Outline

• Motivation

• Our study
  – Data
  – The big picture
  – Supplier networks
  – Auto parts trade

• Conclusion
U.S. Parts Supplier Industry: Motivation

• Carmakers receive most of the attention
• But suppliers account for 4/5 of auto industry employment
• And 2/3 of vehicle value
U.S. Parts Supplier Industry: Motivation

• Suppliers face changing relationships with carmakers
• Resulting in layoffs, cost pressures, even bankruptcy
Our Supplier Study

• What are challenges and opportunities for auto suppliers?
• How are changes in the industry causing changes in geography?
Principal Data Sources

• Records of 4,500 supplier plants in North America
  – Considerably modified from ELM

• Government production and trade data
  – Census
  – BLS
  – International Trade Commission
U.S. Parts Supplier Industry: The Big Picture

• Employment 740,000
  – 4 times larger than assemblers
• Sales (2002) $208 billion
  – $153 bn original equipment
  – $55 bn aftermarket
The Big Picture:
Suppliers are highly clustered
The Midwest continues to be the industry’s hub

<table>
<thead>
<tr>
<th>Region</th>
<th>% supplier plants</th>
</tr>
</thead>
<tbody>
<tr>
<td>Midwest</td>
<td>61%</td>
</tr>
<tr>
<td>Southeast</td>
<td>28%</td>
</tr>
<tr>
<td>Northeast</td>
<td>7%</td>
</tr>
<tr>
<td>West</td>
<td>4%</td>
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</tbody>
</table>
But new supplier plants are heading South . . .
Especially foreign-owned suppliers

<table>
<thead>
<tr>
<th>Region</th>
<th>Domestic</th>
<th>Foreign</th>
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<tbody>
<tr>
<td>Midwest</td>
<td>66%</td>
<td>47%</td>
</tr>
<tr>
<td>Southeast</td>
<td>23%</td>
<td>42%</td>
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<tr>
<td>Northeast</td>
<td>8%</td>
<td>6%</td>
</tr>
<tr>
<td>West</td>
<td>3%</td>
<td>5%</td>
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</table>
U.S.-owned suppliers are still centered around Detroit

But not foreign-owned suppliers
Drift southward also varies by type of part

Most clustered around Detroit
- Body
- Drivetrain
- Engine
- Air & fluid handling
- Interior
- Chassis
- Electrical

Most dispersed
¼ of all body parts are made at plants <91 miles from Detroit.
½ are <203 miles from Detroit.
¾ are <486 miles.
Drivetrain parts

Quartiles

\[ \frac{1}{4} \text{ 128 miles} \]
\[ \frac{1}{2} \text{ 227 miles} \]
\[ \frac{3}{4} \text{ 514 miles} \]
Engine parts

Quartiles
$\frac{1}{4}$ 127 miles
$\frac{1}{2}$ 257 miles
$\frac{3}{4}$ 536 miles
Air & fluid handling parts

Quartiles

\[ \frac{1}{4} \text{ 138 miles} \]
\[ \frac{1}{2} \text{ 270 miles} \]
\[ \frac{3}{4} \text{ 602 miles} \]
Interior parts

Quartiles

⅛ 128 miles
⅛ 307 miles
⅜ 609 miles
Chassis parts

Quartiles

¼ 160 miles
½ 375 miles
¾ 679 miles
Electrical parts

Quartiles
$rac{1}{4}$ 298 miles
$rac{1}{2}$ 654 miles
$rac{3}{4}$ 1,592 miles
Supplier networks
Suppliers cluster near final assembly plants . . .
For its new TFAT plant, Toyota is forming regional networks around assembly plants. This network is designed to optimize supply chain efficiency and reduce environmental impact.
Honda’s supplier network

Tighter rings, because Marysville is closer to Midwest suppliers
Nissan’s supplier network

Further from Midwest suppliers, depends more on Mexico
Yet, assembly plants are moving south
Future regional networks?

• Honda Marysville and Toyota Georgetown drew heavily on traditional Midwest supplier base. They weren’t all that far away from Michigan.

• Newer transplants are further South. Will they pull supplier plants with them?

• Yes, some . . .

• . . . But fewer than are located near Marysville and Georgetown.
Auto parts trade
Auto parts trade deficit has grown faster since 2001
Imports by system 2004

- Chassis highest market share held by imports
- Engine largest $ increase in imports since ‘95
- Drivetrain largest % increase in imports since ‘95.
Source of imports

- Mexico passed Canada as #1 in 2000
- NAFTA accounts for 56%, China for 5%
Different parts from different sources

- Canada
- Mexico
- Japan
- Rest of world

$\text{billion}$
What about China?

- Imports up from $2 bn in ‘95 to $5 bn in ‘04
- For now mostly aftermarket parts

**Top Imports 2004 ($ million)**

<table>
<thead>
<tr>
<th>Item</th>
<th>Value</th>
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<tbody>
<tr>
<td>Radios</td>
<td>$493m</td>
</tr>
<tr>
<td>Wheels</td>
<td>$449m</td>
</tr>
<tr>
<td>Tires</td>
<td>$398m</td>
</tr>
<tr>
<td>Brakes</td>
<td>$355m</td>
</tr>
<tr>
<td>Wiring</td>
<td>$176m</td>
</tr>
<tr>
<td>Child safety seats</td>
<td>$152m</td>
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</table>
Summary: Geography matters

Local scale:

• Networks form around assembly plants for just-in-time delivery.
• One-day drive permits many location choices.
• Some suppliers can serve new assembly plants from existing plants.
Summary: Geography matters

**National scale:**

- Suppliers highly clustered in Midwest.
- Especially powertrain suppliers.
- But suppliers are heading South.
- Especially foreign-owned and electrical suppliers.
Summary: Geography matters

**International scale:**
- ¼ of parts are imported.
- ¾ from NAFTA and Japan.
- Especially powertrain and chassis.
- China small but growing source.
Geography Matters: Challenges & Opportunities for Auto Suppliers

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