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# Staff Paper Series

## Challenges in Demonstrating the Impact of Overconfidence in M&A Activity

By

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## Introduction

One of the foundations of behavioral finance is the overconfidence hypothesis. Barberis and Thaler (2003) list it as one of the main beliefs that characterize study in the field. Simply put, the overconfidence hypothesis suggests that the subjects of study (investors or corporate managers) believe that they are more competent or better able to achieve above-average results. Interestingly, we know that half of any group is below-median, yet when asked about general items such as driving ability or income prospects, 90% of a given group believe themselves to be above average.<sup>1</sup> Our purpose in this paper is to examine the literature on overconfidence as it relates to mergers and acquisitions (M&A) with a specific focus on measuring the effect of overconfidence in mergers. It is our assertion that a clear way to establish the role of overconfidence in merger activity has not yet been developed. We explore alternate ways to address this issue and offer suggestions about some directions that research could take in developing such an approach.

The literature on the overconfidence hypothesis in investing decisions is rich and well-developed.<sup>2</sup> This is in part a result of the immediate, comprehensive, and precise feedback associated with investing and stock prices, under the assumption that stock price movements can be linked to behavior that can be classified as overconfident. Within a given definition of overconfidence, data can be marshaled to either support or refute a given proposition concerning overconfidence. However, the same cannot be said for corporate activity, and this represents a challenge for applied research. In this case, the feedback (corporate earnings or stock price movement) is much noisier. Specifically, any given corporation has enough simultaneous activities impacting their stock price that it is quite difficult to say with statistical confidence that any one of them is the direct cause of any observed pattern or movement in the stock price.

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<sup>1</sup> Svenson, O. (1981), "Are we all less risky and more skillful than our fellow drivers?" *Acta Psychologica*, 47:143-148, as cited in Camerer and Lovo (1999).

<sup>2</sup> See, for example, "How Men's Overconfidence Hurts Them as Investors," *New York Times*, March 14, 2010, p.4 (Business & Investing section) in the popular press. In conducting a literature search on "overconfidence," nearly three-fourths of the articles examine overconfidence in the context of investment behavior.

With that said, mergers and acquisitions are significant corporate events, but ones with a high degree of uncertainty. Given their importance, they have received a high degree of scrutiny and analysis, and from this an interesting difference of opinion emerges. Many corporate managers<sup>3</sup> seek mergers, and yet the academic literature on them strongly indicates that they do not produce meaningful positive returns for the acquiring company.<sup>4</sup> Two threads of research have attempted to bridge this gap: agency theory<sup>5</sup> and overconfidence. Agency theories suggest that managers may not have the best interests of stockholders in mind when pursuing mergers, seeking the perks that accompany either empire building or another personal interest. The overconfidence explanation indicates that, even if managers do have the best interests of stockholders in mind, they may not be making the best decisions for them as a result of overconfidence – a form of behavioral bias.

## **Overconfidence Hypothesis**

In order to put forth a theory that suggests how overconfidence can explain the actions of corporate managers, it is necessary to formulate a definition of what a rational decision would include and then show that a given decision deviates from that definition. Theory informs us that rational decisions are those that maximize shareholder value, and so the test of any decision is its (ultimate) impact on share price for a given organization. In this section, we explore the attributes of overconfidence and also discuss some causes, features and specific attributes as they relate to M&A activity.

### *Overconfidence Defined*

In examining a range of definitions of overconfidence, general patterns emerge. “Narrow confidence intervals” and “estimate calibration” are the most commonly cited components of overconfidence, as discussed in the survey by Barberis and Thaler (2003). “Narrow confidence intervals” refers to overestimates in the confidence that subjects have in decisions they have made. Barberis and

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<sup>3</sup> For the sake of brevity, “mergers” and “M&A” will hereafter refer to merger and acquisition or strategic integration work generally and “managers” will refer to CEOs and other corporate officers.

<sup>4</sup> See Roll (1986) or Malmendier and Tate (2008).

