

**“RELATIVE” REVENUE-MAXIMIZING STRATEGY UNDER DUOPOLISTIC
COMPETITION: THE CASE OF US-JAPAN BILATERAL AUTO-TRADE**

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The rapid expansion of Japanese exports of manufacturing goods such as automobiles and semiconductors has given rise to disputes with its trading partners, especially, with the US. While Japan's huge amount of trade surplus against the US might be attributed partly to protectionism, unfair trade practices, or other non-tariff barriers, such as the *keiretsu* distribution system, more deeply-rooted factors should be identified from micro foundation. Blinder (1992, 1993) has provided a "pure" revenue-maximizer dominance hypothesis to answer the question of why and how the Japanese firm keeps winning in the US-Japan bilateral trade. However, his analysis is based on the dichotomous choice, assuming that the top executive is either a *pure* revenue-maximizer or a *pure* profit-maximizer. These are extreme cases. Indeed, compared with its US counterpart, Japanese top management tends to be more concerned with gaining market-share from the long-run perspective because of different institutional arrangements and corporate culture. This, however, does not mean that the Japanese firm is not a profit-maximizer or the US firm is not a revenue-maximizer. It is the *relative* degree of adopting a revenue-maximizing (or a profit-maximizing) strategy that matters. In this paper, we develop a simple Cournot duopoly model with a managerial decision-making parameter, which is dependent on a linear combination of revenue- and profit-maximizing strategies. Our "relative" revenue-maximizer dominance hypothesis shows that a relatively revenue-dominant firm (the Japanese firm) has certain distinct advantages over a relatively profit-dominant firm (the US firm) in competition. Some evidence in the context of the US-Japan bilateral automobile trade will be provided to show the plausibility of the hypothesis and the outcomes of competition within the framework developed.

INTRODUCTION

Over the past few decades, orthodox microeconomic theory postulates that the sole objective of a firm is profit-maximization. This profit-maximization dogma is criticized by a number of economists, such as Baumol (1959), Cyert and March (1963), Galbraith (1967). Indeed, the relevance of *pure* profit-maximization becomes less obvious for modern corporations where ownership (i.e., stockholders) and control of the firm (i.e., top management) are separated. In the US, Berle and Means (1932), and Larner

(1966), for instance, found that “there are no dominant owners” as described in the traditional microeconomic textbook. Rather, the huge amount of capital required by giant corporations usually leads to an extensive dispersion of their ownership among many investors. In Japan, Hirose (1963), Uekusa and Caves (1976), Miyazaki (1976), Komiya (1987, 1994) have also reported that the separation of ownership and control causes a deviation of the management from *pure* profit-maximization principle. In fact, many experienced Japanese executives suggest that this separation between shareholders and professional management has provided a considerable degree of decision-making autonomy for managers, whose objectives often deviate from the so-called *pure* profit-maximization. Thus, it is reasonable for us to use the concepts of managerial incentives by Fershtman (1985), and Fershtman and Judd (1987) in the owner-manager relationship. They have examined the interactions of internal contracting and external strategic considerations in the case of the owner-manager relationship under oligopoly, and demonstrated that competing firm’s managers would often distort their owners’ objectives away from strict profit-maximization for strategic reasons. Usually, in an oligopolistic market, firms may set up their goal on somewhere between profit and sales maximization because of separation of ownership and management.

More recently, Blinder (1992, 1993) even moved one step further, proposing a “*pure*” revenue-maximizer dominance hypothesis (in our terminology) for the well-performed Japanese firms engaged in international trade. Instead of seeking to maximize profits, these large Japanese firms usually seek to maximize growth, market-share, or employees’ welfare. A revenue-maximizing strategy enables them to produce more output than the US firms adopting profit-maximizing strategy. Blinder concluded that as long as it

has a secure source of capital, a revenue-maximizer is at a distinct advantage when competing with a profit-maximizer. He has also stated that the revenue-maximizer seems likely to drive its profit-maximizing rivals out of business if either (a) average costs are declining or (b) learning is a function of cumulative output. However, Blinder's argument is based on the dichotomous strategic choice that each firm can only choose to be either a "pure" revenue-maximizer (Japan) or a "pure" profit-maximizer (US). These are two extreme cases.

Indeed, Japanese firms put more weight on revenue-maximization for various reasons. First of all, the increase in firm-size is a necessary condition for a firm to maintain the life-time employment system and internal promotion. In order to provide more jobs and promotion opportunities for employees, the size of the firm must be continuously expanded. Secondly, under the usually practiced seniority system where a staff's wages and his position are a positive function of the number of service years, hiring more new graduates from colleges or high-schools is crucial to reducing labor costs. Hence, growth of the firm at a faster rate results in a continuous increase in hiring of the graduates, and keeping the average age of the employees young. This eventually helps building up an advantage in respect of labor costs. Thirdly, Japanese firms pursue growth-oriented strategy also because there is little external pressure for short-term earnings. In Japan, stockholders' influence on corporate strategy is rather weak, and the threat of a take-over on the public stock exchange is negligible due to the cross-share holding of common stocks. Fourthly, administrative guidance and controls have to some extent led Japanese firms to act like revenue-maximizers. Usually, administrative guidance and controls play a role as a "shelter from the storm." (Nakamura 1978, 1981). In this case,

firms in an industry, in their competition for market-share, tend to invest more than their own capital permitted, thereby bringing about rapid growth of the industry as a whole. This is because that they expect that when at some point, there arises excess production and firm profitability declines sharply, then “administrative guidance” would come to rescue. As Schumpeter (1942, p. 88) mentioned in his book, “ a car with brakes of course is driven faster than one without.” Therefore, administrative guidance and controls ironically create “excess competition”. Finally, according to Nakatani (1993), Japanese firms are more risk-averse than their Western counterparts. Japanese business culture emphasizes conformity and group-oriented behavior. Once one of the firms in the industry becomes successful in new projects and in gaining its market-share, the rest of the firms follow it.

