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ECOLOGICAL INVESTIGATION OF FIRM EFFECTS IN HORIZONTAL MERGERS

MICHAEL LUBATKIN[1]*, WILLIAM S. SCHULZE[2], AVINASH MAINKAR[3] and RONALD W. COTTERILL[4]
[1]*School of Business Administration, University of Connecticut, Storrs, Connecticut, U.S.A. and EM Lyon, Lyon, France*
[2]*Weatherhead School of Business, Case Western Reserve University, Cleveland, Ohio, U.S.A.*
[3]*College of Business, James Madison University, Harrisonburg, Virginia, U.S.A.*
[4]*College of Agriculture and Natural Resources, University of Connecticut, Storrs, Connecticut, U.S.A.*

Using an ecological lens, we extend strategic management and industrial organization theory to investigate the performance effects of horizontal mergers. We theorize that firms differ in their ability to benefit from horizontal mergers; that the products involved in the merger differ in their ability to attain and sustain any increase in performance above their premerger level; and that resource niches in which each product competes differ in terms of competitive constraints. We then test these predictions using longitudinal data specified at the product–market level, a unit of analysis that is less influenced by aggregation bias than are industry, firm, and even line-of-business level data. Our findings demonstrate how organizational ecology, when coupled with strategic management and industrial organization economic theories, can enrich our understanding of horizontal mergers.

Do firm effects matter? Can some firms, by virtue of their strategy and other organizational attributes, buffer their returns from the dynamic constraints of competition, and thereby sustain a level of earnings that exceeds the market-expected rate? Or is this level of 'extra-market' return a short-lived anomaly, destined to be eroded by the forces that return all industries to their competitive state? Can firms maintain their competitive advantage by continuously adapting to shifts in the forces that govern their markets, or are such efforts wasted because the competitive landscape changes faster than organizations can adapt? These questions lie at the heart of a long-standing debate that continues within and across three fields of inquiry: strategy (McGahan and Porter, 1997; Rumelt, 1991), industrial organization economics (IO) (Schmalensee, 1989), and organizational ecology (OE) (Barnett and Freeman, 1997).

The debate has endured in part because the three field's (strategy, IO, and OE) theories, concepts, and measures are calibrated using different units of analyses (firm, industry, and population). We bridge these differences by using an ecological lens to model the performance effects of horizontal mergers at the product–market (resource niche) level. Our core thesis is that firm effects matter: some of the products involved in a horizontal merger will attain and sustain an increase in performance from their premerger level in excess of that explained by industry and population-level effects. Our study identifies three

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*Correspondence to: Michael Lubatkin, School of Business Administration, University of Connecticut, 2100 Hillside Road, U-41MG, Storrs, CT 06269-1041, U.S.A.

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conditions under which the merged products are more likely to earn these postmerger extramarket returns. These findings inform the strategy literature by suggesting specific sources of performance gains in horizontal mergers. Further, our postmerger analysis of industry effects supports the current position of the Federal Trade Commission, whose Chairperson (Pitofsky, 2000) announced that the agency's previous consent decrees understated the effects of horizontal mergers on competition by only considering premerger industry conditions.

Using line-of-product data allows us to construct product–market measures of extramarket returns, and firm, industry, and population effects that are less influenced by aggregation bias than industry or even line-of-business data (Rumelt, 1991; Scherer and Ross, 1990; Schmalensee, 1989). Data are drawn from three large horizontal mergers in the food-manufacturing industry: Nestlé and Carnation, RJR and Nabisco, and General Foods and Kraft, each of which brought together, or 'merged,' about 100 branded-food product lines. Standard statistical methods in all three empirical merger case studies were used, allowing us to apply a positivist research design to one of the field of strategy's originating foci, 'the study of the singular, unique competing firm in a changing environment' (Hatten, 1979: 454). We find that firm effects add significant explanatory power to a model of extramarket returns.

THE CASE FOR AN INTEGRATION OF THEORIES

Strategy was founded on the assumption that firms' rent-seeking options go beyond those determined by the structure of the markets in which they compete. Strategists are therefore centrally concerned with firm-specific business capabilities, maintaining that the firm (and, by extension, the product–markets in which the firm competes) is the appropriate level of analysis. Thus, strategists have paid less theoretical attention to industry- and population-level effects, and generally do not focus on them in empirical studies.

In contrast, IO was originally based on 'structural' models of competition in imperfectly competitive markets. Before 1980, IO viewed competition through a deterministic and relatively static industry-level lens that attributed rents to anticompetitive practices and/or to flaws in the organization (structure) of an industry or product–market. Since the early 1980s, however, IO economists have tested models of industry performance that examine how different types of interactions among firms influence market efficiency and the persistence of product rents. Both types of models generally define industry at the product level and focus on consumer prices; however, the later models tend to be more dynamic and allow for the possibility that firm effects can have an enduring impact on firm performance beyond that which can be explained by market structure alone (e.g., Baker and Bresnahan, 1985; Chirinko and Fazzari, 1994; Cotterill and Haller, 1997; Hausman, Leonard, and Zona, 1994; Jacquemin, 1990; Kwoka and Ravenscraft, 1986; Schmalensee, 1985, 1989; Shapiro, 1989).

OE's views about competition have also changed. Before the mid-1980s, OE primarily focused on resource competition within populations of organizations (which Haveman, 1992, defined as a group of firms that share common attributes like the clients they serve, the goods and services they produce, and the technology they employ), and on the variation in survival rates within those populations over time (Hannan and Freeman, 1977). OE tended to ignore firm effects, since one of its founding assumptions is that organizational inertia makes it virtually impossible for a firm to effectively adapt to environmental change. Ecologists thus presumed that successful organizational adaptation was not generally the outcome of a rationally planned and carefully administered strategy, but rather the occasional product of happenstance.

By the late 1980s, however, ecologists began to challenge the implicit assumption that 'each organization in a population influences and is influenced by competition equally' (Baum, 1996: 85). For example, Barnett and Amburgey's (1990) 'mass dependence' model posited that large firms have a disproportionate influence on resource competition, while Baum and Mezias (1992) showed that location, size, and pricing strategy also influence the intensity of competition. Baum and Singh (1994) hypothesized that the intensity of competition between firms is proportional to the extent that the targeted resource niches overlap. A common presumption is that at least some of the variance in the dynamics of competition to firm-level differences is due to strategy and

other organization attributes. Like IO, therefore, the level of analysis in ecological theory has shifted closer to that of the firm.

This shift from a focus on the dynamics of competition at the population level of analysis to the influence of organization-level attributes upon those dynamics in different industry segments (or resource niches) is evident in Barnett and Freeman's (1997) investigation of multifaceted transformation, in which the simultaneous introduction of multiple products creates a kind of punctuated change that gives an organization little recourse but to alter its core attributes in order to accommodate new business imperatives. Although multifaceted transformations can overcome inertial forces, thus compelling the organization to change strategies, reallocate resources, modify administrative routines, and redefine certain job responsibilities, the authors caution that the broad scope of the change and abrupt manner in which products are introduced will initially engender unanticipated coordination problems and organizational resistance, and may lead to failure. However, these problems may dissipate with experience as the organization learns and adjusts to its new form and circumstances (Amburgey, Kelly, and Barnett, 1993). Consequently, implicit in Barnett and Freeman's (1997: 8) prediction that 'the increase in failure rate falls away as time passes after the change' is the suggestion that OE's domain can be extended to a more micro level of analysis (i.e., concepts originally developed for population-level phenomena, such as the 'liability of newness,' are also applicable at the product–market level).

Whereas IO and OE have previously pursued largely nonintersecting streams of research about the firm and its competitive environment, the recent shift in focus by IO economists and ecologists to a more micro level of analysis suggests the removal of barriers that heretofore separated these two fields from each other and from strategy, thus making it possible to integrate these theories, methods, and measures. For example, while these three fields conceptualize performance differently, their concepts converge when performance is defined at the product–market level, where IO views performance in terms of variance from some market-expected level, or rent, and strategists view it relative to some market-wide baseline, using such measures as industry-adjusted returns and growth. IO bases its view on concepts of market power and price discrimination, while strategy bases its view on concepts of sustainable competitive advantage and differentiation. Nevertheless, these concepts represent a very similar outcome: the ability of a firm to sustain an increase in the price of its products above the competitive level and/or decrease its input costs below that level.

