THE RELATION BETWEEN MARKET SHARE AND PROFITABILITY

Birger Wernerfelt

Gaining market share can be a means of obtaining profits. While one cannot develop precise prescriptions for gaining market share in complex and dynamic environments, a stylized model can provide a reference point for evaluating what to do in more complex situations.

In the last ten years, it has become something of a dogma in the theory and practice of strategic management, or at least in popular simplifications of it, that maximizing one's market share is a way to maximize one's profits.

A positive association between market share and profitability has been demonstrated empirically in several cross-sectional studies, most notably in the PIMS study by Buzzell, Gale, and Sultan [3]. The supporting theory most often cited is that of the experience curve effect, formulated by the Boston Consulting Group (BCG) [1]. As an indirect measure of the impact of these ideas, Haspeslagh [6] estimates that a majority of the Fortune 500 use another of BCG's ideas, namely some sort of portfolio planning technique. Finally, diversified firms often state it as a policy to participate only in those markets where they can occupy the number one or number two spot [10].

Some voices, however, have been raised in opposition to the seemingly widespread desire to increase market share at any cost. Several years ago, Fruhan [4] cited numerous examples where attempts to gain market share proved costly to the involved firms, a finding which suggests that ample financial resources are a necessary prerequisite for engaging in a fight for market share. Later, Hamermesh, Woo, and Cooper [5, 14, 15] showed that low market share firms can be very profitable. Rumelt and Wensley [7] have argued that the price of getting market share, in analogy to the prices in perfect markets for investment goods, must be expected to adjust, so that one could not make a long-term profit on investments in market share. That is, the high returns from having a high market share are counterbalanced by a correspondingly high price paid earlier to get that market share. Rumelt and Wensley test the theory in a time series setting and cannot reject the hypothesis that the relationship between market share and profitability is due only to stochastic effects.

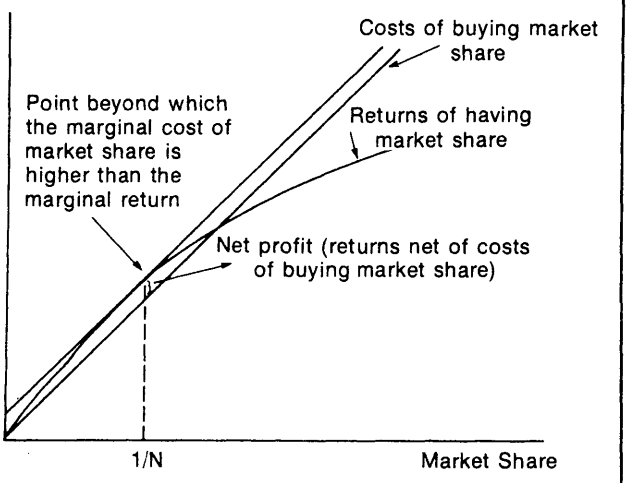
By taking a theoretical perspective, this article offers new insights concerning the question: Under what circumstances, and by how much, should a firm try to increase market share?

The Nature of the Problem

The argument by Rumelt and Wensley—that it is necessary to look at long-term profits and subtract the cost of getting market share from current returns from it—is crucial to the issues here. One should expect the "price" of market share (in the form of pricecutting, quality variation, R&D, ad-

Birger Wernerfelt is Associate Professor, Policy and Environment, J.L. Kellogg Graduate School of Management, Northwestern University. He would like to thank Aneel Karnani for comments on this article.

EXHIBIT 1
Market Share Auction With Decreasing Returns to Market Share



vertising, etc.) to adjust in such a way that no profits can be made on investments in it. Much casual use of previous work seems to proceed on the assumption that other firms are stupid and underinvest in market share to get it cheap. This seems unrealistic and the author here will adopt a theoretical perspective that assumes competitors are smart. This perspective will be applied to situations with increasing returns to scale. Here are some highly idealized thought experiments.