However, even if Japanese firms are acting as revenue-maximizers, this by no means denies shareholders’ interests. When Japanese top management pursues the goal of gaining more market-share from a long-run perspective, it is also subject to various constraints, such as risks of bankruptcy and being monitored closely by main banks in the case of the market value of the firm being extremely low. Therefore, it is more plausible to assume that both Japanese and the US firms have a similar object function; that is, their goal is somewhere between profit maximization and revenue maximization under separation of ownership and management. However, relatively speaking, just as Kagono et al. (1985) pointed out, Japanese firms show relatively strong growth-preference, while the US firms emphasize more on investment returns and capital gains.¹ It is important to

¹ This survey result is consistent with the popular view among American and British managers that the stock price is affected more by short-run profitability than by long-run consequences, which prevents the managers from adopting a long-run growth strategy. This “managerial myopia” argument is, for instance, discussed in Stein’s article (1988).

recognize that the weighted strategy is not the same between Japanese and the US firms. The former tends to put a higher weight on sales while the latter tends to put a higher weight on profits. Furthermore, in competition, firms may adjust the weight to maximize their objective functions. But the adjustment can be made only gradually over time, since the weighted strategy is basically determined by corporate culture and institutional factors that change slowly.

This paper has two objectives: (1) to analyze why and how a “relatively” revenue-dominant firm keeps winning under duopolistic competition; (2) to verify whether a relative revenue-maximizer dominance hypothesis is true for the US-Japan bilateral automotive trade. In Section 2, the “*relative*” revenue-maximizer dominance hypothesis is proposed based on a simple Cournot (quantity) duopoly model with a managerial decision-making parameter, which is dependent on a linear combination of revenue- and profit-maximizing strategies. Section 3 is devoted to identifying some features of the US-Japan bilateral auto-trade that are consistent with the “natural competition advantage” of a relatively revenue-dominant firm.

A COURNOT DUOPOLY MODEL WITH A MANAGERIAL DECISION-MAKING PARAMETER

For simplicity but not losing generality, we deal with a simple game theoretical framework based on a Cournot (quantity adjustment) duopoly model with a linear demand curve. Suppose that each firm has an identical total cost function, cq_i with constant returns to scale for $i = 1, 2$.² The market demand curve is $P = a - bQ$ where a, b , are positive constants, and total output Q , is given as $Q = q_1 + q_2$. The firm i 's profit function is given as $\pi_i = (P - c)q_i$. The firm i 's revenue function is also given as $R_i = Pq_i$. Fershtman and Judd (1987) demonstrated that competing firm's managers would often distort their owners' objectives away from strict profit-maximization for strategic reasons. Thus, to compromise between the owner's objective (i.e., profit-maximization) and the management objective (i.e., revenue-maximization), owners deviate its pure profit-maximization principle, and managers are paid by a linear combination of profits and revenues.³ Since the separation of ownership and control in modern corporations is commonly observed in both Japan and the US, it is reasonable to assume that the top manager in firm i for $i = 1, 2$, is confined to maximize the following linear combination of profits and sales, M_i ⁴:

² According to Friedlaender, Winston, and Wang (1983), the "typical" firm in the US automobile industry, at the sample means and in 1979, appears to produce under constant returns to scale. Recently, Fuss and Waverman (1992) have also reported that scale elasticities of the automobile industries in US and Japan are 1.09, and 1.07, respectively. Therefore, these empirical results allow us to assume constant returns to scale and hence, constant marginal cost when considering the case of the US automobile industry. Another note is that if we consider an asymmetric cost function, say, the Japanese firms having a cost advantage, then the market-share advantage is much higher for such a firm with a cost advantage.

³ If one measures executive compensation mainly by salary and bonus, then both revenues and profits are important for optimal incentive structure in the contract.

⁴ The top manager's reward is $\alpha + \beta M_i$ for some constants α, β where $0 < \beta < 1$. Thus, the manager acts to maximize βM_i . Refer to Fershtman and Judd (1985, 1987). Under the contract, the manager has a strong motive to maximize revenue, since $\partial M_i / \partial \lambda_i = R - \pi > 0$. However, owners prefer profit maximization, since

$$(4): \quad \text{Maximize } M_i = (1 - \lambda_i)\pi_i + \lambda R_i = Pq_i - (1 - \lambda_i)(cq_i) \quad \text{for } i = 1, 2,$$

where λ_i is the degree of adopting a revenue-maximizing strategy by the chief executive in firm i , and $0 \leq \lambda_i \leq 1$. Note that $\lambda_i = 0$ if the chief executive adopts a profit-maximizing strategy, whereas $\lambda_i = 1$ if the chief executive adopts a revenue-maximizing strategy.⁵ Blinder's argument (1992, 1993) is based on the dichotomous strategic choice that each firm can only choose to be either a "pure" revenue-maximizer (Japan), $\lambda_i = 1$, or a "pure" profit-maximizer (US), $\lambda_i = 0$. These are special cases in our model.