In contrast, OE generally does not define performance in terms of returns and rents,[1] but as the growth and survival of a type of firm, where the number of organizations and/or their size indicates the market acceptance (legitimacy) of the organization at any given point in time. Accordingly, the greater the acceptance, the greater the organization's ability to compete for scarce resources and to survive. OE's performance concepts are thus compatible with those of IO and strategy: firms whose products have a high level of market acceptance should be more able to compete for limited resources, and thus should show higher levels of growth, profitability, and survival than their less legitimate counterparts (Barnett and Freeman, 1997).

OE and IO views about the intensity of competition are also complementary at the product–market level of analysis. Ecologists measure competitive intensity in terms of density, or the number of businesses competing in a product–market (resource niche), and define this density measure to proxy for the degree to which the carrying capacity of the product–market niche is filled. In contrast, IO economists use an industry's concentration, or the percentage of the industry's product shares that is controlled by its largest inhabitants, to measure competitive intensity. Although IO does not refer to a product–-market such as cream cheese as a 'resource niche' within the cheese segment of the processed food industry, that is exactly what it is. And to the extent that density and concentration capture different aspects of the competitive process—and there is evidence that

[1] Haveman (1993, 1994) for example, argues that ecological models need to account for firm-specific performance for two reasons: (1) to keep the causes of organizational change distinct from effects of change, for otherwise the cause/effect logic of an OE model may blur (e.g., some observed organizational changes may be symptoms of decline rather than the causes of failure), and (2) to prevent the possibility that any observed link between change and failure is spurious, in that both might be caused by the same firm-specific performance effects.

they do[2]—then both measures can be used to better specify the competitive forces that operate in each product–market or resource niche (Boone and van Wittleoostujin, 1995). Using these and other links between the three fields, we ground our study's hypotheses and construct its measures and methods.

HYPOTHESES

Firm effects

We address the question of whether firm effects matter (i.e., can a firm attain and then sustain extramarket performance, or returns in excess of those that are explained by industry and population-level effects?) by focusing an OE investigative lens on resource niches within a single population (e.g., Delacroix and Swaminathan, 1991). After defining firm performance in terms of the returns that a firm earns in each of the many product–markets (resource niches) in which it competes, we draw on theories from OE, strategy, and IO to enrich our current understanding about the performance effects of horizontal mergers.

First, horizontal mergers seem to fit Barnett and Freeman's (1997) theory of multifaceted transformation and manageable inertia (i.e., they are undeniably disruptive events that abruptly bring together firms and their respective sets of products and organizational attributes). The simultaneous introduction of multiple products causes a sudden 'jump' to a new environmental alignment, leaving the merged firm little recourse but to change product strategies, reallocate resources, and modify administrative routines in an effort to stabilize the newly formed organization. Put differently, the merged firm might eventually overcome its inertial constraints in a manner that enhances its prospects for survival. For example, we infer from OE that horizontally merging firms may also benefit from increased size and access to new resource niches, as well as reducing the overlap among products targeted at particular resource niches, and hence the intensity of competition. Finally, a horizontal merger may allow firms to increase their power and prospects for survival by shifting their reliance in selected product–markets from fewer to more legitimate (established) products and brands.

Second, strategy's 'relatedness hypothesis' complements the OE view by also suggesting that horizontal mergers should improve firm performance. This hypothesis, which originated with Rumelt's (1974) extension of work by Penrose (1959), is grounded on three assumptions: (1) that asymmetries exist in the distribution of power in input and output markets (Porter, 1980); (2) that asymmetries also exist in the market for resources because resources are lumpy, heterogeneous, and cannot be costlessly acquired (Barney, 1991); and (3) that the optimal way for a firm to leverage those asymmetric advantages is to seek growth in related product–markets (Porter, 1985). Lubatkin (1983) extended the relatedness hypothesis to mergers by claiming that firms that acquire 'eggs' from similar 'baskets' (so that their assets can be efficiently shared) and from similar baskets of knowledge (so that their knowledge can be effectively transferred) will generally outperform those firms that acquire unrelated baskets of assets and knowledge.[3] Similarly, Capron (1999) associated horizontal mergers with cost-based synergies (by exploiting economies of scale and scope), and revenue-enhancement synergies (by mobilizing core competencies). According to Lubatkin and Chatterjee (1994), relatedness

[2] While it is reasonable to conclude that concentration and density should have opposite effects on competition, and therefore on rent (high density increases competition and lowers rent, while high concentration decreases competition and increases rent), this may not be the case. For example, Boeker's (1991) study of organizational strategies in the brewing industry found the two constructs to be inversely correlated, but only moderately so ($r = -0.25$). A variety of propositions have been advanced to explain why the correlations are only moderate. Some are derived from theory about industry substructures (e.g., Carroll's, 1985, 'resource partitioning' model and Barnett and Amburgey's, 1990, 'mass-dependence' model), while others concern measurement. Boone and van Witteloostujin (1995) posit that density measures neglect an important aspect of the size distribution of firms that is captured by concentration; concentration measures, by focusing on the share of the largest inhabitants, emphasize the properties of only one tail of the size distribution. For example, the competitive pressures of an industry dominated by a few large rivals (i.e., concentrated), but including also a large number of lesser rivals (i.e., dense) may be quite different from those of a concentrated industry where all the lesser rivals have already exited due to 'market shakeout.'

[3] While empirical tests of both the relatedness and merger relatedness hypotheses differ by samples, measures, methods, and time frames, results generally, but not always, support the hypotheses (Lubatkin, Srinivasan, and Merchant, 1997; Seth, 1990).

allows some firms to push some of the burden of dynamic market uncertainties onto their less-related rivals.

Finally, the ability of a horizontal merger to change a market's structure by the acquisition of a competitor—and, in so doing, raise price—has been at the core of IO research and antitrust law for almost a century (see Barton and Sherman, 1984, for a good review). However, more recent models look beyond this market power explanation to consider other features that might allow firms to offset market forces. While IO has yet to fully address these features (Cotterill, 1993b, 1996), the fact that it, along with OE and strategy, recognizes that firm effects underlie at least some of the benefits of horizontal mergers lends support to our first hypothesis about the extramarket performance associated with each horizontally merged product. We define 'extramarket performance' as the return to a horizontally merged product after controlling for industry- and population-level effects.

Hypothesis 1: The products involved in a horizontal merger will attain and sustain an increase in extramarket performance over pre-merger levels.

Hypothesis 1 forces us to ask, 'Are all horizontal mergers related?' At first glance, this question may appear odd to strategy scholars because to them the term 'horizontal' implies a high level of relatedness between firms. For example, General Foods' 1988 acquisition of Kraft is horizontal because it brought together two branded food-manufacturing giants that sell roughly the same products in roughly the same geographic markets. While OE scholars have used similar dimensions to classify organization strategies at the firm level (Boeker, 1991; Kelly and Amburgey, 1991), a product–market level focus may cause them to classify this merger differently. They might note that this merger brought together, or 'merged,' about 155 branded food products, of which only 28 shared the same (horizontal) or similar (related) resource spaces. That is, the two firms may each have had their own lines of cheeses, some of which may have competed directly (e.g., each had a line of cottage cheese) and some indirectly (e.g., only one firm had a line of cream cheese). In ecological terms, merging the two branded lines of cheese represented a 'specialist' adaptation, in that the mix of these products effectively increased the merged firm's focus on various resource niches within the family of related cheese product–markets.

Ecologists may also note that the majority of the related food product lines involved in that merger brought together products like canned baby foods and potato chips that had no equivalent at the other firms (i.e., they occupied non-overlapping resource spaces), thus broadening the merged firm's reach and reducing its dependence on sales to any particular resource niche. Consequently, the General Foods/Kraft merger led to a 'generalist' adaptation in five times as many instances as it did to a specialist adaptation.

This product-level distinction in adaptive strategies and OE's theory about the evolution of competition indicates that the performance benefits from horizontal mergers will not be equally distributed among all food-related merged products. For example, Carroll's (1985) resource-partitioning theory suggests that specialization is more able to compete for scarce resources in concentrated markets. He attributes the benefits of specialization to the relative amount of resources available to firms that compete in those product–markets and to the specialist's ability to defend those rents. Swaminathan (1998) and Capron (1999) extend Carroll's point by suggesting that specialists should be better able to defend their products' performance from competition because they possess business capabilities that are tailored to the specific needs of the market segments in which they compete. The defensive value of specialization grows when markets become more concentrated, because intense competition encourages established firms to 'concentrate on adapting and strengthening what they already know how to do, rather than diversify into market segments that require different capabilities and knowledge' (Mitchell, 1998: 409). Further, OE's fitness-set theory predicts that in stable, fine-grained environments (like the food-manufacturing industry), where many small fluctuations exist in supply and demand, specialization is always preferred regardless of the level of uncertainty (Baum, 1996).

