

# Canada's changing role in North America's auto industry under NAFTA: Who makes what and what goes where

Thomas Klier, Federal Reserve Bank of Chicago  
James Rubenstein, Miami University

APRC workshop  
April 4-6, 2018  
Toronto

*Disclaimer*

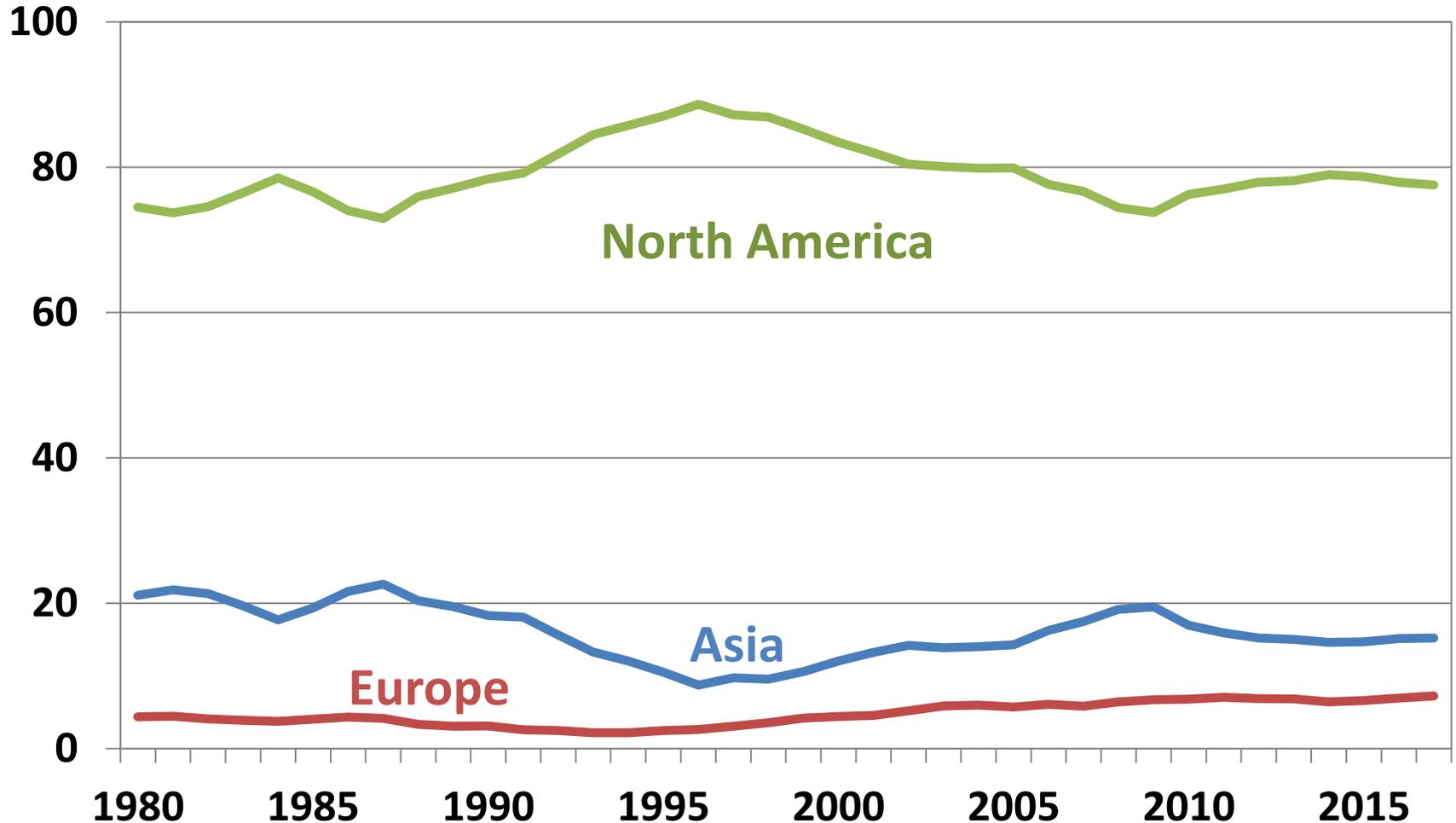
*The analysis and conclusions set forth are those of the authors and do not indicate concurrence by other members of the research staff or the Federal Reserve Bank of Chicago*

# Outline

- Light vehicle production in North America
- Canada's vehicle export profile
- Canada's role in the powertrain supply chain

# Vehicles are produced where sold

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



Source: Authors' calculations based on Wards AutoInfobank

# Mexico is now larger than Canada

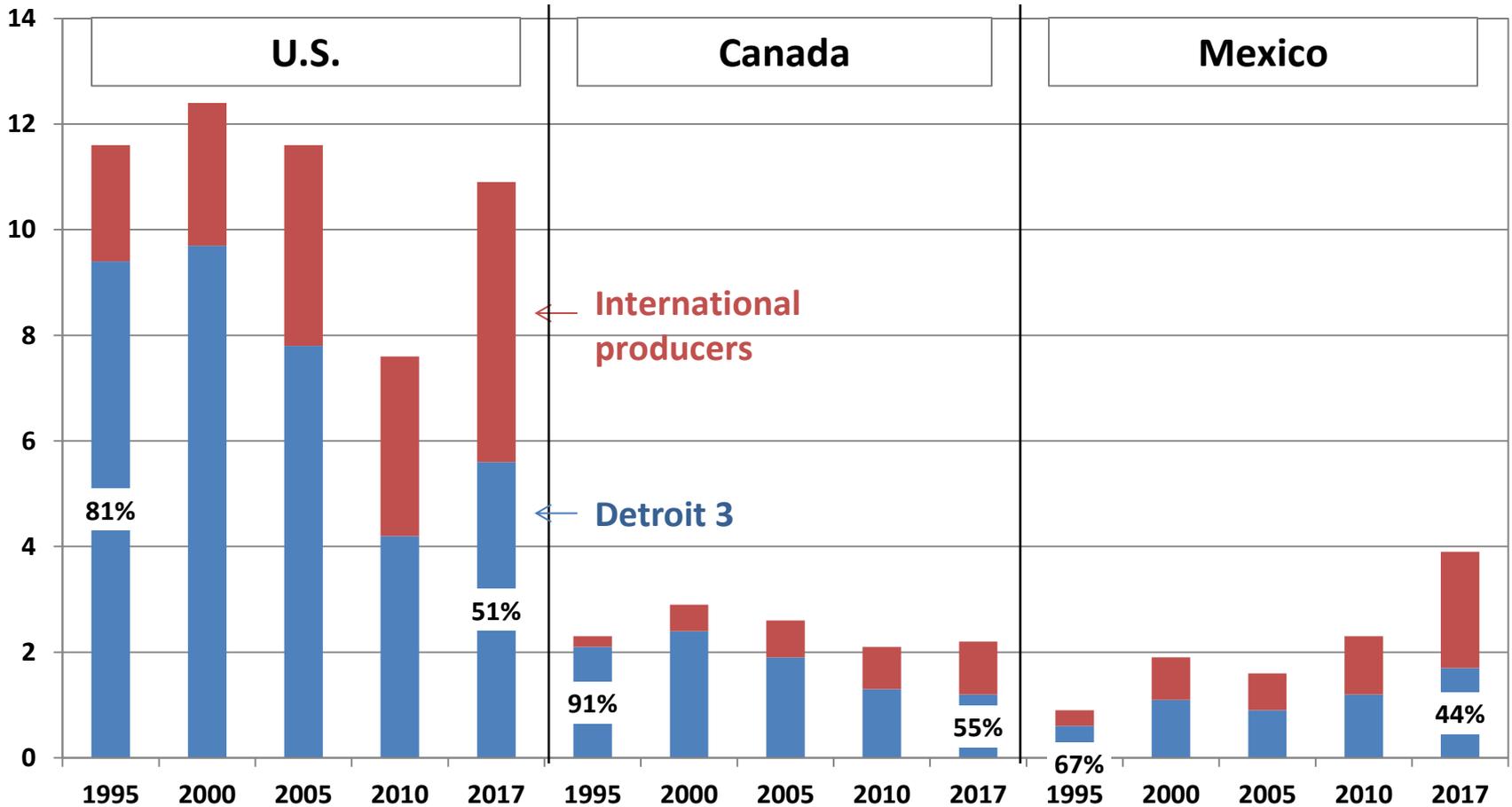
Share of NAFTA's light vehicle production (%)

