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INVESTORS REACTIONS TO COMPETITIVE ACTIONS AMONG RIVALS: A STEP TOWARD STRATEGIC ASSET PRICING THEORY

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ABSTRACT OF DISSERTATION

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A dissertation submitted in partial fulfillment of the
requirements of the degree of Doctor of Philosophy
in the College of Business and Economics
at the University of Kentucky

By

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Lexington, Kentucky

Director: Dr. Walter J. Ferrier, Gatton Endowed Associate Professor of Management

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INVESTORS' REACTIONS TO COMPETITIVE ACTIONS AMONG RIVALS: A STEP TOWARD STRATEGIC ASSET PRICING THEORY

This dissertation describes the development and empirical testing of *strategic asset pricing theory* (STRAPT). This explains the processes by which investors form ideas and judgments about a given firm's competitive strategy, and their ultimate belief about the impact these strategies will have on the firm's future stock price. My model explicitly accounts for information investors associate with dimensions of a firm's pattern of competitive actions, how investors process and interpret this information, and how they form opinions about the relationship between competitive strategy and future value of the firm's equity shares. Thus, by accounting for observed competitive behavior, my model stands in stark contrast to asset pricing theory – which asserts that financial markets are efficient and all investors rational – and instead sides with Hirshleifer (2001) who contends some investors form biases, and that the next stage of asset pricing theory is to look at how investors form opinions about stocks. Drawing from some unique theoretical areas: information perception/salience, information processing, social judgment, and decision making, my dissertation develops a conceptual model of this process by which *long-buyers* and *short-sellers* view and react to patterns of competitive actions carried out among rivals.

My findings about how long-buyers regard between-firm "differences" in the pattern of competitive actions the firm carries out over time, or strategic heterogeneity, are generally supportive of Miller and Chen (1996), who posited that distinctive processes such as heterogeneous strategies may decrease the "legitimacy" of the firm. They exhibit a negative relationship with stock returns. Due to a different decision-making process, short-sellers come to different conclusions. Strategic heterogeneity exhibits a U-shaped relationship with short interest. My findings pertaining to how long-buyers value the number of strategic moves carried out by a firm generally support Young, Smith, and Grimm (1996) and Ferrier (2001). Specifically, I demonstrate that these investors value exposure to a firm, and this translates into positive stock market returns. Short-sellers, on the other hand, see the value of a large number of strategic actions only to an extent. Through their systematic analysis, they subscribe to the Porter (1980) and Shamsie (1990) viewpoint that more is not always better. This results in a U-shaped relationship with short interest.

KEYWORDS: asset pricing theory; behavioral finance; cognitive psychology; competitive dynamics; decision-making

Margaret V. Hughes

May 2, 2008

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To My Dearest Family

ACKNOWLEDGMENTS

"*The most valuable commodity I know of is information. Wouldn't you agree?"*
--- Gordon Gekko

In the past five years, the power and truth of these words really began to sink in. In academia, we create and pass on information, and this knowledge creation and transmission in the form of teaching and research has made these past five years the most rewarding of my life.

Along the way, I have been fortunate to share these experiences with many individuals who, by their own example, encouraged me to persevere, both professionally and personally. The first individual to contact me regarding the doctoral program at UK was Dr. Walter Ferrier. From day one, Wally believed in me, inspired me and provided me with many opportunities to learn and grow. I would like to thank Wally for his endless patience and wisdom– and for his box seats on the finish line at Keeneland. I truly value Wally's ongoing friendship and support. For many of the same reasons, I would also like to thank Dr. Joe Labianca who devoted numerous hours to my academic development. Joe's common-sense advice, keen wisdom, and quick wit contributed a great deal to my sanity and success during the program. The efforts and helpful feedback of these two individuals enabled me to achieve two very important goals associated with the doctoral program – completing this dissertation and securing gainful employment. Thank you.

In addition to these individuals, I would like to further thank the members of my dissertation committee – Dr. Ajay Mehra, Dr. Emery Yao, Dr. Jeff Reuer, and Dr. James Fackler – for their time and dedication. Ajay was a constant source of advice and good humor. Watching him and Joe "discuss" issues pertaining to important social networks research topics has prepared me for the critique of my own ideas that I am sure will come as I venture into the realm of assistant professor. Emery has also been a constant source of support and advice. He showed much enthusiasm for even my minor successes along the way, and that was helpful in keeping my spirits high. I thank Jeff for serving on my committee and I look forward to his future camaraderie. We have made him an honorary Kentuckian and he has become a wonderful role model for me. As the outside member, I value Dr. Fackler's economic expertise and am grateful he volunteered for this role.

I would also like to thank Brian Dineen, who has explained complex methods approaches to me and made them look easy. Thanks to Brian, I have skills that will be very valuable to my future research. I also thank Michelle Duffy and Jason Shaw who have always been willing to lend an ear, provide sound advice, and in Jason's immortal words, encouraged me to "carry on". The insight, generosity, and devotion of all of these individuals has been invaluable, and I am sincerely grateful.

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Next, I would like to thank my family. I could never possibly begin to express my heartfelt gratitude, appreciation, love and admiration for them. First, I would like to recognize my mother and father, Sally and Ben Hughes, for being amazing parents who always believed in me and encouraged me to pursue my dreams. I would also like to thank them for making each and every one of these possible along the way. I thank Aunt Gracia and Uncle John, who took a great interest in my program. As a Professor of Journalism, Uncle John understood the challenges of a doctoral program and gave me a great deal of encouragement. Thank you!

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CHAPTER 1

INTRODUCTION

Future earnings of any firm are difficult to forecast; however, estimates of this potential are a key aspect of valuing a firm's equity shares. How is this done? What do investors evaluate to forecast this future earnings capability? And who are these investors? Do they all think the same way and arrive at similar conclusions? This dissertation seeks to take a step toward incorporating neurofinance into strategy research by addressing the question: What do investors think?

Finance and strategy scholars have turned extensively to "traditional" measures of performance such as return on assets or earnings per share to forecast future performance. However, I believe that investors, those with the most at stake in valuing equity shares, scrutinize factors other than these conventional evaluation measures. I propose that they look at strategy, in particular competitive strategy—or the interaction of competitive moves between firms. I think investors scan, analyze, and interpret the value-creating potential associated with the competitive interaction—the pace, intensity, and pattern of dynamic competitive rivalry—in a given industry. Thus, rivalry may be viewed as an underexplored component of stock valuations whereby competitive strategy is defined and characterized as the unfolding of competitive moves carried out by rivals in strategic time.

In the context of competitive interaction "… misinterpretation [by rivals] of the intended moves of the competitor is a constant hazard" (Bettis and Weeks 1987, 552, brackets added). Investors also deal with this same interpretive risk. I believe that these investors appraise, to some extent, the patterns associated with the interplay of each rival's competitive moves, and consider these questions: (1) How different are the company's competitive patterns from those of rivals? (2) How difficult is it to understand a company's competitive patterns compared with rivals' patterns? (3) How visible is the company on the "radar screen" every day as compared with the visibility of the referent competition? For example, Bettis and Weeks (1987) found that although both Kodak's and Polaroid's market value declined during the 1976–1977 time period, Kodak's losses were greater than Polaroid's. Why? What did Polaroid do to outperform Kodak? At the beginning of the observation period, investors apparently conjectured that Kodak would

fend off Polaroid's attacks on its market position. However, these attacks exposed some of Kodak's weaknesses. The investment community, interpreting the Kodak–Polaroid battle as it unfolded, adjusted Kodak's future earnings estimates downward. So the central question my study proposes to answer is how these investors come to conclusions about the viability of the pattern of a firm's competitive moves in contributing to future earnings growth. More important, do all investors think alike and come to the same conclusion? The "efficient markets hypothesis" from finance tells us that they do. I will argue otherwise.

According to the efficient markets hypothesis—a key tenet of asset pricing theory—financial markets are "informationally efficient." That is, prices on traded assets, for example, stocks and bonds, already reflect all known information and therefore are unbiased in the sense that they incorporate the collective beliefs of all investors about future prospects (Fama 1970). However, scholars working in the area of behavioral finance have recently begun to question the efficient markets hypothesis. Indeed, this emerging field has shown that a myriad of factors affect how investors form opinions about stocks, from the home country of the equity in question to the amount of sunlight in the city where the exchange on which the stock is listed is located (Hirshleifer 2001). This implies that not *all* investors always act rationally. In fact, when a stock is purchased by one investor, an investor on the other side of the transaction is *selling* the security, indicating that the investors do not have the same opinion as the efficient markets hypothesis would espouse. What leads to these differing opinions? The following excerpt demonstrates a possible cause (*Business Week*, August 5, 1996):

> Manuel Asensio … who runs Asensio & Co., a New York hedge fund, is a rarity among short-sellers, for he is anything but secretive…Asensio has shared his views with the message boards of America Online Inc., where they are welcomed. But Wall Street is another matter. Asensio and other shorts complain that brokerage analysts and fund managers have a uniformly hostile attitude and are loath to even return their calls. "I would love for someone to call me and tell me that a stock that I own is a piece of s---," says Asensio. "But I'll talk to some pension-fund manager who owns $4 million of some stock, which he bought with employee money. I'll tell him something is wrong with the company—and he gets emotional! It is ridiculous. It is irresponsible."

The above quotation highlights two classes of investors—long-buyers and short-sellers—who apply very different cognitive processes to the selection of stocks they want to buy, hold, or sell. Long-buyers are those who buy a stock with the expectation that the price of the shares will go up. Short-sellers, on the other hand, borrow shares of a stock and sell them on the open market with the expectation that the share price will go down. In many cases, these are shares in the same company. Thus, consistent with views in behavioral finance, various classes of investors incorporate relevant or public information differently, leading to conflicting assessments of the value of a corporation's equity shares, and possibly even mispricing the equity shares.

Hirshleifer (2001, 1533) contended that the "great missing chapter in asset-pricing theory … is a model of the process by which people form and transmit ideas about markets and securities." Thus, the goal of my dissertation is to develop a model of this process for long-buyers and short-sellers in the arena of strategic management. My central research design synthesizes theories from competitive dynamics with ideas from social judgment theory and cognitive psychology to extend a subset of asset pricing theory that explores the distinct decision-making processes of these two classes of investors when evaluating competitive strategies.

I develop and empirically test *STRategic Asset Pricing Theory* (STRAPT) with a model of the processes by which investors form ideas about firms' competitive strategies and their ultimate belief about the impact these strategies will have on stock prices. Specifically, I unify several areas of psychological thought that have yet to be cohesively applied to investor decision-making. Interlinking these diverse theoretical viewpoints causes a new theory to emerge that provides both a platform for testing new empirical relationships and a framework within which to analyze problems related to investor decision-making. Globally, STRAPT has four stages presented in chronological order as if viewed as a framework. First, I describe the overall decision-making process as informed by social judgment theory. This theory describes how individuals process pieces of information, or "cues" and infer outcomes based on these cues. Second, I explain the manner in which investors "code" this information as evidenced by information theory. This theory posits that people have strong propensities to discover patterns in sequences of events presented by the environment along continuums such as complexity-simplicity, and to

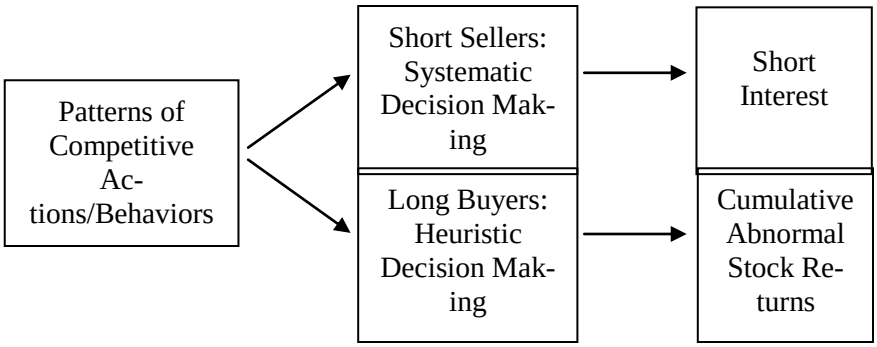
use these patterns to predict positive or negative future outcomes. Third, I describe what makes these patterns of cues salient to investors. Fourth, I make predictions as to the extent to which the competitive information is processed using heuristic versus systematic decision-making models. Heuristic decision-making requires less effort, and people often use heuristic choice rules when they have large amounts of information to process. When the stakes are high, people generally use a more effortful, or systematic decision-making process. I then hypothesize as to how the combination of these cognitive principles leads to evaluations of corporate strategies by long-buyers and short-sellers based on their interpretation of the patterns they see. Thus, I incorporate the information investors consider, how they process and interpret this information, and how they form opinions about whether these strategic patterns will positively or negatively affect the future value of corporations' equity shares.

In addition to studying long-buyers, I have chosen to examine the decision processes and actions of short-sellers. According to scholars in finance, these investors are the most informed investors because of the high cost and significant risk involved in shorting stocks (Diamond and Verrechia 1987). Evaluation of the mental processes and actions of this group of investors is unprecedented in strategy research and is of utmost importance because they have more information, and short interest (the number of shares sold short relative to the outstanding float) is a variable that finance scholars have shown to have a devastating impact on stock prices (Dechow, Hutton, Meulbruck, and Sloan 2001). Conceptually, the construct of short interest represents investors negative speculation of the potential downside risk of a firm's equity shares. A critical element of this future potential is the stance the company takes in the marketplace as exhibited by the strategic moves it carries out.

I believe that because short-sellers incur higher cost and risk, they use this more thorough or *systematic* decision-making process (Chaiken 1980) as compared with long-buyers. The long-buyer, faced with less to lose, excessive amounts of information, and considerable time constraints, will resort to the more efficient *heuristic*-based decision-making process (Tversky and Kahneman 1974) where the buyer relies on cognitive shortcuts to avoid the cost of complex information processing. I predict that, in contrast to the central tenets of the efficient markets hypothesis, which supposes that all investors act

"rationally" (or in the same manner), the different decision-making processes of long-buyers and short-sellers will lead to different evaluations of the extent to which various strategies will enhance or diminish a firm's worth. Thus, stock valuations are indeed influenced by disparate investor perceptions of competitive behavior manifest in the complexity and differentiated patterns in the competitive moves carried out among rivals. My model is depicted in Figure 1 below:

Figure 1



I begin by providing a detailed review of short-selling and asset pricing theory, as these concepts are new to strategy and key components of STRAPT. I then discuss the field of competitive dynamics, as it is the cornerstone of STRAPT. I subsequently develop the theoretical framework of investor psychology and explain how I chose to characterize strategies, why investors should find the various measures of competitive strategy to be salient, and why these various types of strategies prompt investors to develop positive or, more important, negative opinions of a given firm's strategy as it unfolds. I proceed with my hypotheses, model and data descriptions, results, and concluding remarks that justify why exploration of this phenomenon is important to the field of strategy as a whole, and competitive dynamics in particular.

CHAPTER 2

CONCEPTUAL BACKGROUND

BACKGROUND ON SHORT SELLING

Short-selling in finance and commerce is a form of speculation based on anticipation of a decline in the prices of securities and commodities. This type of selling occurs most frequently in connection with the sale of securities on stock markets. Short-sellers sell stocks that they do not own but have borrowed, instead, from a brokerage house, generally a large institutional investor or broker-dealer. For example, an investor who wants to sell short 100 shares of a company, believing the shares are overpriced and that their price will fall, will borrow the shares and promise to return them later. The investor then sells the borrowed shares at the current market price. If the price of the shares drops, the investor "covers the short position" by buying back the shares and returning them to the lender. The profit is the difference between the price at which the stock was sold and the cost to buy it back, minus commissions and expenses for borrowing the stock. However, if the price of the shares increases, the potential losses are *unlimited*. The company's shares may continue to rise, and at some point the investor has to replace the 100 shares he or she sold. As Figure 2 illustrates, if an investor sold Google stock short at its inception in August of 2004 for $100, by December of that year if the investor covered, or bought the shares back, that investor would have lost almost $100 per share.

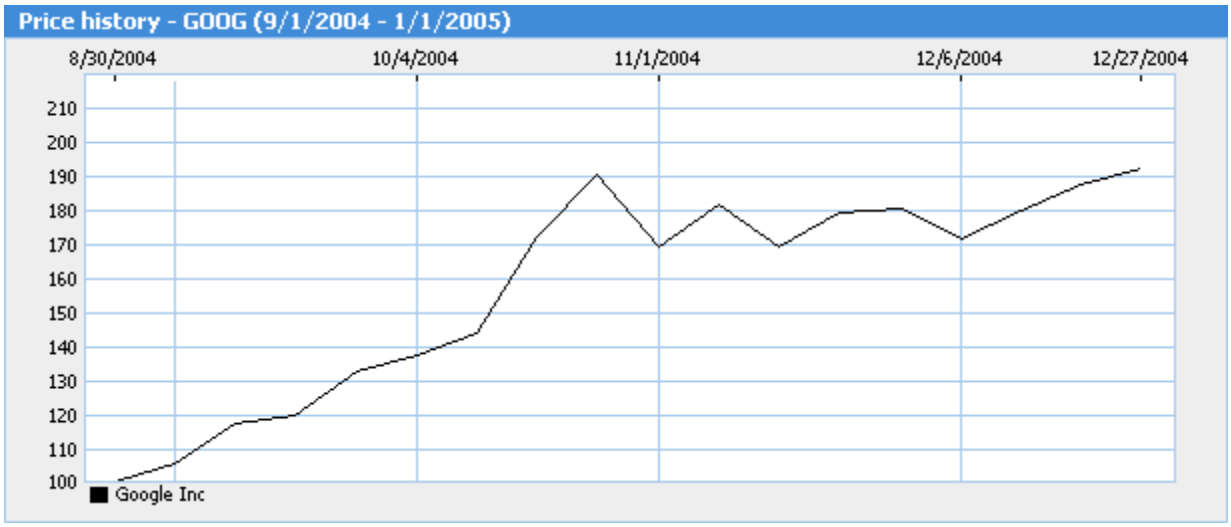
Say the investor thought that by hanging on to the short position for just a while longer the stock would come back down. Figure 3 demonstrates that the investor would never have made money, but if the investor covered the investment in December of last year, the investor's loss would have been $600 per share, or six times the value of the stock in the first place.

This demonstrates that losses can mount without limit until the short position is covered. For this reason, short-selling is a very risky technique that investors would not undertake lightly.

The impetus for examining the characteristics of companies that have a large amount of their stock shorted is quite compelling. Dechow et al. (2001) found that for firms with no short positions, the average one-year-ahead abnormal return is 2.3%, while

for firms with over 5% shorted, the average abnormal return is *negative 18.1%*. For each of the categories with short positions, the average abnormal return is significantly lower than the average abnormal return for the firm-years with no short positions (the authors sort firm-years into six categories based on the magnitude of the short position in the stock).

Figure 2



Adapted from CNBC.com

Figure 3

Adapted from CNBC.com

Ancillary to the impact on stock price is that information from short sales is extremely important as a valuation tool because it quickly disseminates information about negative investor perceptions of corporate strategies. Analyst over-optimism is well documented in the finance literature. Lin and McNichols (1997) found that analysts whose employers have underwriting relationships with a company—relationships in which financial services such as initial public offerings are offered for a fee—issue more favorable investment recommendations than do unaffiliated analysts. Francis and Philbrick (1993) suggested that analysts want to maintain favor with management because management is a source of analyst information. In addition, McNichols and O'Brien (1997) documented that analysts infrequently issue sell recommendations. So, in some cases, short sales are the only method by which to obtain potential negative information, which is ultimately parlayed into decreased company valuations.

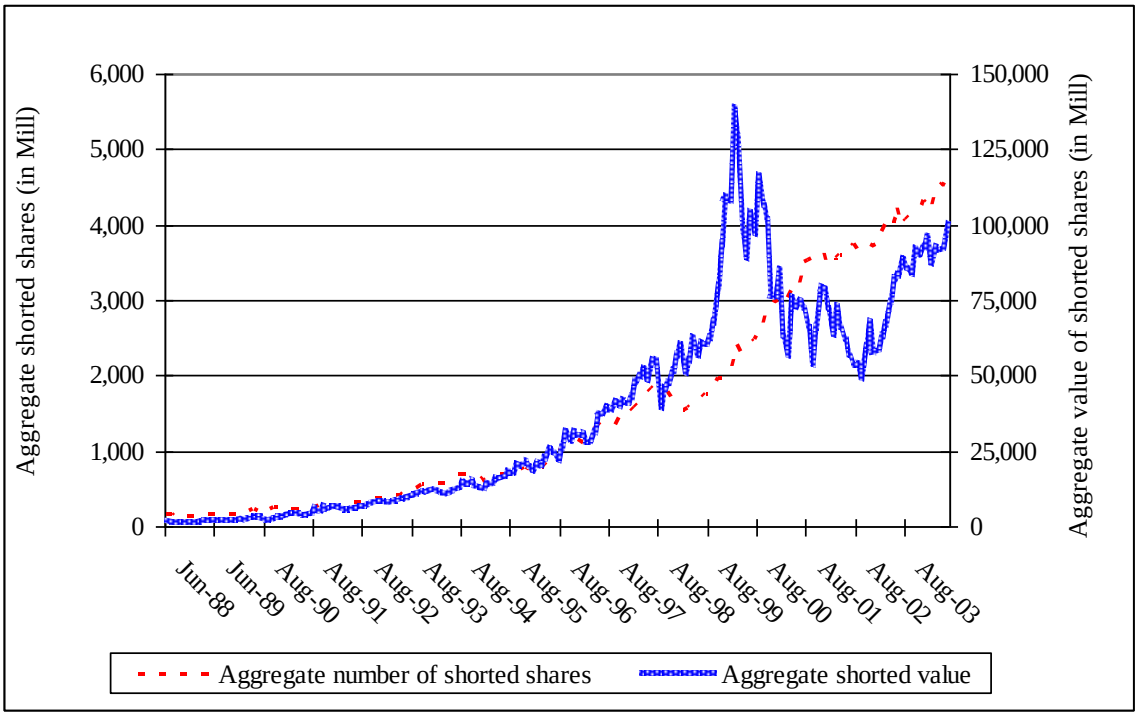
Because of the high risk involved with short-selling, and because of its putative potential for manipulating stock prices, short-selling is heavily regulated in U.S. stock markets and is not allowed in many foreign stock markets. In addition, the fund charters for many institutional investors prohibit them from selling short or restrict the size of their short positions relative to the overall size of their portfolios. However, the growing popularity of hedge funds (unregulated funds that hedge long positions with a significant amount of short-selling), has led to skyrocketing short-selling. As Figure 4 demonstrates, short sales have increased 20-fold in the last 20 years. In fact, short sales are having such an impact on markets that the *Financial Times* recently reported that a Senate banking panel is holding hearings to investigate how the explosive growth of hedge funds is influencing financial markets.

Regulation in the United States has developed because of the considerable damage to stock prices short-sellers can cause, and short-sellers "remain reviled today by corporate managers" (Asquith, Pathak, and Ritter 2005). SEC rules allow investors to sell short only on an uptick or a zero-plus tick[1] (the stock price has increased), to prevent

[1] According to the tick test, the security can be sold short at a price that is higher than the last trade (i.e., the short sale can be the uptick) or at the same price as the previous trade (zero uptick) if the previous trade was executed at a higher price than the trade that preceded it. Effectively, if the last trade prior to the short sale was a downtick or a zerotick (e.g., following a trade at $100, the last trade was executed at $100 or below) then the short-sale must be executed as an uptick, at a price higher than $100. On the other hand, if the

"pool operators" from driving down a stock price through heavy short-selling, then buying the shares for a large profit. These regulations act to further increase the cost of short-selling.

