

## DO STRATEGIC GROUPS EXIST? AN ECONOMIC FRAMEWORK FOR ANALYSIS

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*This paper offers a framework and methodology for resolving the question regarding the existence of strategic groups. We say that a strategic group exists if characteristics of the group affect firm performance independently of firm-level and industry-level effects. We argue that group-level effects are a byproduct of strategic interactions among members, and develop an empirical testing model, based on the 'New Economics of Industrial Organization,' to distinguish true group effects from spurious effects. From this model, we derive a series of logically consistent propositions, suggesting that while strategic interactions are critical for a group-level effect on profits, mobility barriers are necessary to preserve both groups and their effects over time. A review of prior empirical studies of strategic groups suggests that the inconclusive nature of prior research has been due more to the lack of a theoretical foundation for empirical analysis than to the nonexistence of groups. To the extent that our methods have been employed, there is limited evidence that a rigorous search for strategic groups may prove fruitful. © 1998 John Wiley & Sons, Ltd.*

### INTRODUCTION

Despite an unabated stream of research on strategic groups across a wide range of industries, there is still little agreement over the research findings. Critics question whether strategic groups exist and point to the absence of consistent links between strategic groups and profits.<sup>1</sup> Others complain of limited theoretical development, the ad hoc nature of key concepts, poor model specification, and problems of measurement.<sup>2</sup> Perhaps the most critical concern is whether the study of

intraindustry groups provides any information that cannot be gleaned from the study of industries and individual firms.

In this paper, we offer a theory-based empirical approach to identifying distinct group-level effects. Although many types of group-level effects are plausible, we restrict our attention to profitability effects due to intraindustry (i.e., strategic) groups. We provide a definition of what it means for a strategic group 'to exist' that is both consistent with prior research and rooted in the field of industrial organization. Our approach allows us to distinguish between 'true' (i.e., group-level) effects and 'spurious' (i.e., firm or industry-level) effects. Our methods also allow us to avoid somewhat the methodological quagmire of how to identify strategic groups *a priori*.<sup>3</sup>

Key words: strategic groups; industry analysis; performance; economics; strategic interactions

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<sup>1</sup> See, in particular, Thomas and Venkatraman (1988) and Barney and Hoskisson (1990).

<sup>2</sup> See McGee and Thomas (1986); Hatten and Hatten (1987); Cool and Schendel (1987); Thomas and Venkatraman (1988); Barney and Hoskisson (1990).

<sup>3</sup> By this, we mean that our methodology can distinguish between true group effects and spurious group effects, regardless of how putative groups have been selected for study. Misidentifying groups *a priori* will not produce spurious profitability results; it will only bias downward the chance of

In addition to presenting this approach, we also review some empirical papers whose approach comes near to the methodology that we advocate. We find that the results of these studies are sufficiently encouraging to warrant further research. We also discuss why, in the absence of true group effects, the application of the strategic group concept for analytic convenience may be counterproductive.

To address the criticism that the strategic groups literature has failed to distinguish between firm, group, and industry-level effects,<sup>4</sup> we offer a working definition of *strategic group existence* that speaks to the heart of this criticism:

*Definition: A strategic group exists if the performance of a firm in the group is a function of group characteristics, controlling for firm and industry characteristics.*

If true group-level effects exist, then groups are more than an analytical convenience (Hatten and Hatten, 1987). On the other hand, if our understanding of firm performance is not enhanced by studying groups, then the value of doing so is limited.<sup>5</sup>

In this paper, we detail the ways in which group-level characteristics can affect the performance of individual member firms. Our central insight is that without strategic interactions among group members there can be no direct effect of group membership on performance.<sup>6</sup> We offer

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uncovering true group-level effects. To the extent that researchers choose relatively stable groups for investigation, where mobility barriers limit entry and internal interactions are likely to be prevalent, their chances of finding significant group-level effects will be improved.

<sup>4</sup> Another objection is that if strategic groups *do* affect firm performance, it is because they represent industry submarkets. Certainly, our ability to define 'industries' is more art than science, as anyone who has struggled over market definition knows. This objection, however, does not invalidate our claim that greater attention to levels of analysis (Klein, Dansereau, and Hall, 1994) may enhance our understanding of the sources of firm profitability. One specific reason for believing that group effects may not be the same as 'submarket' effects is that a meaningful group identity may result from input commonalities, while submarkets more often reflect output commonalities.

<sup>5</sup> While group-level effects may not be restricted to effects on firm profitability, other concerns are of a secondary nature, due to the causal link between profitability and survival.

<sup>6</sup> Strategic groups may also have an indirect effect on firm profitability through intergroup rivalry, of the type described by Porter (1979) and assessed by Cool and Dierickx (1993). We do not concern ourselves with this effect in this paper.

approach, grounded in the 'New Economics of Industrial Organization' (NEIO), to identifying strategic interactions. The key is to employ group-level characteristics, such as group size, as proxies for less tangible interaction variables. This distinguishes our work from past work on strategic groups, which has commonly used a variety of firm-level variables, such as key strategies common to the members, to characterize a group. Without a link between firm performance and uniquely group-level variables, one cannot be sure that any apparent group effects are not merely aggregated firm-level effects.

Stated another way, we argue that the concept of a strategic group is important only if there is a relationship between group *conduct* and firm performance. If information about conduct within strategic groups does not add predictive power, then the strategic group concept is analytically empty for the purpose of studying firm performance. Conduct is a parameter which has been notably absent from most empirical studies on strategic groups and profitability. The work of Cool and Dierickx (1993) and Peteraf (1993b) are recent exceptions.

Prior research has also focused on mobility barriers. We argue that while mobility barriers serve a critical role in limiting entry to a group and enhancing strategic interactions among members, they do not have a direct, group-level effect on outcomes. Because they can help sustain group-level profit differentials, however, they are an important part of our theory. The real key to group-level effects is strategic interaction. Supported by mobility barriers, group-level effects produced by strategic interactions can persist.

