to pay big bucks because they got an IDED grant to do this). We tell them that pay or no pay there is no economic impact study to be done. Why is that?
After 451 performances attended by a total of 87,000 people, the locally popular comedy production of ‘Triple Espresso’ closed in February. The president and CEO of the Civic Center said of this show “… an area of downtown some considered undesirable is now vibrant” and that there was a lot to celebrate including, “… the resurgence of the downtown and an economic impact (more than $5 million by our estimates).”

All this from a three man show. Just think of the possibilities had they added another performer.
In rural Iowa there is a place to which people make religious pilgrimages. What is the economic impact of redemption?