This is not to say that there are no benefits to relating products in a generalist manner. For example, some of these products like cereals and snack foods might share resources like brand management and generic processes like packag-

ing. They might also help to extend bargaining power (e.g., to obtain better shelf space). However, these benefits should be at least as available for specialist-related food products, because specialist-related products occupy overlapping resource spaces, and thus share more attributes in terms of how they are produced, packaged, distributed, and promoted. Finally, brand extensions are more difficult among generalist-related products, because consumers perceive differences in their product class complementarities (Aaker and Keller, 1990). Simply put, consumers will likely be receptive to extension of the Kraft brand name to a cheese line of snack food than they would if Gerber were to extend its name to snack foods. Thus, generalist-related products should have less opportunity to reap the benefits of market power, cost reduction, and revenue enhancement that Capron and other strategists associate with their 'relatedness' hypothesis. Restating Hypothesis 1 to reflect OE's more precise niche unit of analysis:

Hypothesis 1a: Specialist-related products will attain and *sustain a larger increase in extramarket performance over premerger levels than will generalist-related products.*

A second corollary hypothesis follows regarding market share. Since the PIMS studies of the early 1980s, strategists have argued that high share is associated with cost-based and revenue-enhancing synergies and market power. For example, high share enables the firm to reduce its per-unit cost of differentiation and R&D, thereby enhancing customer loyalty (Porter, 1985: 120).

High share also figures prominently in IO predictions about the monopoly effects of horizontal mergers, which is evident both in past versions of the Federal Merger Guidelines (U.S. Department of Justice, 1992) and in the current version that uses the HHI measure to capture it (i.e., the sum of the squared market share held by each firm in an industry). Specifically, horizontal merger enhances the ability of firms whose products command high shares to exploit market imperfections (Deneckere and Davidson, 1995; Ravenscraft, 1983; Salop and Scheffman, 1983). For example, Cotterill and Haller (1997) document that breakfast cereal manufacturers reduced the cross-price elasticity of demand for their high-share products, thereby significantly enhancing their revenues, by introducing closely related products in resource niches that are adjacent to or overlap the market segments they dominate.

Finally, ecologists assert that stakeholders view organization size as the product of prior success, thus serving to enhance legitimacy and firm survival (Hannan and Freeman, 1984). Boone and van Witteloostujin (1995) point out that legitimization processes that occur at the product–market level spill over and enhance those at the industry level (i.e., firms gain legitimacy indirectly as they grow, and directly as their products gain reputation and share).

In summary, high-share products are more legitimate than low-share products and, consequently, should better capitalize on the changes in market structure that accompany a horizontal merger. However, the theory of contestable market school (Baumol, Panzar, and Willig, 1982), and a strain of IO which takes a multiperiod games perspective (Tirole, 1988), suggest otherwise. Because these latter theories question the sustainability of any gains that might come from holding a dominant market position, we view them as an alternative hypotheses, and base Hypothesis 1b on mainstream theory.

Hypothesis 1b: High-share products will attain and *sustain a larger increase in their extramarket performance over premerger levels than will low-share products.*

A final corollary hypothesis about firm effects comes from the observation that each merger is unique, bringing together firms with different products, resources and capabilities, history, and core organizational features. While ecologists argue that organizations gain skills over time (Amburgey *et al.*, 1993), the particular skills required to consolidate the acquired firm's resources and to manage cultural differences may not be equally mastered by all merging firms (Haspeslagh and Jemison, 1991; Very *et al.*, 1997). Indeed, Seth (1990) noted that integration problems may diminish the scope for realizing economies, suggesting a latent firm-specific merger effect that is hard to deny, but difficult to specify empirically. Consequently, Rumelt (1991), McGahan and Porter (1997), and others who study firm effects, model it as a latent construct, using a dummy to capture the variance in firm performance that remains after controlling for

market-wide influence. IO economists also explore the extent to which a variety of firm-specific factors influence price and product rent following horizontal merger. Thus,

> *Hypothesis 1c: Merged firms differ in terms of their ability to attain* and *sustain increases in extramarket product performance over premerger levels.*

Industry- and population-level effects

The aforementioned hypotheses predict that various firm effects associated with the products involved in a horizontal merger will add significant explanatory power to a model of postmerger performance, which has already controlled industry and population effects. However, what exactly are industry and population effects?

A good starting point is IO's 'market power' hypothesis, which posits that the less competitive the structure of any given industry, the more horizontal mergers will improve a firm's market power (i.e., the firm's ability to set prices). Imperfections in the extant structure of a given market, in this sense, will allow merged firms to earn extramarket product returns without fear of immediate reprisal by competitors (Scherer and Ross, 1990) or competition from new entrants (Eckbo, 1985). Merged firms will also earn extramarket returns due to the market power gained by removing a competitor. Stated in general terms:

> *Hypothesis 2: The less competitive the premerger structure of a product–market niche, the greater the increase in a product's extramarket performance over its premerger level.*

Hypothesis 2 is based on traditional IO theory, yet a review of the IO literature by Anand and Singh revealed that 'empirical studies have generally failed to find support for the market power hypothesis' (Anand and Singh, 1997: 103). Rather than take these findings as a given, we test the proposition suggested by Boone and van Wittleoostujin (1995) and Swaminathan (1998) that a broader definition of market forces is needed that should include both IO (share-based) and OE (density-based) measures. These constructs need to be defined at the product–market (resource niche) unit of analysis to avoid possible aggregation bias associated with SIC-based industry definitions that characterize most market-power investigations. To fully account for market-power effects from horizontal mergers, a multiperiod examination is required, which simultaneously captures niche competitiveness just prior to the date of the merger and in multiple periods following the merger. We are aware of no such study. Further, our argument is timely: FTC Chairman Pitofsky (2000) recently announced that the agency would be more critical of proposed horizontal mergers because earlier consent decrees, largely based on *ex ante* analysis of market structure, were found to have significantly understated the reduction in competition they cause.

A broader definition of market forces

Using an industry's level of concentration (the percentage of the industry that is controlled by its largest inhabitants) to describe intensity of competition, IO economists show that the level of a market's concentration (the percentage of the market that is controlled by its largest inhabitants) is positively associated with its rent (e.g., Cotterill, 1993a, 1994; Salinger, 1990; Weiss, 1989). Some strategists (e.g., Chatterjee, Lubatkin, and Schoenecker, 1992) and ecologists (e.g., Carroll, 1985; Boeker, 1991) also identify concentration as a key determinant of firm performance.

Most ecologists, however, define intensity of competition in terms of density (the number of businesses competing in a product–market niche), and use density as a measure of the degree to which the carrying capacity of the niche is filled (Delacroix, Swaminathan, and Solt, 1989; Hannan and Freeman, 1989). The competitive effects of density in these models are straightforward: competition for available resources is greater in high-density (many competing businesses) niches than in low-density niches (Boeker, 1991; Carroll and Hannan, 1989; Tucker *et al.*, 1988). We propose that population dynamics have a similar effect at the product–market level. Given that density and concentration capture different aspects of the competitive process (cited earlier), we propose corollary hypotheses from IO and OE:

> *Hypothesis 2a: The more concentrated the premerger structure of a niche, the greater the*

increase in a product's extramarket performance over its premerger level.

Hypothesis 2b: The less dense the premerger product–market niche, the greater the increase in a product's extramarket performance over its premerger level.

Accounting for ex ante and ex post market forces

Hypotheses 2a and 2b are based on the assumption that the effect of premerger market conditions on postmerger pricing behaviors will remain relatively stable throughout the postmerger time frame, an assumption that the FTC will no longer make (Pitofsky, 2000). Postmerger performance can be altered by a variety of events, including unanticipated changes in the business climate, the influence of some rival firms that try to extract rents during this period of market adjustment, and the response of others to those actions.

Put in OE terms, industry evolution is driven by both exogenous and endogenous factors (Mitchell, 1998). For example, competitive pressure may motivate an established firm to merge horizontally in an effort to solidify its position within that industry and gain advantage in the scale, scope, and differentiation of its products. These advantages may, in turn, afford a firm options to expand the resource-carrying capacity of its product's market niches by capturing market opportunity from other products whose resource spaces partially overlap (i.e., niches with close product substitutes). Such efforts will not only change the industry's structure, but also alter the context of competition such that rival industry incumbents may have no choice but to retaliate. Baum and Mezias (1992), Delacroix and Swaminathan (1991), and Zammuto (1988) thus view the specialist and generalist strategies as processes by which firms attempt to adapt to their environment as a means to maintain or enhance legitimacy and their access to resources.