<u>Country</u>	<u>1995</u>	<u>2000</u>	<u>2005</u>	<u>2010</u>	<u>2017</u>
<b>Canada</b>	<b>16</b>	<b>17</b>	<b>17</b>	<b>17</b>	<b>13</b>
<b>Mexico</b>	6	11	10	19	20
<b>U.S.</b>	78	72	73	64	67
<b>Total</b>	100	100	100	100	100
<b><i>Vehicles (millions)</i></b>	<b><i>14.9</i></b>	<b><i>17.2</i></b>	<b><i>15.7</i></b>	<b><i>11.9</i></b>	<b><i>17.7</i></b>

Source: Authors' calculations based on Wards AutoInfobank

# Home team vs foreign team

Light vehicle production by OEM group and country, in million units



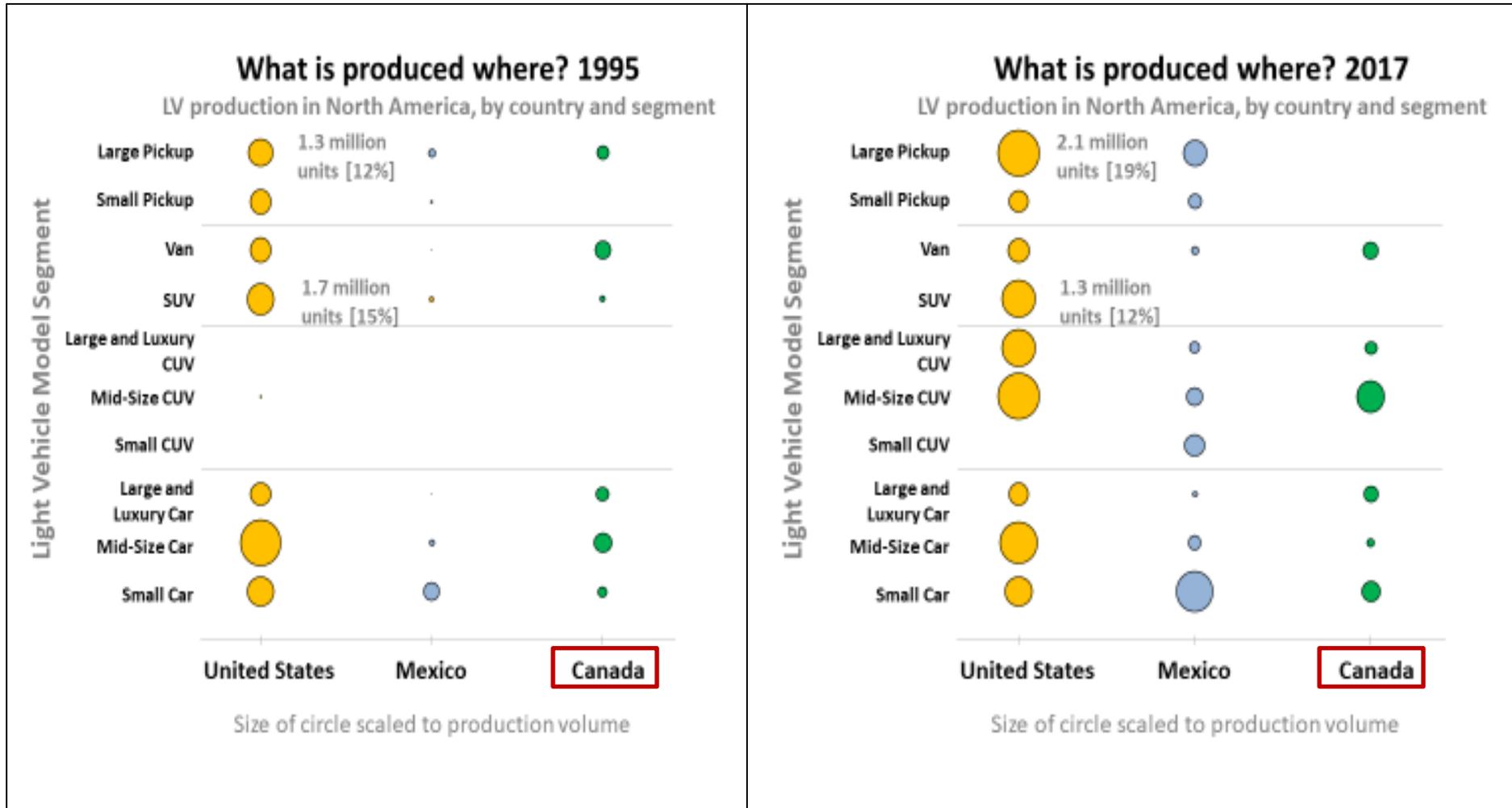
Source: Authors' calculations based on Wards AutoInfobank

# Not every OEM is cutting back in Canada

Share of North American light vehicle production in Canada [%]

<u>OEM</u>	<u>1995</u>	<u>2017</u>
FCA	21.0	22.3
Ford	13.1	8.6
GM	19.2	11.9
Honda	15.4	23.0
Toyota	12.3	28.7
<i>Industry</i>	<i>15.9</i>	<i>12.8</i>

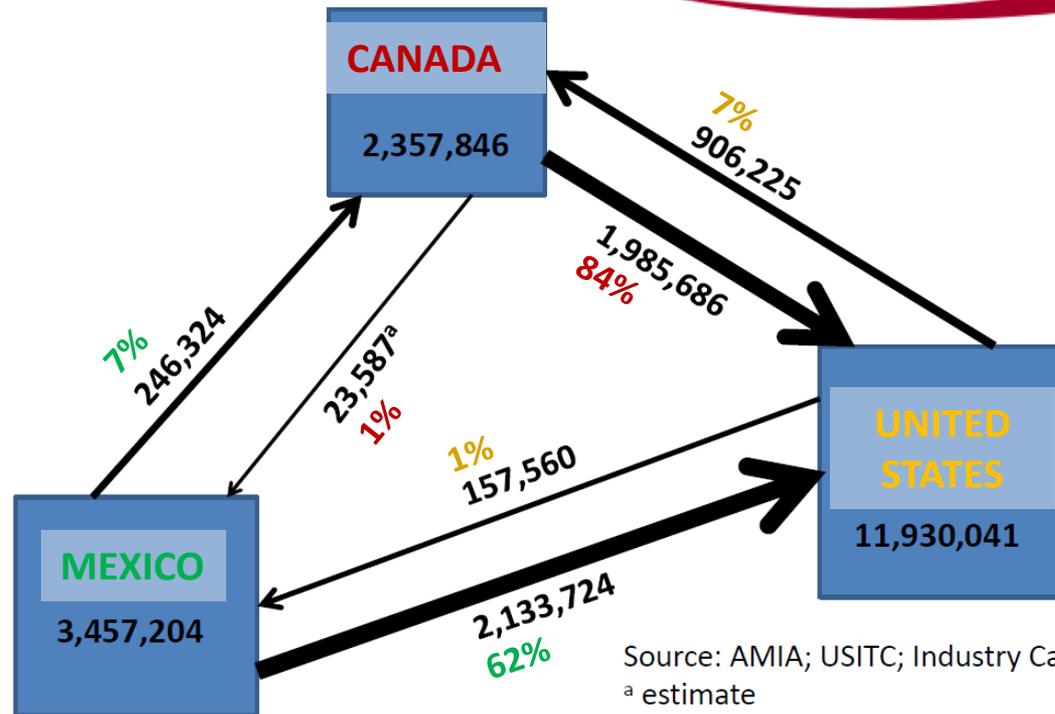
# From vans & small cars to CUVs in 20+ yrs.



