Agenda

- Center background & activities
- Analytical framework
- North Carolina in the Global Economy website
- Industry example
Who we are/what we do

1. Answer research sponsors’ real world questions about globalization and development.

2. Experts in (global) value chain analysis

3. Academic footprint at Duke University
## Recent clients

<table>
<thead>
<tr>
<th>Governments</th>
<th>Governmental organizations</th>
<th>Private foundations</th>
</tr>
</thead>
<tbody>
<tr>
<td>USAID</td>
<td>OECD</td>
<td>Rockefeller Foundation</td>
</tr>
<tr>
<td>Industry Canada</td>
<td>World Health Organization</td>
<td>SURDNA Foundation</td>
</tr>
<tr>
<td>Canada</td>
<td>Multilateral Investment Fund</td>
<td>Robert Wood Johnson Foundation</td>
</tr>
<tr>
<td>CNI</td>
<td>Inter-American Development Bank</td>
<td>Apollo Alliance</td>
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<tr>
<td>Brazil</td>
<td></td>
<td>Walton Family Foundation</td>
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<td>comex</td>
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<td>Ewing Marion Kauffman Foundation</td>
</tr>
<tr>
<td>Nova Scotia</td>
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<td>World Economic Forum</td>
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</tbody>
</table>

*Governments, Governmental organizations, and Private foundations.*
What is a value chain?

A value chain describes the full range of activities that firms and workers carry out to bring a product from its conception to its end use and beyond.
<table>
<thead>
<tr>
<th>Model</th>
<th>Outsourcing Rate</th>
<th>Source</th>
<th>Year of Production</th>
</tr>
</thead>
<tbody>
<tr>
<td>737 Classic</td>
<td>10%</td>
<td>Boeing; Reuters</td>
<td>1968</td>
</tr>
<tr>
<td>747 series</td>
<td>20%</td>
<td>Boeing in-house</td>
<td>1970</td>
</tr>
<tr>
<td>787 Dreamliner</td>
<td>80%</td>
<td>Boeing in-house</td>
<td>2009</td>
</tr>
</tbody>
</table>

Source: Boeing; Reuters
Global Value Chains

• Global perspective, not just U.S.-centric
• Organization of entire industries: raw materials to production to final sale & beyond
• Linkages across firms and countries – coordination and integration
• Upgrading opportunities
• Power in the chain (drivers)
Representative Duke CGGC Projects – Industries & Regions

Low-Mid Tech
• Coffee (Burundi) & tobacco (multiple)
• Wheat, corn & cotton (multiple)
• Oysters (U.S.) & Shrimp (Mexico)
• Beef & Dairy (U.S.)
• Coal (U.S.)
• Textile & Apparel (multiple)
• Furniture (U.S.)
• Water & transportation infrastructure (U.S.)

Mid-High Tech
• Aerospace (Brazil, Costa Rica)
• Automotive (Canada)
• Geosynthetics (U.S. Gulf Coast)
• Lithium-ion Batteries (U.S.)
• Medical devices (Brazil, Costa Rica)
• Ocean technologies (Canada)
• Solar & Wind Renewable Energy (U.S.)
• Smart Grid (U.S./NC)
U.S. and North Carolina Projects

Low-Mid Tech
- Oysters (U.S. Gulf Coast)
- Beef & Dairy (U.S.)
- Coal (U.S.)
- Furniture (U.S./NC)
- Transportation infrastructure (U.S.)
- Transit busses & bus rapid transit (U.S.)
- Rail vehicles (U.S.)
- Energy Efficiency (U.S.)

Mid-High Tech
- Geosynthetics (U.S. Gulf Coast)
- Lithium-ion Batteries (U.S.)
- Nanotechnology (US/CA/NC)
- CSP Solar & Wind Renewable Energy (U.S.)
- Smart Grid (U.S./NC)
- Electric Heat Pumps (U.S.)
- Carbon capture & storage (U.S.)
- High Efficiency Motors (U.S.)
- Hybrid Trucks (U.S.)
Key take-aways

Value chain analysis is a tool to help:

- Define industries
- Identify where & how value is added in an industry
- Identify companies in each segment and phase of an industry
- Identify opportunities to capture value in a regional economy (gap analysis)
- Understand how private governance and public policies affect the conduct and performance of an industry
- Identify needed skills
- Identify important market & technology trends
- Identify key stakeholders
North Carolina in the Global Economy (NCGE)