Like the preceding premerger set of market-power hypotheses, our third set of hypotheses is grounded on the same theories of imperfect competition and density dependence. However, they attempt to *explain* the change in postmerger performance, rather than use 'fixed' *ex ante* (premerger) conditions to *predict* that change. Stated first in general terms (Hypothesis 3) and then as corollaries:

Hypothesis 3: The less competitive the niche becomes after the merger, the greater the increase in a product's extramarket performance over its premerger level.

Hypothesis 3a: The more concentrated the niche becomes after the merger, the greater the increase in a product's extramarket performance over its premerger level.

Hypothesis 3b: The less dense the niche becomes after the merger, the greater the increase in a product's extramarket performance over its premerger level.

Ecologists and strategists note that change in the demand characteristics of a product–market niche influences competition. Density dependence models, for example, attribute certain competitive dynamics to temporal variations in the carrying capacity of a niche (Delacroix and Carroll, 1983; Delacroix *et al.*, 1989). For example, Boeker (1991) and Swaminathan (1998) proxy for the carrying capacity of the brewing industry by calculating the total consumption (demand) for beer in each state. As was the case with density, proponents of the population dynamics argument assert that the competition for available resources will be higher in niches where growth in total demand is slow, because slow growth induces a greater interdependence among niche participants. Further, they suggest that the relationship between growth in demand and the resource-carrying capacity of a niche is 's-shaped' (Eighmy and Jacobson, 1980).

Strategists observe a similar s-shape in the relationship between demand growth and the 'life stages' of an industry (Anderson and Zeithaml, 1984; Hambrick and Lei, 1985); that is, the level of growth defines a series of stages in the life of an industry (Hofer, 1975), and the nature of competition in each stage differs. For example, strategists predict that when growth is high, rivalry is generally low because each firm operates close to capacity. As such, rivals in high growth markets have little incentive to erode their own profits by competing on price. Therefore, a merg-

ing firm has more freedom to exploit structural advantages and enhance extramarket performance during periods of high growth since the threat of retaliation is expected to be low.

Hypothesis 3c: The greater the growth in a niche after a merger, the greater the increase in a product's extramarket performance over its premerger level.

METHODOLOGY

Sources of data

The food-manufacturing industry represents a conservative context for studying the degree to which firm effects matter. Most food product niches in the United States are characterized by slow growth and high levels of competition. They are thus presumed to have little excess carrying capacity, which makes it more difficult to exploit resource opportunities (Brittain and Freeman, 1980). Similarly, strategists note that mature markets offer firms fewer opportunities to attain a sustainable advantage (Porter, 1980: 237–253). Moreover, the food retailing industry has become increasingly consolidated. The surviving retailers capitalize on their size by charging food manufacturers higher fees for the privilege of occupying shelf space (Mandel and Heinbockel, 1984). It may not be surprising, therefore, that in the 1980s food manufacturers used mergers as one means to ensure their own destiny (Connor and Geithman, 1988).

We obtained product-level data for branded food products sold in the United States between 1981 and 1990 from Selling Area Markets, Inc. (SAMI), a private market research firm. SAMI gathered information directly from grocery warehouses in 54 U.S. metropolitan areas about the price and tonnage sold for every food product (branded and generic) whose annual sales exceeded $1 million (about 3650 products). Data were then grouped into 495 product categories, using definitions considered by agricultural economists to be meaningful and precise indicators of economic markets (Connor *et al.*, 1985). As such, the product categories are close representations of what organization ecologists call distinct resource spaces, or niches. Finally, the 495 product categories were grouped into 75 product families, defined by common distribution requirements and consumer perceptions of substitutability (Connor *et al.*, 1985). For example, the product family 'Cereal' contains three overlapping categories (i.e., target the same resource niche): ready-to-eat, breakfast bars, and hot cereals; 'Baby Foods' contains five product categories: formula, baby breakfast foods, baby juices, baby meals, and miscellaneous.

Because SAMI data are annual and are specified at the product–market level, they can be used to construct precise measures for each product and each product niche. As such, they are free of the aggregation bias that plagues industry measures based on 4-digit SIC codes (Scherer and Ross, 1990; Schmalensee, 1989), including the two most often used to study the performance effects of strategy and market structure, the FTC's Line-of-Business data (used by Rumelt, 1991) and the Compustat Business Segment data (used by McGahan and Porter, 1997). For example, the SIC lumps together noncompeting products like canned baby foods and canned soup into the same 4-digit (SIC) category (#2032) and does the same with pickled fruits and soy sauce (#2035). Indeed, McGahan and Porter (1997) note the likelihood that imprecise industry measures muted their study's findings about industry determinism.

We used two criteria to construct our sample: each merger had to involve enough product-level observations to adequately run our statistical model; and each had to have taken place no later than the mid-1980s, giving us access to time series data over enough years to account for the dynamic influence of market competition and population dynamics. Three mergers met the first criterion, but only two—the 1984 acquisition of Nabisco by R. J. Reynolds (involving 93 branded food products) and the 1984 acquisition of Carnation Company by Nestlé (involving 73 branded food products)—met the second. Since both mergers occurred in 1984, it allowed us to test the dynamic interplay between the merging firms and their environment over the same 6-year time period (1984 through 1990, the last year that SAMI collected data).[4] Missing data reduced the size of the first sample from 166 to 132 products. The 1988 acquisition of Kraft by General Foods

[4] SAMI's data were the accepted metric during the 1980s. However, the metric changed with the advent of scanners, and Nielsen and IRI seized first mover advantage. SAMI failed to adjust and went out of business in 1991.

(GF), involving 155 branded products, met the first criterion but not the second. Because the Kraft/GF merger contains only 2 years of post-merger data, we used it to run separate tests of our hypotheses.

Testing our hypotheses one merger at a time in a single industry allowed us to control for three sources of variance common to cross-sectional studies: (1) noncomparable industries (all come from the food manufacturing industry); (2) noncomparable firms within an industry (all are large, multiproduct food manufacturers who sell brand name products); and (3) noncomparable, within-firm data (all concern only the branded food products sold by these firms).

The dependent variable: extramarket performance

Extramarket performance (X-Perf) can be thought of as returns that exceed those normally achieved in the marketplace. It is conceptually akin to market power and price discrimination in the IO literatures, to competitive advantage and differentiation in the strategic management literature, and, at some broad level, to growth and legitimacy in the OE literature. However, defining the concept is one matter; measuring it is quite another. Given that the purpose of our study is to assess the longitudinal impact of horizontal merger on the extramarket performance of affected branded products, we measure X-Perf as the change in a merged product's price (over its premerger level) *after* controlling for two factors that are expected to covary with a change in price (the change in the product's market share, and the change in the product's cost), and two sets of factors that are theoretically associated with change in price (industry- and population-level effects).

First, we computed the 2-year *Change in Price* for each branded product in the sample by subtracting the price of each product in 1983 (1 year before the merger) from its price in 1985 (1 year after the merger). However, this 2-year interval is not likely to capture the longitudinal interplay between the firm and the market, though theory provides little guidance on how to specify the appropriate time span. Perhaps organizational inertia prevents the anticipated benefits of horizontal mergers from appearing within such a brief period (Barnett and Freeman, 1997). Alternatively, the benefits of horizontal mergers could be fleeting in the mature, low-growth markets that characterize most of the resource niches in our study. Accordingly, we calculated a *Change in Price* for all years in our study, ranging from the 3-year span covering the change in price between 1983 and 1986, to the 7-year span between 1983 and 1990.