Each manager's objective function takes the same formula but the weight on λ_i might differ between the rival firms due to different corporate culture and/or institutional factors. If λ_i and $(1 - \lambda_i)$ are the respective weights assigned to revenue-maximization and profit-maximization, each manager picks q_1, q_2 to maximize the objective functions:

$$(5): \quad \text{Maximize } M_1 = Pq_1 - (1 - \lambda_1)C = [a - b(q_1 + q_2)] q_1 - (1 - \lambda_1)(cq_1)$$

$$(6): \quad \text{Maximize } M_2 = Pq_2 - (1 - \lambda_2)C = [a - b(q_1 + q_2)] q_2 - (1 - \lambda_2)(cq_2)$$

For a given rival firm's output level, the first-order conditions gives the following reaction functions:

$$(7): \quad q_1 = \{a - (1 - \lambda_1)c\}/(2b) - (1/2)q_2$$

$$(8): \quad q_2 = \{a - (1 - \lambda_2)c\}/(2b) - (1/2)q_1.$$

Solving these two reaction functions simultaneously gives optimal output, price, and profit levels:

$$(9): \quad q_1^* = \{a - (1 - 2\lambda_1 + \lambda_2)c\}/(3b);$$

$\partial\pi_i/\partial\lambda_i < 0$ is usually satisfied. For instance, from (11) and (11'), we obtain $\partial\pi_1^*/\partial\lambda_1 < 0$, and $\partial\pi_2^*/\partial\lambda_2 < 0$ in our model.

⁵ This case is the Baumol's sales-maximization hypothesis (1959).

$$(9'): \quad q_2^* = \{a - (1 + \lambda_1 - 2\lambda_2)c\}/(3b);$$

$$(10): \quad P^* = \{a + (2 - \lambda_1 - \lambda_2)c\}/3;$$

$$(11): \quad \pi_1^* = [a - (1 + \lambda_1 + \lambda_2)c][a - (1 - 2\lambda_1 + \lambda_2)c]/(9b);$$

$$(11'): \quad \pi_2^* = [a - (1 + \lambda_1 + \lambda_2)c][a - (1 + \lambda_1 - 2\lambda_2)c]/(9b).$$

From (11) and (11'), both firms can earn positive profit if the market condition, $a > (1 + \lambda_1 + \lambda_2)c = (1 + s)c$ holds,⁶ where $s \equiv \lambda_1 + \lambda_2$ for $0 \leq s \leq 2$. From (11) and (11'), we also have the profit differential as:

$$(12): \quad \pi_1^* - \pi_2^* = (ck)[a - (1 + s)c]/(3b), \quad \text{where } k \equiv \lambda_1 - \lambda_2 \quad \text{for } -1 < k < 1.$$

Consider a case that one firm, say firm 1, is acting *relatively* as a revenue-maximizer over its rival firm. Thus, firm 1 puts relatively a higher weight on a revenue-maximizing strategy over the rival firm, firm 2; that is, $k = \lambda_1 - \lambda_2 > 0$. Firm 1 will then earn a larger profit than the rival firm because $\pi_1^* - \pi_2^* = (ck)[a - (1 + s)c]/(3b) > 0$ for $k > 0$, and the normal market condition, $a > (1 + s)c$. In this case, firm 1 also acquires relatively a higher market-share than firm 2 because from (9) and (9'), $q_1^* - q_2^* = (c/b)k > 0$ for $k > 0$. At the same time, the market price will decrease as firm 1 put more weight on revenue-maximization, holding other things constant, since $\partial P^*/\partial \lambda_1 = -c/3 < 0$. We will obtain the following important proposition:

Proposition [the *Relative Revenue-maximizer Dominance Hypothesis*]: If one firm puts *relatively* a higher weight on revenue-maximization over its rival firm, it will attain a “natural competitive advantage” over its rival firm, where the natural competitive advantage means:

- 1) The firm acting relatively more like a revenue-maximizer will obtain a greater profit than its rival firm;
- 2) The firm acting relatively more like a revenue-maximizer will obtain a larger market-share than its rival firm, and the market price will fall.

Corollary: As k , the gap between the two rivals of revenue-maximization degree, increases, the market-share differential will change in favor of the firm with a larger λ , and so will the profit rate differential, if the normal market condition is satisfied.

[*Proof:* For $k > 0$, $\partial(\Delta q)/\partial k = c/b > 0$, where $\Delta q \equiv q_1^* - q_2^*$. For $k > 0$, $\partial(\Delta \pi)/\partial k = (ck)[a - (1 + s)c]/(3b)$, where $\Delta \pi \equiv \pi_1^* - \pi_2^*$, and the normal market condition, $a > (1 + s)c$, is satisfied.]

Finally, consider how net social welfare (NSW) changes as firm 1 changes its strategy by putting more weight on revenue-maximization. Net social welfare (NSW) from production of Q^* units of output is the amount that consumers pay for Q^* units, less production cost, plus consumer's surplus. Thus, NSW at the point (P^*, Q^*) is obtained as:

$$(12): \quad \text{NSW} = (a - P^*)Q^*/2 + (P^* - c)Q^*$$

$$= \{[4a - (4 + \lambda_1 + \lambda_2)c][2a - (2 - \lambda_1 - \lambda_2)c]\}/(9b)$$

A reduction of the market price and an increase of the market output due to the increased λ_1 lead to an improvement of NSW, because $\partial(\text{NSW})/\partial \lambda_1 = 2[a - (1 + s)c]/(9b) > 0$ if the normal market condition, $a > (1 + s)c$, holds. This implies that as the firm moves

⁶ In practice, if this condition does not hold, then both firm will not operate in the long-run because of negative profits. Thus, setting this normal market condition, $a > (1 + s)c$, is quite realistic in an oligopolistic market.

to form a strategy with more weight on revenue-maximization, the welfare of the society or consumers will be improved.⁷

EVIDENCE AND POLICY IMPLICATIONS: THE CASE OF THE US-JAPAN BILATERAL AUTOMOBILE TRADE

Many factors have been identified as being the causes of the rapid expansion of the Japanese share in the world auto-market over the last three decades. Our hypothesis suggests that, at a very basic level, this is due to the different strategies adopted by US and Japanese firms. At this early stage, however, it is not without difficulty to estimate λ 's for the US and Japanese firms and test our hypothesis empirically.