In this paper, we restrict our attention to the performance effects of horizontal industry groups. Although other types of group effects, such as those due to intergroup interactions or vertical relationships, may also be important, we reserve these topics for future research.

We begin with a brief review of the theoretical literature on strategic groups. We then discuss conceptual issues regarding group-level effects. Following this, we present an empirical framework for identifying groups. This framework is based on the new economics of industrial organization (Bresnahan, 1989), and is tailored specifically

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but acknowledge that it has independent relevance for understanding firm and industry profitability.

Finally, to identify group-level interactions. Based on this framework, we derive a series of logically consistent and testable propositions and then discuss the implications of the framework for empirical work. After this discussion, we review the results of the few previously published empirical studies on strategic groups whose approach is consistent with ours. We find, on the basis of these results, some encouragement regarding the existence of groups. This suggests that future research along the lines that we recommend will be fruitful. We warn researchers away from the continued use of strategic grouping as an analytical convenience, should the existence of strategic groups prove doubtful. We conclude with a brief summary.

## THE THEORETICAL LITERATURE ON STRATEGIC GROUPS

Although the strategic groups concept was first introduced by Hunt (1972), the underlying theory was not fleshed out until the work of Porter (1976, 1979) and Caves and Porter (1977). Porter (1979) defined a strategic group as a set of firms within an industry that are similar to one another and different from firms outside the group on one or more key dimensions of their strategy. For Porter, strategic groups are persistent structural features of industries that are bounded by mobility barriers. Mobility barriers (a generalization of the concept of entry barriers) limit entry into the group by retarding imitation (Caves and Porter, 1977; Porter, 1979).

The earliest theorists viewed strategic groups as a dimension of industry structure that could enrich traditional models of industrial organization. They were most concerned with the effects of competition among groups on profitability. Porter (1979) hypothesized that the presence of groups within an industry increases the amount of rivalry. (See also Hunt, 1972, and Newman, 1978.) The extent of this effect depends, in turn, upon three factors: the number and share distribution of groups in an industry, the 'strategic distance' between them, and the level of 'market interdependence' (Porter, 1979: 218). The greater the number of groups and the more equal their shares, the greater the rivalry among them. The greater the 'strategic distance' (i.e., how different the groups are along key dimensions), the greater

the rivalry. The greater the 'market interdependence' (the degree to which groups target the same customers), the greater the rivalry. These factors affect firm profitability indirectly, in that the effects come through the mediating factor of rivalry at the industry level.

While competition among groups is potentially important, it presumes the existence of strategic groups and the effects of membership on individual firms. We focus our attention on a more fundamental way in which strategic groups may affect profitability—through *intragroup* rivalry. Porter (1979) refers to this type of effect in his discussion of the 'height' of mobility barriers and the degree of rivalry within a group. The higher the mobility barrier, the greater its ability to prevent imitation and the greater the potential for profit by group members. Porter argues that the degree of rivalry within a group depends on the structure of the group. Large groups, for example, whose members differ significantly in scale and risk preferences, are likely to be more rivalrous than smaller groups.

While there have been a variety of contributions to the literature on strategic groups since 1979, we discuss only those economics-based theoretical papers that are most relevant to our own work. McGee and Thomas (1986) argue that mobility barriers provide a much firmer basis for identifying groups than 'strategies' which tend to be more loosely defined. They identify two essential properties of mobility barriers. First, they are long-term investments in assets (sometimes intangible) whose costs are irrecoverable.<sup>7</sup> Second, they impede imitation as well as entry. While their arguments advanced our understanding of mobility barriers, they left open the question of why an aggregation of firms, based on common firm-specific characteristics, should have any group-level effect on performance.

Cool and Schendel (1987) also grapple with group definition. Their recommendation is similar: define groups on the basis of resource and scope commitments. Cool and Schendel (1988) argue that mobility barriers alone are insufficient to explain firm profitability. Firm-level characteristics and market factors must also be considered. They call for a more complex model which incorporates all of these factors. This too is con-

<sup>7</sup> Tang and Thomas (1992) espouse a similar view.

sistent with our approach, but still leaves open the question of what produces a group-level effect.

Hatten and Hatten (1987) have suggested that it is not necessary to identify group-level effects. Rather, the 'strategic group' concept may be employed as an analytical convenience to detect firm-level commonalities and effects, when more detailed data are missing. Without a theoretical understanding of true group-level effects, however, there is a danger of erroneously attributing firm-level effects to a group.

## GROUP-LEVEL EFFECTS

A robust theory of strategic groups must articulate what constitutes a group-level effect and how it differs from firm-level and industry-level effects. This will enable researchers to control for the influence of firms and industries on profitability and thus avoid making incorrect inferences about group influences. Without such a theory, researchers will have difficulty collecting data and employing methodologies that ensure conformity of the data to the appropriate level of analysis.

We argue that group-level effects result from group-level processes. These processes take the form of interactions among group members that alter the orientations, decisions, and actions of the individual members. Group-level effects change the behaviors of members from what they would be in the absence of the group. They are more than a simple aggregation of firm-level effects and are not reducible to either firm-level or industry-level factors.

To see the difference between true and spurious group effects, consider a set of manufacturing firms that are distinguished from other firms in their industry by their reliance on oil for power instead of gas. The common 'strategy' of relying on oil is not a meaningful basis for grouping if oil is procured in a competitive input market. The reason is that the use of oil is merely a firm-level characteristic, and the price of oil is independent of any group-level interactions. Knowledge of the group adds nothing to our understanding of firm profitability, so this fails our definition of a true strategic group. Even so, existing empirical methodologies might unearth this 'strategic group.' To see why, suppose that oil prices increased. These firms would all experi-

ence a reduction in profits. A researcher who observed this common profit movement and used the methodologies commonly employed in strategic group research might classify this set of firms as a strategic group. In fact, the firms that use oil are a spurious group.