Next, we computed the two independent control variables. We calculated six annual *Change in Market Share* measures using each product's 1983 premerger market share as the baseline, and compared it to its market shares in the third through seventh year after the year of the merger. (Holding all else equal, demand elasticity should cause a product's share to decrease as the product price rises.) We also calculated six annual *Change in Cost* measures, using the 1983 price data for the branded product's private-label counterparts as the baseline. Because the efficient scale in food manufacturing is generally low (Scherer and Ross, 1990: 581–582; Starbird and Agrawal, 1996), the price of private labels is a good proxy of the marginal cost of producing and distributing products whose quality is similar to branded products (Connor and Peterson, 1992; Rogers, 1987).[5] These same economists also view the change in

[5] Perhaps this point is best illustrated by recognizing that it is the small, private-label manufacturers, and not the large branded product manufacturers, who base their survival entirely on low price and therefore low cost. These firms 'sell to retailers in large quantities under conditions of continuous price negotiations with professional retail buyers who are well-informed about product quality and availability' (Connor and Peterson, 1992: 158). Also, these firms produce products comparable in quality to the products produced by the branded manufacturers (Scherer and Ross, 1990: 581–582). Private labelers can afford to do this because the technologies are generally stable and commonly known. In short, if the minimum efficient scale of manufacturing in this industry was high, the small, private-label producers would be unable to defend their cost minimization positions; the large, branded-products manufacturers could sell their products at a price below the cost curves of their counterparts, while still maintaining persistent profits. Also, the branded manufacturers could leverage their volume advantages to enter the private-label business and overwhelm the private labelers. However, there is little evidence that either happens; indeed, private-label food manufacturing by branded manufacturers is rare (Connor *et al.*, 1985: 220–223). Distribution economies are also doubtful in food manufacturing because the production plants of the merged firms are unlikely to be in close proximity to coordinate shipping from a single location. Furthermore, few shipments are made directly to retailers because retailers generally perform their own wholesaling activities or use their own wholesale firms. Therefore, the retailers and wholesalers, not the producers, are more likely to be concerned with the efficiency of the distribution system, while being indifferent to the origin of the producer's shipments.

the price of a branded product, net of the change in the price of its private label counterparts, as a good approximation of a branded product's profit margin.[6]

Entering these two covariates in our regression model empirically redefined the dependent variable to be 'change in price net of its covariance with changes in share and cost.' We then transformed this variable to *Change in Extramarket Performance* by netting out its covariance with its *ex ante* (Hypothesis 2) and postmerger (Hypothesis 3) market forces.

Ex ante and postmerger industry- and population-level variables

Concentration is generally defined either as the share of the market held by the four largest firms in the market, or as the sum of the squared market share of all firms in the market (the Hirshman–Herfindahl Measure). However, and consistent with both our level of analysis and prior research in the food industry, our metric accounts for the fact that most food product category markets are highly concentrated (Kwoka and Ravenscraft, 1986). Therefore, we defined the level of market concentration before the merger, or *Initial Market Concentration* (Hypothesis 2a), as sales (in tons) of the top two products in each product category during 1983 (the year before the merger) divided by the total tonnage sold in that market niche in 1983 (including tons sold of private-label products). *Initial Market Density* (Hypothesis 2b) is a count of the number of different brands listed by SAMI in each product category during 1983.

The *Change in Concentration* measure (Hypothesis 3a) was computed by subtracting the *Initial Market Concentration* (1983) from that computed in 1985; the same was done for each subsequent postmerger year (1986–90). Six *Change in Density* measures (Hypothesis 3b) were likewise computed, using *Initial Market Density* (1983) as the baseline. Finally, we computed six *Market Growth* (Hypothesis 3c) measures by subtracting sales (in tons) observed for each product–market niche for each of the six postmerger years (1985–90) from the sales of that niche in 1983.

Firm-effect variables

Variance in the change in extramarket performance from horizontal mergers is explained by three firm effects: Relatedness, Relative Market Share, and Merger-Specific Effects. *Relatedness* (Hypothesis 1a) is a categorical variable (1 = Specialist; 0 = Generalist). Cases are considered specialist related when the product of one firm (be it the buying or acquired firm) is in the same product 'family' or resource space as a product from the other firm. As such, specialist-related products involve those that are close substitutes, in terms of both market perceptions and distribution requirements (e.g., a potato chip brand and a corn chip brand, both classified under the product family 'snack foods'). Cases that involve branded food products from different product families are generalist. (Recall that the 495 product categories, or niches, in the SAMI data are grouped into 75 product families.) Generalist-related products are not close substitutes (e.g., baby food and potato chips). The Nestlé and RJR mergers involved 24 (18%) specialist-related products, while Kraft/General Foods merger involved 30 (18%). *Relative Market Share* (Hypothesis 1b) is a categorical variable. We assign a value of 1 if the product of interest is one of the top two market share leaders (in terms of tons sold) in its niche in 1983 and a value of 0 if not. Finally, Hypothesis 1c predicts that no two mergers are alike due to various administrative, resource, and cultural factors. We capture the variance associated with these idiosyncratic effects with a dummy variable, *Merger-Specific Effects* (0 = Nestlé/Carnation; 1 = RJR/Nabisco).

[6] Using private-label prices in the computation of X-Perf has several advantages. First, this approach is conservative, since it understates the branded product's profit margin if the merger generates scope efficiencies. Second, the estimates are free of any distortion that might be introduced by different accounting practices across the firms in our study. Third, this approach, when coupled with our 'case study' design (which examines one merger at a time), reduces the variance in the difference in X-Perf between the specialist and generalist merged products that might be due to differences in marketing and advertising policy. It implicitly assumes that each of the products associated with a specific merger was subject to approximately the same postmerger corporate influences regarding marketing and advertising expenses, regardless of whether that product was merged with a specialist or generalist strategy. Finally, computing an annual Change in Cost measure for each individual product category allows us to control more precisely for inflationary pressures than is possible using general measures like the consumer price index.

RESULTS

Sample 1

Part 1 of Table 1 contains descriptive statistics for the Nestlé/Carnation and RJR/Nabisco mergers in 1985, the first full 'merged' year. (Descriptive statistics for the other 5 years are withheld because of their similarity to the first-year data.) Although a large positive correlation (0.89) between Initial Density (a *premerger* measure) and its *postmerger* counterpart, Density Change, raise a concern about collinearity, diagnostic procedures suggest it is not a problem. The VIFs for Initial Density ($\leq$8.5) and Density Change ($\leq$8.2) are below 10 and thus not suggestive of collinearity. Further, the Condition Measure did not exceed 10 in any of the six annual regression runs. (Collinearity is suggested if this measure exceeds 30, Norusis, 1993: 355–357).

Part 2 of Table 1 shows the 6-year trend in Change in Price for the branded products involved in each of the two mergers, as well as the corresponding Change in Cost for each product's private-label counterpart. There is a similar price trend for branded- and private-label products during the first four postmerger years, such that branded products maintained about an 8-cent differential over their private-label counterparts. Interestingly, the price differential increased during the final two postmerger years.

Hypotheses are tested using Seemingly Unrelated Regression (SUR), a form of generalized least-squares regression that takes advantage of correlated cross-equation errors to provide more precise within-equation parameter estimates than ordinary least squares (OLS) (Greene, 1990: 510). Specifically, we found that SUR produced parameter estimates with more than 28 percent less variance (i.e., more precise estimates) than OLS, due to SUR's use of a multistage estimation technique in which regression equations from each of the six postmerger time periods are run simultaneously as a system. (When the disturbance terms of different regression equations are correlated, SUR incorporates relevant information from each into its final estimate for each regression model, Griffiths, Hill, and Judge, 1993: 551). Cross-equation error correlation (i.e., heteroskedasticity) is indicated by the Breusch–Pagan test ($\chi^2 = 908$; $p > 0.05$). We ran our SUR model six times (one for each postmerger period) using data from the 1984 RJR/Nabisco and Nestlé/Carnation mergers; the model consisted of 10 independent variables:

Table 1. Descriptive statistics for all variables on 1985 data

Part 1: Correlations[a]

Variable	Mean	S.D.	1	2	3	4	5	6	7	8	9	10
1. Change in Product X-Perf	0.13	0.26	–									
2. Change in Market Share	0.00	0.03	0.08									
3. Change in Cost	0.05	0.17	0.62	–0.07								
4. Initial Market Concentration	0.43	0.18	0.06	–0.17	0.17							
5. Initial Market Density	21.08	23.45	0.05	0.00	–0.14	–0.60						
6. Change in Concentration	0.00	0.04	0.13	0.47	0.06	–0.09	–0.05					
7. Change in Density	3.83	5.57	0.12	–0.06	–0.15	–0.51	0.89	–0.06				
8. Market Growth	–3.36	67.03	0.03	–0.17	0.21	0.00	0.16	–0.20	–0.04			
9. Relatedness	0.18	0.39	0.12	0.04	–0.11	–0.03	0.03	–0.05	–0.02	0.05		
10. Relative Market Share	0.21	0.41	0.05	–0.25	0.18	0.37	–0.25	–0.19	–0.24	0.05	–0.10	
11. Merger Specific Effects	0.56	0.50	-0.08	0.11	–0.05	–0.20	0.04	0.01	–0.03	0.03	0.02	–0.32

[a] $n = 132$. All correlations larger than 0.17 are significant at $p < 0.05$.

