

# Chicago Fed Letter

## Whose part is it?—Measuring domestic content of vehicles

by Thomas H. Klier, senior economist, and James M. Rubenstein, professor, Miami University

Today, the distinction between “American” and “foreign” vehicles is not so clear: Some models produced by the American-owned Detroit Three carmakers have a smaller share of domestic parts than models produced by foreign-owned carmakers. This article examines how much domestic content goes into motor vehicles sold in the U.S.

The U.S. motor vehicle industry has become more international and competitive over the last few decades. Foreign-owned carmakers have a sizable presence in the U.S. market through their sales and production operations, and domestic carmakers import some vehicles for sale in the U.S. market.

In the wake of increased competition in the industry, Chrysler Group, Ford Motor Co., and General Motors Corp. (GM) are no longer referred to as the “Big Three” because their market share of U.S. vehicle sales has been much diminished; the U.S. market share of these carmakers, now dubbed the “Detroit Three,” fell below 50% for the first time in July 2007.

While these changes have occurred, the U.S. motor vehicle

parts industry has also become more international: Domestic carmakers rely more on imported parts, foreign carmakers increasingly use parts that were

produced in the U.S., and foreign parts companies have established production operations in North America.<sup>1</sup> In 2006, about 25% of parts used in the U.S. were imported, and approximately another 25% were produced by U.S.-based operations of foreign parts makers.<sup>2</sup>

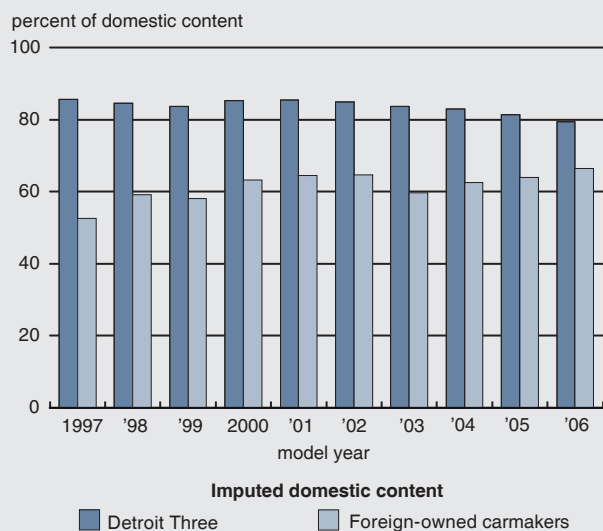
In such a context, the distinction between “American” and “foreign” vehicles has become blurred (see figure 1). The press has noted that some models produced by the American-owned Detroit Three carmakers have lower domestic content than vehicles produced in the U.S. by foreign-owned carmakers, such as Honda and Toyota. For example, in model year 2006, the Ford Mustang had 65% domestic content and the Chevrolet Suburban 67%—both less than the Honda Accord at 70% and the Toyota Camry at 80%.<sup>3</sup> In this *Chicago Fed Letter*, we illustrate two different ways to calculate domestic content of motor vehicles sold in the U.S.

### Domestic content data

The U.S. federal government uses several approaches to determine the domestic content of vehicles sold in the United States. All of them define “domestic” as a geographic concept, rather than strictly by nation of ownership.

For regulating fuel-efficiency, the U.S. Environmental Protection Agency considers a vehicle to be domestic if

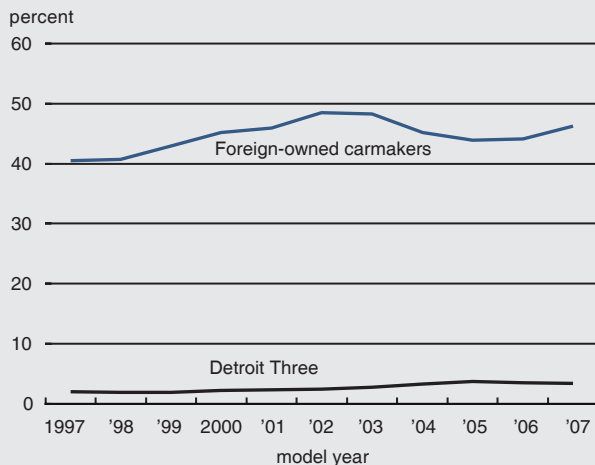
### 1. Production-weighted domestic content, 1997–2006



NOTES: The Detroit Three are the Chrysler Group, Ford Motor Co., and General Motors Corp. Here, foreign-owned carmakers are those with assembly plants located in the U.S. and Canada, producing vehicles for sale in the U.S. Domestic content is weighted by units of light vehicles produced in the U.S. and Canada for sale in the U.S.