True group-level effects result from group-level processes. Continuing our example, suppose that these firms use enough oil so that if they were to bargain as a group they could obtain a better price. In this case, the nature of their strategic interactions (i.e., the effectiveness of their group bargaining) would affect performance. They would constitute a true group.

### Types of group-level effects

True group-level effects may take several forms including market power, efficiency, and differentiation effects. Some effects are mainly static; others are dynamic. While it is most often claimed that group actions may enhance profitability, they may sometimes erode profits.

The market power effects of groups have been extensively studied by economists. For group-level market power effects to occur, managers of member firms must recognize their mutual interdependence—that each member's actions affect the outcomes of other members. As a result, they take into account the activities of other firms to improve their own results. This mutual modeling and its resulting coordinated interactions at the group level produce market power effects on profitability. The clearest example of this is the case of explicit collusion within a group to raise prices or restrict output (Scherer and Ross, 1990).

Effective collusion need not be explicit. A number of implicit coordinating mechanisms may also raise profits. Examples include pricing rules of thumb, price posting, and price leadership by a dominant firm. The key to each of these mechanisms is that firms base their own decisions and actions on their observations of others in the group. There are numerous models of noncooperative strategic interactions.<sup>8</sup> In the basic Cournot model, for example, firms take into account their expectations of rivals' output decisions, but act

<sup>8</sup> The single-period Bertrand model with undifferentiated products is the exception to the rule that profits increase.

independently. Profits increase, in this model, as the number of firms declines.

In general, the supranormal profits predicted by these models result from the coordination that *naturally* occurs as a byproduct of firms taking the expected reactions of others into account. How close a group comes to jointly maximizing profits typically depends on cognitive and behavioral factors, such as managerial expectations regarding other firms' conduct. These, in turn, are influenced by more tangible factors, such as the size of the group and its behavioral history. Small groups with a history of effective coordination, even if noncooperative and unintended, typically realize higher firm profits.

Efficiency effects are a second type of group-level effect. A strategic alliance among group members to pool production, reap shared economies of scale in manufacturing, and eliminate excess outdated capacity would be an example of a static efficiency effect due to interactions among group members. An agreement to allow plant visitations and to share best practices within a group is another example of how group interactions can enhance the productive efficiency of member firms. While such interactions can take place across many types of groups, including those spanning industries (Bresser and Harl, 1986; Astley and Fombrun, 1983), they can also take place at the level of a strategic group.

Dynamic efficiency effects may also result from group-level processes. Increased levels of interaction within a group may intensify competitive activity, which may induce greater numbers of new product introductions, higher-quality products, and faster competitive response (Young, Smith, and Grimm, 1996). By competing more fiercely with others in the group, group members may become more nimble and responsive competitors relative to firms outside the group. An example of dynamic efficiency effects due to group interactions involves cooperative agreements among group members to develop basic technologies (Teece, 1994). By jointly supporting the development of new technologies, a group of firms can make technological advances that would be otherwise difficult for an individual firm to accomplish. Such joint investments often augment the capabilities of group members relative to those outside the group and yield dynamic efficiency gains by increasing the rate of technological advancement within the group (Gibson

and Rogers, 1994; Browning, Beyer, and Shetler, 1995).

A third type of group-level effect on profitability occurs through the effect of group interactions on differentiation. One example of this is when group members engage in jointly sponsored advertising or congruent advertising that generates synergistic increases in product demand. In addition, firms may interact to create reputational capital. For example, the professional interactions of the 'Big Six' accounting firms, and the resulting reputational gains, help to differentiate them from smaller competitors.

We use the term *strategic interactions* to denote the entire array of firm behaviors in which there is some form of cooperation or coordination among group members. Strategic interactions can range from the purposive collusion typically at issue in antitrust cases, to noncooperative interactions, to mutual R&D or other cooperative ventures that enhance efficiency, to various types of group level effects on differentiation. They include both static and dynamic effects. They can generate positive and negative effects.<sup>9</sup> We are purposely broad in our definition: as long as an interaction involves the orientation of firm behavior to that of other firms, it is relevant to our arguments.

In summary, profit effects can stem from multiple sources at the industry, group, and firm level. Group-level effects originate in group-level processes, which we call strategic interactions. Strategic interactions among group members can result in market power, efficiency, or differentiation effects. The relative contribution of group-level effects to the explanation of a firm's profits in a given industry context is an empirical matter. Testing for these effects requires that researchers assess the link between group-level characteristics or processes and profitability, while controlling for possible firm-level and industry-level effects.

## AN EMPIRICAL FRAMEWORK FOR IDENTIFYING GROUP-LEVEL EFFECTS

An empirical approach for establishing the existence of strategic groups is to demonstrate that

<sup>9</sup> Negative effects might result from myopic group behavior or herd behavior around what proves to be an unproductive fad (Peteraf and Shanley, 1997).

group-level strategic interactions affect firm performance. This is, essentially, what has been missing from prior work on the performance effects of strategic groups. The NEIO is an empirical branch of economics that attempts to identify how market-level strategic interactions affect firm performance. We borrow from the NEIO to develop an empirical framework for detecting group-level interactions.

We closely follow Bresnahan's (1989) general model of pricing and performance among mutually interdependent firms. We expand on his model by examining interdependent behaviors in both input and output markets and by incorporating strategic interactions that occur within intraindustry groups. We analyze, below, the profit-maximization problem of a firm which competes directly with firms in its strategic group and indirectly with firms in other groups. For simplicity we assume that each of the groups produces a possibly differentiated product, but that within each group each firm's products are homogeneous.

We could permit firm-specific differentiation within groups, so that the price for each group represents the average price. We do not do so for notational convenience. The results are unchanged if we were to allow for differentiation. Note, however, that our final reduced form equations could be written to include parameters reflecting firm-specific differentiation.

Let the demand facing firm  $i$  in group  $G1$  be

$$P_{G1} = D_{G1}(Q_{G1}, P_{G2}, \dots, P_{GN}, \underline{Y}) \quad (1)$$

where  $Q_{G1}$  is the output of group 1;  $P_{G2}$  through  $P_{GN}$  are the prices charged by other groups and individual firms and  $\underline{Y}$  is a vector of demand parameters.

