American Automobile Manufacturing: It's Turning Japanese

by Michael F. Bryan and Michael W. Dvorak

In the last 10 years, the world auto market has been undergoing possibly the most dramatic transformation since assembly line production was introduced in 1913. Sparked by rising gasoline prices, the industry has developed and introduced new engineering materials and techniques allowing for smaller, lighter, and more fuel-efficient vehicles. This environment of change has also seen the emergence of foreign manufacturing operations, especially in the Fourth Federal Reserve District, which are rapidly being blurred in the world automobile market.

The auto industry plays a major role in the U.S. economy. In 1985, it represented about 5 percent of real U.S. gross national product (GNP), and accounted for a comparable proportion of national employment. Given the importance of the automobile sector in the United States, the controlling worldwide changes in the industry could have profound impacts on our economy.

This Economic Commentary discusses a recent development that has important implications for the auto industry, especially in the Fourth Federal Reserve District. In the last 10 years, automobile production is relocating to the United States at a fast pace. Before the end of this decade, several Japanese-owned assembly plants will be located in the U.S. and at least two will be in the Fourth Federal Reserve District. These facilities will have a capacity of at least 1.4 million units within the next few years. Given current auto sales estimates, this would represent more than 10 percent of the total U.S. new-car market.

Collectively, the Japanese could easily become the third-largest automobile producer in the United States before the end of this decade.

Made in America

Last year, Japanese manufacturers of automobiles sold about 1.4 million units in the United States (table 1). The largest, and the first, is Honda's plant in Marysville, Ohio, which began producing cars in 1982. Within a year of starting operations, Honda was America's fifth-largest car manufacturer, out-producing Volkswagen of America. In 1985, with a production of slightly over 100,000 cars, Honda surpassed American Motors as the fourth-leading U.S. auto producer. Honda captured 5 percent of the U.S. new-car market in 1985; about 30 percent of its sales were of cars actually made in Ohio.

Since 1983, two additional Japanese-owned auto plants began producing cars domestically—Nissan, located in Smyrna, Tennessee, and the New United Motor Manufacturing (or NUMMI) in Fremont, California. Nissan initially focused on producing small trucks in Smyrna but, in 1985, the Tennessee plant started production of the company’s most popular U.S. car (the Sentra) with a production capacity of about 125,000 units. Nissan’s investment in its Smyrna operation is around $660 million.1

NUMMI is the joint General Motors-Toyota enterprise that operates out of a renovated GM factory. Next year, this plant may also begin producing a car marketed specifically for Toyota. The production capacity at NUMMI is currently around 200,000 units, with a target of approximately 450,000 units.

Three more Japanese plants have recently begun development, but are not yet producing automobiles. Mazda, a Ford affiliate, will soon open an assembly plant in Flat Rock, Michigan. Two factories located in Tennessee and one in Georgia will carry a Ford label and the other a Mazda label. Total capacity in Flat Rock is estimated at about 350,000 units annually. The Diamond-Star Corporation, a Mitsubishi-Chrysler affiliate, will soon locate in Bloomington, Illinois, with an estimated production capacity of 180,000 cars, and at a cost of approximately $400 million.

Most recently, Toyota announced it will begin production of a luxury car in the central Kentucky city of Georgetown. Toyota-Georgetown, also in the Fourth Federal Reserve District, will cost about $200,000 and have an annual capacity of about 200,000 units. Production at the Georgetown assembly plant is unlikely before the 1988 model year.

Finally, Fuji (Subaru) has been studying the possibility of locating an auto assembly plant somewhere in the U.S., although details are incomplete. By some very conservative estimate places total output at these seven Japanese plants at about 1.4 million units annually, representing an investment valued in excess of $3.5 billion.

These U.S.-based Japanese auto assembly plants have not demonstrated very uniform characteristics. For example, no geographic concentration has yet developed, and it would appear that tax/subsidy arrangement at the state...
4. These ratios include incomes earned from Japanese sales and operations in the United States.

