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## **Mergers and Economic Performance: Do Efficiency Gains Justify Horizontal Mergers?**

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Why do firms merge? Are mergers beneficial for the society? With the rise of mergers and acquisitions cases in recent years, these questions have become more and more pertinent from both corporate strategy and competition policy viewpoints. This paper aims to investigate these questions both theoretically and empirically, with special emphasis placed on the assessment of efficiency gains as a rationale for mergers. The paper is organized as follows: In Section 1, I will show that in a symmetric Cournot oligopoly without entry and without collusion, a merger is unprofitable unless it results in efficiency gains. In Section 2, I investigate a case in which such efficiency gains are attained to the effect of lowering the marginal cost of merger firms. If the efficiency gains are substantial, the profits of merger firms can increase. If these gains are even more substantial, it is also possible that the equilibrium price goes down after the merger, increasing consumers' surplus. In reality, however, few of the empirical studies I survey in Section 3 confirmed that mergers enhanced efficiency. In Section 4, I turn to the discussion of managerial theory of the firm, in which managers are assumed to maximize the growth of the firm subject to valuation constraint. I will argue that this growth-maximization behavior can contribute to macroeconomic growth: importantly, however, two conditions have to be met; first, firms invest in R&D and, second, growth is pursued internally -- not with mergers and acquisitions but with internal investment in physical and knowledge capital. In conclusion, in Section 5, I will argue in favor of a cautious attitude towards using efficiency gains as a defense for horizontal mergers.

## 1. Mergers in a Cournot Oligopoly Model

Let me begin by analyzing the effects of mergers theoretically using a simple Cournot oligopoly model<sup>1</sup>. Suppose that there are  $n$  firms before the merger, each producing  $q_i$  units of output. For simplicity, assume a linear model in which the inverse demand function is

$$p = a - bQ \tag{1}$$

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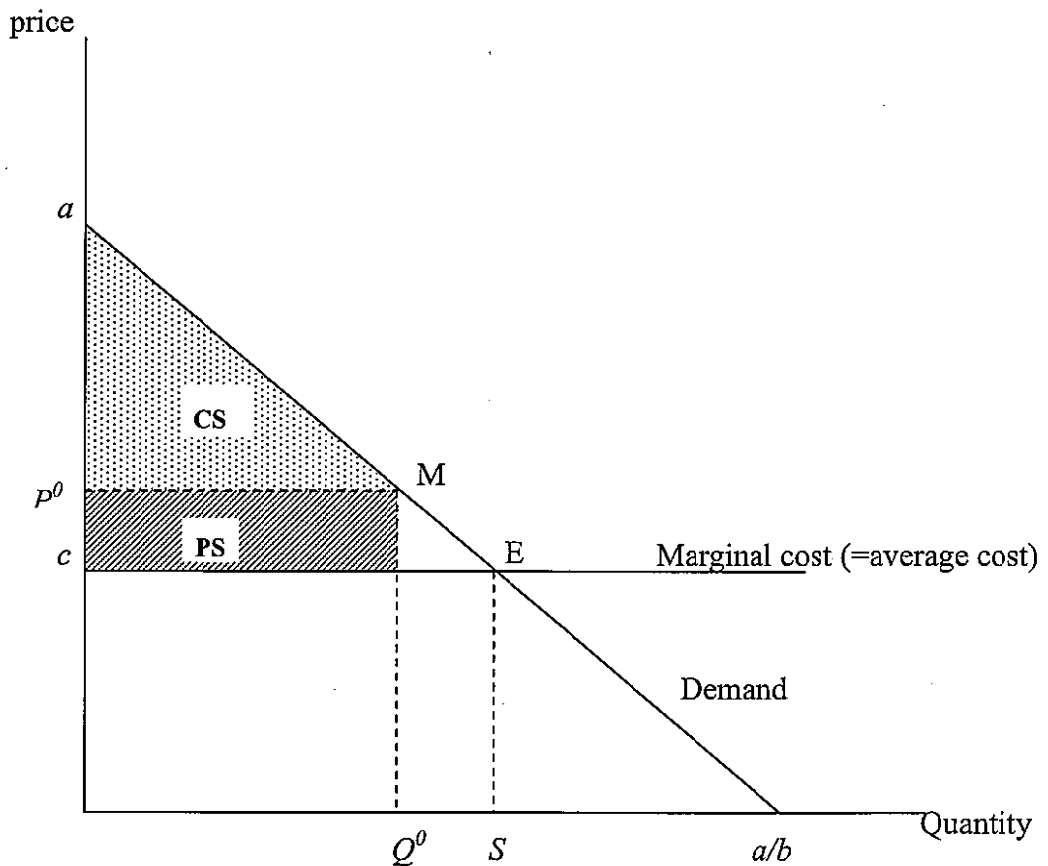
<sup>1</sup> A more general analysis of mergers in Cournot models was given by Farrell and Shapiro (1990).

$a$  and  $b$  are positive constants,  $p$  the price, and  $Q = \sum_{i=1}^n q_i$ . Also assume that the marginal cost is constant at the level of  $c$  and is common across firms. Apparently the Cournot equilibrium is symmetric, which can be easily calculated as follows:

$$q^0 = \frac{S}{n+1}, \quad Q^0 = \frac{nS}{n+1}, \quad p^0 = c + \frac{bS}{n+1}, \quad \pi^0 = \frac{bS^2}{(n+1)^2} \quad (2)$$

where  $S = (a-c)/b$ .  $\pi$  is per-firm profit and superscript 0 indicates a pre-merger equilibrium. Figure 1 illustrates this equilibrium. The dotted area marked as  $CS$  indicates consumers' surplus and the shaded area marked as  $PS$  indicates producers' surplus, namely industry profits (assuming the absence of fixed costs) that equal  $n \times \pi^0$ .