Experiment I

Assume that the static returns revenues minus costs at constant market share from having market share in a given industry are decreasing, so that the industry does not exhibit the positive cross-sectional association between profits and market share found in the aggregate PIMS results. Now hypothesize an auction in which a number of identical firms (called N) can buy small units of market share. In this auction, each buyer will want to buy until the marginal (net present value of long-term) returns from higher market share are lower than the price (marginal cost) of that market share. Since all buyers are identical, this point will be the same for all of them and the ultimate price will be such that each gets $1/N$ of the market. If the price is lower, total demand will exceed one and if it is higher, it will be less than one. In a more complete analysis, N will adjust in such a way that each firm's net profit, after costs of buying share, will be just enough to keep it in the industry. So in this situation, the analysis of Rumelt and Wensley applies directly. (See Exhibit 1.)

Experiment II

Now look at the more difficult case, involving increasing static returns from market share. For simplicity of reasoning, skip the intermediate case with first increasing and then decreasing cost curves. In a similar auction, buyers here maximize net profit by having either the whole market or nothing at all. What one runs into is a variation of a major problem in modern economic theory, namely, the nonexistence of competitive prices (or natural monopoly) in markets with increasing returns to scale. So the market for market shares does not clear at any single price; there is either too much or too little demand (see Exhibit 2). Since this obviously does not happen in real life, there is something wrong with the model. In particular, the single price assumption cannot hold. In a market with increasing static returns from market share, some units of market share will be cheaper to get than others. So the static auction model is insufficient, and one needs to think explicitly about the dynamic process of market share acquisition. This is done in the section called "Analysis."

The implication of the above is that in the case with increasing returns from market share, a price, in the usual sense of the word, does *not* exist. This is not to say that getting more market share does not have a cost; it clearly does, but the cost depends on a number of factors, such as how much market share one has already, how much one's competitors have, the cost positions of both sides, and the stage of the product life cycle. In a market with relatively few competitors, which is what one always will have with increasing returns to scale, the price furthermore depends on what a company and its competitors think one party will do in response to all possible actions on the part of the other party. If everyone thinks that more aggressive fighting for market share will be matched, relatively low prices will result. Conversely, if one thinks that any effect above a certain high level will be beaten, then the price of market share will be driven to that level. So it is hard to characterize equilibrium in very much detail. Equilibrium should, however, have the following property: All players attempting to gain market share would find that the benefits of a

change are fewer than the negative consequences. (This is strictly speaking, unless the effort is plus or minus infinity.) Now look at some properties of such equilibria in simple dynamic models with increasing static returns from market share.

Analysis

One builds models to study the effects of a few phenomena on a system of interest in a noise-free laboratory setting.[1] One does not build models if the effects under investigation are so simple that one can understand their logical impact in one's head. Similarly, one cannot build models of situations that are too rich, since one's model solving capability is limited. Such situations have to be understood in more intuitive ways, but that intuition could be helped by examining medium-sized models, experience with similar situations, etc. The purpose of modeling is to capture as many of the important elements of a real situation as possible and then analyze these rigorously. One can never get a precise and complete analysis of the full richness of real economic situations, but in one's attempt to understand them, it may help to have the precise analysis of simpler but similar situations. If one wants to use a model to find the optimal action for a firm with competitors, a special problem is what to assume about the actions of those competitors. The traditional economic answer is that one assumes all of one's competitors act optimally. Then decide on what to do oneself. Although this of course is unrealistic, it seems hard to decide on a particular type of "error" to ascribe to the competitors. So when one investigates the optimality of BCG-type penetration pricing, one assumes that all other firms do the same. This is a much more interesting situation than that where all other firms make mistakes. It may well be possible to find a real life example of successful firms that do not follow the prescriptions from models. This can be due to factors not in the models (technical change, heterogeneous buyers, etc.), errors on the part of competition, or it may be that firms did well but still not as well as if they had followed the prescriptions. One can never model reality exactly, but a precise understanding of similar situations may be a good building block for one's intuition.

For reasons of expositional ease, consider first a highly idealized industry with only two firms, *A* and *B*, competing on price only. Hypothetically, say that the two identical firms with unlimited financial resources can lower their price/performance ratio and go for market share "early" or "late" in the product life cycle of an unsegmented market. The word "price" will be used for the price/performance ratio, allowing competition along lines of quality, services, price, etc. Going for it in all periods is assumed suicidal and never trying will not be optimal under the assumptions made below.

