



## Auto Industry Trends<sup>1</sup>

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The automotive industry, including both automakers and their suppliers, is the largest manufacturing industry in the US, making up nearly 10 percent of the US economy. The domestic auto industry – the Big 3 and US-based suppliers – makes up 5 percent of all US employment.<sup>2</sup> About 500 establishments in the US manufacture motor vehicles -- passenger cars, sport utility vehicles, pickup trucks and vans, heavy-duty trucks, buses, and other special purpose motor vehicles ranging from limousines to garbage trucks. About 7,000 establishments in the industry manufacture motor vehicle parts—including electrical and electronic equipment, gasoline engines and parts, brake systems, seating and interior trim, steering and suspension components, transmission and power train parts, air-conditioners, and motor vehicle stampings, such as fenders, tops, body parts, trim, and molding.<sup>3</sup>

This report describes the market dynamics that are shaping the US auto industry, how automakers and suppliers are responding to them, what impact that is having on employment, and where the industry may be headed.

### Market Dynamics

The most striking trend in the US auto industry is the falling market share of US automakers. Since the 1970's, Japanese and European automakers have been steadily increasing their share of sales in the US market, while the share of US automakers has fallen from 82 percent to below 60 percent.<sup>4</sup> In response to protectionist policies implemented in the 1980's to limit the import of vehicles from Japan, Japanese automakers began building assembly plants in the US. Today, over three-quarters of Japanese vehicles sold in the US are also manufactured in the US by these transplants.<sup>5</sup>

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<sup>1</sup> This report was prepared for the New Commission on the Skills of the American Workforce, which issued its report *Tough Choices or Tough Times* in December 2006. Information about the commission and copies of other industry studies can be found at [www.skillscommission.org](http://www.skillscommission.org).

<sup>2</sup> Richard E. Dauch, "Comment: Adapt or Die," *Automotive News*, March 22, 2004.

<sup>3</sup> Bureau of Labor Statistics, U.S. Department of Labor, *Career Guide to Industries, 2004-05 Edition*, Motor Vehicle and Parts Manufacturing, on the Internet at <http://www.bls.gov/oco/cg/cgs012.htm> (visited December 28, 2004).

<sup>4</sup> David Welch, "Commentary: Borrowing from the Future," *Business Week*, January 10, 2005.

<sup>5</sup> Timothy Sturgeon and Richard Florida, "Globalization, Deverticalization, and Employment in the Motor Vehicle Industry," in Martin Kenney and Richard Florida (editors), *Locating Global Advantage: Industry Dynamics in the International Economy*. Stanford, CA: Stanford University Press. 2004

One reason the transplants are gaining ground is higher quality. The J.D. Power and Associates annual study of automakers ranks all of the US automakers below the industry average based on quality problems with new vehicles. In 2005, only GM ranked above average.<sup>6</sup>

<b>2005 Quality Ranking</b>	<b>Automaker</b>	<b>Problems per 100 Vehicles</b>
1	BMW	95
2	Toyota	105
3	Hyundai	110
4	Honda	112
5	General Motors	113
<b>Industry Avg.</b>		<b>118</b>
6	Nissan	120
7	DaimlerChrysler	121
8	Ford	127
9	Mitsubishi	129
10	Subaru	138
11	Kia	140
12	Porsche	147
13	Volkswagen	147
14	Suzuki	151

Another reason the transplants are gaining ground is higher productivity. The 2005 Harbour Report shows that US automakers all trail their Japanese rivals in the number of hours required to produce a vehicle.<sup>7</sup>

<b>2005 Productivity Ranking</b>	<b>Automaker</b>	<b>Hours per Vehicle</b>
1	Toyota	27.90
2	Nissan	29.43
3	Honda	32.02
4	GM	34.33
5	DaimlerChrysler	35.85
6	Ford	36.98

Much of the productivity advantage enjoyed by the Japanese is due to their greater flexibility to produce different models on the same assembly lines and to change over more quickly. Currently, fewer than 40 percent of Chrysler and Ford vehicles are built on flexible assembly

<sup>6</sup> “J.D. Power and Associates Reports: Toyota Motor Corporation, General Motors Corporation Garner Most Awards in 2005 Initial Quality Study,” May 18, 2005.