**Figure 1. Pre-Merger Equilibrium**



Now suppose that two out of the  $n$  firms merge to become a single firm. With everything else unchanged, we now have a  $(n-1)$ -firm symmetric Cournot equilibrium; hence, by replacing  $n$  in Eq.(1) with  $n-1$ , and denoting the post-merger equilibrium by superscript 1, we have the following equilibrium conditions:

$$q^1 = \frac{S}{n}, \quad Q^1 = \frac{(n+1)S}{n}, \quad p^1 = c + \frac{bS}{n}, \quad \pi^1 = \frac{bS^2}{n^2} \quad (3)$$

Obviously,

$$q^1 > q^0, \quad Q^1 < Q^0, \quad p^1 > p^0, \quad \pi^1 > \pi^0 \quad (4)$$

That is, the price rises, thereby causing a decrease in consumers' surplus. The profit of a non-merger firm increases. Importantly, however, the profit of merger firms decreases. This proposition is confirmed because the combined profits of the two pre-merger firms,  $2\pi^0$ , is less than the post-merger profits  $\pi^1$ , provided  $n \geq 3$ , that is, unless the merged firm becomes a monopoly firm.

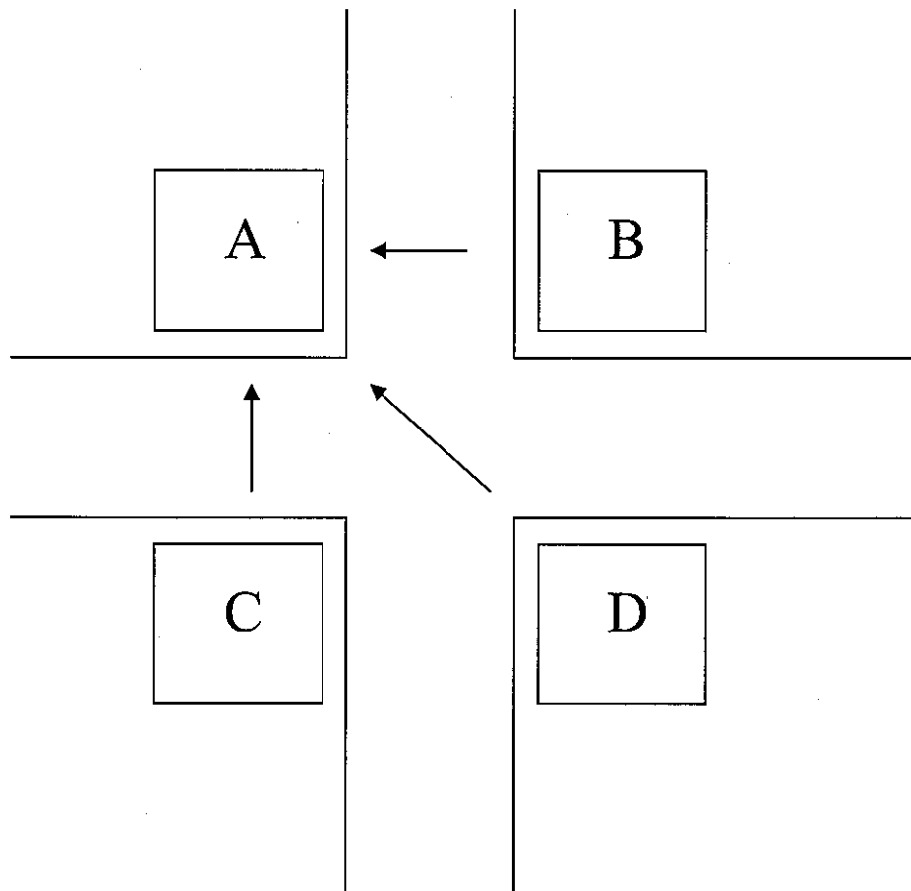
It is true that the profit rate on sales increases because the profit margin per unit of output,  $p - c$ , increases. However, with the decrease in output from  $2q^0$  to  $q^1$ , the amount of profits decreases, reducing the total shareholder wealth. Thus, insofar as the firms maximize the shareholder wealth, there should be no incentive for merger.

This simple result may appear odd because, if the two former firms -- now two divisions or two factories within a merged firm -- act as if they were independent, they seemingly would be able to earn at least  $2\pi^0$ . This conjecture, however, ignores an important consequence of a merger, namely, internalization of business-stealing effect. Consider a simple case illustrated in Figure 2. At a crossroad, there are four stores (or banks) competing against each other. When store  $A$  lowers its price or intensifies its marketing effort, it can increase its revenue, firstly, by enlarging the demand to the whole industry and, secondly and probably more effectively, stealing customers from the competitors,  $B$ ,  $C$ , and  $D$ , as shown by arrows in the figure. This is the *business-stealing effect*<sup>2</sup>.

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<sup>2</sup> The "business-stealing effect" has been discussed by Mankiw and Whinston (1986) to

**Figure 2. Business-Stealing Effect and the Merger**



Now suppose that *A* and *B* merge. *A* can still steal business from *C* and *D*, which is a gain to the merged firm. *A* can also steal business from *B*; however, *A*'s gain is *B*'s loss and, since they are now within the same firm, there is no gain at the firm level. That is, between *A* and *B*, the business-stealing effect is *internalized*, with no contribution to the firm as a whole. Consequently, *A* (and *B*) have a smaller incentive to lower the price or intensify the sales effort than *C* and *D*, and will gradually reduce their market share. In equilibrium, *A* and *B* combined must have the same market share as *C* or *D*, as shown by Eq. (3) above. The profits of the merged firm are smaller than the pre-merger level, whereas those of non-merger firms are larger.

Then, why do firms merge? In my view, there are three explanations. The first is the *empire-building hypothesis* (Ravenscraft and Scherer, 1987). Managers may wish

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explain why socially excessive entry tends to take place in a homogeneous oligopoly market when there are fixed costs.

to pursue size and growth, because these raise their power and prestige, subject to the constraint that the shareholder returns are kept at a certain satisficing, though not necessarily maximizing, level. This hypothesis is an application to mergers of the managerial theory of the firm (Marris, 1964 and Odagiri, 1981) and will be discussed again in Section 4.

