ESSAYS ON ISSUES
THE FEDERAL RESERVE BANK OF CHICAGO
MAY 2013
NUMBER 310

Chicago Fed Letter

The growing importance of Mexico in North America's auto production

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Mexico's share of automotive production has grown relative to those of its neighbors to the north because the country has become more integrated with North America and pursued trade agreements with numerous other countries. Those developments have boosted Mexico's motor vehicle production by way of raising exports.

Mexico's share of North America's light vehicle (car and light truck) production has steadily increased over the years, rising from 6% in 1990 to 11% in 2000 and then to 19% in 2012.[1] In 2008, Mexico for the first time surpassed Canada to become the second-largest producer of light vehicles in North America, after the United States. Since then, Mexico's production gap with Canada has increased every year. Recent decisions on new plant openings in Mexico are set to widen that gap even further.[2] Similar to Canada, all light vehicle production in Mexico is attributable to foreign producers, including the Detroit-based automakers—Chrysler, Ford, and General Motors (GM)—as well as auto manufacturers headquartered overseas, such as, in Mexico's case, Volkswagen (VW) and Nissan (see figure 1). In contrast to Canada's situation, the rapid expansion in Mexico's vehicle output is chiefly due to growth in its vehicle exports. This *Chicago Fed Letter* puts recent developments in Mexico's automotive industry into historical perspective.

1. Light vehicle production in Mexico, 2012

Company	Plants in operation	Share of all auto production	Share exported by company	Share of all auto exports
		(- - - - - - - - - - - - - - - *percent* - - - - - - - - - - - - - -)		
General Motors	3	20	82	20
Ford	2	16	96	18
Chrysler	2	15	92	17
Volkswagen	1	21	86	22
Nissan	2	24	68	20
Honda	1	2	60	2
Toyota	1	2	99	2

NOTES: In addition, the following plants have been announced: Mazda in Salamanca (to open in 2013); Nissan in Aguascalientes (to open in 2013); Honda in Celaya (to open in 2014); and Audi (Volkswagen) in San José Chiapa (to open in 2016). Most of them are currently under construction; see note 14 for more details. The last column does not total to 100% because of rounding.

SOURCE: Authors' calculations based on data from WardsAuto InfoBank.

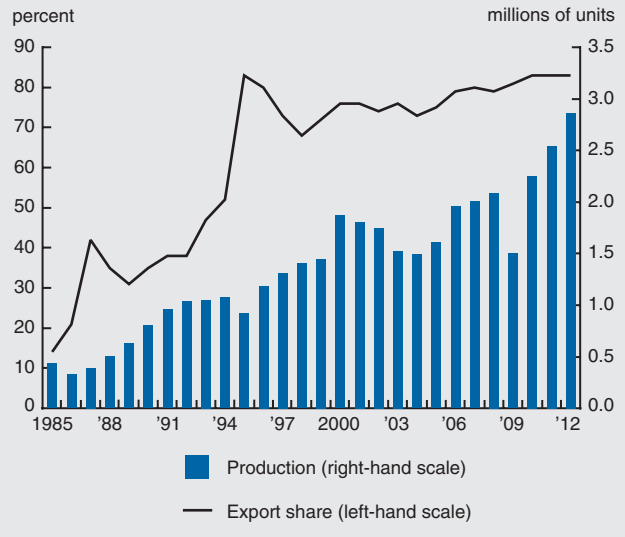
Role of trade policy

Mexico has a long history of motor vehicle production. Two Detroit-based automakers, Ford and GM, were assembling vehicles there by the mid-1930s. Several additional producers, such as Chrysler, VAM (Vehículos Automotores Mexicanos), and Renault, entered the Mexican market over the years, yet no dominant Mexican vehicle producer emerged.[3]

A key factor shaping the development of Mexico's automobile industry was the country's auto-industry-specific trade policy. During the first half of the twentieth century, vehicles sold in Mexico were either imported as finished products or put together from kits (made up of domestically produced and imported components) at small-scale assembly plants. In 1960, a dozen assembly plants in Mexico produced a total of about 50,000 vehicles; back then, local content in the vehicles assembled in Mexico amounted to less than 20%.[4]

In 1962 the Mexican government started implementing a policy that favored domestic production over imports. The new policy prohibited imports of finished vehicles, engines, and many other auto

2. Mexico's light vehicle production and exports, 1985–2012



SOURCE: Authors' calculations based on data from WardsAuto InfoBank.

