Regional Business Cycle vs. National Business Cycle

How the Illinois Economy Responds to Shocks from the Nation and Surrounding States

IEO Report 2003-5

Presentation by the Illinois Economic Observatory
Introduction

- All economies are subject to business cycle fluctuations
- This report explores the impact of national and regional (other state) business cycles on the Illinois economy
- Analysis attempts to answer the question – how does the Illinois economy respond to changes in
  - National cycles
  - Other state cycles
Structure of Regional Business Cycle

- State-specific Shock
- Industry-specific Shock
- National-common Shock

State to State Interactions
Industry to Industry Interactions

State Business Cycle
## National Business Cycle vs. Regional Business Cycle

<table>
<thead>
<tr>
<th>Dominant Shock</th>
<th>Results</th>
</tr>
</thead>
<tbody>
<tr>
<td>National-common Shock</td>
<td>Similar cyclical pattern</td>
</tr>
<tr>
<td>State-specific Shock</td>
<td>Different cyclical pattern</td>
</tr>
</tbody>
</table>

- The proportion of national shock to total variance: 66:34 (annual data), 49:51 (quarterly data). Residual is regional-specific shock
Common Wisdom about Relationship Between State and National Cycle

- Around Turning Points: National and Regional Cycle Coincide with Each Other
- In the Middle of Expansion or Contraction: National and Regional Cycle Behave Differently
- Big State Leads Neighborhood States
Cyclical Part of Midwest States’ Coincident Indexes

**Illinois**: lags national cycle 3-4 months; different behavior in middle expansion/contraction

**Indiana**: Coincides with national cycle
**Michigan:** moves with nation but different pattern in late 1980s cycle

**Ohio:** coincides with nation

**Wisconsin:** coincides with nation
Why does this happen?

National Common Shock

Manufacturing

......

Services

Industry Combination of Each State

Differences in State Business Cycles
Industry Mix Effects

- Manufacturing sector reacts promptly to the national shock while services sector responds after a few months.
- Hence, manufacturing-oriented state moves first and relatively service-oriented state follows.
- Table shows Illinois structure more similar to US than Rest of Midwest.
- Reinforces finding of IEO-2003-4 that major difference between Illinois and US is in growth rates not industrial composition.
Industry Mix Effects

- May also be a sequencing effect – value chain of production – as raw materials successively transformed into finished product
- States with establishments producing close-to-final product likely to move together with nation
- Hence: expect Michigan and Ohio to move with nation because of large number of auto assembly operations
- Illinois and Wisconsin move with some delay since they are primarily intermediate suppliers
### Ratio of Industry Production to GSP
(Base Year: 2000)

<table>
<thead>
<tr>
<th>Industry</th>
<th>Illinois</th>
<th>Indiana</th>
<th>Michigan</th>
<th>Ohio</th>
<th>Wisconsin</th>
<th>U.S.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Agriculture, forest., fish</td>
<td>0.89</td>
<td>1.16</td>
<td>0.89</td>
<td>0.93</td>
<td>1.64</td>
<td>1.36</td>
</tr>
<tr>
<td>Construction</td>
<td>4.77</td>
<td>5.12</td>
<td>5.11</td>
<td>4.51</td>
<td>4.86</td>
<td>4.66</td>
</tr>
<tr>
<td>Manufacturing</td>
<td>15.71</td>
<td>30.65</td>
<td>26.27</td>
<td>23.99</td>
<td>25.38</td>
<td>15.37</td>
</tr>
<tr>
<td>TPU</td>
<td>8.82</td>
<td>7.51</td>
<td>6.56</td>
<td>7.27</td>
<td>7.17</td>
<td>8.18</td>
</tr>
<tr>
<td>Wholesale Trade</td>
<td>7.92</td>
<td>5.96</td>
<td>7.24</td>
<td>7.11</td>
<td>6.47</td>
<td>7.04</td>
</tr>
<tr>
<td>Retail Trade</td>
<td>8.06</td>
<td>9.04</td>
<td>9.23</td>
<td>9.71</td>
<td>9.35</td>
<td>8.97</td>
</tr>
<tr>
<td>FIRE</td>
<td>20.73</td>
<td>13.23</td>
<td>14.27</td>
<td>16.36</td>
<td>15.81</td>
<td>19.99</td>
</tr>
<tr>
<td>Services</td>
<td>23.04</td>
<td>17.04</td>
<td>19.93</td>
<td>18.76</td>
<td>18.21</td>
<td>21.40</td>
</tr>
</tbody>
</table>

Illinois **manufacturing** share of Gross State Product much smaller than Rest of Midwest.

Illinois share of **FIRE** and **Services** much higher.
Business Cycles and the Illinois Economy

Dynamic Simulation with VAR Model

Recessions caused by national shock

Illinois lags Indiana 3-4 months in response to national shock
Business Cycles and the Illinois Economy

Illinois lags
Michigan 4-5 months

Illinois lags
Ohio 3-4 months

Illinois lags
Wisconsin 2-3 months

Illinois - solid line: other state - dotted line
Interpretation

- Illinois response lags other states
- If we decompose into sector effects, find that Illinois does affect other Midwest states
- Need to explore transmission effects of cycles on a state-sector basis – for example
  - How changes in auto production in Michigan affect fabricated metals production in Illinois and steel production in Indiana
Implications

- Patterns of response very complicated – need more detailed analysis
- Divergence of the regional business cycle from the national one does not necessarily mean that there is a region-specific shock – may reflect different stages in chain of production linkages
- Attention should be directed to tracing the national shock and the corresponding changes in the region’s industry composition