The payoff matrix for this game should look more or less like that in Exhibit 3. In the upper left and lower right squares, both firms are lowering price in the same period, resulting in heavy competition in those periods and a friendlier coexistence in the other half of the product life cycle. If one firm attacks "early" and the other "late," various mechanisms will make the former firm a much stronger defender than the latter.

EXHIBIT 2
Market Share Auction With Increasing Returns to Market Share

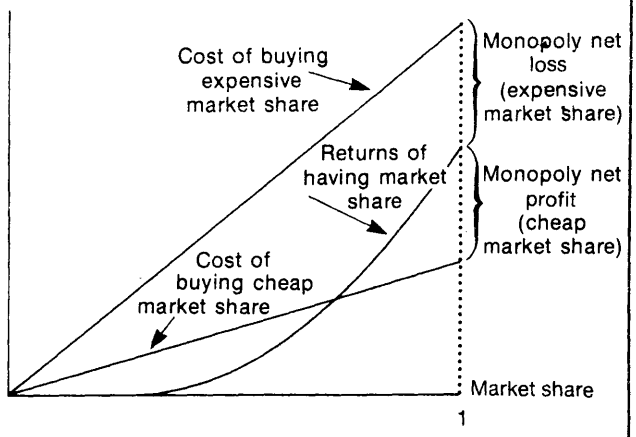


EXHIBIT 3
Payoff to Firm *A*/*B*

A \ *B*	Early	Late
Early	Medium / Medium	Low / High
Late	High / Low	Medium / Medium

[1] This section draws heavily on B. Wernerfelt (see [11-13]), where the results are derived in the setting of differential game theory.

With increasing returns from market share (due, for example, to economies of scale or brand loyalty effects), the early firm will have built up entry-barrier-type advantages, as a result of which the late firm faces an uphill battle. The early firm will therefore take the lion's share of the payoffs and be able to take home returns on its "investment" over a longer period. If firms are not identical, the same argument holds, although the payoff matrix loses its symmetry.

From this, unless a player expects very unreasonable reaction patterns from the other, any reasonable equilibrium concept would point to the upper left corner, where both firms lower price early. It is possible that this will lead to very low payoffs, especially if the firms have approximately the same financial strength; but if one wants to participate in the industry, this is the appropriate strategy. In a more realistic setting, new technologies, designs, segments, or tastes might annul the original entry barriers and create enough turbulence to make it profitable to attack again later in the product life cycle. But even if one also takes those opportunities, one would always be better off by also attacking early, since the first-mover advantage from the original situation gives one a better position to exploit the new possibilities especially if others are doing so. (Late entrant success stories like BIC and L'eggs would, following this logic, have been even better off by entering earlier.) If the others are too strong, a firm may choose to drop out; but a smaller firm should not sit and wait while larger firms create entry barriers. It should be intuitively plausible that the core of this reasoning remains valid in a more realistic setting with firms, technical change, etc. The following are some guiding principles on which to model a plan for gaining market share.

Attacking Early to Stay in the Industry

If a firm wants to stay in the industry, it should at least attack early. The next logical question concerns the fierceness and duration of the attack. It is clearly not optimal to charge infinitely low prices; instead, the price should be determined by the earlier rule, that the expected net present value of benefits and costs of changing to other prices at least balance each other out. Applying the logic from the above hypothetical situation to a specific setting would, however, enable one to argue that attacks should decrease in fierceness over the product life cycle.

Attacking With Decreasing Fierceness

Staying with the example of identical firms, these firms will have the same increasing markup pattern and will share the profit equally. Pushing this to its logical limit, in a more complete analysis, the number of firms should adjust so that each only reaps enough profit to keep it in the industry. Again, the above analysis assumes optimal behavior on the part of one's competitors. If they only wake up to the competitive reality late in the life cycle, the optimal response may, of course, be different.