SOURCES: Ward's AutoInfoBank; and American Automobile Labeling Act of 1992 data from the National Highway Traffic Safety Administration.

## 2. Import share of light vehicles sold in the U.S., 1997–2006



NOTES: The Detroit Three are the Chrysler Group, Ford Motor Co., and General Motors Corp. Imported vehicles are those produced outside of NAFTA (North American Free Trade Agreement) countries—the U.S., Canada, and Mexico.  
SOURCE: Ward's AutoInfoBank.

at least 75% of its content is produced in North America, including Canada and Mexico.

For setting import tariffs, the U.S. Department of Treasury, Customs Service considers a vehicle to be domestic if it has at least 50% U.S. or Canadian content.

For informing consumers, the American Automobile Labeling Act of 1992 (AALA) considers a vehicle to be domestic if at least 85% of its parts originate in the U.S. or Canada; a part is counted as domestic if at least 70% of its content comes from the U.S. or Canada.

Data in this article are based on reports filed by carmakers for model years 1997 through 2006 in compliance with the AALA. The act requires carmakers to affix a sticker showing where the vehicle was assembled, as well as where its engine and transmission (or transaxle) originated. For vehicles with domestic content less than 85%, the act also requires that the two foreign countries contributing the most content are listed. A separate report is filed for each model, making it possible to calculate an overall domestic content figure for each carmaker based on a weighted average of its individual models.

### Domestic content of vehicles produced in the U.S. and Canada

We first report domestic content data for the set of vehicles produced in the U.S. and Canada for sale in the U.S. The AALA defines “domestic” to include both the U.S. and Canada, but not Mexico.

In model year 2006, vehicles built by foreign-owned carmakers at assembly plants located in the U.S. and Canada for sale in the U.S. had 66.2% domestic content.

This level is only slightly below the 79.4% recorded by the Detroit Three (see figure 1). Furthermore, the gap in the level of domestic content between foreign-owned carmakers and the Detroit Three has narrowed substantially since 1997, when foreign-owned carmakers had only 52.5% domestic content compared with 85.7% for the Detroit Three.<sup>4</sup>

This convergence resulted from two simultaneous trends: increasing domestic content of foreign cars assembled in North America and decreasing domestic content of vehicles assembled in North America by the Detroit Three. The decline in the domestic content of domestic carmakers' production began in 2001, as efforts to increase foreign sourcing of parts by the Detroit Three intensified because of increased competition in the U.S. auto industry. In fact, as measured on a production-weighted basis, the overall domestic content of light vehicles produced in the U.S. and Canada started declining in 2002, as the falling domestic content of Detroit Three vehicles outweighed the rising domestic content of vehicles produced in North America by foreign-owned carmakers (in 2006, foreign carmakers produced a third of the light vehicles produced in North America).

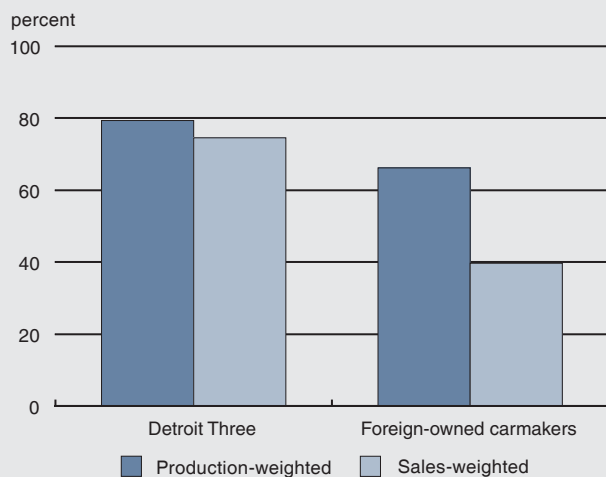
Underlying the convergence in the aggregate numbers, however, were substantial variations among individual carmakers. Among the Detroit Three, Chrysler had 71.3% domestic content in 2006, compared with just above 80% for both Ford and GM. Among Asian-owned carmakers producing vehicles in the U.S. and Canada, domestic content ranged from 76.3% at Toyota to 18% at Hyundai. Among the two German-owned carmakers, BMW used only 31.7% domestic content in the vehicles produced at its South Carolina assembly plants, while Mercedes-Benz used 62% at its Alabama assembly plant.