The second is the *collusion hypothesis*. With fewer firms, it tends to be easier to form collusion, because the transaction cost of forming an agreement among firms is smaller. Even if collusion is not explicit but only implicit, it tends to be more stable because collusive profits for each firm are larger and, hence, the gain from cheating partners by deviating from the collusive strategy (which equals the difference between the monopoly profits and the collusive profits) is smaller. Besides, such cheating is likely detected sooner. Hence, 'trigger strategies' will be more effective, resulting in an easier formation and more stability of collusion (Vives, 1999). It is thus reasonable that the Merger Guidelines in EU, Japan and USA explicitly state a need for investigating whether a proposed merger would increase the probability of an anti-competitive consequence of collusive behavior<sup>3</sup>.

If the managers are profit-maximizers and collusion is absent, then, the explanation for the merger must be the *efficiency hypothesis*, that is, the hypothesis that the merger brings in an increased efficiency. One argument for such efficiency increase may be economies of scale. However, if economies of scale are really large, natural monopoly must be the equilibrium outcome. The prevalence of an  $n$ -firm equilibrium prior to the merger is thus contradictory to the hypothesis of economies of scale.

Other reasons for efficiency enhancement are learning and complementary assets. Learning implies that the merger partners can learn better technologies and better management practices from each other. Complementary assets imply that the partners can combine their complementary assets to raise efficiency. In either explanation, it must be that the efficiency gain cannot be attained through market transactions or knowledge spillovers. The knowledge to be learned must be implicit because, if it is explicit like patented technology, then, the firm can learn from others through licensing or through knowledge spillover, with no need to merge with them. Similarly, if complementary assets can be purchased at markets, merger is unnecessary. Therefore,

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<sup>3</sup> We will later discuss Guidelines in more detail.



the knowledge and assets that are referred to in the learning and complementary-assets arguments must be those that are unsuitable for market transactions including procurement, licensing, and alliance. That is, they must be the types of knowledge and assets that necessitate too large a transaction cost to be transferred in markets so that internalization within a single firm is more efficient, as argued in the transaction-cost literature such as Williamson (1975, 1985). Following Nelson and Winter (1982), Chandler (1990), and Teece et al. (1997), 'capabilities' are probably a better word to describe what these knowledge and assets really imply.

In fact, almost in every major merger case, firms claim they expect a big efficiency increase and cost reduction from the proposed merger. Table 1 gives one such example. Japan Airlines (JAL) and Japan Air Systems (JAS) announced their merger plan in November 2001 and the merger took place in October 2002<sup>4</sup>. Table 1 is taken from their press release at the time of proposed merger, which shows that the firms claimed the cost reduction of 73 billion yen and the reduction of about 3,000 employees. They also claimed they would be able to achieve a rate of return on equity (ROE) of 15% by the fiscal year 2005, even though JAL and JAS combined was making a loss in 2001 with the ROE of -15.3%.

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<sup>4</sup> To be precise, the two companies jointly established a holding company (Japan Airlines System) and both JAL and JAS were acquired by this holding company.

**Table 1. Merger of Japan Airlines (JAL) and Japan Air System (JAS): Benefits from the Merger as Claimed by JAL**

**INTEGRATION EFFECTS**

COST reduction (in FY2005) (In the first stage of integration we have to invest in information technology - about 20 billion yen a year)	73 billion yen	1. Facilities 2. Manpower 3. Aircraft 4. Others	31 billion yen 24 billion yen 12 billion yen 6 billion yen
INVESTMENT (up to FY2005)	100 billion yen	1. Aircraft 2. Facilities	75 billion yen 25 billion yen
MANPOWER Reductions (up to FY2005)	About 3,000 staff	1. Main ground personnel 2. Associated companies 3. Others	840 STAFF 2,050 STAFF
FLEET reductions	About 10 aircraft	This based on current fleet planning of both airlines.	

**GROUP TARGETS**

To establish stable and steady dividends at the earliest possible stage, by FY2005

Consolidated return on earnings	15%
Repayment of interest-bearing debt	About 7 Years

Source: Japan Airlines Press Release, January 29, 2002 (<http://www.jal.com/en/press/2002/012902/012902.html>)

Thus, efficiency improvement is a most commonly cited rationale for mergers. Whether such improvement is really significant will be questioned in Section 3. Indeed, JAL's actual ROE in 2005 was -31.9%, again negative and even worse than before the merger, contrary to their expectation at the time of merger!<sup>5</sup>

For the moment, however, let us assume that mergers do improve efficiency and discuss whether they would also improve social welfare<sup>6</sup>.

## 2. The Consequence of Mergers with Efficiency Improvement

When a merger improves the firms' efficiency, it will decrease costs, thereby increasing the social welfare, but it may also cause a price increase, hurting the social welfare. Williamson (1968) discussed this 'welfare tradeoff' in his now classic paper. His analysis, however, assumed that all firms in the industry reduce their costs after merger – an unlikely possibility because, if it is the case, firms can never strengthen their relative position by a merger within the industry.

We therefore investigate the case in which only the merger firms can reduce its marginal cost by  $\Delta c$ . Other assumptions in the previous section still apply. Among the  $n$  firms, we assume that Firm 1 and Firm 2 merge and, after the merger, it is still called Firm 1. The constant marginal cost of the pre-merger firm is  $c$  while that of the post-merger Firm 1 is  $c - \Delta c$ . The marginal cost of all other firms, that is, Firm  $i$  with  $i = 3, \dots, n$ , remains at  $c$  after the merger. Then, a simple calculation shows that the post-merger Cournot equilibrium (shown with superscript 1) is as follows:

$$q_1^1 = \frac{1}{n} \left[ S + (n-1) \frac{\Delta c}{b} \right] \quad (5)$$

$$q_i^1 = \frac{1}{n} \left[ S - \frac{\Delta c}{b} \right], \quad i = 3, \dots, n \quad (6)$$

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<sup>5</sup> I should add that All Nippon Airways (ANA), the main and virtually the only rival to JAL, earned a positive ROE of 7.7% in 2005, to suggest that JAL's negative ROE was not entirely due to the factors common to the industry.