Figure 4



Time series of monthly relative aggregate shorted shares and shorted value on NASDAQ (NASDAQ.com)

Thus, because short sales are sharply rising and severely affect stock prices and because sellers more closely analyze firm characteristics than buyers do, it is essential that strategy scholars flesh out which aspects of strategic and managerial characteristics prompt short-sellers to establish positions. In fact, the evidence that short-sellers are the most informed investors is so pervasive, Francis, Venkatachalam, and Zhang (2005) state:

> …it is not unreasonable to think that analysts' revisions are a *response* to the information conveyed by short positions. Alternatively, analysts' revisions may be a response to a more direct signal conveyed by the short seller to analysts. [The authors subsequently empirically prove these suppositions.]

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last trade is an uptick (e.g., following a trade at $100, the last trade was at $101.5) than the short-sale can be a zerotick, which means that it can be executed at the same price as the last trade.

Mechanisms of a Short Sale

When a broker facilitates the delivery of a client's short-sale, the client is charged a fee for this service. The fee is typically accrued daily and charged monthly, starting on the day that the short-sale settles and concluding on the day that the short position is "closed out." This adds incremental "short financing cost" to the strategy of short-selling, and therefore decreases the profit potential of short-selling. It should also be noted that contrary to standard finance theory, the short-seller often does not enjoy the benefits of the proceeds of the short-sale, but generally the revenue is escrowed as collateral for the owner of the borrowed shares. Typically, the short-seller receives interest on the proceeds, but the rate received (the "rebate") is below the market rate. Regulation T, set by the Federal Reserve, requires short-sellers of stocks to deposit additional collateral of 50% of the market value of the shorted shares. If the price of the shorted stock rises, increasing the liability of the short-seller, additional collateral funds are generally required. The tax treatment of short positions contributes to the high cost of short-selling. All profits from a short-sale are taxed at the short-term capital gains rate, no matter how long the short position is open. Finally, the short-seller is required to reimburse the stock lender for any dividends or other distributions paid to the shareholders of the shorted stock while the short position is open. Because the ex-dividend stock price of the shorted stock is generally higher than the pre-dividend stock price less the amount of the dividend (Frank and Jagannathan 1998), dividend reimbursement represents a real cost to the short-seller (in addition to inconvenience and transactions costs).

Adding further to the risk is that the standard stock-lending practice requires the loan to be repaid on demand. This practice exposes short-sellers to the risk of being "squeezed." A short-squeeze occurs when the lender of the borrowed shares wants to sell the stock. If the short-seller is unable to find an alternative lender, the short-seller must repurchase the shares in the open market to repay the loan and close the position, known as "buy-in" risk. To avoid this risk, a short-seller can borrow on a term basis for an additional fee, but most short-sellers seem to prefer the risk of a squeeze to the cost of a term loan, and term loans are rare. To help short-sellers assess the probability of a squeeze, the broker will sometimes reveal the identity of the lender of the shorted stock. Generally, a short-squeeze is less likely for more liquid securities, such as large market-capitalization

stocks with high institutional ownership, because it is easier for brokers to find alternative lenders of such stocks if the original lender demands the return of the borrowed shares.

This review serves to illustrate the considerable expense and risk associated with short-selling as opposed to establishing a long position. As a result, Diamond and Verrechia (1987) suggested that short-sellers will not trade unless they expect the price to fall enough to compensate them for the additional costs and risks of shorting. Short-sellers are therefore more motivated to be better informed than are investors with long positions. This suggests that short-sellers more closely analyze all elements of a firm including the strategic posture, characteristics of the top management team, and real options portfolio than long-buyers do, making short-sellers more capable of predicting the future revenue-producing capability of a given set of firm characteristics. While the finance scholars have appropriately looked only at financial ratios that prompt short-sellers to establish a position, short-sellers look at all aspects of the firm.

Literature Review

Prior theories of the effect of short interest on stock prices have incorporated the information contained in short-sales. Three fundamental views have been offered on the information content of short interest, each with different implications for pricing (Desai, Ramesh, Thiagarajan, and Balachandran 2002). The most commonly held view is that high short-interest is a negative signal since short-selling is costly and more likely to originate from informed traders with adverse information (Diamond and Verrecchia 1987). The second view, "no relation theory," argues that short interest is primarily because of hedging, tax-related issues, and/or arbitrage strategies; thus, it has no significant negative or positive signals (Brent, Morse, and Stice 1990). The third hypothesis, the "positive relation," argues that high short interest signals a future demand pressure as short-sellers eventually have to cover their position, which puts an upward pressure on the stock price (Epstein 1995; Byrnes 1995).

Early short-interest studies failed to identify a strong relationship between short interest and abnormal returns, and reasoned that most short-selling is because of arbitrage or hedging (Figlewski 1981; Woolridge and Dickinson 1994). Figlewski and Webb (1993) found increased short-selling around option introductions as option writers hedge their position in the underlying stock. The authors did, however, find small negative

excess returns in stocks without traded options. Senchack and Starks (1993) suggested that index futures arbitrage accounts for most short-selling, but also reported small negative abnormal returns in optioned stocks around short interest announcements. Brent, et al. (1990) found little evidence of speculative-based short selling and instead stressed the prevalence of tax-based and arbitrage-related short sales. However, Asquith and Meulbroek (1996) demonstrated that the sample selections of previous studies are not based on the magnitude of the short interests and, as such, the power of the tests in these studies was weak. These authors pointed out that many firms have very small short positions (less than 0.5%). These small short positions are likely to represent hedge positions, rather than a systematic attempt to exploit perceived overpricing. By focusing on a sample of firm-years with large short interests (e.g., firm-years with short positions greater than 2.5% of shares outstanding), Asquith and Meulbroek (1996) documented a strong and consistent relation between short interests and excess returns. They established that stocks for firms listed on the NYSE and AMEX with high levels of short interest significantly underperform relative to comparable stocks without short positions. Desai et al. (2002) presented critical supporting evidence for negative abnormal returns on highly shorted stock portfolios. They created equal-weighted highly shorted Nasdaq stock portfolios and, after controlling for market, size, book-to-market, and momentum factors, documented roughly negative 1% abnormal monthly returns. They also demonstrated that heavily shorted firms are more likely to be delisted compared with the controls. Two recent papers also look at daily short-sales and subsequent returns on the Australian and Nasdaq stock markets. Aitken, Frino, McCorry, and Swan (1998) presented international evidence that instantaneous negative information is signaled by short-sales on the Australian stock market, where short interest information is available in real time. The second, by Angel, Christophe, and Ferri (2003), used proprietary Nasdaq data over a three-month period from September 13 through December 12, 2000. Both papers showed that high daily short-sales are followed quickly by negative abnormal returns. Finally, in their event study of the announcement effects of monthly short interest, Senchack and Starks (1993) found that changes in short sales are followed by negative abnormal returns.

These papers influenced the view that short-sellers are informed, thus contributing to the widely held belief that high short interest stocks underperform. Empirical evidence consistent with the view that at least some short-sellers are informed includes Dechow et al. (2001),who demonstrated that short-sellers on the NYSE and AMEX exchanges position themselves in stocks with low book-to-market ratios, and that they are able to distinguish low ratios because of temporarily low fundamentals (such as cash flow, earnings, and book value) to stock price. This evidence is consistent with short-sellers using the information in these ratios in anticipation of lower future returns. Using proprietary Nasdaq data, Christophe, Ferri and Angel (2004) examined short-sales transactions in the five days prior to earnings announcements of 913 Nasdaq-listed firms. They found that short selling increases substantially in these stocks prior to unfavorable earnings announcements. Also, they indicated that short-sellers typically are more active in stocks with low book-to-market valuations. However, they demonstrated that the levels of pre-announcement short-selling mostly appear to reflect *firm-specific information* rather than these fundamental financial characteristics, indicating that short-sellers have company-specific information that leads them to believe that operational aspects of a given company are not sufficient to meet analysts' earnings-estimates forecasts.

Arnold, Butler, Crack, and Zhang (2005) added generalizability to these findings by extending the Diamond and Verrecchia (1987) model to include short-selling against the box,[2] and tested the extended model using a natural experiment based around the Taxpayer Relief Act of 1997 (TRA97). Prior to TRA97, a short sale against the box allowed investors to eliminate their exposure to an appreciated financial position and preserve a capital gain while postponing the capital gains tax until a later tax year. TRA97 eliminated the tax benefits of short-selling against the box. The authors demonstrated that when a short-sale of this nature occurs, it is a result of relatively informed traders with negative expectations, rather than because of motivations. By exploiting an exogenous

[2] A *short-sale against the box* is a transaction in which a trader holding a long position in an asset sells the same asset short but does not immediately deliver the long position to cover the short sale. This allows the trader to neutralize his or her exposure to fluctuations in stock price without liquidating the long position. Thus, unlike a regular short-sale, which leaves the short-seller with negative exposure to the stock, a short-sale against the box leaves the trader with zero net exposure to the stock. Prior to the Taxpayer Relief Act of 1997 (TRA97), a short-sale against the box allowed investors to eliminate their exposure to an appreciated financial position and preserve a capital gain while postponing the capital gains tax until a later tax year.

event as a natural experiment, the authors were able to demonstrate that the costs of short-selling increase the negative information content of short interest announcements in general, rather than for just a subset of stocks, such as those that have high levels of short interest, no traded options (Senchack and Starks 1993), or an introduction of traded options (Danielson and Sorescu 2001).

From a practitioner's standpoint, a survey of fund managers supports the notion that short interest is bad news for stocks. In a memo to clients, Principal Kevin Johnson of Aronson, Johnson, and Ortiz, LP, a Philadelphia-based firm that manages $15 billion in institutional assets, wrote: "In a nutshell, higher levels of short interest—and increases therein—bode poorly for future stock returns, all else equal."

ASSET PRICING THEORY AND BEHAVIORAL FINANCE

With the start of a new quarter, Wall Street seems to have found something it badly needed: a major shift in sentiment. "Sentiment is the whole story, and what we're seeing is an improvement in sentiment," said Alfred Goldman, chief market strategist at Wachovia Securities. (AP Newswire , April 6, 2008).

Before psychological research applications appeared in finance research, only rational financial theory applied, stating that market investors are rational, thus incorporating all relevant and available information. Fierce competition among investors induces the desired market equilibrium, whereby stock prices reflect only the risk-adjusted discounted value of expected cash flows. However, as the above quotation suggests, investors are not always rational, and sentiment can be a powerful force driving stock prices.

Since prospect theory was introduced (Kahneman and Tversky 1979; Tversky and Kahneman 1992), psychology research has integrated investor sentiment into financial research as irrationality. Investors exposed to some information in the market will behave irrationally and under-react or over-react, thus deviating from market equilibrium.

The basic equation of asset pricing can be written as follows:

$$P_{it} = \mathrm{E}_t \left[\mathrm{M}_{t+1} \mathrm{X}_{i,t+1} \right]$$

where P_{it} is the price of an asset *i* at time *t* "today," E_t is the conditional expectations operator conditioning on today's information, $\mathrm{X}_{i,t+1}$ is the random payoff on asset *i* at time $t+1$ (tomorrow), and M_{t+1} is the stochastic discount factor, or SDF. The SDF is a random variable whose realizations are always positive. It generalizes the familiar notion of a discount factor to a world of uncertainty; if there is no uncertainty, or if investors are risk neutral, the SDF is just a constant that converts expected payoffs tomorrow into value today. The behavioral elements explored by finance scholars and strategic asset pricing theory are contained in the E_t portion of the equation, or the expectations operator.

Over the past several years, theoretical and empirical developments in asset pricing have taken place within a well-established paradigm. This paradigm emphasizes a *state* price exists (or price of the assets today) for each state of nature at each date, and the market price of any financial asset is just the sum of its expected future payoffs, E_t. Recent developments in behavioral finance, which emphasize nonstandard preferences or

irrational expectations, can be understood within this paradigm in that the expected future payoffs will vary based on the cognitive models of various investors.

Behavioral finance seeks to supplement the standard theories of finance by introducing behavioral aspects to the decision-making process. Contrary to the Markowitz and Sharpe approach, behavioral finance deals with individuals and the different ways they gather and use information. Some of the focus is on cognitive biases, which include *heuristics*, or rules of thumb that make decision-making easier; however, these biases can lead to suboptimal investment decisions (Hirshleifer 2001). For example, when faced with N choices for how to invest retirement money, many people allocate using the 1/N rule. If there are three funds, one-third goes into each. If two are stock funds, two-thirds go into equities. If one of the three is a stock fund, one-third goes into equities. Recently, Benartzi and Thaler (2001) have documented that many people follow the 1/N rule.

Behavioral finance has been one of the most active areas in asset pricing in recent years. Models in this arena contain two key elements. First, they postulate nonstandard behavior, driven by irrationality or nonstandard preferences, on the part of at least some investors. Second, they assume that rational investors with standard preferences are limited in their desire or ability to offset the asset demands of the first group of investors. This means that irrational expectations or nonstandard preferences affect the prices of financial assets.

A number of papers have explored the consequences of relaxing the assumption that investors have rational expectations, much of it in the area of reactions to stock dividends. For example, Barsky and De Long (1993) showed that rapid dividend growth increases stock prices more than proportionally, indicating overreaction of stock prices to dividend news, or the *value effect*—the perception that stocks with higher dividend payouts are more valuable. Other work in the behavioral area includes Hong and Stein (1999), who asserted that there are two types of irrational investors. The first, *news-watchers,* receive private signals about fundamental value, which diffuse gradually through the news-watching population. These investors form price expectations based on the signals the news items confer, but are imperfectly rational in that they do not learn from market prices. *Momentum investors* have no private information and trade on the basis of the most recent change in price. These investors are imperfectly rational in that

they do not trade optimally based on the entire history of price changes. The interaction between these two groups produces both a momentum effect, as private information gradually affects prices and is reinforced by momentum trading, and a value effect, as momentum investors drive prices beyond fundamental value. This is further examined by a study in the marketing arena that suggests that consumers use heuristics such as the *hot hand* and *the gambler's fallacy* and decide to buy or sell stocks based on their past performance. More specifically, consumers (wrongly) use sequential information about past performance of assets to make suboptimal decisions. They sell "losers" and buy "winners" leading to mispricing on the stock market for winning stocks. A recent marketing study found that mutual funds capitalize on these biases by advertising positive past performance" (Johnson and Tellis 2005).

Modigliani and Cohn (1979) demonstrated that another form of irrationality is a failure to understand the difference between real and nominal magnitudes. They showed that investors suffer from *inflation illusion*, in effect discounting real cash flows at nominal interest rates. Ritter and Warr (1999) and Sharpe (1999) argued that inflation illusion may have led investors to bid up stock prices, as inflation has declined since the early 1980s. According to Campbell, (2000), an interesting issue raised by this literature is whether misvaluation is caused by a high *level* of inflation, in which case it is unlikely to be important today, or whether it is caused by *changes* in inflation from historical benchmark levels, in which case it may contribute to high current levels of stock prices.

While it is impossible to be comprehensive on a topic of this scope, Hirshleifer (2001) pointed out several incidences of investor biases that contradict the efficient markets hypothesis and impact asset prices. For example, environmental factors that influence mood are correlated with stock price movements. Kamstra, Kramer, and Levi (2000) found that changes to and from daylight saving time disrupt sleep patterns, and are related to stock fluctuations. The amount of sunlight in the city of a country's major stock exchange is associated with higher daily stock index returns in 26 national exchanges including the United States (Hirshleifer and Shumway 2001; Saunders 1993). Investors are subject to a strong bias toward investing in stocks based in their home country and in their local region. In addition, employees invest heavily in their own firm's stock and perceive it to have low risk (Barker 1997).

The crux of the research regarding behavioral aspects of asset pricing theory presented above provides strong support for Herbert Simon's theory of bounded rationality, in which limited cognitive power and the complexity of decision problems prevent fully rational decisions. Limited attention, memory, and processing capacities force a focus on subsets of available information, and the costliness of evaluating contingencies suggests that investors may undervalue complex securities, and that imperfect rationality affects the introduction and success of new securities. Thus, bounded rationality implies a need for simple heuristics for making decisions, suggesting that the use of "heuristic agents may be a fruitful line of inquiry for finance" (Hirshleifer 2001, 1563).

COMPETITIVE DYNAMICS

Strategic management's "competitive dynamics" is focused on the study of the antecedents and consequences of competitive moves. Building on Schumpeter's (1934) theory of creative destruction, scholars in this area study how and why firm interactions either help or hurt the firms involved in the interactions. They develop theory and empirical methods centering on conceptualization of a firm's *strategy as action* (Grimm, Lee, and Smith 2005). Inquiry in this area is loosely organized into three major categories:

- *Sociological*—studies of competitor actions based on focal firm actions
- *Sociological*—studies of firm actions based on firm or industry characteristics
- *Economic*—studies examining performance based on characteristics of competitive actions

Researchers in this stream usually make three important assumptions derived from D'Aveni's (1994) theory of hypercompetition: competitive advantage is short-lived because aggressive firm actions disrupt and erode the competitive conduct and performance; firms must undertake a series of actions to continuously recreate competitive advantage; and firms with more competitive actions are generally expected to show superior performance. Based on these assumptions, researchers empirically investigated different aspects of competitive action, including repertoires, timing, and level of competitive action. Early research in this stream focused attention on the sociological aspects of competition or the *action-reaction dyads* level of analysis (Chen, Smith, and Grimm 1992). In this stream, the characteristics of an individual competitive action, as well as the characteristics of the competing firms, are important predictors of the competitive response. For example, Smith, Grimm, Gannon, and Chen (1991) showed that the type of action, *strategic* (requiring a significant commitment of resources) versus *tactical* (an easy-to-implement, reversible action) affected the response likelihood, response imitation, response lag, and response order of competitors in the airline industry (see appendix 1 for a complete description of these terms). Chen and Miller (1994) found that action visibility, response difficulty, and the potential benefit of an action contributed to the number of responses and the response ratio—all competitive responses directed toward the actions of a given firm in a given year / the total number of actions made by that firm in that year—toward the competitor initiating the original action.

The field then moved toward another level of analysis that linked the characteristics of actions with performance. This began with an *aggregated set of actions* over a finite time period; that is, the *action repertoire-year* levels of analysis. Findings suggest that broad and complex sets of actions are more likely to have a positive impact on firm performance than narrow and simple repertoires of actions. Miller and Chen (1996) demonstrated that competitive simplicity, or the range of different action types, impacted the revenue per seat mile flown in the airline industry. Similarly, Ferrier, Smith, and Grimm (1999) found that action repertoire simplicity, a*ction timing*, and leader-challenger action dissimilarity impacted market share erosion, or loss of market leadership.

The field then moved in the direction of examining a firm's actions based on the characteristics of that firm. Here scholars found that top management team characteristics affected strategic change (the diversity across a firm's activities) (Wiersema and Bantel 1992), and that strategic similarity between two firms affected the intensity of rivalry between firms in the airline industry (Gimeno and Woo 1996).

Recently, scholars explored the link between the concept of a *competitive attack*, which describes the pattern, order, and pace of an *uninterrupted sequence of repeatable competitive action events* carried out in real time, and performance. This view is consistent with the concept of strategy as a logically unified sequence of actions (Mintzberg and Waters 1985), or a simultaneous and sequential set of many actions (D'Aveni 1994). Relatedly, such "sequences of dynamic competitive moves are an essential component of strategic competition" (Bettis and Weeks 1987, 449), which has been shown to influence performance. For example, Ferrier (2001) found that attack volume, duration, and unpredictability affected market share gain.

Most recently scholars have begun to explore unanswered questions in the competitive dynamics literature in a series of unpublished working papers. Ferlic**,** Raisch, and Krogh (2008) posited that the combined insights from the competitive action and the competitive rivalry research streams indicate that there should be an optimum competitive action level; however, no theory had been developed or empirical research done to address this question. These authors reconcile this by identifying upper and lower boundaries of competitive action to sustain competitive advantage. Specifically, they demonstrate that firms whose competitive action is insufficient to defend their competitive posi-

tion, and whose competitive action exceeds their financial resource limits have poorer performance (return to shareholders). Also, Bridoux and Smith (2008) bridge another gap by examining which *types* of actions are most beneficial for firm performance (operating profit). They show that actions in product markets, or *output* actions, have the largest impact on performance.

This dissertation adds to the latest additions to the stream in two important ways. First, as investors are ultimately responsible for fluctuations in stock prices through assessing the value-embedded patterns of competitive behavior, and then buying and then acting on these assessments, I examine the mechanism by which investors strive to process and assess the multiple channels of information when evaluating a given firm. Second, I explore a phenomenon new to both competitive dynamics and the field of strategy as a whole—short-selling.

Two additional streams of literature, while not defined explicitly as competitive dynamics, serve to inform competitive dynamics, thus those streams are briefly discussed below.

Multimarket competition. Multimarket competition is an oligopolistic situation where firms compete against each other simultaneously in more than one market (Edwards 1955). Wisely, firms often understand that it may be advantageous to stake out a sphere of influence or dominant position in one market, while leaving their competitors' sphere of influence unchallenged in another area in which they both compete. This allows a firm dominant in one market to intimate its subordination in another market, thus acting a deterrent to its competitor to initiate a challenge in the market in which the firm is dominant. In the realm of multimarket competition, the competitive actions carried out by rivals are governed by the threat of retaliation; hence the dynamics of competitive interaction are governed by the respective market shares of firms competing in subsectors of an industry.

Studies of multimarket competition were initiated by the mutual forbearance hypothesis, which posits that firms that have competitive contacts in more than one market will compete less intensively with each other—because the threat of retaliation is reciprocal, the forbearance is mutual. Firms may even completely pull out from their rivals' markets, in the expectation that their rivals will reciprocate. As long as this were done

mutually, firms would have clear economic incentives to trade market share in markets in which they do not have large territorial interests for market share in their own important markets (Gimeno 1999).

Previous empirical research in the multimarket stream has attempted to draw relationships between the amount of multimarket rivalry (generally measured by the number of markets in which rivals compete) to the intensity of competition between two firms, and has focused mainly on competitive dyads. For example, Baum and Korn (1996) found that market domain overlap (aggregate of the markets served by the focal firm and each competitor) and multimarket contact (the number of routes on which each competitor meets each other) had an effect on market entry and exit rates in the airline industry. In 1999, these same authors found that variables such as the total number of markets an airline served at the start of each observation year and the capacity of the markets served affected both initiation and expansion of multimarket contact between a focal firm and each of its competitors. Gimeno and Woo (1996) examined economic consequences of multimarket competition. They found that number of markets in which the airline met a specific rival outside the focal market affected not only the intensity of rivalry, but also the profitably and efficiency (cost per revenue-passenger-mile) of an airline. Accordingly, multimarket contact not only governs competitive action, but important economic outcomes.

Critics of the multimarket competition stream of research have noted that studies have found conflicting rates of competition because of multimarket contact. For example, Mester (1990) showed that multimarket competition had a positive effect on competition in the banking industry, while Baum and Korn (1999) found inverted U-relationships in the airline industry. This suggests that either the dynamics of the industry play a role, or that other influences or constructs could be responsible for these results. Austrian economics' concept of "the perennial gale of creative destruction" (Schumpeter 1934) suggests that "the outcome of market process is the inevitable and eventual market share erosion and dethronement experienced by market share leaders over time through the process of competition" (Ferrier et al. 1999, 373). Hence, viewing multimarket contact through the lens of competitive dynamics within industries could be warranted.

