NAFTA and the North American auto industry

Thomas Klier
Federal Reserve Bank of Chicago

GACC Midwest Business Luncheon Series
Schaumburg, IL
August 2nd, 2017

Disclaimer
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NAFTA in the news

Donald Trump’s Nafta Plan Would Confront Globalized Auto Industry


Tens of thousands of parts that make up a vehicle often come from multiple producers in different countries and travel back and forth across borders several times.

Trump Threatens to Undo Nafta’s Auto Alley

“Then you have to play whack-a-mole with every low-cost country.”

by Brendan Greeley, David Welch, and Austin Weinstein

January 26, 2017 1:39 PM

From BloombergBusinessweek | Subscribe | Reprints

FINANCIAL TIMES

Mexico urges Trump to create Nafta powerhouse to rival China

May 1, 2017
Germany in the news

Fact: In 2016, VW, BMW, Audi and Mercedes sold 1.28 million autos in the U.S. market
Most vehicles sold in U.S. produced in N.A.

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

- NAFTA
- Asia
- Europe
North America’s auto production footprint

Assembly plants scaled by units of production

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

Light Vehicle Production: 2016
Assembly plants scaled by units of production

Thomas Klier, FRB Chicago
Mexico is now larger than Canada

Share of NAFTA’s light vehicle production (%)

<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>
Mexico’s auto industry: pre-NAFTA

• Long history of vehicle production in Mexico
  – Model T (1925); GM and Chrysler in 1930s
  – 15 carmakers operated low volume assembly plants
  – No Mexican-owned carmaker

• Importance of industry-specific trade policy
  – First: import substitution, later: export promotion
  – By late 60s: 5 producers in Mexico: Detroit 3 plus Nissan and VW

• Note: Vehicle production in Mexico:
Mexico’s auto industry at NAFTA

• By ‘95: D3 each operate two assembly plants, Nissan (2), VW (1)
  – Original Detroit 3 plants have been replaced
• NAFTA removes trade barriers and quotas over 10-year transition period (1995-2004)
• Mexico is becoming fully integrated into North-American production space (started slowly, in 80s)
  • E.g.: PT Cruiser exclusively produced in Mexico from 2001-2010
• Until 2004 only the 5 “legacy” carmakers benefit from NAFTA
Mexico’s auto industry since 2004

• Mexico pursues many free trade agreements
• BMW, Daimler, Kia (Hyundai subsidiary), Mazda, Toyota, Audi (VW division) decide to assemble vehicles in Mexico
• The legacy carmakers open additional assembly plants
• Assembly plant count increases from 11 in 2004 to 21 in 2019. Only two of those are by Detroit 3
Exports drive Mexico’s strong growth

Light vehicle production in Mexico

Production has increased by 2.5 million units since 1995

Export share

2016 production

<table>
<thead>
<tr>
<th>OEM</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Nissan</td>
<td>24</td>
</tr>
<tr>
<td>GM</td>
<td>21</td>
</tr>
<tr>
<td>FCA</td>
<td>13</td>
</tr>
<tr>
<td>VW</td>
<td>12</td>
</tr>
<tr>
<td>Ford</td>
<td>11</td>
</tr>
<tr>
<td>Others</td>
<td>19</td>
</tr>
<tr>
<td>Total</td>
<td>100</td>
</tr>
</tbody>
</table>

Millions
What is produced in Mexico?

LV production in Mexico, by segment

<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>661,421 [19%]</td>
</tr>
<tr>
<td>Small Pickup</td>
<td></td>
<td></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>1.7 million units [48%]</td>
</tr>
</tbody>
</table>

Size of circle scaled to production volume
<table>
<thead>
<tr>
<th>Carmaker</th>
<th>2016</th>
</tr>
</thead>
<tbody>
<tr>
<td>Nissan</td>
<td>Sentra</td>
</tr>
<tr>
<td>GM</td>
<td>Silverado</td>
</tr>
<tr>
<td>FCA</td>
<td>Ram pickup</td>
</tr>
<tr>
<td>VW</td>
<td>Jetta</td>
</tr>
<tr>
<td>Ford</td>
<td>Fusion</td>
</tr>
</tbody>
</table>

5 highest volume models total 39% of production
Who produces what?
LV production in Mexico, by segment, 2016

- Large Pickup
- Small Pickup
- Van
- SUV
- Large and Luxury CUV
- Mid-Size CUV
- Small CUV
- Large and Luxury Car
- Mid-Size Car
- Small Car

Size of circle scaled to production volume

- Ford
- GM & Chrysler
- VW & Nissan

- 661k
- 1,083,281
Exposure to Mexico varies

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>VW</td>
<td>100</td>
<td>82</td>
</tr>
<tr>
<td>Ford</td>
<td>5</td>
<td>13</td>
</tr>
<tr>
<td><strong>MEX total</strong></td>
<td><strong>6</strong></td>
<td><strong>20</strong></td>
</tr>
</tbody>
</table>
So do destinations of Mexican production

Mexican production by destination region, 2012-14 average

- Stays in Mexico
- Exported to NAFTA
- Exported elsewhere
- Destination unknown
Majority of Mexican sales are imported

Mexican light vehicle sales by region of production, %
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
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
Possible changes in U.S. trade policy

• From NAFTA to NAFTA
  – Raise the North American content requirement from the current 62.5%
  – Possibly introduce a U.S. peg
• Tariff on imports from Mexico
• Border tax
  – Envisioned as part of broad corporate tax reform
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extras
### North America goes international

Detroit’s light vehicle production share in North America, by country, in percent

<table>
<thead>
<tr>
<th></th>
<th>1995</th>
<th>2016</th>
</tr>
</thead>
<tbody>
<tr>
<td>U.S.</td>
<td>81</td>
<td>53</td>
</tr>
<tr>
<td>Canada</td>
<td>91</td>
<td>57</td>
</tr>
<tr>
<td>Mexico</td>
<td>67</td>
<td>45</td>
</tr>
</tbody>
</table>
Close-up of auto alley