

Made in America? The US Auto Industry, 1955–95

Lorraine Eden and Maureen Appel Molot

This paper examines the production and political responses of the Big Three auto assemblers to the penetration of the North American market by Japanese auto assemblers over the 1955–95 period, using the technological competition model to analyze three successive challenges faced by the Big Three: import competition (1955–73), surplus capacity (1973–83), and transplant production (1983–95). We argue that the US auto makers first responded with intensification strategies and then by rationalizing production. These production strategies, together with lobbying for favorable US government policies, were unsuccessful in stemming import penetration. It was only after the Japanese firms began onshore production that the Big Three understood the competitive challenge—the need to shift from mass to lean production—and began to transform their auto operations. © 1996 John Wiley & Sons, Inc.

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INTRODUCTION

In 1955, cars sold in the United States were made there. This is no longer true; Japanese cars (both imports and Asian transplant production in the US) account for about 30 percent of the North American (Canada plus US) market. At the same time, a significant percentage of cars sold by the Big Three (General Motors [GM], Ford and Chrysler), particularly subcompact and compact cars, are made in Asia and sold under Big Three names or assembled by the Big Three using parts and components from around the world. "Made in America" is no longer synonymous with the Big Three. What happened between 1955 and 1995 that caused this apparent loss of competitiveness of the Big Three in their own domestic market? What does the term "made in America" mean for autos in the mid-1990s and beyond?

Manufacturing industries like autos, steel, and aircraft have been traditionally considered the most important industries for nation building. In the 1970s and 1980s, they were marked by the US government as strategic industries, critical to the long-run competitiveness of the US economy. Since the 1960s, as *Made in America* (Dertouzos, Lester, and Solow, 1989), demonstrates, these US industries have been threatened by foreign competitors, both by imports and transplant production, and by massive technological change.

How are these industries faring in the post-Fordist world of the mid-1990s? Are they still "made in America" industries? How successful has US policy intervention been at preserving the long-run competitiveness of these industries? The answers to these questions have important implications both for the old strategic industries and for the new critical industries of the 21st century. In *Who's Bashing Whom* (1992), Laura Tyson recommends the US government adopt a "cautious activist" approach to critical high-tech industries, with policies consisting of selective subsidies, aggressive unilateralism and, as a last resort, managed trade. These policies have been used in the past with mixed results in large, mass production, oligopolistic manufacturing industries such as autos, steel and aircraft. Do past policy interventions offer lessons for policy makers for the so-called critical industries of the 21st century?

We address the "made in America" issue by examining how the U.S. auto industry met the challenge of foreign competition, and assess the role played by government in preserving industry competitiveness.¹ The US auto industry has historically been seen as a strategic industry because of its pervasive linkages to the rest of the economy. The industry can be broken into three segments: cars and light trucks; heavy trucks and buses; and recreational vehicles. In

¹In this article we define the US auto industry as including US and Canadian auto and auto parts producers since the industry in the two countries has been integrated as a result of the 1965 Auto Pact.

this article we focus on the car and light truck segments and call this the “auto industry.” It is the largest American manufacturing industry, responsible for 4.4 percent of U.S. gross domestic product (Taylor, 1994: 53). More than a million and a half people in the US and Canada work in the assembly and parts sectors, and many hundreds of thousands more work in the retailing end. Although the number of assemblers is small,² several thousand firms produce the parts and components that go into these vehicles. What happens to the firms in this industry affects the lives of millions of Americans.

The industry fell on hard times in the 1970s and 1980s. The Big Three dominated the world auto industry until the 1950s and led the world in auto exports. Even in the late 1960s the U.S. had an export surplus in international auto trade. The Big Three’s share of the North American car market started to fall significantly after 1960, as Japanese cars began to constitute a growing segment of the US market. The share of auto trade in the total US deficit has remained stubbornly stuck at one-third despite substantial political pressure on the Japanese government by US trade officials to buy more US-made auto products.

The loss of market share to the Japanese was widely seen as clear evidence of the Big Three’s loss of competitiveness, where “competitiveness” is defined in firm-level terms as the ability of a firm to maintain and expand its market share over time. Other measures of competitiveness such as labor productivity, length of time from product design to first sales, number of defects per vehicle all showed the same trend: the Big Three could not compete with the Japanese auto MNEs. What explained this loss of competitiveness?

We argue in this article that the Big Three faced several challenges in the 1955–1995 period. The first came from increased European and Japanese imports in the 1960s; the second from increased import penetration by Japanese vehicles together with the dislocations induced by the oil price shock in the 1970s; and the third from the movement onshore by foreign producers in the 1980s. The “first wave” of transplant producers, led by Honda in 1982 and Nissan in 1984, are now significant players in the North American market. At the end of the 1980s, a “second wave,” this one of Asian parts suppliers, followed their downstream customers to the United States, and a “third wave” of latecomers, mostly European, is now moving onshore.

Historians may well see the 1955–95 period as the *Great American Auto War* with innovation as the key instrument of competitive rival-

²The assemblers currently include the Big Three, five Japanese transplants (Honda, Mazda, Nissan, Subaru–Isuzu, and Toyota) and four Big Three–Japanese joint ventures (Diamond Start, Mazda–Ford, Nissan/Ford, and NUMMI). They are being joined by BMW and Mercedes–Benz which are building assembly plants in South Carolina and Louisiana, respectively.

ry between the incumbents (the Big Three) and the entrants (the Japanese auto MNEs). We argue that this “auto war” can be explained by the *technological competition model* (Clark, 1988; Eden, 1994c). This model examines the ways that the entry of a foreign competitor into a domestic market dominated by established firms changes the prevailing pattern of competition within the industry. The foreign firm enters with a different product concept based on innovations in product and process technology. Entry generates technological competition between the new firm and the insiders.

In this article, we divide technological competition in the US auto market into three time periods, corresponding to three challenges faced by the US auto producers: *import competition* (1955–73), *surplus capacity* (1973–83), and *transplant production* (1983 to the present).³ The three together comprise a sustained period of technological competition wherein the Big Three, the industry insiders, suffered a loss in market share to Japanese auto producers, the foreign entrants with a superior technology. Each of these challenges induced responses both by the Big Three and the US government designed to offset the loss in market share and restore the competitiveness of the US-owned industry. Regardless of the type of response, the slide in market share continued.

In 1993 this situation changed. North American car sales began to grow rapidly and the market share of the Big Three began to increase. The rapid rise in the yen–dollar exchange rate, buoyant US demand, and the depressed market for cars in Japan and Europe resulted in a marked turn around in the fortunes of the Big Three. All three producers are now “in the black” and their share of the North American market is again rising. Productivity and quality measures for many Big Three vehicles now rival Japanese levels. In 1994, the Ford Taurus was the most popular car in North America, surpassing the Honda Accord.

Has the loss been stopped? Do the Big Three rule the road again? Have the incumbents finally developed a sustainable strategy that works? Have they regained their lost competitiveness? We address these issues in the last section of the paper.

A MODEL OF TECHNOLOGICAL COMPETITION

In this section we develop a simple model of industry structure and firm behavior, which we then apply to the auto industry. The model is outlined in Figure 1 and explained below.

³The dates of the periods, in practice, overlap by several years. However, for heuristic purposes we divide them into distinct periods according to these key three events: 1955 (first import penetration by the Volkswagen Beetle), 1973 (the oil price shock), and 1983 (Honda is first Japanese producer of cars in the US, selling 55,000 Civics).

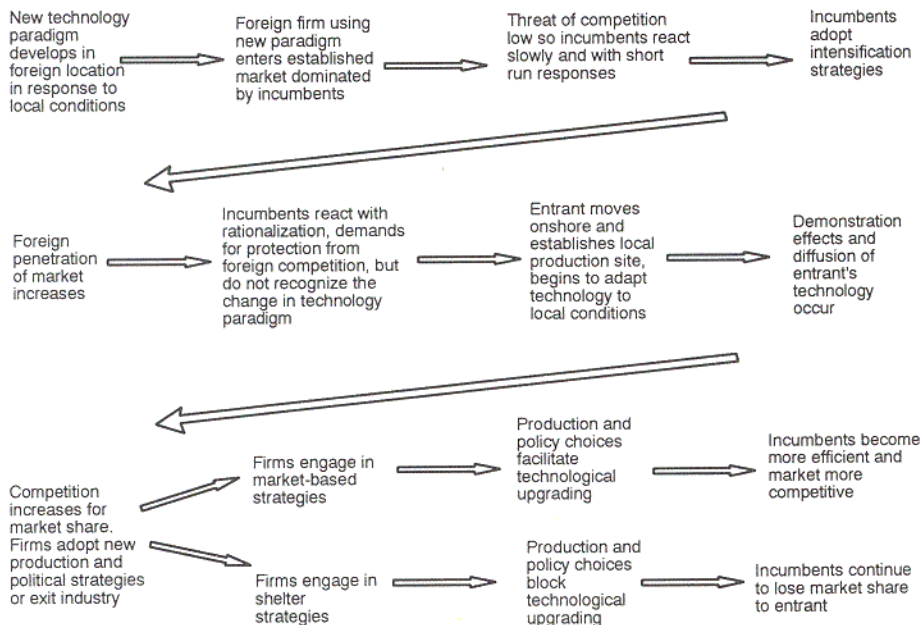


Figure 1. The Technological Competition Model.

The Outsider Challenge

Assume a domestic industry has historically been dominated by a few, large firms, called *incumbents* or *insiders*. These oligopolistic firms see themselves, and are seen by others, as a strategic group of local enterprises with stable market positions. The technological paradigm is a dominant design, well known and understood by the incumbents. Competition within the market is generally nonprice and based on brand differentiation.

Assume initially the market is penetrated by a foreign exporter. The oligopoly sees the new entrant as a competitor and potential threat to the stability of this market, and thus as an *outsider*. If the outsider has a small percentage of the market, the threat to the insider firms may be seen as insignificant. The competitive advantage of the entrant is not low cost labor or the ability to underprice the incumbents, but technology. We assume that the successful entrant has a *technological advantage* over the insiders that is both firm and context specific.