Strategic groups. The line of research addressing strategic groups attempts to draw meaningful delineations between firms that may compete in the same industry, but do not necessarily compete in the same markets. For example, (and relevant to the sample in this dissertation) in the pharmaceutical industry, the question of whether generic pharmaceutical companies and ethical pharmaceutical companies are really competing against each other would be taken into consideration.

Considerable variation in defining strategic groups exists, however. Cool and Schendel (1987) classified the basic elements of strategic groups according to their business scope as follows:

- the range of market segments targeted
- the types of products and/or services offered in the market segments selected
- geographic reach of the product-market strategy

The theory of strategic groups was developed to test whether one set of strategies was more effective than another and to analyze the competitive dynamics within an industry (Leask and Parker 2004). For example, Cool and Dierickx (1993) found that the strategic distance and the concentration within strategic groups affected profitability. Pegels, Song, and Yang (2000) found that membership in different competitive interaction groups affected airline load factors.

Like multimarket competition, studies of strategic groups have produced mixed results. Cool (1985) found that market share differed greatly between groups in U.S. pharmaceuticals. However, Martens (1988) failed to find differences in growth of market share between groups. This led him to conclude that within-group performance differences may outweigh between-group differences. Thus, it stands to reason that competitive dynamics within groups may be a more fruitful line of inquiry, and a study of how the dynamics within groups differs between groups would add to this stream of literature.

Appendix table. A review table outlining many papers in each of these research streams is included in the appendix. A thorough search of major journals was conducted using the following keywords: competitive dynamics, multimarket competitions, mutual forbearance, and strategic groups. In addition, the Academy of Management and Strategic Management Society conference programs for 2006 were consulted to identify working papers in these areas. Each of these authors was contacted via e-mail, and included if the

paper was provided, and if it conducted or proposed empirical analysis. For each paper included in the appendix table, I identified the level of analysis and time frame where applicable, as well as the independent and dependent variables and their associated measures.

This literature review and the enclosed table in the appendix serve two purposes. The first is to appraise the progress of the field and its contributions. Second, and importantly, I accounted for the various types of measures of competitive interaction used in prior research to assess which measures will best inform STRAPT. Based on the social judgment theory outlined below, I believe that the action repertoire, or a series of cues over time, is the appropriate level of analysis when studying investor interpretation of corporate strategies. In addition, I believe that based on information theory, the measures of strategic complexity, heterogeneity, and volume most closely represent the manner in which human beings process a series of inputs over time.

CHAPTER 3

THEORY AND HYPOTHESES

Corporations are involved in an unending series of competitive moves and countermoves meant to keep their competitors off balance and their own corporations profitable (e.g., price cutting, introducing new products, marketing campaigns, and capacity expansions). As each competitive move is announced publicly, anxious outsiders, investors, and potential investors evaluate whether the corporation's move is likely to succeed or fail, which will affect the investors' decision to either buy the stock, continue owning the stock, sell the stock, or short it.

The efficient-markets assumption of asset pricing theory posits that investors are "rational" and value securities based on future earnings discounted by risk. This assumes that investors have full knowledge of public information and act rationally (Bromiley and James-Wade 2003). However, investor sentiment has presented a challenge to the efficient-markets hypothesis by demonstrating that it is a powerful mechanism by which stock prices fluctuate (Barberis, Shleifer, and Vishney 1998). This suggests that scholars need to investigate how investors interpret this public information to establish how equities are truly valued. This requires identification of fundamental (nonfinancial) aspects of corporations that are included in investor assessments of a corporation's equity shares, such as corporate strategies, top management teams, alliances, and incorporation of behavioral analysis of investors, to determine how stock prices will react to an announced series of competitive moves. Here, fundamental analysis by investors is augmented with the systematic scanning for "market inefficiencies" associated with firm-specific investments and competitive moves—and additional, but noisy sources of public information. Undoubtedly, both classes of investors included in this study—long-buyers and short-sellers—are ultimately concerned with firm-specific investments, strategies, and tactics that are effective versus ineffective, imitable versus inimitable, routine versus deviant.

Yet, such analysis requires well-developed information-scanning and interpretive capabilities that help investors to know where to look, what to look for, and how to ascribe meaning to the patterns of events they see. In the absence of the motivation to scan for and scrutinize all available information, I propose that some investors apply certain

decision-making heuristics that allow them to confidently make a decision about the future value-generating capability of a firm's chosen strategies. In fact, a recent issue of *McKinsey Quarterly* indicated that some investors do indeed resort to alternative mechanisms in evaluating stocks, rather than fastidiously evaluating corporate fundamentals and organizational assets that have future value-creating potential (or lack thereof) for the corporation's equity shares, especially in the short term:

> Market fundamentals explain share price fluctuations over the long term, but in the short term investor biases and myopia can skew prices. These emotionally driven deviations in the markets can upset a company's strategic plans—if its managers don't understand what lies behind the deviations. (*McKinsey Quarterly*, Fall 2007)

As the above quotation points out, investor perception is a key element in the decisions that ultimately drive asset prices; thus, exploration of corporate phenomena outside the realm of financial ratios that investors do evaluate is crucial. According to Hirschleifer (2001, 1535), "after decades of study, the sources of risk premia in purely rational dynamic models are well understood. In contrast, dynamic psychology-based asset-pricing theory is in its infancy."

To effectively develop a strategic theory of asset pricing, it is important to investigate both the long-buyer and the short-seller: *if* their perceptions differ and *if* and *how* they come to disparate conclusions about the future value-creating potential of an announced series of strategic moves. I believe the investors of each class do come to different conclusions because they use different decision-making processes motivated by the risk they must bear and the potential losses they must face if they are wrong. Long-buyers, faced with less risk and less to lose, will have limited attention and processing capacities. These conditions will prompt long-buyers to focus on subsets of available information, and the costliness of evaluating complex securities will lead them to use a bounded-rationality approach, implying a need for *heuristics* for making decisions (Hirshleifer 2001). Short-sellers, faced with much greater risk and *unlimited* losses, are more likely to closely scrutinize corporations' strategies, implying a *systematic* decision-making process that may yield different notions of the value of a strategy as it unfolds. In fact, short-sellers are heralded as the most informed of investors, and scrutiny of

this class of investors will provide managers with additional insight into how investors perceive the added value of a given series of strategic moves. According to *Business Week*:

> Short-sellers include some of the most talented analysts in the investment arena and are noted for their adroit, labor-intensive research. One short-selling partnership even includes among its analysts a retired physician to evaluate biotechnology stocks. But at bottom, what gives shorts an edge is sheer shoe leather.

Characteristics and Patterns of Competitive Strategy Perceived as Value Creating by Investors.

Previous scholars have identified research into how important outsiders value strategies as a potentially fruitful line of inquiry in competitive dynamics. For example, Miller and Chen (1994) averred that "isomorphic" or conventional strategic repertoires for companies in the airline industry may be more acceptable to competitors, customers, and even suppliers of capital, and lead to superior results in the form of operating revenue per available seat mile flown of companies pursuing. The authors asserted that competitive nonconformity will hurt financial performance because it increases costs and competitive risks, and reduces the acceptability of the organizational actions to important outsiders.

Thus, to further the line of research proposed by Miller and Chen (1994), the question this study explores is what prompts different classes of investors to "act" on a series of announcements by actively buying or selling a company's stock, which ultimately results in changes in firm valuation. This study contends that stock market response to competitive action announcements is based, in part, on the subjective evaluation of the patterns of strategic moves as they unfold. Based on the cognitive model I develop below, I believe that investors evaluate these patterns as to their *complexity* (how different are the moves used in a strategic repertoire), *heterogeneity* (how different is the strategic repertoire from rivals'), and *volume* (how many moves do investors see). According to information theory, these are natural codings by the human mind. Key to the development of a model of investor decision-making is a complete analysis of the various elements of the decision-making process of the two classes of investors I consider with regard to strategic repertoires. To begin developing the decision-making framework in

the context of strategic actions, I turn to social judgment theory or "SJT" (Brunswick 1956), and cognitive psychology. These areas elucidate the strategic signals that are relevant to investors, how they process this information, and the mechanisms by which positive or negative opinions are formed about the patterns of strategic actions they see.

Investor Psychology and Decision Making

STEP ONE – Cues - Social Judgment Theory

The underlying assumption of SJT is that decision-makers (especially long-buyers) do not have access to "real" information (few companies release negative information on themselves), but instead perceive that information through proximal cues. Hence SJT captures "theories in use" (those that actually govern decision-makers' actions) as opposed to "espoused theories of action" (those that decision-makers publicly state they use) (Hitt and Tyler 1991). In other words, we look at how investors actually decide which equities to buy or sell, rather than what they say they do in making their decisions—actual versus reported processes, which can be at odds.

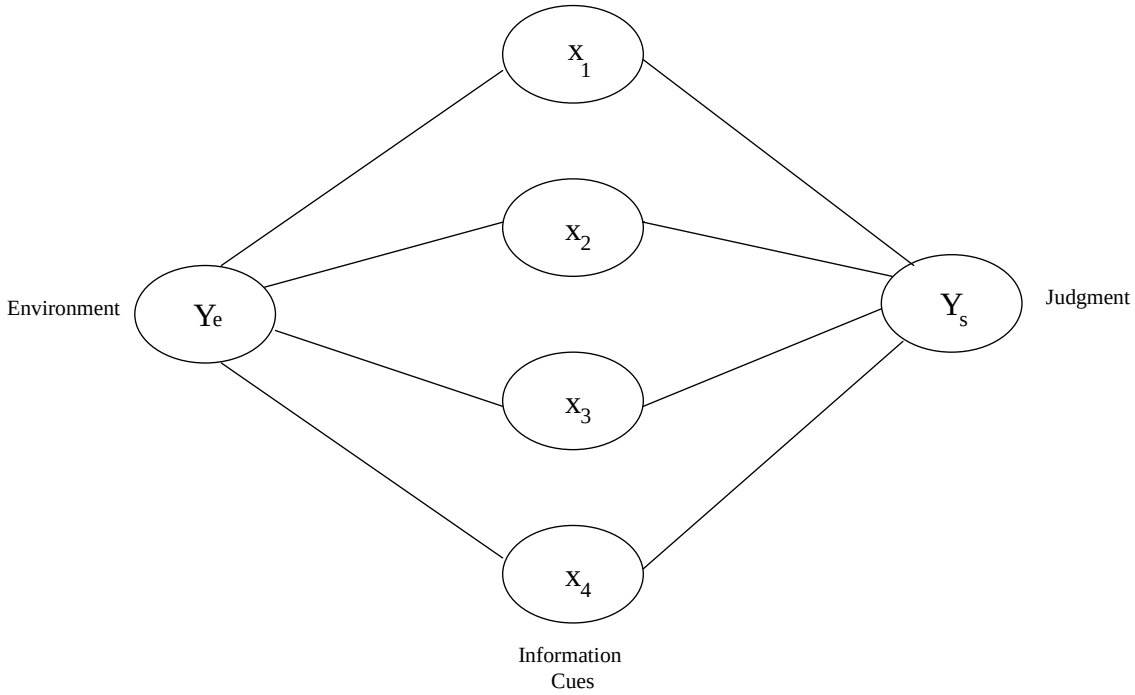
Within SJT, the lens model is a formal depiction of humans' decision-making processes (depicted in Figure 5 below). This model links "cognitive" and "task" systems by proximal information cues Y_e. The cues (represented by the X variables) are the information factors (the strategic actions companies undertake) that an individual (the investor) considers when making a decision. The right side of the model represents the "cognitive" system. Cues are combined in some manner to make a judgment or decision (Y_s). Hammond (1975, 73) summarized the lens model:

> Judgment is a cognitive process similar to inductive inference, in which the person draws a conclusion, or an inference, Y_s, about something, Y_e, which he cannot see (or otherwise directly perceive). In other words, judgments are made from palpable events and circumstances.

While this theory was developed in a social realm, it may be broadly applied to all kinds of judgments. For example, the lens model can portray an investor deciding whether to buy or short a stock. The investor appraises the stock's potential to go up or down based on a number of information factors X_k (i.e., strategic moves, top management team characteristics). The investor is not observing the stock's ultimate outcome, but in-

stead is inferring what he thinks that outcome will be based on a number of current observable conditions, in this case strategic moves ($X_1 \ldots X_4$). This demonstrates that decision-makers evaluate potential outcomes by using a series of information factors (cues) that they can observe, making the evaluation of this potential outcome very subjective.

Figure 5



Once the information cues are observed, strategic asset pricing theory follows a long line of arguments of decision-making. Decisions scholars maintain that any significant decision is a choice between gambles, because the outcomes of the alternative options are not fully known in advance. Financial decisions are made in situations of high uncertainty that do not allow the decision-maker the luxury of relying on fixed rules (Hirshleifer 2001). Thus, decision-makers are compelled to rely on alternative mechanisms such as intuition, which is motivated by their subjective interpretation of the pattern of events as they unfold.

STEP TWO – Coding – Information Theory

Classification of event sequences. When evaluating the human perception/judgment element of strategies carried out in a given time frame, it is essential to categorize these strategies along dimensions revealed in the psychology literature as natural

constituents of human cognition. Previous studies that have looked at sequences of events have classified the sequences as complex, heterogeneous, and so forth, in a rather ad-hoc fashion. These scholars have assumed that important outsiders see the world in these sequences, without justifying why outsiders will interpret patterns as scholars have assumed. Thus, the next step in strategic asset pricing theory is to explore how investors categorize the many cues that companies deliver. Information theory (Simon 1972) gleans insight into these phenomena by revealing that humans do indeed categorize cues into patterns, and by introducing the various inherent categorization tendencies of the human mind.

Information theory supports this notion by introducing representational (or "information-processing") explanations of this type of coding, known as "serial pattern processing," and postulates one or more processes for inducing pattern description from sequences. According to Simon (1972) people appear to have strong propensities, whether learned or innate, to discover patterns in temporal sequences presented by the environment, and to use these patterns to predict positive or negative future outcomes—they know what they see and whether they like or dislike what they see.

Information theory postulates that one direct method to measure information sequences is by their *complexity*, which is the *amount of information*, the *breadth of the information*, and the *variability of the elements* within the sequence of information. Thus, when looking at various types of strategies one can logically assume that investors are classifying the sequences in a similar fashion. This assumption gives rise to strategic classifications such as *complexity* and *heterogeneity* (the breadth of information—how different a focal firm's strategy is from its previous strategies and those of its competitors) and *volume* (the amount of information).

Thus, while I have not had to change the measures based on cognitive principles, an important part of strategic asset pricing theory is understanding how investors will apply these cognitive principles to comprehend and react to the patterns of strategic action sequences they observe. Further, I believe that these are the elements of a competitive strategy that investors will find salient (Fiske and Taylor 1991). In hypothesis development, based on cognitive principles, I will go further to justify how different classes of

investors make decisions about the "wholes" they observe and whether they will like or dislike the various patterns of events as they unfold.

STEP THREE – The Salience of Cues

Investors are generally bombarded with news events regarding the stocks they own, have sold short, or are considering trading. The Dow Jones newswire can publish thousands of press releases and corporate announcements each day. To which announcements do investors attend and react? The cognitive literature on salience of proximal cues provides some suggestions, which I apply to this setting.

Fiske and Taylor (1991) have identified several aspects of peoples' behaviors that onlookers view as salient. These scholars assert that salient properties such as novelty (dissimilar to the individual's previous behaviors) are attention-getting. In addition, onlookers will find behavior unusual for a social category (i.e., heterogeneous) to be salient. Third, Fiske and Taylor (1991) averred that observers find persons or objects that dominate the visual field to be salient.

I argue that an investor's evaluation of a corporation's strategic moves requires that the investor first take note of the moves. For example, Apple recently reduced the price of iPhones by $200, departing from their customary strategy of waiting several months to cut prices, as they did with several versions of the iPod. This departure from the norm garnered significant attention and even outraged early adopters. Investors replied in kind with a 2% reduction of Apple's stock price in a single day. Thus, I believe that the same characteristics that make generic cues salient (as described above) also make the strategies of corporations salient to market investors. Thus, investors take note when corporations undertake strategic patterns that are *distinctive* from their referent rivals and previous strategies, and are *dominating*—consisting of a large number of competitive moves that dominate the cognitive space.

STEP FOUR - The Decision-making Process—Heuristic vs. Systematic

Human decision-making processes can be placed into three general categories: simplistic, heuristic, and systematic. *Simplistic decision-making* occurs without regard to rational calculation. For example, decisions may be formed "on the doorstep" (Converse 1964; Zaller 1992) or in response to arbitrary stimuli such as symbols (Kinder and Sanders 1996). An investor using the simplistic decision-making process may, for example,

buy Starbucks stock on impulse because he likes the green color of its store logo. I propose very few investors use such a simple decision-making process because an element of risk is always involved.

The second type of decision-making, *heuristic decision-making* involves considerable rational thought but limited systematic effort (Tversky and Kahneman 1974). *Heuristics* refer to the choice of something that comes easily or intuitively to mind, but the term also refers to more deliberate strategies that people use to limit or guide their search among options (Kahneman 2002; Kahneman and Frederick 2002). Important to note is that the cues discussed by social judgment theory play a significant role in both simplistic and heuristic decision-making processes—irrationally in the former, rationally in the latter. For example, when using a simplistic style, cues such as competitive moves may not be evaluated as to their value-creating capability; the investor may just like the latest Budweiser Clydesdale ad and buy the stock. Those using a more heuristic process will, at least to some extent, assess the value-creating potential of these competitive moves.

Basing judgment on data that is processed according to heuristic choice rules reduces effort and is generally quite useful, but can sometimes lead to biases or systematic judgment errors (Tversky and Kahneman 1974). Indeed, scholars have debated at length whether the tendency toward "cognitive stinginess" reflects ignorant incompetence or rational efficiency (Lau and Redlawsk 2001; Petty and Cacioppo 1986). Many studies have shown that "gut level" heuristic processing often produces outcomes that are very similar to those produced under conditions of complete analysis of information (Downs 1957; Lupia 1994; Nisbett and Ross 1980). However, as Tversky and Kahneman (1974) observed, heuristics introduce bias into the decision-making environment almost by definition. And indeed, although reliance on heuristics may be perfectly rational, several studies have now demonstrated that heuristic-based decisions do not necessarily lead to "correct" decisions (Bartels 1996; Lau and Redlawsk 1997). Biases resulting from the use of heuristics include:

- *Representativeness*: The tendency to make decisions based on stereotypes or to see patterns where none exist. It can, for example, influence our preference not to fly after a well-publicized plane crash. In financial markets, representativeness

manifests when investors seek "hot" stocks and avoid stocks that have performed poorly in the recent past.

- *Overconfidence*: The tendency for people to be highly overconfident about their abilities and knowledge. For example, evidence shows that Wall Street analysts are slow to revise their previous assessment of a company's likely future performance, even when notable evidence shows that their existing assessment is incorrect (Kumar 2005). Overconfidence has often been suggested as one reason analysts touted Enron stock even after evidence of accounting irregularities became apparent.
- *Anchoring*: The inclination for investors to use recent observations to determine what is fair. For example a used-car salesman always starts negotiating with a high price and then works down. The salesman is trying to get the consumer "anchored" on the high price so that when he offers a lower price, the consumer sees value. Anchoring leads investors to expect a stock to continue to trade in a defined range or to expect a company's earnings to be in line with historical trends, leading to possible under-reaction to changes in trends (Kumar 2005).
- *Gambler's Fallacy*: The tendency for people to predict inappropriately that a trend will reverse, a belief in regression to the mean. Gambler's fallacy may lead investors to anticipate the end of a run of good (or poor) market returns and to sell winners quickly (Kumar 2005).
- *Fluency Heuristic:* The tendency for individuals to infer that an object has higher value with respect to another that is being considered (Jacoby and Brooks 1984). If one object is processed faster or more fluently than another, that is, if individuals must strive to "figure something out," they may place a lower value on the criterion. The fluency heuristic can explain investors' tendencies to invest in stocks that are easier to value.
- *Affect Heuristic:* The tendency for humans' affect to influence their decision-making, meaning a strong emotional response to a stimulus might alter their judgment. Finucane (2000) used the affect heuristic to explain the unexpected negative correlation between benefit and risk perception by demonstrating that a good feeling toward a situation (i.e., positive affect) would lead to a lower risk

perception and a higher benefit perception, even when this perception is logically not warranted.

- *Recognition Heuristic*: The tendency for people to infer that one object has higher value than another because the valued object is recognized and the other is not (Goldstein and Gigerenzer 1999). In the stock market, participants have a greater perceived familiarity with local and domestic securities and, in turn, invest more in such securities (Ackert, Church, Tompkins, and Zhang 2005).
- *Exposure Heuristic*: The tendency, which psychologists have long observed, that repeated, unreinforced exposure increases positive affect toward a stimulus (Fechner 1876; Maslow 1937). A number of early studies of exposure heuristics investigated the effects of repeated exposures on affective ratings of music and generally found more positive ratings with increasing familiarity (e.g., Meyer 1903; Moore and Gilliland 1924; Washburn, Child, and Abel 1927). Investors tend to have positive affect toward stocks to which they have significant exposure, often achieved through advertising.

The third process of decision-making, *systematic decision-making*, by contrast, involves effortful, methodical, and even scientific processing of relevant criteria. Motivation to process systematically is often determined by the evaluator's desire for accuracy in judgments. To the extent that an evaluator has a strong desire to reach an accurate conclusion, that individual is more likely to engage in systematic processing (Chaiken, Giner-Sorolla, and Chen 1996) when they are motivated and able to "cognitively elaborate" on the decision at hand (Chaiken 1980). Senge (1990) provided a powerful example for why systematic decision-making rather than "intuition" often leads to better outcomes. This author envisioned a swimmer caught in a whirlpool's vortex: while swimmers would instinctively fight against being sucked down, their only chance of survival would be to allow themselves to go down and then swim laterally to escape drowning. Only a systemic view of the situation allows the swimmer to escape (Senge 1990).

As evidenced by Malhotra (2006), relationships and interactions among and between decisions may affect the quality of decision results, and a systematic decision process is necessary to do this. In one study, he showed that for one product line, a second-tier supplier to a large firm had a high cost structure and passed these costs to the customer. Ne-

gotiations yielded no real solution. A more systematic analysis exposed the real problem. A third supplier was supplying the second-tier supplier and was charging high prices. By negotiating with the third-tier firm, the cost structure of the second-tier supplier was reduced to the extent that it could supply the same input material at a much lower price than before. These improvements would not have come about without looking at the entire set of supply chain entities in a more systematic fashion (Malhotra 2006). From an investment standpoint, investors that have a higher likelihood of "drowning" will be more compelled to use such systematic processes.

HYPOTHESES

Within strategic management, the competitive dynamics stream of research has examined the game theoretic stability of costly signaling by developing theory and empirical methods centering on conceptualization of firm strategy as *competitive action* (Smith, Ferrier, and Ndofor 2001). In general, early research in this stream focused attention on the *action-reaction dyads* level of analysis (e.g., Chen et al. 1992), whereby the characteristics of an *individual competitive action*, as well as the characteristics of the competing firms, are important predictors of the intensity of an individual competitive response. This analysis has taken on the form of development of effective responses in the face of actions a competitor initiates (Smith et al. 1991; Bettis and Hitt 1995; Chen and Hambrick 1995), and has also demonstrated a link between the characteristics of an *aggregated set of actions* over a finite time period and performance; that is, the *action repertoire-year* levels of analysis (e.g., Ferrier et al. 1999; Miller and Chen 1996).