Table 1. Continued

Part 2: Trends in pricing change from 1983 base year

	Price Change		Cost Index Change		Difference
Year	Mean	S.D.	Mean	S.D.	Brand-index
1985	0.13	(0.26)	0.05	(0.17)	0.08
1986	0.23	(0.55)	0.15	(0.41)	0.08
1987	0.21	(0.37)	0.14	(0.29)	0.07
1988	0.24	(0.39)	0.16	(0.27)	0.08
1989	0.31	(0.47)	0.21	(0.31)	0.10
1990	0.36	(0.51)	0.24	(0.31)	0.12

X-Perf$_i$ = Control Variables: Market Share Change$_i$ + Cost Measure Change$_i$
+ Ex-ante (H2): Initial Market Concentration + Initial Market Density
+ Ex-post (H3):Concentration Change$_i$ + Density Change$_i$ + Market Growth$_i$
+ Firm-Effect (H1): Relatedness + Relative Market Share + Merger-Specific

where $_i$ = the 2-year change (1985 vs. 1983) through the 7-year change in 1990.

Part 1 of Table 2 presents the results from the individual SUR models. All models are highly significant ($p < 0.001$) and explain a large percentage of the variance in the Change in X-Perf (ranging from 0.39 in 1990 to 0.67 in 1987). Part 2 of Table 2 presents the SUR analysis obtained from running the overall system of the six equations, or 792 observations ($R^2 = 0.73$). With this analysis, we hierarchically entered four blocks of variables into the model, beginning with a block consisting of the two control variables, followed by blocks consisting of the two premerger (Hypothesis 2) and the three postmerger sets of environmental variables (Hypothesis 3), and concluding with the three firm-effect variables (Hypothesis 1). (We discuss results in the same order.) Whereas the regressions in Part 1 test each of the sub-hypotheses, the hierarchical regressions in Part 2 estimate the independent contribution made by each block of variables. By varying order of entry, we confirmed that the firm-effects and the two sets of competitive environment effects are indeed independent of each other.

From Part 2 of Table 2, we note that the block consisting of the two control variables, taken as a system, explains a large percentage ($R^2 = 0.51$) of the variance in X-Perf., although it appears from Part 1 that Change in Cost is consistently driving this result. Indeed, this measure is highly significant ($p < 0.001$) in each of the six annualized SUR runs. This is a reasonable finding: the ability of each branded product to raise its price is largely explained by the cost (and thus price) pressures that characterize its specific niche. Were this the only significant variable, our results would merely suggest that postmerger change in the price of a merged product is driven primarily by niche-wide changes in cost, and not by firm effects or competition.

This is clearly not the case. During the first 2 years after the merger (1985 and 1986), the prices of the branded products rose ($p < 0.05$) even as market share rose ($p < 0.001$). Interestingly, all subsequent price increases appear insensitive to Change in Market Share. In addition, the *ex ante* block of market structural variables, when taken as a system, explains an additional 4 percent of the variance in X-Perf over that of the two-variable control block ($p < 0.01$), which is consistent with Hypothesis 2. The ability of a merging firm to earn higher X-Perf from its products after the merger thus appears contingent upon the structure of each product's market at the time immediately preceding the merger. Interestingly, the Initial Market Density (Hypothesis 2b) of the product niche in 1983 explains a significant portion of the residual variance in three of the six annual measures of X-Perf associated with a merged branded product (i.e., in the third ($p < 0.001$), fourth ($p<0.05$), and fifth ($p<0.05$) years

Table 2. Seemingly unrelated regressions using data from two 1984 mergers: Nestlé/Carnation (=0) and RJR/Nabisco (=1)[a]

Part 1: Individual regressions

Years after the merger:	Product X-Perf 1 year (1985)		Product X-Perf 2 years (1986)		Product X-Perf 3 years (1987)		Product X-Perf 4 years (1988)		Product X-Perf 5 years (1989)		Product X-Perf 6 years (1990)	
Variable	Beta	S.E.	Beta	S.E.	Beta	S.E.	Beta	S.E.	Beta	S.E.	Beta	S.E.
Intercept	0.00	0.07	0.00	0.12	0.00	0.08	0.00	0.11	0.00	0.13	0.00	0.15
Controls												
Change in market share	0.11*	0.48	0.12***	0.44	–0.04	0.27	0.06	0.24	–0.01	0.27	0.02	0.30
Change in cost	0.57***	0.06	0.64***	0.04	0.75***	0.05	0.49***	0.06	0.51***	0.06	0.45***	0.07
Premerger variables												
Initial market concentration	0.08	0.11	0.03	0.19	0.09	0.13	0.09	0.18	0.07	0.22	0.08	0.24
Initial market density	–0.07	0.00	–0.06	0.00	0.38***	0.00	0.24*	0.00	0.23*	0.00	0.13	0.00
Postmerger variables												
Change in concentration	0.01	0.31	0.10**	0.35	–0.06†	0.21	0.06†	0.18	0.00	0.16	–0.01	0.10
Change in density	0.28***	0.00	0.17**	0.01	–0.28**	0.00	–0.09	0.00	–0.07	0.00	0.01	0.00
Market growth	–0.03	0.00	–0.02	0.00	–0.02	0.00	0.01	0.00	0.00	0.00	0.02	0.00
Firm effects												
Relatedness	0.19***	0.04	0.08	0.07	0.11*	0.05	0.14*	0.07	0.14*	0.08	0.14*	0.09
Relative market share	0.00	0.05	–0.01	0.08	0.00	0.05	–0.02	0.07	–0.04	0.09	0.00	0.10
Merger-specific effects	–0.04	0.03	–0.05	0.06	–0.09†	0.04	–0.11	0.06	–0.17*	0.07	–0.14†	0.08
Model												
F	12.02***		23.89***		24.99***		8.37***		8.15***		7.65***	
R^2	0.50		0.66		0.67		0.41		0.40		0.39	

[a] $n = 1.32$; †$p<0.10$; *$p<0.05$; **$p<0.01$; ***$p<0.001$

Table 2. Continued

Part 2: Hierarchical regressions on overall system of six seemingly unrelated regression equations

Variable set	R^2	Change R^2	*F*-stat. change
Control	0.51		
Premerger variables	0.55	0.04	5.61**
Postmerger variables	0.64	0.09	9.89***
Firm effects	0.73	0.09	14.19***

following the merger) while Initial Market Concentration (Hypothesis 2a) does not. However, the relationship between Initial Market Density and the dependent variable is counter to what Hypothesis 2b predicted: the more dense the premerger niche (and therefore, by inference, the lower the excess resource-carrying capacity of that niche), the more a branded product earns X-Perf after the merger. We offer an explanation to this seemingly counterintuitive result in the discussion section.

Hypothesis 3 predicts that the ability of a merging firm to earn higher X-Perf from its products is contingent upon the changes that occur in the competitive forces of each product's niche due, in part, to the merger. Consistent with Hypothesis 3, we find that the block of merger-induced competitive changes, when taken as a system, explains a significant contribution portion of the residual variance in the dependent variable. Hierarchical analysis shows that this block of variables explains an additional 9 percent of the variance in Product X-Perf ($p < 0.001$) over that explained by the control and pre-merger blocks of variables. Supporting Hypothesis 3a, Concentration Change is significantly and positively related to the dependent variable, a result that is found only in the second ($p < 0.01$), third ($p < 0.10$), and fourth (p 0<.10) years following the merger. In contrast to Hypothesis 3b, though, Density Change is significantly and positively related to X-Perf in the first ($p < 0.001$) and second ($p < 0.01$) postmerger years, such that extramarket performance from the merged products increases with Market Density. Consistent with Hypothesis 3b, however, the relationship becomes negative in the third postmerger year ($p < 0.01$), but is not significant in the final 3 years. Finally, we find no support for Hypothesis 3c and its prediction about market growth in any of the SUR models. There is modest overall support for each of the corollary hypotheses of Hypothesis 3 (Part 1 of Table 2), but the large contribution made by the block of the three variables when taken as a system in the hierarchical runs (Part 2) suggests that their true contribution may stem from their cumulative effect.