Creating value for customers through new product concepts and processes helps the foreign firm enter the market and solidify and expand its position. For the foreign entrant to be successful, at least two conditions must be satisfied in terms of the product (Clark, 1988). First, the new product must meet the minimum standards of reliability and performance set by the incumbents; otherwise there is

no competition. Second, the product must offer a distinctive bundle of characteristics that solves some problem or constraint faced by the local consumers. This package of characteristics—the new product—is based on innovation in product design, product function, and process technology.

Possible Responses by the Insiders

As import penetration grows the incumbents can be expected to attempt to discourage entry through a variety of strategies, which we group into two categories: production and political.

There are three possible *production strategies* that the insiders can adopt in response to the challenge of new competitors: intensification, rationalization, and upgrading (Massey and Meegan, 1982; Rubenstein, 1992; Eden, 1994c). An *intensification* strategy is designed to improve productivity while holding the number of plants and technology constant. Some examples of the strategy are changing the output mix, encouraging workers to work longer and/or harder, changing the plant capacity utilization rate, and so on; however, there are no major new investments or divestments or substantial changes in production technique (Massey and Meegan, 1982: 19). In effect, intensification is a short-run strategy designed to reduce costs and/or raise output such that average productivity (output per worker) increases.

The second strategy, *rationalization*, is designed to reduce costs and raise profits through the reallocation of capital among the MNE's plants. It usually involves reducing total capacity through the closure of existing plants and/or shifting production lines among plants. Altering the number of plants is a long-run strategy since it cannot be done overnight.⁴ *Technological upgrading*, the third option, is a very long run strategy that involves investing in technological change, e.g. replacing labor with robots, shifting to information technologies. This strategy involves significant changes and investments in a new product and/or process technologies.

⁴Massey and Meegan (1982: 18) define rationalization as "a simple reduction in total capacity."

Our definition is somewhat different. The three terms were developed by Massey and Meegan (1982) in their study of employment losses in Britain. Since our study focuses on technology and capital, rather than labor, we have modified the terms slightly so they correspond to the standard economic definitions of change, that is intensification corresponds to the *short run* (no changes in the number of plants or technology, although the firm may change its variable inputs, capacity utilization ratios and factor intensity of production), rationalization to the *long run* (the number of plants and size of the physical capital stock can also change but technology remains constant), and technological upgrading to the *very long run* (even basic product and process technology can change).

There are also two types of *political strategies* available to the insiders (Eden, 1994c; Eden and Molot, 1993b, 1993d). First, the firms can focus on the distinction between "us" and "them," attempting to isolate the entrant so that it is not seen by the government and the general public as part of the "domestic" industry. Among these political strategies are the exclusion of outsider firms from membership in national industry associations, public relation efforts to shape domestic perceptions of what are "true" American firms, and the development of unified positions for governments on issues of significance to the industry.

Second, the insiders can lobby for protection against the entrant and/or for policies that favor themselves at the expense of the entrant. These can include demands for industry specific or international policies that would close the local market and/or improve the insiders' access both to their own market and to the home market of the foreign firm. By actively involving governments in the fight for market share, the incumbents can change the playing field in ways that, on net, benefit themselves.

Both production and political responses can be efficient; that is, they can be *market-based* choices that facilitate the MNE's adaptation to change. For example, a political strategy that involves the creation of a regional market and opportunities for economies of scale for the firm is a pro-market, efficient strategy. On the other hand, the insiders could adopt *shelter* strategies, designed to protect themselves from market competition and slow their adaptation to change. Such strategies are anti-market, inefficient, and in the long run probably lead to reduced market share for the shelter seekers (Rugman and Verbeke, 1990, 1993).

We hypothesize that incumbents, faced with a new entrant, are slow to realize the challenge of technological competition and to respond to it. They may not perceive the entrant's product for the long-run threat it really is. Even when they perceive the threat, they will resist adopting new technologies due to inertia, lack of information, and the costs of switching. When the insiders do respond, they are likely first to adopt strategies based on intensification. Intensification is a short-run strategy which fails because it does not deal with the underlying problem: differences in the technologies of the incumbents and the entrant.

As penetration continues, the incumbents may increase their activities. A move to a rationalization strategy is a longer term approach. Political responses are also likely as the incumbents' market share falls; if import penetration is already high and the insiders are on the defensive, protectionist demands (e.g. for tariffs, quotas or countervailing duties) should follow.

The Outsider Moves Onshore

At some point, the entrant shifts from exports to foreign direct investment (FDI), establishing production inside the market as a transplant. The timing of the shift from exporting to FDI depends on both production and political factors. The need to secure and enhance market share is likely to be the driving factor behind the shift. The movement onshore changes the nature of the competition between the entrant and the insiders. The transplant acts both as an importer and a distributor of parts, subassemblies and final products manufactured by the parent firm, and as a local production site. The entrant now competes with the incumbents for market share in two ways, through import penetration and sales of onshore production. This raises the stakes for both the entrant and the incumbents.

Success for the entrant at the FDI stage depends on the type of technological firm specific advantages (FSAs) of the entrant, together with any other FSAs the firm may possess such as advantages of common governance (Chesnais, 1988; Dunning, 1983: 81, 84; Eden, 1994c, 1991). The technological FSAs include access to complementary assets, both specialized and co-specialized, needed to exploit the innovation. Ownership of these assets is necessary if the firm is to protect its innovation (Teece, 1987).

Innovative FSAs are partly embodied in the product but also partly tacit and context specific. Technological innovation is a cumulative and incremental process (Cantwell, 1991). Initial entry does not stop the pace of technological change because products must be adapted to the local environment. If the entrant is to be successful, it must engage in effective innovation, i.e. learning from experience, solving problems and adapting to change. "The entry product is the first step along a development path whose outline may be only dimly perceived at first" (Clark, 1988: 34). Firms therefore progress along technological trajectories that are both uniquely specific to themselves and simultaneously determined by location.

This means the technological FSAs of the foreign entrant are both location and non-location bound (Rugman and Verbeke, 1992). Part of the technological competence of the entrant comes from innovative activities of the parent done in the home country that build on the locational or country specific advantages of the home country. The non-location bound, or mobile, part of the parent firm's competence then moves within the MNE, through the foreign direct investment process, to become part of the technological competence of the host country affiliate. As the MNE matures, the flow of mobile FSAs continues from the parent to the subsidiary. At the same time, the foreign affiliate develops its own innovative capacity as part of its

experience within the host country, building on the locational or country specific advantages of the host country.⁵ Thus the technological trajectory of the entrant should change over time in ways that are partly firm specific and partly affected by the choice of home and host country locations.

The evolving nature of the entrant's technology compounds the competitiveness problem for established firms. Traveling along a different technological development path, it is difficult for the incumbents to understand the innovative process of the entrant, much less make the transition from one path to another (Kenney and Florida, 1993: 87-93).

The Incumbents Respond to the New Threat

Having the entrant onshore has a demonstration effect on the incumbent firms which is important for two reasons. First, producing onshore helps dispel any spurious arguments that the entrant competes on the basis of lower wages or using the comparative advantage of the entrant's home country. In addition, onshore production helps diffuse the technology of the foreign entrant. Multinationals tend to reflect the national organizing principles of their home countries (Kogut, 1994). These organizing principles diffuse more easily between firms than between countries, and even more easily between affiliates of a MNE. FDI is the means by which MNEs act as agents of change or investment bridges in transferring home country organizing principles to host countries. As time passes, onshore production should diffuse the entrant's technology to the incumbents.

Transplant production does not stop the pace of technological change by the foreign firm because the products must be adapted to the local environment. The evolving nature of the entrant's technology compounds the competitiveness problem for the established firms. Traveling along a different technological development path, it is difficult for the incumbents to understand the innovative process of the entrant, much less make the transition from one path to another. Their loss in market share persists until either the domestic firms emulate the foreign entrant's technology (which is difficult for the reasons outlined above) or attempt to modify their own technological advantage in ways that better suit customer needs.

How the incumbents respond to this new challenge from the outsider will determine their long-run market share. We hypothesize that there are two possible responses: an efficient, market-based re-

⁵This means the competitive advantages of MNE build on, but are different from, the comparative advantages of home and host countries where the MNEs are located. See Blomstrom and Lipsey (1993) and Eden and Molot (1992).

sponse using production and political strategies to facilitate technological upgrading, and an inefficient, shelter strategy designed to block change and postpone the necessary adjustment. Depending on which strategy the insiders choose (and on how the outsider reacts to this strategy), market penetration by the outsider will rise or fall.

This model therefore predicts various types of *industry-level responses* by the incumbents, rather than *individual firm-specific responses*. In practice, each insider firm is different in terms of its mix of resources, history and institutional structure, and therefore will have a somewhat different response to the threat from the outsider. For example, larger, better positioned firms may be more willing to ignore the threat, viewing the outsider as having little potential impact on their market share. Smaller, nimbler, or more farsighted firms may be more likely to respond, either due to necessity (smaller, weaker firms) or greater flexibility (nimble, farsighted firms). While we pay some attention in this article to differentiated responses by the incumbents, in general the article focuses on industry-level responses.

The Role for Government Policy

The need to understand the threat posed by the competitor is key to motivating the incumbents to adopt technological upgrading. This means that access to information about the entrant's technology is key for the incumbents' response and that there is a role for government in providing information about leading edge product and process technologies. The model also implies that government policies designed to keep the entrant's product out of the market temporarily may backfire in the long run since shelter policies do nothing to induce the insiders to change their underlying technological trajectory. Where the firms understand the challenge of the entrant, however, they may use the "window of opportunity" provided by the government to engage in technological restructuring. If this does not occur, in the long run the incumbents will fail and/or exit the industry, leaving the field to the victorious entrant. The appropriate government policy is therefore to encourage market competition, diffusion of technology, and technological upgrading by the insiders.

