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PRIVATE STRATEGIES, PUBLIC POLICIES & FOOD SYSTEM PERFORMANCE

NEW THEORETICAL APPROACHES TO MEASURING
INDUSTRY PERFORMANCE

by

Julie A. Caswell and Ronald W. Cotterill

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NEW THEORETICAL APPROACHES TO MEASURING INDUSTRY PERFORMANCE

The 1980s have seen an explosion of theoretical and deductive analyses of how firms operate in markets and of the functioning of their internal organizations. These approaches are characterized by a focus on the interaction between market and firm structure and conduct with a strong emphasis on the strategic conduct of firms and individuals. Inferences about firm and market performance are the ultimate goal of these new approaches.

The burst of theoretical activity in the 1980s is not unprecedented. During the 1930s, for example, Robinson and Chamberlin developed the theory of monopolistic competition that was used in the next decade, along with other neoclassical price concepts, to develop a wide array of oligopoly price-output equilibrium models. From 1950 to 1980, however, advances in the theory of industrial organization, such as Bain's theory of entry and Porter's theory of strategic groups, came primarily from empirically oriented practitioners rather than theorists. The time is now ripe for a joining of these two strains through rigorous empirical testing of the new, and as yet largely untested, theoretical approaches of the 1980s.

Here we discuss two leading theoretical approaches to understanding market operation and performance.[1/] These approaches share a common emphasis on strategic behavior in the context of particular markets, firm

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[1/] Other new work in industrial organization includes search theory (Stiglitz 1979), transaction cost theory as it applies to vertical relationships (Williamson 1975, 1986a), contestable market theory (Baumol et al. 1982), and renewed work on oligopoly conduct and equilibrium under uncertainty (Breshnahan 1981, Selten 1986). Williamson's initial work was done prior to the 1980s; however, considerably more has been done since. The adoption in the 1982 Department of Justice Merger Guidelines of a Williamson type of approach to vertical mergers has increased interest in this work (Williamson 1986b).

organizations, and information environments. They differ markedly, however, in terms of the major economic questions to which they have been applied. The first, the game theoretical approach, has been developed mainly in the context of firm level decision making. It is a microanalytic approach to the analysis of firm conduct vis-a-vis its competitors and market equilibria. Agency theory, on the other hand, has been mainly developed to explain individual and internal firm decision making processes. Its major concern is with institutional questions regarding what, besides potentially ineffective competition with other firms in input and output markets, disciplines firm management. Thus it focuses on a particular class of transaction costs--those arising from corporate organizational forms that feature a separation between ownership and operational control. It is also concerned with how existing forms of discipline affect the evolution of market structure, firm governance systems, and firm financial structure (Fama 1980, Jensen 1986). Agency theory is a modern attempt to address the issues of internal organization and corporate control raised by Berle and Means in their 1932 classic The Modern Corporation and Private Property.

We proceed by giving a brief description of game and agency theory approaches to industrial organization. In the final section, we discuss empirical applications of these approaches to the measurement of industry performance.

Game Theory Approaches

Rather than generating novel explanations of how markets operate, game theory and related approaches offer a useful framework for organizing thinking about those factors that are believed to be important to firm competition. By focusing on firm strategic behavior vis-a-vis its rivals, this approach serves

to clarify which variables are critical to strategic choice and, in turn, to market operation. As Fudenberg and Tirole note 'it imposes some discipline on theoretical thinking. It forces economists to clearly specify the strategic variables, their timing, and the information structure faced by firms (1987: 176).' In doing so, game theory has lead to revitalized research on perennial issues such as predation, price discrimination, and cartel behavior (see Roberts 1987).

The basic approach used is to model interfirm rivalry as a one period game or a multi-period supergame in which the firms involved choose one of a set of possible strategies to use for each period played. The strategies are associated with a payoff or profit matrix that depends on the strategies chosen by the other firms. Interest centers on how firms make their strategic choices and how, over time, these choices affect the structure and performance of the market.

Although relatively simple in concept, game theory is not simple in application to real markets. The model must specify who the players are, what their relevant ranges of strategic choices are, the order in which players make their moves, the amount of information they have on their own and other players' positions and strategic choices, the degree of cooperation among players, and whether the players are able to learn from the game and adjust their subsequent behavior. In a real market, the number of possible combinations quickly becomes unmanageable. Theoretical applications have, therefore, concentrated on identifying the critical variables that explain how the game and, by extension, the market functions.