Firm  $i$  sets price according to the familiar supply relationship equating marginal revenue with marginal cost:

$$P_i = \frac{\partial C_i}{\partial Q_i} - \frac{\partial D_{G1}}{\partial Q_i} Q_i \theta_i \quad (2)$$

where  $\theta_i$  indexes the strategic interactions within group 1 that relate to the product market.

Equations analogous to Equations 1 and 2 can be solved for each firm/group other than group 1 to obtain reduced form solutions for their prices:

$$P_{Gj} = P_{Gj}^*(Q_{G1}, \underline{W}, \underline{Y}, \theta_N, \psi_N) \quad (3)$$

where the dependence on  $Q_{G1}$  arises because only groups 2, ...,  $N$  have been solved out,  $\underline{W}$  represents a vector of cost shifters facing the groups, and  $\psi_N$  is a vector of strategic interactions, described below, that relate to factor markets.

Substitution into Equation 1 gives the reduced form residual demand curve facing group  $i$ :

$$P_{G1} = D^R(Q_{G1}, W_N, Y, \theta_N, \psi_N) \quad (4)$$

Let firm  $i$  have production costs equal to

$$C_i = C(Q_i, W_i, Q_i, \psi_i) \quad (5)$$

where  $W_i$  is a firm-specific cost shifter,  $Q_i$  is the output of group 1 and  $\psi_i$  indexes the strategic interactions within group 1 relating to factor procurement. Note that  $Q_i$  and  $\psi_i$  are relevant only if the group engages in strategic interactions that affect at least one input market. We are implicitly assuming that firms in other groups obtain that input in other markets (or else we would need to account for industry-wide strategic interactions in factor markets).

Combining Equations 4 and 5, we can write a supply relationship for firm  $i$ :

$$P_{G1} = \frac{\partial}{\partial Q_i} C(Q_i, W_i, Q_i, \psi_i) - \frac{\partial}{\partial Q_i} D^R(Q_{G1}, \underline{W}, \underline{Y}, \theta_N, \psi_N) \quad (6)$$

Solving Equations 1 and 6 simultaneously for each firm in group 1 yields reduced forms for  $P_{G1}$ ,  $Q_i$ , and  $\pi_i$ :

$$P_{G1} = P_{G1}^*(\underline{W}, \underline{Y}, \theta_N, \psi_N) \quad (7a)$$

$$Q_i = Q_i^*(\underline{W}, \underline{Y}, \theta_N, \psi_N) \quad (7b)$$

$$\pi_i = \pi_i^*(\underline{W}, \underline{Y}, \theta_N, \psi_N) \quad (7c)$$

These equations resemble simple structure/performance equations in that performance measures ( $P_{G1}$ ,  $Q_i$ , and  $\pi_i$ ) are a function of firm and industry-level parameters ( $\underline{W}$ ,  $\underline{Y}$ ), firm-specific sources of vertical differentiation, and group-level conduct parameters ( $\theta_N$ ,  $\psi_N$ ) that capture the nature of the strategic group interactions. Note that each firm's performance may depend on charac-

eristics of other firms and groups. Just as in the standard literature on structure and performance, a first pass at assessing the role of groups might be to parameterize  $\theta$  and  $\psi$  for relevant groups, run least-squares regression on Equations 7a–7c, and examine the coefficients on  $\theta$  and  $\psi$ . Also, as in the standard literature, this approach could be problematic due to unresolved causality and omitted variable bias.<sup>10</sup> We return to these ideas later.

## MORE ON THE FRAMEWORK

This framework captures several essential ingredients for strategic group identification. We summarize these through a series of propositions that, taken together, comprise the fundamentals of a theory of how and when strategic group interactions will affect firm performance. While we specifically discuss profits, our conclusions should apply to many other measures of performance.

*Proposition 1: Strategic groups may affect firm profitability through their effect on product prices or factor prices (or both).*

In factor markets, strategic interaction and coordination among group members can result in monopsony (buyer) power that allows them to purchase inputs at less than competitive factor prices. This resource cost advantage may support profits for group members that exceed the industry average. The mechanism is similar when strategic interactions among group members lead to market power in product markets. Where strategic interactions lead to differentiation effects, such as through an enhanced reputation for the group, group members may capture these benefits through higher prices and profits. In the case of group-level efficiency effects, the effect on profits may be direct if group members' costs are reduced relative to the industry average. Alternatively, increased efficiency/quality can support a price/quality advantage for group members relative to firms outside the group.

*Proposition 2: Strategic groups can affect factor prices or product prices only if the respective markets are imperfectly competitive.*

If a market is perfectly competitive, then strategic interactions among a subset of players cannot affect price. For example, group members may agree to cooperate to raise price in an output market, but the existence of other competitive sellers will doom this strategy to failure. Consumers will purchase from the nongroup firms who will be eager to expand their market shares at slightly reduced prices. Likewise, competitive input purchasers will defeat the efforts of group members to depress input prices. Note that a group might successfully depress input prices in an imperfectly competitive input market and then earn supranormal profits in a competitive output market by virtue of its lower input costs.

Imperfectly competitive markets are also necessary for group-level efficiency effects or differentiation effects to make a lasting difference in prices and profits. Without imperfectly competitive markets, differentiation effects or efficiency effects that distinguish group members from others in the industry would instantly be imitated and competed away.