parts, significantly raising trade barriers for Mexico's auto industry. This policy required that at least 60% of the parts in vehicles assembled in Mexico be produced in Mexico and that the parts suppliers have at least 60% Mexican ownership.[5] Thus, Mexico's 1962 auto decree enticed producers that wanted to sell in Mexico to set up production operations in the country. For instance, it stimulated the construction of several vehicle assembly and engine plants by foreign firms near Mexico City, the country's largest city, where the majority of the vehicles were going to be sold. Notably, during the mid-1960s both Nissan and VW first entered the Mexican market as vehicle producers by establishing plants in Aguascalientes and Puebla, respectively; both plants were located fairly close to Mexico City. The new policy succeeded in raising the level of Mexico's vehicle production to 250,000 units by 1970, yet those vehicles "were of poorer quality and entailed higher production costs than their foreign counterparts."[6]

By 1983, the Mexican government shifted its auto industry policy again, this time focusing on export promotion. Vehicle producers responded by opening modern and competitive plants. For example, two assembly plants were opened during the 1980s—one by GM at Ramos Arizpe in 1981 and another by Ford at Hermosillo in 1986. These plants also altered the traditional footprint of Mexico's auto industry. Earlier plants had all been located near Mexico City, where most customers for new vehicles produced in Mexico were concentrated. The two new plants were located much farther north, closer to the United States, where most of their output was headed as exports.[7]

Integration with North American market

Mexico's trade restrictions were loosened, though not completely eliminated, with the implementation of the North American Free Trade Agreement (NAFTA) in 1994.[8] That agreement included several key provisions affecting Mexico's auto industry:

- Import duties on light vehicles were cut from 20% to 10% in 1994 and eventually phased out over ten years.
- The minimum requirement for Mexican content in Mexico's auto production was reduced from 34%–36% in 1993 to 29% in 1999 and eventually eliminated in 2004.
- The level of the trade compensating ratio for vehicles was reduced from 1.75 to 0.80 in 1994 and eventually to zero in 2004.[9]

In addition to reducing trade barriers within North America, NAFTA introduced barriers to the vast majority of competitors that were not already producing vehicles in any of the three North American countries by 1994. The five automakers that were operating production facilities in Mexico prior to the implementation of NAFTA—namely, Chrysler, Ford, GM, Nissan, and VW—received a head start in the free trade era. Until 2004, only those five automakers could import vehicles duty-free into Mexico. In addition, in order to qualify for duty-free exports from Mexico after 2004, at least 62.5% of a vehicle's content had to be made somewhere in North America.[10]

NAFTA's passage stimulated another round of investment by these five producers. For example, Nissan opened a second assembly plant in Aguascalientes during the NAFTA ratification process, and within a year of NAFTA's implementation, Chrysler and GM opened plants in Saltillo (in northern Mexico) and Silao (in central Mexico), respectively. NAFTA also required that some production be located in Mexico in order to be able to import vehicles there.[11] Subsequently, both Honda, in 1995, and Toyota, in 2002, established small-scale production plants in Mexico.[12]

With the implementation of NAFTA, Mexico had opened up its market.[13] As a result, auto manufacturers optimized their production operations within North America. Indeed, vehicle assembly plants in Mexico implemented state-of-the-art technology and became, more or less, interchangeable with those in the United States and Canada (e.g., note that since the launch of the North American version of the Ford Fusion in model year 2006, it has been exclusively produced at Ford's Hermosillo plant in Mexico). Since 1994, the country's production has on balance steadily increased, in step with the rising volume of vehicle exports (see figure 2). By the end of 2012, light vehicle production had reached an annual level of 2.86 million units, with 2.38 million of those representing exports.

Recent developments

Mexico's vehicle production capacity is soon to be boosted further by a number of additional vehicle assembly plants. In 2011, Mazda and Honda announced the construction of their first full-size assembly plants in Mexico (Mazda at the same time ended a production agreement at a former Ford facility in southern Michigan). Mazda's and Honda's plants are scheduled to begin producing small cars in 2013 and 2014, respectively. Nissan is currently building its third assembly plant in Mexico, also designated for

the production of small cars. Finally, Audi—VW's luxury marque—last year announced its decision to start building a small luxury crossover vehicle at a new plant in Mexico by the middle of the current decade.[14]

earlier, are slated for the production of small vehicles.