Multiple factors account for this variation in domestic content across individual companies. Among the Detroit Three, Ford and GM have historically produced more of their parts in-house in North American facilities than has Chrysler. Among foreign-owned carmakers, domestic content tends to be higher, the larger the production level in North America and the longer the assembly plants have been in operation. Once production volumes of a foreign producer are large enough, the stamping of body parts and machining of transmissions—two activities that have larger economies of scale in production than the assembly of vehicles—are likely to be performed domestically as well. Once activities like these are brought “on shore,” the use of domestic content in a vehicle line usually receives a major boost. Incidentally, domestic production of key components of a car is often accomplished by the foreign carmaker's traditional suppliers following along. A key factor in attracting a foreign carmaker's main suppliers to set up production operations in this country is its volume of U.S. auto production.

### Import share and domestic content of vehicles sold in the U.S.

Even though the vast majority of motor vehicles are assembled near consumer markets, 21.5% of all light vehicles sold in the U.S. in model year 2006 were imported from outside NAFTA (North American Free Trade Agreement) countries. In the same model year, foreign carmakers imported 44.1% of vehicles

### 3. Production- vs. sales-weighted domestic content, 2006



NOTES: The Detroit Three are the Chrysler Group, Ford Motor Co., and General Motors Corp. The values shown in this figure are for model year 2006.

SOURCES: Ward's AutoInfoBank; and American Automobile Labeling Act of 1992 data from the National Highway Traffic Safety Administration.

sold in the U.S. from overseas (see figure 2).<sup>5</sup> Most imports were vehicles for which demand exceeded U.S. assembly plant capacity or those for which demand was too low to justify U.S. production. On the other hand, 96% of vehicles sold in the U.S. by the Detroit Three were assembled in North America in 2006.

With the exception of vehicles coming from Mexico, imported vehicles tend to have very low North American parts content. Consequently, one could identify the domestic content of cars sold by foreign carmakers versus domestic carmakers (rather than the domestic content for vehicles produced in the U.S. and Canada by both). A sales-weighted domestic content measure lowers the domestic content for both domestic and foreign carmakers (see figure 3). Yet the gap in domestic content between Detroit Three and foreign-owned carmakers becomes much larger. That is because the Detroit Three import only a few models for sale in the U.S. market. Foreign automakers, however, import a much larger share of the vehicles they sell in the U.S. market. According to the sales-weighted measure, the domestic content of the entire fleet sold in model year 2006 by the Detroit Three in the U.S. was 74.5%, compared with 42.3% for Asian-owned carmakers and

7.8% for German-owned carmakers. Domestic content varied little among Chrysler, Ford, and GM. Among the Japanese-owned carmakers with the largest sales numbers, domestic content for the entire fleet sold in the U.S. in 2006 was 59% for Honda and around one-half for Toyota and Nissan.

### Conclusion

There is more than one way to measure domestic content for a particular vehicle. The U.S. federal govern-

ment uses three different methods. In addition, determining domestic content of vehicles is an increasingly challenging task. It requires an understanding of the behavior of a large number of parts suppliers, as the Detroit Three and foreign-owned carmakers have turned over responsibility for producing many auto parts to independent suppliers. Typically, parts suppliers contribute about 70% of the value added to a vehicle. Therefore, the decision about where to produce parts for a vehicle often lies with the parts producer.

Based on vehicle-specific domestic content data reported for AALA purposes, we illustrate two different ways to calculate domestic content for a carmaker's entire fleet. A carmaker's domestic content is measured both in relation to the models produced in the country of interest and in relation to all the models sold in that country.