*Proposition 3: Strategic groups can have a persistent effect on firm profitability relative to the industry average only if mobility barriers limit entry into the group.*

Mobility barriers are important to the maintenance of profitability differentials for two reasons. First, they retard imitation of group-level actions and attributes, thus dampening competitive forces from outside the group. Thus mobility barriers preserve the imperfectly competitive conditions that are necessary for strategic groups to affect prices and profits. Second, mobility barriers serve the role of delineating the boundaries of the group and increasing the stability of the group over time. While the boundaries of a strategic group are likely to be 'fuzzy,' in the sense that most groups are likely to be comprised of core members and a less distinct periphery (Reger and Huff, 1993), boundaries are important in concentrating strategic interactions within the group. Without a strong concentration of group-level interactions, relative to other types of interactions, a strategic group is not likely to have meaningful outcome effects. Similarly, while strategic groups

<sup>10</sup> See Weiss (1989) for a further discussion of these issues.

are by nature dynamic entities (Cascarenhas, 1989; Cool and Schendel, 1987), their effects are likely to be more meaningful if the associations and strategic interactions among core members are built up and maintained over time.

Traditionally, mobility barriers have been thought of in terms of firm-specific sunk investments (such as a reputation for high quality), common to group members (e.g., the group of high-quality producers), that isolate the group and differentiate it from others in the industry (Oster, 1982; McGee and Thomas, 1986).<sup>11</sup> This view is consistent with the NEIO perspective and reminiscent of the notion of entry barriers, from which the concept was first developed (Caves and Porter, 1977). Sunk investments of this sort inhibit entry in two ways. First, they impose a cost asymmetry between potential entrants and group members (Stigler, 1964). Second, they inhibit strategic repositioning and exit from the group by members. Potential entrants know they cannot dislodge group members and may also face a real threat of retaliatory strategic response. This can increase their perceived risk of losing unrecoverable entry costs (Baumol and Willig, 1981). In stable industry environments, firm-specific but common sunk investments can shield a group from competitive forces outside the group over long periods of time, preserving a group's competitive advantage.

In highly dynamic environments, effective mobility barriers are more likely to take the form of a series of temporary barriers that shield the group from imitation by outsiders (D'Aveni, 1994). Again, these barriers are likely to take the form of a set of firm-specific investments that group members have made in common, but not necessarily in conjunction with their counterparts. Although unstable environments may threaten group mobility barriers due to Schumpeterian competition, group members may look to one another for solutions to environmental threats during uncertain and changeable periods (Ashforth and Mael, 1989; Peteraf and Shanley, 1997).

<sup>11</sup> Note that a mobility barrier can also be erected jointly (Porter, 1979), as when a group of firms lobbies together for special treatment by government agencies. In this case, the barrier is a shared asset, and not a set of firm-specific assets, that profile a group of firms. While shared mobility barriers may exist, they are likely to be less widespread than firm-specific investments (of a similar nature) that a group of firms has in common.

Moreover, group members may well react in parallel to environmental changes due to their common resources, strategies, histories, and managerial mindsets (Peteraf and Shanley, 1997). If this is the case, then even as conditions change, group members may continue to make firm-specific investments that are quite similar to the investments made by others in their group. By this means, a series of temporary mobility barriers may consistently impede imitation and entry by firms outside the group, thereby preserving the profit advantage of member firms.

*Proposition 4: Strategic groups can affect the profits of member firms (i.e., groups exist) only if there are strategic interactions among the firms within the group.*

This proposition extends the analogy from the economic analysis of industries that spawned the notion of mobility barriers. At the industry level, entry barriers are necessary, but not sufficient, for sustained profitability effects (Rumelt, 1987). The profitability of firms within an industry protected from entry depends critically on their conduct as well (Bresnahan, 1989). The closer firms come to achieving a cooperative outcome, either explicitly or implicitly, the higher their profits. The same principles may be applied to the group level. The ability of a strategic group to elevate profits above that implied by industry-level or firm-level characteristics depends foremost upon the conduct of group members.

By drawing on the study of industries, we can identify several characteristics of groups that may promote coordinated behavior and therefore elevate the profits of group members:

1. Coordination is more likely to be effective (and profits higher) when groups are highly concentrated (Martin, 1988). This is consistent with expectations of Porter (1979) regarding the relationship of group size and intragroup rivalry.
2. Coordination, in the form of learning effects, is more likely if group members are geographically proximate (Krugman, 1991; Lant and Baum, 1995).
3. Coordination is enhanced and profits elevated, if members produce similar products under similar cost conditions with similar time preferences (Porter, 1979).



4. Coordination is more likely if there are strong and numerous network ties among the group members (Peteraf and Shanley, 1997).
5. Group members may have stronger incentives to coordinate actions if they interact across a number of markets (engage in multimarket competition) (Tirole, 1989).

*Proposition 5: Strategic groups can have a persistent effect on profits if and only if there are mobility barriers limiting entry into the group as well as strategic interactions within the group.*

Neither the conditions of effective mobility barriers nor of strategic interactions is by itself sufficient for the group to have a *lasting* effect on the profitability of member firms. Strategic interactions create profits for group members through market power effects, efficiency effects, or differentiation effects. Mobility barriers are necessary to ensure that the profits generated by strategic interactions are not competed away. They also preserve the structure of the group and give it stability. In this way, mobility barriers facilitate strategic interaction within the group. Together, the two conditions of mobility barriers and strategic interactions are both necessary and sufficient for groups to have a persistent effect on member firm profitability.

This economic interpretation of how strategic group interactions affect profitability is consistent with recent writings on managerial perceptions. Porac, Thomas, and Baden-Fuller (1989) show how mental models facilitate strategic interaction and coordination in the Scottish knitwear industry. Fiengenbaum, Hart, and Schendel (1996) suggest that strategic groups facilitate coordination among group members by providing a reference point. Reger and Huff (1993) find that managers act on the basis of perceived groupings of firms and that such groupings are associated with differences in profitability.

Our model is also consistent with empirical results suggesting that the level of rivalry among group members mediates between the existence of strategic groups and the attainment of higher profitability by members. Cool and Dierickx (1993) report that a decline in profitability in the U.S. pharmaceutical industry may be attributed to increasing intragroup rivalry. Peteraf (1993b)

finds evidence of oligopolistic coordination within strategic groups in the airline industry.