In practice firms are, however, not identical, and not all firms have unlimited financial resources. In reality some firms will enter earlier than others, and some will not be financially able to participate in the early race for market share. These asymmetries, combined with returns to scale, brand loyalty, or other entry barrier type effects, award first-mover advantages to the early and/or strong firms. (That some firms fail to capitalize on these advantages is another case.) While the ideal for all firms is to attack most fiercely early in the life cycle, late entrants may find themselves at too big a disadvantage to be able to make it pay. Similarly, the financial limitations of the less well-endowed firms are likely to be more constraining the earlier in the product life cycle it is, and these financial limitations may prevent them from capitalizing on their early entry. These firms will presumably get more and more cash flow as time goes by. If cash flow has some positive relationship to profit, a higher market share should produce disproportionately more cash flow in an industry with increasing returns from market share. This cash will then permit the lowering of price. So, while the ideal degree of attack declines over the product life cycle, the financial constraints under which some firms operate make a more and more vigorous attack feasible. This gives very early, less-well-endowed firms the opportunity to maximize growth subject to financial constraint. The early entrants and/or financially strong firms fare best in the war. So in this game the fat will get fatter.

Taking the Profits Home

Thinking further ahead in the product life cycle, it is clear that at some time, the firms will stop maximizing growth and start taking profits home. The question is when.

To provide a partial answer to this, still in an unsegmented market, it is easiest to start out by considering the firm which by virtue of early entry and/or financial strength has become the largest. This firm will be gaining market share as long as it maximizes growth. This will be more and more expensive, however, and less and less effective, since price has to be lowered on bigger and bigger market shares, while fewer and fewer customers are left to chase. On the other hand, the competitors could be at an increasing cost disadvantage because of the increasing size differences.

On the whole, however, it is likely that the biggest firms will stop maximizing growth well before monopolization. If one does not take into consideration regulatory influence and assumes that the big firm does come close to monopoly, it might be tempting to persist long enough to squeeze the last competitor out so that one could practice monopoly pricing. This is an unlikely scenario, however: First, one cannot abstract from regulatory agencies; second, a truly dominant firm will often be able to ensure near-monopoly markups anyway; and third, in reality smaller firms will often succeed in segmenting the market, making monopolization even harder. Thus, the largest firm will rarely want to monopolize the industry.

A Declining Market Share for the Largest Firm

Accepting that the biggest firm is unlikely to monopolize the industry, the next question is how it will choose to let its market share develop. The same mechanisms that make monopolization expensive also make it tempting to "sell off" some market share. This is because increasing prices on a big market share will give high short-term payoffs and the entry barrier effect of the high market share will have become less important in the late stages of the product life cycle, where the fierceness of attack is smaller. Therefore, at some "late point in time," the largest firm will often reduce its market share slightly.[2]

From the viewpoint of smaller firms, the pressures early in the product life cycle tend to work two ways. On the one hand, the declining market share of the smaller firms will make price cutting cheaper; on the other hand, the declining size of their market share will, through economies of scale, tend to squeeze profit margins and available financial resources. The crucial instant is when the largest firm stops maximizing growth and starts to raise prices (or lets prices drop less sharply). If a small firm can turn out a profit at the new, higher prices, it will probably be able to stay in the industry, although it is unlikely to be very profitable. If it has lost too much in scale advantages, it will probably already have left the industry. Some of the short-run results are graphically summarized in Exhibits 4 and 5.

The largest firm will rarely want to monopolize the industry.

In terms of the long-run steady state of the industry, bigger and smaller firms face different cost and markup conditions as illustrated in Exhibit 6. The biggest firms will have low marginal costs (because of economies of scale) but be tempted to charge high markups (because of their relatively big customer base). The smaller firms, conversely, will have higher marginal costs and be less tempted to charge high markups. Both types of firms should price at the long-run profit-maximizing level, which for stable markets will be equal to marginal costs plus a markup. And this depends on the size and price-sensitivity of the customer base.

Assume that as the firm grows very big, changing market shares affect the marginal costs less than the demand-derived markup. So economies of scale are not too dramatic for very big firms. In this case, the steady state price will increase as the firm grows very big, since marginal costs go down less than the markup goes up. Conversely, for the smaller firm, the steady state price may decrease as it grows smaller, if the markup will decrease more than enough to compensate for the loss in cost efficiency. The industry could therefore stabilize in an equilibrium where both smaller and larger firms charge the same price, based on different costs and profit margins [2].