Source: Authors' calculations based on Wards AutoInfobank

# Many vehicles cross borders

## NAFTA Vehicle Production and Trade Flows: 2016 (Units)



Source: Holmes and Sweeney, 2017. Percentages calculated out of each country's production

# Mexico has broadest export base

Light vehicle production in North America by destination, 2014 [%]

<u>Destination</u>	<u>Canada</u>	<u>Mexico</u>	<u>U.S.</u>
Domestic	12	18	79
Exported to other NAFTA	79	59	9
Exported elsewhere	4	14	8
Exported, destination unknown	5	9	4

# North America dominates in powertrains

Origin of powertrains used in light vehicle assembly  
2000 & 2016 [%]

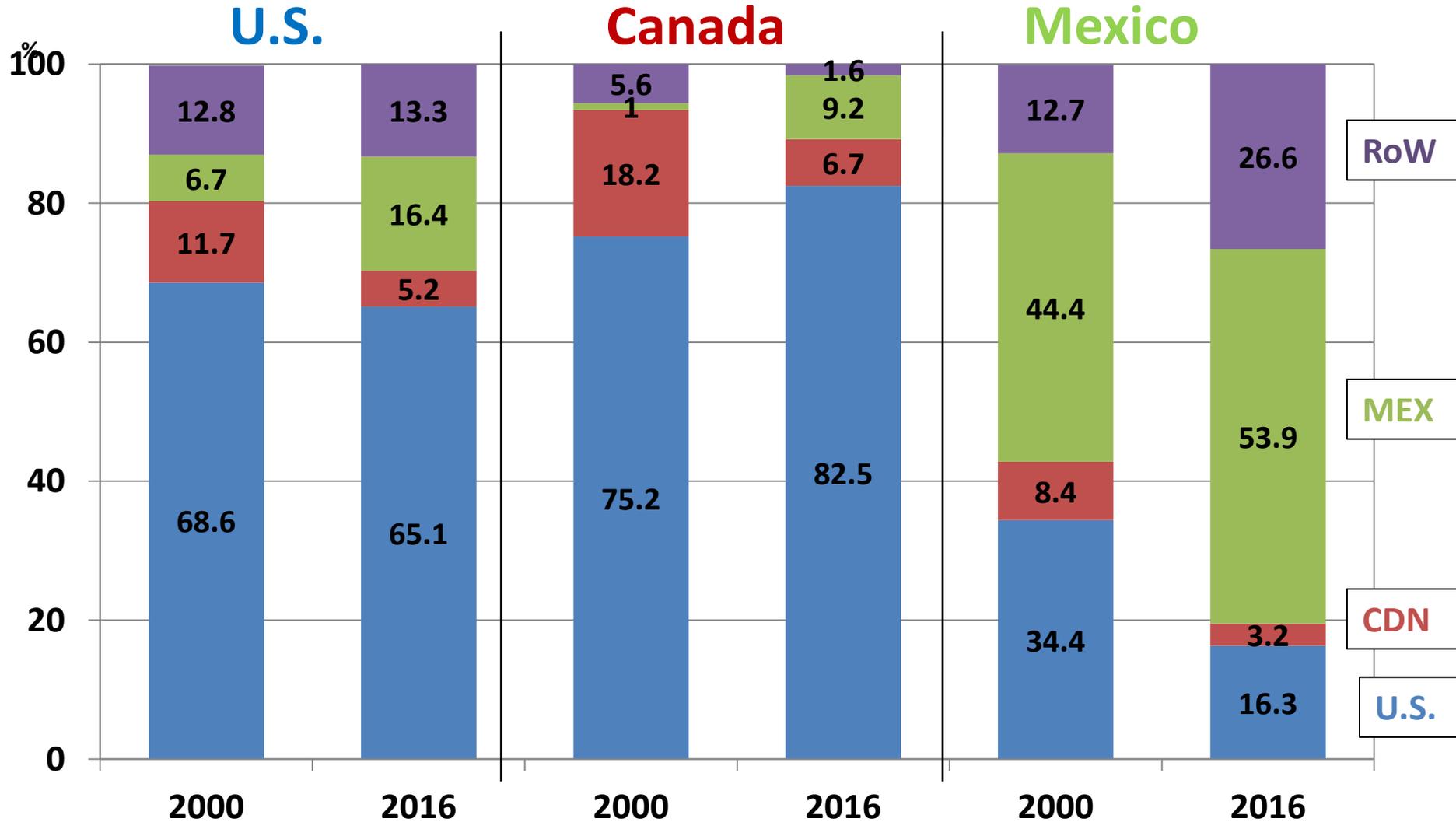
<u>Sourced from:</u>	<u>Engines</u>		<u>Transmissions</u>	
	<u>2000</u>	<u>2016</u>	<u>2000</u>	<u>2016</u>
Same country that builds vehicle	57.6	55.1	49.4	49.0
Imported from within NAFTA	30.8	30.6	25.6	27.5
Imported from elsewhere	11.6	14.3	25.0	23.5
<i>Total [%]</i>	<i>100</i>	<i>100</i>	<i>100</i>	<i>100</i>
<i>N (million units)</i>	<i>17.1</i>	<i>17.8</i>	<i>17.1</i>	<i>17.8</i>

# North America dominates in powertrains

Origin of powertrains used in light vehicle assembly  
2000 & 2016 [%]

