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Assumptions of rationality and equilibrium in strategy research: the limits of traditional economic analysis

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Abstract

We argue that two core assumptions of economic analysis – managers and employees make optimal decisions and markets operate in equilibrium – have undesirable implications in strategic management research. To show how these assumptions lead to dubious implications, we analyze two exemplars of the rigorous application of these assumptions in strategic management research: Barney's (1986a) 'Types of competition and the theory of strategy: toward an integrative framework' and Mosakowski's (1998) 'Managerial prescriptions under the resource-based view of strategy: the example of motivational techniques'. We also introduce the basics of a behavioral theory of the firm, which we claim is preferable to traditional economic analysis and its severely limiting assumptions. Finally, we argue that most research in strategic management takes an implicitly behavioral view and would benefit from making that view explicit.

Key words • behavioral theory • equilibrium • rationality

Frequently used theories of strategic management have been heavily influenced by economic analysis. Industrial organization economics, agency theory and the resource-based view (RBV), for example, all liberally draw from neo-classical economics. While these theories have aided our understanding of firm behavior and performance, the use of conventional economic analysis in strategic management research has substantial problems. The problems stem from two unrealistic core assumptions of most economic analysis: managers and employees make optimal decisions and markets operate in equilibrium.

Assuming optimal decisions and equilibrium has several undesirable characteristics in strategic management. First, these assumptions are inconsistent with the facts – empirical evidence clearly rejects general assumptions of optimal decision-making or equilibrium (Simon, 1997). Second, they are inconsistent with research that attempts to identify better or worse strategic choices – the optimality assumption means all choices were optimal. Third, they lead to

factually incorrect generalizations that have become widely stated. For example, the rationality and equilibrium assumptions imply there can be no rules that will improve performance (even for some subset of the population) – ‘no rules for riches’ (Barney, 1986b, 2001; Mosakowski, 1998; Rumelt et al., 1991). Yet, we have abundant examples of managerial innovations that have improved performance.

We argue that strategic management should adopt a behavioral perspective – basing research assumptions on what we know about how organizations and managers behave.¹ While some might respond to our criticism of optimality and equilibrium by arguing for the inclusion of ‘behavioral’ assumptions within essentially economic models, such efforts are generally ad hoc and inconsistent. They are ad hoc because the assumptions are chosen to make tractable models rather than to reflect empirical facts (Conlisk, 1996). They are inconsistent in that they generally assume optimal decision-making or equilibrium in parts of the model while rejecting it in other parts.

We begin by describing how these assumptions impede progress in strategic management research. We also introduce the basics of a behavioral view of the firm, which we believe explains firm behavior better than does traditional economic analysis and its severely limiting assumptions. A behavioral view of the firm is primarily associated with the decision process view of the organization and a cognitive processing view of the individual, as opposed to an optimizing or economically rational view of the organization or individual. However, a behavioral view encompasses other (consistent) behavioral approaches that emphasize various other facets of the firm such as psychological contracts (Rousseau, 2001), norms and culture (Scott, 1995), and almost all conventional organizations theory. While these emphasize different facets of the organization, they all share a common underlying view of individuals and organizations.

Next, we analyze two papers that are exemplars of the use of economic analysis in strategic management research: Barney’s (1986a) ‘Types of competition and the theory of strategy: toward an integrative framework’ and Mosakowski’s (1998) ‘Managerial prescriptions under the resource-based view of strategy: the example of motivational techniques’. We chose these papers because they are among the most rigorous attempts to build a theory of strategy using the traditional economic assumptions of rationality and equilibrium. While praising these papers for their rigorous analysis, we will show how the assumptions of rationality and equilibrium lead to dubious implications. We chose these two papers to critique because their rigor illustrates most clearly the problems of assuming rationality and equilibrium.

Before addressing the problems with these assumptions, we must briefly outline the objectives of strategic management research. Without surveying in depth the literature on objectives of strategic management research (see Rumelt et al., 1991 for example), the field generally tries to:

- 1 *Explain firm behaviors at the strategic level* – as in any applied discipline, we need to understand the behavior of the fundamental building blocks. Our building blocks are competing firms so we need to understand firm behavior. The strategic management research agenda takes firm behavior at a relatively aggregate level.
- 2 *Explain performance differences among firms* – we want to understand why some firms prosper and others do not.
- 3 *Provide suggestions on improving firm performance* – if we understand how firms behave and what influences firm performance, we open the possibility of offering suggestions for behavior that may improve performance.

Some might question whether we need to understand firm behavior to explain performance differences or offer suggestions for improving performance. In general, if we want to understand the quality of a given performance, we need to understand the processes involved in that performance. Trying to develop prescriptions without understanding the underlying processes is like trying to do medicine with an incorrect understanding of anatomy and physiology. You may be able to predict some gross phenomena, but face severe handicaps in prescription or explanation at the individual level.

Thus, we will ask how assumptions of equilibrium and rationality influence strategic management theories attempting to address these objectives.²

Basic problems with equilibrium and rationality

Krugman (1996) notes:

... the overwhelming thrust of conventional theory has been to say that agents are not only intelligent, they maximize – that is, they choose the best of all feasible alternatives. And when they interact, we assume that what they do is achieve an equilibrium, in which each individual is doing the best he can given what all the others are doing.

That is, conventional economic analysis rests on two pillars: (1) *rational optimization* by agents – here rational optimization means that the agent chooses the best of all possible alternatives, and (2) *equilibrium* – no actor in a competitive situation can unilaterally act to increase his or her expected utility payoff (Nash, 1950). While other definitions of rationality and equilibrium exist, the definitions here fit most applications in strategic management.

While economics includes a wide variety of work including various definitions of rationality and equilibrium, given our interest in strategic management, we focus on how those terms have been used and interpreted in strategic management scholarship. Most work in strategic management that assumes rationality or equilibrium uses the terms in the senses defined above.

The assumption of optimal decision-making simplifies the life of the economists by making choices a strict function of the tangible preconditions. For example, in the Structure–Conduct–Performance paradigm underlying Porter’s (1985) competitive analysis, if firms behave rationally given the structure of their environments, we can directly relate structure to performance. However, this simplification creates problems for strategy researchers who often want to understand how managerial choices influence performance.