However, one plausible way of proving the hypothesis is to examine the results of the competition between Japanese and US firms under the different strategies. Figure 1 and Figure 2 show that the gaps between US and Japan of shares in the world vehicle sales and production have narrowed over the last three decades and the output differential has changed in favor of Japanese auto-makers. Since the early 1960s, Japanese auto-makers have been more concerned with increasing their market-share through export promotion (Figure 3). Note that although the total number of automobiles exported to the US has declined since mid-1980s due to the currency appreciation and the avoidance of trade friction between the two countries, the local production by Japanese auto-makers in North America has increased steadily. This represents a new stage of

⁷ The expansion of Japanese exports does not always mean negative to the US economy. This has increased the incentives for the US firms to put in efforts to raise productivity and improve quality of products. Especially, in an oligopolistic market like the automobile industry, where technological innovations and improvements in production system are important, Japanese exports might result in raising US competitiveness. Furthermore, these improvements lead to cost reduction, and hence result in price reduction, which in turn provides a benefit for US consumers, and increases NSW.

Japan's expansion in the world market and hence a continuation of the revenue-maximizing dominance strategy that has been adopted by Japanese auto-makers for many years. Then, How can the Japanese auto-makers sharply increase their market-share? Why would the US auto-makers lose out even on a fully level play field? What are the policy implications for the US-Japan bilateral automobile trade? One can conjecture from these stylized figures that Japanese auto-makers have been adopting a revenue-maximizer dominance strategy and therefore kept winning over their US rivals over time.

Our model predicts that when competing with its rivals, the Japanese auto-maker with a relative revenue-maximizer dominance strategy will attain a "natural competitive advantage" over its rival firms. More specifically, (1) the Japanese market-share will become larger if Japanese auto-makers act more like revenue-maximizers over time; and (2) the profit rate differential between Japan and the US will show a trend in favor of Japanese auto-makers over time.⁸

Table 1 shows the profit rate differential between the two countries, where the profit rate is measured as net income after taxes over sales, and the profit rate differential is defined as $(\pi/R)_{\text{Japan}} - (\pi/R)_{\text{US}}$, where π and R are the summation of net income and net revenue of the Big 3 (GM, Ford and Chrysler) for the US and Top 4 (Toyota, Nissan, Honda and Mazda) for Japan. In this table, the "adjusted" profit rate differential is based on the profit rates adjusted by eliminating the effect of GDP growth in the two countries. Automobiles are durable consumer goods, and the demand for them could be heavily affected by business cycles or economic fundamentals. Thus, the adjustment of the business fluctuations enables us to focus on microeconomic factors. For the unadjusted

case, the gap of profit-sales ratio between the two in the overall period (1963 to 1994) is .0028, which means that the average profit-sales ratio of the Japanese top 4 firms is 0.28 % higher than that of the Big 3. It is interesting to note that the adjusted profit rate differential is larger than the unadjusted ones. This shows that the US auto-makers are more strongly affected by domestic economic performance. The most important point to note in Table 1 is that the gap has been getting wider over time, as predicted by our model.⁹ In fact, with a relative revenue-maximizer dominance strategy, Japanese auto-makers could afford to compete in the auto industry at a lower profit rate. But, in a longer run, they are able to acquire “relatively” higher profits over time (Table 2). Although the profit-sales ratios in both countries show a downwards trend during the sample period, the ratio for Japan is higher than that for the US. This is also consistent with Equation (15) suggesting that $\pi_1^* - \pi_2^* = (ck)[a - (1 + s)c]/(3b)$ is positive, and hence, $\pi_1^* > \pi_2^*$ if $k > 0$, and the normal market condition, $a > (1 + s)c$, hold for both firms earning positive profits. One might then ask why the relative difference of profit rates is so important? Schaffer (1989) suggested that the firms most likely to survive are those which maximize their ‘*relative profit*’, or acquire a *relatively* higher rank-order within the industry.

Table 3 shows changes in shares in the world motor vehicle production by the US and Japan over time. Over the last three decades the US and Japan have almost changed their positions. The relative market-share based on net revenue between the Big 3 and Japan’s top 4 demonstrates the same trend (Table 4). While Japan is advancing, the US is

⁸ In addition to a wider profit gap over the time, profits at a given period could be also higher for a revenue-maximizers than that for a profit-maximizer.

⁹ Using profit over total asset (π/TA) as a measurement of profitability, we obtained similar results. Although this ratio is lower for Japan than for the US, the gap is getting smaller over time. This is not contradicting to our hypothesis.

retreating. These results are more extraordinary when one takes into account the following two events: the introduction of the voluntary export restraint (VER) in 1981, causing the hike of prices of Japanese made cars, and the appreciation of the yen against the US dollar after the meeting of G5 in 1985, leading to a reduction of Japan's cost advantages in production. These events were supposed to reduce competitiveness of Japanese auto-makers. However, it seems that these events did not change the basic trend "predetermined" by the different strategies.

