

Integration of the auto industry under NAFTA: Who makes what and what goes where?

Thomas Klier
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DABE/Wards Auto Automotive Insight Conference
Detroit, MI
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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

NAFTA in the news

Donald Trump's Nafta Plan Would Confront Globalized Auto Industry

The Wall Street Journal, November 10, 2016

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

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January 26, 2017

FINANCIAL TIMES

Mexico urges Trump to create Nafta powerhouse to rival China

• Aborted TPP said to provide common ground • Ready-made process presented as win-win

JONATHAN HEALEY — LONDON
JULIE WHELAN — MEXICO CITY
Mexico is urging Donald Trump to come to an agreement reached under the aborted Trans-Pacific Partnership. Partnership to create a manufacturing powerhouse between the US, Mexico and Canada to compete with low-cost producers in China.

Richard Guajardo, Mexico's economy minister, said in an interview with the Financial Times that demands of the TPP could be used to renegotiate the North American Free Trade Agreement between the three nations. His comments come as the US trade minister

backtracked again yesterday when he told CBS news he could still terminate the pact if the renegotiations failed to provide "a fair deal for all".
Mr Guajardo, who is also Mexico's lead trade negotiator, said using sections of the TPP would offer the US president a quick and relatively easy victory outside.
"A package is already in your pocket," he said. "But my message is that if you become extremely greedy you may waste a victory that is already there."
If they agreed to talks, it would be a case study of cooperation between



reformed Mexican sectors such as energy and telecoms.
Mr Guajardo said he had raised the suggestion of basing talks on TPP with Wilbur Ross, saying the US commerce secretary had reacted positively.
However, another person close to Mexico's negotiating team said that if the US insisted on strict rules of origin, for example, it risked playing into the hands of Chinese manufacturers.
The Mexican government is keen to reach a deal by the end of December, ahead of campaigning for election in his own name.

May 1, 2017

Outline

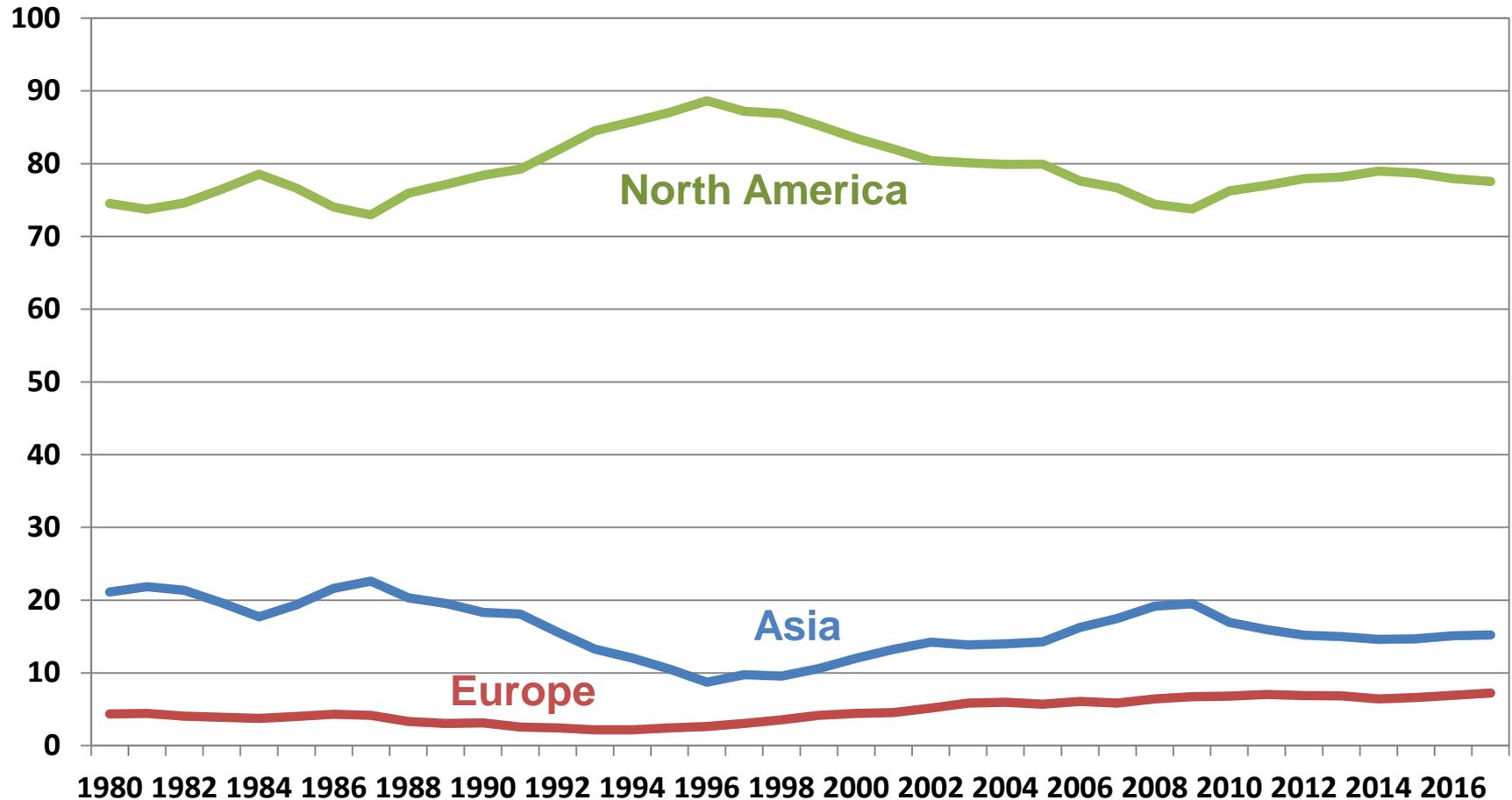
- **North American production geography**
- **Growth in Mexico**
- **Trade in vehicles**
- **Supply chain integration**