Two recent works are illustrative of this approach. Encaoua et al. (1986), for example, have modeled a market game between an incumbent firm and

a potential entrant. They specify a case where the existing firm may use a competitive weapon such as price, location, or capacity to discourage entry into the market. The game is specified as having two periods, pre-entry and post-entry. They then discuss a variety of possible forms the game might take depending on whether the firms cooperate and the quality of information held by the incumbent and the potential entrant. On the latter point, for example, the potential entrant may or may not be able to distinguish whether the incumbent firm's strategic signals on price are real or bluffs.

As a second example, Salop (1986) employs a game theory approach to model practices that credibly facilitate oligopoly coordination. Using a two firm model, he explores the effect of various types of buyer-seller contracts on the ability of an oligopoly to maintain a collusive agreement over time. In this work, the strategic variable focused on is the form of the buyer-seller terms offered by the firms. While not reflecting the full richness of reality, there is no doubt that such models, by focusing on key strategic variables, are very useful in analyzing many types of conduct that have been the subject of antitrust cases. Related work, not all of which is cast in an explicitly game theoretic framework, includes Gilbert (1986) on preemptive competition, Krattenmaker and Salop (1986) and Mathewson and Winter (1986) on vertical restraints, and Katz (1987) on price discrimination in intermediate goods markets.

Two key characteristics on which games are classified are whether they are non-cooperative or cooperative and whether information is symmetric or asymmetric. Under American antitrust laws, most oligopoly situations are non-cooperative games in that it is not possible for the players to make binding agreements among themselves (see Waterson 1984: Ch. 3). Vertical

relationships may feature a range of cooperativeness from none to very close (e.g., the case of franchises). Yet, since even close, legally binding relationships can be broken and are subject to varying interpretation, the non-cooperative game branch of the theory is most widely useful in industrial organization analysis.

Similarly, although the symmetric information case can be interesting analytically, the asymmetric situation is the one widely encountered in markets. Milgrom and Roberts (1987) describe the two polar information cases with an apt analogy to simple card games. In the symmetric information case, all players are dealt five cards face up, make any bets they wish, and then the best hand wins. In the asymmetric information case, the players' cards are all dealt face down. Yet, even here the players share a common knowledge of the number and distribution of cards so that information is not totally asymmetric. The most interesting case for economic analysis is an intermediate one where some cards are dealt up, some down, and each player may look at his or her own hole cards. Likewise most firms have access to a body of common industry knowledge but also possess some proprietary information that is not generally known. Thus the theoretical work on non-cooperative, asymmetric information games is the most promising avenue for identifying important strategic variables and new hypotheses for empirical work.

Theoreticians have also devoted considerable attention in their models to the stability of games or, in other words, to whether the games generate an equilibrium in the market. This strain of the work is likely to be of less interest to empirically oriented economists seeking to explain the operation of dynamic markets. Yet it may offer significant insights into the remarkable observed stability over time of many oligopoly markets in the United States.

In addition, game theory models also provide potentially potent tools for analyzing the agency problems that are the focus of the theoretical approach discussed in the next section. We now turn to this second approach.

Agency Theory Approaches

Agency theory is an important new theoretical approach to understanding market and firm organization. It uses transaction cost analysis to provide a general theory that encompasses several heretofore separate theories on the relationship between ownership in and control of large industrial corporations. These theories include institutional analyses by Veblen, Berle and Means, and Galbraith; theories of corporate finance by Fama and Jensen; and theories of mergers constructed by Manne, Fama, and Jensen.

When one stops to think, it is puzzling that microeconomic theory continues to conceptualize the firm as a production function rather than a complex organization with agency problems.[2/] Berle and Means in The Modern Corporation and Private Property (1932) were the first to point out a glitch in the theory of the firm when they documented that ownership can be, and often is, separate from control in larger corporations, thus removing the discipline imposed by the profit seeking owner/operator. They argued that corporate democracy often does not work, that stockholders have very limited power, that corporate managers have significant discretion with which to pursue their own goals, and that their conduct may or may not be compatible with stockholders' interests. Galbraith extolled the virtues of this separation and the ascendance of technocratic managers over market forces (see, for example, Galbraith 1971). Berle (1959) even wrote an eloquent book

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[2/] See Cotterill 1987, Rogers and Caswell 1988, and Caves 1980 for further discussion of this point.

Power Without Property, in which he argues that the universities and intellectual elite should be and are a check on the unfettered power of the business elite.

Throughout this era, the neoclassical theory of the firm was defended by many economists who argued, with Friedman (1953), that it is useful as long as large firms behave "as if" they are profit maximizing entrepreneurs. Understandably, many economists were not comfortable with either a theory of the firm that relied upon the noblesse oblige of a business or academic elite for resource allocation or with Friedman's black box approach. Industrial organization economists did considerable research on managerial discretion and the question of profit maximizing behavior in large corporations during the 1960s (Larner 1970, Marris 1963, Kamerschen 1968). Rather than being conclusively solved, the corporate control riddle simply receded.