Japanese auto-makers as relatively revenue-maximizing firms tend to also seek the long-run objective (i.e., long-run growth of the firm) rather than the short-run objective (i.e., short-run profit). This can be seen in Table 5 where the average growth of revenue is higher for Japan and its standard deviation is smaller for Japan, indicating that both the long-run growth and revenue stability (therefore market-share) have been more important for Japanese auto-makers. On the other hand, the path of revenue growth for the US has been very fluctuating, implying that revenue is not the target. Of course, other reasons could be also important. The nature of Japanese domestic competition differs from that in the US oligopolistic market. There exists eleven auto-makers in Japan, running cut-throat competition among themselves. Consequently, managers of Japanese companies will sacrifice some of their firm's short-run profits for the sake of long-run growth, and they must consider their survival in the first place. The strategic importance of gaining market-share is that the cost reduction may be attained by increasing cumulative output if the learning curve is a function of cumulative output. Thus, it is quite natural that such excess

competition drives Japanese auto-makers to expand their market-share even at a lower profit-cost margin in both domestic and foreign markets.¹⁰

The success of the relative revenue-dominant strategy can be seen from the relationship between the short-run and the long-run profit rates for the US and Japan. When the US firm targets more at profits,¹¹ it may realize its short-run target. Indeed, the highest profit rate was scored by the US auto-makers. However, the cost of targeting at the short run profit rate is larger fluctuations of the long run profit rate, as shown by the large value of the standard deviations of the US profit rate in Table 2. The largest negative profit rate was also reported by US auto-makers. This is basically due to the larger fluctuations in the path of revenue growth. On the contrary, when Japanese auto-makers put more emphasis on revenue and have achieved the higher growth and more stability of that under the strategy, they also realized a higher long-run profit rate. More significantly, the profit rate differential is changing in favor of Japanese auto-makers, a very fact consistent with the result derived from our model.

Another result to note is that exports may contribute to the stable paths for both revenue and profit rate. As mentioned above, the US auto-industry's profit rate is more strongly affected by domestic economic performance. This could be partly attributed to the low ratio of exports over total production. Japan's higher ratio of exports over total production has actually diversified risks.

Facing severe competition from Japan, how the Big 3 have been coping with the relative revenue-dominant firms? If they had maintained increased their price levels less

¹⁰ This kind of firm's behavior looks like a predatory pricing, or dumping to their Western rivals, although to the Japanese, it is simply normal business practice under severe competition.

¹¹ GM, for instance, is used to use the target-return pricing strategy, fixing the mark-up rate at 15 to 20 % till the end of the 1970s (Kawahara, p.103, 1995).

proportionally than their Japanese counterparts in the first half of the 1980s, then the Big 3 could have recovered their market-shares. However, as Itoh and Ono (1982, 1984) pointed out, the US auto-makers merely used Japanese auto-makers as a price leader in the Stackelberg sense, and raised the price levels of automobiles higher than what would prevail under tariffs or other related measures. (See Table 6). Instead of fully utilizing this opportunity to gain more market-share by simply putting more weight on adopting a revenue maximizing strategy, they seemed to have been persistent with adopting the traditional strategy of putting more weight on profit maximization. For the sake of stockholders, the Big 3 stabilized the prices higher than that Japanese firms. This allowed Japanese firms to maintain a competitive advantage over their rival US firms, even facing such severe and adverse environments.

Currently, Japanese firms are again suffering from the further appreciation of the yen in 1990s. Japanese firms, for instance, Toyota Motors,¹² or other auto-makers, are being expected to further expand transplant production in the US. For the purpose of maintaining and gaining more market share, they are ready to sacrifice short-term profits. How should the US auto-makers form their strategy in the new round of competition? Based on the proposed hypothesis, one solution could be that the US firms put more weight on revenue-maximization (i.e., increase λ). The US could pay more attention to both increased exports and establish more transplants abroad, looking for lower production costs, in particular, for lower labor costs, just as the Japanese firms are currently operating in some Asian countries. To cope with Japan's relative revenue-

¹² As of November 2, 1995, Toyota Motors announced to build another transplant in Indiana, US.

dominant strategy, the Big 3 should not only reduce prices but also make efforts to raise productivity and improve quality.

SUMMARY AND CONCLUSION

Based on the analysis of Japan's institutional factors or corporate culture, we argued that Japanese firms tend to behave more like revenue-maximizers. Then we developed a simple Cournot model with a managerial decision parameter, which is dependent on a linear combination of revenue- and profit-maximizing strategies.

The following results have been obtained from our model: if one firm puts a *relatively* higher weight on revenue-maximization as compared with its rivals, then such a firm will attain a "natural competitive advantage" over its rival firm. The natural competitive advantage means: (1) The firm acting relatively as a revenue-maximizer will obtain a greater profit than its rival firm; (2) The firm acting relatively as a revenue-maximizer will potentially obtain a larger market-share, and the market price will fall. Correspondingly, our model predicts that the gap of market-share and the profit rate differential between two rivals will evolve in favor of the firm with a larger λ .

We have explained why and how Japanese firms keep winning in the US-Japan bilateral auto-trade. We have examined validity of our proposition and its corollary. Although we admit that factors other than the managerial decision parameter are also important, the differently weighted strategies adopted by the US and Japanese auto-makers are a more deeply-rooted factor. Of course, more vigorous empirical research should be done in order to test our hypothesis.