Let us apply the model. In each historical case we first outline the challenge to the Big Three (i.e. import competition, surplus capacity, and transplant production) and then analyze the responses of the incumbents and the U.S. government to the challenge. First, however, we outline the nature of the challenge faced by the Big Three: the shift from mass to lean production.

UNDERSTANDING THE JAPANESE TECHNOLOGICAL PARADIGM

Mass production (or Fordism) was pioneered by Henry Ford in the U.S. auto industry in the early 1900s (Beset, 1990, Kenney and Florida, 1993, Womack, Jones, and Roos, 1990). The strategy took advantage of the underlying *national organizing principles* (Kogut, 1994) of the U.S.: a large market, easy access to capital, liberal regulations, and plenty of unskilled labor. The key to mass production was "the complete and consistent interchangeability of parts and the simplicity of attaching them together" (Womack et al., 1990: 27). Not only parts were interchangeable, so were workers. By narrowing tasks, using unskilled labor and a moving assembly line, Ford was able to achieve economies of scale at substantially lower cost than could other firms using craft production (i.e., the labor intensive, batch or job production processes in small plants typical of the late 1800s).

Lean production (also known as flexible specialization, Post-Fordism, or Toyotism) is a totally different way of managing materials, human resources, and supplier relations. The emphasis is more on process than product technological development. The new technology paradigm, first developed in the 1950s in Japan, reflects the national organizing principles of Japan: small domestic market, firms starved for capital, militant labor, and inward prohibition of FDI (Womack et al., 1990: Chapter 3). Lean production has been defined as

a series of innovations and practices in manufacturing and product development . . . aimed at high productivity as well as high quality in engineering and manufacturing, resulting in high price-performance in the value of products delivered to the customer. (Cusumano, 1994: 27)

Table 1 lists the three pillars of the lean production system: just-in-time (JIT) production, cooperative supplier-assembler relations, and integrated product development. The archetypical Japanese management techniques consist of several organizational practices (small-lot production, just-in-time delivery, total quality control, multi skilled workers organized in teams and continuous improvement). The small-lot, JIT manufacturing approach is complemented by a product development approach based on "heavyweight" product managers.⁶ A philosophy of continuous improvement in product and

⁶Heavyweight project managers assume responsibility for all steps in the product development process, a process very different from the traditional mass production approach whereby functional departments assume sequential responsibility, handing projects "over the wall" to the next department as they are completed. See Clark and Fujimoto (1991).

Table 1. Statistics on the U.S. Motor Vehicle Assemblers, 1979-91

	US-Owned Motor Vehicle Assembly Plants						I-65/I-75 Plants		
	Chrysler	Ford	GM	Total US-Owned	Foreign-operated	Total US and Foreign	US-Owned as Percent of Total	Number	Percent of Total
Number of plants open in 1979	14 ^a	21	34	69	1	70	98.57	22	31.43
Number opened in new location	2	1	5	8	13	20	40.00	12	60.00
Number opened as replacements for old plants	1	0	4	5	0	5	100.00	3	60.00
Number of plants closed or idled indefinitely	6	3	11 ^b	20 ^b	1	20 ^b	100.00	5	25.00
Number of plants open in 1991	10	19	28	57	13	70	81.43	29	41.43
Percent change in number of plants, 1979-91	-28.57	-9.52	-17.65	-17.39	1,200.00	0.00			31.82
Number of plants per producer, 1990	6	8	14	28	10	38	73.68		

^aincludes American Motors plants in 1979.

^bFremont plant is counted as a closure by GM, an opening as a foreign-operated plant by NUMMI, but not counted in the total US and foreign changes.

Source: Adapted from data in James Rubenstein (1992). *The changing US Auto Industry: A Geographical Analysis*, London and New York: Routledge 3, 9, 149.

process also underlies the Japanese lean production system (Kaplinsky, 1995). Cooperative buyer–supplier relations based on close and frequent contacts with customers and suppliers complete the system (Helper and Sako, 1995).

Clearly, mass and lean production are very different technological paradigms, and yet for the first twenty years or so of Japanese penetration of the U.S. market, the Big Three thought that the competitive advantage of the Japanese auto MNEs came from low wages. In the sections that follow, we apply the technological competition model to analyze the US auto industry.

THE FIRST CHALLENGE: IMPORT COMPETITION, 1955–73

The US auto market of the 1950s and 1960s was dominated by a product technology developed in the 1930s: the watercooled, carburetted V8 engine, automatic transmission, rear-wheel drive, power steering, and power brakes. The American car was an all-purpose road cruiser emphasizing power, comfort, a smooth ride, and versatility. All cars were roughly the same size; diversity came by offering a variety of cosmetics, body styles, and accessories on the same platform. Between 1940 and 1965, the innovative effort of US firms was primarily incremental and stylistic; the last major innovation in automotive technology pioneered by the Big Three was the automatic transmission, first used in the 1940 GM Oldsmobile (Clark, 1988). The Big Three largely manufactured their own parts, components, and subassemblies. Through vertical integration, they tried to control all stages in the production process (Rubenstein, 1992: 100–101).

The first onslaught of imports came from the Europeans in the mid-1950s. Because national auto markets in Europe were segmented due to high national tariffs and taxes, road conditions, and consumer tastes, the European auto firms offered a “extraordinary range of models” compared to the one-sized family car that dominated the US market (Womack and Jones, 1984: 29). The Europeans, led by Volkswagen (VW), entered the US market in the mid-1950s and quickly raised their share from one percent in 1955 to 10 percent in 1959. Renault and Fiat had the advantage of very low wage rates in Europe; however, low wage rates were not a sufficient competitive advantage to overcome poor performance, unreliability, and lack of a dealer/service network. Thus, the first wave of European import penetration was brief and not sustained.

This also happened to Toyota and Nissan. They entered the US market with underpowered cars that overheated and broke down fre-

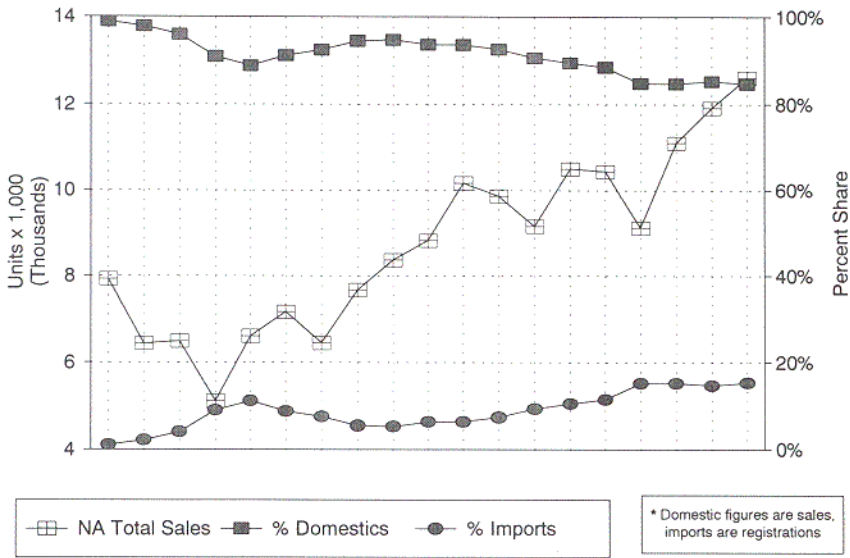


Figure 2. N.A. Total Vehicle Sales, 1955–73.

Source: MVMA World Motor Vehicle Data, 1993: 303.

quently. Import penetration fell from 8 percent of the market to 5 percent in 1963. In 1965, the Japanese firms tried again with better made cars, and import penetration started to rise.

Figure 2 illustrates this process. It shows the shares of the North American vehicle market (including trucks) held by domestic and foreign production over the 1955–73 period. Imports rise from a near zero share in 1955 until 1959, fall through the early 1960s, and then rise steadily to under 20 percent of North American sales in 1973.

THE FIRST RESPONSE: 1955–73

The Production Response: Intensification

The Big Three initially lacked any products even roughly similar to the first wave of imports. The first small US-made cars appeared in the late 1950s, led by American Motors. AMC captured six percent of the market with the Rambler, a car shorter than any produced by the Big Three. In the 1960s, the Big Three responded to the import competition in two ways: shorter platform cars and corporate twins. Both of these fit an *intensification strategy*, designed to cut costs through short-run measures within existing plants and without major technological change. Let us look at each strategy in more detail.

Increasing the Number of Platform Sizes. As a first response to the import competition, Ford, Chrysler, and GM all introduced compact cars, one meter shorter than their conventional full sized models in 1960. These smaller cars were designed to compete directly with the imports and, for a time, did reduce the market share captured by the imports. The Big Three followed with more cars built on different sized platforms; by 1971, there were four sizes: subcompacts, compacts, intermediates, and full-sized cars. By 1970, there were 28 US-made platforms ranging from 4.3 to 5.6 meters in length (Rubenstein, 1992: 148). The new products were lighter, smaller, and less expensive than traditional US-made vehicles, but were still larger than the imports and sold for a higher price. However, imports continued to gain market share; Toyota and Nissan had less than one percent of the market in 1965 by 12.3 percent by 1980.

Corporate Twins. Second, the Big Three created *corporate twins*. The vehicles were mechanically identical and looked alike, but sold under different names and at different prices. One car would have a slightly superior cosmetic package and be carried by a different division, even though the parts and components inside the car were often the same. GM, in particular, followed this strategy because it built upon the MNE's traditional strength: marketing cars that were clearly differentiated by price and by brand image. As long as the customer was unaware that twin vehicles were essentially the same under the hood, the firms could reap some economies of scale while maintaining their range of products and brand differentiation.