The three variables that were entered last in the hierarchical runs (Hypothesis 1) predict that a merging firm, by engaging in the kind of multifaceted transformation brought about by a horizontal merger, can perform in excess of industry- and population-level effects. Since Hypothesis 1 represents one of this study's primary 'reasons for being,' we are obviously encouraged to find it strongly supported. First, the hierarchical SUR runs show that the three firm-effect variables, when taken as a system, explain an additional 9 percent of the variance in the dependent variable ($p < 0.001$) (i.e., above the 63% that had already been explained by the other blocks of variables). Further, we find consistent and enduring support for Hypothesis 1a: specialist strategy is associated with significantly higher extramarket performance in the postmerger period than the generalist strategy in five of the six SUR runs, and approached significance in the sixth (1986) run. Simply put, merged firms seem to increase the output price of their branded products, net of the dynamic influences of changes in cost and market share, when they bring together products that hold overlapping resource spaces (e.g., potato chips and corn chips) than those that come from the same 4-digit SIC code but hold unrelated resource spaces (e.g., canned baby food and canned soup).

This result supports recent IO research based on brand-level analysis of cross-elasticities between related products (Baker and Bresnahan, 1985; Cotterill and Haller, 1997; Hausman *et al.*, 1994). Further, this firm effect does not appear to be a short-lived anomaly; i.e., one destined to be eroded by market forces that return all markets to their natural states of equilibrium. To the contrary, while the effect of the market power variables (Hypotheses 2 and 3) vanished by the sixth year after the merger, the relationship between specialist strategy and extramarket performance endured.

We also find evidence that supports Hypothesis 1c in three of the six SUR runs: 1987 ($p < 0.10$), 1989 ($p < 0.05$), and 1990 ($p < 0.10$). The

Nestlé/Carnation merger appears to have resulted in higher postmerger rents for its products than RJR/Nabisco products. Apparently there was something about the merger of Nestlé/Carnation that allowed its products to perform better in their markets (i.e., to offset market/population forces) than RJR/Nabisco products. Finally, we find no support for Hypothesis 1b, which predicts the advantages of Relative Market Share.

Sample 2

We now turn to the 155 branded food products involved in the 1988 Kraft/General Foods (K/GF) merger and the 2 years of postmerger data. Descriptive statistics in Part 1 of Table 3 show two interesting differences from those reported in Table 1. First, the majority of the K/GF branded products were among the two top-selling brands in their respective niches at the time of the merger (the mean value associated with the binary variable, Relative Market Share, is 0.73). In contrast, the Relative Market Share of the branded products of two 1984 mergers is 0.21. Also, the average K/GF product–market niche declined in demand (average Market Growth = −3.36), while average Market Growth was positive (+2.28) for the other two mergers.

Part 2 of Table 3 reveals another interesting contrast with the data reported in Table 1. The price of the K/GF branded products increased by about 18 cents in 1989 and 13 cents in 1990, while the Change in Cost measure for each of those products only increased by 6 cents and 4 cents over the same 2 years. As such, K/GF achieved a larger postmerger price differential (21 cents on average) between its merged products and the private-label products that sell in the same product niche than did the two 1984 mergers (8 cents after 2 years and 12 cents after 6 years). The differential between the price of a branded product and that of its private-label counterpart is thought to be a reasonable approximation of the branded product's profit margin.

Part 1 of Table 4 presents the two individual SUR regression results, and Part 2 Table 4 presents the hierarchical runs on the same four blocks of independent variables. Here, the Merger-Specific variable is omitted from the block of firm-effect variables because we examine only products from one merger in the K/GF sample. Nevertheless, the 1-year and 2-year models are both highly significant ($p < 0.001$), though they each explain only about half of the variance in the dependent variable we observed for the models run on the two 1984 mergers. As Part 2 of the table suggests, much of the decline in explanatory power might be attributed to the block of the two control variables. In contrast to the 51 percent observed with the two 1984 mergers, the two control variables explain only 8 percent of the variance in extramarket performance in this sample. Further, the lower correlation for the block seems largely attributable to the reduced influence of the Change in Cost measure, which plays a much smaller, though still statistically significant role in explaining X-Perf.

Consistent with our findings for the two 1984 mergers, each block of variables explains a significant portion of the variance in the dependent variable, and Initial Market Density (Hypothesis 2b) again drives the results in the premerger block of market factors, while Initial Market Concentration (Hypothesis 2a) does not. Moreover, the relationship between Initial Market Density and the dependent variable is again positive, and thus opposite to what we had predicted. In contrast to the 1984 finding, but consistent with Hypothesis 3c, Market Growth shows a significant and positive relationship to the dependent variable in both postmerger years, whereas it had no bearing on the results in any of the six annual postmerger regression runs. Finally, firm effects again matter, although the results for this block of variables appear to be driven by Relative Market Share and not by Relatedness (Hypothesis 1a), as it was with the two 1984 mergers. That is, consistent with Hypothesis 1b, K/GF attained higher postmerger prices for its high-share brands than for their low-share brands, by leveraging their high-share products in a manner that reduced those products' cross-price elasticities with their direct rivals and with private-label products as well.

DISCUSSION

After proposing and testing a model that integrates elements from the fields of strategy, OE, and IO at the product–market (resource niche) level of analysis, we conclude that the performance benefits of horizontal mergers depend upon four competitive factors: (1) where (the character-

Table 3. Descriptive statistics for all variables on the Kraft/General Foods data

Part 1: Correlations[a]

Variable	Mean	S.D.	1	2	3	4	5	6	7	8	9
1. Change in Product X-Perf	0.18	0.25	–								
2. Change in Market Share	–0.01	0.03	–0.02								
3. Change in Cost	0.06	0.18	0.21	0.03							
4. Initial Market Concentration	0.43	0.21	–0.17	–0.18	–0.15						
5. Initial Market Density	36.97	43.34	0.38	0.12	0.12	–0.55					
6. Change in Concentration	0.00	0.13	–0.16	0.14	–0.05	–0.11	–0.04				
7. Change in Density	6.14	10.15	0.41	0.05	0.16	–0.49	0.95	–0.06			
8. Market Growth	2.28	86.64	0.27	–0.09	0.21	–0.43	0.39	–0.07	0.44		
9. Relatedness	0.17	0.37	–0.06	–0.19	0.02	0.29	–0.23	–0.04	–0.19	–0.13	
10. Relative Market Share	0.73	0.45	–0.08	–0.09	–0.26	0.25	–0.40	–0.09	–0.42	–0.33	–0.08

[a]$n = 155$. All correlations larger than 0.15 are significant at $p < 0.05$.

Table 3. Continued

Part 2: Trends in pricing change from 1987 base year					
Year	Product rent		Cost index change		Difference
	Mean	S.D.	Mean	S.D.	Brand-Index
1989	0.18	0.25	0.06	0.18	0.12
1990	0.31	0.42	0.10	0.32	0.21

istics of the product–markets in which the firm competes); (2) when (the influence of firm, industry, and population vary over time); (3) who (firms are not equally capable of benefiting from horizontal merger); and (4) how (both relative market share and relatedness among the merged products influence success). Specifically, evidence points toward the interplay between industry-level processes, which have been the focus of ecological and IO economic theory, and the firm-level attributes examined by strategic management. We find that the firm-effects associated with horizontal merger persists longer than those induced by changes in industry structure (and population).

Writings in OE about density in industry substructures (Baum and Mezias, 1992) and in IO about concentration and spatial niches (Schmalensee, 1989) shed some light on why Initial Market Density was positively related to the dependent variable (as it was in the 1987, 1988, and 1989 models with the two 1984 mergers, and in 1989 and 1990 with the K/GF merger). Most ecologists expect that higher density of a market niche is associated with lower excess carrying capacity; thus, the likelihood that a single brand gaining advantage is reduced as density increases. However, this expectation assumes symmetric product differentiation (i.e., all brands compete equally with each other and with all other brands in the same product niche).