### Dynamic implications

Our framework concerns industries, groups, and firms at a given point in time. Industry environments, however, vary widely and will evolve over time. Competitive conditions which preclude the existence of strategic groups may change such that it becomes possible for groups to form and influence firm profitability. Conversely, groups need not persist for the entirety of a firm's or an industry's lifetime and their effect on firms may be temporary. Mobility barriers may be strengthened through collective action or may dissipate through innovation, market growth, or the development of substitute products. Patterns of member interactions may also change, such that members form stronger attachments outside of the group and the group itself becomes merely an assemblage of firms with few significant interactions.

The time frame over which mobility barriers deter entry is, of course, relative. Over a period of time, the value of incumbents' resources deteriorate and their successful strategies may be imitated. Given sufficient incentives for entry, competitors can eventually develop their own critical resources with which to enter a group. In highly turbulent environments, whether due to innovation or market growth, mobility barriers are likely to be shorter lived.

Strategic group research has often restricted its analysis to stable time periods.<sup>12</sup> In doing so, it has failed to address the possibility that stable conditions may be more conducive to firm-level competitive strategies than to strategies based on interactions with group members (Peteraf and Shanley, 1997). In dynamic and highly competitive environments, the management of firms may find it less desirable to act alone, but instead engage in collective strategies with other group members (Astley and Fombrun, 1983; Bresser and Harl, 1986). Bresser, Dunbar, and Jithendranathan (1994) find evidence of strategic groups during a period of deregulation in the U.S. thrift industry. Peteraf and Shanley (1997) argue that groups are more likely to be important for firm performance during periods of industry instability

<sup>12</sup> Bresser, Dunbar, and Jithendranathan (1994) is an exception to this.

that can stem from lack of legitimacy, innovation, new entry, or deregulation.

That groups may be more likely to be identified in turbulent industry contexts suggests that competition and coordination (whatever the form) are not mutually exclusive. Applications of cooperative game theory to strategy have shown that competition and cooperation can exist simultaneously (Brandenburger and Nalebuff, 1996; Brandenburger and Stuart, 1996). Bresser (1988) has shown that a variety of combinations of collective action and competition are feasible among competitors, depending on the competitive dimensions selected and the vulnerability of firms to the disclosure of proprietary information. Competition does not exclude the importance of entrepreneurship, innovation, imitation, tacit local knowledge, and other factors associated with mobility barriers and strategic interactions. Indeed, such resources are more likely to be developed in response to competitive pressures (Jacobson, 1992). Groupings formed around these factors, however, are unlikely to persist in the absence of mobility barriers.

## IMPLICATIONS FOR EMPIRICAL WORK

Equations 7a–7c form the basis of an empirical study of the profit implications of strategic groups. The basic empirical structure follows that of the structure–conduct–performance (SCP) literature in which the dependent variable is a measure of performance and the right-hand side variables must at a minimum include some correlates of strategic interactions, such as group structure. Just as in the SCP literature, there may be some concern that structure is endogenous to other determinants of profits. In this case, simple least-squares regression may produce biased results and some of the more sophisticated techniques of the NEIO are recommended.

Estimating Equations 7a–7c requires data at the firm, group, and industry levels. Firm-level data are important for controlling for idiosyncratic determinants of profitability (Helfat, 1994; Peteraf, 1993a). Firm-level data are also essential for controlling for profit shocks tied to firm-specific characteristics rather than to group interactions.

It is also essential to control for industry-level

effects, especially when performing interindustry analyses. If changes in the structure of a group occur at the same time as changes in industry profitability, an empirical model that fails to account for the industry effect may falsely attribute it to the strategic group. Industry-level data may include overall demand and supply characteristics, as well as measures of industry structure, such as an industry Herfindahl index.

Identifying group effects requires the researcher to develop measures of strategic group interaction that vary in the data. One approach is to use easily measured structural variables as proxies for conditions that facilitate strategic interactions. There are a number of candidate structural variables, including group structure, group history, and the strategies of the corporate parents of groups members. Group structure may be measured by a Herfindahl or a similar variable. Group history may be measured by examining group stability at different points over time (Cool and Schendel, 1987). Corporate parent strategies can be assessed with such variables as board interlocks with other group members or the extent of overlapping markets.

A second approach is to utilize more behaviorally oriented variables that capture the patterns of interactions within a group. The extent of strategic interactions, for example, may be inferred from a network analysis that measures the extent and intensity of the linkages in a strategic group (Nohria and Eccles, 1992).

However groups are identified, the analysis will be greatly enhanced if there is substantial variation in the measures of strategic interaction. This can be attained using intraindustry studies where there are geographically distinct local markets. For example, parochial schools may constitute a strategic group found in many local markets for elementary education. One can take advantage of natural variation in the number of such schools in each community to develop a Herfindahl measure that varies by community. The airline industry, the trucking industry, the daycare industry, and the hospital industry are further examples of industries with multiple local geographic markets that lend themselves readily to cross-sectional study.

One might also take advantage of longitudinal variation in group structure (Cool and Schendel, 1987). For example, one might identify a strategic group in the consumer electronics industry on the

basis of R&D costs. Its members and size are likely to vary to some degree over time. To capture this, one might construct an intragroup Herfindahl (or some other proxy measure of group interaction) that varies over time. If the group is meaningful, then group profits in the time series should vary with the measures of strategic interaction.

Intraindustry studies of strategic groups are preferred to interindustry studies. Interindustry analyses have proven problematic (Schmalensee, 1989). The researcher often lacks necessary institutional knowledge about the many industries being examined, so that he or she may erroneously attribute industry-specific effects to some more general phenomenon. A lesson from the NEIO is that structural variables often contain unmeasured information about costs and demand, and thus may cause spurious correlations in simple reduced form estimates of the effect of structure on prices, quantities, or profits. While intraindustry studies are not immune from this criticism, the danger is much lower than in interindustry studies.<sup>13</sup> NEIO research, while employing abstract models such as presented above, has stressed the empirical applications of these models in specific industry contexts that require the use of institutional knowledge.

