Binational Industry Concentrations
Cali-Baja Region

Christopher Wilson and Alma Bezares
Cluster Based Economic Development:
A Pro-Competition and Data Driven Way to Focus Economic Development Resources

Note: relies heavily on concepts developed by Michael Porter and Christian Ketels
Competing Trends

- Globalization: stretching supply chains out across the world
- Agglomeration: Clustering industries in a small geographic area
- Regionalization/Reshoring/Nearshoring: Somewhere in between. Not quite clusters but a countercurrent to full blown globalization.
Why Do Businesses Cluster?

• Access to Inputs: Suppliers build specialized supply chains to feed inputs to the industry. Specialized workforce develops in the area.

• To take advantage of (and drive the construction of) shared resources--scientific, physical infrastructure, informational infrastructure, natural resources, regulatory environment, etc.

• To meet a large or specialized local or regional demand.

• To capitalize on existing complimentary industries (i.e. wine-tourism-food nexus)
Role of Innovation

- Innovation drives productivity, which drives competitiveness.
- Healthy clusters have significant innovation benefits.
- The move away from a closed, in-house lab, model to an open innovation model inherent in global value chains (OEM works with suppliers and outside experts to innovate) ironically strengthens importance of geographically clustered networks.
Where do Cluster-Based Strategies Fit in to Overall Economic Development?

An example "Industrial" Policy Definitions and policies vary, but at its worst, can be:
- Firm Specific
  - Weaken competition and thus incentives to improve
- Politically driven
  - Inconsistent across administrations
Examples:
- Subsidies,
- Tariff barriers,
- Negotiated tax incentives

Cluster-Based Strategies - Data reveals existing industrial clusters with roots (not politically driven)
- Industry/Cluster specific
  - Pro-competition (seeks diversity and numerous firms competing within sector)
Examples:
- Specialized Education Programs,
- Industry Worker Training Programs,
- Specialized Infrastructure (port, pre-inspection),
- Business-Regulator Dialogue,
- Joint Marketing

Macro and Overall Business Environment Improvements (Cross-Cluster Strategies)
- Subregion, Region or Nation specific
  - Pro-competition (robust business environment fosters competitive environment)
Examples:
- General Education,
- Responsible Fiscal and Monetary Policy,
- Trade Liberalization,
- Currency Red-Tape,
- Simple Tax Code,
- General Infrastructure (overall highway network, broadband, etc.),
- Broad tax incentives
Supporting Cluster Development and Competitiveness

Principles:

• focus on improving productivity, not growing the size of the cluster

• Data-driven whenever possible

• Integrate cluster-based efforts with broader economic competitiveness enhancing efforts--complement and interact with, not replace other efforts

• Not creating clusters--facilitating their development

• Collaborative Government-Private Sector process. Also involving independent institutions, such as universities, is even better (Will be needed to support research and workforce development).

• In the border region, federal government may need to play a larger role given border management and other international issues. This is a good way to engage government as a partner.
Examples of Cluster-Enhancing Strategies

- Corporate Philanthropy to improve the business/social environment
- Trade Associations sharing costs (training facilities, some infrastructure investments, etc.)
- Courses for managers on regulatory affairs and best practices in the industry
- Create Industry-Based Groups/Trade Associations
- Create testing and standards infrastructure and organizations
- Government-Business dialogue on regulation of industry
- Businesses and trade groups work with local universities and technical schools to develop curricula
- Create university research centers and jointly fund research
- Support development of supplying industries and customer industries, strengthening the cluster-linkages across industries
- Joint marketing by trade associations
- Joint procurement
- Supporting focused scholarships to strengthen workforce and research/design/innovation capacity of the region
Industry-Based Groups

facilitate the flow of information and the definition of cluster-based strategies

• Industry Associations (company groups)
• Professional Associations (groups of individuals)
• Incubators, Accelerators, entrepreneurial networks
Cluster vs. Industry

• Clusters: Groups of firms and entities that are linked and geographically proximate
• We are identifying key industries, but we advocate the construction of strategies to support the clusters they are embedded in--upstream and downstream industries, educational institutions, etc.
Willingness to Upgrade