<sup>7</sup> Michael Ellis and Jeffrey McCracken, “Harbour Report: U.S. Automakers Boost Factories’ Productivity,” *Detroit Free Press*, June 3, 2005.

lines, compared to 80 percent for Nissan and Toyota.<sup>8</sup> Flexible production costs 10-15 percent less than traditional production systems, with an additional 50 percent savings in changeover costs. In addition, flexible production allows automakers to offer a wider range of models, more choices within each model, and a fresh look more often.

US automakers are also at a disadvantage when it comes to workforce flexibility. Studies show that US automakers provide less training and give production workers less responsibility than their global competitors.<sup>9</sup> They also have a higher number of job classifications and more rigid work rules, restricting their ability to move people around to respond flexibly to changes in customer demand. And, until recently, they have had very little flexibility to close plants or lay off employees.

As a result, US automakers have higher fixed costs than their competitors, particularly higher labor costs. While the mostly non-union production and maintenance workers in transplant companies receive hourly pay that is comparable to their union counterparts in US companies (in part to avoid unionization), health care and pension costs run much higher for US automakers. Health care costs alone run \$450 per vehicle more at Chrysler and \$1,200 per vehicle more at General Motors than at the Japanese automakers, where most non-US employees are covered by a national health plan.<sup>10</sup> Pension, retiree health and other retiree benefits account for \$631 of every Chrysler vehicle's cost, \$734 per Ford vehicle, and \$1,360 for every GM car or truck. In contrast, pension and retiree benefit costs per vehicle for the U.S. plants of Honda and Toyota, where the average age of the workforce is much lower, are estimated to be \$107 and \$180 respectively.

Because they are limited in their ability to close plants or lay off workers as part of their agreement with the UAW, US automakers need to keep their plants running at 80 percent capacity, at minimum, to cover their costs. They have decided that it's cheaper to just keep making cars, even if they have to pay people to buy them. At the end of 2004, the average sales incentive for GM vehicles was \$4,124, \$3,795 for Chrysler, and \$3,541 for Ford, compared to Toyota's subsidy of \$747.<sup>11</sup> In general, sales discounts are unusual for Japanese automakers, which tend to use them only during economic downturns. US automakers, on the other hand, now rely on them heavily to keep their plants running at high capacity and realize economies of scale. During the summer of 2005, GM, Ford, and Chrysler all offered deep discounts as part of their "employee-pricing" advertising campaigns.

This heavy reliance on discounts to move cars is cutting deeply into profits, making it even more difficult to attract the investment US automakers need to modernize their plants and equipment

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<sup>8</sup> Austin Weber, "Automakers Do More with Less: Automotive Manufacturers Face More Challenges and Opportunities than Ever," *Assembly*, September 1, 2004.

<sup>9</sup> Matthias Holweg and Frits K. Pil, *The Second Century: Reconnecting Customer and Value Chain Through Build-to-Order*, The MIT Press, Cambridge, MA, 2004, Chapter 11.

<sup>10</sup> David Welch, "Commentary: A Contract the Big Three Can Take to the Bank," *Business Week*, September 29, 2003

<sup>11</sup> Kothandaram Venkatakrishnan, "The Big Three on a Slippery Ground," Frost & Sullivan Market Insight, August 10, 2005; Jeff Plungis, "Automakers Now Discount 90% of Vehicles, See a Paltry 0.8% Rise," American International Auto Dealers Association, December 8, 2004.

and introduce more flexible production systems, thereby creating a vicious cycle that is hard to break.<sup>12</sup>

<b>Automaker</b>	<b>2005 Profit/Loss Per Vehicle</b>
General Motors	-\$2,311
DaimlerChrysler	\$186
Ford	\$620
Honda	\$1,250
Toyota	\$1,488
Nissan	\$1,603

In August 2005, Moody's Corporation cut the credit rating at Ford and General Motors to junk bond status.

### **Response**

US automakers are relying on three main strategies to become more competitive. They are shifting vehicle production to Canada and Mexico, shifting fixed costs to suppliers, and seeking new markets overseas.

US automakers have historically operated production facilities in Canada and Mexico, but they have mainly produced vehicles for sale in those countries, not for sale back into the US. That has changed dramatically over the past decade, beginning even before NAFTA took effect. Vehicle exports from Mexico to the US have gone from \$244 million in 1989 to \$4.6 billion in 1994 to \$13.1 billion in 1998. That trend is continuing. Today, half of the vehicles produced by US automakers in Canada and two-thirds of those produced in Mexico are sold in the US.<sup>13</sup>

The advantage of moving production to Mexico is obvious -- lower labor costs. In Canada, where wage rates for production workers are higher than in the US, it's not so obvious. However, overall labor costs are actually lower in Canada due to higher productivity and lower health care costs.