Because group-level profitability effects result from strategic interactions among group members, our empirical model emphasizes the link between conduct and performance. The role played by mobility barriers in our model is a supporting one. On the one hand, mobility barriers, whether stable or serial, temporal barriers, affect the persistence of profit differentials. On the other hand, by supporting the stability of the group and helping to delineate its boundaries, they foster strategic interactions among members, thus indirectly affecting profitability. Measuring mobility barriers has proven a considerable challenge to researchers (Wiggins and Ruefli, 1995). To the extent that they can be measured, we recommend that they be entered interactively with other parameters, such as group size, that proxy for strategic inter-

action.<sup>14</sup> This should improve the predictive power of the regression.

There are a number of possible ways to measure mobility barriers, and the selection of appropriate measures will vary by industry. Groups in technology-driven industries, for example, may be protected by patent lags, cumulative R&D investments, and installed base. Groups in brand-driven industries, on the other hand, may be protected by cumulative marketing expenditures, access to channels, and trademarks. Groups in regulated industries may be protected differentially, as the national carriers were in the regulated airlines industry, relative to the regionals, the charters, and the commuters. Barriers should be measured contingent on the size of the market and the degree to which a given mobility barrier 'depreciates.'

Mobility barriers need not be long-lasting to provide a basis for groups. Their value will almost certainly depreciate over time, as technology develops, market dynamics change, and competitors imitate successful strategies. This implies that strategic groups may be more or less identifiable at different times and that the advantages afforded by groups will be temporary. Empirical work on strategic groups will need to provide temporal control variables to distinguish among periods during which groups may or may not be present.

### The problem of multiple groups

Our framework focuses on one type of group that may exist among firms—a horizontal intraindustry group. This has been the traditional focus in strategic groups research. In developing the framework, we have also assumed a rather simple group structure within an industry (provided that there are groups), in that firms are either members of a given group or not. In actuality, the situation may be more complicated. Firms often form persistent relationships with other firms outside of their strategic group and even outside of their industries. Firms may be members of multiple partially overlapping groups. Moreover, firms may be members of groups that span industry boundaries.

The principle that we have developed in this

<sup>13</sup> Sutton (1991) provides an excellent counterexample. Sutton relied on extensive knowledge about various food and beverage products to analyze strategic issues associated with sunk costs and market structure.

<sup>14</sup> Of course, if one logs the performance measure, the two types of predictors can be entered additively.

paper, that group-level effects can only come from strategic interactions, is applicable to all kinds of groups. Testing for group effects, other than those attributable to strategic groups will be more complicated and the researcher will need to craft his or her hypotheses carefully. In situations where horizontal groups may be subsets of other groups, nested tests for effects could be performed. In situations in which horizontal groups may overlap incompletely, tests for the existence of each type of group might be needed to avoid specification errors. For groups that span industry boundaries, such as vertical groups, our model is inappropriate. Nevertheless, our model can serve as a basic template for developing broader empirical testing models that are concerned with distinguishing any type of true group effect on firm profitability from spurious effects.

## IS THERE ANY EVIDENCE THAT STRATEGIC GROUPS EXIST?

Our model provides the means for distinguishing true group-level effects from spurious effects, and thereby creating a body of evidence about whether strategic groups exist in any given setting or time period. Specifically, researchers must look for an association between strategic interactions within groups and performance, controlling for firm-level, industry-level, and other exogenous effects. Researchers can be aided in their *a priori* identification of putative groups by utilizing deep institutional knowledge to search for mobility barriers that can help to delineate group boundaries during a given time period. By incorporating both mobility barriers and strategic interactions into an empirical model of performance effects, they can improve the power of their results. We have presented a theoretically sound empirical testing model based on recent empirical work in the NEIO to guide researchers in their efforts.

Since many studies of the performance effects of strategic groups have been done, it is instructive to determine whether any have employed methods consistent with our recommendations and to review these results. If prior studies have found a significant and economically meaningful (McCloskey, 1983) association between true group-level variables and firm performance, then they provide ready evidence that strategic groups indeed exist. If the evidence from such studies is

mixed, this would suggest that strategic groups exist, but only in certain settings or under certain conditions. This would be in line with our expectations of the results of studies utilizing different time periods, industries, and methods for identifying putative groups. If the evidence from all such studies is negative, but scant, this would cast doubt on the existence of strategic groups, but suggest that researchers examine wider time periods and more varied setting for further evidence. If no studies, out of the vast strategic groups literature, have employed methods consistent with our recommendations, then this would tell us that we, as of yet, have no reliable evidence on the existence of groups. In this case, the jury is still out.

For most of the studies that find significant performance effects for strategic groups, it is difficult to exclude firm-level explanations of the results. Out of the entire set of empirical studies of strategic groups, we find only a few that come near to employing an approach suitable for finding group-level effects, distinct from other types of performance effects. Porter's (1979) interindustry study classifies firms into two strategic groups based on size. To the extent that there are economies of scale in the industries that he studied, and that fringe firms cannot easily obtain the resources and distribution channels necessary to achieve those economies, mobility barriers may delineate these groups. In his analysis of firm performance, Porter finds that a variable measuring the number of firms in the 'big firm' group is associated with profits in that group, which seems to suggest that 'big firm' groups exist. This is an encouraging result, although it is weakened by the interindustry context, the limited nature of the group-level variable and the lack of adequate firm-level and industry-level controls.

Tremblay's (1985) study of the beer industry also comes close to meeting our criteria for the existence of strategic groups. He divides brewers into strategic groups based on location. There is a national group, and distinct regional groups. If firms use different distribution and marketing channels, then it is possible that mobility barriers protect firms in each group from incursions, since economies of scale in distribution and brand name development may limit the ability of new firms to compete with incumbents. Tremblay also finds that relative firm size within groups and advertis-

ing intensity within groups are significant determinants of firm profits. Unfortunately, the theoretical basis for his size measures is vague, making it unclear whether they are good proxies for group structure and interaction. If they are nothing more than firm-level variables, which may well be the case, then Tremblay's results provide no evidence regarding group-level effects.