• With our methodology, we aim to identify binational, concentrated and dynamic industries as candidates to prioritize in economic development efforts
• Additionally, cluster-based prioritizations should take into account willingness to upgrade (Ketels, 2003)
### Some Basic Numbers

<table>
<thead>
<tr>
<th>Baja California</th>
<th>California</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Pop’n:</strong> 1,685,113 inhabitants (2014)</td>
<td><strong>Pop’n:</strong> 38,802,500 inhabitants (2014)</td>
</tr>
<tr>
<td>– Mexicali 597,112 – 35.43%</td>
<td>– Imperial: 179,091 inhabitants</td>
</tr>
<tr>
<td>– Tecate 52,505 -3.12%</td>
<td>– San Diego: 3,263,431 inhabitants</td>
</tr>
<tr>
<td>– Tijuana 726,042 – 43.09%</td>
<td><strong>Per capita income:</strong> $44,980 USD (2012)</td>
</tr>
<tr>
<td><strong>Per capita income:</strong> $114,411 pesos (2012) ~ $7,800 USD</td>
<td>– Imperial: $27,942 (2012)</td>
</tr>
<tr>
<td><strong>GDP:</strong> $1,959 billion USD (2012)</td>
<td></td>
</tr>
</tbody>
</table>
Cali-Baja Region

• Definition
  – San Diego and Imperial Valley in California
  – Mexicali, Tijuana and Tecate in Baja California
• Total population: over 4.8 million people.
• Land area: 40,182 sq. km.
• Employment: more than 1.75 million jobs.
  – Tijuana and San Diego are the main economic drivers in the region.
• Unemployment (April 2015):
  – Baja California: 3.9%
  – San Diego County: 4.8%
  – Imperial Valley: 21.2%
At the Border

Border Crossing/Entry Query Results at Port Level

<table>
<thead>
<tr>
<th>Port Name</th>
<th>2009</th>
<th>2014</th>
<th>% change</th>
<th>2009</th>
<th>2014</th>
<th>% change</th>
</tr>
</thead>
<tbody>
<tr>
<td>CA: Andrade</td>
<td>284</td>
<td>0</td>
<td>-100.00%</td>
<td>214</td>
<td>0</td>
<td>-100.00%</td>
</tr>
<tr>
<td>CA: Calexico</td>
<td>0</td>
<td>0</td>
<td>0.00%</td>
<td>0</td>
<td>0</td>
<td>0.00%</td>
</tr>
<tr>
<td>CA: Calexico East</td>
<td>276894</td>
<td>325243</td>
<td>17.46%</td>
<td>141437</td>
<td>178871</td>
<td>26.47%</td>
</tr>
<tr>
<td>CA: Otay Mesa</td>
<td>684425</td>
<td>810193</td>
<td>18.38%</td>
<td>446241</td>
<td>609172</td>
<td>36.51%</td>
</tr>
<tr>
<td>CA: San Ysidro</td>
<td>0</td>
<td>0</td>
<td>0.00%</td>
<td>0</td>
<td>0</td>
<td>0.00%</td>
</tr>
<tr>
<td>CA: Tecate</td>
<td>65039</td>
<td>52239</td>
<td>-19.68%</td>
<td>32866</td>
<td>27214</td>
<td>-17.20%</td>
</tr>
<tr>
<td><strong>TOTAL</strong></td>
<td>1026642</td>
<td>1187675</td>
<td>15.69%</td>
<td>620758</td>
<td>815257</td>
<td>31.33%</td>
</tr>
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</table>