Furthermore, Mexico has become a very attractive location for automakers because of the country's aggressive pursuit of free trade agreements. Indeed,

Producers with overseas headquarters accounted for 45% of Mexico's light vehicle exports in 2012, compared with 16% in 1985.

What are the reasons behind this remarkable expansion in auto production capacity? The primary drivers of this growth are low production costs, changing consumer preferences in automobiles prompted primarily by rising gasoline prices, and country-specific export opportunities.

Mexico's auto industry wage rate (starting at $40 per day for assembly line workers in 2012[15]) is low relative to its neighbors to the north as well as other industrial nations, so it continues to help attract international automakers. Auto manufacturers choosing to produce vehicles in Mexico instead of the United States (or Canada) face a trade-off between somewhat lower labor costs and somewhat higher shipping costs for vehicles produced in Mexico and sold north of the border.[16] However, for automakers choosing between producing in North America and producing overseas and shipping vehicles from there to North America (and sometimes other markets), Mexico appears to have a clear advantage over the rest of the world of late. For example, the substantial appreciation of the yen against the U.S. dollar and other currencies has made Japan a much more expensive place in which to produce vehicles than Mexico.[17]

As the mix of vehicle production is shifting toward small vehicles on account of rising gasoline prices and consumers' concerns about vehicle fuel efficiency, Mexico has become the location of choice for Asian-headquartered automakers to produce vehicles destined primarily for the Americas. Notice how all of their newly announced assembly plants in Mexico, which were mentioned

signing NAFTA was merely one of Mexico's first steps in liberalizing its trade. As of 2012, the Mexican government had signed free trade agreements with 44 countries, including those with the European Union, Japan, and Israel.[18] So, it is of little surprise that auto manufacturing firms with headquarters overseas (i.e., those not headquartered in North America) have played a disproportionate role in the recent growth of Mexico's vehicle exports. Between 1985 and 2012, Mexico's exports of light vehicles grew 40 times—from 60,000 units to 2.4 million units; yet, exports of vehicles produced in Mexico by auto producers with headquarters overseas increased over 100 times during the same time span—from fewer than 10,000 units to 1.1 million units—boosting those producers' share of Mexico's light vehicle exports from 16% to around 45% (see the distribution of the nation's light vehicle exports by company in the last column of figure 1).

As a further sign of Mexico's emerging role as an automotive export hub, vehicle exports to destinations outside North America have been experiencing the fastest growth rates in recent years. For example, Chrysler is now exporting some of its Fiat 500 vehicles produced in Mexico all the way to China.[19] During the twentieth century, nearly all auto exports from Mexico were destined for the United States. In contrast, during 2012 only 63% of the 2.38 million vehicles exported from Mexico went to the United States; Latin America received 16% and Europe 9%, with the balance evenly split between Africa and Asia.[20] Given this recent distribution of destinations for Mexico's automotive exports, it is noteworthy

that all the new assembly plants are being located in the interior of Mexico, which has easier access to ports than locations farther north. This access enables exports of finished vehicles to several global markets, as opposed to just the United States and Canada.

Summary

Mexico's auto sector has been growing strongly. The country is on track to account for 22% of North American light vehicle production by 2020.[21] A distinctive feature of Mexico's rapidly growing auto industry is the importance placed on exporting vehicles rather than selling them in Mexico. Exports accounted for 83% of Mexico's light vehicle production in 2012, representing a higher share of auto production than in any other major car-making country in recent years.[22] In terms of volume, Mexico was the fourth-largest exporter of motor vehicles in 2012, behind only Germany, Japan, and South Korea.[23] In contrast to the other major car-exporting countries, Mexico has no domestically owned automakers to spearhead the export strategy. And so, Mexico's role is unique among automotive export hubs.

ISSN 0895-0164

[1] Unless otherwise noted, the automotive statistics presented in this article are from authors' calculations based on data from WardsAuto InfoBank.

[2] See, e.g., Nicholas Casey, 2012, "In Mexico, auto plants hit the gas," *Wall Street Journal*, November 19, available by subscription at http://online.wsj.com/article/SB10000872396390444083304578018462369529592.html.

[3] VAM was a Mexican auto producer from the mid-1940s to the late 1980s. In 1983 the Mexican government decided to sell its 100% stake in VAM to Renault; see Juan Carlos Moreno Brid, 1992, "Structural change in Mexico's motor vehicle industry (1977-89)," in *Industry on the Move: Causes and Consequences of International Relocation in the Manufacturing Industry*, Gijsbert van Liemt (ed.), Geneva, Switzerland: International Labour Office, pp. 259–278 (in particular, p. 269).