Production geography



Vehicles are produced where sold

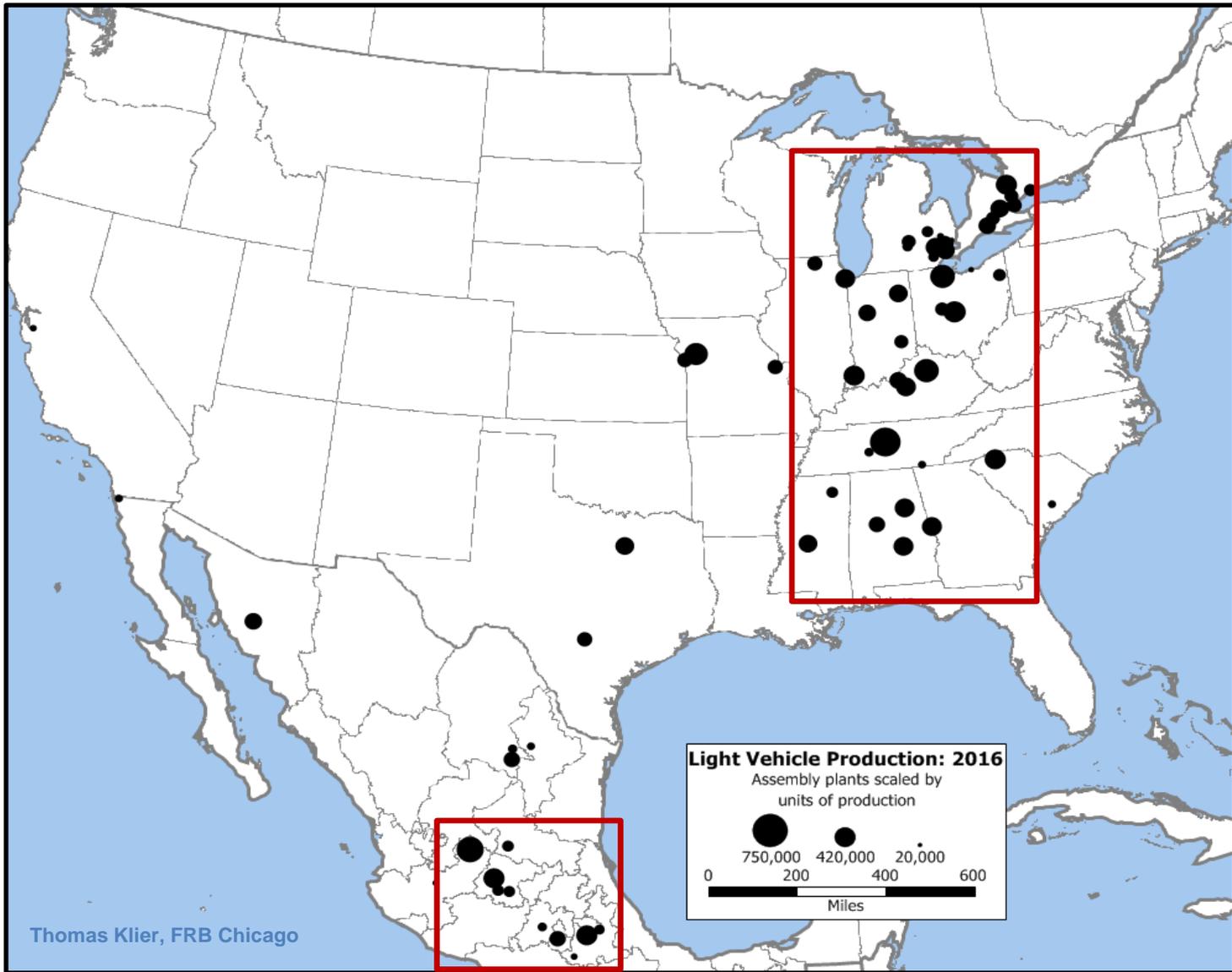
U.S. light vehicle sales by major production region, %