<sup>6</sup> In the case of hostile takeovers, a *bargain hypothesis* is also proposed, suggesting that the share of the target firm is under-valued by the stock market and, hence, the acquisition appears to be a bargain to the acquirer. Since hostile takeovers have been rare in Japan (except in the last couple of years), we will not pursue this possibility.

$$Q^1 = q_1^1 + (n-2)q_i^1 = \frac{1}{n} \left[ (n-1)S + \frac{\Delta c}{b} \right] \quad (7)$$

$$p^1 = a - bQ^1 = c + \frac{b}{n} \left[ S - \frac{\Delta c}{b} \right] \quad (8)$$

and

$$\pi_1^1 = \frac{b}{n^2} \left[ S + (n-1) \frac{\Delta c}{b} \right]^2 \quad (9)$$

Therefore, the merger changes the profit of merger firms as follows:

$$\begin{aligned} \pi_1^1 - 2\pi_1^0 &= \frac{b}{n^2} \left[ S + (n-1) \frac{\Delta c}{b} \right]^2 - \frac{2b}{(n+1)^2} S^2 \\ &= \frac{2(bS)^2}{b(n+1)^2} + \frac{(n-1)^2}{bn^2} \left( \Delta c - \frac{bS}{n+1} \right) \left[ \left( \Delta c - \frac{bS}{n+1} \right) + \frac{4nbS}{(n-1)(n+1)} \right] \end{aligned} \quad (10)$$

It can be shown that there is a level of  $\Delta c$  that equates the right-hand side (RHS) to zero. Let us denote it by  $\Delta \hat{c}$ . If  $\Delta c > \Delta \hat{c}$ , then RHS is positive; that is, if the merger firms can lower their marginal cost by more than  $\Delta \hat{c}$ , then, the merger is profitable to the firms. We know from the discussion in the previous section that the merger is unprofitable if there is no cost reduction. Also, from Eq. (10), it is obvious that if  $\Delta c = bS/(n+1)$ , then RHS is positive. Hence, it must be that

$$0 < \Delta \hat{c} < \frac{bS}{n+1} \quad (11)$$

We can also calculate the price change by comparing equations (2) and (8):

$$p^1 - p^0 = \frac{1}{n} (bS - \Delta c) - \frac{1}{n+1} bS = \frac{1}{n} \left[ \frac{bS}{n+1} - \Delta c \right] \quad (12)$$

Therefore,

$$p^1 < p^0 \quad \text{if and only if} \quad \Delta c > \frac{bS}{n+1} \quad (13)$$

That is, if the cost reduction is substantial, the equilibrium price may actually fall despite the increased market concentration. However, the required condition is strict. Recall from Eq. (2) that

$$p^0 - c = \frac{bS}{n+1} \quad (14)$$

The left-hand side (LHS) is a pre-merger markup; hence, Eq. (13) implies that the price decreases after the merger if and only if the cost reduction is more than the pre-merger markup. For instance, if the pre-merger price was 15 percent more than the marginal cost (which equals the average cost in the present model), the marginal cost has to decrease more than 15 percent for the equilibrium price to go down after the merger. The condition for the profits of the merger firms to increase is less strict as Eq. (11) shows.

When  $\Delta c > bS/(n+1) = p^0 - c$ , the price decreases and, consequently, consumers' surplus (CS) increases. The profit of merger firm also increases by Eq. (11). Even though the profits of non-merger firms can be shown to decrease under the same condition (i.e.,  $\pi_i^1 < \pi_i^0$ , for  $i=3, \dots, n$ ), producers' surplus (PS), i.e., total industry profits, can be shown to increase. Hence, the social welfare ( $W$ ), namely, the sum of CS and PS, also increases; that is,  $W^1 > W^0$ . On the other hand, when  $\Delta c = 0$ , we know, from equations (2) and (3), the industry output decreases after the merger, implying that the social welfare should decrease; that is,  $W^1 < W^0$ . In between there must be a level of  $\Delta c$ , say  $\Delta c^*$ , that makes  $W^1 = W^0$ . This  $\Delta c^*$  can be found in the following manner.

Given the linear inverse demand function defined by Eq. (1), consumers' surplus (CS) equals  $(a-p)Q/2 = bQ^2/2$ . Therefore, the social welfare before the merger is

$$W^0 = CS^0 + n\pi^0 = \frac{b}{2} \left( \frac{nS}{n+1} \right)^2 + nb \left( \frac{S}{n+1} \right)^2 = \frac{(n+2)nbS^2}{2(n+1)^2} \quad (15)$$

and, after the merger,

$$\begin{aligned}
 W^1 &= CS^1 + \pi_1^1 + (n-2)\pi_i^1 \\
 &= \frac{b}{2n^2} \left[ (n-1)S + \frac{\Delta c}{b} \right]^2 + \frac{b}{n^2} \left[ S + (n-1)\frac{\Delta c}{b} \right]^2 + \frac{(n-2)b}{n^2} \left[ S - \frac{\Delta c}{b} \right]^2
 \end{aligned} \tag{16}$$