Most recently, scholars have introduced the concept of a *competitive attack*, which describes the pattern, order, and pace of an *uninterrupted sequence of repeatable competitive action events* carried out in real time (Abbott 1990; Ferrier 2001; Ferrier and Lee 2002). This view is consistent with the concept of strategy as a logically unified sequence of actions (Kirzner 1973), patterns or consistencies in streams of behaviors (Mintzberg and Waters 1985), or a coordinated series of actions (MacCrimmon 1993). Relatedly, such "sequences of dynamic competitive moves are an essential component of strategic competition" (Bettis and Weeks 1987, 449), which has a demonstrable influence on competing firms' stock prices. Accordingly, investors are ultimately responsible for fluctuations in stock prices through assessing the value embedded in the real-time pat-

terns of competitive behavior, and then buying or selling these equity shares based on these evaluations. Thus, the next step in strategic asset pricing theory is to examine the under-explored mechanism by which investors strive to process and assess the multiple channels of information when evaluating a given firm. Based on the cognitive principles outlined above, I believe that these investors evaluate strategic actions based on their complexity, heterogeneity, and volume. Furthermore, I believe that investors have a short- term time frame, as compensation schemes on Wall Street often alter fund objectives from a long-term to a short-term perspective (Brown and Starks 1997). Thus, I test my model at the *action repertoire-month* level of analysis, confining observations of strategy to a moving window of "strategic time" in which adaptive strategic decisions are made (Ramaprasad and Stone 1992).

Strategic complexity – breadth of range of within-firm strategic repertoires. One of the most fundamental ideas of competitive interaction posits that firms should execute strategy in an effort to dampen the ability or motivation of competitors to respond (Smith et al. 2001; Ferrier 2001). Prior research has found that rivals will easily understand and unravel very simple competitive strategies or strategies that are similar to those of rivals, thereby leaving the attacking firm vulnerable to aggressive competitive response. Conversely, very complex competitive strategies require the mobilization of sizable resources and managerial effort to carry out, thus increasing the cost and reducing the speed of implementation, which can also have negative consequences for performance. Thus, an inverted U-shaped relationship is implied. But how do investors evaluate this complexity?

Psychology scholars have demonstrated that if a person can process one out of two items more fluently or more rapidly, the person will infer that easily processed object has the higher value (Jacoby and Brooks 1984). Termed the *fluency heuristic*, researchers have shown that people might use a cue's fluency, or the ease with which it is processed, as an additional basis for weighting the value of cues. For example, Shah and Oppenheimer (2007) showed that when participants were given the names of two different brokerage firms, one easy and the other difficult to pronounce, participants assigned greater value to the stock of the firm that had the easily pronounceable name and lesser value to the stock of the firm that had a name with complex pronunciation. This highlights a rather simple tendency: people place greater weight on information that feels easy to process.

Previous scholars investigating the complexity of messages have also shown that if subjects found the message complexity to be too great, the message not only resulted in "nonlearning"; in fact it induced negative feelings (Eagly 1974; Chaiken and Eagly 1976, 1983). To the contrary, Berlyne (1972) found that subjects showed an affinity for complex messages. Accordingly, very complex competitive strategies convey a diverse spectrum of information that investors may either find difficult to absorb and use efficiently, or they may like what they see.

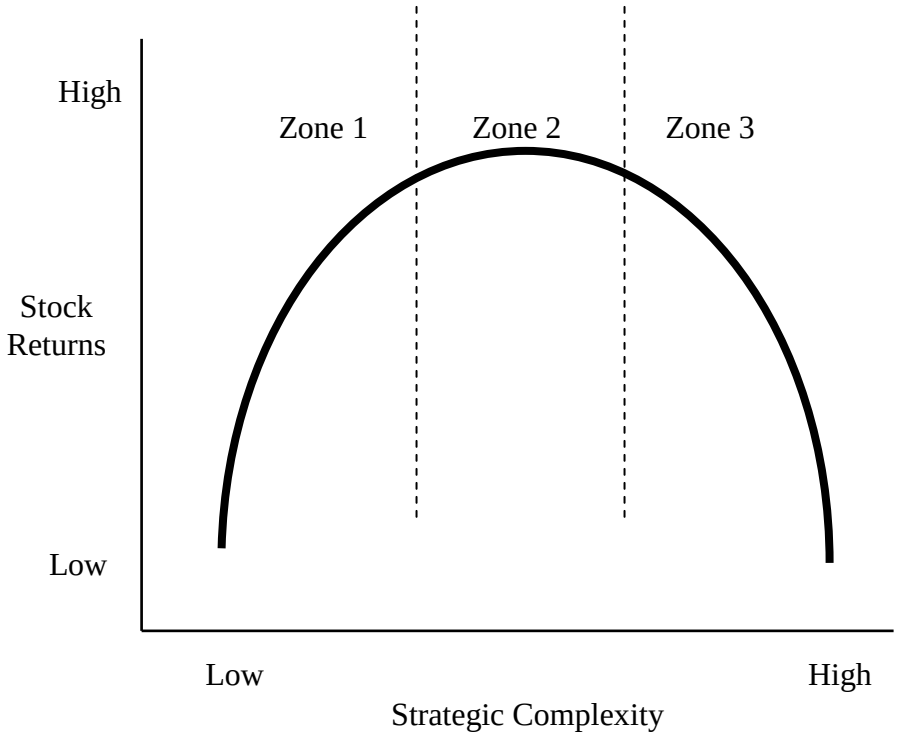
I believe that when long-buyers and short-sellers evaluate *strategic complexity* they will react differently; one group will deem these strategies to be superior; the other group, fettered by their motivation and ability to exhaustively scrutinize complex strategies, will react negatively to too much complexity. The complexity will be attractive to both groups at first (moving from zone 1 to zone 2 in Figure 6), as these companies will seemingly be carrying out strategies that competitors will find difficult to counter. However as the complexity increases to the point where the company is moving into zone 3, the long-buyer, lacking the motivation to unravel all of the elements of this complex strategy, will resort to the fluency heuristic and experience increasing difficulty in seeing the value in the complexity. In fact, I believe that these strategies may evoke feelings of unpleasantness, even discomfort, as the complexity increases beyond that which the investor wishes to assimilate (Eagly 1974; Chaiken and Eagly 1976, 1983). Thus, the *affect heuristic* will lead the investor to develop a negative attitude toward the equity share of the company in question. This attitude will prompt the long-buyer to sell the stock, thus lowering stock prices.

Hypothesis 1: *The complexity of a firm's strategic repertoire will exhibit an inverted U-shaped relationship with stock returns (Figure 6).*

On the other hand, I believe the short-seller, faced with costs and risks that far exceed the long-buyer's costs and risks when transacting stock, will strive to unravel the elements of a strategy as complexity increases in an effort to determine whether the complexity will add value to the equity shares. Like the long-buyer, the short-seller will likely believe that competitors will easily decipher strategies that are too simplistic and put the company at risk, which leads to higher levels of short interest. As complexity increases to a given level, short-sellers, like long-buyers, will applaud the advantages of being less vulnerable to rivals. However, as complexity increases to the level where the long-buyer

becomes apprehensive, the short-seller's systematic decision-making approach will not incite the belief that high levels of internal complexity are necessarily detrimental. In fact, while higher levels of costs and risk may be associated with such complexity, the short-seller will realize that the complexity has associated benefits in the form of keeping rivals off guard and will refrain from shorting the stock. Thus, the greater the complexity of a firm's strategic repertoire, the lower the level of short interest in the company.

Figure 6

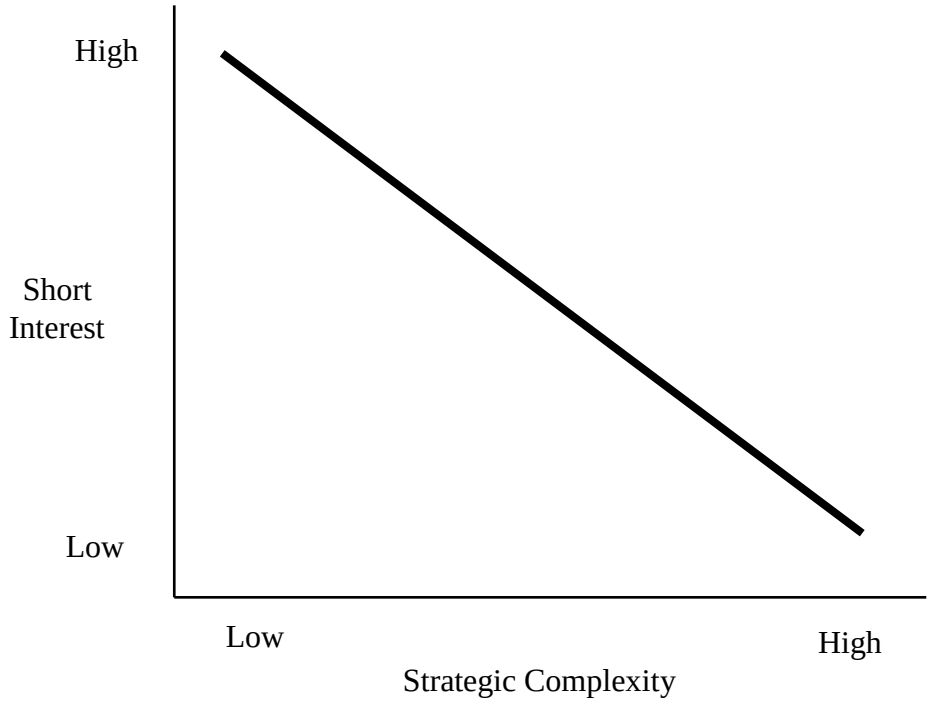


Hypothesis 2: *The complexity of a firm's strategic repertoire will exhibit a negative relationship with short interest (Figure 7).*

Strategic heterogeneity – differences in between-firm strategic repertoires. The strategy literature seems to disagree over the implications of competitive nonconformity, or strategic heterogeneity. Porter (1980, 1985) has advocated the merits of atypical (hence heterogeneous) competitive repertoires that confuse rivals and are hard for competitors to detect and counter (Chen and MacMillan 1992; Chen and Miller 1994). In addition, effective competition from the Austrian perspective espouses strategic and re-

source heterogeneity (Jacobsen 1992). This perspective advocates creation of competitive advantage through possession of the knowledge, resources, and flexibility to engage in a variety of actions, and that successful firms are able to combine and direct these resources differently than other firms. Thus, much of the basis for value creation is attributed to the ability of firms to innovate or compete in a manner unique to their competitors.

Figure 7



However, Miller and Chen (1996) pointed out that distinctive products and processes may actually be troublesome to important outsiders; hence the costs of nonconformity may overshadow its advantages. They found that revenue per seat mile declined for airlines that strayed too far from the strategies of their competitors. Deephouse (1996) found that strategic isomorphism was positively associated with both regulatory and public endorsements, however in a later study, he found an inverted U-shaped relationship with return on assets as the performance measure. Institutional theorists have also argued for the advantages of conformity in many organizational contexts. They believe that companies stand to benefit by following typical repertoires, as customers, competitors, and powerful stakeholders perceive these repertoires to be legitimizing (Meyer and Ro-

wan 1977; Scott and Meyer 1983). Thus, complacent firms may not actually diminish their performance when they are inactive or unwilling to continually innovate or compete aggressively.

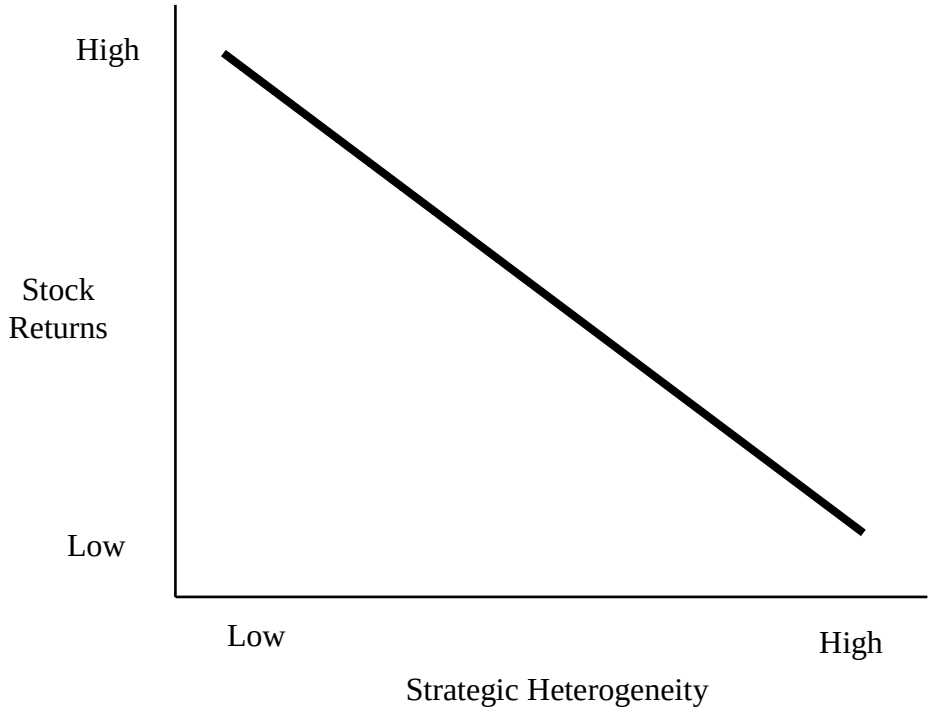
I believe that when competing firms differ greatly in the composition, pattern, and pacing of the competitive attacks each carries out against the other, long-buyers, in accordance with Miller and Chen (1996) and Deephouse (1996), will not ascribe value to the departure from the status quo. Long-buyers will, in fact, be influenced by the recognition heuristic; they will consider those firms that conform to the strategies that are recognized, those their competitors carry out, to be more legitimate and of higher value. Bornstein (1989) suggested that a preference for something that is recognized or familiar is a logical human process, as unfamiliar stimuli and situations are potentially riskier than familiar ones, and the familiarity is preferred even in negative situations.

In their discussion of the recognition heuristic, Anderson and Rakow (2007) provided several instances in which people use this heuristic—examples that are useful for discussion. Many people likely believe that consumer products, movies, and sports teams that they have heard of are more successful than those whose names or titles are unfamiliar. In fact, some recent negative publicity for a Disney Channel star was touted as a positive for her career because it increased her name recognition; some suggested that this individual posted the negative information herself, knowing it would bring a myriad of endorsements and other contracts. This heuristic has also been prevalent in empirical studies of stock selection. Scholars have demonstrated that private investors tend to purchase "high-profile" stocks that have previously experienced high volumes or returns, or have been publicized in recent press releases and news reports. This investment strategy, however, has been shown to underperform the market index (Barber and Odean 2005). Weber, Siebenmorgen, and Weber (2005) provided some insight into why investors might follow an unprofitable investment strategy driven by the "attention-grabbing" features of shares. They found that people tend to perceive that shares of companies whose names they recognize are less risky than those with which they are unfamiliar. It ensues that some firms within an industry become known for strategies that are recognized and acceptable in that industry, and that some investors will penalize firms that deviate from the estab-

lished, particularly long-buyers who are more likely to resort to heuristics. Thus, the greater the heterogeneity of a firm's strategic repertoire, the lower the stock returns.

Hypothesis 3: *The heterogeneity of a firm's strategic repertoire will exhibit a negative relationship with stock returns (Figure 8).*

Figure 8

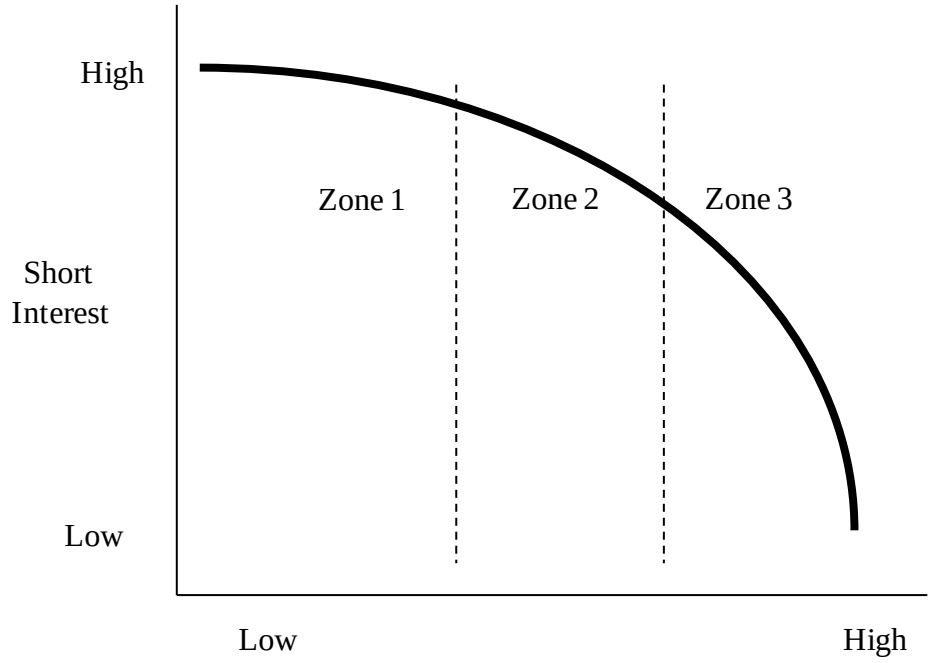


I believe that short-sellers, who follow the more systematic of decision-making processes, will not resort to simply recognizing the patterns of cues to ascribe value to these strategies. In fact, at first they will find the novelty to be value-enhancing in a Porteresque fashion—the nonconformity will be perceived as a competitive advantage resulting in lower short interest. However, as the firms depart from strategies that have proven successful within their industries and develop repertoires that are too different from their referent rival, then short-sellers, faced with high levels of risk, will cease shorting these stocks. Unable to compare the firm's strategies with the strategies of others in the industry, the short-seller will find it difficult to achieve the high level of analysis required to effectively evaluate strategies and determine whether they will create value. In other words, the short-seller will not have enough information to suit the systematic decision-

making process, and this will lead the short-seller to avoid the equity shares. Thus, the increased heterogeneity of a firm's strategic repertoire will exhibit a nonlinear relationship with short interest.

Hypothesis 4: *The heterogeneity of a firm's strategic repertoire will exhibit a nonlinear relationship with short interest (Figure 9).*

Figure 9



Strategic volume. An important principle of competitive rivalry posits that when firms are able to initiate and sustain competitive attacks on rivals these actions will keep rivals off balance and on the defensive (D'Aveni 1994; Ferrier 2001). So, when carrying out corporate strategies, more may be better. Indeed, strategic volume has been related to firm performance. Young, Smith, and Grimm (1996) found that when firms increase their competitive moves, they experience higher returns on assets and sales; that is, firms win when they consistently carry out more competitive actions than their rivals do. Several studies have also both proposed and shown volume of competitive moves to be beneficial when defending market share. Huff and Robinson (1994) contended that firms improve their competitive position when they undertake competitive actions to steal market share

from the market leader. Likewise, market leaders are expected to lose their position unless they act competitively to prevent competitors from eroding their market share (Ketchen, Snow, and Street 2004). Ferrier et al. (1999), in a study of 41 industry leaders and challengers, found that market leaders are more likely to lose market share if they initiate fewer moves than their challengers do.

The more strategic moves carried out, however, the higher the cost and risk that a rival firm can unravel a pattern, anticipate the next move, and respond to the elements of the strategy. For example, empirical studies have shown that firms generally improve their relative competitive position through price-cuts or excessive expenditures, which depletes financial resources (Armstrong and Collopy 1996). Moreover, intense industry rivalry is related to surging costs of scarce resource procurement, and could spur suppliers to extend distribution to rivals (Barney 1991; Peteraf 1993). Scholars have also contended that competitor responses not only counteract a competitive action's benefits, but they may also induce a need for further actions. Consequently, costs may rise faster than revenues (Porter 1980, 1985; Shamsie 1990). This implies that the cost associated with executing a large number of strategic actions may outweigh the benefit. What do investors think?

Psychologists have long observed that repeated, unreinforced exposure to a stimulus increases positive affect toward the stimulus (Fechner 1876; Maslow 1937). A number of early studies in this exposure heuristic showed that repeated exposures and increasing familiarity generally elicited more positive ratings of music (Meyer 1903; Moore and Gilliland 1924). Additional evidence for the hypothesis that increased exposure leads to more positive affect toward a stimulus came from studies of social interaction (Festinger 1951; Newcomb 1963). More recently, this heuristic generated "overnight fame," in which exposure caused nonfamous names to be judged as famous (Jacoby, Kelley, Brown, and Jasechko 1989).

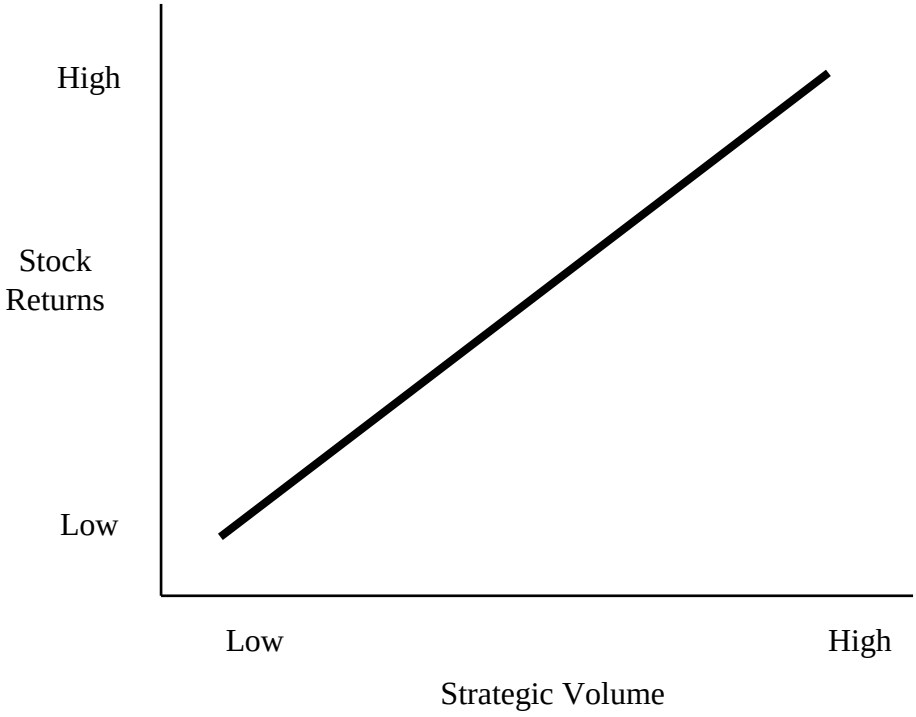
Recent research in the finance literature has suggested that exposure to a company can benefit the corporation's equity shares. Scholars have provided empirical evidence that a firm's overall visibility with investors, as measured by its product market advertising, has important consequences for the equity shares. Specifically, researchers have demonstrated that firms with greater advertising expenditures have a larger number of

both individual and institutional investors (Grullon, Kanatas, and Weston 2004). Thus, I believe that a firm carrying out a large volume of strategic moves will benefit by the long-buyer's use of the exposure heuristic. Absent the motivation to hunt for negative information, the long-buyer will take notice of the firm's equities and buy in a linear fashion to the number of strategic moves carried out.