Source: Wards Autoinfobank



North America's auto production footprint

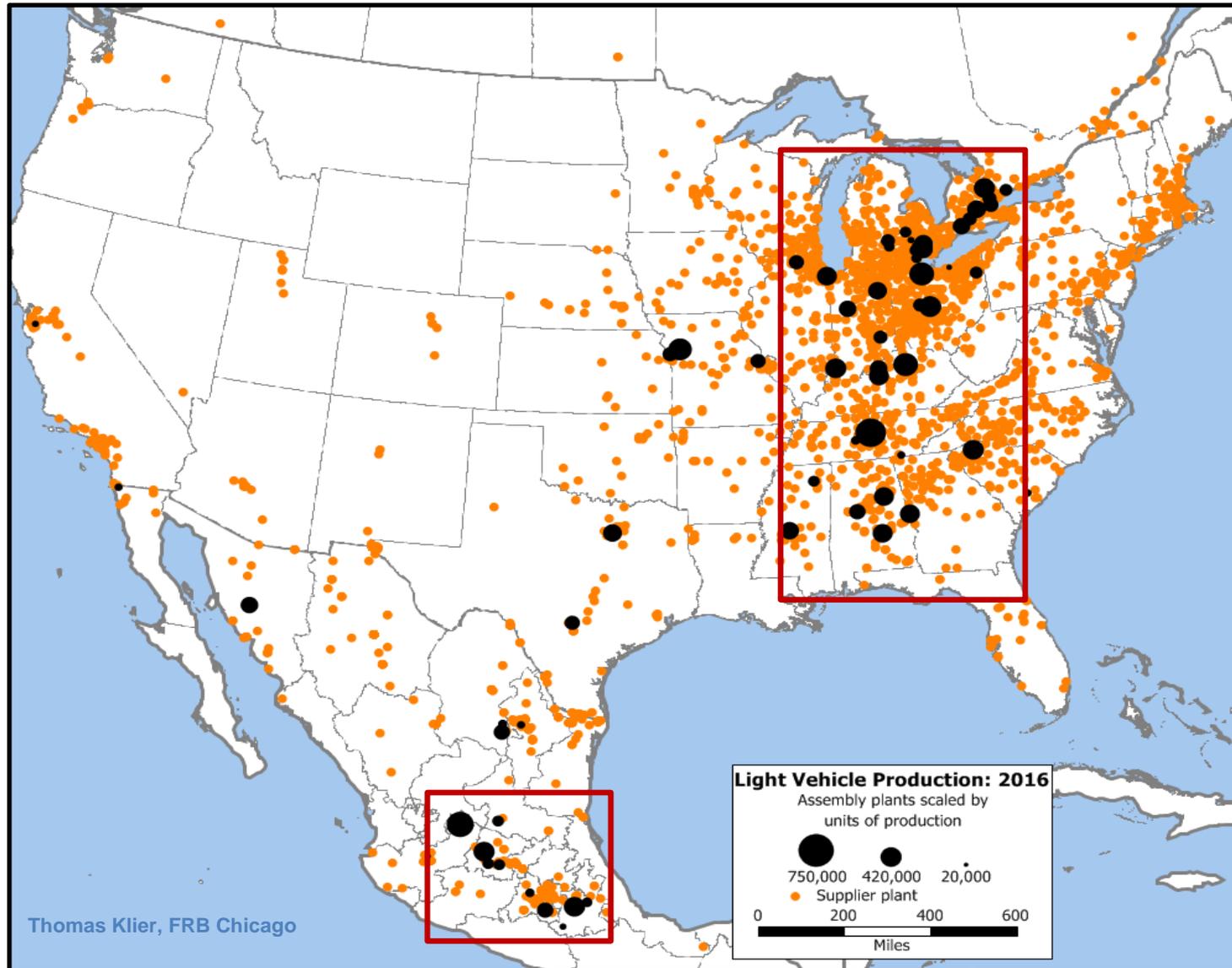


2016

Thomas Klier, FRB Chicago

Source:
Wards,
Maptitude

Parts and vehicle assembly co-locate



2016

Source:
Wards,
ELM,
Maptitude

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

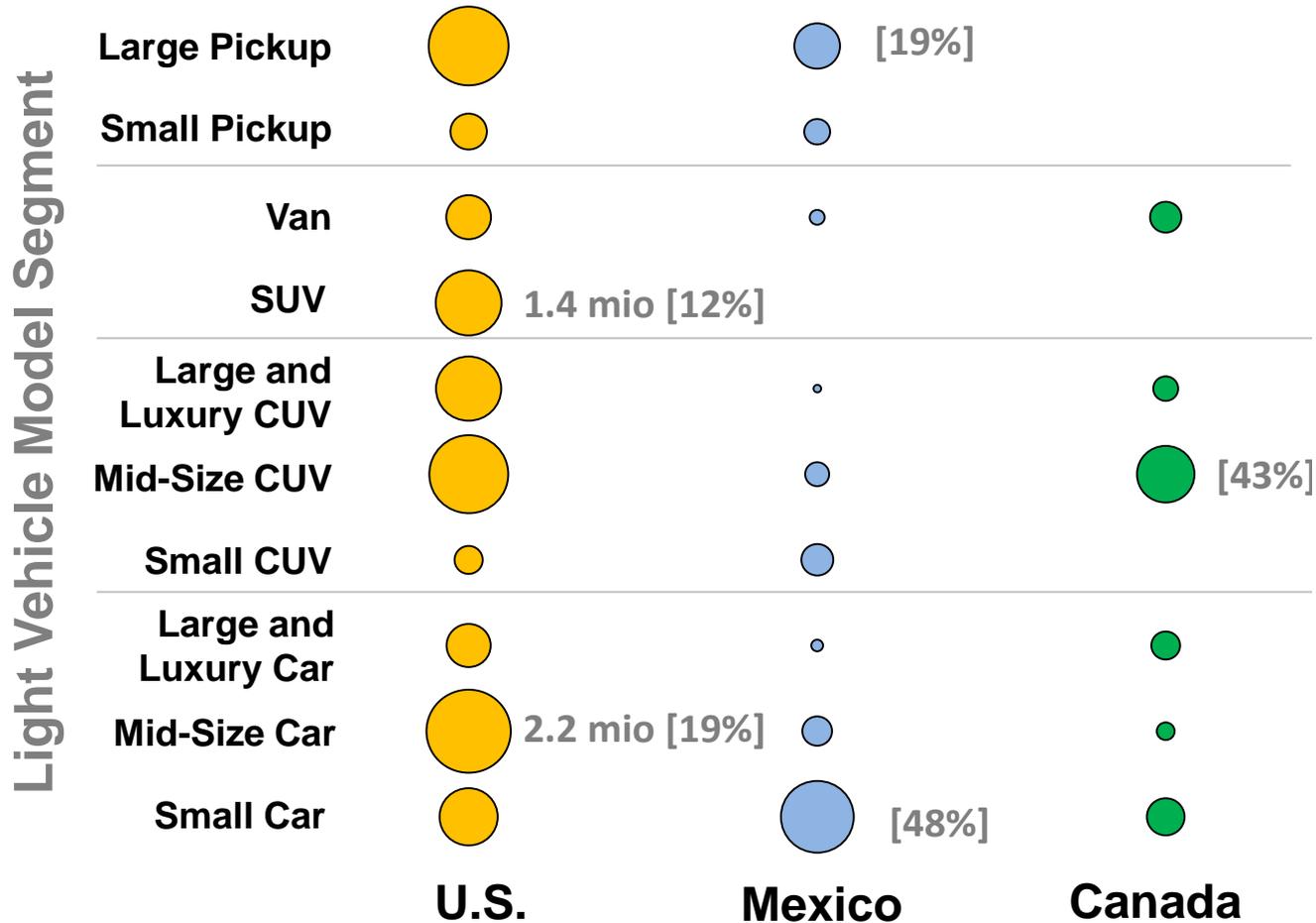
Share of NAFTA's light vehicle production (%)

Country	1995	2000	2010	2016
Canada	16	17	17	13
Mexico	6	11	19	20
U.S.	78	72	64	67
Total	100	100	100	100
<i>Vehicles (millions)</i>	<i>14.9</i>	<i>17.2</i>	<i>11.9</i>	<i>17.7</i>

Source: Author's calculations based on Wards Autoinfobank

What is produced where?