<table>
<thead>
<tr>
<th>Port Name</th>
<th>2009</th>
<th>2014</th>
<th>% change</th>
<th>2009</th>
<th>2014</th>
<th>% change</th>
</tr>
</thead>
<tbody>
<tr>
<td>CA: Andrade</td>
<td>0</td>
<td>0</td>
<td>0.00%</td>
<td>0</td>
<td>0</td>
<td>0.00%</td>
</tr>
<tr>
<td>CA: Calexico</td>
<td>0</td>
<td>0</td>
<td>0.00%</td>
<td>0</td>
<td>0</td>
<td>0.00%</td>
</tr>
<tr>
<td>CA: Calexico East</td>
<td>253</td>
<td>252</td>
<td>-0.40%</td>
<td>403</td>
<td>587</td>
<td>45.66%</td>
</tr>
<tr>
<td>CA: Otay Mesa</td>
<td>246</td>
<td>205</td>
<td>-16.67%</td>
<td>7</td>
<td>1</td>
<td>-85.71%</td>
</tr>
<tr>
<td>CA: San Ysidro</td>
<td>0</td>
<td>0</td>
<td>0.00%</td>
<td>0</td>
<td>0</td>
<td>0.00%</td>
</tr>
<tr>
<td>CA: Tecate</td>
<td>7</td>
<td>0</td>
<td>-100.00%</td>
<td>0</td>
<td>0</td>
<td>0.00%</td>
</tr>
<tr>
<td><strong>TOTAL</strong></td>
<td>506</td>
<td>457</td>
<td>-9.68%</td>
<td>410</td>
<td>588</td>
<td>43.41%</td>
</tr>
</tbody>
</table>
### At the Border

**Border Crossing/Entry Query Results at Port Level**

<table>
<thead>
<tr>
<th>Port Name</th>
<th>Bus Passengers</th>
<th>Personal Vehicle Passengers</th>
<th>Pedestrians</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>2009</td>
<td>2014</td>
<td>% change</td>
</tr>
<tr>
<td>CA: Andrade</td>
<td>0</td>
<td>0</td>
<td></td>
</tr>
<tr>
<td>CA: Calexico</td>
<td>625</td>
<td>0</td>
<td></td>
</tr>
<tr>
<td>CA: Calexico East</td>
<td>40161</td>
<td>111400</td>
<td>177%</td>
</tr>
<tr>
<td>CA: Otay Mesa</td>
<td>147186</td>
<td>186898</td>
<td>27%</td>
</tr>
<tr>
<td>CA: San Ysidro</td>
<td>453130</td>
<td>491058</td>
<td>8%</td>
</tr>
<tr>
<td>CA: Tecate</td>
<td>3805</td>
<td>5456</td>
<td>43%</td>
</tr>
<tr>
<td><strong>TOTAL</strong></td>
<td><strong>644907</strong></td>
<td><strong>794812</strong></td>
<td><strong>23%</strong></td>
</tr>
</tbody>
</table>
Industry Mapping

• **Objective:** The idea behind this study is that the industries along the U.S.-Mexico border cannot be delimited to the national arena as they interact with industries across the border and jointly develop.

• 5 subregions:
  • Cali-Baja
  • Arizona-Sonora
  • Paso del Norte
  • Coahuila-NL-Tamaulipas-Texas
  • Lower Rio Grande Valley

• The study intents to identify the **concentration** of the industries in the regions, analyze how **dynamic** are these industries across the time and verify if they are indeed **binational**.
Measuring Industrial Concentration

• What are the most important industries, in terms of employment, for the subregion of Cali-Baja?

Location Quotient

\[ LQ = \left( \frac{E_{ii}}{E_i} \right) / \left( \frac{E_{i}^{nat}}{E^{nat}} \right) \]

A ratio equal to one means that the industry in that region has the same share of employment relative to the binational share. A ratio greater than one indicates that the local economy has a greater share of that industry than the reference economy.

– Important to promote regional competitiveness in industries that generate high levels of employment.
Methodology

• Analysis of industries by using the North American Industry Classification System (NAICS) → 4-digit codes identifying industry groups.

• Binational study at the county/municipio level: Sources: US Census Bureau and INEGI (2009)

• Assumption: similar industries in both sides of the border have the same needs in terms of human resources.
BAJA CALIFORNIA
Main Results

• 67 industries with LQ greater than 3
• 65 industries with LQ between 1.5 and 3
• 83 industries with LQ between 1 and 1.5
• These 215 industries concentrate more than 362,000 jobs.
  – Tijuana has 81 industries with LQ greater than 1 that employ more than 217 thousand people.
Mexicali- Top 10 LQ