Short-sellers will likely evaluate strategic volume differently. I believe that in zone 1 of the curve, like the long-buyer, the short-seller will believe that the company must implement some strategic moves to defend and improve their competitive position in the marketplace. Thus, in zone 1, the short-seller will short the stock because he believes the company's inactivity will cause erosion of competitive position. As the company implements more strategic moves, the short-seller will see value in the increased quantity, but only to an extent. As the corporation carries out more and more strategic moves, the short-seller will see these moves as beneficial in defending market share and competitive position down to the level depicted by zone 2. After this point, the short-seller, faced with greater cost and risk, will systematically evaluate the high volume strategy and note the decreasing marginal benefit of numerous competitive actions. This systematic decision-making process will allow the short-seller to realize, as espoused by Porter (1985), that there is an associated cost to implementing these strategic moves, and in fact, costs may rise faster than revenues. This will lead to increased short-selling as depicted by zone 3.

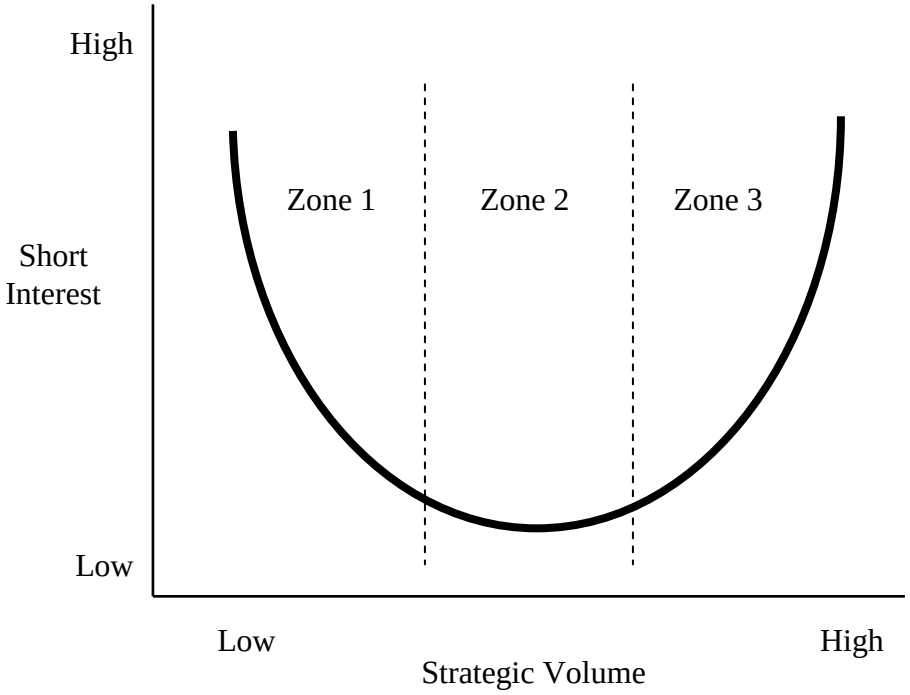
Hypothesis 5: *The larger the volume of a firm's strategic repertoire, the higher its stock returns (Figure 10).*

Figure 10



Hypothesis 6: *The volume of a firm's strategic repertoire will exhibit a U-shaped relationship with short interest (Figure 11).*

Figure 11



CHAPTER 4

DATA AND METHODS

Sample. I focused on a sample of firms that list pharmaceutical preparation as their primary business (SIC code 2834), a designation taken from the COMPUSTAT database. The pharmaceutical industry has clearly identifiable boundaries, which ensures that competitive moves carried out among industry participants are clearly directed at improving a company's position in the industry relative to other industry players. Also, as the valuations of many firms in the industry rely heavily on future cash flows, this ensures that firms widely advertise competitive moves that will enhance the value-generating ability of the firm, and that investors, at least in part, are likely to use judgments about competitive strategy as the basis for value creation, rather than operating ratios, which in many cases do not exist. Also, because R&D expenditures by these firms are substantial, and products generated by these R&D expenditures have blockbuster potential, competitive interaction is intense.

Four criteria were used to identify a sample of firms from this industry. First, firms that designated the SIC code 2834 (pharmaceutical preparation industry) as their primary business were selected from the COMPUSTAT database. This set of firms focused on pharmaceutical product development as their major business. As a result, I excluded those firms that were involved only in marketing and distribution activities in the pharmaceutical section. Second, to create a balanced panel of data, I selected only those leading firms that reported their research and development investments every year from 1998-2004. This sampling process yielded a final research sample consisting of a pooled, 7-year cross-sectional database (1998–2004) for the 100 publicly traded firms within the pharmaceutical industry. The N overall was 8568, or 12 months × 7 years × 102 companies.

Strategy as action. A key tenet of competitive dynamics and hypercompetition theory posits that competitive advantage must be achieved by aggressively and cleverly outmaneuvering rivals in the marketplace with a series of competitive actions (D'Aveni 1994). Prior research in competitive dynamics defines *competitive actions* as externally directed, specific, and observable competitive moves initiated by a firm to enhance its

relative competitive position (see Ferrier 2001; Smith et al. 2001). Keeping consistent with this prior research, I used *structured content analysis* to code these competitive actions (Jauch, Osborn, and Martin 1980), a method that allows for reducing a text to a unit-by-variable matrix and enables researchers to quantitatively test hypotheses (Denzin and Lincoln 2000). Using Factiva, an electronic online database, I searched for published articles of news announcements of competitive actions for all companies in the 2834 SIC code that were publicly traded from 1998–2004. Because of its global scope (news sourced from Reuters, Dow Jones, and many others), my use of Factiva as a news source ensured that all relevant announcements were included in the database, and thus, captured in my analyses. In addition, compared with other sources used in previous research (e.g., F&S Predicast), Factiva provides full articles in electronic form, rather than news headlines alone. This enhanced my ability to reliably categorize news about a given company's competitive actions into different action types.

This search was based on keywords developed to retrieve announcements that were categorized by *action types* that were relevant to the pharmaceutical industry. I used the action categories developed in previous competitive-dynamics research (Ferrier 2001; Ferrier et al. 1999), and adjusted these categories to the specific characteristics of the pharmaceutical industry. This was accomplished through careful screening of numerous news announcements of several companies to determine the types of externally directed moves that comprised "strategy" in the pharmaceutical industry. For example while defending patents may be irrelevant in an industry such as womens, misses, and juniors outerwear (SIC Code 2330), it is critical in the pharmaceutical industry where, when a drug goes off patent, generic drugs are free to compete with it and sales typically decline 75% (Arnott 2001). Thus, premature introduction of a generic, or a formula similar enough to violate a patent, can cost a drug company hundreds of millions of dollars in revenues, and patents are vigorously defended. This assisted in establishing an initial categorization of each news item into one of following action type categories:

1. *price* (e.g., announcement of price changes or sales incentives),
2. *marketing* (e.g., announcement of new advertising or promotional campaign),
3. *new product introduction* (e.g., introduction of new product),

4. *capacity* (e.g., new manufacturing plants),
5. *legal* (e.g., attempts to block a competitor's introduction of a competing product),
6. *overt signals* (e.g., announcements of future actions that may or may not be realized)
7. *improvement actions* (e.g., improvements to existing products),
8. *promotion actions* (e.g., attempts to promote products or the image of the company),
9. *clinical trials* (e.g., announcements of movement into new phases of clinical trials), and
10. *licensing actions* (e.g., acquiring products through licensing from others).

Table 1 provides a complete list of these action categories, as well as examples of the keywords used to generate each news announcement, and samples of news announcements.

Table 1

Action Types, Coding Keywords, and Example Headlines

ACTION TYPE	CONTENT ANALYSIS CODING SCHEME	EXAMPLES OF HEADLINES
Pricing Actions	*Keywords*: price, cut, discount, change	"Abbott Laboratories has lowered prices on about 50 of its drugs (mostly injectable anesthetics and intravenous products)."
Marketing Actions	*Keywords*: advertise, commercial, television, campaign, spot	"Interneuron Pharmaceuticals announces alliance with American Cyanamid to market anti-obesity product"
Product Actions	*Keywords*: introduce, launch, unveil, roll out, approve	"Merck introduces *Mevacor*, to reduce serum cholesterol"
Capacity Actions	*Keywords*: raises, boosts, increase, expand	"Alpharma Reaches Agreement to Expand Vancomycin Capacity"
Legal Actions	*Keywords*: sue, litigate, settle, infringement	"Allergan Sues Santen Pharmaceutical, Alleges Rights Infringement"
Signaling Actions	*Keywords*: vows, promises, says, seeks, aims	"Elan restructuring aims to please market."
Improvement Actions	*Keywords:* improve, enhance, update, change	"Systematic Tooling Analysis Improves Warner-Lambert Product Transfer"
Promotion Actions	*Keywords:* donate, contest, sponsor, promote	"Eli Lilly To Donate Drugs To Battle Tuberculosis Crisis In Russia"
Clinical Trial Actions	*Keywords:* phase, clinical, trial	"Bristol-Myers, Liposome Begin Phase II Testing Of ABLC Drug"
Licensing Actions	*Keywords:* license, contract	"Mylan licenses controlled release product from Andrx"

Using Perrault and Leigh's (1989) index of reliability, an index of 89% was attained for these action types.

After indentifying the action categories, I scanned several headlines in each category to determine which "keywords" were most often included in the headline and first few sentences of the article text, and I developed and applied a detailed keyword screen-

ing schema. After cleaning the data from repeating or irrelevant news, I transferred the full articles (and citations) into a Microsoft Access database. Overall, my study included 6,258 competitive actions from 100 companies over this time frame. I read and independently recoded each of these 6,258 news articles into the 10 action categories described above. To test for reliability of the coding, I randomly selected 50 articles, which were independently recoded by two outside raters. I used Perrault and Leigh's (1989) procedure to estimate the reliability of my coding the news items into the different action categories. I achieved a reliability index of 89%, which exceeds the convention of 0.70 (Denzin and Lincoln 2000).

Dependent Variables

Cumulative abnormal stock returns (CARS). I used the event-study methodology approach recommended by McWilliams and Siegel (1997) to test the abnormal stock price returns of the firms related to the sequential patterns of competitive actions. The event-study method was developed to measure the effect of an unanticipated event on stock prices. The standard approach estimates a market model for each firm and then calculates abnormal returns relative to some index, in this case, the S&P 500. The method is as follows: The rate of return on the share price of firm i on day t is expressed as:

$$R_{it} = \alpha_i + \beta_i + R_{mt} + \varepsilon_{it}$$

R_{it} = the rate of return on the share price of firm i on day t,

R_{mt} = the rate of return on the Standard & Poor's 500 day *t*,

α = the intercept term,

β = the systematic risk of stock i,

and

ε_{it} = the error term, with E(cit) = 0.

Abnormal returns capture the financial impact of unanticipated and new information associated with the action sequences, and account for the market's assessments of the firm's ability to create value through a set of announced strategic actions. The cumulative abnormal returns that correspond to each action in the sequence of competitive actions carried out in a given month were summed at the monthly level. I included the returns within a one-day window around the day each strategic move was announced rather than average monthly returns. The one-day window captures the possible "leakage" prior to

the publication of the news headline or slow reactions by some investors to a particular strategic action or tactic; however, this relatively short window excludes confounding events. This short event window implies that I follow the assumption of market efficiency; that is to say that I believe that any financially relevant information that is newly revealed to investors will be quickly incorporated into stock prices (not necessarily *in the same manner),* however the two day window does allow for leakage and slower reactions by some investors which does occur. For example, on November 20, 2000, the Wall Street Journal reported that Coca-Cola was in talks to acquire Quaker Oats. Shortly thereafter, Coca-Cola confirmed such discussions. The market reacted negatively, sending Coke's shares down almost 8% on November 20th, and more than 2% on November 21st, the next day.

Short Interest. Short interest is the proportion of the number of shares sold short to the total shares outstanding. Short interest figures are generally collected in the middle of the month, and published two days later in the *Wall Street Journal*. For calculation simplicity, each month the shorted interest portfolios were created on the last day of the month based on the current short interest information as reported on the NASDAQ and NYSE stock exchange websites.

Independent Variables

Characteristics of competitive repertoires. I draw attention to three characteristics of a firm's competitive repertoire: strategic complexity, strategic heterogeneity, and strategic volume.

Strategic complexity. To measure the extent to which a firm's competitive repertoires consist of a broad range (as compared to a narrow range) of different action types, I used a Herfindahl-type index that accounts for the weighted diversity among all 10 action types (Ferrier et al. 1999; Ferrier 2001). The Herfindahl index is commonly used to measure the level of diversification across industry categories in the diversification literature (Montgomery 1985). This index takes into account both the number of action categories and the degree of concentration of actions within each category. For example, a competitive repertoire dominated mainly by marketing actions is considered a simple repertoire. By contrast, those that have a relative representative balance among the possible action types are more complex. The measure of the complexity was calculated as follows:

Strategic Complexity

$$= 1 - \sum_{a} (N_a / NT_L)^2$$

where N_a / NT_L is the share or proportion of competitive actions in the *a*th action category. Thus, a firm with a low action complexity score favored just a few action types. Conversely, a firm with a high complexity score employed a broad range of action types.

Strategic heterogeneity. To measure how different each firm's strategic repertoires are relative to others in the industry, I used a Euclidean-like distance score. I calculated the frequency of each type of action (pricing, marketing, product, and so on) by each competitor that accounts for the weighted diversity among all different action types. I then calculated a difference score between the competitive action repertoires for the firms relative to the industry average.

Strategic Heterogeneity

$$= \sum_{a} \left(\frac{I_a}{I_T} - \frac{F_a}{F_T} \right)^2$$

where I_a and F_a are the industry average of the frequency competitive actions in the *a*th action category and the frequency of firm's competitive actions in that category, respectively. The terms I_T and F_T represent industry and firm total actions, respectively. These difference scores are taken at the monthly level. High scores indicate that a firm carries out very different competitive strategies from its rivals, whereas low scores indicate that the firms carry out a mix of competitive actions very similar to other firms in the industry.

Strategic Volume. To measure the extent to which a firm sustains competitive repertoires of considerable volume, I calculated the number of competitive moves carried out each month, which is consistent with prior research (Ferrier et al. 1999; Young et al. 1996).

Controls. As research in finance has shown that firm size significantly impacts stock returns, I controlled for firm size for both short interest and CARS (King 1966; Banz 1981). I used total assets as a measure of *firm size* and took the log of this. As firm

age has a significant effect on stock returns (Pastor and Veronesi 2003), I also controlled for firm age for both short interest and CARS, which I measured as years since founding. I looked up each firm's age independently using the Google search engine. To measure *financial performance,* I used Altman's Z-score, which is a weighted composite of financial indicators relating to profitability, revenue, debt/equity, slack resources, and market return (Chakravarthy 1986).

$$\text{Z-score} = \frac{1.2 \text{ working capital} + 1.4 \text{ retained earnings} + 3.3 \text{ operating income} + \text{sales}}{\text{total assets}} + \frac{.6 \text{ net worth}}{\text{total debt}}$$

High Z-scores indicate a condition of strong financial health; low Z-scores indicate risk of bankruptcy.

To control for different levels of absorbed slack and resource allocations that could impact returns and varying levels of short interest, I included *R&D intensity*, *capital intensity*, and *advertising intensity*. R&D intensity reflects the extent to which a company chooses to invest in the development of new products or processes and is also ambiguous in it relationship to risk. R&D expenditures can be seen either as huge capital burns or as competitive buffers that will impact risk and returns. R&D intensity is defined as R&D spending/total sales.

Similarly, advertising expenses could be perceived as positive or negative. In the case of firms such as Pfizer who has created a strong brand image for Viagra, advertising expenditures may be perceived as positive because they have created a powerful brand loyalty element, but costly, less effective campaigns could negatively impact perceived value. Advertising intensity is defined as advertising spending/total sales.

Brealy and Myers (2002) demonstrated that capital intensity is an important component of the value of a firm because the proportion of fixed expenses in a firm's cost structure is represented. One would logically conclude that fixed expenses would be more risky because they would reduce the flexibility of the firm.. Capital intensity is defined as net fixed assets/total book assets. Ferri and Jones (1979) found that this measure provided the most reliable and significant discrimination among different leverage groups compared with other operating leverage measures.

Control Variables- Short Interest Models

Optioned stocks. Controlling for noninformation-based determinants of short selling is common in the finance literature. Scholars have argued that short sales in stocks that have options attached to them are less likely to be informative. Diamond and Verrecchia (1987) argued that introducing option contracts on a stock reduces the costs associated with short-selling, because option strategies allow traders to mimic short-selling strategies. Brent et al. (1990), Aitken et al. (1998), and Graham, Hughen, and McDonald (1999) argued that the use of options is associated with the use of short-selling for hedging and options arbitrage purposes, which must be controlled for when looking at information-based reasons for short-selling. In addition to options arbitrage and hedging effects on short interest, the option market may provide a substitute for short-selling through synthetic construction of short position.

The American Stock Exchange has established the following guidelines to be considered in evaluating a security for options trading:

- Public float of the underlying security: 7.0 million shares. The public float excludes shares held by officers, directors and controlling shareholders (those holding 10 percent or more of the shares).
- Holders of the underlying security: 2,000.
- Shares of the underlying security traded: 2.4 million shares traded in the twelve months preceding listing.
- Either:
  - i) the price of the underlying security has been at least $3.00 per share for the 5 business days preceding the selection date or
  - ii)
    - (1) underlying security meets the guidelines for continued approval;
    - (2) options on the underlying security are traded on at least one other registered national securities exchange; and
    - (3) the average daily volume for the option over the three calendar months preceding the date of selection has been at least 5,000 contracts. Issuer of underlying security is in compliance with any applicable requirements of the Securities Exchange Act of 1934.

The fact that a security meets the guidelines does not necessarily mean that it will be approved as an underlying security. Furthermore, in exceptional circumstances, the Exchange may approve a security as an underlying security even though it does not meet all of the guidelines

To control for options arbitrage, I constructed a dummy variable to indicate whether the stock has traded options. I obtained this information from Poweropt.com, which provides a complete list of all stocks that have tradable options. The option dummy variable has a value of 1 if a stock has traded options and 0 otherwise.

Control Variables- CARS Models

Short interest. I previously demonstrated that short interest has a sizable impact on stock returns. Dechow et al. (2001) found that for firms with no short positions, the average one-year-ahead abnormal return is 2.3%, while for firms with over 5% shorted, the average abnormal return is *negative 18.1%.* For each of the categories with short positions, the average abnormal return is significantly lower than the average abnormal return for the firm-years with no short positions (the authors sort firm-years into six categories based on the magnitude of the short position in the stock). Thus, when running analysis for CARS, I controlled for levels of short interest.

My study includes a very important departure from previous studies in competitive dynamics (Chen and Hambrick 1995; Ferrier et al. 1999; Ferrier 2001; Miller and Chen 1994, 1996; Young, Smith, Grimm, and Simon 2000) in that the competitive repertoires were analyzed at the *monthly* as opposed to the annual level. This is important when measuring how investors act because their short term focus generally makes the annual level of analysis meaningless. In fact, the focus on short term results by Wall Street investors is so prevalent that a 2005 survey of more than 400 financial executives found that 80% of the respondents said they would decrease discretionary spending on such areas as research and development, advertising, maintenance, and hiring to meet short-term earnings targets (Graham, Harvey, and Rajgopal 2005). Thus, because both investors and managers are focused on the short term, my departure from the annual level of analysis is appropriate to my research question.

Analysis

Means, standard deviations, and correlations are presented in Table 2. Examination of the correlations produced no serious concerns regarding multicollinearity.

To control for autocorrelation within each firm, I ran a mixed, fixed-effects regression analysis that accounted for time by including each observation's month-year as a separate effect, which is formulated as follows:

$$Y_{it} = \alpha_i + \gamma_t + \beta'_{xit} + \varepsilon_{it}$$

where α_i is the effect of a firm i; γ_t is the month-year t effect; β'_{xit} is the coefficient (slope) that is assumed to be constant across firms; and ε_{it} are the errors that are assumed to be independent and identically distributed. Indeed, owing to the cross-sectional time panel structure of our data, most of the autocorrelation (AR1) covariance estimates were significant, indicating the presence of serial correlation. This regression technique produces regression coefficients that account for this important influence. I ran a mixed model with fixed firm and time effects for all independent variables, and a first order autocorrelation structure for the error terms within a firm. These results are presented in Table 3.

Table 2

Control	Mean	Std. Deviation	1	2	3	4	5	6	7	8	9	10	11
1. Age	25.555	15.7177											
2. Altmans Z	5.7034	26.8423	-.044**										
3. Size	2.3742	1.09964	.665**	.149**									
4. OptionedStock	0.4388	0.49627	.199**	.126**	.386**								
5. R&D Intesity	3.0214	19.4192	-.110**	-.029*	-.124**	-.056**							
6. Capital Intensity	0.1769	0.13363	.355**	-.153**	.124**	-.124**	-.002						
7. Advertising Intensity	0.1015	0.10466	-.196**	-.174**	-.289**	.001	.092**	-.174**					
Independent													
8. Complexity	0.0493	0.15879	.214**	.008	.271**	.118**	-.032*	.056**	-.009				
9. Heterogeneity	0.0042	0.27566	.077**	-.008	.110**	.042**	-0.019	.042**	.003	.399**			
10. Volume	0.0887	0.47606	-.034**	-.002	.074**	-.095**	-0.018	.060**	-.036	.009	.052**		
Dependent													
11. CARS	1.9842	35.3827	.019	.002	-.004	-.006	-.005	.026	.059*	-.004	.003	-.021	
12. SIR	0.0086	0.02063	-.051**	.033	-.051**	.094**	.045*	-.097**	.113**	-.019	.005	-.008	.016

p<.05*
p<.01**

Table 3

	Stock Returns			Short Interest Ratio		
	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6
Intercept	.8398	-.5449	-1.792	.0127**	.0227**	.0076***
Firm Age	.2180**	.2240**	.2618**	.00009	-.0009***	-.00005
Altman's Z	.1765	.0334	-.1103	-.00004***	-.0002**	-.00004***
Firm Size	-2.335	-2.540	-3.378**	-.0027	.0019	-.0002
Short Interest Ratio	-13.509	64.528	61.006			
Optioned Stock				.0107**	.0170	.0028**
R&D Intensity	-.0894	-.0499	-.1014	.0006	.0674	.0031
Capital Intensity	-35.791**	-36.192**	-26.847*	.0061*	.1898	1.138*
Advertising Intensity	7.194	9.099	14.146	.0279	.5468	-.3756
Strategic Complexity	28.666			-.0007		
Strategic Heterogeneity		-8.689**			-.0046**	
Strategic Volume			3.292**			-.0007**
$(\text{Strategic Complexity})^2$	-62.825					
$(\text{Strategic Heterogeneity})^2$					.0011**	
$(\text{Strategic Volume})^2$						.0002**

Results

As stated in hypotheses 1 and 2, I predicted that the complexity of a firm's strategy will exhibit an inverted U-shaped relationship with stock returns and a negative relationship with short interest. As reported in Table 3 above, neither hypothesis is supported.

Hypothesis 3 was supported ($b = -8.69$; $p<.05$). The heterogeneity of a firm's strategic repertoire exhibits a negative relationship with stock returns. Hypothesis 4, which predicted that the heterogeneity of a firm's strategic repertoire will exhibit a nonlinear relationship with short interest, was partially supported. While the cubed term was not significant, the main effect and the squared terms were both significant ($b = -.004$; $p<.05$) ($b = .001$; $p<.05$). This indicates that strategic heterogeneity demonstrates a U-shaped relationship with short interest.