Therefore,  $\Delta c^*$  is the level of  $\Delta c$  that equates LHS of (15) to that of (16) and can be shown to satisfy the following condition:

$$\Delta \hat{c} < \Delta c^* < \frac{bS}{n+1} = p^0 - c \tag{17}$$

Putting the results together, we can separate four cases as shown in Table 2. In Case (1), the cost reduction is so small that the profits of the merger firm go down; hence, firms should have no incentive to merge (provided they maximize profits), which is good for the social viewpoint as well. In Case (4) by contrast, firms have a good incentive for mergers, which is also good for the consumers and the society at large because the equilibrium price goes down. In Case (3), firms have an incentive for mergers because profits go up. Even though the price also goes up, hurting  $CS$ , the increase in  $PS$  outweighs the decrease in  $CS$ , increasing the total social welfare. In any of these cases, therefore, the firms' decision does not conflict with the social optimum, as long as the firms' objective is to maximize their profits and the society's goal is to maximize the social surplus that is measured by the sum of  $CS$  and  $PS$  (i.e., industry profits). Such a conflict, however, arises in Case (2) in which the profits of the merger firms increase, giving them an incentive for merger, and the equilibrium price also goes up, hurting  $CS$ , with the total effect of decreasing the social welfare.

**Table 2. Changes in the Price, Consumers' Surplus, Profits of the Merger Firm, and Social Welfare: According to the Extent of Reduction of Merger Firms' Marginal Cost ( $\Delta c$ )**

Case No.:	(1)	(2)	(3)	(4)
Condition:	$0 \leq \Delta c < \Delta \hat{c}$	$\Delta \hat{c} < \Delta c < \Delta c^*$	$\Delta c^* < \Delta c < p^0 - c$	$p^0 - c < \Delta c$
Price	↑↑	↑↑	↑↑	↓↓
Consumers' surplus (CS)	↓↓	↓↓	↓↓	↑↑
Profits of the merger firm	↓↓	↑↑	↑↑	↑↑
Social welfare (CS + PS)	↓↓	↓↓	↑↑	↑↑

Note: ↑↑ indicates that the variable increases after the merger. ↓↓ indicates that the variable decreases after the merger.

Here is a case for government intervention. Even though the firms will have an incentive for merger, this merger is socially undesirable and should be prohibited. Note that my policy stand is probably weaker than that of the behavioralist who tends to think that any merger that raises the equilibrium price is undesirable and hence advocate that the mergers in Case (2) should be also prohibited. Mine agrees with Williamson's view that, even if the price goes up after the merger, the social welfare may still increase. However, we have explicitly taken into considerations the fact that efficiency gains occur in merger firms only and not other firms. Still, as in Williamson's, our theory suggests that the expected effect of the merger on price alone cannot and should not be the criterion for whether the merger should be accepted or banned.

If so, should we (or, more precisely, the competition policy agency) be more open-minded towards the efficiency arguments in evaluating merger proposals? To

reach such a conclusion, however, there are substantial conditions that have to be cleared. To this topic, we now turn.

### **3. Do Mergers Really Raise Efficiency?: Empirical Evidences in Japan**

Do mergers really raise efficiency? Quite a few empirical studies have been made to test this question, in the US as well as in other countries. See, for instance, the collection of papers in Cosh and Hughes (1998) and Kaplan (2000), or a survey of European results in Röller et al. (2001). In my view, a general picture that emerges from these studies is twofold. First, most studies with stock-price data (or data on shareholder rate of return) suggest that the shareholders of target firms may gain (because of the premiums paid by bidders) but those of acquiring firms do not, with the total gain being positive or insignificant. Second, the majority of studies with accounting data found that the post-merger profitability fails to increase, or actually decreases, relatively to the industrial average.

As for Japanese firms, Hase and I have compared the financial performance of 46 pairs of merger firms and non-merger comparable firms in the 1980s (Odagiri and Hase, 1989)<sup>7</sup>. The result suggested no evidence that merger firms performed better. In fact, it rather suggested that the pre-merger superiority of profitability of merger firms disappeared after the merger. Similarly, in his study of 15 mergers during 1977-1995, Matsuoka (1997) found no post-merger improvement of relative profitability of merger firms.

More recently, three studies found similar evidences. Fukamachi and Makino (2004b) made event studies in which the impact on CAR (cumulative abnormal returns on stock) was studied of 10 mergers in 4 industries (petroleum products, carbon products, cement, and corrugated cardboard) that occurred during 1984-1999. The result indicates negative impact in 5 out of 10 mergers and positive impact in 3 out of the 10, with the remaining 2 showing no impact. Thus, if the stock market may be assumed to predict the consequence of mergers properly, it suggests that mergers more likely worsen the efficiency than improving it.

Nagaoka (2005) used an unbalanced panel of 1988 firms and 19 years (1985-2003) and found no significant effect of mergers on profitability. For sales growth, he found

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<sup>7</sup> The major part of this study is reproduced in Odagiri (1992), Chapter 5.



that mergers tend to raise the growth rate by 2 percent point generally. However, among equal mergers, they tended to lower the rate by 6.5 percent point, where mergers are considered 'equal mergers' if the two merging firms consider themselves as equal partners, usually in terms of size and/or the composition of directors. Since, in Japan, many of the large-scale horizontal mergers, namely, those mergers that tend to be the target of close scrutiny by the competition policy authority, are equal mergers, the result suggests that many of such mergers in fact hurt the growth capability of the firms. The effect of equal mergers on profitability was also negative but insignificant.

Finally, Yoshida (2007) studied 53 mergers during 1991-2002. These were the mergers of non-financial firms on which both of the pre-merger firms were listed in Stock Exchanges as well as the post-merger combined firm. Most of them were horizontal mergers. The results are summarized in Table 3. The relative profitability of merger firms tended to decline after the merger. The labor productivity tended to increase after the merger but only insignificantly. Since Nagaoka (2005) found also a decline in employment growth rate after equal mergers, both studies may suggest that firms make efforts to reduce employment after horizontal equal mergers. Nevertheless, such effort to reduce employment has not contributed to profitability increase.