Seven key industries in North Carolina:

- Tobacco
- Hog farming
- Textiles & apparel
- Furniture
- Information technology
- Biotechnology
- Banks & finance

http://www.ncglobaleconomy.com/index.shtml
North Carolina in the Global Economy (NCGE)

Sections of the website for each industry include:
  • Industry overview
  • Introduction to the value chain
  • Important NC companies/employers
  • Labor market, trade & policy analysis
  • Tables, charts and maps
  • Key resources
Geographic Analysis at Three Levels
NC, U.S. & Top States

- Data can all be viewed at three levels:
  - NC, U.S. & U.S. (Top) States
  - Graphics & Text Analysis
- Applies to data on establishments, employment, wages, exports & imports
Data Formats: Three Types

Tables, Charts & Maps

- Data can be viewed in three formats: table, chart or map
- Similar numbering convention makes it easy to find comparable information across formats
  - North Carolina tables/charts/maps all end in “a”
  - U.S. tables/charts/maps all end in “b”
  - Top U.S. states/all states tables/charts/maps all end in “c”
Interactive Visuals

Example: NC County Maps

- Previous maps only showed two years of data, for one variable without showing data for each county
- County-level maps allow you to view data for each county for all years (1992-2012) across multiple variables
U.S. Level Data

- Data is now available for the United States and other U.S. states using the same industry definitions for North Carolina
- Data is designed to easily show trends in default visual, but is also interactive
- Applies to labor market and trade data sections

New Charts: U.S. Employment Over Time

New Maps: U.S. Employment by State
NC in the U.S. Economy

Section: Workers & Wages

Users can easily see NC’s contribution to the U.S. economy and how the NC industry compares to other U.S. states.
Other Updates

• Corporations section updated for all industries
  • Overview
  • Brands & Market Segments
  • Strategy & Competitiveness
  • Geographic Footprint
• Value Chain
  • 2012 data & updated employer footprints
• Policy
  • Key issues at state, national & international levels
• Resources
  • Industry Associations, Education & Training, Government Resources, Web-Based Resources and Books, Reports & Articles
• Overview
  • Links to key sections
  • History & updated trends
• Inter-Industry Trends
  • Updated employment analysis across industries (1992, 2002, 2012)
Industry example
20 year NC employment growth
1994-2014

Source: Calculated from US Bureau of Labor Statistics, Census of Employment and Wages
Industry Employment Growth

- Banks & Finance: 45% (1994-2004), 6% (2004-2014)
- Information Technology: 73% (1994-2004), 34% (2004-2014)

Source: Calculated from US Bureau of Labor Statistics, Census of Employment and Wages
2014 State Ranking

<table>
<thead>
<tr>
<th>Industry</th>
<th>Ranking</th>
</tr>
</thead>
<tbody>
<tr>
<td>Banks &amp; Finance</td>
<td>9</td>
</tr>
<tr>
<td>Biotechnology</td>
<td>9</td>
</tr>
<tr>
<td>Furniture</td>
<td>2</td>
</tr>
<tr>
<td>Hog Farming</td>
<td>9</td>
</tr>
<tr>
<td>Information Technology</td>
<td>12</td>
</tr>
<tr>
<td>Textiles &amp; Apparel</td>
<td>4</td>
</tr>
<tr>
<td>Tobacco</td>
<td>1</td>
</tr>
</tbody>
</table>

Source: Calculated from US Bureau of Labor Statistics, Census of Employment and Wages
Furniture Value Chain

Pre-production Services (5-10%)
- Furniture Design & Engineering

Raw Materials & Components (~20-25%)
- Wood, metal, leather, plastic, glass & rattan
- Plywood, cut stock, frame & upholstery

Production & Assembly (10-20%)
- Household Furniture (upholstered, non-upholstered & non-wood)
- Office Furniture (wood & non-wood)
- Furniture related products (mattresses, cabinets & shades)

Distribution (~10%)
- Furniture Wholesale

Retail (~45-50%)
- Furniture Stores

* Value-added estimates in parenthesis (% of retail cost)
U.S. Furniture Value Chain - 1992