If one assumes all firms make optimal choices, then the choice really has little interesting content. In such a world, choices simply reflect tangible preconditions. For example, if all firms make optimal diversification choices, any tie between diversification and performance must be explained strictly in terms of the preconditions leading firms to certain diversification choices. Assuming the choices were optimal makes it logically impossible to say one firm made better diversification choices than another or to prescribe alternative diversification choices.

Equilibrium offers an equally desperate problem. By definition, if a market is in equilibrium firms cannot improve their situations. This makes any effort at prescription inherently illogical.

Empirically, both optimal decision-making and equilibrium have been shown to be either incorrect descriptions of firm (and individual) behavior or, at the very least, not generally correct descriptions of firm behavior. At the individual level, behavioral decision theory offers a plethora of ways in which individuals deviate from optimal decision-making (Kahneman et al., 1982; Yates, 1992). That firms can adopt tools that improve their performance demonstrates that their prior decisions were not optimal. We have clear evidence in many areas of operations research and operations management where mathematical tools have improved scheduling and a variety of operational activities, producing substantial improvements in profitability (see, for instance, reports of management science applications in *Interfaces*, the practice-oriented journal of INFORMS). We have less clear evidence from many areas of business research (including strategic management) suggesting firms make suboptimal decisions. We also have casual observation that many firms are simply badly run. That new management can come in and improve firm performance demonstrates the firms were not optimally run.

If firms do not make optimal decisions, then markets generally should not reach equilibria (since the firms in the market could improve their positions by making better decisions). While we might find an equilibrium in some area (e.g. pricing of airlines for specific flights), the industry overall may still be in disequilibrium (as the airline industry structure with massive losses is clearly not in equilibrium). Even Friedman’s (1953) classic defense of optimization and equilibrium assumptions did not attempt to justify them as fitting the empirical facts.

Thus, rationality and equilibrium assumptions are empirically incorrect, and they create direct logical problems in pursuing the objectives of strategic management research.³

Defenses of rationality and equilibrium

In presenting these arguments, we have elicited a number of common defenses of rationality and equilibrium assumptions. We list the most common defenses (in italics) and our counter-arguments:

(1) *Economics uses a number of bounded rationality models.* Economists do build what they call bounded rationality models, but calling these models 'bounded rationality' often comes from misappropriation of the term. For a behaviorist (including Simon [1947], who introduced the term to both the management and economics fields and whom economists routinely cite in using the term), bounded rationality implies assuming a level of information and information-processing ability consistent with what we know people actually have.

Economists frequently use the term to mean everyone does not have perfect information and information-processing capabilities. In agency theory models, the principal does not know how much effort the agent is exerting on the principal's behalf, although the agent knows the optimal actions to maximize returns to the principal and to the agent. In macroeconomic work, Sargent's (1993) *Bounded Rationality in Macroeconomics* moves from the rational expectations assumption to assuming all the agents in the economy have the knowledge and tools of the most advanced economic theorists and econometricians but still face the data and estimation problems the econometricians face. In short, a behaviorist takes bounded rationality to mean we must account for the known limitations of human cognition, while economic models of bounded rationality often take perfect rationality and then introduce some small lack of information.

(2) *The theoretical insights from an equilibrium analysis inform us even if the world is not in equilibrium.* We acknowledge that in quite simple situations the use of neo-classical economics and its assumptions may provide insights, but they can also lead us to obviously incorrect conclusions (see the discussion of rules for riches below). Economically oriented scholars may claim that knowing the characteristics of one equilibrium and then the characteristics of a new equilibrium when things change will help us understand how firms change. However, if markets do not reach equilibrium, then analyzing how they move from one place we know they are not to another place we know they will not reach is potentially misleading and tells us little about how markets actually change.

In a very similar problem, the theory of the second best in welfare economics indicates that an equilibrium analysis has no relevance if all the assumptions of the analysis are not true (Samuelson, 1947; Davis and Whinston, 1965; Bohm, 1967). The best alternative under one set of assumptions does not have to be 'near' or 'similar to' the best alternative if you give up any of the assumptions for the optimization analysis.

Furthermore, the theoretical insights seldom depend on the rationality or equilibrium assumptions. For example, the predictions of agency theory we use in strategic management are (i) managers respond to personal incentives so incentives tied to stock price should aid performance, and (ii) managers reflect

risk aversion in their evaluation of incentives. Implicitly, the studies assume managers get little pleasure from working in a successful company. We do not need rationality assumptions to justify these implications – indeed, as Simon (1997) notes, the prediction here comes from the ad hoc assumptions rather than the rationality assumption. The assumption that managers are self-interested, risk averse and get little or no utility from corporate success underlies the predictions, not rationality.

(3) *The correctness of assumptions is irrelevant if the model predicts in the area of interest (Friedman, 1953).* Numerous scholars both within and outside economics have rejected this simple positivist approach (see Caldwell [1984] for examples). Over and above the general criticisms, strategic management creates additional problems for the positivist position. Such general prediction might suffice for aggregate analysis, but to understand which firms succeed, we need to understand the mechanisms that generate the success. To parallel Friedman's famous pool example, while the laws of physics may explain the movement of balls on a pool table, they do not help us explain why one player won and another lost. That is, if firm success comes from firm behaviors, we need to understand the determinants of those behaviors to understand success.

Furthermore, as we will show below, the assumptions have led directly to extremely questionable predictions, particularly associated with the non-existence of rules that can help firms improve performance.

(4) *One should not take 'rationality' and 'equilibrium' too literally.* We see this as trying to avoid the inconvenient logical implications of these assumptions (Mosakowski, 1998). In any logical or rigorous discussion, one cannot simply choose some of the implications of one's assumptions and ignore those that are inconvenient. Note that our colleagues in finance take these identical assumptions seriously when they use the 'no rules for riches' guide as a test of market efficiency (Fama, 1970). Why should work in strategic management take its assumptions less seriously than work in finance? Indeed, to do so demonstrates a lack of rigor.

(5) *Even if firms cannot calculate as rational theory assumes they do, market processes and learning will lead them to optima.* While it is tempting to assume firms will learn the important facts relevant to their strategies, even a casual examination of the actual problems shows such learning is unlikely. For many strategic choices (acquisitions, diversification, corporate structural form, strategic decision processes, etc.), firms get insufficient observations to make reliable inferences. Firms do not try out many alternative diversification strategies, corporate structures, strategic decision processes, etc. and so lack the data to make reliable inferences. For example, Fredrickson and Iaquinto (1989) found effective decision processes vary with environmental uncertainty, but the firms in their sample on average moved to less desirable processes over time. The data problems facing strategic management scholars are massively magnified for managers who largely focus on data from their own companies and want good predictions for their companies – not some average for the industry.