LV production in North America, by country and segment



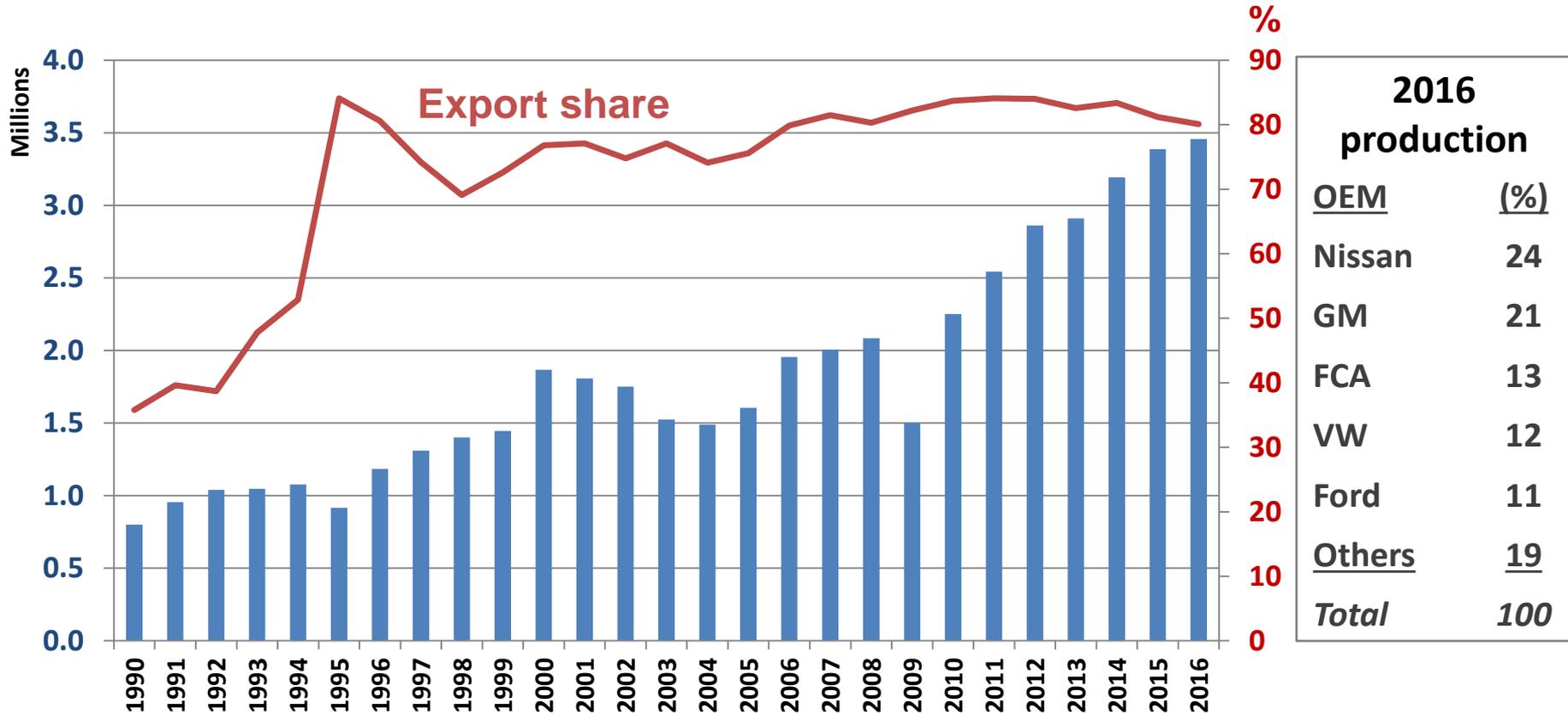
Size of circle scaled to 2016 production volume

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:*
 - *1960: 50k; 1970: 193k; 1980: 490k; 1990: 800k*