European and Japanese automakers are adopting the same strategy, developing their own regional production networks. In Europe, production is shifting from the traditional high-cost auto centers in the UK and Germany to lower-cost facilities in Spain and, increasingly, Eastern Europe. Although Japanese automakers have typically not produced vehicles in other low-cost countries for sale back in their home market, they too are now adopting a regional strategy. For example, Toyota plans to phase out domestic production of pick-up trucks in 2004 and shift production to Thailand.

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<sup>12</sup> Laura Smith, "What's Bugging the Big 3?" *Quality Digest*, November 9, 2005.

<sup>13</sup> Timothy Sturgeon and Richard Florida, "Globalization and Jobs in the Automotive Industry," MIT IPC Globalization Working Paper 01-003, March 2000.

The Japanese and European transplants also are pursuing the same regional strategy in North America as the US automakers. Toyota, Honda, and Suzuki have assembly plants in Canada, and Toyota, Honda, Nissan, BMW, Mercedes Benz, and Volkswagen have plants in Mexico.

Another strategy US automakers are using to cut fixed costs is to shift component and subassembly production to suppliers. This simplifies final assembly by cutting down on the number of operations involved, and it simplifies purchasing by cutting down on the number of suppliers involved. It also cuts down on the amount of inventory, space, equipment, and number of employees required.

A good example of this strategy in action is the new Chrysler Jeep plant in Toledo, Ohio. Chrysler cut its capital investment by one-third by outsourcing 60 percent of the production responsibility to suppliers, who will own and operate three of the four factories co-located on the same site. One-quarter of the employees directly involved in production of the new Jeep will be on supplier payrolls.<sup>14</sup>

US automakers are also trying to cut their fixed costs by simplifying product and process design. They are minimizing the number of different platforms on which their vehicles are built, minimizing the number of unique parts that go into each vehicle, and minimizing the variety of production tools and production processes that they use in their operations. These changes make it easier for different plants to use common parts and processes across all operations around the globe. And they also make it possible to centralize product development, purchasing, and management functions in core locations. In addition, US automakers are also outsourcing some of the product and process design functions to tier-one suppliers.

The third competitive strategy US automakers are employing is to seek new markets overseas. Emerging markets are expected to account for 90 percent of net new sales growth over the next decade.<sup>15</sup> New vehicle sales in China are currently growing at 30 percent a year, making it the third largest car market in the world.

US automakers are now competing with European and Japanese automakers to get a foothold in China, as well as India, Russia, and Brazil. Local content requirements, tariffs, and import restrictions make it necessary to invest in production facilities in these countries, rather than simply export vehicles to them. Assembly capacity in China is expected to double within the next four years, significantly exceeding domestic demand, in keeping with the Chinese government's plan to begin exporting vehicles to other countries.<sup>16</sup> There is intense competition among automakers to get a big piece of this action.

Global automakers have announced that they intend to invest around \$13 billion to boost vehicle production in China to around 6 million cars a year. Currently, one-third of global growth in auto sales is coming from China.<sup>17</sup> However, domestic sales growth in China is expected to slow

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<sup>14</sup> Joann Muller, "Saving Chrysler," *Forbes*, August 16, 2004.

<sup>15</sup> American Financial Services Association, "U.S. Auto Sector Outlook," April 2004.

<sup>16</sup> International Metalworkers' Federation, *IMF Auto Report 2004*

<sup>17</sup> Ted C. Fishman, *China Inc* (New York: Scribner, 2005)

to around 15 percent a year over the next few years, roughly half of its current rate. That will leave hundreds of thousands, if not millions, of cars looking for a market. General Motors and Volkswagen are already exporting cars from China to neighboring countries in Asia. There will be increasing pressure to export more.