Within the operations and technology literatures, path dependence and the existence of multiple optima open similar problems. Since firms and technologies largely adapt from prior conditions, they may not reach the true optima. They may get adept at a less desirable technology and be unable to move to the optimum (Levitt and March [1988] call this a competency trap). The firms or technologies that might be optimal if the market reached the optimum may be unable to survive until that event occurs.

A behavioral alternative

Pointing to difficulties of rationality and equilibrium without offering an alternative seems unfair. However, an alternative does exist, and it turns out many strategy scholars have used the alternative for years, if without full recognition.

Strategy has two intellectual foundations it might rest on. First, it might adopt conventional economic assumptions – firms optimize profits, markets are in equilibrium, and so forth. While this approach can be used with a variety of different ancillary assumptions, any given paper keeps these within bounds to limit the complexity of the model. As Simon (1979) said, while the economists' models assume everyone optimizes, when it comes to their own models, economists satisfice.

Alternatively, strategy may adopt a behavioral view. A behavioral view accepts psychological and sociological findings about organizations. It recognizes bounded rationality, emotions, and a variety of other factors. Any given model will simplify, but behavioral scholars assume that we want to reflect the true behavior of firms. Instead of firms optimizing, we have firms that sometimes search for ways to improve profits. Instead of equilibrium, we have markets that exist and operate which may sometimes approximate the economists' equilibrium, but, in general, we assume people could change their behavior in ways that may improve their performance.

A behavioral perspective requires that the simplifications made agree with or reflect our understanding of individuals and organizations. Such simplifications may highlight one aspect of behavior rather than another. Thus, one study might highlight the influence of education on cognition whereas another might highlight personality traits. However, both of these relate back to clear psychological foundations. The assumptions derive from our understanding of the next lower level (how individuals process information and make decisions) rather than from assumptions of rationality and equilibrium that are seen as facilitating analysis.

Much of the behavioral tradition in strategic management traces its intellectual heritage to Cyert and March's (1963) *Behavioral Theory of the Firm* (BTOF). Other behavioral approaches to the firm that are consistent with the BTOF include those based on psychological contracts (Rousseau, 2001) and norms and institutions (Scott, 1995). All of these constitute different emphases,

but have common and largely consistent underlying assumptions. That is, boundedly rational individuals and organizations (the emphasis in the BTOF) will rely on psychological contracts and norms. While not constituting a coherent aggregate theory at this time, they are consistent parts of the puzzle. Note that optimization models do not constitute a consistent theory either, because they often make contradictory assumptions – for example, agency theories and theories that assume firm profit maximization are inconsistent.

The BTOF argues that firms constitute coalitions involving a variety of stakeholders. Firms survive when they can generate sufficient value that the various necessary stakeholders remain in the coalition. For business firms, this means doing things that generate revenues that can be used to offer inducements to stakeholders to remain in the coalition. Rather than fully aligning behavior with a clear objective, the firm continually faces conflict over what to do and deals with this conflict by resolving different problems within its own domain rather than resolving overall conflict (termed quasi-resolution of conflict). Firms have employees and exist as firms rather than sets of market transactions because it is markedly more efficient to contract in general for a class of exchanges (e.g. an employee will undertake any of a set of duties), rather than to negotiate each exchange separately.

While the BTOF emphasizes this model of the coalition, it recognizes that the creation of an organization results in other phenomena. Members of the organization often identify with the organization, or with parts of the organization (Simon, 1947). Complex sets of agreements, both implicit and explicit, become established – psychological or formal contracts (Rousseau, 2001). Identification, use of common information, selection and other factors influence how the members of the organization perceive and interpret their environments (Weick, 1979). These, and a number of other organizational factors, influence the organization's behavior.

Markets are institutions where organizations or individuals exchange goods or services, normally for payment. Markets are powerful institutions – the structure of a market may strongly influence the exchanges taken despite widely varying decision rules for the participants (Gode and Sunder, 1993; Sunder, 2002). However, markets are not idealized single exchange locations (as in conventional economics); we must model and understand markets based on the specific characteristics of each market. For example, while simple models of markets often imply only one price for a given product (the 'law of one price', seen for example in stock exchanges), behavioral observation of markets clearly finds substantial price variation for many standard products – just watch the prices for gasoline as one drives to work (Bromiley et al., 2002).

Following March and Simon (1958) and Simon (1947), the BTOF sees most firm behaviors reflecting routines. The vast majority of what firms do is done by their routines – large or even modest sized organizations cannot function without routines. Routines save on computation (e.g. we do not have to analyze anew each problem every time we see it), and offer predictability allow-

ing coordination. Just think about the number of coordinated activities needed so that a faculty member can teach a class. We need routines to get students (recruit, select, advise, house, fund, etc.), arrange classes (determining what to offer, who will offer it, when and where to offer it), and have classrooms ready (entailing all the physical plant activities). Without routines that let most participants count on activities of other participants, the job just could not be done.

The BTOF emphasizes that hunger drives change. Firms and managers have aspiration levels on various dimensions (e.g. levels of pay, sales, profits, etc. that they see as satisfactory). When the expected or actual outcome on a particular dimension falls below the aspired level, firms search to find ways of improving performance on that particular dimension. When firms find an acceptable alternative (one which gets expected performance above the aspiration level), they tend to adopt it without additional search.

While this is the core of the BTOF, it stands as a theory subject to elaboration and modification. Although the theory emphasizes the change that comes from the aspiration process noted above, it also recognizes other ways changes may evolve. Some routines are designed to create changes (e.g. new product development or new business development departments). Some changes come from external arrival of solutions or new capabilities (e.g. new managerial techniques or technologies may be sold to the company). Finally, some may reflect top management acting as they believe their roles require them; such role definitions include making changes.