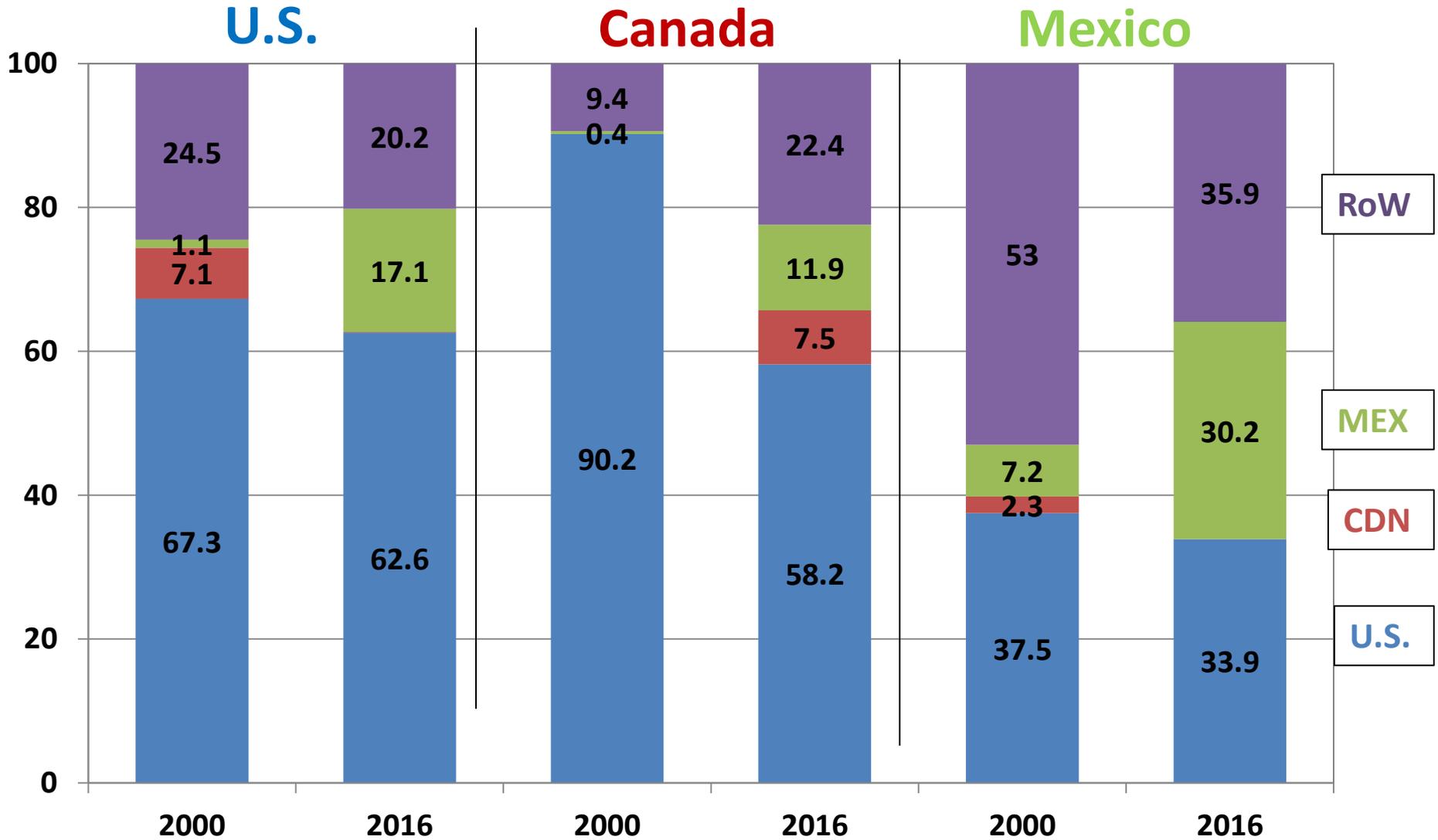
<u>Sourced from:</u>	<u>Engines</u>		<u>Transmissions</u>	
	<u>2000</u>	<u>2016</u>	<u>2000</u>	<u>2016</u>
<b>Canada</b>	<b>12.5</b>	<b>5.0</b>	<b>5.4</b>	<b>1.0</b>
Mexico	9.8	22.8	1.6	19.0
U.S.	66.1	57.9	68.0	56.4
Other countries	11.6	14.3	25.0	23.5
<i>Total [%]</i>	<i>100</i>	<i>100</i>	<i>100</i>	<i>100</i>
<i>N (million units)</i>	<i>17.1</i>	<i>17.8</i>	<i>17.1</i>	<i>17.8</i>

# Engine sourcing by country [%]



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

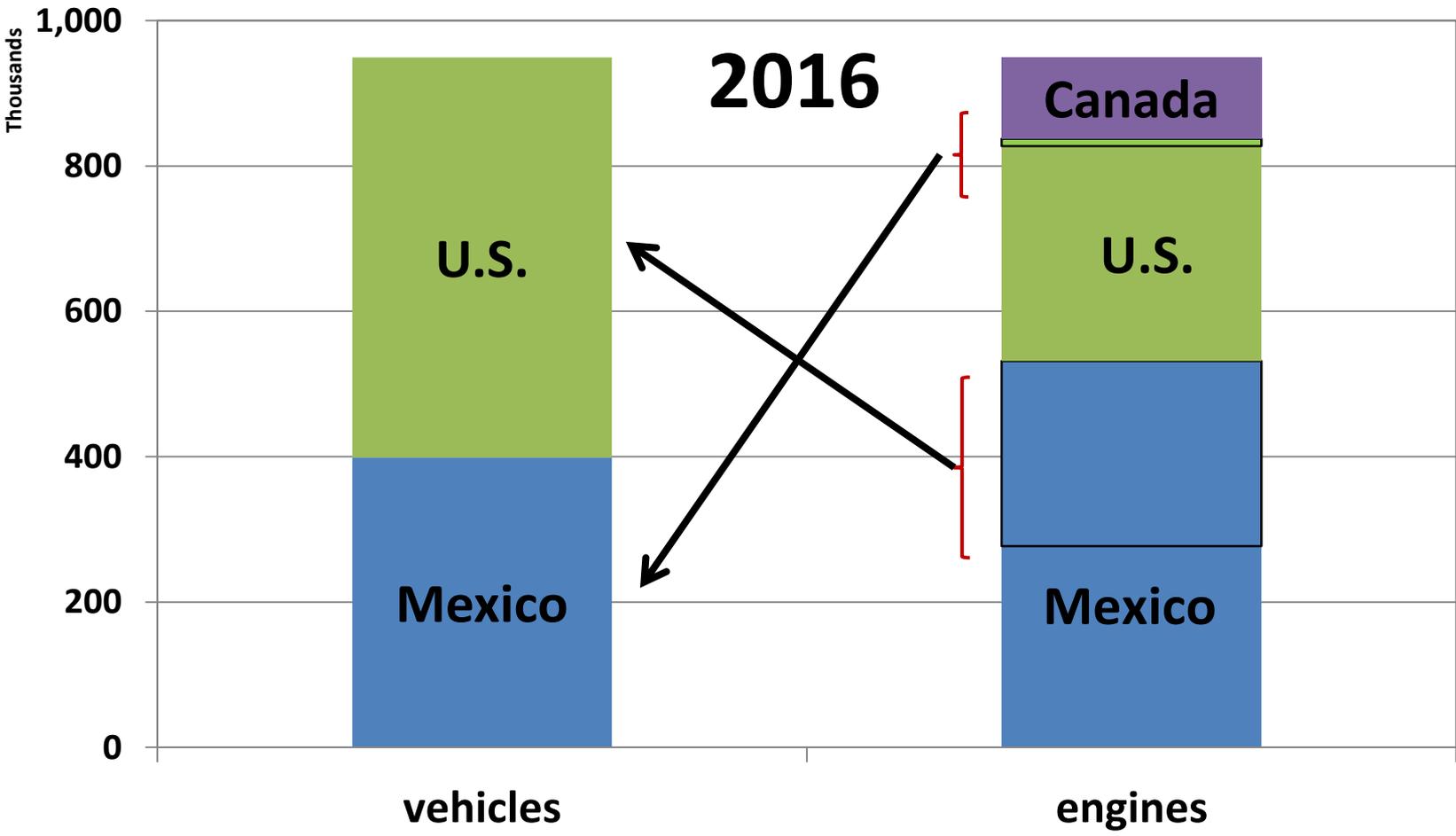
# Transmission sourcing by country [%]