Independent Chinese automakers are looking at the US market for potential exports, but they still lack the distribution, sales, and maintenance networks they would need to be successful.<sup>18</sup> One possibility is that they will develop alternative distribution networks similar to what they have done with motorcycles and off-road sport bikes, which are sold through Pep Boy's Auto Parts stores. Costco and other big-box stores provide a possible distribution channel for the first wave of Chinese cars, which would likely sell for less than \$10,000.<sup>19</sup>

US automakers have begun to import Chinese-made parts for use in their North American assembly operations. Lower labor and energy costs make these parts attractive. However, higher costs of raw materials, many of which need to be imported, high transportation costs, and weak protection of intellectual property rights are still major problems.<sup>20</sup>

It will be several years before the infrastructure is in place to support significant export of parts from China. However, US suppliers are expanding their operations there, and investing in infrastructure improvements to support their operations. The biggest US parts makers, Delphi and Visteon, are rapidly expanding their China operations, while shutting their plants in the US.

Elsewhere, US auto industry investments in India and Brazil have been limited up to this point, because there is not enough per capita income in these countries yet to support a profitable automotive industry, and there may not be for another decade.

## **Employment Effects**

The effects of these industry trends on employment are mixed. Unlike manufacturing employment overall, auto industry employment actually grew during the 1990's, despite the loss of jobs at Big 3 assembly plants due to increasing automation and shifting production to Canada and Mexico. The opening of Japanese and European transplants in the US has added tens of thousands of new assembly jobs. But, the biggest contributor to growth in industry employment has been the supply sector.

From the mid-1980's to the mid-1990's, automotive parts suppliers generated nearly three times the number of jobs added by the Japanese transplants, and nearly double the jobs lost by the Big 3 assembly plants. Since the mid-1990's, employment in the supply sector has increased by half again, although some of that increase is due to GM and Ford spinning off their parts divisions into independent suppliers, Delphi and Visteon.

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<sup>18</sup> Reuters, "China Export Dragon Stirs," September 24, 2004.

<sup>19</sup> Fishman, *China Inc.*

<sup>20</sup> Alysha Webb, "Automotive News China Congress: Cheap Chinese Auto Parts? Maybe Not," *Automotive News*, June 14, 2004

The new jobs from transplants are a mixed blessing for autoworkers. The assembly jobs that are disappearing are mainly from the traditional auto centers in the upper mid-west, while the new jobs being created by transplants are mainly down south. One out of five auto assembly jobs are now in the South. In addition, the lost assembly jobs have been mainly unionized, while transplants have located in areas that are mainly non-union, and they have successfully resisted union efforts to organize their facilities.

At the same time, high-paying research, design, engineering, and administrative jobs are still concentrated in the traditional centers. The largest US, European, Scandinavian, and Japanese suppliers have all established their North American headquarters just outside Detroit. This trend should continue as tier-one suppliers take on more of the design work from US automakers, requiring them to be located close to their customers' engineering centers.

The growth of the supply sector is also a mixed blessing for autoworkers. Jobs in supplier plants in the US pay 30-40 percent less than jobs in assembly plants, and that wage gap has been steadily widening for the past three decades. Only around 20 percent of the supply sector is unionized, and although unions have targeted this sector, they have been largely unsuccessful in their organizing efforts, despite occasional help from the Big 3 in twisting the arms of their suppliers.

Suppliers are under intense pressure to reduce costs from automakers and from competition with other suppliers. They are responding by increasing productivity, outsourcing components to even lower-cost suppliers, and shifting low-skill assembly work to Mexico and to other low-cost, off-shore locations. So far, the production of capital-intensive and high value-added parts (such as engines, transmissions, and body panels) has remained mainly in the US, largely due to sunk capital costs, lack of capability in low-cost countries, and union resistance to moving those jobs. However, as more and more assembly work shifts to low-cost countries, their infrastructure improves, and union influence weakens here at home, suppliers will likely shift more of their production work to low-cost countries as well.

Autoworker unions are looking for ways to stem this tide. In its latest round of bargaining with the Big 3, the UAW agreed to close unproductive plants, cut jobs, decrease job classifications, outsource peripheral jobs like janitorial services and material handling, and introduce a two-tier wage system (in the supply sector). The savings from these changes are estimated to be worth around \$300 per vehicle. To put this in perspective, the gap between Chrysler and its Japanese rivals is around \$750 per vehicle.<sup>21</sup>

But these concessions have not been enough to keep suppliers Visteon and Delphi competitive. Both have been struggling to stay afloat with wages and benefits that are twice what their rivals pay. Earlier this year, Visteon got Ford to agree to reclaim 24 factories and 17,000 employees in North America, so Visteon can focus on its more profitable operations overseas. In October 2005, Delphi declared bankruptcy after failing to wrest major concessions from the UAW in wages, retiree benefits, employee contributions to health care, and pay for laid off workers.