Models based on the BTOF have been applied in a variety of areas. Cyert and March (1963) included a simulation that predicted the evolution of a duopoly. Levinthal (1997) and Rivkin (2000) show that local firm search rules can lead to suboptimal outcomes. Bromiley (1991), Greve (1998), and others have applied the theory to explain changes in risk-taking and strategic choices. Nelson and Winter's (1982) *Evolutionary Theory of Economic Change* can be seen as applying a model of the firm as routines to the problem of firm or industry-level technological advance. Nelson and Winter adopt a neo-Schumpeterian perspective that rejects the equilibria assumptions of neo-classical economics. Subsequent work on dynamic capabilities within firms (e.g. Kogut and Zander, 1992; Teece et al., 1997; Zollo and Winter, 2002) explains firm routines too; however, Foss (2003) argues that this work tends to ignore the important effects of individual bounded rationality on firm routines.

In contrast to economic modeling that takes rationality and equilibrium as maintained assumptions,⁴ a BTOF view of the world should adapt as our understanding of managerial and firm behavior changes. For example, models that emphasize the cost and difficulty of information-processing predict changes in strategic decisions with changes in information-processing abilities. We should note that many necessary extensions and applications of the BTOF related to strategy have not been considered. For example, while Nelson and Winter consider technological change in essentially commodity markets from a BTOF

position, we lack serious analysis of competition in differentiated markets from a BTOF position.

Having laid out a behavioral approach, let us examine more directly two outstanding theoretical papers based on rationality in strategic management. We do this to show how the rationality and equilibrium assumptions lead to difficulties when handled rigorously.

Barney and the resource-based view of the firm

The RBV started as a way to explain differences in firm performance without giving up equilibrium and rationality assumptions. Lippman and Rumelt (1982) begin with the unpleasant fact that in most industries, most of the time, firms differ in performance and these differences do not simply appear as random variation. The differences survive over time. Lippman and Rumelt (1982) argued that most conventional economic models make such continued differential performance problematic. Thus, their paper developed a model by which rational firms have different performance levels in market equilibrium.

However, the Lippman and Rumelt (1982) solution appears ad hoc – they solve the problem of firms having differing performance characteristics by simply having firms choose their production functions from some random distribution. While this can give differences in performance in equilibrium, it does not strike us as a particularly interesting explanation for those differences. First, it fails to explain why firms choose their production functions from this random distribution. Second, it also seems quite contrary to what we know about how technologies develop (see Levinthal and Myatt, 1994, for a discussion of capability development) and how firms manage their production processes. Finally, it implies that managers cannot influence firms' expected value.

Later developments in the RBV often incorporate either explicitly or implicitly the unrealistic assumptions of rationality and equilibrium. For example, Peteraf (1993) and Wernerfelt (1984) both use analyses that either explicitly or implicitly assume equilibrium and choice-optimization. Barney (2001: 54) argues for the RBV by saying, 'I believe that the equilibrium approach to understanding sustained strategic advantage in the 1991 paper is very powerful.'

Additionally, the RBV generally suffers from lack of rigor because these assumptions are often inconsistently applied (Bromiley and Fleming, 2002). By rigor, we mean logical consistency between clearly defined assumptions and conclusions. For the purpose of this paper, we will focus on what we believe to be one of the best and most rigorous examples of RBV theoretical work. Barney (1986a) provides an outstanding attempt to explain firm performance differences within an industry using a conventional economic analysis. He accepts the problem as posed by Lippman and Rumelt (1982) – how can rational firms have different performance levels in industries with no entry barriers and in equilibrium?

Barney (1986a, 1991) follows this line of logic to argue that firms can have 'resources' which provide performance differences in equilibrium. His resources play the role of the randomly selected production function in Lippman and Rumelt. However, Barney argues that managers must not understand their firm's resources. If managers understood their resources then other firms could obtain or re-create those resources by hiring managers from the focal firm or by similar activities. Thus, this perspective on the RBV emphasizes the things that make it possible for firms to keep their secrets (uncertain imitability) so that others will not copy their resources.

Note how Barney uses bounded rationality. If managers completely understood their resources and those of others, then we would expect almost all advantage to be competed away – the 'no rules for riches' problem. Strictly to solve this problem and with no empirical justification, Barney assumes managers do not understand their resources – a form of bounded rationality. This ad hoc determining of assumptions for convenience is quite standard in the economic literature (Simon, 1997). There is also of course no reason why they should understand everything else (necessary for equilibrium), but not understand one particular thing (resources).

Instead of this extreme characterization, it seems more reasonable that if a firm does something well other firms may want to learn how to do it. However, this process is by no means as clear as Barney suggests. Assume a given set of firm behaviors or characteristics positively influences firm performance in a given market. Before other competitors can steal this set of behaviors, they must recognize that this set of behaviors has value. Thus, we would expect competitors might not copy some firm characteristics that positively influence performance because the competition does not recognize the value of these particular characteristics.

Next, after competing firms understand the value of a given behavior, they must be able to replicate the behavior and choose to do so. Many businesses may recognize a competitor does something better than they do, but choose not to try to copy it because they have more promising things to pursue, or because copying appears very difficult. An odd contrast exists between the literature that tries to understand how to improve technology transfer and Barney's RBV.

Barney assumes that resources transfer if a firm's managers understand them. This may reflect an assumption that such transfers are easy, or an assumption that the market is in equilibrium, in which case we are only concerned with the situation after all economically viable transfers have occurred. The transfer assumption reflects the rational view of organizations that generally credits competitors with high levels of information and understanding. The equilibrium assumption implies that as long as competitors could improve their position by hiring managers from the focal firm (who would bring understanding of how to create the resource), the market is not in equilibrium. Thus, Barney gets logically to the conclusion that managers must not understand their resources.

People who study technology transfer, on the other hand, emphasize the difficulties in copying technology or transferring skills. Indeed, the literature (Szulanski, 1995) is filled with descriptions of situations where firms cannot transfer skills within their own organization, let alone have those skills copied by someone outside the firm.

Another weakness of the RBV is its failure to adequately explain how resources create value and, consequently, lead to competitive advantage. For example, Priem and Butler (2001a) argue that the RBV is tautological when it states that (1) the probability of achieving competitive advantage is a positive function of the joint occurrence of resource value and rarity, and (2) both competitive advantage and value are defined in terms of increasing efficiency and effectiveness. Priem and Butler also argue that ascertaining value is indeterminate in RBV because the external factors that lead to competitive value are neither independently defined nor determinable in the theory.