The Political Response

In this first time period, the Big Three were not actively engaged in lobbying for protectionist policies. They were, however, deeply involved in the early to mid-1960s in the negotiations for the Canada–US Auto Pact, a clear example of an efficient, market-based policy.⁷ The Auto Pact was a sectoral free trade agreement for qualified producers (the Big Three and Volvo), designed to promote the rationalization of the auto industry. On both sides of the border, assemblers and components manufacturers could ship vehicles and parts across the border duty free as long as they met North American content requirements.⁸ The Auto Pact worked to improve the efficiency of the Big Three producers by allowing them to take advantage of differences in factor costs and endowments between Canada

⁷For further details, see Eden and Molot (1993a).

⁸For details, see Eden and Molot (1993a).

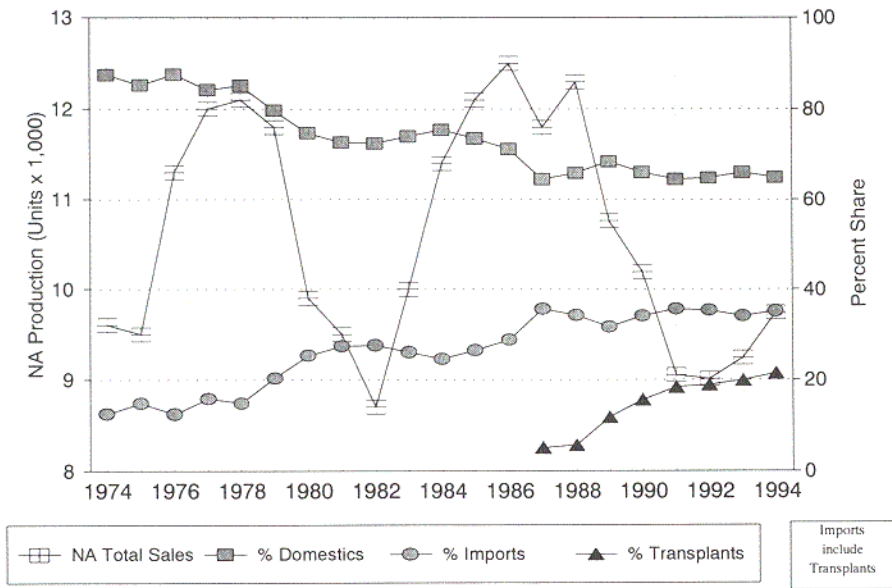


Figure 3. N.A. Passenger Car Sales, 1974-94.

Source: Wards Automotive Yearbook, various editions, and Desrosiers Automotive Yearbook, 1995: 3, 31.

and the US and by reducing the transactions costs involved in supplying both markets. As a result of integrating the two producer markets, Canadian auto plants substantially improved their efficiency until, by the 1980s, plant efficiency ratings between US and Canadian plants were roughly equivalent.

Assessing the Responses to the First Challenge

The early period of import penetration followed by the incumbents' response accords with the model of technological competition outlined above, particularly in the latter part of the period when the Japanese imports were of higher quality. Although the Big Three expanded the number of platforms, they continued to concentrate on the family-sized car, partly because profits were higher on the larger platforms. This allowed overseas competitors to capture the subcompact and compact segments. By 1973, imports had captured almost 20 percent of the US market (see Figure 2).

THE SECOND RESPONSE, 1973-83

Figure 3 plots the changes in North American passenger car sales over the 1974-94 period. Total sales show two clearly marked cycles.

The first cycle begins in 1975, rises until 1978, then falls and bottoms out in 1982. The second cycle begins in 1982, peaks in 1986, and bottoms out in 1992. A third possible cycle is visible starting in 1992. Throughout the period, the percent share held by the Big Three continues its general decline, while the share held by imports rises. In the mid-1980s, the first transplant production comes on stream (transplants are counted as part of the import total), rising rapidly to top 20 percent of North American car sales by 1994.

In terms of imports, the charge on market share was sounded by Volkswagen. In 1973–74, VW shipped its first Rabbits to the US. The Rabbit soon became the dominant design for subcompacts. Then in 1976, Honda entered with the Honda Accord, which became the dominant design for the compact model. Sales of imported vehicles rose by 25 percent over the period. The total market share held by foreign firms showed little change until 1979 (see Figure 3), but VW's share fell while sales of Japanese imports rose. After 1979, publicity about gasoline shortages sent American consumers in search of smaller cars and thus to the Japanese. The result was a 31.8 percent rise in sales by foreign firms, compared to a 2.1 percent drop the previous year, increasing the market share of foreign firms from 15 to 21 percent (*Ward's*, 1980: 134).

The Production Response: Rationalization

The 1970s economic crisis forced the US auto firms to restructure their operations in several ways, through downsizing, plant closures, and sourcing “captive imports” from Asia and establishing US-Japanese joint production ventures. These can be considered *rationalization strategies* since they attempt to alter the number and size of plants and cut employment, primarily for cost reduction motives.

Downsizing Vehicles. First, the Big Three downsized their car models; this shrinkage in the length of platforms, started by GM, continued for more than ten years. GM reduced its full-sized cars in 1976, its compacts in 1980 and its intermediates in 1982; Ford is full-sized models in the late 1970s, compacts in 1984, and intermediates in 1986; Chrysler, due to its severe financial difficulties, started downsizing compacts in the late 1970s, intermediates in 1988, and simply stopped producing full-sized models (Rubenstein, 1992: 154). In 1977–78, Chrysler introduced the first US-made front wheel drive subcompact, the Dodge Omni (twinned as the Plymouth Horizon). However, the Big Three's sales continued to fall.

Plant Closures. The second response of the Big Three, initially by Ford and Chrysler in the early 1980s, was simply to close plants to

Table 2. The Pillars of the Japanese Lean Production System

Just-in-Time Production
JIT "small-lot" production
Minimal in-process inventories
Manual demand-pull with <i>kanban</i> cards
Production leveling
Rapid setup
Machinery and line rationalization
Work standardization
Foolproof automation devices
Multiskilled workers
Selective use of automation
Continuous incremental process improvement
Integrated Product Development
Rapid model replacement
Frequent model-line expansion
Overlapping and compressed development phases
"Heavyweight" project managers
Design team and manager continuity
Strict engineering schedules and work discipline
Good communication mechanisms and skills
Multiskilled engineers and design teams
Skillful use of computer-aided design tools
Continuous incremental product improvements
Cooperative Buyer–Supplier Relations
Long-lasting cooperative relations
High levels of subcontracting
Pyramid structure with first, second and third tier suppliers
Parts suppliers brought into production process
High levels of supplier engineering
Information sharing and design interaction
Use of guest engineers
Just-in-time production and delivery
Geographic concentration of assembly and parts production

Source: Based on Cusumano (1994:28), Koichi (1993), and Helper and Saki (1995).

reduce total capacity. Between 1945 and 1960, the US-owned auto companies opened 25 plants and closed none. Between 1960 and 1978, four more were opened and four closed. Between 1979 and 1991, eight were opened and 20 were closed. These statistics (see Table 2) show the sharp shift towards plant closures in the second time period.⁹

⁹Chrysler underwent a second round of plant closures after acquiring American Motors in 1987. GM, on the other hand, ignored the crisis and opened plants in the early 1980s; it was forced to close a large number of plants after sales declined in the late 1980s.

Another factor was labor costs. In the 1970s GM began closing plants in heavily unionized areas in the northern US and replacing them with new plants in the southern states. This “Southern Strategy” was designed to take advantage of low wages, weak trade unions, and liberal work rules. Because the United Auto Workers (UAW) followed and unionized these plants, the strategy proved unsuccessful, and many of these plants were closed in the 1980s and 1990s.

Sourcing Captive Imports and Offshore Joint Ventures. The third response was to develop a closer relationship with Asian auto producers. This took two forms: purchasing captive imports (importing vehicles produced in Japan for sale in the US market under a Big Three label), and creating US-Japanese joint ventures. In 1971 Chrysler became the first US producer to buy captive imports, in its case from Mitsubishi Motors. Chrysler purchased 15 percent of Mitsubishi, thus creating the first US-Japanese auto joint venture. Ten years later, US sales of Chrysler’s captive imports exceeded 100,000. In 1979, Ford bought 25 percent of Toyo Kogyo, to import Mazda vehicles from Japan.

GM, on the other hand, attempted to build subcompacts itself, most notably the Chevette, but the platform size was unprofitable and GM switched to US-Asian joint ventures and captive imports to supply its US customers. GM took a 34 percent interest in Isuzu, followed later by 5.3 percent of Suzuki. GM’s captive imports, started in 1984, reached sales levels of 150,000 in the mid-1980s.

The rise in the yen led the Big Three to broaden their source of captive imports to include South Korean firms. GM bought 50 percent of Daewoo Motor Company; Ford bought 10 percent of Kia Motors; and Mazda bought 8 percent of Kia and helped design the captive model. Mitsubishi, partly owned by Chrysler, bought 15 percent of Hyundai. By the early 1990s, captive imports from Japan and Korea held three percent of the North American market (Rubenstein, 1992: 156–157).

The Political Response

The lobbying ability of the Big Three with members of Congress and administration is legendary. Goodman, Spar, and Yoffie (1993) suggest that until 1989, with few exceptions, the protectionist demands of the Big Three were limited. The Big Three were in serious financial difficulties by the late 1970s, with Chrysler almost bankrupt. The political responses were three-fold: requesting financial aid for Chrysler, applying for free trade zone status and location subsidies, and lobbying for tariff protection against Japanese imports. These

policies provided a window during which the Big Three could re-group.

The Chrysler Bailout. Chrysler, inefficiently run, producing low quality, low demand cars, was close to bankruptcy in the late 1970s. In 1979 the US government passed the Chrysler Loan Guarantee Act, which issued 1.2 billion dollars in guarantees, backed by Chrysler's assets. In return, the firm agreed to close several plants. The loans were controversial, although not the first subsidy received by an auto producer.¹⁰ Through a combination of the strategies comprising a "rationalization" production response, downsizing, plant closures, and sourcing captive imports, Chrysler returned to profitability, repaid the loans and invested in new product development. Thus the bailout can be seen as having a positive impact on industry competitiveness.