We have also shown that entrance of revenue-maximizers is not necessarily bad for the US economy. This is basically because an increase in Japanese exports combined with an increase in local production from the US transplants result in an increasingly higher degree of competition, which provides better quality and lower prices for US consumers. This price reduction obviously increases net social welfare.

Table 1 The Gap of Profit-Sales Ratio Between Two Countries (1963 - 1994)

	Overall Periods 1963 - 1994	1963 - 1972	1973 - 1982	1983 - 1994
Unadjusted	.0028 (.0334)	- .0115 (.0128)	.0112 (.0286)	.0080 (.0464)
Adjusted by GNP Growth	.0123 (.0306)	- .0018 (.0198)	.0169 (.0243)	.0210 (.0437)

Source: "Global 500 (200)," *Fortune* (various issues).

Note: Gap = $(\pi/R)_{\text{Japan}} - (\pi/R)_{\text{US}}$.

Table 2 Profit-Sales Ratio: US Big 3 vs. Japan Top 4 (1963 - 1994)

Period/ Country	Overall Periods 1963 - 1994	1963 - 1972	1973 - 1982	1983 - 1994
Japan	.0350 (.0161)	.0503 (.0136)	.0314 (.0071)	.0252 (.0142)
US	.0322 (.0393)	.0602 (.0169)	.0201 (.0288)	.0189 (.0491)

Source: "Global 500 (200)," *Fortune* (various issues).

Table 3 Shares in World Motor Vehicle Production (1963 - 1994)

Period/ Country	Overall Periods 1963 - 1994	1963 - 1972	1973 - 1982	1983 - 1994
Japan	.2116 (.0678)	.1299 (.0456)	.2307 (.0431)	.2638 (.0194)
US	.2880 (.0769)	.3770 (.0609)	.2694 (.0463)	.2292 (.0239)

Sources: *Jidosha Tokei Nenpo*; *Shuyokoku Jidosha Tokei*;
Ward's Automotive Yearbook (various issues)

Table 4 Relative Market Share [Revenue = \$ base] (1963 - 1994)

Period/ Country	Overall Periods 1963 - 1994	1963 - 1972	1973 - 1982	1983 - 1994
Japan	.2179 (.1166)	.0930 (.0378)	.2142 (.0520)	.3392 (.0571)
US	.7821 (.1166)	.9070 (.0378)	.7858 (.0520)	.6608 (.0571)

Source: "Global 500 (200)," *Fortune* (various issues).

Note: $R_{Japan}/(R_{Japan} + R_{US})$ for Japan; $R_{US}/(R_{Japan} + R_{US})$ for US

Table 5 Growth Rate of Revenues: Japan Top 4 vs. US Big 3 (1963 - 1994)

Period/ Country	Overall Periods 1963 - 1994	1963 - 1972	1973 - 1982	1983 - 1994
Japan	.1765 (.0886)	.2378 (.0682)	.1614 (.0956)	.1381 (.0749)
US	.0903 (.1136)	.0983 (.1256)	.0664 (.1312)	.1034 (.0926)

Source: "Global 500 (200)," *Fortune* (various issues).

Table 6 Passenger Car Prices (\$) in the US Before and After the VER

Model\Year		1980	1981	1982	1983	% increase in Prices 1980-1983
Nissan	Sunny	4,619	5,219	5,319	5,999	29.9
	Maxima	8,129	9,979	10,549	10,869	40.2
Toyota	Corolla	4,698	5,458	6,138	6,138	30.7
	Crusader	6,429	6,979	8,159	8,599	47.5
GM	Century	5,446	7,094	7,141	9,002	65.3
	Citation	5,153	6,282	6,399	6,934	34.6

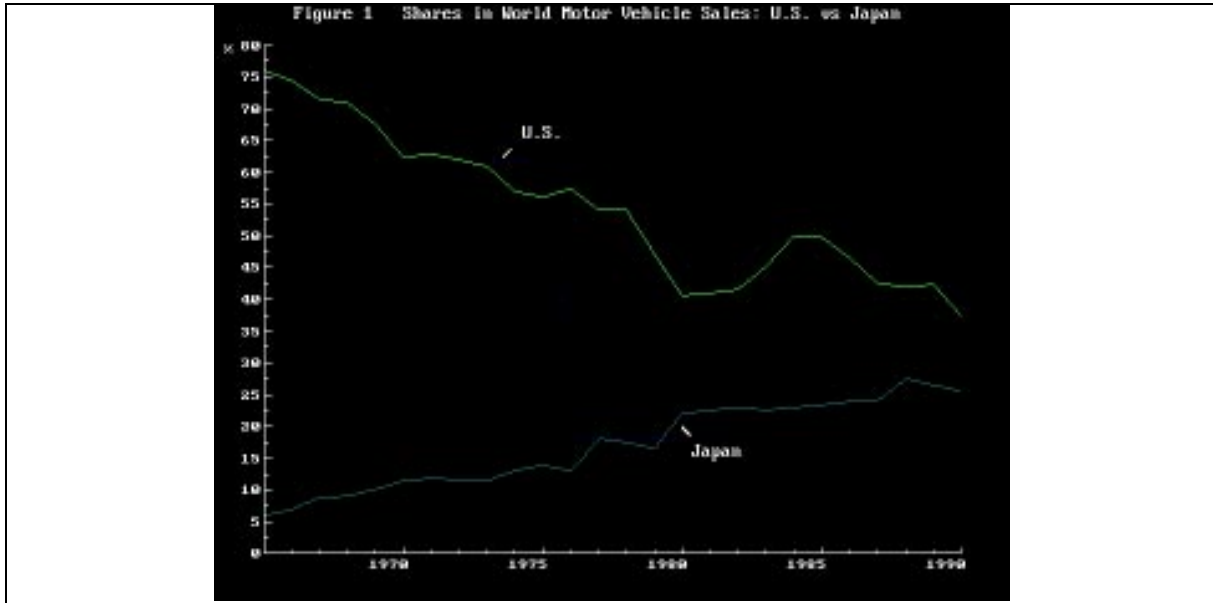
Source: *Asahi Newspaper (Asahi Shinbun)*, October 19, 1983