**Table 3. Changes in Relative Performance after Mergers**

	Profit rate change			Labor productivity change		
	mean	st. dev.	t-value	mean	st. dev.	t-value
1st year after merger	-0.0068	0.0294	-1.6989 *	0.1115	0.6744	1.1807
2nd year after merger	-0.0046	0.0239	-1.4094	0.1112	0.7915	1.0032
3rd year after merger	-0.0053	0.0254	-1.5189	0.2148	1.0616	1.4451
Average of 1st, 2nd and 3rd years after the merger	-0.0056	0.0215	-1.8897 *	0.1458	0.7097	1.4675

Notes:

- (1) The profit rate change is the difference in relative profit rates between the designated post-merger year and one year before the merger, where the relative profit rate is calculated as the profit rate of the merger firm (the sum of the profit rates of firms to merge, for the pre-merger figure) minus that of industrial average.
  - (2) The labor productivity change is the difference in relative labor productivity between the designated post-merger year and one year before the merger, where the relative labor productivity is calculated as the labor productivity of the merger firm (the weighted average of the labor productivities of firms to merge, for the pre-merger figure) divided by that of industrial average.
  - (3) \* indicates 10-percent significance, two-tailed.
  - (4) Sample size: 53 for profit rate change and 51 for labor productivity change.
- Source: Yoshida (2007).

Yoshida also found that the profitability change is an increasing function of the ratio of sales between the merger partners, with the sales of a larger firm in the numerator. Hence, it indicates that the merger of equal size tend to yield the poorest profitability change, agreeing with Nagaoka's finding. A similar tendency was also found on the labor productivity change.

All these results therefore found no evidence of mergers contributing to profit increase and some in fact found a negative contribution, that is, mergers hurting profitability. Therefore, among the four cases in Table 2, Case (1) seems to be the most common in reality or, of course, the cost reduction ( $\Delta c$ ) may be actually negative, that is, mergers may lower efficiency.

In addition, Fukamachi and Makino (2004a) studied the impact of mergers on product prices, estimating price equations that also take into account the effects of factor prices and demand fluctuation. Except for the petroleum product industry, in which import is expected to be an effective competitive threat, they found that the prices increased significantly after the mergers. This result suggests that, unless import threat is substantial, Case (4) is unlikely and is consistent with our speculation that Case (1) is the most common outcome.

Therefore, the welfare tradeoff shown in Case (3) in which consumers' surplus is hurt and yet the social surplus increases appear uncommon in reality. Actually, the puzzle is why firms do merge even though the majority of mergers have failed. I have earlier argued two possibilities. One is the collusion hypothesis, namely, the hypothesis that mergers increase the chance for collusion, which may be consistent with the finding of price increase after the merger. However, the lack of evidence that mergers increased profitability suggests that, even if collusion took place, its effect on profitability was probably mitigated by increased *in*-efficiency. This explanation is rather in conflict with the lowered employment growth found by Nagaoka and increased labor productivity (though statistically insignificant) by Yoshida. Therefore, the collusion hypothesis does not appear to explain the majority of merger cases in Japan.

The second is the empire-building hypothesis or the managerial hypothesis. Let me discuss this issue further.

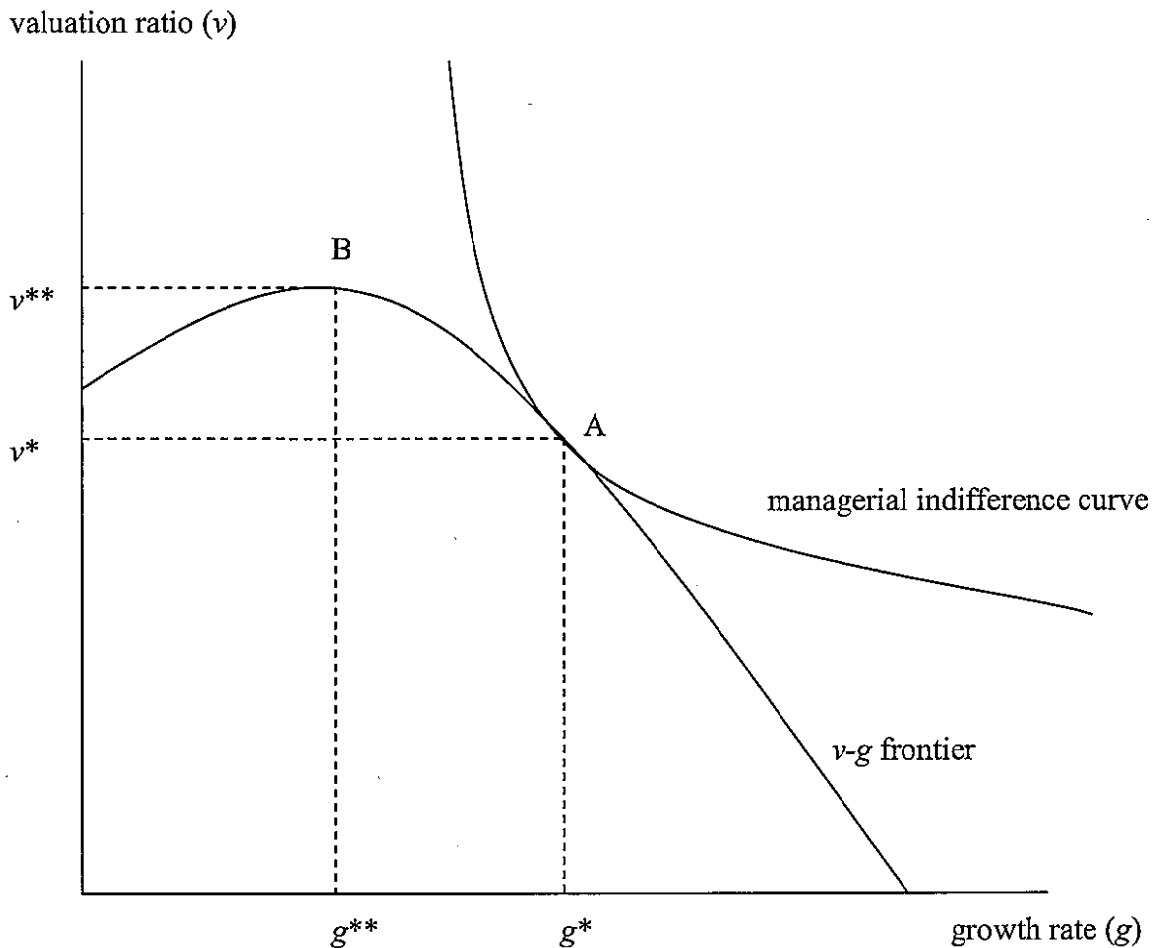
#### **4. Are Mergers Good for Economic Growth?: A Managerial Perspective**