The issue has been reopened by the work of Williamson (1981) on transaction costs and the internal organization of firms and by the development of agency theory during the 1980s (Fama 1980, Jensen 1983, Fama and Jensen 1983a, 1983b). Agency theory directly addresses the principal-agent problem that occurs when any person (principal) delegates authority to another person (agent) to perform desired activities. Because it is impossible to specify a complete contract, agents can engage in opportunistic behavior such as managerial shirking, self-dealing, and sub-optimization (Cotterill 1987). Agency theory seeks to identify the institutional structures, i.e., the market and internal firm governance structures, that minimize agency costs for the principals of the firm. In other words, it seeks to identify the disciplining factors, other than competition in input and output markets, that insure that firm management acts in the interests of firm owners.

Three potential disciplining factors are identified by agency theory: the board of directors, the executive labor market, and the market for corporate control. The board of directors is the first line of defense for protection of the interests of the firm's owners or residual claimants (Fama and Jensen 1983a: 312-15). If it is not effective, outside sources of discipline exist. The first of these is the operation of the executive labor market.

Fama's managerial labor market theory of social control is a provocative application of agency theory. He argues that the separation of security ownership and control is consistent with, and indeed is a fundamental feature of, modern corporate finance theories based upon portfolio diversification. It is also consistent with general equilibrium models of securities markets such as the capital asset pricing and arbitrage pricing models. Separation presents no discipline problems because management has an indirect but no less compelling interest than that of the stockholders in firm performance. In Fama's words:

> The managers of a firm rent a substantial lump of wealth--their human capital--to the firm, and the rental rates for their human capital signaled by the managerial labor market are likely to depend on the success or failure of the firm (Fama 1980: 291).

The manager is disciplined by the fact that salaries, via the executive labor market, reflect how well individual firms are managed. Since firm performance is determined, at least in part, by the performance of the entire management team, managers have a stake in the performance of those above and below them in the firm hierarchy. They will actively engage in two-way monitoring to discipline managerial performance, eliminate opportunistic behavior, and minimize agency costs.

The primary criticism of Fama's theory is its implicit assumption that the monetary reward structure produced by the managerial labor market is congruent with the interests of stockholders. In other words, it requires that the executive labor market work perfectly (i.e., experience no agency costs) in order for the agency costs associated with the separation of ownership and control to be minimized. This in turn requires perfect symmetry with respect to information pertaining to managerial performance (Hirschey 1986: 318). Thus the venue of the perfect market is shifted but the requirement of perfection remains in order for problems of corporate discipline to disappear. Nonetheless, this agency theory approach does suggest that firm and top management performance may depend on the structure of executive compensation packages and how they relate to other compensation packages available in the market. Herman and Lowenstein provide a serviceable introduction to and list of recent research on this topic (1986: 9-12).

Managerial labor markets notwithstanding, agency theory's major mechanism for disciplining management rests in the market for corporate control. Building upon Manne's 1965 insight, recent theorists reason that agency costs are minimized by the threat of hostile takeover and the completion of leveraged buyouts (Fama and Jensen 1983a, 1983b; Jensen 1986). The threat of hostile takeover acts as an external disciplining mechanism that forces slothful and opportunistic managers to shape up and maximize the transfer of wealth to stockholders or be replaced.

As possible explanation for leveraged buyouts and other related corporate restructuring moves, Jensen (1986) argues that a major problem in corporate finance and control is how to motivate managers to pay out cash rather than investing it internally at rates of return below the cost of capital or

wasting it on organizational inefficiencies. Managers can pay out cash by increasing dividends or buying back stock but both strategies leave managers with control over future discretionary cash flows. Increasing the leverage of the corporation, as occurs in a leveraged buyout (LBO), commits future cash flows to cover debt payments and thus controls the agency costs of free cash flow. Jensen also argues that issuing large amounts of debt to buy back stock has the same advantages.

Agency theory has value as an approach to understanding firms and markets because of its attempt to explore issues of internal management and corporate control. What is troubling about it is its blithe reliance on the existence of competitive markets and market forces, albeit one step removed from input and output markets, to ensure profit maximization in large organizations. These forces are thought to guide the organization of corporate hierarchies, the structuring of ownership and control relationships between stockholders and managers, and the financial and product structuring of corporations.