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

# Example: Silverado/Sierra engine sourcing

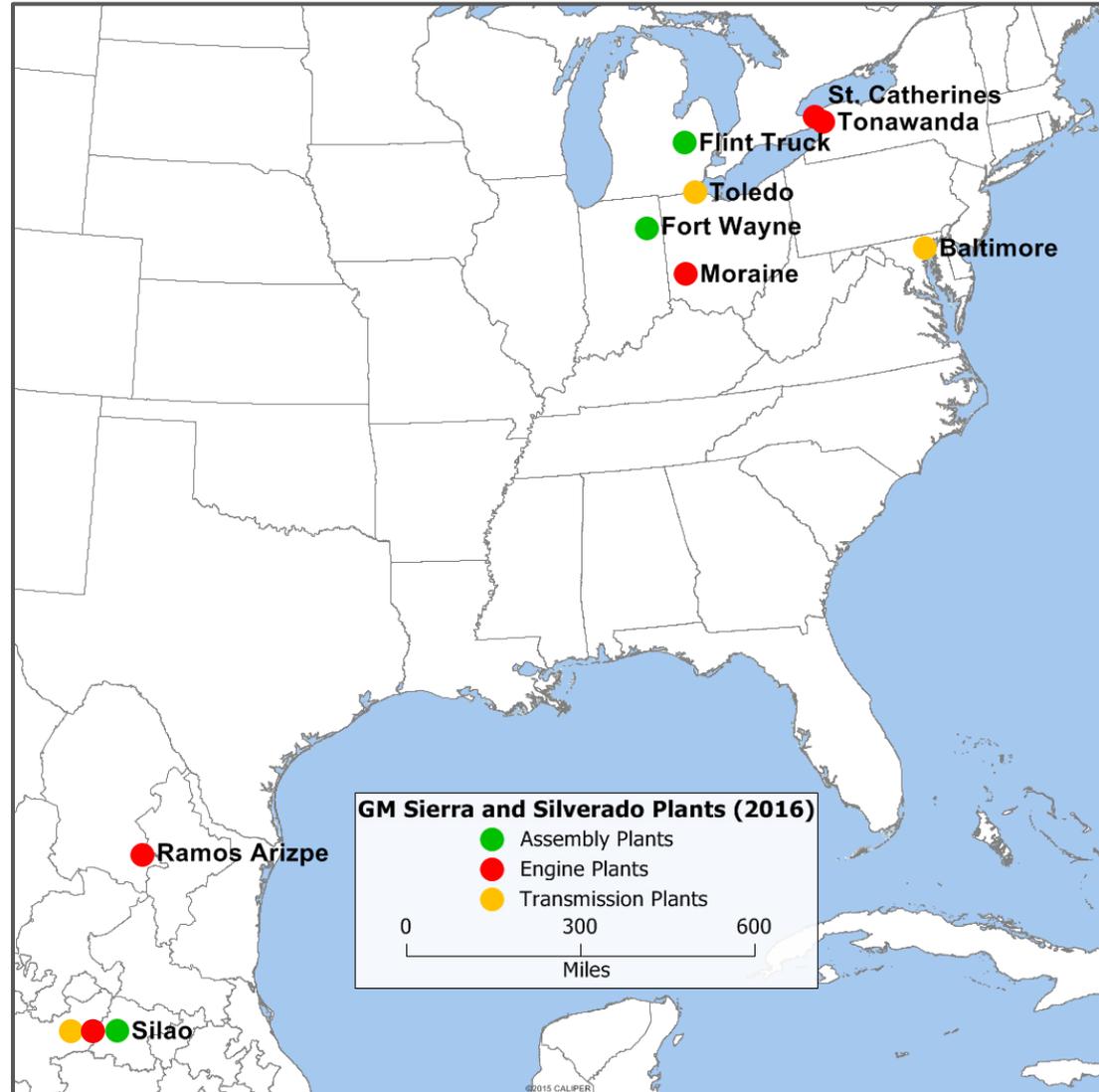
## 39.6% of engines cross borders



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

# Silverado/Sierra engine sourcing by plant location

- All 3 transmission plants supplied all 3 assembly plants in 2016
- 3 engine plants supplied all 3 assembly plants (Moraine, Tonawanda, & Ramos Arizpe)
- Silao supplied Silao and Ft Wayne
- St Catherines supplied only Silao



# Summary

- Canada's share of North American light vehicle production started declining in 2010. Unlike Mexico and U.S., Canada did not expand production after 2010.
- Most vehicles produced in Canada are sold in the U.S.
- Powertrain sourcing is integrated across North America.
- Canada's share of North American powertrain sourcing has been declining (at least since 2000). [exception: St. Catherine's started producing transmissions in 2012]

# Canada's changing role in North America's auto industry under NAFTA: Who makes what and what goes where

Thomas Klier, Federal Reserve Bank of Chicago  
James Rubenstein, Miami University