The reader may wonder why, if the RBV is flawed, studies find support for it. A large percentage of the studies that allude to the RBV do so simply to justify studying how firms differ. These studies use some other theory to actually derive their hypotheses. Thus, many papers that claim to be related to the RBV neither confirm nor test it. For example, Zaheer and Zaheer's (1997) outstanding study of competition in global currency trading alludes to the RBV, but justifies its hypotheses based on network theory. In addition, Priem and Butler (2001b) cite numerous studies about which they argue that while researchers often tend to paraphrase or cite Barney's work they do not define their terms of interest in the original, underlying RBV terms. Barney (2001) admits that many empirical papers that cite his RBV papers are not actually direct tests of the theory but rather are 'used primarily to help establish the context of some empirical research, for example, that the focus is on the performance implications of some internal attribute of a firm' (p. 46).

The citing of the RBV at the beginning of papers that rely on other theories appears to reflect a belief that before the RBV strategic management research emphasized industry analysis predominately. As Barney (2001: 54) said, 'the 1991 article was helpful in reintroducing firm attributes into strategic management research after a period in which work focused almost exclusively on industry determinants of firm performance'. Other scholars have offered similar claims (cf. Priem and Butler, 2001b; Dierickx and Cool, 1989). As noted in Bromiley and Fleming (2002), this is empirically wrong. From the founding of, for example, *Strategic Management Journal*, inter-firm differences in performance based on firm rather than industry characteristics have been the predominant focus of strategic management research. Indeed, industry-analysis-based studies have never been more than a small proportion of strategic management research. Anyone who doubts this should simply peruse the article titles from *Strategic Management Journal* – our review suggests far less than 20% of the articles used industry approaches. The overwhelming majority of articles across all years consider inter-firm differences in behavior that influence performance.

The field of strategic management has recognized that differences in firm abilities strongly influenced firm strategies from its earliest days (Teece et al., 1997). As Schendel (1994) notes, the behavioral study of competition was central to early work in strategic management. Learned et al. (1965) and Andrews (1971) emphasized the need to develop and recognize what the firm did well as a central component in developing business strategies. Indeed, Jay Barney once said in an Academy of Management symposium that the RBV is old wine in new bottles.

Even when studies test something that may be associated with the RBV, many studies do not do it in a consistent or appropriate manner. For example, they often confuse sustainable competitive advantage with abnormal returns in equilibrium (Richard, 2000; Powell, 1995). Abnormal returns in equilibrium and sustainable competitive advantage differ. A firm might have sustainable competitive advantage but compete in a market that for a long period has not been in equilibrium. For example, the industry structures of the airline, banking, and financial services industries have been adjusting to deregulation from the 1970s (i.e., have not been in equilibrium) for at least two decades. A firm with competitive advantage in these industries does so in a disequilibrium industry structure. Alternatively, one might have abnormal returns in a short-lived equilibrium.

Note that the idea of sustained competitive advantage comes from equilibrium logic (Foss, 1997). Lippman and Rumelt (1982) and Barney (1986a) deal with equilibrium, as does Peteraf (1993) in her influential paper on the RBV. She argues that monopoly or Ricardian rents, concepts that come from conventional economics using the assumptions of rationality and equilibrium, arise from resource heterogeneity. Inherent if implicit in discussions of sustained competitive advantage is an efficient market model that argues most firms will earn normal profits. Thus, we are only interested in the few that consistently earn more. Note how radically this differs from a traditional focus on straight performance (for example annual Return on Assets [ROA] or shareholder returns) where we are just as interested in explaining how the losers differ from the average as how the average firms differ from the superior.

Why would we only be interested in differentiating between firms with sustained competitive advantage and others? After all, *almost half the firms would improve their performance just by becoming average*. Furthermore, if we take a stockholder returns view, the appropriate objective is the net present value of expected returns, regardless of whether those returns are stable or fluctuate randomly above and below average (assuming appropriate discounting for future returns). The sustained competitive advantage view seems to come out of a market model that assumes everyone makes normal returns with the exception of a few particularly gifted firms. However, this is clearly not the case in most of the industries we study. Return on assets and stockholder returns do not have some large peak at a normal return level. Instead, they have a variety of different, and often quite odd distributions. If we really wanted to empirically examine

sustained competitive advantage or profits in equilibrium, we would need to take these issues seriously.

A behavioral view of Barney and the resource-based view of the firm

A behaviorist might interpret the basic story in the RBV very differently from Barney. A firm includes a variety of things – physical, intellectual, and human assets, reputation, structure, products, processes, etc. These components interrelate in a complex system. Routines constitute one of the components that comprise a firm. The outputs of the firm can be described along a variety of dimensions (termed characteristics).

Instead of describing the characteristics of the firm as ‘resources’ we would view them as descriptive characteristics of the organization and its processes. The things that the firm does are not clean, neat ‘resources’ or ‘capabilities’ but rather outputs of a complex system. The RBV’s practice of labeling characteristics of firms or their products as ‘resources’ gives the impression that these things have meaningful existence. Barney (1986b) uses the concept of ‘strategic factor market’ defined as ‘a market where the resources necessary to implement a strategy are acquired’ to analyze the cost of implementing product market strategies (Dierickx and Cool, 1989). Although Dierickx and Cool challenge the idea that all resources can be traded, their characterization of asset ‘stocks’ corresponds to Barney’s (2001) emphasis on resources as meaningful and manageable things.

A behavioral perspective makes the tie from characteristics (RBV’s resources) to performance more complex than Barney’s RBV suggests. By assuming that managers use their resources optimally, the RBV can essentially eliminate the importance of managerial choice. That is, the RBV discusses a direct relation from resources to performance:

Resource \Rightarrow Performance

The direct tie from resources to performance only exists if you assume firms make optimal decisions – they use their resources in the way that gives most value. Without this assumption, scholars would have to recognize the possibility that a firm uses its resources in less than optimal ways and would have to consider those utilization decisions.