Hypothesis 5 was also supported ($b = 3.9$; $p<.05$). The larger the volume of a firm's strategic repertoire, the higher its stock returns. Hypothesis 6 too was supported ($b = -.0007$; $p<.05$), ($b = .0002$; $p<.05$). The volume of a firm's strategic repertoire exhibits a U-shaped relationship with short interest.

CHAPTER 5

DISCUSSION AND CONCLUSIONS

Within the field of competitive dynamics, competitive actions are seen as a major factor that contributes to the performance differentials across companies (Bettis and Weeks 1987; Miller and Chen 1994, 1996, Ferrier et al. 1999; Ferrier 2001; Ferrier and Lee 2002). Thus, integration of financial theories that prescribe how this area of strategy contributes to firm value is a logical step in answering the call set forth by Bettis (1983, 414):

> … there is a need for strategic management researchers to establish closer working relationships with finance scholars…ultimately such cross communication is essential, or else practitioners will be forced to select among contradictory paradigms—a most undesirable circumstance.

Competitive dynamics in strategy research maintains that to understand the outcomes of competition, one must examine and evaluate the collective actions of companies (a strategic repertoire), and how this repertoire will impact the future value of the firm. While the field of competitive dynamics has yielded noteworthy results, and in general made considerable progress theoretically over the past two decades, many important questions remain unanswered, particularly with respect to Bettis's (1983) call.

My dissertation stands among the first attempts to integrate financial and strategic theory in competitive dynamics by developing strategic asset pricing theory (STRAPT). In developing this theory, I address the following questions: What do investors think? How do they perceive and evaluate a series of competitive actions as they unfold? How do they come to conclusions about the impact these strategies will have on the future earnings growth that ultimately affects a firm's equity shares? And, who are these investors?

In answering these questions, I look to whether investors scan, analyze, and interpret the value-creating potential associated with the competitive interaction—the pace, intensity, and pattern of dynamic competitive rivalry. In doing so, I present the four stages of STRAPT. First, I describe the overall decision-making process as informed by social judgment theory. Second, I explain the manner in which investors "code" this information as evidenced by information theory. Third, I describe what makes these patterns

of cues noticed by investors. In accomplishing these first three objectives, I justify why coding schemes such as strategic heterogeneity and volume are appropriate in competitive dynamics research. Fourth, I examine the decision-making processes of long buyers and short-sellers, and consider how the combination of these cognitive principles leads to evaluations of corporate strategies by these two classes of investors, resulting in changes in stock returns and short interest.

Also, and quite importantly, I challenge the applicability of the efficient-markets hypothesis in finance to strategy research by attesting that all investors do not come to the same conclusions. According to Preuschoff, Quartz, and Bossaerts (2005), neoclassical finance, from which the efficient-markets hypothesis arises, assumes that humans take in information and convert it into actions, blindly applying certain rules called "rational decision-making." This area of finance ignores how decision-makers perceive complex environments and how they process this information to make choices. "As a theory of human decision making, this approach has really never worked" (Preuschoff et al. 2005, 2). Indeed, the emerging field of behavioral finance has shown that numerous factors affect how investors form opinions about stocks (Hirshleifer 2001), implying that not *all* investors always act rationally or in the same manner. Thus, I test models for two classes of investors—long-buyers and short-sellers—who, I believe, given very different levels of cost and risk will use different decision-making processes, and ultimately come to different conclusions about the strategic patterns they observe.

Drawing from core ideas in competitive dynamics and cognitive psychology, I demonstrate that long-buyers and short-sellers are influenced by specific dimensions that describe how a firm's competitive strategy unfolds over time. My development of STRAPT and results from testing combine to advance strategy theory by providing additional understanding of the model of the processes by which investors form ideas about firms' competitive strategies and their ultimate beliefs about the impact these strategies will have on stock prices. Specifically, I unify several areas of psychological thought that have yet to be cohesively applied to investor decision-making about strategy. In doing so, I also inform managers as to the optimal level of strategic heterogeneity and volume to appeal to these two important groups of outsiders.

First, investors' type influences the decision-making processes investors use and the amount of effort they will expend due to differing costs and risks inherent in the stock transactions they undertake. Throughout this dissertation I consistently argue that long-buyers use a less effortful heuristic decision-making process, and that short-sellers use a more thoughtful or systematic decision-making process. My findings of how long-buyers regard between-firm differences in the pattern of competitive actions the firm carries out over time, or strategic heterogeneity, are generally supportive of Miller and Chen (1996) who posited that distinctive processes such as heterogeneous strategies may do more harm than good by decreasing the "legitimacy" of the firm. The long-buyer, using the recognition heuristic, does not assign value to this variety, and tends to reward firms that adhere more closely to the status quo. At first, short-sellers—undertaking a more systematic evaluation of the strategy at hand—subscribe to Porter's (1980) view that heterogeneous competitive repertoires confuse rivals and thus create value by catching them off guard. More specifically, in the context of fierce competitive rivalry, short-sellers value the firm's ability to out-maneuver rivals through differentiation (carrying out a pattern of actions different from rivals). However, as the strategy becomes increasingly different from that of referent others, the short-seller apparently believes the firm is straying too far from the core business conduct within the industry, and is "out in left field" with regard to the strategy's potential to add value. This results in a U-shaped relationship with short interest. So it appears that Miller and Chen's and Deephouses' (1996) theories on the benefits of isomorphism apply to both types of investors, but for short-sellers, this happens further along the homogeneous–heterogeneous continuum. This is consistent with Deephouse (1999), who argued that the nature of the relationship between competitive nonconformity (heterogeneity) and performance depends on the size of the deviation from established norms. Short-sellers adhere to the *strategic balance proposition* that moderately differentiated firms have higher performance than either highly conforming or highly differentiated firms. Thus, rather than simply ceasing short-sales activity as heterogeneity increases beyond a judicious level, short sellers apparently believe that radical deviations will encounter institutional forces resulting in negative future performance.

My findings pertaining to how long-buyers value the number of strategic moves carried out by a firm generally support the Young, et al (1996), and Ferrier (2001) views

that that more rather than fewer strategic moves are good for firm outcomes. Specifically, I demonstrate that long-buyers value exposure to the firm, and this translates into positive stock market returns. Short-sellers, on the other hand, see the value of a large number of strategic actions only to an extent. Through their systematic analysis, they then subscribe to the Porter (1985) and Shamsie (1990) viewpoint that more is not always better. This results in a U-shaped relationship with short interest.

Findings that relate to within-firm differences, or strategic complexity, are not significant. This insignificance could indicate that neither type of investor evaluates strategies on this continuum. Further research should be conducted in this area to determine whether and why this is the case. This investigation could be done in the form of surveys of both classes of investment professionals to determine whether there is an intra-firm difference measure that strategy researchers have yet to consider.

One possible reason for these nonfindings is that within firms, investors may regard certain types of strategic actions as more important in creating future value than others, thus disregarding many of the other elements of "strategy." My model did not test for the relative importance of each *type* of strategic action to investors. If one type of action was a great deal more important for investor evaluations of firm-specific strategies, this may preclude cognitive development of the actual complexity of the strategy, because by focusing on one or two elements, a pattern such as this would not emerge. Indeed, in an unpublished working paper, Bridoux and Smith (2008) examined which types of actions are most beneficial for firm performance. They showed that actions in product markets, or *output* actions, have the largest impact on performance (operating profit). If products are the most important type of strategic action, in the context of the pharmaceutical industry, investors may take a real options perspective to evaluating the worth of the equity shares based on internal actions. This is because in the pharmaceutical industry, product development processes are lengthy and costly. A negative vote on a drug by an FDA panel or a failed clinical trial can have severe consequences for a company's future earnings. Thus, investors may wisely pay much closer attention to the progression of drugs to market rather than elements of strategy such as pricing or promotion. Adding to the logic that they take a real options perspective is that following the progress of a drug candidate to market is actually quite easy and methodical. Results of various stages of clinical trial

progress are widely publicized, and as the drug progresses through trial stages 1, 2, and 3, the risk of failure diminishes significantly.

Pragmatics and Practice

Indeed, "… strategic investments and tactical moves influence the uncertainty of future income streams and reduce information asymmetry between the firm and the broader investment community" (Chatterjee, Wiseman, Feigenbaum, and Devers 2003, 76). In my dissertation, I demonstrate that beyond traditional valuation tools, investors interpret strategic actions as cues, and assign value to a series of these cues based on well-documented cognitive principles. Also, different classes of investors take different approaches to the assessment and evaluation of the cues as they are successively announced. I also introduce a new and potentially fruitful line of inquiry in the strategy literature, the evaluation of strategic principles by a class of investors deemed to be very informed—short-sellers (Diamond and Verrechia 1987).

In developing STRAPT, I demonstrate that long-buyers use behavioral/action-based analysis in addition to current performance outcomes, and believe this departure from prescribed financial theory is indeed a rational valuation strategy for investors because "through the purposeful commitment to a course of action…companies can seize and defend a valuable market position" (Lubatkin, Schulze, McNulty, and Yeh 2003, 86). As posited by Christophe et al. (2004), I also demonstrate that short-sellers use this action-based inquiry in their analyses. Therefore, rivalry may be viewed as an under-explored component of abnormal returns and short sales, whereby competitive strategy is defined and characterized as the unfolding of competitive moves carried out by rivals in strategic time.

In addition to advances in the integration of financial theories with strategic management, STRAPT also has strong managerial implications. With respect to the market for managerial talent, managers (and management teams) that are able to better control stock prices and short interest will command a premium for employment as they can potentially have a greater impact on shareholder value. Accordingly, those that have a better understanding of the mechanisms by which investors make decisions and ascribe value to various strategic patterns will be at an advantage in both the competitive and employment marketplace. Additionally, since most compensation packages for top managers are

closely tied to stock price (Sahadi 2006), strategy researchers and practitioners alike should investigate the mechanisms by which to control stock prices, and an understanding of the thought processes of those ultimately in control—investors—is a good start.

Limitations

This study is a theoretical study that uses secondary data to test the hypotheses. Therefore, the central limitations of this study concern the appropriateness of the measures used to test the hypotheses put forth. First, the conceptual portion is founded on theories developed in behavioral finance and cognitive psychology. While the latter body of knowledge has been thoroughly developed and rigorously tested under experimental circumstances for many decades, the former is a new and somewhat controversial field that has emerged in the finance literature. While the suppositions seem logical, it undermines decades of work in the formation and testing of asset pricing theory. For instance, the notions of the rational investor and market equilibrium are called into question, and I have assumed behavioral finance scholars have disproved asset pricing theory. Therefore, if one strictly subscribes to the theories and suppositions put forth in neoclassical finance, my findings would have no relevance. Furthermore, since this is one of the first studies to apply psychological principles to the theory of competitive dynamics and propose outcomes, it may be possible to criticize the approach, despite carefully developed arguments to justify its relevance.

In addition, there are problems with the design and data. The use of only secondary data could be problematic. This study could be improved with primary data collection through interviews with and surveys of the very individuals whose thought processes I am trying to suppose—long-buyers and short-sellers. In addition, testing hypotheses in only one industry limits generalizability. As noted in the nonfindings for strategic complexity, investors may regard certain types of strategic actions to be more important in one industry than another. This could lead investors to form conclusions about the viability of overall patterns of strategies in some industries, while ignoring these patterns altogether in others.

Future Directions

Logical progressions of this study and the advancement of strategic asset pricing theory include further study into the cognitions of these two classes of investors with re-

gard to other areas in the strategy arena where patterns are evaluated for future earnings-creating potential. Since my results reveal that investors tend to focus on the interaction or heterogeneity between firms more than the intra-firm differences, a logical extension is to evaluate how investors interpret the interconnectedness of relationships between firms. According to Gulati (1998), the strategic conduct of firms in an industry is influenced not only by the properties of their relationships taken one at a time, but also by the overall structure of interfirm relationship networks. This social networks perspective builds on the general notion that economic actions are influenced by the social context in which they are embedded and that actions can be influenced by the position of actors in social networks (Gulati 1998, 295). Thus, it follows that the competitive dynamic posture of a firm can be in part deduced from its position in a social network. Also, according to Fombrun and Shanley (1990, 233), "publics construct reputation on the basis of information about a firm's relative structural positions within organizational fields." So in essence, these structural positions act as signals or cues of firm quality to investors; thus the question, "Do firms benefit from entering strategic alliances?" (Gulati 1998, 309), can be examined by assessing investors' evaluations of the network of alliances. Fombrun and Shanley (1990) go further to confer that institutional signals indicating conformity to social norms and strategic signals indicating strategic postures are key elements of the reputation-forming process. It follows that the strategic postures firms develop based on the conformity imposed by various types of social networks should be studied, and the performance outcomes from these, such as stock returns and short interest, should be empirically examined.

A second logical extension is to test reverse causality, which would explore the question "do managers adjust strategies based on signals from Wall Street?" Several economic scholars have explored similar questions. Jensen and Meckling (1976) argue that stock prices serve to monitor management. Since the implications of managers' decisions are reflected in stock prices, investors have incentives to influence corporate policies, even replacing management teams if necessary. Likewise, since compensation structures of many top managers are closely tied to stock price, managers have incentives to listen to investors (Kau, Linck, and Rubin, 2008). Dye and Sridhar (2002), argue that listening to investors may be a wise strategy for managers since capital markets can be better in-

formed than the firm itself. However, Roll (1986) argued that managers may not heed market signals due to their belief that they know their company and industry better than outside investors. Thus, since economic scholars are at odds regarding this question, it may be a fruitful line of inquiry in strategy research.

Conclusion

I hope that my study serves to kindle scholarly interest in how other managerially influenced organizational behaviors and characteristics affect the way in which patterns of firm behavior are perceived and ascribed. Toward this end, I think that strategy scholars are well positioned to contribute, given our field's assumption of imperfect markets and our focus on the firm-environment interface. Recognizing that "human behavior is bewilderingly complex and heterogeneous" (Preuschoff, et al. 2005, 2), we can perhaps come to a better understanding of how human heterogeneity affects the decision-making processes that lead to different evaluations of the interaction between firms. Indeed, the distinctive role of strategy research among the social sciences has always been its capacity to integrate economic and behavioral theories with our understanding of the firm to provide insights and guidance to individuals who manage them.

Post-hoc Analyses

I ran several post-hoc analyses to attempt to derive additional insight into corporate actions that influence investor perceptions of a corporations viability, and thus stock returns and short interest. First, I ran fixed effects models for each action category independently. Results were insignificant for the most part indicating that investors tend to analyze the totality of the actions rather than each action in isolation. The one that did show significance was clinical trail announcements on stock returns which had a *negative* impact ($b = -3.09$; $p<.05$). A review of these announcements showed that most of them were positive outcomes. This is counterintuitive because progression through clinical trails should have positive influence on future earning perceptions so what explains this finding? Wall Street has a well known saying "by the rumor, sell the news". An extreme example of this occurred on May 10, 2000 when investors bought the rumor and sold the news of Cisco Systems beating earnings forecasts, sending shares of Cisco Systems plunging 4-1/4 to 58-1/2, following the networker's better-than-expected quarterly earnings. After reporting, the stock fell victim to a bout of profit taking substantial enough to

drive down the entire NYSE. These results were not significant for short interest which suggests that short-sellers do not subscribe to this adage, however, results are difficult to interpret as I do not have short interest data for the actual day, only the month in which the event occurred.

I also lagged each of the action-related variables by 1, 2, and 3 months. The only significant result of this analysis was strategic heterogeneity impacted short interest in a U-shaped manner for the 1 month lag. This suggests that short-sellers value heterogeneity only up to a certain level and evaluate these types of strategies over the previous two months. As such, short-sellers are taking a longer-term analytical approach to these types of differentiated strategies than long buyers, further supporting my proposition regarding the systematic nature of their decision-making processes.

Third, I did a split sample analysis on firm size and firm performance (CARS) for each class of investor. In the analysis regarding size for long-buyers, strategic heterogeneity impacted returns negatively only for large firms, and volume positively only for large firms. This suggests that long-buyers more closely analyze the strategies of large firms which likely because these firms comprise a larger percentage of their overall portfolio. Results for the short-seller for size did not differ from those of the sample in its entirety. This suggests that short-sellers closely analyze all firms in which they have short positions because an incorrect call on a small firm can be just as devastating as for a large one.

The analysis regarding performance for long-buyers revealed that strategic heterogeneity only had a negative impact on stock returns for high performance firms, and no impact for those in the low performance set. A possible explanation for this is if a firm is not performing well, investors are not concerned with the strategy of the firm but more the financial ratios. Results for short-sellers showed a U-shaped relationship for strategic heterogeneity for high performance firms, but no relationship for low performance firms. Once again, if a firm's stock is not performing, the short-seller may not be concerned about strategy, but look more to financial ratios. Results pertaining to volume for short-sellers indicate a U-shaped relationship for high performance firms and a positive relationship for low performing firms. The results for high performing firms correspond to those of the sample in its entirety. The results for the low performing firms suggest that

when performance is down, short-sellers believe that channeling resources towards larger numbers of strategic moves could erode the financial position of an already faltering firm.

APPENDIX

Sociological (Studies of Competitor Actions Based on Focal Firm)	**Time**	**Level of Analysis**	**Independent Variables**	**Dependent Variables**
Smith, Grimm, Gannon and Chen 1991	Annual	Action-Reaction Dyad	**Type of action:** strategic (significant commitments of specific, distinctive resources and are difficult to implement and reverse) vs. tactical (easy to implement, reversible actions)	**Response likelihood**: number of times each airline responded to competitors' actions/ the number of times the firm had an opportunity to respond **Response imitation:** binary variable, with a value of 1 when the type of response was the same as the type of action **Response lag:** amount of time was measured by the difference between the data of the first report of a specific competitive action in Aviation Daily and the date a response was reported **Response order:** rank position in time of a responding firm among all responders, calculated by averaging each airline's actual rank position in the order of responders for each action for each year
Chen, Smith, and Grimm 1992	Action	Action-Reaction Dyad	**Competitive impact**: sum total of the competitors actually affected by an action. Competitors affected by each action were	**Number of responses** was defined as the total number of competitors who actually **Response lag:** the number of days between the

Chen, Smith, and Grimm 1992 (cont.)			further defined as those airlines which provided service in at least one of the sample airports affected by the action **Attack intensity:** among passengers served by an airline in the year an action was taken, the proportion of those passengers affected by that action **Implementation requirement:** amount of time spent preparing to execute that action. The time difference between the date Aviation Daily reported an action and the date that action was executed as indicated in the journal **Type of action:** strategic (significant commitments of specific, distinctive resources and are difficult to implement and reverse) vs. tactical (easy to implement, reversible actions) move	date a specific action was first reported in Aviation Daily and the date that journal first made public the airline's response
Chen and Miller 1994	Event and Annual	Action-reaction dyad	**Action visibility:** three scales to assess how visible each type of attack might be to rivals (first two derived from questionnaires sent to top executives). - amount of industry publicity associated with each move - likelihood that this type of attack would be publicly announced by top management. - n*umber of lines of print* in *Aviation Daily* associated with each move **Response difficulty:** five scales is the	**Number of responses:** the number of airlines that responded to an action **Response ratio***:* All competitive responses directed towards the actions of a given firm in a given year / the total number of actions made by that firm in that year **DV 2** **Performance:** (**IV:** response ratio) total operating revenue per revenue passenger mile (RPM) - operating profit per RPM

Chen and Miller 1994 (cont.)			ease with which a competitor can respond in kind to an attack (first four derived from questionnaires sent to top executives, fifth, author derived). - estimated financial expense - disruption of staff and systems - amount of relocation of staff or equipment required - the need for complex coordination among different functional departments - overall perceived difficulty of making the move **Centrality of attack:** proportion of annual passengers affected. Aggregate index for each action was obtained by averaging the centrality measures for each affected airline. **Potential benefit of the attack:** number of attackers' passengers affected by the action aggregated for all the actions made by a given attacker in a given year.	- profit margin Standard and Poor's published stock ratings for each airline for each year. **Interaction terms:** Visibility x difficulty Centrality x difficulty Visibility x centrality Visibility x centrality x difficulty

Sociological (Studies of Firm Characteristics Impact on Firm Behavior)				
Fombrun and Ginsberg 1990	Annual	NA	**Organizational inertia**: firm size (logarithm of total employees) **Firm performance**: return on assets (ratio of operating income to total assets) **Sector volatility:** sale volatility coefficients of individual firms within a sector. Because the aggressiveness of firms can be influenced by other forces, dummies f or manufacturing/service, capital intensity) were included.	**Corporate aggressiveness**: index of which three dimensions - emphasis on product development (allocations to R&D as a percentage of sales) - emphasis on market development (allocations to market development as a percentage of sales) - willingness to take a risky position in the capital markets (debt - equity ratio)
Lant, Milliken, and Batra 1992	Annual	NA	**Environmental turbulence**: relative rates of strategic reorientation **Past performance**: return on assets relative to industry average **Managerial interpretations:** **Environment -** coded from the 198610K and annual reports. An indication of whether or not a firm mentioned changes or their expectations of changes in environmental contingencies. A firm's managers were coded as being aware of environmental contingencies if they indicated explicitly that they had observed or were predicting a	**Strategic reorientation:** a change in business strategy coupled with change in other key organizational dimensions. Thus, a change in business strategy is a necessary but not sufficient condition for strategic reorientation. 13 identifiable strategies that the companies in the samples used to compete in their industries were coded from the 10K. A company was coded as having changed strategies when they either did not mention a strategy they had indicated in 1984, or when they mentioned a new strategy that had nor been indicated in 1984. Change in organizational structure was coded

Lant, Milliken and Batra 1992 (cont.)			specific change in their organization's environment. **Past performance** - obtained from content analysis of the management discussion in the 10K reports and the president's letter in the annual reports in 1986. Coded each mention of a performance outcome as being positive or negative. Then coded the reason given for that outcome as being internal or external. **Top management team functional heterogeneity** **CEO and top management team turnover** - A change in the CEO was coded when the CEO or president changed within the given time period. Change in the management team was measured as a percentage variable.	when there was evidence of a major change in structure, such as a change from a functional to a divisional organization, between the 1984 and 1986 10K reports. **CEO and top management team turnover** (**IV past performance**): change in the CEO coded when CEO or president changed within the given time period. Change in management team was measured as a percentage variable. **Top management team functional heterogeneity** (**IV past performance**) **Managerial interpretations:** (**IV past performance**) **Environment** - coded from the 1986 10K and annual reports. An indication of whether or not a firm mentioned changes or their expectations of changes in environmental contingencies. A firm's managers were coded as being aware of environmental contingencies if they indicated explicitly that they had observed or were predicting a specific change in their organization's environment. **Past performance** - obtained from content analysis of the management discussion in the 10K reports and the president's letter in the annual reports in 1986. Coded each mention of a performance outcome as being positive or negative. Then coded the reason given for that outcome as being internal or external.

Wiersema and Bantel 1992	Total-1980-1983	NA	**Top management team characteristics**	**Strategic change -** the absolute percentage change in diversification strategy over the period 1980-83. Measured with Jacquemin and Berry's (1979) entropy measure of diversification, which captures both the extent of diversity across a firm's activities and the related versus unrelated elements of diversity (Palepu 1985). $\sum_{i=1}^{N} P_i \ln(1/P_i)$ where Pj is the percentage of a firm's total sales in the ith segment and N is the number of the firm's businesses.
Hambrick, Geletkanycz, and Fredrickson 1993	One time questionnaire	NA	**Commitment to the Status Quo** *Leadership CSQ* – survey measure - degree to which the respondent (mostly CEO) believes the firm's ideal CEO in the Year 2000 should be similar to the current CEO, in terms of expertise and behaviors *Strategy CSQ* – two sets of items in the questionnaire which dealt with competitive weapons (e.g., low price, premium image; 11 items in total) and growth strategies (e.g., acquisitions in industries new to the firm, internal development of new businesses seven items in total). **Organizational tenure** - years **Industry tenure** – years	**Interaction term (performance)** CSQ x Industry discretion **Performance** 4-point item: question on how would you describe the profitability of your firm?' 1 = unprofitable, 2 = breaking even, 3 = moderately profitable, 4 = very profitable.