Foreign Trade Zones. Since 1977, the auto MNEs have been active in soliciting the designation of a plant and its surrounding area as a *foreign trade subzone (FTSZ)*, under US Department of Commerce authorization. The legislation for foreign trade zones (FTZs) dates back to 1934. Imported parts can be brought into a FTZ duty free for processing and warehousing; when the final product is exported the deferred duty is then payable, but only on the value of the imported parts. In 1952 the law was amended to permit a manufacturing plant to be declared a *free trade subzone*, even if the *plant was physically located outside the FTZ* (Rubenstein, 1992: 217).

In the late 1970s, VW and Honda were the first two auto plants to receive the FTSZ designation.¹¹ The US assemblers soon realized that their plants were also eligible for FTSZ status. By 1986, duty free status had been granted to 11 GM assembly plants, nine Ford, and four Chrysler assembly plants, all the transplants, and several component plants. Almost half of all manufacturing plants with FTSZ status are automotive plants. As in the case of state subsidies, both the Big Three and the transplants have benefited from the FTSZ legislation.

¹⁰Volkswagen received considerable funds for its Pennsylvania facility and in 1978 the Canadian federal and Ontario provincial governments put together a large package for the Essex Engine Plant located in Windsor, Ontario. We are indebted to Kenny Thomas for pointing this out to us. For details on the Chrysler bailout see Reich and Donohue (1985).

¹¹VW, attracted to Westmoreland, PA, by state support of \$71 million, operated an assembly facility for the Rabbit model from 1976 to 1987 when the plant closed and production was relocated to Mexico (Plumstead, Russell, and Stuewe, 1993: 171–73). Plant closure was the result of insufficient US demand for a vehicle which was once attractive to US consumers but which had been eclipsed by the more technologically sophisticated Japanese vehicles.

The 1981-84 VER Program. In 1981, in response to requests from the US government, the Japanese government, through the Ministry of International Trade and Industry (MITI) placed VERs on Japanese auto exports to the US. Exports were capped at 1.68 million vehicles (22 percent of the US market). The purpose of the VERs was to provide the Big Three¹² with a breathing space so that they could retool and produce cars which would compete with the Japanese products. MITI set an individual VER for each Japanese auto assembler, based on its share of the US market in 1980. The allocation system favored Honda, Toyota, and Nissan because they had the largest share of the market at the time. The ceiling was raised to 1.85 million units in 1983. Most of the additional export quotas were assigned to Mazda and Mitsubishi which were selling captive imports to the Big Three. Since the US demand for Japanese cars outstripped the supply, the Japanese auto producers used the VER program to raise their own prices in the US. They also shipped cars of higher product quality and loaded with extra options since the implicit tax per unit was less on higher value added exports (Feenstra, 1985).

The VER program is a clear example of a shelter strategy. The US producers used the VER window to raise prices, and in 1984, the Big Three made record-level profits. However, instead of spending the additional profits on upgrading, they paid their executives large salary and bonus packages and did not engage in technological upgrading. Partly because of these bonuses the US government did not pressure for renewal of the VER program in 1985. The Japanese government, however, decided to continue to restrict auto exports, setting a ceiling of 2.3 million vehicles, because the restrictions were profitable for Japanese firms, gave some administrative clout to MITI, and helped with the politics of the US-Japan trade deficit.

Assessing the Responses to the Second Challenge

On a variety of criteria, Japanese cars were simply better than the US-built vehicles. They had four cylinder engines and front wheel drive and emphasized fuel economy, good acceleration, nimble handling, efficient use of space, solid construction, and high levels of fit

¹²The Big Three did not take the same position on protection. Ford (and the United Auto Workers) demanded import restrictions, first appearing before Congress and subsequently filing an injury complaint with the US International Trade Commission in 1980. Chrysler supported import restrictions but did not appear at the ITC hearings. GM opposed import restrictions. The ITC determined by a 3-2 vote that the recession and the shift to smaller cars, rather than imports were the cause of the Big Three's difficulties. Nonetheless bills to impose import quotas on Japanese cars were introduced into Congress in 1981, prior to the negotiation of the VERs (Goodman et al., 1993: 24-25; Pearson and Takacs, 1981: 47-49).

and finish (Clark, 1988). Most new innovations were first introduced on imported cars (e.g. four-wheel steering, four-wheel drive, turbo-charging, antilock braking systems). The cars had better acceleration and handling, better frequency of repair records, fewer defects per vehicle, used less gasoline, and received better buyer evaluations. Their average performance, as documented in Consumer Reports and the J.D. Power and Associates surveys, was simply superior to the US average. The product cycle was also significantly shorter for Japanese producers than the Big Three so that the Japanese could get new models to market faster than the Big Three.¹³

Thus, as the technological competition model suggests, the new entrant firms produced a technologically more sophisticated product than the insiders, fulfilling a new market niche with a rapidly growing market share. Moreover, the Japanese standards were a “moving target” since their technological standards were always improving. This meant the US-owned firms had to change their engine designs, materials, electronics, as well as the components in brakes, steering, suspensions, and so on, and at the same time develop new process technology for the shop floor—a challenge which the incumbents did not recognize, much less address.

The second response—rationalization—failed to address the underlying differences between mass and lean production. Downsizing and plant closures reduced production costs, while captive imports helped fill out product lines for the Big Three. Joint ventures with Asian firms, with the products made offshore, also provided some learning experience, although it is not clear how much of this was transmitted to the US operations. At the same time, the political strategies of the Big Three were aimed at providing a breathing space, in which to regroup against the Japanese import threat. Both the Chrysler bailout and the VER program can be seen as defensive political responses to the second challenge. The net effect of both the production and political responses was to buy time for the Big Three. The gap in competitiveness between the Big Three and their Japanese auto competitors, however, continued to widen.

¹³Three factors explain the longer time-to-market of the Big Three. First, Japanese firms gave a single “heavyweight” project manager authority over the product from start to finish. In US-owned firms a new model typically had a series of project managers; this split the authority and increased the room for errors. Second, Japanese firms engaged in simultaneous engineering where different teams worked simultaneously on the same project. US-owned firms on the other hand used product development teams that worked in relays; as each group finished its work it “threw it over the wall” to the next group. This increased the probability that product design was not “manufacturable.” Third, first-tier suppliers were brought into the Japanese design process at the beginning and worked with the core development team. In US-owned firms, suppliers were kept at arm’s length and brought in only after the product was ready for manufacturing (Dertouzos, 1989: 182–5).

THE THIRD CHALLENGE: TRANSPLANT PRODUCTION, 1983-95

In this period, the share of total vehicle sales in North America held by pure imports fell from 22.5 percent in 1983 to 14.6 percent in 1993, while the share of transplant production rose from 1.3 percent to 14.1 percent (see Figure 3). In 1983, Detroit-built vehicles held 74.7 percent of the North American market (76.2 percent counting captive imports); the Big Three's share bottomed out in 1991 at 64.9 percent (68.0 percent including captive imports). The Big Three's share rose in 1993 to 71.3 percent. The market shares held by each of the Big Three also shifted: GM's share of total North American vehicle sales fell from 43.3 to 34.5 percent, Ford's rose from 20.7 to 24.6 percent, while Chrysler's share increased from 12.1 to 15.1 percent. The market also shifted from cars to light trucks: in 1983 light trucks held 24.4 percent of North American light vehicle (cars plus light trucks) sales; by 1993 this had risen to 38.4 percent.¹⁴

Honda was the first Japanese producer to establish a US production facility, manufacturing motorcycles in 1978 and cars in 1982 in Ohio. Honda was followed by Nissan in 1984; then a bunching of Japanese FDI occurred in the late 1980s. There were several reasons for the move onshore by the assemblers: the highly competitive market in Japan and Honda's small share in that market hastened its move to the US; the continuing demand for Japanese cars could more easily be handled with on-site production (the traditional reason for switching from exports to FDI); transplant production could be used to offset the decline in Japanese auto exports to the US induced by the VER program; the desire to reduce the US-Japanese balance of payments deficit, one third of which was autos and auto parts, through onshore production; the desire to become insiders in the North American market, as CAFTA and then NAFTA opened up new marketing opportunities; the "follow the leader" phenomenon induced other Japanese auto producers to follow the leaders in the US market to protect their individual market shares; and the rising yen together with state subsidies made setting up US facilities inexpensive relative to new facilities elsewhere (Eden and Molot, 1994; Inkpen, 1993; Kenney and Florida, 1993; Rubenstein, 1992).

In the mid-1980s, auto imports from Japan accounted for two-thirds of all North American auto imports. The Japanese share of small car and pickup truck imports was even higher. They also upgraded and expanded their offerings to cover more and more market segments. The Japanese MNEs had learned the lesson, well under-

¹⁴Data provided by the Automotive Directorate of Industry Canada.

stood by the Big Three, that higher profit margins on luxury cars can be used to subsidize losses on compacts.¹⁵

In the late-1980s, the Japanese transplants began sourcing more of their parts in the United States, partly for political reasons (to reduce the tensions caused by the widening US-Japan trade deficit) but also for economic ones (the rising yen made imported parts very expensive). Because the quality of US made auto parts was problematic, the Japanese assemblers encouraged their first-tier suppliers in Japan to set up US facilities. Starting in the late 1980s a second wave of Japanese auto FDI, this time in parts and components production, occurred. By 1991, there were over 250 first and second tier Japanese majority and minority owned auto parts firms in the US (Rubenstein, 1992). The assembly transplants are working to increase their US sourcing, whether from Japanese parts suppliers which followed the assemblers to the US or from traditional US components producers.¹⁶

THE THIRD RESPONSE: 1983–95

The production responses by the Big Three to the challenge posed by transplant production were mixed—some old, some new strategies; while the political responses by the government and by the firms became much more complex and active.