Note that this equilibrium is stable, since a sudden change in market share will lead to a correcting price action. If the big firm gains (loses) market share, it will increase (decrease) price, since the effect due to changed elasticity of

[2] See also F.M. Scherer, *Industrial Market Structure and Economic Performance* (1970), pp. 217-218.

EXHIBIT 4
Price Paths for Bigger and Smaller Firms

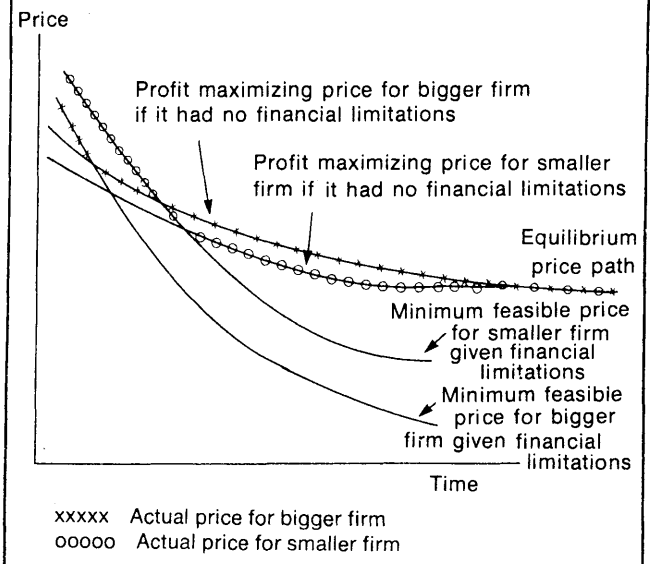
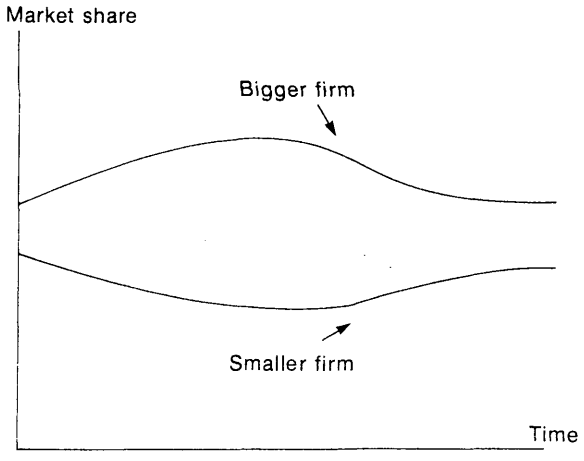
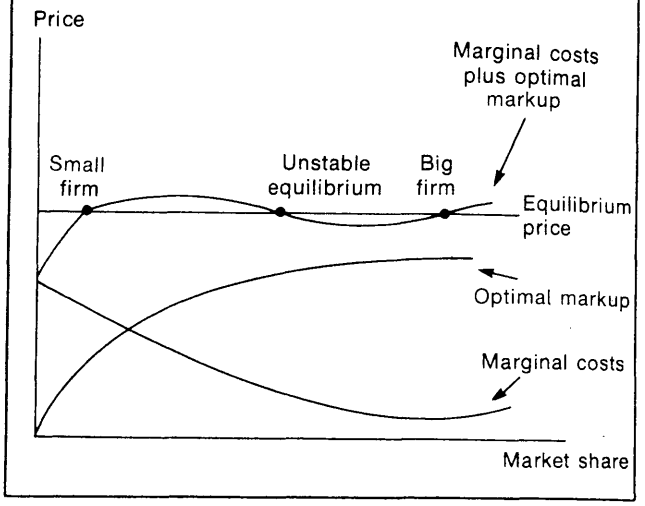


EXHIBIT 5
Market Share Paths for Bigger and Smaller Firms



demand will outweigh the cost change. Correspondingly, if a small firm gains (loses) market share, the same effects would pertain. So, under certain technical conditions the industry could end in a stable asymmetric long-run equilibrium

EXHIBIT 6
Steady State Prices as Functions of Market Shares



where all firms charge the same price. An interesting and related result, which holds under a set of similar technical conditions, is that a "symmetric" industry structure, where firms are of the same size, is often unstable.