REFERENCES

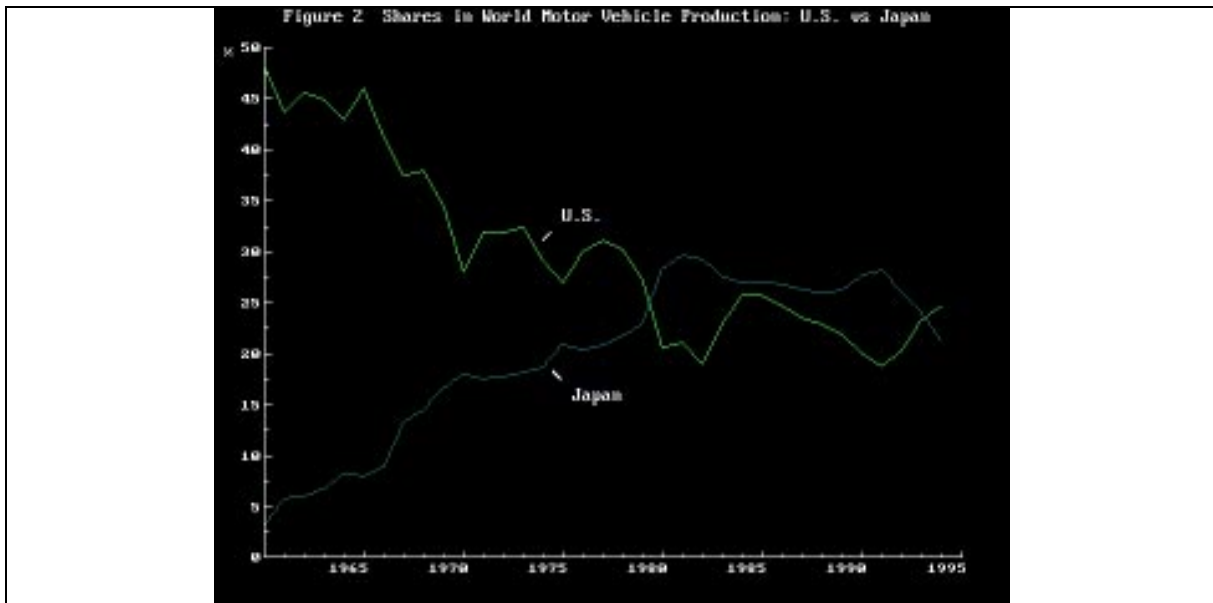
- Asahi Shinbun. October 19, 1983. *Asahi Shinbun* (Asahi Daily Newspaper). In Japanese.
Tokyo: Asahi Sinbun Sha.
- Baumol, William, J. 1959. *Business Behavior, Value and Growth*. New York: Macmillan.
- Berle, Adolf A. & Gardiner C. Means. 1932. *Modern Corporation and Private Property*.
New York: Macmillan.
- Blinder, Alan S. 1992. International Perspective: Trading with Japan: Why the U.S.
Loses-Even on a Level Playing Field. *Business Economics*, 27: 25-29.
- _____. 1993. A Simple Note on the Japanese Firm. *Journal of the Japanese and
International Economies*, 7: 238-55.
- Cyert, Richard M. & James G. March. 1963. *A Behavioral Theory of the Firm*. New
Jersey: Prentice Hall.
- Fershtman, Chaim. 1985. Managerial Incentives as a Strategic Variable in Duopolistic
Environment. *International Journal of Industrial Organization*, 3: 245-53.
- Fershtman, Chaim & Kenneth L. Judd. 1987. Equilibrium Incentives in Oligopoly.
American Economic Review, 77: 927-40.
- Fortune. various years. Global 500 (or 200). *Fortune*. New York: Time, Inc.
- Friedlaender, Ann. F., Clifford Winston & Kung Wang. 1983. Costs, Technology, and
Productivity in the U.S. Automobile Industry. *The Bell Journal of Economics*, 14:
1-20.