The Production Response: A Mixed Strategy

The Big Three spent the bulk of this period addressing the challenge of decreasing market share. In terms of production strategies, they continued to rationalize production and search for lower cost sources of supply. At the same time, they began to study and then adopt some components of lean production, beginning the long run process of technological upgrading.

The Shift to Worldwide Sourcing. The Big Three, especially GM and Ford, traditionally sourced most of their parts and manufactured

¹⁵While the Japanese auto MNEs were taking over the US compact market, the European firms were developing small luxury vehicles to compete with the Big Three in the luxury segment of the market. By 1987, European-built imports were almost one-sixth of the total volume of imports, but one-third in value terms. In addition, some auto firms from the newly industrializing economies (NIEs) have been in North America as long as the Japanese firms. Inexpensive cars from Korea, Brazil, Mexico, and Yugoslavia captured 5.3 percent of market in 1987.

¹⁶Honda boasts that its Ohio-built Acura has a North American content of 82 percent (Chappell, 1994a: 4). Nissan has been increasing the use of US-made parts; its Altima, made at the Smyrna plant contains 70 percent US-made parts (Bennet, 1994b: 5).

components in-house. This reduced the transactions costs of running a vertically integrated, mass production line, and provided large batches of identical, low cost parts. Estimates of in-house as a percent of total components vary from 50-75 percent for GM, 40-50 for Ford and 30-40 for Chrysler (Rubenstein, 1992: 168). One strategy adopted by the Big Three to reduce costs was to source components from low cost producers outside the US. GM was the first auto maker to take advantage of the low wages offered in the Mexican maquiladoras, setting up a wire harness plant and a seat cover and interior trim plant in Ciudad Juarez in 1978. Brake hose, dashboard, and steering wheel production soon followed, as did electronics assembly. After the Mexican peso collapsed in 1982, the number of maquiladora plants skyrocketed. Of the 1,800 plants in 1988, 129 were automotive plants, but they were among the largest maquiladoras. The three major categories of maquila plants were wire harnesses, electronics assembly, and trim plants.

Downsizing and Plant Closures. Downsizing in the late 1980s involved not only the closure of assembly plants but also the divestment of in-house parts producers. GM, the largest of the Big Three and the one whose market share has slipped most dramatically, has had the most difficult time coping with the need for restructuring. Its leadership, which changed several times over the period, took a long time to come to grips with the extensiveness of the corporation's problems (Keller, 1993: Chapter Two). In December 1991, GM announced the closure of 6 assembly plants (one of which in fact had already closed) and 15 other factories and a reduction of its work force, primarily through attrition (Keller, 1993: 39). At the end of 1992 GM indicated that it would close a further 23 plants in the United States and Canada, reducing its employees by some 35,000 (Pritchard, 1992: B1). Throughout 1993 GM identified a number of parts facilities for divestiture (Bennet, 1993: D3). If the corporation follows through with its downsizing plans, it could eliminate as many as 90,000 jobs by the end of the 1990s (Eden and Molot, 1993a: 15). For details on some of the changes GM has made in its North American operations, e.g., reduced costs by demanding reductions from suppliers, reduced payroll costs through a reduced workforce, etc. see Thomas (1994: 1, 29). A March 1994 *Automotive News* story (Henry, 1994: 8) notes that GM's Automotive Components Group has trimmed worldwide employment since 1992 from 165,000 to 141,000. As many as 30,000 more jobs will be eliminated in North America through attrition or termination in the next two to three years. Jobs will be added in Europe, Asia, and Latin America.

Ford and Chrysler both implemented cost-cutting measures and

layoffs during the late 1980s and have emerged somewhat leaner and more efficient. This is particularly true of Chrysler which closed three plants between 1988 and 1990 (Womack et al., 1990: 244–45).

The Shift from Mass to Lean Production. By the early 1980s, academics had begun to study the loss of competitiveness of the Big Three. Altshuler et al. (1984) documented the technological advantages of the Japanese imports and worried about the future of the automobile. This study clearly galvanized the US policy establishment and led to several more studies of lean production, focusing on autos (Molot, 1993; Rubenstein, 1992; Womack et al., 1990) or more generally (Dertouzos et al., 1989; Eden, 1991, 1994a,b; Eden and Molot, 1992; Kenney and Florida, 1993; UNCTC, 1991, 1993; Westney, 1994).

Executives from Big Three firms went to Japan to familiarize themselves with the basic concepts of lean production and came back realizing that low wages were not the source of the Japanese competitive advantage. Seeing Japanese assembly plants produce onshore using American labor but achieving Japanese efficiency levels also had a salutary demonstration effect. Lastly, US-Japanese joint ventures have allowed the Big Three access to lean production techniques.¹⁷

Starting in the mid-1980s, the Big Three began to adopt some of the practices of lean production (e.g., JIT delivery, closer links with fewer suppliers, quality circles). In varying ways, each MNE attempted to restructure to meet the competition. Huge sums were expended in rationalization and upgrading: GM, for example, spent some 1.3 billion dollars in the 1984–88 period on retraining programs and aggressively cut costs. By 1987–88, GM and Ford were optimistic that restructuring had prepared them for the 1990s. There have also been efforts to improve relationships in the industry that have been weak historically, such as assembler-supplier, union-management, and technical specialist-general management. The Big Three have begun to reduce the number of their first tier suppliers while at the same time demanding greater cost effectiveness and price reductions from them. Ford, for example, is reducing the number of its suppliers by about half and demanding that those who wish to continue absorb engineering duties that the company used to per-

¹⁷From the perspective of GM, the most dramatic adoption of lean production is in the NUMMI (New United Motor Manufacturing Inc.) plant in Fremont, California. A joint venture with Toyota, NUMMI replicated Toyota's production system. By the time NUMMI was fully operational, its quality matched that of a Toyota plant in Japan and its efficiency was not far off the Japanese level (Womack et al., 1990: 83). Keller suggests that NUMMI "remains the rare example of American-Japanese collaboration to the benefit of both" (1993: 204).

form in-house and return to Ford any windfall profits they might make from shifting currencies (*Economist*, 1995a: 77, Kisiel, 1995: 50). See also Frame (1995: 3,32) for a discussion of GM's parts' purchasing strategy and Womack and Jones (1994: 97). The car makers are concentrating more on new product development and vehicle assembly, while shifting the intermediate stages of production (parts, components and subassemblies) to first-tier suppliers. A pyramid structure is emerging, similar to the keiretsu structure in Japan (*Financial Times*, 1994: II).

Each of the Big Three has adopted a different production strategy to target global markets. For each the strategy reflects what the MNE sees as its FSAs and its new sourcing policy. For Chrysler, the US will remain the center of its operations, with expansion overseas primarily through exports: Chrysler will build on its success with minivans and the Jeep to become a small-volume "image" manufacturer (Lapham, 1994: 1, 48). Chrysler anticipates that the utilization of "production teams" for its vehicles will allow it to develop replacements at lower cost than its current generation of products (Lawder, 1995: B4). Ford has introduced "Ford 2000," a global masterplan which reorganizes the company into five vehicle program centers, one in Europe and four in the U.S., each of which will focus on a different market segment; by the year 2000 Ford plans to have only 16 vehicle platforms, down from the current 24 (Kisiel, 1995: 50). GM expects to leverage its worldwide resources to enable it to serve market niches; vehicles assembled in one location will be shipped and rebadged for sale in another (Frame, 1994: 1). There will be some sharing of platforms between North America and Europe (particularly for small cars), but GM is not moving toward a global organization.

The Political Response

Between 1984 and 1995 the Big Three became more aggressive in their demands both for protection of their insider status and for policies that would make it more complicated and costly for the transplants to sell vehicles in an increasingly integrated North American market. At the same time as the Big Three pressed for policies they believed would enhance their capacity to compete against the transplants, their position (in terms of North American content requirements) also demarcated the new parameters of future auto industry competition. Political strategies in this period took two forms: pressuring governments for policies that benefited the Big Three at the expense of their Japanese competitors, and efforts to influence US perceptions of "who is us." The firms lobbied for both

auto-specific policies and to influence national/continental legislation in ways beneficial to themselves.

State Location Subsidies. Since the mid-1980s, the auto MNEs have actively sought location subsidies from state (and provincial) governments (Rubenstein, 1992; Chapter 8). Three types of state assistance have typically been offered: site improvements (roads, electricity, etc.), job training grants, and tax holidays. The latter generally include relief from state and local taxes for a specified time period. State subsidies have benefited both the Big Three and the Japanese transplants, since both groups have encouraged bidding wars when deciding where to locate a new plant or a new product line. While the transplants have benefited more from the new plants, the Big Three have focused on subsidies for plant retooling for new product lines.

Autos and the 1989 Canada-U.S. Free Trade Agreement. The Big Three had very definite demands during the CAFTA negotiations, which the US government pressed on their behalf at the bargaining table. The assemblers were concerned by increasing Japanese vehicle production onshore while the US government was frustrated with the way in which the terms of the 1965 Auto Pact promoted the location of Asian transplant assembly plants in Canada. The CAFTA autos chapter reflected these irritants. Among the auto provisions are a 50 percent North American content requirement¹⁸ and the closure of the Auto Pact to new firms (unless they could qualify by January 1, 1989).¹⁹ What CAFTA did was to establish two classes of North American auto producers (Johnson, 1993a,b), those covered by the Auto Pact and those that were not (the transplants).

Autos and the 1994 North American Free Trade Agreement. The position of the Big Three producers during the NAFTA negotiations reflected their deteriorating competitive position vis-a-vis the transplants and their concerns that the inclusion of Mexico in a North American free trade arrangement could open the door to cheap imports (*Inside U.S. Trade*, 1991: 3). The Big Three sought to augment their own position as insiders and to make it as difficult as possible for their competitors to attain insider status. Their demands again received a sympathetic hearing from the US administration.