Pre-production Services
- Furniture design & engineering
  - Employees: 6,178
  - Estbm’t: 1,003
  - Avg. wage: 29,285

Raw Materials & Components
- Wood, metal, leather, plastic, glass & rattan
  - Employees: 228,546
  - Estbm’t: 19,441
  - Avg. wage: 22,890

- Plywood, cut stock, frame & upholstery
  - Employees: 274,429
  - Estbm’t: 3,626
  - Avg. wage: 23,085

Production & Assembly
- Household Furniture
  - Employees: 270,608
  - Estbm’t: 8,017
  - Avg. wage: 19,496

- Office Furniture
  - Employees: 163,662
  - Estbm’t: 4,738
  - Avg. wage: 25,760

- Furniture related products
  - Employees: 157,619
  - Estbm’t: 13,748
  - Avg. wage: 21,069

Distribution
- Furniture Wholesale
  - Employees: 29,780
  - Estbm’t: 3,824
  - Avg. wage: 32,863

- Furniture Stores
  - Employees: 225,608
  - Estbm’t: 25,022
  - Avg. wage: 21,038

Retail
- Employees: 502,975
  - Estbm’t: 23,067
  - Avg. wage: 22,996

- Employees: 591,889
  - Estbm’t: 26,203
  - Avg. wage: 21,651

- Employees: 29,780
  - Estbm’t: 3,824
  - Avg. wage: 32,863

- Employees: 225,608
  - Estbm’t: 25,022
  - Avg. wage: 21,038

Source: Calculated from US Bureau of Labor Statistics, Census of Employment and Wages
U.S. Furniture Value Chain - 2012

Pre-production Services
- Furniture design & engineering
  - Employees: 12,201
  - Estbm’t: 2,161
  - Avg. wage: 76,471

Raw Materials & Components
- Wood, metal, leather, plastic, glass & rattan
  - Employees: 140,354
  - Estbm’t: 12,796
  - Avg. wage: 40,434
- Plywood, cut stock, frame & upholstery
  - Employees: 103,186
  - Estbm’t: 2,641
  - Avg. wage: 40,625

Production & Assembly
- Household Furniture
  - Employees: 122,051
  - Estbm’t: 4,764
  - Avg. wage: 35,806
- Office Furniture
  - Employees: 98,219
  - Estbm’t: 3,668
  - Avg. wage: 46,137
- Furniture related products
  - Employees: 130,543
  - Estbm’t: 9,831
  - Avg. wage: 37,231

Distribution
- Furniture Wholesale
  - Employees: 41,777
  - Estbm’t: 4,353
  - Avg. wage: 59,196
- Furniture Stores
  - Employees: 212,368
  - Estbm’t: 22,830
  - Avg. wage: 35,529

Retail
- Employees: 243,540
  - Estbm’t: 15,437
  - Avg. wage: 40,515
- Employees: 350,813
  - Estbm’t: 18,263
  - Avg. wage: 39,229
- Employees: 41,777
  - Estbm’t: 4,353
  - Avg. wage: 59,196
- Employees: 212,368
  - Estbm’t: 22,830
  - Avg. wage: 35,529

Source: Calculated from US Bureau of Labor Statistics, Census of Employment and Wages
U.S. Furniture Value Chain
% change, 1992-2012

Source: BLS, CEW
U.S. Furniture Value Chain
unit change, 1992-2012

<table>
<thead>
<tr>
<th>Stage</th>
<th>Employment</th>
<th>Establishments</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pre-production</td>
<td>6,023</td>
<td>1,115</td>
</tr>
<tr>
<td>Raw materials &amp; components</td>
<td>-7,630</td>
<td>-259,435</td>
</tr>
<tr>
<td>Production &amp; assembly</td>
<td>-7,940</td>
<td>-241,066</td>
</tr>
<tr>
<td>Distribution</td>
<td>11,997</td>
<td>529</td>
</tr>
<tr>
<td>Retail</td>
<td>(13,240)</td>
<td>(2,192)</td>
</tr>
</tbody>
</table>

Source: BLS, CEW
U.S. Household Furniture Industry (NAICS 3371), % change 1992-2012