Cool and Dierckx's (1993) analysis of the U.S. pharmaceutical industry indicates that profitability is negatively affected by both within-group and between-group rivalry, as measured by Herfindahl-like indices from which the squared share of the focal firm is subtracted. They report that, over time, the impact on firm profitability changes as the patterns of rivalry shift. This study is highly supportive of our assertion that group-level effects depend critically on conduct measures and may be positive or negative.

Peteraf (1993b) finds that the pricing response of a monopolist airline to potential entry is most aggressive when the potential entrants are not from the monopolist's strategic group. This is suggestive of collusive strategic interaction among group members and is consistent with a positive profitability effect of such interaction.

Reger and Huff (1993) report significant profitability and survival differences over a 5-year period for cognitive groups in the banking industry. Since the perception of intraindustry groups by managers is suggestive of the recognition of mutual interdependence among group members, these results are encouraging regarding the existence of strategic groups.

While this review of prior work makes it clear that no study has yet been done that is entirely consistent with the approach that we advocate, the results to date clearly indicate that a theoretically grounded search for true group-level effects is warranted and may well bear fruit. On the basis of admittedly limited evidence, strategic groups appear to affect profitability when they are the product of strategic interactions among the member firms.

If, contrary to our expectations, researchers find that group-level characteristics and strategic interactions do not influence performance, then this will demonstrate that, by our definition, strategic groups do not exist. What would that imply about future directions for strategic groups research? Over a decade ago, Hatten and Hatten (1987) suggested that the concept of strategic

groups may be nothing more than an analytical convenience—a way to summarize and examine firm-level data efficiently. This line of thinking has had a significant impact on strategic groups research. Indeed, a number of studies of strategic groups and performance have been done which make no pretense of looking for group-level effects; they are concerned only with measuring firm-level effects. If strategic groups prove not to exist, is it to this type of work that our attentions should turn?

### **The potential harm done by grouping**

Grouping firms on the basis of shared firm-level factors associated with profitability does not provide a ready substitute for firm-level analysis. It may actually sacrifice information and introduce noise into the analysis. To see why, suppose that we study a market in which there are economies of scope, but where limited market size prevents all firms from achieving the same degree of diversification. Thus, there may plausibly be a causal relationship between the degree of firm diversification and firm profitability. Consider the simplest possible relationship between the two—i.e., that the true model relating diversification to profits is linear, and is best estimated by simple linear regression. Under these conditions, if we ran a firm-level regression in which the dependent variable was profits and the key predictor variable was a continuous measure of the degree of diversification, we would obtain a significant positive coefficient.

Suppose that instead of estimating the true model, we replaced the measure of the degree of diversification with an indicator variable that distinguishes between general levels of diversification, such as 'highly diversified' and 'less diversified' firms. This is analogous to using ANOVA to identify two strategic groups on the basis of diversification. The indicator variable will be correlated with the continuous measure of diversification, and so this new regression is essentially an instrumental variable estimate of the true model. We would not be surprised to find that the coefficient on the indicator variable is significantly different from zero. Strategic groups researchers might conclude that highly diversified firms form a meaningful strategic group, and that we have gained information by conducting a group-level analysis.

In fact, in the case of strategic interaction, information to be gained by grouping in this situation. Diversification as a corporate activity affects profits at the firm level, not the group level (Nayyar, 1989). Moreover, there is the strong potential to lose information by grouping. The indicator variable that forms the basis of the groupings is a noisy measure of the true degree of diversification, so the coefficient from which we derive the estimated effect of diversification using the new regression will be biased towards zero (Greene, 1993).

This example is oversimplified, since we posit a single variable driving firm performance. In many cases, there could plausibly be several highly correlated variables driving performance. In such a situation, the researcher may wish to perform a factor analysis or similar analysis to reduce the number of independent variables needed to analyze profitability. But this decision necessarily trades off bias (the factors represent noisy measures of the underlying determinants of profits) and precision (multicorrelation of the unfactored variables inflates standard errors).

The above issues suggest that the decision to 'group' or not should be based only in part on statistical and data analysis issues. If the decision is based only on statistical issues, the researcher is not likely to be able to identify either groups that are more than simple aggregations of independent firms or meaningful group-level effects on firm profitability. While the statistical issues attendant to a given specification certainly need to be considered, the theoretical and logical basis for a model of strategic groups is more important. Attention to statistical detail will not permit the identification of meaningful groups and group effects if the model employed does not speak to mobility barriers and strategic interactions among members.

## SUMMARY AND DIRECTIONS FOR FUTURE RESEARCH

We have rooted our framework in the 'new economics of industrial organization' (NEIO) that emphasizes careful modeling of the relationship between structure, conduct, and performance (Bresnahan, 1989). Our framework accommodates behavioral as well as economic factors. It distinguishes the effects of mobility barriers from

the effects of strategic interaction. It defines mobility barriers, in terms of both function and the properties upon which its functioning depends. It ties the nature of strategic interactions to the structural and behavioral properties of groups. It delineates the necessary and sufficient conditions for there to be a persistent effect of strategic groups on profits. It distinguishes group-level effects on profits from firm-level effects and industry-level effects, including supply and demand shocks. Finally, and most importantly, it provides a methodology for distinguishing true group-level effects from spurious group level effects, grounded in a well-specified theory. Thus it gives us the means for determining whether strategic groups really exist.

Should credible evidence of true group-level effects at the intraindustry level surface, this would warrant an analogous investigation into broader types of group-level effects, such as those spanning industries and geographies. Should the evidence cast serious doubt on the existence or economic significance of strategic groups (McCloskey, 1983), then we argue that the study of strategic groups and performance should be abandoned. As we have illustrated, the use of strategic grouping as an analytical convenience for the purpose of studying firm-level effects is far from benign.

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