APRC workshop  
April 4-6, 2018  
Toronto

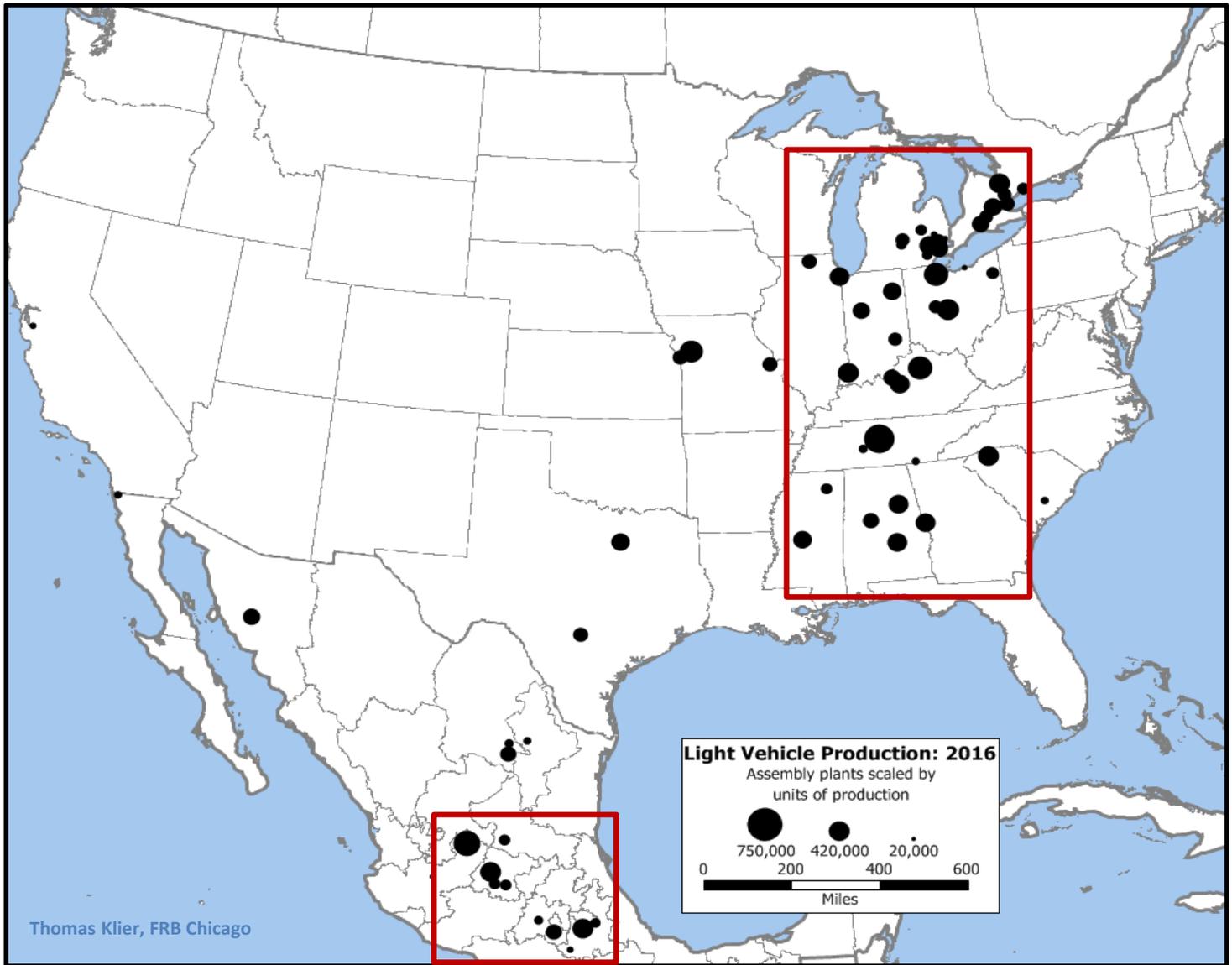
*Disclaimer*

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

**extras**

# North America's auto production footprint

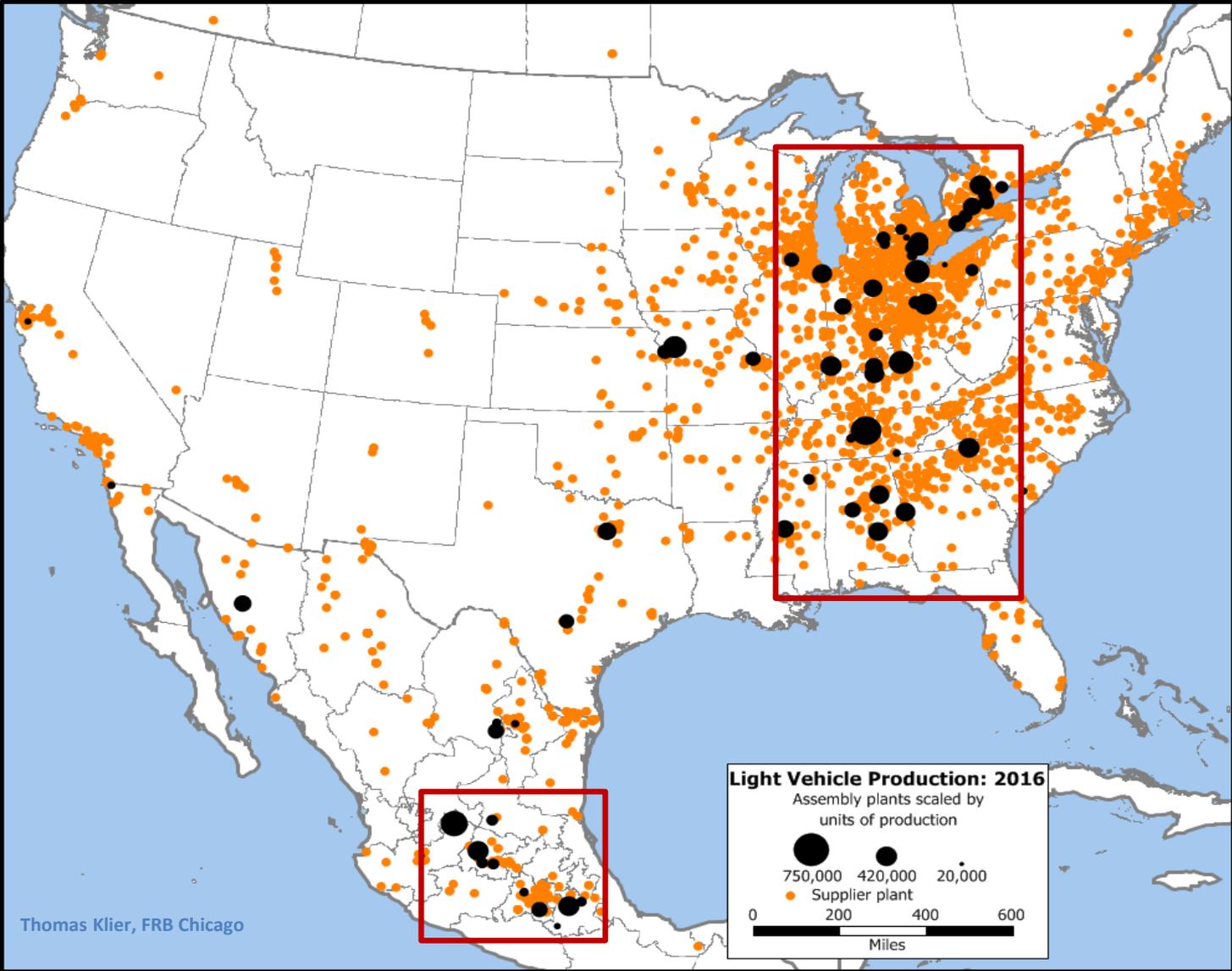
2016



Thomas Klier, FRB Chicago

Source:  
Wards,  
Mapitude

# Parts and vehicle assembly co-locate

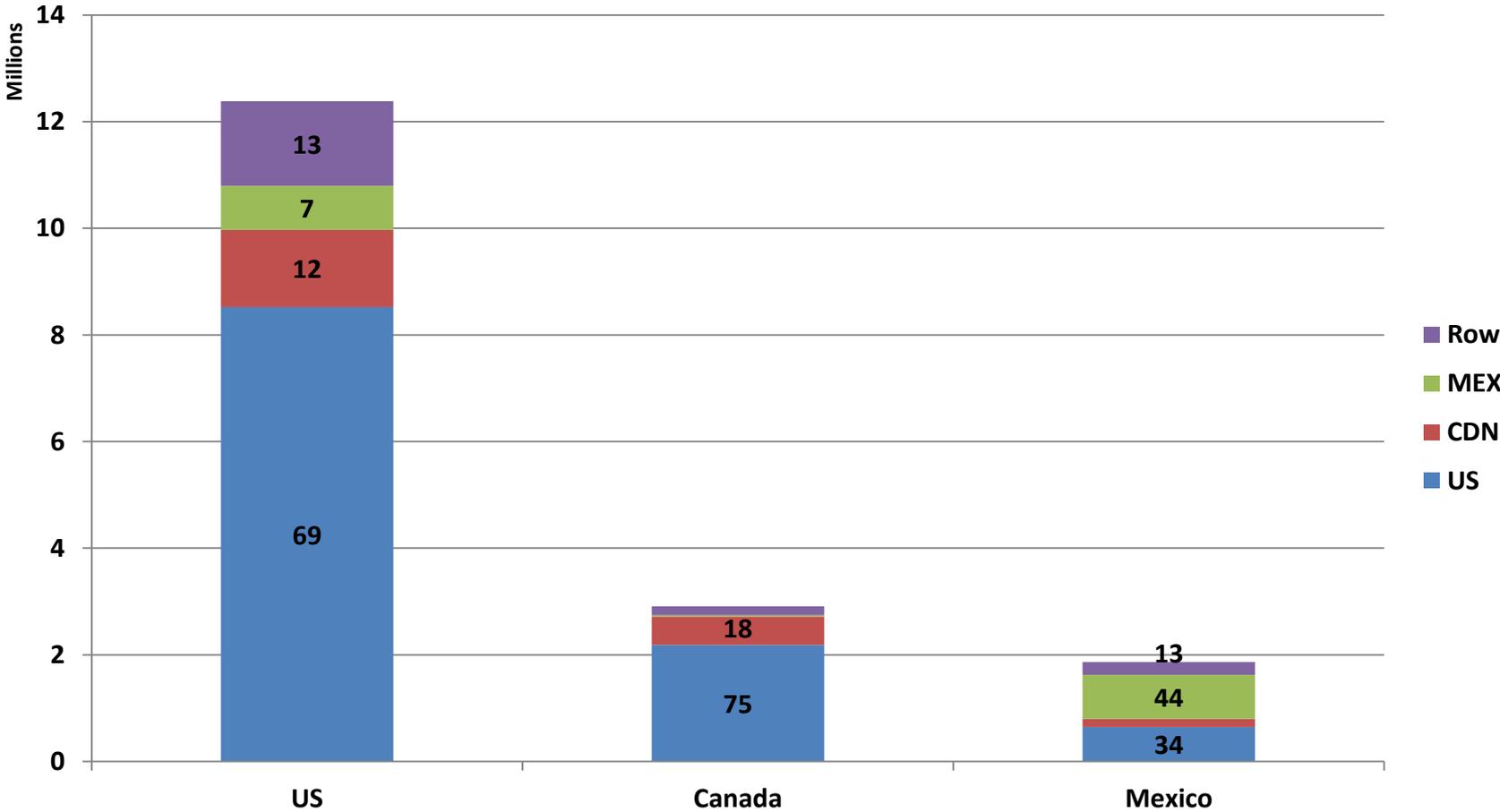


2016

Source:  