Both IO and OE theory have recently challenged this assumption on the basis that it ignores the influence of spatial relationships. For example, Cotterill and Haller's (1997) study of breakfast cereals shows that *Shredded Wheat* clearly com-

Table 4. Seemingly unrelated regression of 1988 Kraft/General Foods

Part 1: Individual regressions				
Years after the merger:	Product X-Perf 1 year (1989)		Product X-Perf 2 years (1990)	
Variable	Beta	S.E.	Beta	S.E.
Intercept	0.00	0.07	0.00	0.11
Controls				
Change in Market Share	0.04	0.55	0.04	0.61
Change in Cost	0.13*	0.09	0.18**	0.08
Premerger variables				
Initial Market Concentration	0.08	0.11	0.09	0.18
Initial Market Density	0.45**	0.00	0.63***	0.00
Postmerger variables				
Change in Concentration	–0.06	0.08	–0.01	0.24
Change in Density	–0.03	0.00	–0.26*	0.01
Market Growth	0.13*	0.00	0.17**	0.00
Firm effects				
Relatedness	0.05	0.05	–0.03	0.08
Relative Market Share	0.15†	0.05	0.23**	0.07
Model				
F	4.49***		6.47***	
R^2	0.22		0.29	

[a] $n = 155$; †$p < 0.10$; *$p < 0.05$; **$p < 0.01$; ***$p < 0.001$

Table 4. Continued

Part 2: Hierarchical regressions on overall system of six seemingly unrelated regression equations

Variable set	R^2	Change R^2	F-stat change
Control	0.08		
Premerger	0.21	0.13	12.54***
Postmerger	0.31	0.09	6.54***
Firm effects	0.38	0.07	8.44***

petes much more intensely with brands located in adjacent product–market space, such as *Post Grape Nuts* and Kellogg's *Special K*, than it does with General Foods' *Trix.* Baum and Mezias (1992) found that location had a similar influence in the Manhattan hotel industry. Consequently, we infer that density by itself may not precisely represent the level of excess carrying capacity of a product niche, since carrying capacity may be heterogeneously distributed among spatially defined micromarket niches nestled within that product category.

Our research model is consistent with Chairperson Pitofsky's recent recommendation for how the FTC can better gauge the competitive impact of horizontal mergers. Its current method, which is detailed in Federal Merger Guidelines and based on IO theory, defines market power with measures of market share and concentration during the *ex ante* time frame using SIC-based industry definitions, while not taking into explicit account the *ex post* influences of firm strategy and population. Our model takes these influences into account and thus can better approximate market-power's influence on product performance over time, net of the other influences.

For example, we found that firm-effects (relatedness and merger specificity) appeared to be more persistent in the Nestlé/Carnation and RJR/Nabisco mergers than industry structure; product density generally explained more variance than product share. In addition, product-level data on the Kraft/General Food merger suggest that market power can drive horizontal mergers, an important point since studies that rely on traditional measures of firm or business unit performance have had difficulty documenting these effects.[7] Lastly, we find evidence that horizontal mergers generate performance that the Federal Merger Guidelines do not (and cannot) consider when judging the antitrust impact of a proposed merger (i.e., postmerger effects that influence changes in product prices cannot be predicted from the initial (premerger) market conditions). Thus, while our overarching results are quite consistent with conventional IO thought (e.g., that horizontal mergers are associated with market power effects), product-level data and measures further enrich the understanding of this phenomenon.

Our results contribute to the ecological literature which, since the 1990s, has become more interested in identifying factors that favor successful adaptation (Haveman, 1992). We suggest that successful adaptation is possible even in relatively mature product-markets that have relatively little excess carrying capacity. And, in contrast to Barnett and Freemen (1997), who studied failure rates associated with the introduction of technologically innovative products in market niches characterized by high excess carrying capacity (i.e., large amounts of available resources), we studied the ability of firms to earn extramarket performance in mature concentrated markets. Data indicated that large firms such as Kraft/General Foods sell products that have as little as $2 million in annual sales (a line of packaged dinners) as well as products that generate annual revenues in the hundreds of millions (cream cheeses). This and other observations from our data challenge resource-partitioning theory, which suggests that large firms will restrict their activities to large market segments. Boone and van Wittleoostujin (1995) offer an explanation: large-firm participation in small market segments depends on the volumes at which scale economies become available.

We also found mixed, albeit indirect, support for OE's prediction that multifaceted changes in product market scope will initially engender coordination problems that may ultimately dissipate as the organization learns (Amburgey *et al.*, 1993; Iansiti, 1997). It took at least 3 years for performance differences between the portfolio of products involved in the Nestlé/Carnation and the RJR/Nabisco mergers to become apparent. How-

[7] We are grateful to an anonymous reviewer for pointing this out.

ever, once established, the Nestlé/Carnation products continued to outperform the RJR/Nabisco products. Perhaps because RJR was primarily a producer of branded tobacco products at the time of the merger, it may have wanted to acquire Nabisco mainly as a means to reduce its dependence on tobacco products. Thus, the decision to expand their food business via merger may have been motivated by a classic 'flight, not fight' response to the turbulence RJR was experiencing in the tobacco industry. On the other hand, Nestlé was already a world leader in branded food products when it acquired Carnation. Nestlé's decision to expand may therefore have been consistent with its long-term commitment to that industry and its ambition to leverage its accumulated know-how by expanding in U.S. markets. Data lend support to this conjecture.

Interestingly, the performance-generating potential of the specialist strategy that was strongly evident in the two 1984 mergers was not evident in the Kraft/General Foods merger. Note that the K/GF merger took place at a different time (1988), contained more than three times the percentage of products that held high shares of their respective niches (0.73 vs. 0.21), and involved niches with growth rates that were, on average, marginally positive (2.3%) as opposed to negative (−3.4%). These and other factors may have acted both independently and in concert to produce favorable conditions that allowed K/GF to quickly achieve a larger postmerger price differential for its products, apparently by leveraging its brands to capitalize on both market growth and relative market share. Recall that during the late 1980s food manufacturers felt that the pricing power of elite food brands was underexploited. Kraft tested the limits of its brands' value by letting the price of its cheeses rise to a point that was 45 percent above that of its rivals in 1992 (*The Economist*, 1993). Not surprisingly, food manufacturers were also willing to pay very high premiums to acquire top-selling brands during this period; (i.e., the $12.9 billion acquisition of Kraft in 1988 and the $25 billion leveraged buy-out of RJR/Nabisco).

While it is relatively easy to raise the price of high-share brands, leveraging the advantages of relatedness among the merged firm's products may require more time and coordination efforts. Perhaps K/GFs' ability to manage the merger may simply have been, at least within the 2-year period we examined, overwhelmed by the number of different products and markets involved. Indeed, Ruback's Harvard Case, 'Kraft–General Foods,' mentions that the two companies had yet to be substantially merged by the end of 1990, which he attributes to the daunting challenge of integrating two equally large firms with very strong cultures, and to uncertainty over '[w]hich management team would operate the new company?' (1992:1).[8]

Ruback's comment highlights the need for complementary research designs that address the strategic logic underlying horizontal mergers, as Capron's (1999) did using a questionnaire design to uncover the endogenous rent-generating processes that may occur during the postmerger period, such as asset divestiture and resource redeployment. While our data allowed us to create precise product–market level measures, we were not able to describe the specific processes firms used to manage or mismanage the rent-generation process. Our data also may have overstated some product's X-Perf, since we could not directly account for advertising and other marketing costs. However, this may not be a serious source of bias, since their marginal costs should not materially differ among our sample of very large firms.

Finally, our results contribute to the strategic management literature. Traditional IO and OE models attribute much of the variance in firm performance to industry or population-level processes while downplaying the influence of firm effects. However, our postmerger results suggest what the field of strategy has intuitively known from its inception: that strategy and other firm effects are not only important determinants of performance, but also influence the evolution of competition within markets and industries. We also found complementary relationships existing between OE and strategy, and between OE and IO, that enrich our understanding of 'relatedness,' while providing a more precise definition of horizontal mergers.

A founding assumption of strategic management (strategy 'can be viewed as the study of

[8] Ruback notes that the market value of Philip Morris stock declined 5.5 percent in excess of market movements on the day of the first announcement (October 18, 1988) of their intent to acquire Kraft—a 1-day loss of $1.3 billion in shareholder value. He observes that, 'judging by the market response, shareholders would have preferred that Philip Morris not acquire Kraft' (Ruback, 1992: 3).

the singular, uniquely competing firm in a changing environment', Hatten, 1979: 454) had a profound impact on the early thinking in the field, and remains foremost in the minds of those who teach by the case method. However, its meaning gets overlooked by those who favor cross-sectional research designs that pool data at one point in time from dissimilar firms and dissimilar industries, use levels of analysis that are subject to aggregation bias, or cling to the norms and methodological differences which originally separated these paths of inquiry. By suggesting a clearer link between strategy, IO, and OE, we are therefore paying homage to the field's founding heritage.

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