- Taxi and Limousine Service
- Electric Lighting Equipment Manufacturing
- Pulp, Paper, and Paperboard Mills
- Manufacturing and reproducing magnetic and optical data
- Semiconductor and other electronic component manufacturing
- Audio and video equipment manufacturing
- Medical equipment and supplies manufacturing
- Metal product manufacturing
- Hardware manufacturing
- Aerospace product and parts manufacturing
Mexicali - Employment in Top 10 LQ Industries
Tecate- Top 10 LQ

- Hardware manufacturing
- Other Leather and Allied Product Manufacturing
- Navigational, measuring, electromedical, and control instruments manufacturing
- Ship and Boat Building
- Semiconductor and other electronic component manufacturing
- Coating, Engraving, Heat Treating, and Allied Activities
- Communications equipment manufacturing
- Plastics Product Manufacturing
- Machine Shops; Turned Product; and Screw, Nut, and Bolt Manufacturing
- Charter Bus Industry

Wilson Center
MEXICO INSTITUTE
Tijuana - Top 10 LQ

1. Audio and video equipment manufacturing
2. Spectator Sports
3. Medical equipment and supplies manufacturing
4. Commercial and Service Industry Machinery Manufacturing
5. Manufacturing and reproducing magnetic and optical data
6. Navigational, measuring, electromedical, and control instruments manufacturing
7. Semiconductor and other electronic component manufacturing
8. Metal product manufacturing
9. Aerospace products and parts manufacturing
10. Communications equipment manufacturing
Tijuana- Employment in Top 10 LQ Industries

<table>
<thead>
<tr>
<th>Industry</th>
<th>Employment</th>
</tr>
</thead>
<tbody>
<tr>
<td>Audio and video equipment manufacturing</td>
<td>22,000</td>
</tr>
<tr>
<td>Medical equipment and supplies manufacturing</td>
<td>20,000</td>
</tr>
<tr>
<td>Spectator Sports</td>
<td>15,000</td>
</tr>
<tr>
<td>Manufacturing and reproducing magnetic and</td>
<td>5,000</td>
</tr>
<tr>
<td>Navigational, measuring, electromedical, and</td>
<td></td>
</tr>
<tr>
<td>Semiconductor and other electronic component</td>
<td>6,000</td>
</tr>
<tr>
<td>Metal product manufacturing</td>
<td>5,000</td>
</tr>
<tr>
<td>Aerospace products and parts manufacturing</td>
<td>4,000</td>
</tr>
<tr>
<td>Communications equipment manufacturing</td>
<td>3,000</td>
</tr>
</tbody>
</table>
### Results Baja California

#### Mexicali

<table>
<thead>
<tr>
<th>#</th>
<th>NAICS code</th>
<th>LQT</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Aerospace 3364</td>
<td>23.7</td>
</tr>
<tr>
<td>2</td>
<td>Hardware Mfg 3325</td>
<td>14.0</td>
</tr>
<tr>
<td>3</td>
<td>Fabricated Metals 3329</td>
<td>11.1</td>
</tr>
<tr>
<td>4</td>
<td>Medical Equip. 3391</td>
<td>8.5</td>
</tr>
<tr>
<td>5</td>
<td>A/V Mfg. 3343</td>
<td>7.8</td>
</tr>
<tr>
<td>6</td>
<td>Semiconductor 3344</td>
<td>7.7</td>
</tr>
<tr>
<td>7</td>
<td>Magnetic and Optical Media 3346</td>
<td>7.1</td>
</tr>
<tr>
<td>8</td>
<td>Paper, Pulp, Paperboard 3221</td>
<td>5.7</td>
</tr>
<tr>
<td>9</td>
<td>Electric Lighting 3351</td>
<td>5.6</td>
</tr>
<tr>
<td>10</td>
<td>Taxi Services 4853</td>
<td>4.9</td>
</tr>
</tbody>
</table>