Chrysler, Ford, and GM wanted the following from NAFTA: an

¹⁸The calculation of North American content under the CAFTA make it much harder to meet than the North American content rules of the Auto Pact. See Eden and Molot (1993a).

¹⁹The only firm to do so was the GM-Suzuki joint venture, CAMI.

immediate reduction in Mexican tariffs and value added requirements for the Big Three producers; a reduction in the trade balancing requirements of the Mexico Automotive Decrees; termination of Mexican restrictions on ownership of autoparts and components producers; continuation of the Corporate Average Fuel Economy (CAFE) regulations; removal of the Mexican embargo on the imports of used cars and trucks; a higher regional content provision than the 50 percent rule under CAFTA; and clarified rules of origin for duty-free treatment of North American goods.

To compensate for what they saw as the restrictive conditions of the Mexican Automotive Decrees under which they had operated for years in Mexico, the Big Three further sought preferential access to the Mexican market for themselves during the NAFTA transition period. The Big Three proposed the creation of a "Two Tier" system for auto producers in Mexico under which firms producing cars and trucks in Mexico on January 1, 1991 would be eligible for a more rapid decrease in tariffs and other trade-restricting requirements than those that might later enter to the Mexican market (most notably Honda and Toyota). These measures would permit the Big Three to further entrench their position as insiders in the North American auto industry.

The Big Three got most of what they wanted out of NAFTA: the abolition of Mexico's 1989 Automotive Decree of 2004, the phase-out by 1999 of Mexico's foreign ownership restrictions, and a schedule for including Mexico under the CAFE regulations. NAFTA also includes both a higher regional content provision (62.5 percent) and new definitions of the rules of origin. Until the NAFTA is fully phased in, existing producers in Mexico (i.e. the Big Three, Nissan, and VW) enjoy more beneficial treatment than new entrants. Thus, the Big Three were influential in shaping the auto provisions of NAFTA in ways advantageous to themselves.

Defining "Who Is Us": Political Activities of the Big Three. Perhaps the most important, and certainly the most symbolic, act of the Big Three in their effort to impress upon the American public the distinction between themselves and the new transplant assemblers was the November 1992 decision to expel Honda and Volvo from the US Motor Vehicle Manufacturers Association (MVMA), the organization that represents auto assemblers (Eden and Molot, 1993d). The rationale for this was the need to create an association which could easily reach a consensus on industry positions. With Honda a participant in MVMA discussion, it was difficult to develop a position on NAFTA or on the minivan complaint (discussed below) since Honda did not agree with the Big Three's stances. Restriction on MVMA

membership would allow the Big Three "to focus on commons issues and interests that are unique to the domestic manufacturers" (Levin, 1993: D1). The MVMA also strengthened its ability to speak for the big Three in debates over trade, technology and regulation by taking over the activities of US Council for Automotive Research. As part of the remake of its image into an "American" association, in late 1993 the MVMA changed its name to the American Automobile Manufacturers Association.

Strategic Trade Policies. The US government, frequently with the support of the Big Three, has made a number of attempts to improve market access in Japan for US auto producers and reduce the US trade deficit. In effect, the government has been engaging in strategic trade policies on behalf of the Big Three. We catalogue several of these. An early effort, in which the Big Three were active participants, was President Bush's January 1992 visit to Japan. Little was accomplished on the trip, save for vague promises that the transplants would increase their purchases of U.S. parts and that imports of more US vehicles would be encouraged (Keller, 1993: 20).

1993 was a very active year in terms of strategic trade policies. early in the Clinton administration's term, the Big Three considered, and then abandoned, an across-the-board dumping case on all cars imported from Japan (JEI Report No. 9A, 1994: 2-3) on the grounds that the costs of production in Japan were higher than the U.S. sticker price of the vehicles. One of the considerations in the decision not to press the case was the pressure brought to bear on the Big Three by the Japanese firms with which they have joint ventures. In effect, the realities of new production arrangements constrained the strategies open to the Big Three.

The Big Three also attempted to persuade the Clinton Administration to reclassify minivans and sport-utility vehicles as trucks instead of cars for customs purposes, which would raise import duties on these vehicles to 25 percent from 2.5 percent. Trucks are also subject to a 25 percent tariff, which allows US producers to mark up prices over cost more than in other segments, thus generating additional profits which can be used to subsidize less profitable segments such as compacts. Hence the desire of the Big Three to have other vehicles redefined as trucks. This endeavor fizzled when, in May 1993, a Court of International Trade judge ruled that the Treasury Department's Custom Service erred in classifying a two-door Nissan Pathfinder sports-utility vehicle as a cargo vehicle and not a car (JEI Report No. 9A, 1994: 9). The US administration appealed the ruling at the request of the Big Three. However, a September 1994 US court of Appeals (for the Federal District for Washington) unanimously

upheld the CIT position that the Nissan vehicle was a car and therefore dutiable at 2.5 percent. The administration did not file a further appeal by the December 6, 1994 deadline, thereby bringing this particular effort by the Big Three to protect the minivan market to an end (JEI Reports No. 35B and 48B, 1994).

Two U.S.-Japan economic summits in 1993 led to the U.S.-Japan Framework for a New Economic Partnership which deals with sales of US-made vehicles in Japan and sales of US-made automotive components to the transplant assemblers. The US administration pushed hard for numerical targets, which the Japanese strongly opposed (MacKnight, 1993: 5-6).

Also in 1993, Congress passed the American Automobile Labelling Act. This legislation, which after October 1, 1994, requires each vehicle to carry a label noting domestic content, is designed to make Big Three vehicles appear more "American" or domestic than they really are and to make transplants vehicles appear as less (Hutchinson, 1994: 13).

In 1994, at President Clinton's request, the Big Three prepared a "wish list" of possible measures that might be employed against the Japanese automakers. The list included the use of an executive order to reclassify sport-utilities and minivans as cargo vehicles and therefore subject to 25 percent duty; withdrawal of free trade zones privileges from the Japanese MNEs US plants, which would mean they would have to pay duty on imported parts;²⁰ raising the tariffs on imported auto parts; and imposing quotas on US sales of all Japanese-badged vehicles. In short, lobbying activities of the US auto industry in terms of emphasizing the insider-outsider distinction have, if anything, intensified²¹ (Gates, 1994: 35).

In the spring of 1995, ongoing US-Japan auto trade talks floundered, as a result of which the U.S. government threatened to impose a 100 percent tariff on imports of luxury cars from Japan if the Japanese would not commit to significantly increasing their purchases of American auto parts. An agreement was reached at the last minute as a result of which the Big Three will have improved access to the Japanese vehicle market, the afterparts market in Japan will be deregulated, and the Japanese transplants will source more parts from US suppliers (MacKnight, 1995: 7). Disagreement exists over the significance of the agreement and how it will be monitored.

²⁰In reality this is not a serious threat given that the tariff on parts is 2.5 percent.

²¹These efforts are, of course, counter-balanced by those of the Japanese assemblers and parts suppliers who point to the jobs they have created. Since, with the exception of Ohio, no state hosts more than one Japanese transplant assembler, the suggestion has been made that the transplants' dispersion among states might be deliberate and reflect a strategy to maximize political benefits (Kenney and Florida, 1991: 27).

Assessing the Responses to the Third Challenge

In 1993, North American sales rose 8.4 percent over 1992, and each member of the Big Three reported a profit. Even GM, which had suffered huge losses in previous years, made a profit on its North American division (Levin, 1994: D1; Bennet, 1994a: D1). 1994 was even better as US car and truck production in 1994 eclipsed automotive output in Japan (*Wall Street Journal*, 1993: C18). Finally, for the third consecutive year, the US market share held by the Japanese auto makers fell (Taylor, 1994: 51). Does this mean that the US auto MNEs have regained their competitiveness vis-à-vis the Japanese?

A number of factors have contributed to the recent upturn in the fortunes of the Big Three. First, the US economy has come out of recession and there is considerable pent up consumer demand for vehicles (although the demand flattened in 1995). Second, the appreciation of the yen has raised the price of Japanese vehicles so that they average close to \$2,000 more than those produced by the Big Three. Third, the Big Three are reaping some of the benefits from their recent attention to cost reductions, downsizing, and production gains (Thomas, 1994: 1). And fourth, the Big Three have closed the quality gap so that there are no longer significant differences in this regard between them and their Japanese competitors (Taylor, 1994: 61).

Lastly, there has been a steady shift in consumer tastes from passenger cars to light trucks (including minivans). Figure 4 shows the growth in North American light truck sales. The market segment is dominated by the Big Three, with over 80 percent of the market. Chrysler and Ford, in particular, have developed products which suit the taste of a significant segment of American consumers, a taste which the Japanese MNEs were slower both to anticipate and be able to fill. The share of the market held by imports, and more recently by transplants, however, is rising.