Source: BLS, CEW

<table>
<thead>
<tr>
<th>NAICS Code</th>
<th>Description</th>
<th>Employment</th>
<th>Establishments</th>
</tr>
</thead>
<tbody>
<tr>
<td>337121</td>
<td>Upholstered</td>
<td>44,418</td>
<td>-1,241</td>
</tr>
<tr>
<td>337122</td>
<td>Nonupholstered</td>
<td>85,063</td>
<td>1,882</td>
</tr>
<tr>
<td>337124</td>
<td>Metal</td>
<td>5,987</td>
<td>-99</td>
</tr>
<tr>
<td>337125</td>
<td>Non-wood &amp; Non-metal</td>
<td>3,992</td>
<td>-36</td>
</tr>
<tr>
<td>337127</td>
<td>Institutional</td>
<td>9,097</td>
<td>-153</td>
</tr>
</tbody>
</table>

Source: BLS, CEW
Exports trend in NC (2002-2012)
NAICS 337 (Furniture and related product mfg.)

- NC exports steadily grew from 2002 to 2008, moving from 150 to 300 USD million
- Because of 2008 economic crisis, exports dropped by 38% between 2008-2009
- Although exports growth in 2010 and 2011, they haven’t reached the 2008 peak
Export Trend in US Top 5 exporting States (2002-2012)
NAICS 337 (Furniture and related product mfg.)

• NC was affected the most by the 2008 economic downturn
• Compared to top 3 exporting states, NC has not been growing at the same pace after 2008
Top Destinations for NC Exports
NAICS 337 (Furniture & Related Product Mfg)

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Canada</td>
<td>48,538,841</td>
<td>119,667,338</td>
<td>147%</td>
</tr>
<tr>
<td>Saudi Arabia</td>
<td>14,041,438</td>
<td>21,411,577</td>
<td>52%</td>
</tr>
<tr>
<td>United Arab Emirates</td>
<td>2,855,418</td>
<td>15,732,615</td>
<td>451%</td>
</tr>
<tr>
<td>China</td>
<td>2,708,318</td>
<td>15,677,219</td>
<td>479%</td>
</tr>
<tr>
<td>Mexico</td>
<td>4,999,751</td>
<td>11,258,805</td>
<td>125%</td>
</tr>
<tr>
<td>Japan</td>
<td>11,794,571</td>
<td>10,788,176</td>
<td>-9%</td>
</tr>
<tr>
<td>Russia</td>
<td>1,582,477</td>
<td>9,027,681</td>
<td>470%</td>
</tr>
<tr>
<td>Kuwait</td>
<td>8,857,297</td>
<td>7,560,873</td>
<td>-15%</td>
</tr>
<tr>
<td>United Kingdom</td>
<td>10,491,213</td>
<td>7,042,419</td>
<td>-33%</td>
</tr>
<tr>
<td>India</td>
<td>158,776</td>
<td>6,341,394</td>
<td>534%</td>
</tr>
<tr>
<td>Australia</td>
<td>953,157</td>
<td>6,043,763</td>
<td></td>
</tr>
</tbody>
</table>

• Significant growth in exports over the last decade to India, Australia, China, Russia and UAE

Source: Foreign Trade Division of the US Census Bureau, 2012
Findings from the Furniture Value Chain: Problem areas

- **Massive declines in employment** over the past 20 years, especially in non-upholstered (~28k, -88%) and upholstered (~9.5k, -36%) furniture.
- **Establishments** in North Carolina manufacturing non-upholstered furniture **have declined** by 51% (115) and 42% (149) for upholstered furniture since 1992.
- **Declines have effects** upstream (broadwoven fabric, cut stock) and downstream (trucking)
- The employment **declines in high value added industries** (institutional & office furniture) is **greater** in North Carolina than in the US as a whole.
- **Wages** in the value chain generally **have not kept pace** with national levels. Household furniture manufacturing in NC has seen an erosion in wages paid to employees relative to the national industry.
- **Export market concentrated** on Canada. Huge markets in emerging economies are not developed.
Findings from the Furniture Value Chain: Bright spots

- Employment in mattress manufacturing and in furniture wholesale has added 2,700 jobs over the past 20 years.
- Establishments in design services and customized manufacturing saw large percentage increases over the past 20 years.
- Wages for upstream and downstream industries in the NC furniture value chain have increased more than the national industry.
- International production may relocate to Mexico. Reduced freight costs and time to market.
Thank you for your attention!