Is the managerial behavior of firms, such as empire building and growth

maximization, always bad for the economy? Are mergers based on such behavior bad for the economy? I would answer "no" to the first question but "yes" to the second.

In Odagiri (1981), I have offered a theory in which managerial behavior contributes to economic growth. Based on Marris's (1964) theory of "managerial capitalism"<sup>88</sup>, I assumed that managers intend to maximize the rate of growth of the firm, measured in terms of sales, assets, or the number of employees. However, if the manager (assumed feminine) ignores the owners' interests excessively, she will face an increasing threat of being taken over or being ousted from the firm. Figure 3 illustrates this theory.

**Figure 3. Growth-Maximization Behavior of Managers**



Source: Odagiri (1981), Chapters 2 and 3.

<sup>88</sup> This now classic Marris's book was reproduced, with edition and addition, as Marris (1998), in which he discussed Odagiri's theory as an important extension of the Marris model.

In the vertical axis is the valuation ratio, also known as Tobin's  $q$ , which is the ratio of the market value of the firm (the sum of the market values of equity and debt) to total assets. The growth rate affects the valuation ratio in two ways. First, faster growth implies a larger profits in the future, resulting in a larger net present value of profits and accordingly a larger valuation ratio. Second, faster growth necessitates a larger investment, hurting current profits and hence causing the valuation ratio to be smaller. As long as the firm aims at a modest growth rate, the first positive effect dominates. However, under an accelerating cost of investment, the second negative effect starts to dominate once the target growth rate exceeds a threshold rate, say,  $g^{**}$ . The curve depicted as the  $v$ - $g$  frontier (abbreviated from the 'valuation-growth frontier') in Figure 3 shows this relationship. It is a frontier because, if the management is inefficient, the firm can realize only a point below the frontier, that is, a smaller valuation ratio *given* growth rate.

Clearly,  $g^{**}$  is the value-maximizing profit rate and is the optimal choice if the manager wants to (or is forced to) maximize the shareholders' interest. By contrast, if she intends to maximize growth, subject to the constraint that a lower valuation ratio will threaten her survival, then, she will have a downward-sloping indifference curve as shown in Figure 3 and her optimal choice has to be point A at which the two curves are tangent. The equilibrium growth rate,  $g^*$ , is of course larger than  $g^{**}$ .

Now suppose that there are two countries, the managers of one country choosing  $g^{**}$  and those of the other choosing  $g^*$ . Is the economic growth of the latter country also faster? Using a macroeconomic equilibrium model, Odagiri (1981) proved that it in fact is the case.

A crucial condition for this result is that firms invest in R&D to increase labor productivity because, otherwise, the labor supply constraint binds the equilibrium economic growth rate to the rate of population growth. If, however, firms need to invest more on R&D to pursue growth, so that the rate of growth of labor productivity is increased, the rate of macro labor supply in efficiency units, that is, Harrod's (1939) natural rate of economic growth, can exceed the rate of population growth. Also, the managers' choice of a higher growth rate results in higher investment in machines and plants, thereby increasing effective demand. In a steady state, investment and consumption also increases at a higher rate. In consequence, the country with growth-maximizing firms achieves faster economic growth.

Of course, it is too simplistic to argue that the higher the rate of economic growth the better it is for the economy. However, since the socially optimal rate of economic growth is difficult to determine, depending on the people's rate of time preference and intergenerational allocation of wealth among other factors, and also because economic growth is one of the key policy targets in most countries, I believe it hard to argue that the managerial behavior of choosing a growth rate larger than the value-maximizing rate causes socially 'excessive' rate of economic growth. This is why I argue that the managerial behavior need not be always bad for the economy: in fact, it does contribute to economic growth.

For our present purpose, the most important fact is that the theory critically depends on the assumption that the firm pursues growth through internal means, namely, expanding production capacity and making R&D investment. If it pursues growth externally through M&A, its expansion is offset by the contraction (or the disappearance, to be precise) of the acquired. Hence, it does not contribute to any increase in effective demand. In most cases, horizontal mergers unlikely lead to increased R&D investment. More usually, they tend to reduce R&D investment, in order to eliminate duplicate R&D efforts. The efficiency hypothesis again comes to play a role, this time in relation to R&D. If they can increase R&D efficiency, they may be able to achieve the same or even better innovation with a smaller R&D investment. However, existing studies do not lend support to the hypothesis that mergers, particularly equal mergers and/or horizontal mergers, contributed to the firms' innovation performance: see Cassiman and Colombo (2006).

In conclusion, I believe that the managerial behavior can actually contribute to economic growth and technological progress, but only if the managers' growth pursuit is made with internal means. Growth pursuit with M&A can be contributing only if they are accompanied with internal growth strategies as well. Such case may arise particularly in the case of non-horizontal M&A that may be made as a means with which the firm intends to expand the scope of their capabilities and enter into new markets. Needless to say, such cases are unlikely to increase market concentration and therefore are unlikely to be the subject of merger regulation.