Exports drive Mexico's strong growth

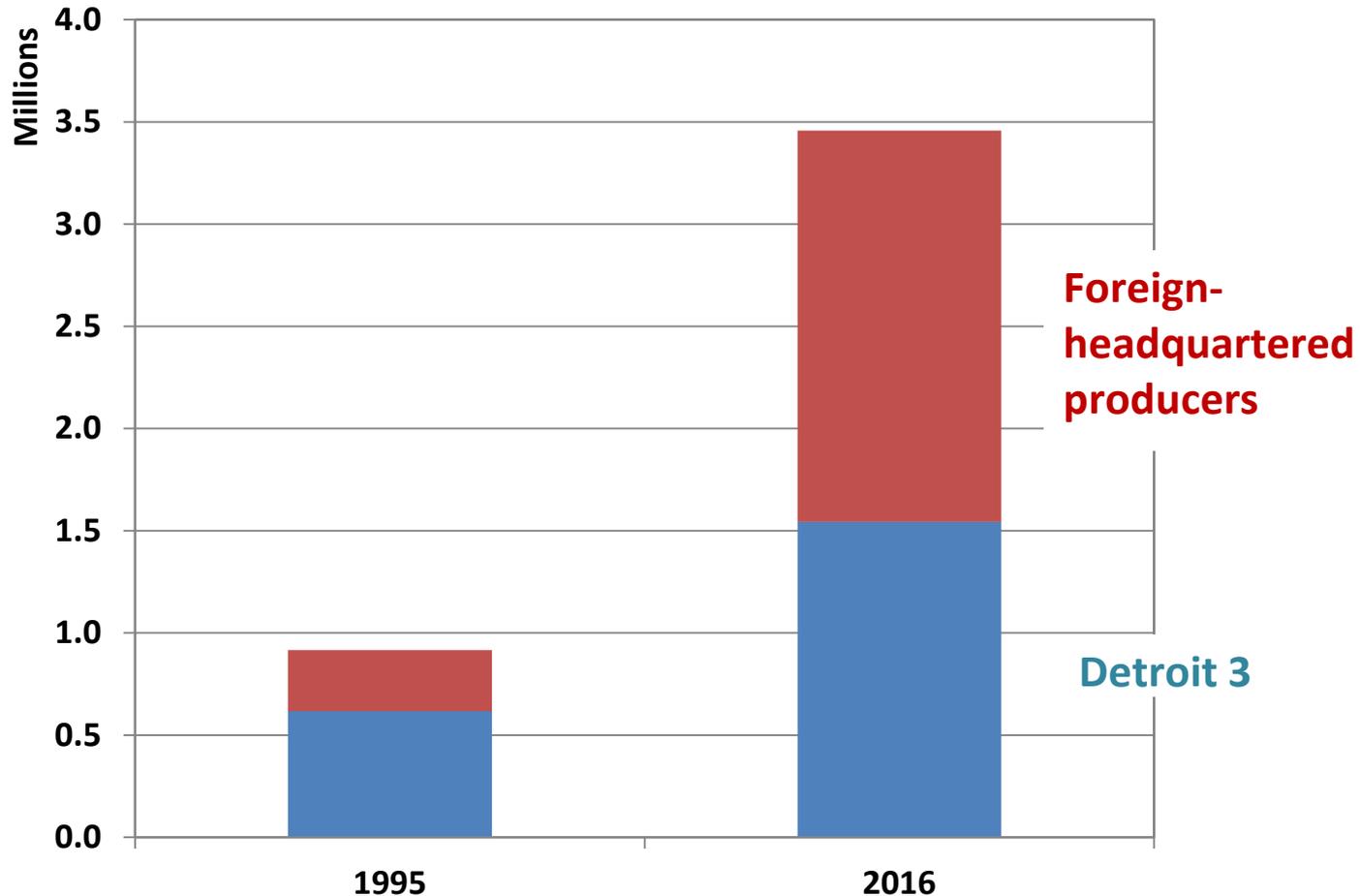
Light vehicle production in Mexico



Production has increased by 2.5 million units since 1995

Non-D3 producers driving growth

Mexico light vehicle production, by nationality of producer



Source: Author's calculations based on Wards Autoinfobank

Exposure to Mexico varies by OEM