#### Tecate

<table>
<thead>
<tr>
<th>#</th>
<th>NAICS code</th>
<th>LQT</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Hardware 3325</td>
<td>55.3</td>
</tr>
<tr>
<td>2</td>
<td>Leather Products 3169</td>
<td>47.1</td>
</tr>
<tr>
<td>3</td>
<td>Measuring Devices 3345</td>
<td>24.3</td>
</tr>
<tr>
<td>4</td>
<td>Ship Building 3366</td>
<td>15.2</td>
</tr>
<tr>
<td>5</td>
<td>Semiconductor 3344</td>
<td>11.8</td>
</tr>
<tr>
<td>6</td>
<td>Charter Bus 4855</td>
<td>9.8</td>
</tr>
<tr>
<td>7</td>
<td>Coating, Engraving, Treating 3328</td>
<td>8.4</td>
</tr>
<tr>
<td>8</td>
<td>Comms. Equip. 3342</td>
<td>7.3</td>
</tr>
<tr>
<td>9</td>
<td>Plastics 3261</td>
<td>6.0</td>
</tr>
<tr>
<td>10</td>
<td>Machine Shop: nuts, bolts, etc. 3327</td>
<td>5.5</td>
</tr>
</tbody>
</table>

#### Tijuana

<table>
<thead>
<tr>
<th>#</th>
<th>NAICS code</th>
<th>LQT</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>A/V Mfg 3343</td>
<td>21.4</td>
</tr>
<tr>
<td>2</td>
<td>Spectator Sports 7112</td>
<td>15.7</td>
</tr>
<tr>
<td>3</td>
<td>Medical Equip. 3391</td>
<td>14.2</td>
</tr>
<tr>
<td>4</td>
<td>Magnetic and Optical Media 3346</td>
<td>7.6</td>
</tr>
<tr>
<td>5</td>
<td>Commercial and Service Industry Machinery i.e. photocopiers 3333</td>
<td>7.1</td>
</tr>
<tr>
<td>6</td>
<td>Measuring Devices 3345</td>
<td>7.1</td>
</tr>
<tr>
<td>7</td>
<td>Semiconductors 3344</td>
<td>6.8</td>
</tr>
<tr>
<td>8</td>
<td>Fabricated Metals 3329</td>
<td>6.5</td>
</tr>
<tr>
<td>9</td>
<td>Aerospace 3364</td>
<td>6.0</td>
</tr>
<tr>
<td>10</td>
<td>Comms Equip 3342</td>
<td>5.8</td>
</tr>
</tbody>
</table>

Not surprisingly, the industries that appear more frequently as having large indices of concentration belong to the **aerospace sector**, the **telecommunications industry**, and the **medical equipment sector**.
CALIFORNIA
Main Results

• 26 industries with a higher level of concentration than 3
• 55 industries with LQ between 1.5 and 3
• 102 industries with a level of concentration between 1 and 1.5
  – These 183 industries employ more than 753 thousand people
• In the 106 industries where San Diego has a level of concentration greater than 1, the number of jobs exceeds 720 thousand.
Imperial County - Top 10 LQ

Imperial County

- Support Activities for Air Transportation
- Vocational Rehabilitation Services
- Miscellaneous Nondurable Goods Merchant Wholesalers
- Technical and Trade Schools
- Animal Slaughtering and Processing
- Sugar and confectionary product manufacturing
- Aerospace products and parts manufacturing
- Metal ore mining
- Support activities for crop production
- Lime and gypsum product manufacturing
Imperial County- Employment in Top 10 LQ Industries

- Lime and gypsum product manufacturing
- Support activities for crop production
- Metal ore mining
- Aerospace products and parts manufacturing
- Sugar and confectionary product manufacturing
- Animal Slaughtering and Processing
- Technical and Trade Schools
- Miscellaneous Nondurable Goods Merchant Wholesalers
- Vocational Rehabilitation Services
- Support Activities for Air Transportation
San Diego County - Top 10 LQ

San Diego County

1. Advertising, Public Relations, and Related Services
2. Urban Transit Systems
3. Electronic and Precision Equipment Repair and Maintenance
4. Amusement Parks and Arcades
5. Household Appliances and Electrical and Electronic Goods Merchant Wholesalers
6. Gambling Industries
7. Scientific Research and Development Services
8. Engine, turbine, and power transmission equipment manufacturing
9. Scenic and sightseeing transportation, water
10. Ship and boat manufacturing
San Diego County - Employment in Top 10 LQ Industries
The industries in the U.S. side are more diverse. In the Imperial County, activities related with agriculture and manufacturing of mineral-based products are highly concentrated, although we also find activities related with the aerospace sector. Meanwhile, the San Diego County engages in some activities related with the automotive/aerospace sector, and takes advantage of its location to conduct activities related with the sea.
CALI-BAJA REGION
Main Results