Attempts by RBV scholars such as Amit and Shoemaker (1993) and Conner and Prahalad (1996) to incorporate bounded rationality more directly into the RBV do not overcome these shortcomings. Neither, in our view, do attempts to integrate the dynamic capabilities view with the RBV (Teece et al., 1997) or Resource-Advantage Theory with the RBV (Hunt and Arnett, 2003). While Amit and Shoemaker (1993) introduce behavioral decision theory and its emphasis on non-optimal decision-making into the RBV they also retain the

RBV's explanation (by implicitly accepting Barney's arguments) for the persistence of rents in equilibrium and its corollary assumption of rationality. However, behavioral decision theory assumes bounded rationality which makes the concept of equilibrium generally untenable. Similarly, in their attempt to develop RBV into a theory of the firm, Conner and Prahalad (1996) invoke bounded rationality to explain how a firm's most important resource, knowledge, affects the choice of whether to organize as a firm or contract through the market; however, they fail to acknowledge the inconsistent application of bounded rationality within the RBV generally. In summary, these attempts to integrate behavioral views with the RBV are inherently contradictory as they try to reconcile each view's different core assumptions (Bromiley and Fleming, 2002).

Figure 1 lays out a behavioral alternative to the RBV. In the short run, a firm has a pre-existing set of physical, intellectual, and human assets, reputation, structure, products, processes, etc. These can be described by a set of characteristics. However, given these characteristics, management must decide in which markets to compete. RBV discussions can ignore the influence of product markets by assuming everyone picks the best possible market. Instead, in a behavioral view, the tie between firm characteristics and outcomes/performance depends on managerial choices and market conditions. The mix of things the firm can do and the arenas in which it chooses to compete influence the firm's performance. Firms with a given set of process characteristics will have different performance outcomes depending on how management chooses to use those characteristics (e.g. what markets it attempts to compete in, how it tries to compete, etc.) and the actions of others in those markets (e.g. competitors, customers, etc.). Instead of a neat tie from resources to performance, we have a complex tie from characteristics to performance depending on a variety of factors.

Note also that the returns depend on the entire set of characteristics of the firm as evaluated in the markets in which it chooses to compete, not a single 'resource' like innovation or customer service. The same process that creates a desirable characteristic (e.g. high quality) may also generate undesirable characteristics (e.g. high price). Scholars often define resources as factors that positively influence competitive advantage, which by definition means undesirable features cannot be resources. However, a given characteristic could positively influence value if used in one market in conjunction with a particular set of other characteristics, but negatively influence value if used in another market or with a different set of other characteristics. Although Leonard-Barton (1992) and Montgomery (1995) expand RBV's concept of capabilities to include the possibility of simultaneously enhancing and inhibiting firm value, the RBV generally examines resources in isolation and largely ignores the complex interdependencies among firm behaviors.

Managerial choices, competitive conditions, and firm characteristics are endogenous. Unlike the RBV and most equilibrium views, the behavioral view naturally addresses adaptation and change. The BTOF emphasizes how feedback influences managerial choices and changes firm processes. Thus, we clearly have

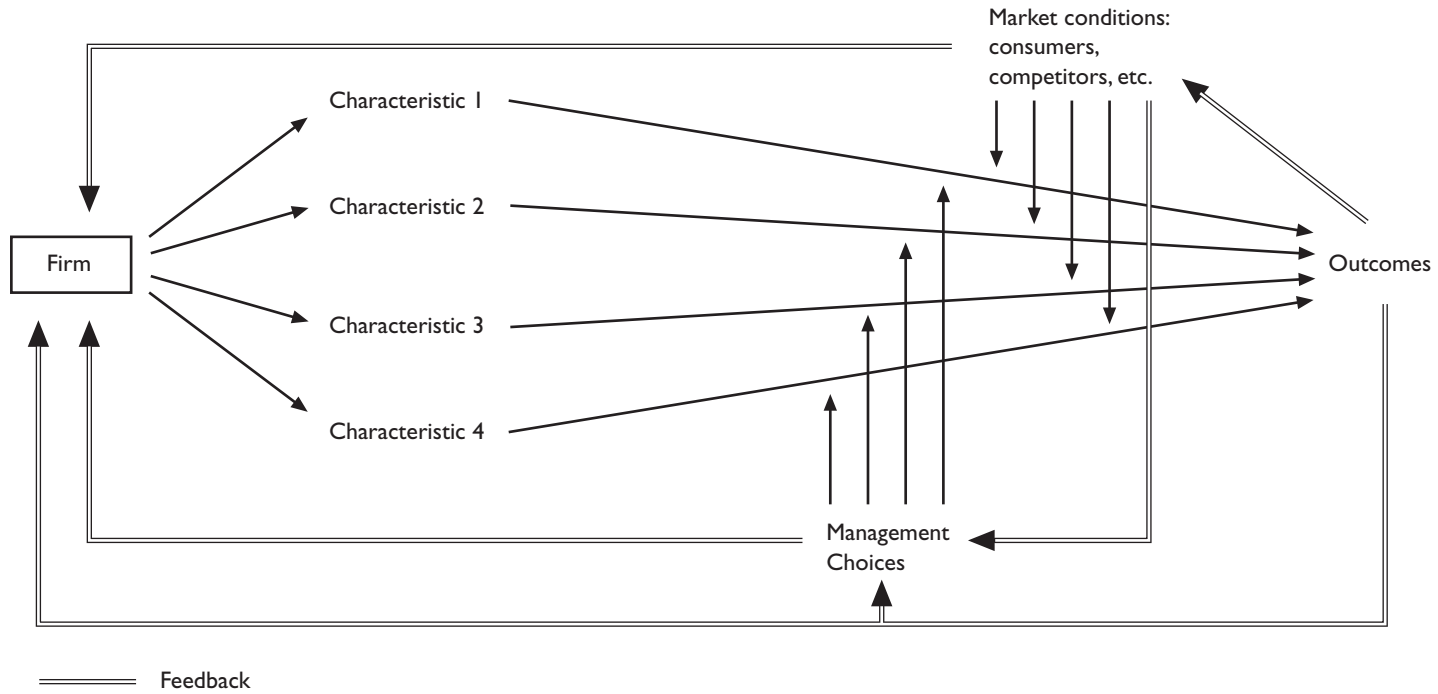


Figure 1 A behavioral alternative to the RBV

feedback from outcomes to managerial choices, competitive conditions, and firm processes. Management choices vary depending on perceived outcomes. Both directly and through conscious managerial choices, outcomes may influence the firm. Competitive and competitor activities will influence the firm directly and through managerial choices. Finally, the competitive environment may vary with outcomes as competitors react to their performance feedback and customers change their perceptions.

The dynamic model in Figure 1 should include numerous delays. Managerial decisions adapt to outcomes with lags. Firm processes likewise adapt to outcomes and management choices with lags. The external market conditions often adapt with lags.