- Fuss, Melvyn A. & Leonard Waverman. 1992. *Costs and Productivity in Automobile Production: The Challenge of Japanese Efficiency*. Cambridge: Cambridge University Press.
- Galbraith, John K. 1967. *The New Industrial State*. Boston: Houghton Mifflin.
- Hirose, Yuichi. 1963. *Kabushiki Gaisha Shihai no Kozo* (Structure of Corporate Management). In Japanese. Tokyo: Nihon Hyoronsha.
- Itoh, Motoshige. & Yoshiyasu Ono. 1982. Tariffs, Quotas and Market Structure. *Quarterly Journal of Economics*, 97: 295-305.
- _____. 1984. Tariffs vs. Quotas under Duopoly of Heterogeneous Goods. *Journal of International Economics*, 17: 359-73.
- Japan Automobile manufacturers Association. various years. *Jidosha Tokei Nenpo*. (Automobile Statistics Yearbook) In Japanese. Tokyo: JAMA, Inc.
- _____. various years. *Shuyokoku Jidosha Tokei* (Automotive Statistics for Major Countries), In Japanese. Tokyo: JAMA, Inc.
- Kagono, Tadao, Ikujiro Nonaka, Kiyoshi Sakakibara & Akihiko Okumura. 1985. *Strategic vs. Evolutionary Management: A U.S.-Japan Comparison of Strategy and Organization*. Amsterdam: Elsevier.
- Kawahara, Akira. 1995. *Kyosoryoku no Honnsitu: Nichibei Jidosha Sanngyo no 50 Nen* (Nature of Competitiveness: Japan-the US Automobile Industries for the past 50 years) In Japanese. Tokyo: Diamond Sha.
- Komiya, Ryutarō. 1987. Japanese Firms, Chinese Firms: Problems for Economic Reform in China (Part I). *Journal of the Japanese and International Economies*, 1: 31-61.
- _____. 1992. *Business Enterprise in Japan*. Massachusetts: The MIT Press.

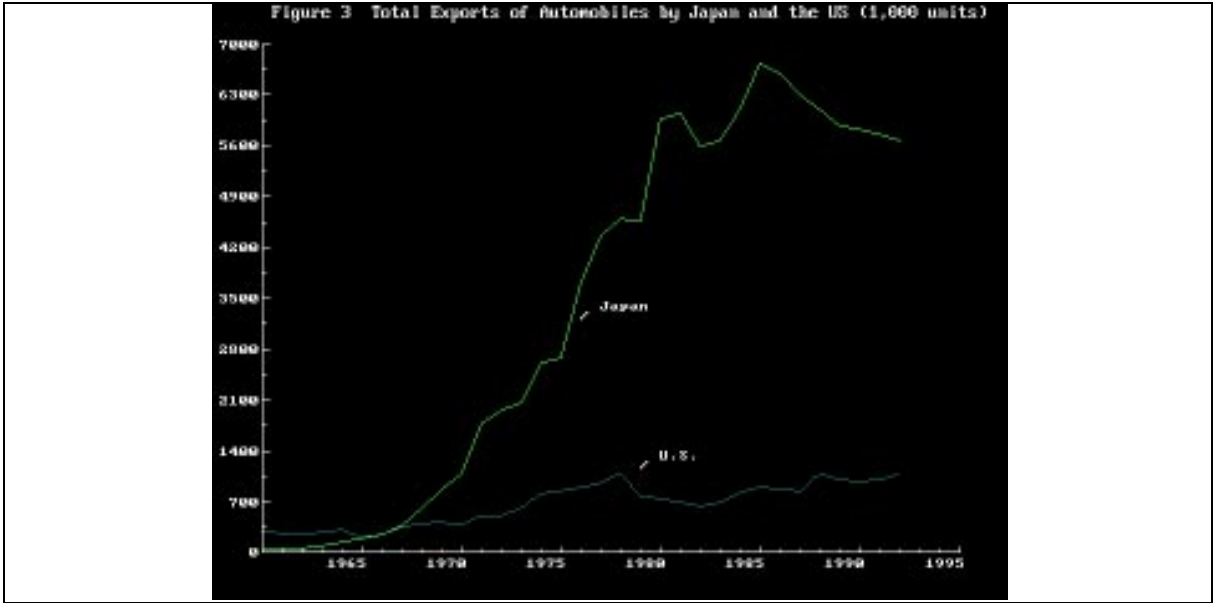
- Larner, Robert J. 1966. Ownership and Control in the 200 Largest Non-financial Corporations, 1929 and 1963. *American Economic Review*, 56: 777-87.
- Motor Vehicle Manufacturers Association of the US. various years. *Ward's Automotive Yearbook*. Detroit: Ward's Communications.
- Miyazaki, Yoshikazu. 1976. *Sengo Nihon no Kigyo Shudan* (Business Groupings in Postwar Japan) In Japanese. Tokyo: Nihon Keizai Shinbun Sha.
- Nakamura, Takafusa. 1978. *Nihon Keizai Sono Seicho to Kozo* (Japanese Economy: Its Growth and Structure) In Japanese. Tokyo: University of Tokyo Press.
- _____. 1981. *The Postwar Japanese Economy, its Development and Structure*. Tokyo: University of Tokyo Press.
- Nakatani, Iwao. 1993. *Nihon Kigyo Fukkatsu no Joken* (Conditions of Revitalization of the Japanese Firm) In Japanese. Tokyo: Toyo Keizai Shinpo Sha.
- Schaffer, Mark E. 1989. Are Profit-maximizers the Best Survivors?: A Darwinian Model of Economic Natural Selection. *Journal of Economic Behavior and Organization*, 12: 29-45.
- Shumpeter, Joseph A. 1942. *Capitalism, Socialism and Democracy*. London: Allen & Unwin.
- Stein, J. C. 1988. Takeover Threats and Managerial Myopia. *Journal of Political Economy*, 96: 61-80.
- Uekusa, Masu. & Richard E. Caves. 1976. *Industrial Organization in Japan*. Washington D.C.: The Brookings Institution.



Sources: *Jidosha Tokei Nenpo* [Automobile Statistics Year-book]; *Ward's Automotive Yearbook* (Various issues).



Sources: Same as Figure 1.



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