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<sup>21</sup> Muller, "Saving Chrysler."

These changes would affect 24,000 UAW workers and another 11,000 retirees. If Delphi is successful in using bankruptcy court to restructure their business, they are also likely to end up with a much smaller presence in North America and expanded operations in low-wage countries.<sup>22</sup> These actions make it more likely that GM and Ford will go down the same path.

The UAW also is ambivalent about adopting more flexible forms of work organization. On the one hand, they support giving more autonomy and decision-making authority to their members. At the same time, they worry that self-management and work teams might be so attractive that workers will decide that they don't need a union to represent them. The picture in Europe is very different, mainly because the European unions have had a long-standing interest in "group work," a higher level of political consensus about the possible benefits of new forms of work organization, and more experience working together with management for mutual gain.

### **Looking Ahead**

The competitive strategies being implemented by US automakers, outlined above, are not necessarily being embraced by other automakers around the world. While all automakers are developing regional production networks and trying to gain a foothold in emerging markets, they do not all find that outsourcing production and product design to suppliers, then squeezing them for price reductions, is a desired strategy. Japanese automakers, in particular, are wary of this approach. They favor joint ventures with suppliers, taking a stake in the resulting entity.

That's because the Japanese believe that the winning strategy will be building vehicles to order and delivering them in a matter of days. That's what customers are coming to expect when it comes to other products, such as personal computers. It's just a matter of time before they demand the same thing from automakers.

Building vehicles to order can improve both quality and cost. Currently in the US, half of all customers drive home from the dealer in a car they didn't intend to buy, mainly because they couldn't find exactly what they wanted or weren't willing to wait several weeks or months for it to arrive.<sup>23</sup> Any automaker that can cut delivery time down to a matter of days and give customers exactly what they want will be rewarded with market share.

They will also save money. Studies suggest that automakers could save \$1,200 per vehicle by eliminating the logistics, handling, storing, and insurance costs that are associated with the mismatch between the cars they make and the cars customers really want. In addition, automakers and dealers spend another \$1,000 per vehicle on advertising to move the cars that nobody wants, on top of the thousands per vehicle they spend in financial incentives at the time of sale.<sup>24</sup>

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<sup>22</sup> David Welch and David Henry, "Spin-Offs that Won't Go Away," *Business Week*, September 19, 2005; David Welch, "Time and Patience Run Out at Delphi," *Business Week*, October 8, 2005; David Welch and David Henry, "Delphi: A Helluva Bargaining Chip," *Business Week*, October 24, 2005.

<sup>23</sup> Holweg and Pil, p.2.

<sup>24</sup> Holweg and Pil, Chapter 7.

As Japanese and European automakers aggressively prepare to take this next leap forward in flexible manufacturing, US automakers face a dilemma. They have been closing the gap on costs with their competitors by using the strategies outlined above. However, the strategies that are bringing them success today may make it harder for them to build vehicles to order tomorrow.

In some ways, their approach to cutting costs has made them less flexible. For example, relying on suppliers to design and deliver components and subassemblies could make it harder to make rapid changes in response to shifting customer demand. Playing suppliers off against each other and squeezing them for price reductions could create instability within the supply chain. And outsourcing components to lower-cost suppliers and low-cost countries could add to delays and inventories, making it harder for automakers to respond quickly to changes in incoming orders.

Changing direction at this point would be very difficult. It would require that US automakers wean themselves from the incentives they have come to rely on so heavily to move vehicles off the lot, and that they close plants in the US to eliminate excess capacity. It would require that they work with suppliers as partners, rather than as vendors. In a nutshell, it would require that they transform the way they design, make, and sell vehicles.

To make the leap to build to order, US automakers would face some big hurdles. No matter how they organize production, they would still be burdened with higher health care and pension costs than their competitors. And they would still have to rely on their current plants, equipment, and workforce, all of which are older than those found in their competitor's operations.

The UAW has opened the door to the kind of restructuring that would allow US automakers to compete. It remains to be seen whether it's enough, whether it's in time, and whether the automakers themselves can do what's necessary to reverse the current trends.