Wards, ELM,  
Mapitude

# Origin of **engines** used in LV production in North America, by country, 2000

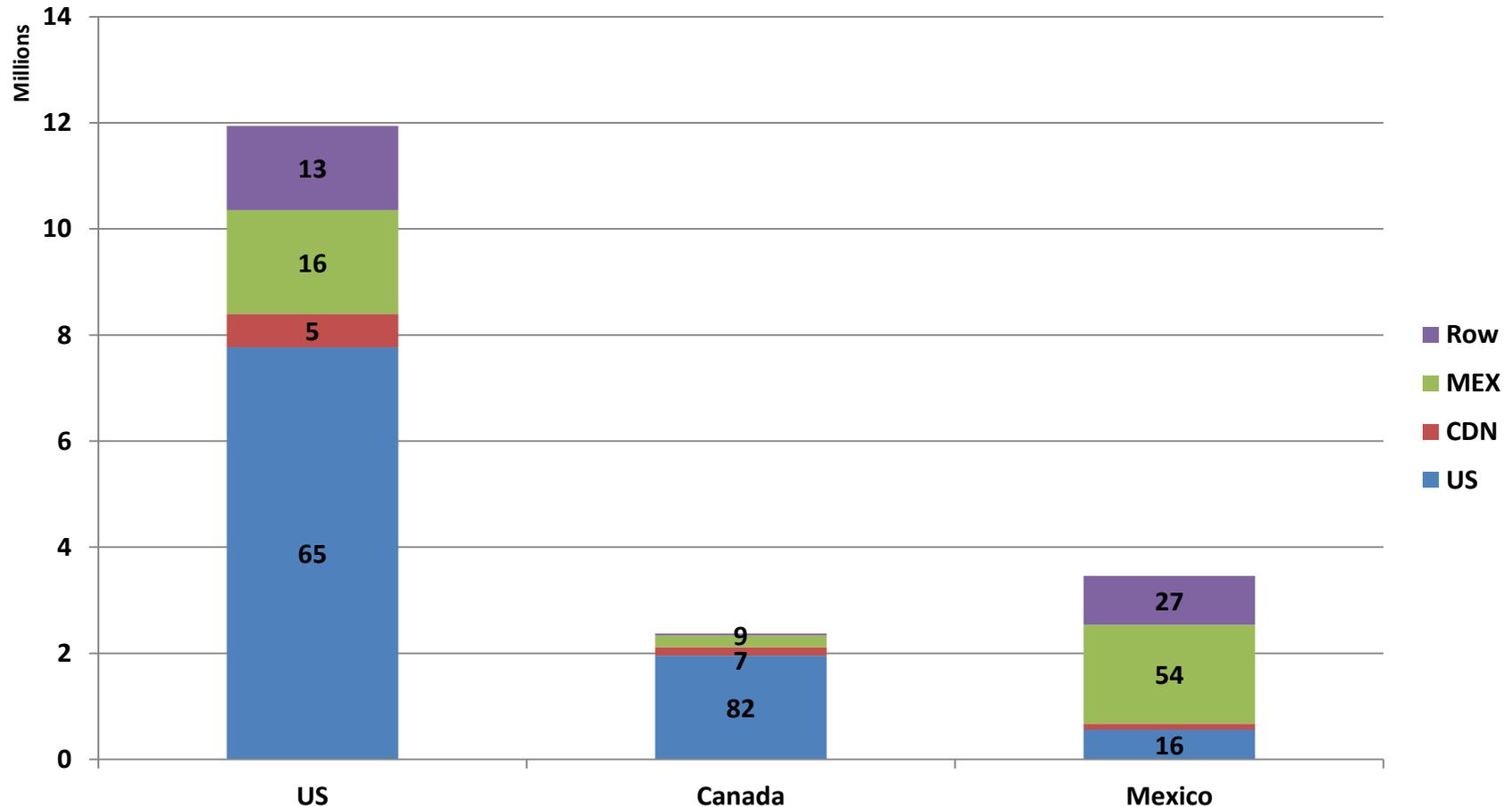
## title: Engine sourcing by country



Source: Authors' calculations based on data from Global Insight as of October 2017

Note: In Canada's column, "RoW" accounts for 6 percent and Mexico accounts for 1 percent. In Mexico's column, Canada accounts for 8 percent.