Share of NAFTA light vehicle production in Mexico, by OEM

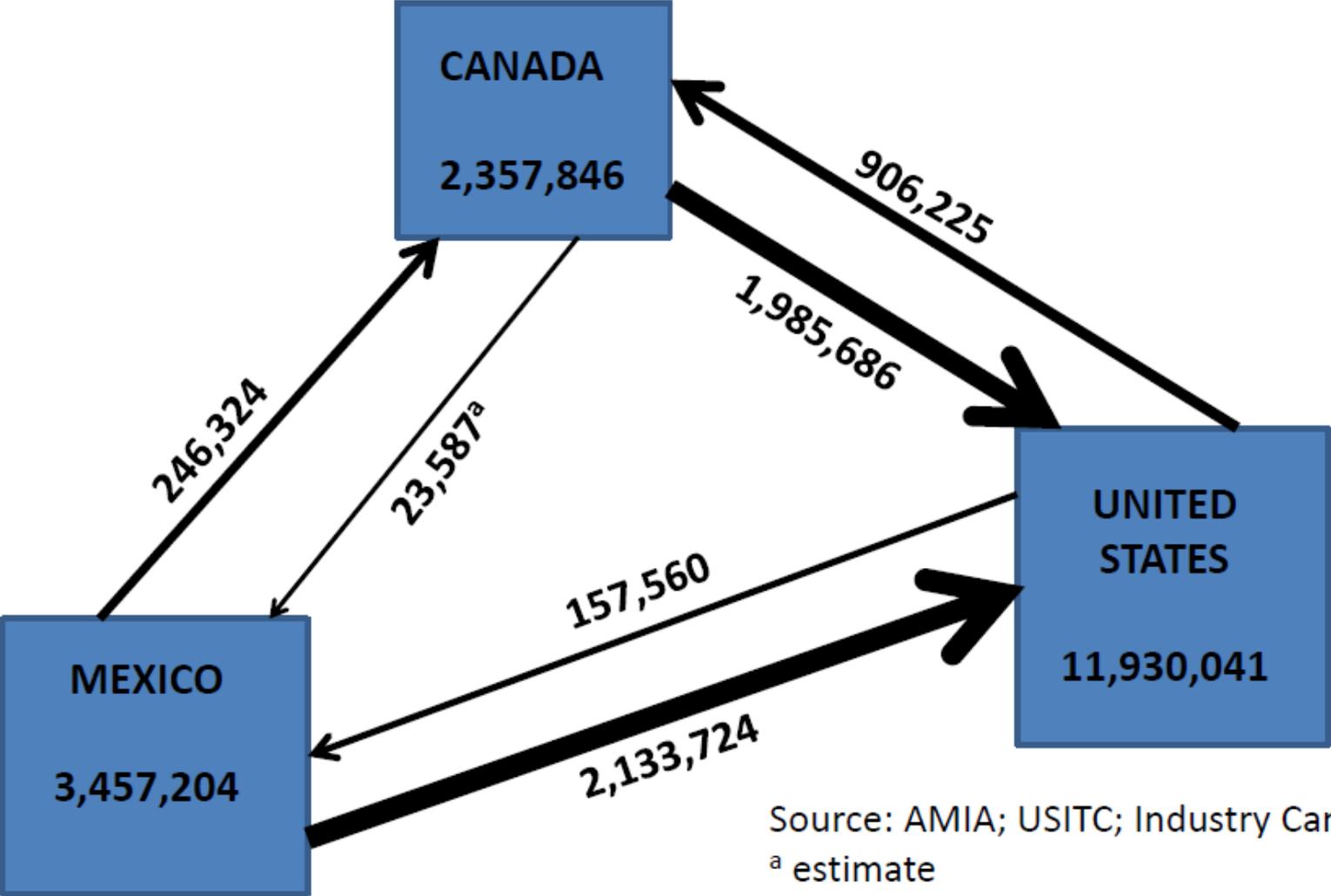
Carmaker	1995	2016
Nissan	17	45
GM	4	20
FCA	8	18
Ford	5	13
VW	100	82
Honda	0	13
Toyota	0	7
<i>MEX total</i>	<i>6</i>	<i>20</i>

Source: Author's calculations based on Wards Autoinfobank

Outline

- North American production geography
- Growth in Mexico
- **Trade in vehicles**
- Supply chain integration