[4] Moreno Brid (1992, p. 260); and Juan Carlos Moreno Brid, 1996, "Mexico's auto industry after NAFTA: A successful experience in restructuring?," Helen Kellogg Institute for International Studies, working paper, No. 232, August, available at http://kellogg.nd.edu/publications/workingpapers/WPS/232.pdf.

[5] Moreno Brid (1992, pp. 260–261).

[6] Moreno Brid (1996).

[7] Moreno Brid (1996); and Jorge Carrillo, 2004, "NAFTA: The process of regional integration of motor vehicle production," in *Cars, Carriers of Regionalism?*, Jorge Carrillo, Yannick Lung, and Rob van Tulder (eds.), London and New York: Palgrave Macmillan in association with GERPISA, pp. 104–117.

[8] Unless otherwise noted, NAFTA details are from Moreno Brid (1996).

[9] The trade compensating ratio specifies the share of Mexico-produced vehicles to be exported. It had been implemented to provide incentives for the auto sector to become competitive internationally (see Moreno Brid, 1996).

[10] Carrillo (2004, p. 111).

[11] See NAFTA's Annex 300-A, available at www.sice.oas.org/trade/nafta/anx300a1.asp.

[12] Honda's plant was located in El Salto (in central Mexico), and Toyota's was located in Tijuana (near the Mexico–U.S. border).

[13] For example, the export share of vehicles produced in Mexico jumped from 52% in 1994 to 84% in 1995 (see figure 2).

[14] For details on Mazda's plans in Mexico, see http://content.usatoday.com/communities/driveon/post/2011/06/mazda-flat-rock-michigan-autoalliance-uaw-united-auto-workers-ford-mustang/1#.UUjO-jf2KSo. For details on Honda's plans, see http://content.usatoday.com/communities/driveon/post/2011/08/honda-building-new-800-million-auto-plant-in-mexico/1#.UUzHNBw4t8E. For details on Nissan's plans, see www.thedetroitbureau.com/2012/01/nissan-announces-new-plant-for-mexico/. And for details on VW's plans, see http://content.usatoday.com/communities/driveon/post/2012/04/audi-picks-mexico-over-us-for-its-factory/1#.UUjPjTf2KSo.

[15] Casey (2012).

[16] In 1992, the U.S. Department of Commerce found that the total cost of producing a 1992 Ford Escort in Mexico and exporting it to the United States slightly exceeded the cost of assembling the same vehicle at a Michigan assembly plant. Higher labor costs in Michigan (relative to those in Mexico) were more than offset by lower shipping costs; see Max Gates, 1993, "Great debate: Pending free-trade pact has automakers, UAW arguing over ramifications," *Automotive News*, Vol. 67, No. 5519, September 27, p. 1.

[17] Note that Honda is planning to produce its smallest car—the Fit—at its new plant in Mexico. That vehicle is currently being imported to North America from Japan. See www.autoblog.com/2012/03/30/honda-announces-fit-production-moving-to-mexico/.

[18] Mexico's free trade policy contrasts with the policies of Brazil and Argentina—both of which represent possible alternative production locales for automakers serving the Latin American market. These two countries, after running up substantial deficits in light vehicle trade with Mexico, last year reached separate agreements to freeze the level of Mexico's vehicle exports to their shores for the next three years (Casey, 2012).

[19] Adam Thomson, 2012, "Mexico: China's unlikely challenger," *Financial Times*, September 19, available by subscription at www.ft.com/intl/cms/s/0/9f789abe-023a-11e2-b41f-00144feabdc0.html.

[20] Brendan Case, Alan Ohnsman, and Craig Trudell, 2012, "Automakers boost investing on vehicle factories in Mexico," *Bloomberg*, November 13, available at www.bloomberg.com/news/2012-11-14/automakers-boost-investing-on-vehicle-factories-in-mexico.html.

[21] R. L. Polk & Co., 2012, "Strategic questions for automotive business planners," white paper, Southfield, MI, December, p. 8, available at www.oesa.org/Doc-Vault/Industry-Information-Analysis/Polk-Automotive-Business-Planners.pdf.

[22] Export shares of auto production are from authors' calculations based on data from www.mexicotradeandinvestment.com/pdf/2012/abril/17/Presentacion%20Automotriz%20mizuho.pdf.

[23] Casey (2012).