## **5. Implications for Merger Regulation**

In this paper, using a Cournot oligopoly model, I discussed that a merger can be

socially beneficial only if the merger contributes to a reduction in marginal cost through efficiency enhancement. If the cost reduction is substantial, for example, in the case of a symmetric pre-merger equilibrium with constant marginal cost, if the marginal cost is expected to be reduced by more than the pre-merger markup, the merger is not only profitable for the firms but also can result in a lower equilibrium price, thus benefiting consumers' surplus. This, I believe, is the case that competition policy authorities accept as the case of 'efficiency defense' of mergers. According to the US Merger Guidelines (1997, Section 4),

"To make the requisite determination, the Agency considers whether cognizable efficiencies likely would be sufficient to reverse the merger's potential to harm consumers in the relevant market, e.g., by preventing price increases in that market."

The Guidelines of the European Commission (2004, Section VII) states that

"The relevant benchmark in assessing efficiency claims is that consumers will not be worse off as a result of the merger. For that purpose, efficiencies should be substantial and timely, and should, in principle, benefit consumers in those relevant markets where it is otherwise likely that competition concerns would occur."

And the Japanese Guidelines (2004, Part 4, 2(6)) states that

"When improvement of efficiency is deemed likely to stimulate competition (for example, a low-ranking company increases its cost competitiveness, financing capability, raw material procurement ability and other fundamentals through a merger, which leads to lower product prices and higher product quality, and in turn promotes competition with high-ranking companies), these positive impacts are considered."<sup>9</sup>

Even if the equilibrium price goes up, there is a case in which the decreased consumers' surplus is more than offset by the increase in profits, thereby raising the social surplus, as speculated by Williamson. Such a case (Case 3 in Table 2) is not considered acceptable in any of the three authorities.

I consider this attitude reasonable for two reasons. First, owing to the asymmetric ownership of information between the merger firms and the competition policy

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<sup>9</sup> A proposed revision of the Japanese Guidelines (published on January 31, 2007; under the public comment procedure at the time of writing) is more specific and requires that "improvements of the efficiency contribute to enhance users' welfare."

authority, it is extremely difficult for the authority to verify the firms' claim of efficiency gains<sup>10</sup>. Second, empirical evidences are not supportive of the claim that mergers tend to increase efficiency. Particularly, the effects on profitability were generally insignificant and some studies actually suggest that mergers worsen the firms' profitability. This tendency was particularly evident for equal mergers of horizontal nature, exactly the type of mergers that tend to be the subject of close scrutiny by the competition policy authority.

Therefore, both theoretical and empirical evidences suggest that the efficiency defense of mergers can be acceptable only in limited cases. Admittedly, the model I presented in this paper is based on many assumptions. Among the most crucial is the absence of entry. When the threat of entry by domestic or foreign firms is strong enough, the market price will not rise regardless of increased concentration caused by the merger, as the contestable market theory predicts. It is thus reasonable that the Guidelines give a detailed discussion on how the government will examine the ease of importation, such as the transportation and distributional costs, supply capability of foreign firms, and substitutability to imported products; and the ease of entry, such as the extent of entry barriers, switching costs, and substitutability to related products.

The possibility was also discussed that mergers may be pursued not to increase profitability but as a means for managers to pursue growth and size, namely, the empire-building theory. I have argued that growth-maximizing behavior of managers is not necessarily bad for the economy. It may in fact contribute to innovation and economic growth. But, for this to be the case, growth must be pursued internally and not through mergers and acquisitions.

I have earlier argued that such growth pursuit was indeed the key factor of post-war high economic growth in Japan (Odagiri, 1981, 1992). One may be tempted to call it *entrepreneurship*. Schumpeter (1942, p. 132) wrote that

"the function of entrepreneurs is to reform or revolutionize the pattern of production by exploiting an invention or, more generally, an untried technological possibility for producing a new commodity or producing an old one in a new way,

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<sup>10</sup> To reduce this information asymmetry, I believe it important that the authority regularly investigates the post-merger restructuring strategies and performance of merger firms, and thereby accumulate their knowledge so as to increase the capability needed to make a better evaluation of the merger firms' claims.



by opening up a new source of supply of materials or a new outlet for products, by reorganizing an industry and so on. ... To act with confidence beyond the range of familiar beacons and to overcome that resistance requires aptitudes that are present in only a small fraction of the population and that define the entrepreneurial type as well as the entrepreneurial function,"

I am inclined to think that he never assumed that these entrepreneurs have profit maximization in mind. Probably, he thought of the type of people who would challenge innovation beyond the extent profit calculation would warrant. Such entrepreneurship was the key engine of Japan's industrialization both before and after the Second World War (Odagiri and Goto, 1996).

That mergers were relatively few during the high growth era must have been closely related to such entrepreneurship, that is, the managers' pursuit of growth through innovation and internal expansion, despite the high risk and difficult challenges they had to face in order to introduce untried technologies, adapt them to their environment, develop them further, and create markets for them. With this view, the increasing cases of mergers are not quite welcome, even though I accept that many of them, mostly non-horizontal ones, are made as a part of the managers' efforts to reorganize their business, streamline the operation, or expand into new business fields.

The attempted (and failed) takeover case of Oji Paper, the market leader, against Hokuetsu Paper in the summer of 2006 is a case in point. From Oji's statement (July 3, 2006), it is apparent that their major aim was to acquire Hokuetsu's technologically superior plant and use it as Oji's central production site, by scrapping Oji's old and inefficient plants. According to a newspaper report, Oji was afraid that Hokuetsu's construction of this superior plant would erode the market price and Hokuetsu's president claimed that he was under a pressure from Oji to abandon the construction plan<sup>11</sup>.

Not only would such a takeover have been against market competition. It might have also failed to promote innovation and economic growth. Though this may be farfetched, I am tempted to argue that an increasing preference of M&A to own innovation and internal investment have been the real cause of Japan's problems since 1990.

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<sup>11</sup> *Nihon Keizai Shimbun*, August 5, 2006.

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