Trade in light vehicles within NAFTA, 2016



Source: Holmes, 2017

Mexico has broadest export base

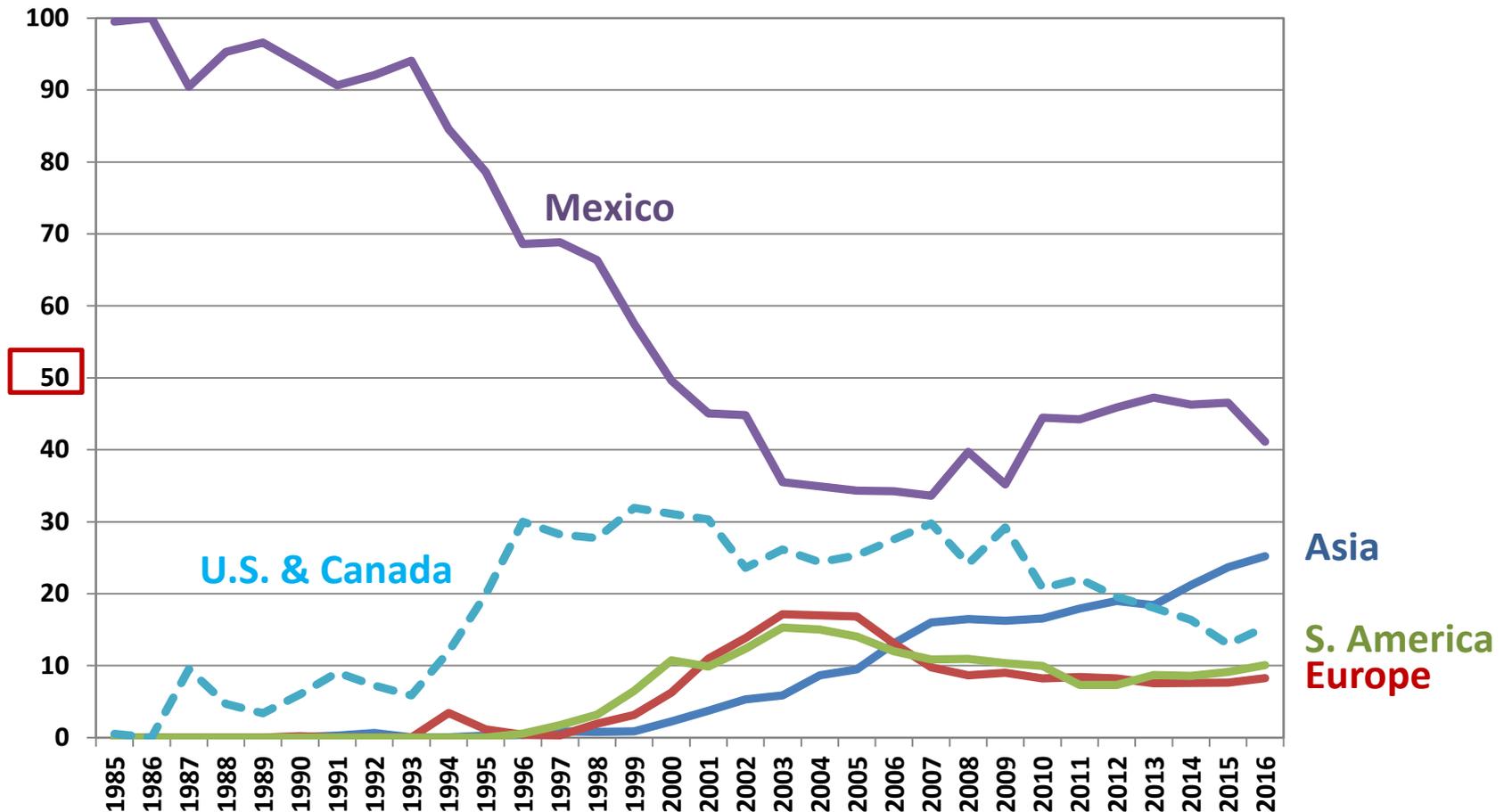
Light vehicle production in NAFTA countries, by destination, 2014, in percent

Destination	Mexico	Canada	U.S.
Domestic	18	12	79
EX to other NAFTA	59	79	9
EX elsewhere	14	4	8
EX, unknown	9	5	4

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

Source of Mexico's imports

Light vehicle sales in Mexico, by country of production, 2016

Country	Light vehicles (1,000)
Mexico	640
US & CDN	264
India	194
Japan	134
Brazil	110
All others	259
<i>Total</i>	<i>1,601</i>

Source: Wards AutoInfobank

Outline

- North American production geography
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- Trade in vehicles
- **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



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%

U.S./CDN content in Mexican vehicles

2016 powertrain data

Production country		Part	
Vehicle	Part	Transm. %	Engines %
MEX	US	34	17
MEX	CDN	0	3
MEX	MEX	30	54
MEX	RoW	36	26

Source: Author's calculations based on data from IHS Markit as of October 2017

Mexican content in U.S. vehicles

2016 powertrain data

Production country		Part	
Vehicle	Part	Transm. %	Engines %
US	CDN	0	5
US	MEX	17	17
US	RoW	20	13
US	US	63	65

Source: Author's calculations based on data from IHS Markit as of October 2017

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., Canada, and Mexico are extensive**

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