NAFTA and the auto industry-
links between the U.S. and Mexico

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Disclaimer
The analysis and conclusions set forth are those of the author and do not indicate concurrence by other members of the research staff or the Federal Reserve Bank of Chicago
Outline

- North American production geography
- Growth in Mexico
- Trade in vehicles
- Supply chain integration
Vehicles are produced where sold

U.S. light vehicle sales by major production region, %

Source: Author’s calculations based on Wards Autoinfobank
North America’s auto production footprint

2016

Source: Wards, Maptitude

Thomas Klier, FRB Chicago
Parts and vehicle assembly co-locate

Source: Wards, ELM, Maptitude
Outline

- North American production geography
- Growth in Mexico
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Mexico is now larger than Canada

<table>
<thead>
<tr>
<th></th>
<th></th>
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<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Canada</td>
<td>16</td>
<td>17</td>
<td>17</td>
<td>13</td>
</tr>
<tr>
<td>Mexico</td>
<td>6</td>
<td>11</td>
<td>19</td>
<td>20</td>
</tr>
<tr>
<td>U.S.</td>
<td>78</td>
<td>72</td>
<td>64</td>
<td>67</td>
</tr>
<tr>
<td>Total</td>
<td>100</td>
<td>100</td>
<td>100</td>
<td>100</td>
</tr>
<tr>
<td>Vehicles (millions)</td>
<td>14.9</td>
<td>17.2</td>
<td>11.9</td>
<td>17.7</td>
</tr>
</tbody>
</table>

Source: Author’s calculations based on Wards Autoinfobank
Mexico’s auto industry: 3 eras

• Pre-NAFTA
  – Long history of vehicle production in Mexico
  – Importance of industry-specific trade policy

• NAFTA removes trade barriers and quotas over 10-year transition period (1995-2004)
  – Mexico becomes fully integrated into North American production space

• Since 2004
  – Assembly plant count increases from 11 to 21 (2019). Only two of the additional plants are by a Detroit producer

• Note: Light vehicle production in Mexico:
Exports drive Mexico’s strong growth

Light vehicle production in Mexico

Production has increased by 2.5 million units since 1995

Source: Author’s calculations based on Wards Autoinfobank
Non-D3 producers driving growth

Mexico light vehicle production, by nationality of producer

Source: Author’s calculations based on Wards AutoinfoBank
What is produced in Mexico?

LV production in Mexico, by segment, 1995 vs 2016

<table>
<thead>
<tr>
<th>Light Vehicle Model Segment</th>
<th>1995</th>
<th>2016</th>
</tr>
</thead>
<tbody>
<tr>
<td>Large Pickup</td>
<td>612k</td>
<td>1.7 million units [48%]</td>
</tr>
<tr>
<td>Small Pickup</td>
<td></td>
<td>661,421 [19%]</td>
</tr>
<tr>
<td>Van</td>
<td></td>
<td></td>
</tr>
<tr>
<td>SUV</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Large and Luxury CUV</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Mid-Size CUV</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Small CUV</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Large and Luxury Car</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Mid-Size Car</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Small Car</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Source: Author’s calculations based on Wards Autoinfobank
Who produces what?

LV production in Mexico, by segment, 2016

Size of circle scaled to production volume

Source: Author’s calculations based on Wards Autoinfobank
## Exposure to Mexico varies by OEM

Share of NAFTA light vehicle production in Mexico, by OEM

<table>
<thead>
<tr>
<th>Carmaker</th>
<th>1995</th>
<th>2016</th>
</tr>
</thead>
<tbody>
<tr>
<td>Nissan</td>
<td>17</td>
<td>45</td>
</tr>
<tr>
<td>GM</td>
<td>4</td>
<td>20</td>
</tr>
<tr>
<td>FCA</td>
<td>8</td>
<td>18</td>
</tr>
<tr>
<td>Ford</td>
<td>5</td>
<td>13</td>
</tr>
<tr>
<td>VW</td>
<td>100</td>
<td>82</td>
</tr>
<tr>
<td>Honda</td>
<td>0</td>
<td>13</td>
</tr>
<tr>
<td>Toyota</td>
<td>0</td>
<td>7</td>
</tr>
<tr>
<td><strong>MEX total</strong></td>
<td><strong>6</strong></td>
<td><strong>20</strong></td>
</tr>
</tbody>
</table>

Author’s calculations based on Wards Autoinfobank
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- North American production geography
- Growth in Mexico
- Trade in vehicles
- Supply chain integration
Trade in light vehicles within NAFTA, 2016

Source: Holmes, 2017

Source: AMIA; USITC; Industry Canada

*estimate*
Mexico has broadest export base

Light vehicle production in NAFTA countries, by destination, 2014, in percent

<table>
<thead>
<tr>
<th>Destination</th>
<th>Mexico</th>
<th>Canada</th>
<th>U.S.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Domestic</td>
<td>18</td>
<td>12</td>
<td>79</td>
</tr>
<tr>
<td>EX to other NAFTA</td>
<td>59</td>
<td>79</td>
<td>9</td>
</tr>
<tr>
<td>EX elsewhere</td>
<td>14</td>
<td>4</td>
<td>8</td>
</tr>
<tr>
<td>EX, unknown</td>
<td>9</td>
<td>5</td>
<td>4</td>
</tr>
</tbody>
</table>

Source: Authors’ calculations based on IHS Markit data
Majority of Mexican sales are imported

Mexican light vehicle sales by region of production, %

Source: Author’s calculations based on Wards Autoinfobank
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- Supply chain integration
Mind the supply chain and its linkages

Example: journey of a seatbelt

1. Produce nylon fibers
2. Dye and weave fibers
3. Cut and sew finished cloth
4. Fit finished seat belt into car

Source: The Financial Times
Supply chains extend across borders

The average Mexican content in U.S.-produced vehicles is about 13.5%.

The average U.S. content in Mexico-produced vehicles is about 26%.

Source: author's calculations based on AALA data from 2016
Summary

• Today the auto industry essentially knows no borders within North America
  – 62.5% NAFTA content required to avoid tariffs
  – Mexico as the low labor cost production location

• Mexico’s strong growth in production is driven by exports

• Industry linkages between the U.S. and Mexico are extensive
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