Applications to Measuring Industry Performance

Game and agency theories generate a wealth of performance hypotheses for empirical testing. Rather than enumerating a list of such hypotheses, we here discuss a major performance question facing industry on which both approaches may fruitfully be brought to bear. This is the issue of the motivations for and likely performance implications of the unprecedented number and size of mergers, acquisitions, leveraged buyouts, and other corporate restructurings taking place in the food and related industries.

The central performance and policy issue raised by these events is whether they are principally motivated by attempts to increase efficiency or market power, since their ultimate performance impacts will rest on the

balance between these two effects. The issue of efficiency versus market power has been (see, for example, Demsetz 1974) and remains a key controversy in industry and firm performance research. A fine review by Thomas (1986) concludes that both the Harvard (market power) and Chicago (efficiency) paradigms 'fail to effectively analyze the central issue of strategic planning - the sources of the industrial heterogeneity that constitute competitive advantage (p. 25)'. Corporate restructuring, as a major source of heterogeneity, is a prime area for testing and expanding the two paradigms. The new theoretical approaches discussed here, at least at their present level of development, tend toward opposing assessments of efficiency versus market power motivations. Game theory with its emphasis on strategic position and preemptive actions would suggest market power or self protection motivations for corporate restructuring. Agency theory with its emphasis on market mechanisms that reduce agency costs would suggest an efficiency motivation behind the same restructuring. The empirically oriented economist has an important role to play in this controversy.

In the area of takeovers, some empirical assessment of the market for corporate control theory has already been completed. Herman and Lowenstein (1986), for example, analyzed the pre-acquisition profitability of target firms and the before and after, long run (five year) accounting profitability of acquiring firms. Unlike the less reliable event studies of short run (30-60 day) stock price changes before and after merger announcement (see, e.g., Jensen and Ruback 1983; for a review see Geithman 1987), they find little evidence to support the theory that poorly managed firms were acquired during the early 1980s, although takeovers in the latter half of the 1970s did conform to the theory. They conclude that at the beginning of the current

merger wave there were bargains available but later acquirers paid full price for target firms (see also, Ravenscraft and Scherer 1987).

Further work on the performance impacts of both friendly and hostile takeovers is needed. We believe that examination of corollaries of agency theory will also yield useful indirect evidence on firm performance. The theory predicts, for example, that corporations with weak boards of directors, no dominant shareholder interests, and a low proportion of stock held by institutional investors will have higher agency costs and thus be more susceptible to takeover by firms with strong boards of directors. If the market for executive labor works, the managers of these firms should also be relatively low paid because their firms are poorly managed. All these are testable hypotheses.

Two examples of major corporate restructurings that occurred in the 1980s in the food industries illustrate the complexity of the corporate activities whose performance implications must be begun to be understood. The first is the purchase of Heublein by R.J. Reynolds in 1982 for approximately $1.4 billion. Reynolds subsequently combined the food lines of Heublein into its Del Monte division, acquired Nabisco Brands in 1985 for $4.9 billion, merged Del Monte into Nabisco Brands, and sold the remaining wine and alcoholic beverages businesses of Heublein for $1.2 billion in 1987. Other business lines were also sold after the Nabisco merger resulting in the current corporate structure of RJR-Nabisco. The second illustrative corporate restructuring is the attempted takeover of Safeway Stores by Dart Group in 1986 and the leveraged buyout that Safeway undertook in response. This restructuring required a massive increase in debt. Before Safeway went private in 1985, its total assets were $4.84 billion, $1.3 billion or 27

percent of which was long term debt. The leveraged buyout added another $4.63 billion in debt requiring sale of several major divisions to lower the debt load.

On the surface, it is difficult to imagine restructurings of this magnitude being explained by agency theories positing efficiency motivations of reducing agency costs. Yet there is no doubt that corporate reorganization reflects to some degree a reassessment of prevailing management strategies at both the corporate and line of business levels. The major performance question remains whether this reassessment is motivated by efficiency opportunities or market power opportunities arising from the current lax antitrust enforcement atmosphere. In the Safeway, Beatrice, and other leveraged buyout cases, as well as in many acquisitions, the market value of companies has often increased by billions of dollars overnight. These increases dwarf the assessments of the costs of monopoly power and X-inefficiency made in the 1970s for the entire food retailing and manufacturing industries (Marion et al. 1979, Parker and Connor 1979). These estimates were criticized as being too high but the deregulated capital markets of the 1980s, if agency theory is correct, appear to be identifying inefficiencies of much greater magnitude.

Alternatively, the emphasis of game theory on the importance of strategic position and market power may prove to be a more powerful tool than agency theory for understanding structural change within firms and industries and its performance implications. In either case, these new theories provide economists with new approaches to and impetus for performance research.

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