Hambrick, Geletkanycz, and Fredrickson 1993 (cont.)			**Industry discretion:** *high-discretion environments*: low capital intensity, product differentiability, low degree of regulation, and high market growth. *low-discretion environments:* highly capital intensive, commodity products, high degree of regulation, and generally low growth.	

Miller and Chen 1994	Annual	Competitive repertoire	**Past performance**: revenue per available seat mile flown **Competitive experience: Prior year competitive inertia:** market growth: annual change in total Revenue seat mile flown for domestic airlines market diversity: Composite index of number of different airports served ands number of competitors faced by each company Company age and size (log of number of employees)	**Competitive Inertia:** index representing the number of decisions in each of the j (=1,…,21) action type categories for each of the companies in given year. Scores were standardized to avoid overweighting most common types. The activity index is the sum of the standardized scores/number of decision types (21) and then divided by the log of the revenue passenger miles. Tactical and strategic actions were separated.
Chen and Hambrick 1995			**Organizational size**: Large airlines - carriers with annual operating revenues of $1 billion or more, small airlines, or nationals, were those with annual operating revenues of between $100 million and $1 billion. **Deviating group norm:** calculated the mean of a group as its typical behavior and a firm's deviation on an attribute was then calculated as the absolute distance between its own behavior and the average behavior for its group	**Action execution speed:** time difference between the date the firm publicly announced or acknowledged the intended action and the date that action began to be executed . **Action visibility:** Measured by the number of lines Aviation Daily devoted to reporting) **Response visibility:** Measured by the number of lines Aviation Daily devoted to reporting the action **DV2** **Organizational performance: (Deviating group norm)** index composed of two market-related and two profit-related performance measures: (1) Net market share change and percentage market share change (net market share change/initial market share. (2) Profit margin and total operating profit per revenue passenger mile

Gimeno and Woo 1996	Annual	Competitive repertoire	***Strategic similarity***: Pairwise similarity of 1. DOT classification of airline size. 2. Date of founding (those founded within similar timeframes will have similar strategies). 3. Euclidian distance of seven different strategic variables such as *average premium over standard industry fare level* and *direct flights over all flights.* ***Multimarket contact:*** The number of contacts outside the airlines major market where two firms also compete??	**Intensity of rivalry**. Average price charged by a firm to passengers or revenue per passenger mile.
Audia, Locke, and Smith 2000 ***(Study 1 only)***	Annual	NA	**Radical environmental change:** deregulation **Past performance:** deviation from the industry median for return on sales and return on assets was computed in each of the five years and then averaged. **Change in performance after the environmental change:** same measure used for past performance to calculate performance in the five years after the environmental change. Then a difference measure was computed subtracting performance before deregulation from performance afterward.	**Strategic persistence**: **(IV performance)** stability (measured by the variance of the indicator annually) of financial and operational ratios that express the strategic position of a company. For example, R&D expenditure divided by total revenues is a classic indicator of a company's R&D intensity. These are industry specific. **Performance: (IV strategic persistence)** return on sales and return on assets

Young, Smith, Grimm, and Simon 2000	Annual	Action/Reaction Dyad Repertoire	**Similarity of firm resources**: includes experience resources (the number of years it has operated in the market) and resource position relative to its rivals (Euclidean distance based on the three resource dimensions of technological intensity, size, and market-specific experience). **Multimarket contact:** number of contacts outside the airlines major market where two firms also compete	**Strategic frequency:** percentage of all moves in a market that are undertaken by the focal firm **Time to move**: lag time in days between a focal firm's move and the most recent preceding move of any of its market rivals
Ferrier, MacFhionnlaoich, Smith, and Grimm 2002	Annual	Repertoire	**Top management team heterogeneity** **Altman's Z-score score:** weighted composite of financial indicators relating to profitability, revenue, debt/equity, slack resources, and market return. **Market share erosion: n**egative year to year gain in percent of firm sales to industry total sales. **Competition-buffered industry environment**: three factor measure: *industry growth rate* for each industry-year (year *t*) was calculated as the percentage change in industry gross sales from that of the previous year (year *t-1*) for each 4-digit SIC industry. *Industry concentration* used a Herfindahl index for each 4-digit SIC industry	**Competitive aggressiveness:** number of actions carried out by a firm in a given year divided by the speed/delay. The latter half was calculated as the annual average of the number of days elapsed between the dates of each competitive action carried out in a given year by the number 1 firm and the dates of the competitive action carried out by the number 2 firm that chronologically precede them.
Mas-Ruiz, Gonzalbez and Ruiz-Moreno 2005			**Three, size-defined, strategic groups:** large banks (national scope), whose distinctive characteristic is their extensive branch network;	**Rivalry instigation:** ratio of 'number of primary movements (as opposed to response movements) of a company in a year/total number of movements

Mas-Ruiz, Gonzalbez and Ruiz-Moreno 2005 (cont.)			Medium size banks (regional scope), which have a significant presence in a few local markets; and smaller banks which are to a greater or lesser extent functionally or geographically specialized in one local market.	**Competitive activity**: number of competitive movements (including actions and responses) of an entity **Propensity to launch new products**: if a company is inclined to introduce new products. It is measured as 'percentage of movements of new product launch (actions and responses)/total number of movements of an entity **Speed of response: a**verage delay time, in days, of the responses of an entity to the actions of its competitors **Imitation of a response to an action**: reflects the degree of duplication implied in each response
Gnyawali, He, and Madhavan 2006	Two years	Competitive Repertoire	**Measures of co-opetition** **Network centrality** - normalized information centrality as calculated by UciNet. **Structural autonomy** - calculated by reversing the sign of the constraint measure as implemented in UCINET **Moderator:** **Market diversity**: inverse of each firm's proportion of sales from the steel industry **Centrality x Market diversity (Structural autonomy** x **Market diversity (**Competitive variety, Competitive activity)	**Competitive activity:** the total number of competitive actions undertaken by a firm - reflects the *scale* of competitive behavior. To control for the stimulant effect of other firms' competitive activity on a focal firm each firm's score was converted to a *z*-score **Competitive variety:** the range or diversity of competitive actions - reflects the *scope* of competitive behavior. Herfindahl-type index of simplicity of calculated over the all different action categories

Andrevski, Ferrier, and Brass 2007 **(working paper)**	Annual	Competitive Repertoire	**Nonredundancy of ties**: used UCINET 6 to compute Burt's (1992) measure of efficiency **Degree centrality:** computed degree centrality measure for each firm by counting the total number of newly formed alliances with partners in a given year **Alliance variety:** Shannon's (1948) diversity index: Adj. hannon's Diversity index =- $\sum$ pi{ln(pi)}- (s-1)/2n, where n denotes automaker's total number of alliances; pi = ni/n, which denotes the degree of concentration of alliance type i (i=1, 2, …,7); and s=7, which denotes the number of alliance types (i.e., distribution, information technology/management, supply/logistics, manufacturing, R&D/technology, marketing, and finance) **Alliance diversity x nonredundancy of ties**	**Competitive repertoire intensity: (Nonredundancy of ties, Degree centrality, Alliance variety, Alliance diversity x nonredundancy of ties)** log of the total number of newly created competitive actions, regardless of type, carried out in a given year. **Competitive repertoire complexity (Nonredundancy of ties, Degree centrality, Alliance variety, Alliance diversity x nonredundancy of ties)** Herfindahl-type index of simplicity of calculated over the all different action categories
Zhang 2007 (Working Paper)	Quarters	Competitive Intensity	**Equity level***:* airline's total shareholder equity divided by its total assets **Earnings pressure***:* difference between the analyst consensus forecast of firms' earnings per share (EPS) and firms' current EPS **Free cash flow level***:* average free cash flow (income before interest and taxes plus depreciation and amortization) divided by average total assets	**Competition intensity**: measured by a scale called "*yield*" - average ticket price that an airline charges in a city-pair route, divided by the distance of the route

Baglieri 2007 (working paper)	One time questionnaire	FMO	**Appropriability measures** *Intellectual property rights* – patents, copyrights, trademarks, utility models and designs, and trade secret protection *Tacitness of knowledge* is measured with ten statements describing the products and processes of the responding company - cover different dimensions of tacitness, namely codifiability, teachability, complexity, system dependence, and product observability.	**First-mover orientation**- five item questionnaire (subjective) that measure how significant it is for the respondent to act early, whether the respondent experiences the firm as an initiator or a follower, and the desire of the firm to invest in new industries.
Economic (Studies examining performance based on characteristic of competitive actions)				
Caves and Porter 1978	Annual		**Leader-challenger action dissimilarity**: measured between-firm action differentiation, or the extent to which leaders and challengers differed in the actions each carried out. This dimension is captured by using a single dummy variable constructed from a composite of several dummy variables that indicate whether the company is the same or different than competitors in markets served, breadth of product line, marketing expense service	**Relative share instability:** absolute value of percentage point change of share divided by the initial shares and summed. **Absolute share instability:** absolute value of percentage point change of share.

Caves and Porter 1978 (cont.)			quality and product image, vertical integration, product quality, product price, and direct production cost.	
Bettis and Weeks 1987	Monthly	Event	**Individual event announcements**	**Cumulative abnormal stock returns**: computed the day the event occurred and the two previous trading days and summed. Summed at the end of complete strategic interaction. Risk adjusted return in excess of the S&P 500
Hambrick and D'Aveni 1988	Annual		**Domain initiative**: new domains: sum of four indicators of initiative for a given year: - the number of wholly owned subunits acquired - the number of wholly owned subunits formed (foreign subsidiaries, new product divisions, etc.) - the number of partially owned units acquired or formed (e.g., joint ventures, minority ownerships - the number of new 4-digit SICS added - location growth: annual percentage change in one of these indicators for each firm - the number of stores (retail), number of routes (airlines), number of terminals (trucking) **Strategic vacillation:** variability of the	**Matched pairs of bankrupt or not firms**

Hambrick and D'Aveni 1988 (cont.)			firms' domain initiatives over time. The coefficient of variation (variance divided by the mean; we added .O1 to both terms to allow inclusion of zero scores) for each of the two indicators of initiative **Environmental carrying capacity**: measure of real demand growth. Recorded the annual real sales growth for the top two (by sales volume) &digit SIC industries of each firm in each year. Then, in the absence of specific volume breakdowns, assigned a weight of .67 to the demand growth for the firm's primary line of business and .33 for the second line of business and added the two scores together to obtain an overall demand-growth indicator. **Slack:** - equity-to-debt ratio - working capital **Performance**: after-tax return on total assets	
Miles, Snow, and Sharfman 1993 **Miles, Snow,**	Annual	NA	***Industry Level Strategic variety.*** Uses 3 factors: 1. ***Marketing factor*** – ratio of advertising to sales 2. ***Capital intensity factor*** – dollar value of plant, property and equipment per employee	**Industry performance:** Accounting based ROI –Market based: change in stock price

and Sharfman 1993 (cont.)			3. ***R&D factor*** – ratio of R&D to sales **Stage of industry life cycle** Growth (Sales increase above 10% annually), Maturity (sales increases of 1-10% annually), Decline (sales decreases annually) **Level of foreign competition** Ratio of imports to total new shipments	
Dooley, Fowler, and Miller 1996			**Industry Level Strategic variety.** Uses 3 factors: 1. **Marketing factor** – ratio of advertising to sales 2. **Capital intensity factor** – dollar value of plant, property and equipment per employee 3. **R&D factor** – ratio of R&D to sales	**Industry performance:** Return on investment
Ferrier, Smith, and Grimm 1999	Annual	Competitive Repertoire	**Total competitive activity:** number of total new actions for the leader minus the number of total new actions for the challenger annually. **Action timing**: time elapsed, measured in days, between the date of a competitive action carried out by the leader and the date of a preceding competitive action carried out by the challenger. The annual average was used. **Action repertoire simplicity:** Herfindahl-type index of simplicity of calculated over six different action categories **Leader-challenger action dissimilarity**:	**Erosion or loss of market leadership**: measured two different: the continuous change in the market share gap in a given year between leader and challenger and as a discrete variable indicating whether or not the leader was dethroned

Ferrier, Smith, and Grimm 1999 (cont.)			summed squared differences in the proportions of competitive actions carried out across all action categories for each industry-year. Our paper uses this calculation for strategic heterogeneity.	
Lee, Smith, Grimm, and Schomburg 2000	Event	Action-reaction	**Move timing**: the number of days elapsed between the date of the new product introduction and the date of each imitation **Move order:** temporal rank position of an imitator compared with the first mover and other imitators. The first mover is designated as order 1, the second mover is designated as order 2, and subsequent laggards are designated in the same manner	**Standardized cumulative abnormal stock returns**: computed for a three day window including the day before and the day after each announcement and the end of each action sequence. The excess return is the risk adjusted return in excess of the S&P 500, and this return was The daily excess returns for common stocks are obtained for the period beginning 260 days prior to the announcement of a new product move to 60 days past. The event window of 60 days before and 60 days after the event was analyzed for abnormal stock returns. The methodology used to test the hypotheses is based on the market model technique to measure abnormal stock returns. This technique regresses security returns against the overall return on the market
Ferrier 2001	Annual	Attack-level	**Attack volume:** average number of competitive action events composing each of a focal firm's competitive attacks in a given year. We use this but at the monthly level **Attack duration**: average duration of all a firm's competitive attacks carried out in a given year. The end of an attack is when	**Market share gain: p**ositive year to year gain in percent of firm sales to industry total sales

Ferrier 2001 (cont.)			the competitor responds **Attack complexity: H**erfindahl-type index of simplicity of calculated over the six different action categories **Attack unpredictability**: uses optimal matching analysis to measure the extent that the order and pattern of actions carried out by a firm and its rival differ from year to year **Top management team heterogenei**ty	
Ferrier and Lee 2002	Annual	Competitive Repertoire	**Strategic complexity**: Herfindahl-type index of simplicity of calculated over the all six different action categories identified above **Strategic heterogeneity**: optimal matching analysis to measure the extent that the order and pattern of actions carried out by a firm and its rival differ. Optimal matching calculates the "distance" between any two action sequences by accounting for the costs of insertions, deletions, and substitutions among all action types (known as INDEL costs) needed to transform one action sequence to exactly match another. **Strategic unpredictability**: optimal matching analysis to measure the extent that the order and pattern of actions carried out by a firm and its rival differ from year to year **Strategic Intensity:** average number of	**Standardized cumulative abnormal stock returns**: computed for a two day window including the day before and the day after each announcement and the end of each action sequence. The excess return is the risk adjusted return in excess of the S&P 500, and this return was standardized

Ferrier and Lee 2002 (cont.)			competitive actions that comprise the focal firm's competitive attacks carried out in a given year deflated by the average time span of each competitive attack- each attack sequence divided by the number of days the attack lasts. The end of an attack is defined as when a competitor responds	
Thornhill and White 2007	Annual	Competitive Repertoire	**Strategic purity:** ratio of the subset of activities (or intentions) consistent with one strategy relative to the subset of actions consistent with another strategy. The relative emphasis, or ratio of strategic activities, is the measure of purity. Two factors represent this latent construct as determined from surveys asking respondents to rate the relative importance of 14 items for their workplace's general business strategy	**Operating margin**: gross revenues minus gross expenses

Thornhill and White 2007 (cont.)			*Operating excellence* - the summed score for reducing operating, improving coordination with customers, reorganizing the work process, and improving measures of performance *Product leadership* - the summed score for developing new products and services, undertaking R&D, total quality management, and developing new operating techniques.	
Combination Studies				
Miller 1994			**Performance:** average annual growth in sales and after-tax profitability (ROI, or, where this was unavailable, return on sales) for each period of analysis. *Past performance* - How a firm compared to its contemporary competitors. A period could only be classified as 'post-success' if both average growth rate and profitability were higher than the industry average for at least the last three years of the *preceding* period	**Environment** 1. *Uncertainty* or dynamism in the environment is manifested by the amount and unpredictability of change in customer tastes, production or service technologies, and modes of competition in the firm's principal industries 2. *Hostility* in the environment is evidenced by price, product, technological and distribution competition, severe regulatory restrictions, shortages of labor or raw materials, and unfavorable demographic trends (e.g. shrinking markets) 3. *Heterogeneity* in the environment is evidenced by differences in competitive tactics, customers tastes, product lines, channels of distribution, etc. across the firm's respective markets. These differences are only significant to the extent that they require different market-

Miller 1994 (cont.)				ing, production or administrative practices **Structure** 4. *Controls* monitor the internal trends and incidents relevant to organizational performance. M.I.S., employee performance appraisals, quality controls, cost and profit centers, budgeting and cost accounting are types of control devices. Score high if there is much emphasis on such controls. 5. *Internal communications* reflect the openness and fidelity of information channels in the organization. A high score is given when information reaches decision-makers quickly, when it is relevant and undistorted, and when communication flows readily in top-down, bottom-up, and lateral directions 6. *Centralization of strategy-making power* involves the distribution of power for making strategic decisions regarding acquisitions, diversification, major new product introductions, long-term goals, etc. Centralization is high if the top executive alone makes most of the decisions with a minimum of consultation, low if middle managers determine strategies by the default or intent of top executives (general manager and up) 7. *Delegation of operating authority* concerns the amount of authority transferred to lower and middle levels of management (any parties below vice president) for administration of the

Miller 1994 (cont.)				day-to-day operation of the business. Operating decisions involve equipment replacement, production planning, adjusting prices of goods, inventory purchases, hiring of lower-level personnel, etc. 8. *Technocratization* is evidenced by the number of highly trained staff specialists and professionally qualified people (accountants, engineers, scientists, doctors) as a percentage of number of employees 9. *Organizational differentiation* measures the degree of difference among organizational divisions or departments in terms of their overall goals, marketing and production methods, and decision-making styles. The more disparate the divisions, the higher the score. Even functionally organized firms with only one division may have high levels of differentiation if there exist many different approaches to marketing, production and other activities within different departments *Strategy-making Process* 10: *Proactiveness of decisions* is determined by whether or not a firm shapes its environment by introducing new products, technologies, administrative techniques, etc. A reactive firm follows the leader while a proactive firm is the first to act 11. *Product market innovation.* Does the firm seem particularly innovative in terms of the number or novelty of new products and servic-

Miller 1994 (cont.)				es introduced and new markets entered? 12. *Risk-taking.* Is there evidence that top managers are risk averse (score low), or does the firm frequently make large and risky resource commitments, commitments that have a reasonable chance of costly failure? 13. *Scanning* involves the search for problems and opportunities in the external environment of the firm. Firms are to be scored in terms of the amount of scanning performed on consumer tastes, competition, technological and administrative developments, etc. 14. *Analysis of major decisions.* Do decision-makers devote much reflective thought and deliberation to a problem and the array of proposed responses? Time spent on correlating symptoms to get at the root cause of problems and effort spent on generating solutions (good or bad) are examples of analysis. A low score is given when there is a rapid and intuitive response to an issue (this response may be ideal or the worst possible). Evidence of analysis includes time delays, frequent meetings and discussions, the use of staff specialists and the writing of lengthy reports 15. *Multiplexity of decisions.* Do top managers address a broad or narrow range of factors in making strategic decisions? For example, in deciding whether to acquire a company, a multiplex strategist would consider marketing, financial, production, demographic, administra-

Miller 1994 (cont.)				tive, and other problems, whereas low multiplexity would be evidenced by a focus, say, on marketing factors alone 16. *Integration of decisions.* Are actions in one area of the firm complementary or supportive of those in other areas, or are they conflicting and mutually inhibiting? High integration would result in (or from) a concerted and well co-ordinated strategy while low integration might be manifested by fragmented or clashing tactics (e.g. acquiring new companies when there is inadequate ability to finance or run them, or selling products that compete against each other) 17. *Futurity of decisions* concerns the extent to which the firm looks into the future in planning its strategies and operations. A distant time horizon (5 years) warrants a high score. A focus on crisis decision-making warrants a low score. 18. *Explicitness of strategies* concerns the degree of conscious commitment to an explicit corporate strategy (i.e. a set of objectives coupled with a number of stated means for attaining these). A low score is evidenced by unclear goals and muddling though. This variable was not measured in the questionnaires. 19. *Adaptiveness of decisions* reflects the responsiveness and appropriateness of decisions to external environmental conditions. For ex-

Miller 1994 (cont.)				ample, an adaptive pricing decision would take into account competitive strategies, customer buying habits, government regulations, etc. A nonadaptive decision (score low) would neglect an important set of external factors. 20. *Traditions.* Does the firm often reconsider its strategies (low score) or are these tied largely to precedent?
Chen and Miller 1994	Event and Annual	Action-reaction dyad	**Action visibility:** three scales to assess how visible each type of attack might be to rivals (first two derived from questionnaires sent to top executives). - amount of industry publicity associated with each move - likelihood that this type of attack would be publicly announced by top management. - n*umber of lines of print* in *Aviation Daily* associated with each move **Response difficulty:** five scales is the ease with which a competitor can respond in kind to an attack (first four derived from questionnaires sent to top executives, fifth, author derived). - estimated financial expense - disruption of staff and systems - amount of relocation of staff or equipment required - the need for complex coordination	**Number of responses:** number of airlines that responded to an action **Response ratio***:* all competitive responses directed towards the actions of a given firm in a given year / the total number of actions made by that firm in that year **DV 2** **Performance:** (**IV:** response ratio) - total operating revenue per revenue passenger mile (RPM) - operating profit per RPM - profit margin Standard and Poor's published stock ratings for each airline for each year. **Interaction terms:** *Visibility x difficulty* *Centrality x difficulty* *Visibility x centrality* *Visibility x centrality x difficulty*

Chen and Miller 1994 (cont.)			among different functional departments - overall perceived difficulty of making the move **Centrality of attack:** the proportion of annual passengers affected. Aggregate index for each action was obtained by averaging the centrality measures for each affected airline. **Potential benefit of the attack:** number of attackers' passengers affected by the action aggregated for all the actions made by a given attacker in a given year.	
Hambrick, Cho, and Chen 1996	Annual	Action-Reaction Dyad	**Top management team heterogeneity**	**Action significance:** number of strategic actions (significant commitments of specific, distinctive resources and are difficult to implement and reverse) as opposed to tactical (easy to implement, reversible actions) the firm took in a year, divided by its total number of actions **Action noteworthiness:** number of lines Aviation Daily devoted to reporting the action **Response noteworthiness:** number of lines Aviation Daily devoted to reporting the action **Action scope:** proportion of firm's revenue base potentially affected by the action **Competitive speed – 3 measures** **Action execution speed:** time difference between the date the firm publicly announced or acknowledged the intended

Hambrick, Cho, and Chen 1996 (cont.)				action and the date that action began to be executed (standardized). **Response generation speed:** amount of time it took a firm to generate a response. The time lag between the day the competitor announced the initial action and the day the focal firm announced its response. **Market share change:** % change from previous year **Profits:** % change from previous year
Miller and Chen 1996	Annual	Competitive repertoire	**Past performance:** passenger operating revenue per available seat mile flown. **Breadth of experience:** number of different types of decisions in the previous year. The lagged C and D indexes of simplicity **Organization and environment:** firm age (natural log of years since founding), and size (natural log of number of employees) **Market Growth:** change in total revenue passenger miles for the industry **Market diversity**. Composite index of the number of airports served and the number of competitors faced by each airline **Market uncertainty:** Standardized total of annual number route entries by new carriers, route exits, and bankruptcies	**Competitive simplicity:** three index measure. Range (number of types of actions), concentration (numerical emphasis on the most commonly employed types of actions), and dominance (numerical emphasis on the single most common type of action) **Range:** number of different action types used each year **Concentration:** natural log (to account for small vs. large companies) of the standard deviation of the standard scores across 21 types of actions **Dominance:** natural log (to account for small vs. large companies) of the standardized score of the category with the most action types/total number of actions. DV2: **Performance** – Revenue per available seat mile flown.