Industry Stability

What happens is that a firm that gains (loses) a small advantage will affect price in such a way that the discrepancy is augmented. This is based on the assumption that the effect from economies of scale is larger than the demand-based effect from a changing market share in the case where firms are of about equal size.[3] If the unstable equilibrium is disturbed, one firm will gain market share until the market structure is driven to the stable "asymmetric" size distribution, at which point the arguments against monopolization carry more weight.

Note that this explanation for a share-profit correlation in mature industries depicts the profit as a result of the share, which again is the result of some underlying information or resource asymmetry. This is different from the conception of profit and share as result of the same underlying phenomena [7, 9]. One should note the interesting managerial implications of this phenom-

[3] See B. Wernerfelt, "Consumers With Differing Reaction Speeds, Scale Advantages, and Industry Structure," *European Economic Review*, Vol. 24, 1984, pp. 257-270.

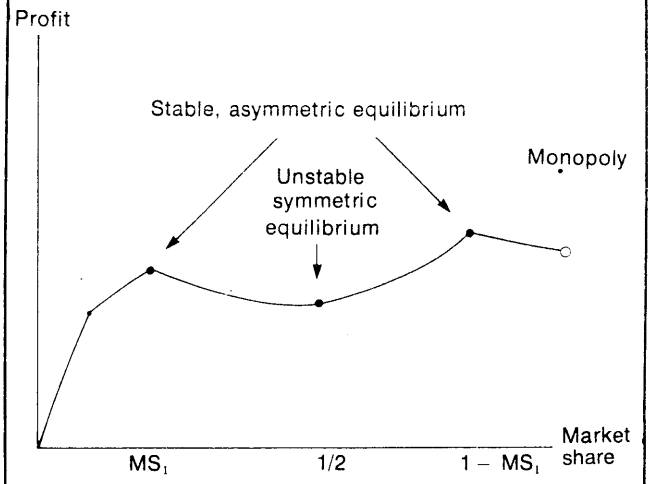
enon. If the optimal price curve looks like Exhibit 6, it becomes very critical to get the biggest relative market share early on, since even a small size advantage will tend to blow up if all firms act optimally. Conversely, if one is at a small market share disadvantage and the leader seems determined to keep its position, one may be better off accepting one's fate and dropping to a lower market share, as illustrated in Exhibit 7. The long-run results are that the industry could end in one of the situations following:

- There is a stable asymmetric long-run equilibrium and all firms charge the same price.
- There is a "symmetric" industry structure that is unstable and firms are of the same size.

These are illustrated in Exhibit 7, which depicts a two-firm example.

In Exhibit 7, (MS_1, $1 - MS_1$) is the stable asymmetric equilibrium, whereas 1/2 is the unstable symmetric situation. The firms clearly gain in profitability by staying close to the stable equilibrium values and avoiding the unstable symmetric equilibrium. The only reason that firms will accept the low payoff from the price war of the symmetric equilibrium is that they both have a chance of moving ahead, thus ending up in the high payoff situation at $1 - MS_1$. Note also that it is irrational for the small firm to challenge the larger firm with a price war. So if one is established as a leader in an asymmetric equilibrium such as (MS_1, $1 - MS_1$), one is in a very secure position, at least in conventional warfare. Now look at the normative implications of these results.

EXHIBIT 7
Equilibrium Profit for Different Market Shares, Duopoly



Implications

Note, first, that if a firm finds itself in a stable, asymmetric equilibrium, a higher market share will correspond to a higher profit from that time on. Over- or under-shooting the equilibrium and trying to hold too big or too small a market share will, however, not lead to maximum profits. Trying to hold too big a market share, for example, will often involve charging prices that are too low. So each firm has an optimal market share to shoot for, and the higher this target, the higher the firm's profit. The target itself is dependent on the structural characteristics of the industry, namely the relative cost positions and the relative price sensitivities of firm-specific demands which entered into the construction of Exhibit 6. Pretending that the target is higher than it actually is and going for higher market share will be self-defeating. What is valuable is not market share but the firm's relative cost position and the price sensitivity of its demand, of which market share, if equal to its equilibrium value, is an indicator. Trying to increase the value of the firm simply by increasing market share is like trying to put out a fire by blowing the smoke away. Again, even though higher sales can influence the firm's relative cost position and demand elasticity, it is not profit-maximizing to try to influence those once the industry is in a stable equilibrium. Hence the stability of the equilibrium.