Adaptation in the firm, managerial choices, and markets occurs in predictable but not optimal ways. Managerial choices react in a non-linear way to performance variations (March and Shapira, 1987). Decisions depend on perceptions that may be inaccurate (March and Simon, 1958). Managers search for ways to improve, but their search faces severe limitations. A massive research literature deals with performance feedback, managerial decisions and organizational change (see Greve [forthcoming] for an introduction).

The figure omits important factors associated with knowledge transfer across firms and does not model within-firm changes. Immense literatures on the diffusion of innovation and knowledge transfer should inform how we model how firms learn from others. Likewise, various literatures consider how firms change themselves. Such changes often emphasize changes in routines, but also include changes in product lines, R&D allocation, etc.

The behaviorist view offers advantages over the RBV. First, it recognizes that many of the things a firm can do may have no intrinsic value but rather influence the value a firm generates by competing in a given market or markets. By labeling the characteristics 'resources' the RBV equates them with our normal usage of resources (money, labor, etc.). However, the RBV resources differ from these others in that meaningful and independent markets exist for the others but not for many RBV resources. Thus, we can meaningfully talk about the value of a factory or a restaurant building but not about the value of the RBV's intangible resources.

Second, firms do not always pick the optimal market in which to use a given ability – not only does a behaviorist reject the idea of anyone generally doing anything optimally, but also competition generally requires multiple capabilities so that a given market will use some well and others less well. A behavioral view allows for such problems.

Mosakowski (1998) and rules for riches

We chose to examine Mosakowski (1998) because this work takes the rationality and equilibrium assumptions quite seriously and attempts to solve the problems

they create. While several fine scholars in strategic management (Barney, 1986b, 2001; Rumelt et al., 1991) have claimed there can be no rules for riches (i.e. no general rules that increase a firm's profits), Mosakowski is the first to ask rigorously what strategic management would look like without rules for riches.

Arguments claiming no rules for riches can exist generally make two important assumptions: economically rational decision-making and reasonably efficient information transfer. Fundamentally, the argument is: if you had a rule that would improve performance in a competitive environment, everyone would learn this rule and so it would not work. A similar argument in finance is used to define market efficiency as essentially the non-existence of rules for riches. In strategic management research, it rules out the possibility of providing prescriptive results that influence expected levels of performance. For example, Barney (2001) states that the RBV is mute on the subject of how managers *create* value because there can be no rules for riches, and further, 'even if a "rule for riches" created economic value, that value would be fully appropriated by those who invented and marketed this rule' (p. 50).

Mosakowski (1998) attacks this problem straight on. First, she spends much of the paper attempting to discredit the claims of goal-setting theorists that many firms could improve their performance if they adopted goal-setting techniques. Note that the 'no rules for riches' is clearly refuted if one finds firms have not adopted techniques that would improve their performance.

Next, she tries to generate a justification for managerial decisions in this kind of intellectual structure. Without rules for riches, we cannot have systematic ways to select alternatives with high expected value; she argues that managerial choices all have the same expected value. Noting Lippman and Rumelt (1982), she argues that a given random event may provide the possibility of riches even if all have the same expected value. In the Lippman and Rumelt model, this possibility of riches is modeled as a draw on a distribution from which higher values give positive returns.

Even if every 'draw' on this uncertain technology has the same expected value, if each draw involves some cost, managers may be able to influence their probability of having above normal returns. For example, a firm that makes no draws would have a probability of .5 of having above average returns. A firm that took a draw would have a distribution of potential outcomes that involved their original state minus the cost of the draw plus the stochastically distributed potential benefits of the draw.

Her solution to this problem requires a transformation of the objective of the corporation. Instead of attempting to increase expected performance (because the expected performance is equal for all participants), her firm attempts to maximize 'the cumulative probability associated with earning any positive rent level' (Mosakowski, 1998: 1170–1). In other words, the firm cannot influence its expected returns, but can influence the distribution around that expected value.

Mosakowski finds much of the prescriptive literature in the RBV unhelpful. She notes that most of the recommendations to find important resources do not tell us much about what we really should do. She ends up recommending that we look not at simple expected value but rather at the distributions of returns. She says: 'to understand the impact of managerial prescriptions, we must know the shapes the distributions associated with alternative managerial choices' (Mosakowski, 1998: 1179). She assumes that managers cannot change the expected value of returns, but can change their distribution.

Accepting Mosakowski's explanation would radically transform the entire field. If managerial choices cannot influence expected value then no patterns of managerial choice should explain expected value. This implies the large number of studies in strategic management that claim to find relations between management choices and performance are profoundly flawed. Risk becomes *the* interesting issue involving managerial choice in the field. We certainly would not need to teach managers how to find or create high expected value projects – the only thing differentiating projects is their risk characteristics. Indeed, if there cannot be rules to improve firm expected value, much of conventional management research and management education scholarship would be pointless.

A behavioral view of rules for riches

A young agricultural college graduate stops by the side of the road and watches a farmer working. After a while the graduate calls to the farmer and says, 'I could show you how to do that much better.'

The farmer calls back saying, 'Kid, I'm already farming only half as well as I know how to.' (traditional joke)

The problem with the 'no rules for riches' story is that it assumes everybody learns everything and uses that knowledge. If that were the case and everyone followed the rule, there would be no differentiation among actors. Consider, however, any skilled activity, such as playing bridge, playing chess, or skiing. For all of these activities, we have books on how to improve your performance. As a beginning chess player or bridge player, these books provide very clear rules, which can certainly help performance. Indeed most serious competitors in these areas rely on rules. Perhaps at the very top of the competitive structure, we may not find rules that will help performance, but such rules will help everyone else. There is no reason to assume that this pattern does not hold in the far more complicated world of management. Strategic management makes chess look trivial; chess is a perfect-information, two-person game with a tiny number of potential moves at each stage, while strategy has massively imperfect information, many players, unclear rules, and so many potential moves that they cannot be enumerated. If everyone cannot learn optimal rules for chess, they certainly cannot in strategic management.

Mosakowski's argument (and the entire 'no rules for riches' story) collapses if we have rules that could improve performance. This would arise when some firms either do not know the rules exist or do not act on them. Note that her argument requires that there cannot even be potential (not yet discovered) rules that would increase performance. Assuming managerial choices are optimal means managers follow optimal decision rules, which would include any potential rules. That is, the 'no rules for riches' does not just say you do not have rules now, but rather that no potential rules exist.