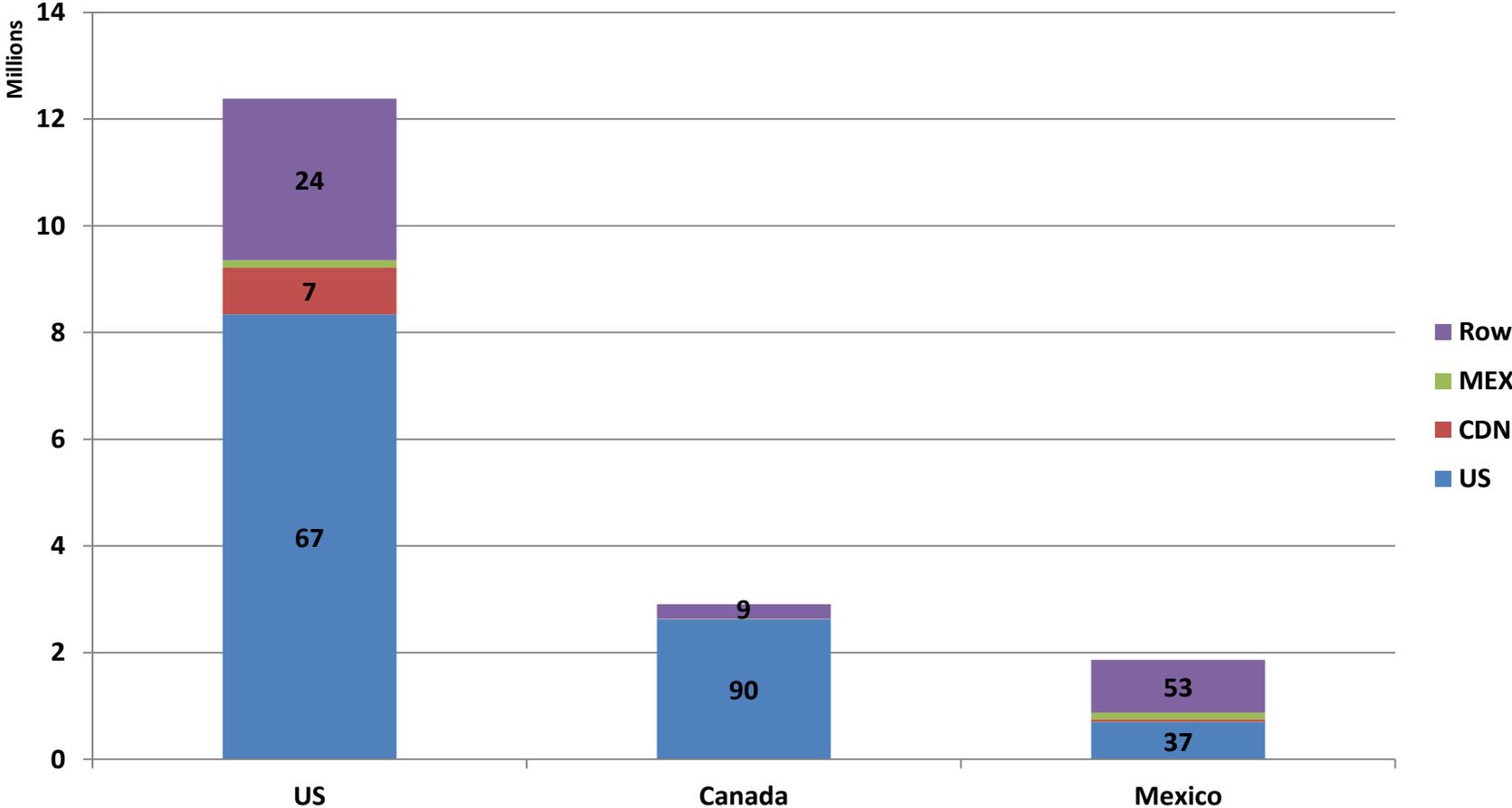
# Sources of **engines** used in LV production in North America, by country, 2016



Source: Authors' calculations based on data from Global Insight as of October 2017

Note: In Canada's column, "RoW" accounts for 2 percent. In Mexico's column, Canada accounts for 3 percent.

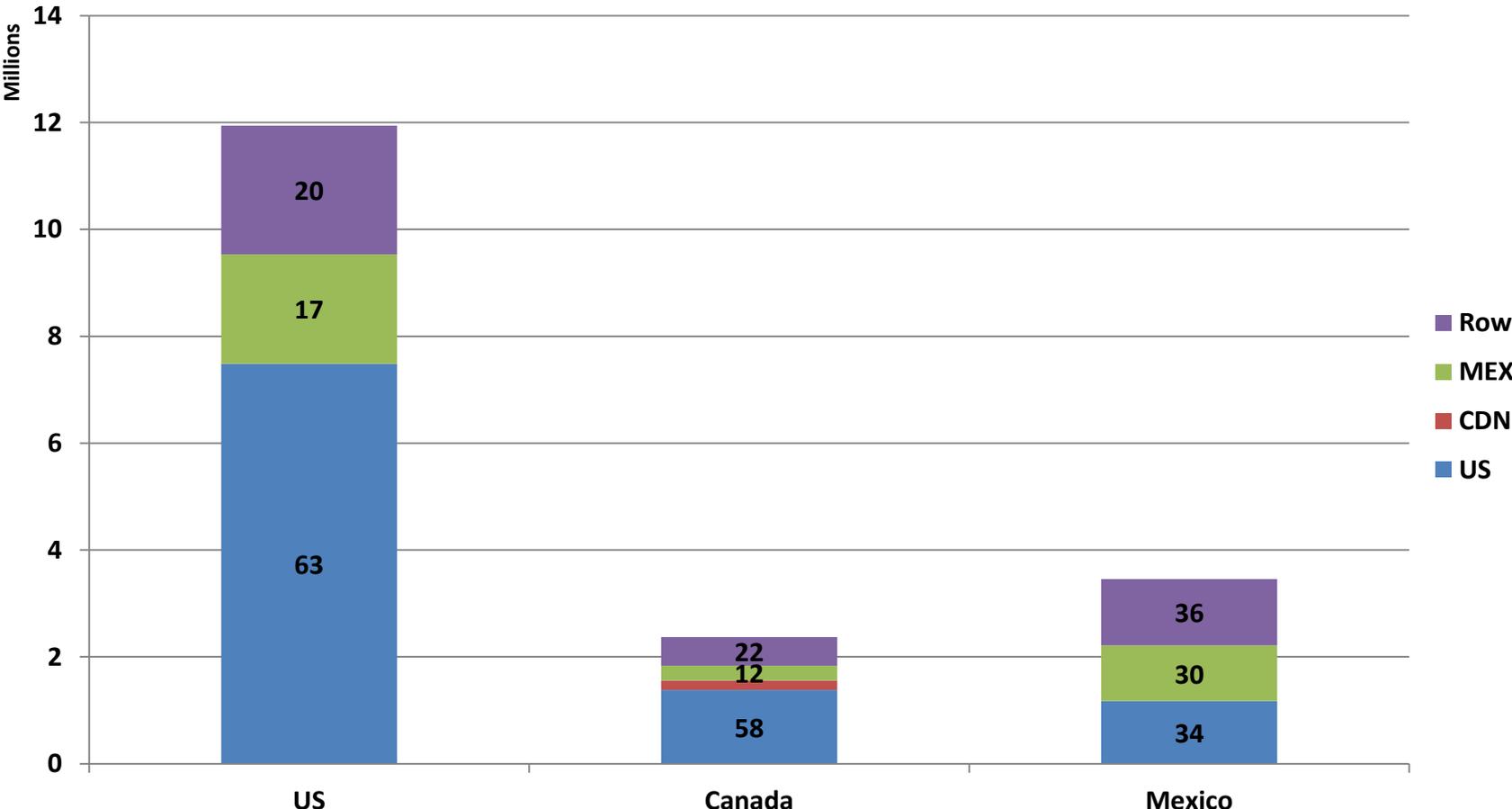
# Sources of **transmissions** used in LV production in North America, by country, 2000



Source: Authors' calculations based on data from Global Insight as of October 2017

Note: In the US column, Mexico accounts for 2 percent. In Mexico's column, Mexico accounts for 7 percent and Canada for 2 percent.

# Sources of **transmissions** used in LV production in North America, by country, 2016



Source: Authors' calculations based on data from Global Insight as of October 2017  
Note: In Canada's column, Canada accounts for 8 percent.