Miller and Chen 1996 (cont.)				**Moderators:** **Market uncertainty x Competitive simplicity** **Market diversity x Competitive simplicity**
Young, Smith, and Grimm 1996			**Horizontal cooperative mechanisms:** (firm and industry level) business moves undertaken jointly by competitors. Included only cooperative moves that create mechanisms for interfirm communication but are not directly tied to a competitive activity- equity arrangements, mergers, technology licenses, and participation in trade associations and technology consortia	**Firm-level competitive activity**: annual sum of each firm's moves **Industry-level competitor activity (industry-rivalry):** aggregation of firm moves to the industry level minus the focal firm's own competitive activity **DV2:** **Firm Performance (Firm and industry-level competitive activity)** return on sales and return on assets.
Chen, Su, and Tsai 2007	Two year period	Combo	**Relative scale.** Rival: airline's available seat-miles divided by a focal airline's during available seat-miles	**Perceived competitive tension: s**urvey measure that asked inside and outside respondents to evaluate the extent to which a given airline

Chen, Su, and Tsai 2007 (cont.)			**Rival's attack volume:** the number of the rival's entries into the firm's routes from 1989 to 1990 **Rival's capability to contest: two measures** - **Similarity:** Euclidean distance between two airlines in terms of distribution of different types of aircraft - **Salience**: captures the extent to which a rival was a dominant player flying the aircraft that were vital to a focal firm's operations. The calculation of salience captured the strategic importance of a given type of aircraft to focal firm and reflected the share of this type of aircraft owned by rival	could be considered a focal airline's primary competitor. Informants were asked to identify and rank, from each airline's viewpoint, its top 5 rivals from a list of all 12 other competitors. In the scoring scheme, the airline rated as the top-ranked rival of a focal airline received a score of 5; the second, a score of 4, and so forth. Those not included in the ranking received a score of 0. Scores were then averaged over all responses. **Volume of a focal firm's attack:** the firm's number of entries, among the 10,000 sample routes, into the rival's routes from 1991 to 1992.
Other				
Macmillan, Mccaffery, and van Wijk 1985	Event		**Product and organization characteristics that affect response lags:** - *Visibility:* extent to which the product launch was visible to competing banks. - *Perceived potential:* extent to which the commercial banking industry, when the product was launched, might perceive the product as having high long run potential. - *Strategic attack:* extent to which the new product directly attacked a major strategic market of the competing bank. - *Radicality:* extent to which the new product would be regarded as revolutionary, requiring the development of *ad*	**Response lag**: time it takes for competition to respond aggressively to a new

Macmillan, Mccaffery, and van Wijk 1985 (cont.)			*hoc* procedures and policies. - *Complexity:* extent to which the new product required the organization of highly specialized skills in order for it to be offered to customers. - *Organization misfit:* extent to which putting together the new product will disrupt the existing political equilibrium among functions and departments	
Chakravarthy 1986	Review and Theory Proposal of Strategic Performance		**Single Measures of Performance:** Return on Investment, Return on Sales, Growth in Revenues, Cash Flow/Investment, Market Share, Market Share Gain, Product Quality Relative to Competitors, New Product Activities Relative to Competitors, Direct Cost Relative to Competitors, Product R&D, Process R&D, Variations in ROI, Percentage Point Change in ROI, and Percentage Point Change in Cash Flow/Investment (Woo and Willard 1983). The authors factor-analyzed the 14 variables using the PIMS data base and isolated four factors which they named: profitability, relative market position, change in profitability and cash flow, and growth in sales and market share. Of these, again, the profitability factor demonstrated the highest factor magnitude. The primary variables that loaded on this factor were Return on In-	**Composite Measures of Performance:** Altman's Z Score **Measures proposed to take into account all stakeholders:** the transformation processes pursued by a firm can be classified into two broad categories: adaptive specialization and adaptive generalization (Chakravarthy 1982). Adaptive specialization is the process of improving the goodness of fit in a given state of adaptation. The emphasis is predominantly on profitably exploiting the firm's current environment, and generating a net surplus of contributions over the inducements paid to the various stakeholders of the firm for their cooperation. Adaptive generalization, on the other hand, is concerned with the investment of the firm's net surplus of 'slack' resources to ensure its flexibility in the future 'Excellent' firms in our sample were able to generate more slack resources than 'non-excellent' firms (Table 10). The former group also invested a sig-

Chakravarthy 1986 (cont.)			vestment, Return on Sales, and Cash Flow to Investment, with the first and third variables being highly correlated.	nificantly higher proportion of their revenues in research and development. **Measures of slack**: *Generation of slack* *Profitability* - cash flow by investment ratio. *Productivity* - labor productivity – sales revenue per employee - capital productivity - sales revenue per dollar of total assets - cashflow/Investment ratio - market to book ratio - debt to equity ratio *Investment of slack* - R&D by Sales ratio - Dividend Payout ratio - Working capital by sales ratio
Smith and Grimm 1987			**Environmental uncertainty**: deregulation **Deregulation x change of strategy** **Deregulation x innovation** **Strategy defined as** **Prospector innovation strategy**: firms scoring highest on innovativeness **Leadership strategy**: highest scores on service quality, marketing focus, and pric-	**Focused strategy (regulation):** pattern of firm behavior oriented toward one or two specific strategic dimensions **Unfocused strategy (regulation to deregulation)**: pattern of firm behavior in which no particular strategic dimension is emphasized. **Performance** (**Deregulation x change of strategy; Deregulation x innovation):** average of ROI, return on total capitalization (ROTC), and return on equity (ROE)

Smith and Grimm 1987 (cont.)			ing **Quality differentiation:** firms that scored highest on the product dependability dimension and second on service quality. **Contingency strategy:** firms in the middle on all dimensions. That is, they were rated consistently "average' **Unfocussed follower:** firms that scored low on all five dimensions. **Strategic dimensions, with the indicators identified in parentheses, are**: - service quality (speed and reliability of service) - marketing focus (ability of marketing personnel to negotiate contracts, be flexible in responding to special needs, and be knowledgeable in shipper's operations) - pricing (rail rates) - organizational innovativeness - product dependability (car supply, loss and damage reliability)	
Dagnino and Cinici 2007 (Working Paper) Dagnino and	Theoretical Proposal of Strategic Hetero-	NA	**Strategic heterogeneity:** **Tobin's q:** to appreciate the Ricardian rents the firm can earn thanks to resources and capabilities heterogeneity; Tobin's q is the ratio of the market value of a firm to	

Cinici 2007 (Working Paper) (cont.)	geneity		the replacement value of its physical assets, the value of its intangible assets, capitalized Ricardian rents, and disequilibrium effect **Patents and R&D investments**: indicators, to determine the superior performance as the consequence of the firms' diversity to produce significant innovations and to defend those innovations from competitors. In particular, - investments in training for employees in R&D; - percentage of investments in R&D; - the percentage of employees in R&D.	
Mutimarket Competition				
Baum and Korn 1996	Annual		**Market domain overlap:** aggregate of the markets served by the focal firm with all other firms in the industry. **Multimarket contact:** for each route the number of routes on which each competitor meet (or potentially meet) each other in more than one route is summarized, and then these contacts are summed for each airline. This is then divided by the number of routes the focal airline serves multiplied by the number of multimarket competitors it faces on the route.	**Market entry rates:** in the first year the Guide reported an airline as flying a given route **Market exit rates:** first year an airline was no longer reported as flying a given route
Baum and	Annual		**Chance variables:**	**Initiation of multimarket contact between**

Korn 1999 **Baum and**			**Number of markets served by firms**: total number of markets an airline served at the start of each observation year **Market entry rates:** firm entries into competitor routes was defined as occurring in the first year an airline was reported in the *OAG* as flying one of a given competitor's incumbent routes. **Capacity of the markets served:** average size of the human population residing at the origin and destination (county or district) of an airline*'s* routes at the start of each observation year based on the *1980 Census of Population.* **Trait-based imitation variables:** **Size**: Total available seat miles ("logged" to normalize the distribution) flown by airline in the prior year. **Operational performance** *passenger load factor* (revenue passenger-miles/available-seat-miles) **Vicarious learning, experiential learning, and selective search variables:** **Route significance:** its *centrality* to an airline's network of routes. The proportion of an airline routes that connected with its competitors routes. **Multimarket contact:**	**focal firm and competitor:** dichotomous measure coded 0 prior to initiation of multimarket contact in a given dyad, If a firm acted to initiate multimarket contact, this variable was coded 1 for that firm and remained 0 for the other. If both firms in a dyad took actions that would create multimarket contact at the same time, the variable was coded 1 for both. **Expansion of multimarket contact between focal firm and competitor:** Dichotomous coded 0 for firms in all dyads having already established multimarket contact. If a firm acted to increase the number of market contacts in a dyad, it was coded 1 for that firm and left coded 0 for the other firm in the dyad. If both firms in a dyad acted simultaneously to increase their number the variable was coded 1 for both.

Korn 1999 (cont.)			for each route the number of routes on which each competitor meet (or potentially meet) each other in more than one route is summarized, and then these contacts are summed for each airline. This is then divided by the number of routes the focal airline serves multiplied by the number of multimarket competitors it faces on the route. For example, on route 2-3, Bold has one multimarket competitor (Dash), which it meets in three routes. Therefore, since Bold serves five routes, its multimarket contact on route 2-3 is 3/(5 x 1), or .600 **Multimarket contact in other dyads**: average multimarket contact in other competitor dyads at the start of each year (contact in dyads not involving either competitor). Reflects the extent to which frequency-based copying of other competitors' multimarket contact is the motivation behind the initiation and expansion of multimarket contact. **Frequency-by-trait-based imitation:** Disaggregate of the extent of multimarket contact engaged in by airlines in other competitor dyads according to their size and performance. **Average multimarket contact by large (small) airlines in other dyads:** average	
Baum and				

Korn 1999 (cont.)			multimarket contact for large (small) firms in other dyads at the start of each year. . Large (small) firms were defined as those above (below) the mean total available-seat-miles flown by all companies in the prior year. **Average multimarket contact by high-performing (low-performing) airlines in other** **Dyads:** average value of multimarket contact for large (small) firms in other dyads at the start of each year. High-performing (low-performing) firms were those above (below) the mean passenger load factor (revenue-passenger-miles/available-seat-miles) for all companies in the prior year. ***Interaction terms***: Average multimarket contact by airline i with competitors other than j Average multimarket contact by competitor j with airlines other than **i**	
Gimeno and Woo 1996 Gimeno and Woo 1996 (cont.)			**Focal firm's resource-sharing opportunities:** the set of markets served by a focal firm (except the focal market) divided into two subsets: those with strong resource-sharing opportunities with the	**Efficiency:** cost per revenue-passenger-mile (the product of cost per available-seat-mile and the ratio of available-seat-miles to revenue-passenger-miles, **Intensity of rivalry:** revenue per revenue pas-

			focal market (those markets that share an end-city, origin or destination, with the focal market) and those with weak resource-sharing opportunities (those markets that do not share an end-city, origin or destination) **Multimarket contact:** **c**ount of the number of markets in which the airline met a specific rival outside the focal market. Since a focal market-unit can meet multiple focal-market rivals, (the variable multimarket contact was computed as the average number of multimarket contacts with all focal-market rivals **Interaction effects:** Measured by splitting the previous aggregate independent variable into submeasures according to whether the moderating condition was present or absent in each nonfocal market. Multimarket contact was split into two submeasures: multimarket contact (strong resource sharing) which measured the extent of multimarket contact in markets with strong resource-sharing opportunities with the focal market, and (2) multimarket contact (weak resource sharing), which captured multimarket contact in the remaining markets	senger-mile, or the average price paid by customers in an airline route divided by the distance between the endpoint cities, stated in cents per mile **Profitability:** (airline-route level) a Lerner index (similar to ROS) was used. Calculated as (yield - cost per revenue-passenger-mile)/ yield
Gimeno 1999	Annual 4th quar-		**Spheres of influence:** three dimensions: **Market share dominance:** market	**Competitive rivalry:** A common outcome of rivalry is decreased prices for the services pro-

Gimeno 1999 (cont.)	ters only		share of a focal airline route in terms of passengers transported **Market dependence:** percentage of overall firm revenues obtained by the focal airline-route **Resource centrality:** airline-route reliance on the firm's important 'hub positions' in airports (percentage of overall firm enplanements that take place at either of the two cities of the city-pair market that includes the hub) **Multimarket contact:** number of markets in which the airline met a specific rival outside the focal market. Since a focal market-unit can meet multiple focal-market rivals, (the variable *multimarket contact* was computed as the average number of multimarket contacts with all focal-market rivals. Sum of reciprocal and nonreciprocal multimarket contact **Reciprocal multimarket contact**: for a challenger in a focal market is measured as the number of markets outside the focal market in which the challenger meets the focal-market leader and in which the focal-market challenger is the leader **Nonreciprocal multimarket contact**: for a challenger in a focal market is measured bythe number of markets outside the focal market in which the challenger meets the	vided by a firm thus *yield* to capture lack of rivalry. Yield was defined as revenue per revenue passenger-mile, or the average price paid by customers in an airline route divided by the distance between the endpoint cities, stated in cents per mile. **Market share**: passengers transported by the airline-route divided by all passengers transported in the market.

			focal-market leader and in which the focal-market challenger is also a challenger.	
Stephan, Murmann, Boeker. and Goodstein 2003	Annual	NA	**Multipoint contact**: average percentage of markets (out of the total number of markets in which the firm competes) that a focal hospital shares with the firms already competing in a market that it could potentially enter. **New CEO**: binary variable set to one if the CEO had been in the position for less than three calendar years and zero otherwise.	**Market entry:** a value of one represented that the hospital entered the service market and a value of zero represented that they did not enter.
Strategic Groups				

Cool and Schendel 1987	Strategic Periods	Strategic Groups	**Strategic groups:** Classified as to *business scope:* - the range of market segments targeted - the types of products and/or services offered in the market selected - geographic reach of the product-market strategy **Resource commitments:** business-level deployments of resources to functional areas that are key to gaining and maintaining a competitive advantage in target product-market segments	
Feigenbaum and Thomas 1990 **Feigenbaum and Thomas 1990 (cont.)**	Stable strategic time periods	Strategic group	**Strategic space:** - *levels* of organizational strategy the *components* of strategic decisions (e.g. scope, resource deployment) - the *time period* **Strategic scope variables:** - personal vs. commercial lines - property/liability vs. life insurance - Firm Size - log (Personal net premiums written (NPW) - product diversification - Herfindal index measuring the relative size of each line in the firm portfolio **Resource deployment:** - Expense ratio: ratio of underwriting expenses to net premiums written - Reinsurance: proportion of reinsur-	**Performance:** - Combined ratio - (Incurred losses + Loss adjustment expenses + Underwriting expenses + Dividend)/Net premiums written - Market share - MS Firm's net premium written/Industry net premium written - Weighted Market share - indicates the firm's dominance of particular lines of insurance.

			ance activity to total insurance - Financial leverage: ratio of net premiums earned to policyholders' surplus - investment strategy: investment categories are stocks and higher levels of stock are associated with a higher level of risk taking. Risk adjusted measures calculated for all variables by dividing each by its standard deviation	
Cool and Dierickx 1993	Four periods each with a different configuration of strategic groups were identified: 1963-69, 1970-74, 1975-79, 1980-82	Strategic period groups	**Strategic distance**: Euclidean distance measure for strategic distance that involves group segment shares in the pharmaceutical industry. A segment example is cardiovascular, or cancer **Concentration**: three concentration measures: the C4. the C8 and the Herfindahl index	**Profitability**: return on sales (ROS), computed as the ratio of net income before interest and taxes from pharmaceutical operations to total pharmaceutical sales

Mehra 1996			**Strategic scope variables:** *Product scope:* - ratio of commercial and industrial loans/total loans - ratio of commercial real estate loan/total loans - ratio of residential real estate mortages/total loans - ratio of time deposits/total deposits *Geographical reach:* ratio of foreign-owned deposits to the total deposit base. *Product diversity:* the percentage of non-interest revenues/total revenues **Resource deployment variables*:*** *Funding:* ratio of net purchased funds to total assets. *Capitalization:* the ratio of risk-weighted equity capital net of goodwill to total assets *Investments:* 5-year annual average asset growth rate *Provisions:***.** percentage of loan lease loss reserve/average loans and leases Loan ratio: percentage of loans in its asset base	**Performance variables:** *ROAA:* standard return on average asset measure *Employee productivity:* net profit by the number of employees. *Relative P/E ratio: p*rice to earnings multiple
Smith, Grimm, Wally, and Young 1997	Annual	Action-reaction by strategic	**Strategic group**: based on airline's deployment of its resources in the firm's cost position, marketing expenditures, management characteristics, and scope of op-	**Competitive activity***:* total number of competitive moves (including actions and responses) a firm undertook in a given year. Calculated by counting the number of actions and reactions

Smith, Grimm, Wally, and Young 1997 (cont.)		group.	eration. No further definition given. - 'niche-seeker', ranks lowest in the number of airports served. Also has the highest costs and the longest trip lengths. - 'high-end flyer' ranks first in the portion of each sales dollar allocated to marketing and also has the leading position in first class passenger revenue. - 'entrenched-dominant' - has the lowest operational and marketing costs, serves the broadest number of airports and has the managers with the most industry experience	for each firm within each year of the data collection. **Degree of rivalry instigation***:* number of first moves a firm undertook to instigate rivalry in a given year divided by the total number of moves it had taken (the difference between the number of first moves and the total number of moves is the number of times the firm was not moving first to instigate competitive warfare. e.g. was a follower) **Proclivity toward price cutting:** proportion of price-cutting moves (actions and responses) divided by the total number of moves that a firm undertook in a given year. **Speed of response***:* average amount of time in days it took a firm to respond to a competitor's action. The amount of time was measured by the temporal difference between the dates of a specific competitive action and the response **Tit-for-tat imitation***:* concurrence of the action type and the response type. An imitation score was created to measure the degree of duplication involved in each response
Pegels, Song, and Yang 2000			**Competitive interaction groups** - derived from the interaction data to identify competitive interaction groups. Using identified events, an action–response matrix was constructed to identify competitive interaction groups. The action–	**DV**: Airline load factors **TMT Heterogeneity (Competitiive interaction groups)** **Airline load factors** – (**TMT Heterogeneity x Competitive interaction groups)**

Pegels, Song, and Yang 2000 (cont.)			response matrix shows the number of matched pairs between an initial actor and all the responders and carries the basic information for applying the clique partitioning method. For example, Clique partitioning positioned firms in group 1 because they are in direct competition in regions where their services overlap. Any competitive action, such as a fare change or a service frequency change, would elicit a response from those competitors directly affected by the initial action. **TMT Heterogeneity x Competitive interaction groups**	(proportion of an aircraft's seating capacity that is actually sold or used, by revenue passenger miles/by available seat miles
Short, Ketchen, Palmer, and Hult 2006 Short,	One strategic time period	Strategic Groups	**Strategic Groups:** *Deductively defined strategic groups* 1. *developing competitive advantage*, research and development (R&D) intensity 2. breadth of operations - number of trademarks the firm holds The first dimension relates to a firm's method of developing competitive advantage; firms are expected to emphasize either being first to market or exploiting previously existing opportunities. The second dimension focuses on breadth of operations (i.e., narrow vs. broad) *Inductively defined strategic groups*	**Performance:** - *Accounting-based (i.e., financial)* performance - return on assets - *Market-based performance* - Tobin's Q - *Prospects for firm survival prospects for firm survival* - Altman's Z,

Ketchen, Palmer, and Hult 2006 (cont.)			1. Scope of operations – - *geographic scope* the % of domestic sales divided by total sales - *number of product types* - the number of patents granted to the firm between 1991 and 1995 2. resource deployment variables - *physical resources* - capital intensity, - capital expenditures divided by sales - *Available financial resources* - current ratio calculated by dividing current assets by current liabilities - *organizational size* - total sales The inductive approach focuses on empirically derived groups that often vary considerably across industries. In contrast, the deductive approach is a theory-driven approach that can be applied to a wide variety of industry contexts	
Leask and Parker 2007 **Leask and Parker 2007**	Strategic Periods	Strategic Groups	**Definition of strategic groups:** 1. *diversification measures of strategic commitment* - importance of overseas markets and each firm's balance of pharmaceutical vs. nonpharmaceutical business activities, respectively 2. *differentiation* - total promotional intensity, research intensity, focus on the hospital vs. the GP market, chronic vs. acute drugs, and the degree to which two or three therapy areas dominate the portfolio	**Performance:** - *market share* - total firm sales divided by U.K. pharmaceutical sales - *weighted market share* - recognizes that some companies may choose to dominate a few selected market segments - measured by the sum of a firm's sales in therapy class i divided by the firm's total sales and multiplied by its sales of products in therapy class i divided by the total market sales of all firms in this segment

			3. *execution ability* - measured by successful new product introductions	- *changes in companies' ranked market positions over the 5-year period*

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Concentration in Operations Management, and Strategy. Teaching Assistant for "Operations Management" and "Manufacturing Policy".

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RESEARCH INTERESTS

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PUBLISHED RESEARCH

Ferrier, W., Hughes, M. & Andrevski, G. (forthcoming) Behavior-eliciting options: Testing the waters prior to launching an attack on rivals. Advances in Strategic Management. Vol. 24, J. Reuer & T. Tong (eds.).

RESEARCH IN PROGRESS

Hughes, M., Ferrier, W., & Labianca, J. Competitive Strategy and Stock Risk: Investors' Responses to Perceived Incongruity Between TMT Heterogeneity and Competitive Actions.

Hughes, M., & Ferrier, W. Strategic Lucidity or Mixed Signals? An Empirical Study of Competitive Maneuvering and Stock Return Risk.

Hughes, M., & Ferrier, W. The Dark Side of Competitive Dynamics. An Empirical Study of Competitive Strategies and Short Interest.

Hughes, M. Buying a Hedge or Hedging Your Bets. The Assignment of Stock Risk Based on Real Options Strategies.

Yao, E., & Hughes, M., Social Capital and Value Appropriation: A Study of Technology Alliances in The Pharmaceutical Industry. Presented at the Strategic Management Society 2005 conference.

Uhlenbruck, K., Hitt, M., Hughes, M., & Ferrier, W. Returns to Mergers And Acquisitions: A Competitive Dynamics Perspective.
Working Paper

Hughes, M. A Contingency Theory and Transaction Cost Analysis of Sales Force Specialization.
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Investors' Reactions To Competitive Actions Among Rivals: A Step Toward Strategic Asset Pricing Theory

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WHITE PAPERS

Hughes, M. & Das, S. Enhancing Aluminum Recycling in Fayette County: A Six Sigma Study. Presented to the board of the Center for a Sustainable Aluminum Industry, 2006.
Published in Journal of Metals. August 2006.

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