In summary, it is too early to tell whether the responses of the Big Three since 1983 have been successful at stemming the threat from transplant production. That the Big Three have begun to adopt Japanese production methods based on just-in-time sourcing, zero-defect quality, reduction in the number of suppliers, and flexible automation is not in doubt. Productivity in the US auto industry has begun to rise significantly. Improvements came first in US factories run by Japanese companies; more recently some US-owned plants have improved their quality and efficiency (Bennet, 1994c: D5). Evidence of this is provided in a new study of 29 major development products of US, European, Japanese and Korean auto MNEs, which reports that U.S. auto firms have significantly improved their product development performance (Ellison et al., 1995). Lead time and productivity

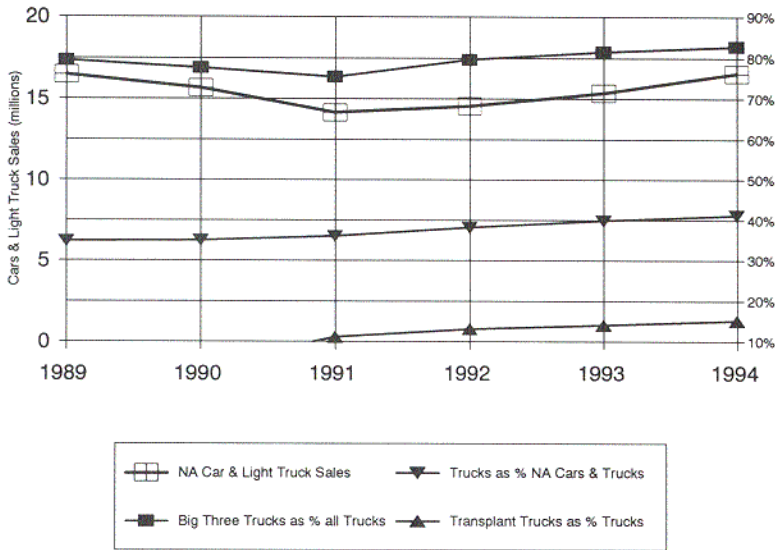


Figure 4. N.A. Light Truck Sales, 1989-94.

Source: Desrosiers Automotive Yearbook, 1995 edition: 3, 4, & 32.

have risen significantly,²² total product quality is higher,²³ and the firms are adopting Japanese lean production techniques (e.g. simultaneous engineering, heavyweight production managers,²⁴ closer links with suppliers).

The real question is the extensiveness and success of this change in production philosophy. The Big Three still lag far behind the Japanese in some areas, such as downtime for new models²⁵ and the time required to develop a new model (Treece, 1995: 2i). Questions can also be raised about the globalization strategies adopted by the Big Three: are they restructuring to meet the challenge of the past or that of the future? Of the three, Ford is the most visionary; its test will be the smooth implementation of Ford 2000. Chrysler is the most oppor-

²²Lead time figures, adjusted for product complexity, in 1980 and 1990 respectively are Japan (44.6, 54.4), US (60.9 and 51.6), Europe (59.2, 56.1). Thus the gap between Japanese and US projects in terms of time from concept to first product has fallen significantly (Ellison et al., 1995: 11).

²³Total product quality measures for the projects in 1980 and 1990 respectively are Japan (53, 61), US (35, 42) and Europe (60, 59). Thus total product quality has risen for Japan and the US, but the gap between them has not changed very much (Ellison et al., 1995: 11).

²⁴The percent of Japanese projects with a heavyweight manager has risen from 17 to 25 percent; on the US projects it has risen from zero to 20 percent (Ellison et al., 1995: 12).

²⁵Ward's estimates that the time needed to change over a factory from one model to another ranged from three days for the 1994 Honda Accord, to 60 days for the 1995 Ford Contour and 87 days for the 1995 Chevy Lumina. Since estimates are that every month a plant is closed costs \$65-85 million in lost pretax profits, switchover costs are still enormous for the Big Three (reported in *Business Week*, 1994: 111-112).

tunistic of the Big Three, using emerging markets to sell excess North American production; among its challenges are development of appropriate links with key suppliers and, with the exception of China, its lack of greenfield investment.²⁶ GM has been opportunistic in focusing on new markets, but faces problems in regaining its reputation for product leadership, in new product development performance and improving supplier integration with the vehicle design process.²⁷ Finally, the political strategies adopted by the Big Three in this period are worrisome because they have strong shelter/protectionist overtones.

While the Big Three have been rationalizing and upgrading their activities, the Japanese auto firms have not been standing still. Since the late 1980s, on a regional scale, the Japanese auto MNEs have started developing *regional core networks* of assembly and parts firms within North America, and more recently, within the European Union (Eden, 1994a,b; UNCTC, 1991, 1993). These networks are replicating the complete value chain of the auto industry, from R&D through parts production, assembly, sales and service within North America, creating fully integrated production networks on a regional basis. Honda has moved fastest in this regard. Until recently, Honda like the other Japanese auto firms in North America, consisted of several individual plants, each separately incorporated and directly linked to the parent firm in Japan. In 1994, Honda California became the regional headquarters for the Western Hemisphere with all other plants reporting directly to it. The North American regional headquarters now has responsibility for planning, doing the research, production, and delivering new North American models (Chappell, 1994b: 1, 45). Toyota is increasing its North American capacity (with a new truck plant in Indiana and expansion at its Cambridge, Ontario facility) and establishing a headquarters for its North American operations in Cincinnati (*Globe and Mail*, 1995: B10).

The move onshore, however, has not been an easy one for the Japanese auto makers (Kenney and Florida, 1993; Rubenstein, 1992; Womack et al., 1990). The lean production, pyramid, keiretsu structure developed in Japan has had to be adapted to North American factor and product markets. Kenney and Florida (1993) argue that a new form—*information mediated production*—is emerging, a blend

²⁶Chrysler, which is now developing more of its own vehicles, is terminating its relationship with Mitsubishi on the grounds that it no longer needs Mitsubishi's small car capacity. The competitive position of the two assemblers has changed and the strong yen has made it expensive for Chrysler to import vehicles (Stern and Templin, 1995: B6).

²⁷Much of this paragraph is based on a discussion led by Gregory Scott at a session of the International Motor Vehicle Program conference, Toronto, Canada, June 6, 1995. See also *The Economist* (1995b: 56–57) and Stern (1995: B1).

of the Japanese keiretsu structure with US supply and demand conditions. The transplants continue to face problems such as ensuring the availability of highest quality parts within the two-hour driving time normally associated with just-in-time production. In addition, they are adapting to the unionized and more antagonistic labor relations structure in North America. Distribution systems are also very different from those in Japan. And, lastly, US protectionism—Japan bashing coupled with US suspicion of inward FDI—is still a recurrent problem.

The jury is still out on whether the Big Three will rule the road again in the late 1990s. What is clear is that the Japanese transplants are here to stay and are becoming as American in terms of their production and sourcing patterns as are the Big Three.

CONCLUSIONS AND POLICY LESSONS

Why did it take so long for the Big Three to recognize the challenge presented by the Japanese? And why was the response of the Big Three slow and ineffective even though they were larger, more experienced, and better endowed? The reasons are twofold.

First, we conclude that the Big Three misunderstood the nature of the challenge. The US-owned MNEs offered many explanations for their loss in market share, all of which suggested the loss would be temporary. The initial Big Three responses were based on cost reduction: downsizing, outsourcing, and plants closures. These worked temporarily but did not stem the Big Three's long run decline in market share.

Second, the Japanese auto MNEs relied on a form of innovation, lean production, that the incumbents found difficult to duplicate. The distinctive set of product characteristics came from differences in concept, design, materials, components, equipment and procedures, all involving in-house development. The competitive advantage of the Japanese was *firm embodied* and partly noncodifiable or tacit, and therefore difficult to transmit outside the MNE.

The Big Three were travelling along a different development path—mass production—and it was very difficult to make the transition from one path to another. The evolving nature of the technology compounded the competitiveness problem since the Asian MNEs were a moving target. In the short run, the insiders were reluctant to switch and thus were trapped in second-best strategies. It was only when the Japanese producers moved onshore in the mid-1980s that the Big Three were able to recognize the problem and take steps to mount an effective response. To quote *Made in America*,

It appears that American firms learn fastest not through reading books or gathering intelligence overseas but by being directly confronted with a competitor performing at a much higher level using American employees in America . . . American-owned firms are now heading in the right direction. (Dertouzos et al., 1989: 187)

What can this case tell us about the role of the US government in improving competitiveness of US manufacturing industries? Is Tyson (1992) right? Should the US government be following a policy of cautious activism based on selective subsidies, aggressive unilateralism, and, as a last resort, managed trade?

As our analysis of the auto industry shows, the US government intervened actively on behalf of the Big Three at several key junctures. In the 1960s, the Auto Pact gave the Big Three a level playing field across Canada and the United States, facilitating continental integration of production that reduced production costs. The 1979 Chrysler bailout kept the third player in the industry alive, or at least from being taken over by another auto firm. The government bought a window of opportunity for the Big Three with the 1981–84 VERs program, even if the firms did not use it wisely. In addition, the VER program may have had the unintended consequence of luring the Japanese producers onshore, thus bringing the Big Three face to face with their competitors and hastening their shift from mass to lean production through the demonstration effect of onshore production.

In the late 1980s and early 1990s, CAFTA and NAFTA provide additional opportunities for further regional specialization but may encourage the Big Three to continue with their search for lower cost labor sites by moving production to Mexico, rather than shift to technological upgrading. Recent attempts by President Clinton to use strategic trade/industrial policies (e.g., market opening measures) on behalf of the Big Three are evidence of the growing importance of political activities by the firms. These strategies have opened the Japanese market to the Big Three, but their capacity to compete is far from clear. Such policies again are likely to encourage the movement onshore of additional Japanese suppliers, replicating the *keiretsu* structure in the United States.

Over the 1955–95 period, the involvement of US policy makers in the auto industry, at the behest of the Big Three, has risen sharply. While the market share of the US firms continued to slide until recently, the production and political responses used by the firms have also shifted significantly, from ignoring the threat to actively trying to manage change in the industry. US policy has attempted to provide a window for this adjustment and to favor the Big Three. In

some cases the policies have been clearly market based and efficiency enhancing (e.g., the Auto Pact); in others (the VER program, Clinton's use of strategic trade policy, the Big Three's NAFTA content demands) the policies look more like shelter strategies.

The unintended consequence of government policies since 1980 may have been to induce the Japanese auto makers to move onshore. In the 21st century, we predict one or more of these Japanese firms (Honda and/or Toyota) will effectively become American manufacturers, setting up regional core networks, where all stages of production (R&D, parts production, assembly, and sales) are done in North America. In the long run, we predict that the term "made in America" may change from "made by the Big Three" to "made in North America," whether by the Big Three or by US regional headquarters of Japanese firms such as Honda and Nissan as these firms become true *regional insiders* within North America.

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