• 17 industries with LQ higher than 3
• 47 industries with industrial concentration between 1.5 and 3
• 67 industries with LQ between 1 and 1.5
• In total, these industries employ almost 1 million people.
  – This represents more than 50% of the total employment in the Cali-Baja region.
Top 10 LQ

Cali-Baja

- Audio and video equipment manufacturing
- Medical equipment and supplies manufacturing
- Semiconductor and other electronic component manufacturing
- Ship and boat manufacturing
- Hardware manufacturing
- Grocery stores
- Engine, turbine, and power transmission equipment manufacturing
- Communications equipment manufacturing
- Electrical Equipment Manufacturing
- Engine, turbine, and power transmission equipment manufacturing
Employment in Top 10 Industries

Cali-Baja

- Audio and video equipment manufacturing
- Medical equipment and supplies manufacturing
- Semiconductor and other electronic component
- Retail of second-hand products
- Ship and boat manufacturing
- Hardware manufacturing
- Grocery stores
- Engine, turbine, and power transmission
- Communications equipment manufacturing
- Electrical equipment manufacturing
## Industries at the Binational Level (2009)

<table>
<thead>
<tr>
<th>#</th>
<th>NAICS code</th>
<th>LQT</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>A/V Equip. Mfg. 3343</td>
<td>30.5</td>
</tr>
<tr>
<td>2</td>
<td>Medical Devices 3391</td>
<td>7.7</td>
</tr>
<tr>
<td>3</td>
<td>Semiconductors and Electronic Components 3344</td>
<td>5.9</td>
</tr>
<tr>
<td>4</td>
<td>MX: Used Goods Retail 4664</td>
<td>5.4</td>
</tr>
<tr>
<td>5</td>
<td>Ship and Boat Mfg. 3366</td>
<td>4.9</td>
</tr>
<tr>
<td>6</td>
<td>Hardware Mfg 3325</td>
<td>4.4</td>
</tr>
<tr>
<td>7</td>
<td>MX: Autoservice Retail 4621</td>
<td>4.0</td>
</tr>
<tr>
<td>8</td>
<td>Engine, turbine, and power transmission mfg. 3336</td>
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</tr>
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<td>9</td>
<td>Comms Equip Mfg. 3342</td>
<td>3.9</td>
</tr>
<tr>
<td>10</td>
<td>Electrical Equip Mfg 3353</td>
<td>3.7</td>
</tr>
</tbody>
</table>

Interestingly, most of the industries that appear as highly concentrated at the binational level were relevant for one or both countries, partially confirming the hypothesis that an industry that develops along the border has not only impact at the local/national level but its economic effect spreads out and becomes relevant for the contiguous country as well.
Relevant sectors

• **3343- Audio and video equipment manufacturing (greatest LQ):** one of the largest employers in the region that manufactures audio and video equipment for home-entertainment systems, vehicles and public areas.
  – Total establishments BC- 25 (more than 25 th. Of employees in Tijuana and Mexicali)
  – Gross production BC- $10,509,546 th. pesos (2009)
  – Total establishments San Diego- 13

• **3391-Medical equipment and supplies manufacturing (largest employer):** this sector has rapidly developed and spread at the binational level, particularly in Baja California and Southern California.
  – Total establishments San Diego & Imperial Counties- 144
  – Annual payroll San Diego- $298,393 th. USD
  – More than 40,000 employees in the Cali-Baja region.
What’s next

• To identify how **dynamic** are those industries (changes in employment between 2009 and 2014)
• Analyze the **binational** interactions among the industries using trade data.

Limitations of the study

• Use of proxies for the total value of employment by industry for the United States
• Data not fully comparable (difference in codes 42,43, 44,45, and 46→ wholesale and retail trade; no government employees in the case of the U.S.)