Should a firm find itself in an unstable symmetric equilibrium with an associated "deadlocked" price war, it is safe to assume that the industry will eventually move to a stable symmetric equilibrium and that the current casualties are part of the fight for the high-share/high-profit position. In these situations, the firm has to decide whether or not to fight on the basis of an assessment of its chances of winning and the associated costs.

Because the firm's relative cost position and demand elasticity gradually freeze as the industry matures, the early phases of the product life cycle always offer opportunities to jockey for position. To stay in the industry, the firm should always

fight hard early in the product life cycle. If the firm is financially weak and only entered after most of its competitors, this fighting is unlikely to prevent market share from declining and may only reduce the speed of that decline; but it is still the profit maximizing course of action. It is possible, of course, that the firm's strengths relative to present and future competitors are so limited that its total product life cycle payoff will be negative, in which case it should not participate at all.

Sometimes opportunities to switch the relative cost and demand elasticity positions occur at selected points in time later in the product life cycle. This might happen, for example, with the advent of new technology, if one can develop a new product design or find a new strategy. As an example, Miller shifted market shares in the mature beer industry by using marketing techniques that were radically new for that industry. The Japanese have shifted shares late in many industries by offering a different price/performance package. A blind attack late in the product life cycle which is not tied to a major change in the cost or demand properties of the product is likely to be a failure, however.

In summary, firms should select the industries they want to be in, attack in periods of turbulence (such as the early stages of the product life cycle), and try not to overplay their cards in the stable periods of the product life cycle.

REFERENCES

1. Boston Consulting Group, *Perspectives on Experience* (1972).
2. R.D. Buzzell, "Are There Natural Market Structures?" Mimeographed, Harvard University, Graduate School of Business Administration, 1980.
3. R.D. Buzzell, B.T. Gale, and R.G.M. Sultan, "Market Share—A Key to Profitability," *Harvard Business Review,* Vol. 53, No. 1, 1975.
4. W.E. Fruhan, Jr., "Pyrrhic Victories in Fights for Market Share," *Harvard Business Review,* Vol. 50, No. 5, 1972.
5. R.G. Hamermesh, et al., "Strategies for Low Market Businesses," *Harvard Business Review,* Vol. 56, No. 3, 1978.
6. P. Haspeslagh, "Portfolio Planning: Uses and Limits," *Harvard Business Review,* Vol. 60, No. 1, 1982.
7. R.P. Rumelt and R. Wensley, "In Search of the Market Share Effect," in *Proceedings of the 41st Meeting of the Academy of Management* (1981).
8. F.M. Sherer, *Industrial Market Structure and Economic Performance* (Rand McNally, 1970).
9. H.A. Simon and C.P. Bonini, "The Size Distribution of Business Firms," *The American Economic Review,* 1958.
10. The Dexter Corporation, ICCH 9-379-112, 1979.
11. B. Wernerfelt, "Consumers With Differing Reaction Speeds, Scale Advantages, and Industry Structure," European *Economic Review,* Vol. 24, 1984.
12. B. Wernerfelt, "A Special Case of Dynamic Pricing Policy," Mimeographed, Northwestern University, J.L. Kellogg Graduate School of Management, 1985.
13. B. Wernerfelt, "The Dynamics of Prices and Market Shares Over the Product Life Cycle," *Management Science,* Vol. 31, 1985.
14. C.Y.Y. Woo and A.C. Cooper, "Strategies of Effective Low Share Businesses," *Strategic Management Journal,* Vol. 8, 1981.
15. C.Y.Y. Woo and A.C. Cooper, "The Surprising Case for Low Market Share," *Harvard Business Review,* Vol. 60, No. 6, 1982.