5. Quotas have been in effect for Japanese cars since 1981, but their impact was largely insignificant until 1983. For a discussion of the cost of the voluntary restraint on Japanese cars, see Bryan, Michael F. and Owen F. Humpage, "Voluntary Export Restraints: The Cost of Building Walls." Economic Review, Federal Reserve Bank of Cleveland, Summer 1984, pp. 7-37.


7. Japanese automakers, however, have developed an intricate system for outsourcing a large percentage of their parts. The Japanese have argued that using outside suppliers (outsourcing) is more labor cost efficient because the high wage rates that are characteristic of the auto industry are not necessarily forced upon suppliers.

8. The current study of the Car Market in Japan is dominated by two major producers—Toyota and Honda. The latter represented one-third of the total Japanese new car output during 1984, less than half of its production actually exported (45 percent). Honda and Mazda combined, on the other hand, represented less than 23 percent of the total Japanese car output, but each exported over 73 percent of their production.

9. Competitive pressures in the U.S. auto market have already forced some American auto manufacturers to introduce Japanese-style manufacturing techniques in the United States. For example, Honda and Mazda are presently around 85 percent of existing capacity. In terms of output, the 15 percent excess capacity suggests that the Japanese can still expand production by as much as 2 million units annually. Given the relatively small market size of the U.S. market, why don’t Japanese automakers continue to expand domestic production and simply export even larger percentages to the United States?

10. To begin with, Japanese automakers cannot wholly ignore the seemingly ever-present threat of greater protectionist measures by the U.S. government. Protectionist barriers have shaped the production of auto manufacturers throughout the industry, and have been used more than once in the U.S. to ease the threat of competition from abroad. Protectionist sentiment has been particularly strong in the United States since 1980. At least 12 auto-related import restrictions have been introduced as potential legislation since then. Currently, there are bills in both houses of Congress concerning auto quotas, tariffs, and local content restrictions. Interestingly enough, the most effective restrictions on Japanese cars is enforced by the Japanese themselves. Since 1984, the Ministry of International Trade and Industry in Japan (MITI) has regulated the number of cars exported to the United States by enforcing quotas that have been set largely on the basis of sales shares established for the U.S. market in 1979.

11. A Question of Costs

From an economic perspective, the growth in U.S. production facilities by Nissan and other Japanese producers is difficult to justify. Cars made in Japan seem to enjoy a large cost advantage over comparable U.S.-made Japanese autos. The actual cost advantage of production based in Japan is uncertain, but export sales typically lose a significant amount of that advantage by relocating here.

A primary reason for production cost differences between Japanese and U.S. auto manufacturers involves the cost of labor and productivity. In 1984, American transportation equipment workers earned, on average, about $20 per hour, compared with an average of $8 per hour in Japan. Moreover, the labor productivity of Japanese workers is roughly two-and-a-half times greater than that of the United States. A result of this is a significant difference in manufacturing techniques, in labor relations, and in factory organization.

Competitive pressures in the U.S. auto market have already forced American auto manufacturers to introduce Japanese-style manufacturing techniques in the United States. In this regard, Japanese auto producers have pioneered a Just-In-Time (JIT) assembly technique designed to provide prompt, timely delivery of components from suppliers to the assembly plant. JIT assembly is designed to cut costs by avoiding inventory stockpiles. While JIT assembly requires an almost continuous flow of parts, more vertically integrated U.S. manufacturers depend on inventory build up to ensure parts availability. The Japanese method is more cost effective. In 1980, the average holding period of major U.S. auto components was approximately 10 days, while the Japanese method gives almost $600 in inventory holding costs per vehicle produced. The typical holding period for similar Japanese components was merely a few hours, and the

12. Another often-cited explanation of the cost difference between U.S. and Japanese automakers involves the relationship between the assembly facilities and the parts suppliers. Since the early days of assembly line production, U.S. manufacturers have pursued an integrated production strategy. This approach maintains that inventory control and production innovation are best implemented when the manufacturer controls component production internally.