Empirical work in many areas seems to suggest techniques have existed or can be found that aid firms. Armour and Teece (1978) showed changes in organization structure positively influenced performance. Operations research applications often directly save firms millions of dollars by better scheduling, plant design, etc. The quality movement relied on techniques that existed for decades, yet US industry suffered substantially from higher-quality Japanese products in computer chips, automobiles, and other areas. Academics in strategy publish papers showing factors associated with performance. Faculty members in all areas of the business school teach techniques that they certainly believe can improve the performance of many firms. If we believed all firms operated optimally (i.e. there were no rules for riches), then there is little point in business schools or business school research. The assumption that no techniques exist that can improve business performance for many firms is empirically incorrect.

To summarize, a behaviorist would strongly object to the idea there exist no rules that would improve the performance of many firms. Again, half the firms in the population would do better just to be average. Furthermore, potential rules may exist but people just have not found them yet. Even once techniques are invented, they do not instantly diffuse to all those who could use them. Firms that could benefit from a particular rule may not know of it, may not be sure it will help, may be occupied with other things, or may not adopt it for political reasons. Many things explain people not adopting rules that could improve their lot.

The problem parallels the development of rules for skilled performance in any area. Superstars may exist for whom additional rules will not help performance. Perhaps at the grand master or global champion level in chess, all the players know all the beneficial simple rules that could exist. However, most players are not at this level. True beginners can benefit from the most elementary rules. Even moderately skilled players benefit from more advanced rules. Indeed, teaching skilled performance in many areas constitutes a ladder of increasingly sophisticated rules.

The skilled performance of a firm improving its behavior has the same features. Firms differ greatly in their capabilities. Some extremely well managed firms may be already exploiting many of the 'rules for riches' – adopting useful innovations. However, the opposite is also true – very badly managed firms do exist. In addition, as always, the great majority sits in the middle. Many firms could do many things better than they do.

Conclusion

Research has clearly demonstrated that firms and individuals seldom make optimal decisions, and markets seldom reach equilibrium, yet some strategy scholars continue to work with models that make these assumptions. Knowing the assumptions are incorrect makes the conclusions vacuous. We believe most strategy scholars have implicitly made less extreme assumptions, and that the field in general should do so.

We began this paper by describing the three objectives of strategic management research: explain firm behavior, explain performance differences among firms, and provide suggestions on improving firm performance. We first argued that assumptions of rationality and equilibrium create logical problems in addressing these objectives. We have attempted to show that the behavioral view is more realistic and more appropriate for studying complex and dynamic organizations than a rational, equilibrium approach. In both the formal RBV and the 'no rules for riches' arguments, we have shown that rationality and equilibrium assumptions lead to serious problems.

Part of the lack of clarity in RBV discussions comes from scholars seeing papers that make contradictory fundamental assumptions as 'RBV'. For example, the Teece et al. (1997) article on dynamic capabilities is often seen as related to RBV, but it takes an explicitly Schumpeterian, non-equilibrium approach. Likewise, a referee on this paper saw N-K models as relevant to the RBV, yet such models assume bounded rationality. The 'low church' RBV scholars essentially take the RBV's 'what you do better than the competition gives you advantage' insight, but ignore the rationality and equilibrium arguments. Such studies would achieve greater theoretical clarity if they clearly differentiated their positions from the rationality and equilibrium arguments of the RBV.

Studies that attempt to relate strategic choices to future performance usually assume some firms make mistakes in their strategic choices. For example, if all firms make optimal market entry choices, any association between market entry and performance should really be explained by the preconditions that resulted in firms making their (optimal) entry choices. Studying how diversification choices influence performance generally implies assuming some firms make better diversification choices than others (see Bergh, 2001 for a review). Entry, diversification, etc. per se only have interesting impacts on performance if firms differ in the skill of their decision-making. In other words, many strategy content studies (including some under the RBV label) implicitly take a behavioral perspective.

We have examined in depth two studies because they highlight important features of the equilibrium and rationality problem. Many presentations of the RBV make rationality and equilibrium assumptions and so have the same kinds of problems Barney (1986a) offers. All studies assuming rationality and equilibrium face the problems Mosakowski (1998) identifies. However, we know of no study that offers an alternative to Mosakowski's (1998) solution, and no

empirical study that explicitly accepts her solution (that all choices have the same expected value).

In short, we advocate moving from rationality and equilibrium assumptions (even if often ignored in practice), to a straightforward behavioral perspective. All the reasonable predictions from equilibrium and rationality models can be readily justified within a behavioral approach, but we rid ourselves of the unreasonable ones. A behavioral perspective lets us be more rigorous and avoid the damage caused by faith in incorrect assumptions.

Notes

We wish to thank Scott Johnson for comments on an earlier draft.

- 1 Bromiley (forthcoming) presents more detailed discussion of these issues.
- 2 Note that we are discussing behavioral versus rationality and equilibrium as foundations for strategic management research, not the difference between content and process. Both content and process work can take either perspective. Indeed, if examined closely, much of the content work in strategic management really takes a behavioral position in that it makes assumptions that would be rejected under rationality or equilibrium assumptions. Part of our argument is that such work would benefit from an explicitly behavioral foundation.
- 3 Perhaps reflective of these assumptions, some economists see game theory as 'The Theory of Business Strategy' (Shapiro, 1989). With optimal decision-making, the structure of the problem (which game theory addresses) becomes all that is of interest. However, as Bromiley (forthcoming) argues, the challenge in many real games comes from bounded rationality. Chess is trivial in game theory because game theory assumes optimal decision-making (and automatically infinite computing power) yet chess challenges brilliant humans because we cannot compute the necessary solutions. Few, if any, real strategic management problems are as simple as chess (a two-person, zero sum, perfect information game with only a small number of potential moves at any time). If bounded rationality transforms chess from trivial to extremely challenging (and makes the game theory analysis largely irrelevant), it will also do so for most strategic management problems.
- 4 Simon (1997) argues that unlike sciences such as physics or chemistry, the core assumptions of economics are held inviolate with empirical anomalies being managed by changing ancillary assumptions. Simon argues that in other sciences, results inconsistent with models result in re-examination of basic assumptions, as for example physics has re-examined its assumptions about the universe depending on empirical results.

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