More generally, the auto industry is increasingly characterized by international carmakers, as well as by parts suppliers that operate in multiple countries. Against a background of global supply chains, it has become quite difficult to identify and label products such as autos by nationality.<sup>6</sup> Overall, the processes of globalization of markets and supply chains have

served to noticeably lower prices of new cars for American consumers and businesses. On a quality-adjusted basis, for example, new vehicle prices have been falling at an average annual rate of 0.5% over the current decade. Importantly, higher quality and gains in longevity are among the improvements in today's vehicles.

<sup>1</sup> Foreign-owned companies accounted for 88 of the 150 largest parts suppliers in North American original equipment sales in 2006, compared with only 41 of the 150 largest in 1994, according to an annual list that appears in the industry publication *Automotive News*.

<sup>2</sup> The 2002 U.S. *Census of Manufactures* reported that 27% of the parts used at U.S. assembly plants were imported; see Thomas H. Klier and James M. Rubenstein, 2006, "Competition and trade in the U.S. auto parts sector," *Chicago Fed Letter*, Federal Reserve Bank of Chicago, No. 222, January. Most of the electronics parts used at U.S. assembly plants were made in other countries, particularly Mexico. Powertrain components accounted for the largest share of all imported parts, especially complete engines and transmissions destined for Japanese-owned assembly plants in the United States.

Charles L. Evans, *President*; Daniel G. Sullivan, *Senior Vice President and Director of Research*; Douglas Evanoff, *Vice President, financial studies*; Jonas Fisher, *Economic Advisor and Team Leader, macroeconomic policy research*; Richard Porter, *Vice President, payment studies*; Daniel Aaronson, *Economic Advisor and Team Leader, microeconomic policy research*; William Testa, *Vice President, regional programs, and Economics Editor*; Helen O'D. Koshy, Kathryn Moran, and Han Y. Choi, *Editors*; Rita Molloy and Julia Baker, *Production Editors*.

*Chicago Fed Letter* is published monthly by the Research Department of the Federal Reserve Bank of Chicago. The views expressed are the authors' and are not necessarily those of the Federal Reserve Bank of Chicago or the Federal Reserve System.

© 2007 Federal Reserve Bank of Chicago  
*Chicago Fed Letter* articles may be reproduced in whole or in part, provided the articles are not reproduced or distributed for commercial gain and provided the source is appropriately credited. Prior written permission must be obtained for any other reproduction, distribution, republication, or creation of derivative works of *Chicago Fed Letter* articles. To request permission, please contact Helen Koshy, senior editor, at 312-322-5830 or email Helen.Koshy@chi.frb.org. *Chicago Fed Letter* and other Bank publications are available on the Bank's website at [www.chicagofed.org](http://www.chicagofed.org).

ISSN 0895-0164

<sup>3</sup> See Jim Mateja and Rick Popely, 2006, "Made in America? Hard to tell," *Chicago Tribune*, September 24, and Justin Hyde, 2006, "Foreign? American? Auto parts go global," *Detroit Free Press*, May 7.

<sup>4</sup> While the North American content of vehicles produced in North America by domestic and foreign carmakers is very similar, their geographies of assembly locations are quite different. See Thomas H. Klier and Daniel P. McMillen, 2006,

"The geographic evolution of the U.S. auto industry," *Economic Perspectives*, Federal Reserve Bank of Chicago. Vol. 30, No. 2, Second Quarter, pp. 2–13.

<sup>5</sup> Here, "overseas" refers to the production of vehicles outside of the NAFTA countries—the U.S., Canada, and Mexico. The import shares of both the Detroit Three and foreign producers have remained remarkably stable since 1997, despite the underlying changes in market share.

The Detroit Three manufacturers dropped 17.5% market share between model year 1997 and model year 2006.

<sup>6</sup> In fact, there is evidence that consumers pay little attention to the domestic content label that needs to be displayed in a new car. See Juanita S. Kavalas and Charles J. Kahane, 2001, "Evaluation of the American Automobile Labeling Act," National Highway Traffic Safety Administration, report, No. DOT HS 809 208, January.