<sup>5</sup> See Jensen (1986) for a brief explanation of agency theory.

Thaler cite an example where subjects<sup>6</sup> indicate that they have 98% confidence in a decision being correct, but in reality they were correct only 60% of the time. “Estimate calibration” refers to the degree that subjects can correctly predict the probability with which an event occurs. Citing Fischhoff, Slovic and Lichtenstein (1977), Barberis and Thaler indicate that “events [subjects] think are certain to occur actually occur only around 80% of the time, and events they deem impossible occur approximately 20% of the time.” Lichtenstein, Fischhoff and Phillips (1982) propose a formal analytical framework to both measure calibration issues and chart them over time, with the aim of improving individual performance, but that framework is not directly relevant to our approach.

### *Sources of Overconfidence*

Barberis and Thaler (2003) list two potential causes of overconfidence – self-attribution bias and hindsight bias. Self-attribution bias is the tendency people may have to both claim personal credit for success and also blame luck or other people for failure. Hindsight bias is the inclination people may have to say that they predicted an event or that it was inevitable. Doukas and Petmezas (2007) and Menkhoff and Nikiforow (2009) discuss self-attribution bias in terms of the “better-than-average” effect, with the latter providing data from a survey of fund managers, where the mean response of the fund managers in a question asking them to compare themselves to their peers indicates they believe themselves to be better than average.

Fischhoff (1982) expands on the concept of hindsight bias by including the following attributes and specific manifestations of it, all of which are applicable to our study of merger activity. Namely, subjects believe:

- others should have been able to anticipate events (e.g., Pearl Harbor) better than they did,
- historical processes should have or did occur faster than they really did, i.e., because they were inevitable (“telescoping”),
- individuals in times past were as they are today, not allowing for the fact that these individuals may have changed over the ensuing period, or

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<sup>6</sup> “Subjects” will refer to the people who are the subject of the analysis in which they are mentioned, whether the analysis was conducted in a laboratory or in an examination of real-world events.

- participants in an historical event knew or should have known either the outcome or the importance of an event at the time it started (the “myth of the critical experiment”).

Fischhoff concludes his discussion with the observations that hindsight bias impacts the analysis of a prior event by (1) incorporating a perspective of what he called “creeping determinism”, or the belief that the reported outcome was inevitable, (2) displaying the effects of an “over-fitted theory”, namely finding some pattern or other form of explaining otherwise random events or data, and (3) precluding the possibility of other outcomes in the analysis of the prior event. He concludes by indicating that knowing the outcome of an event does not help in its analysis.

An additional cause of overconfidence was provided by Oskamp (1965), in his study of the impact of increasing levels of information on the confidence in a decision (in his study, psychologists’ assessments of patient case histories) and hence the appropriateness of that confidence. He observed that as more case information was given to analysts, their confidence in their preliminary assessments increased, even if it was inaccurate and refuted by the subsequent information. He also concluded the accuracy of decisions reached a ceiling at some point in the information-gathering process, but confidence in the decision continued to grow, resulting in overconfidence in a given assessment by the time all the information was gathered. Since analysts were “reluctant” to change their assessments in the face of new evidence, the process became irrational. Finally, he observed that more experienced analysts were less likely to be overconfident than less experienced analysts. He referred to this phenomenon as “confirmation bias”.

Kahneman and Tversky (2000) provide another cause of overconfidence in their discussion of the tendency of subjects to both not include aspects of a decision with which they are unfamiliar into their decision-making process and also to separate general beliefs (e.g., “mergers do not add value to acquirers”) from their particular situation (e.g., “my merger will be successful”). Other causes found in the articles surveyed indicate people will tend to be more overconfident if (1) they believe they control the outcome (the “illusion of control”), (2) they are highly invested in the outcome, (3) the feedback they either will or should receive in relation to their decisions is infrequent, delayed or ambiguous, and (4) the

tasks themselves are diffuse rather than specific, allowing for differences in interpretation as to whether they have been successful. It is straightforward to see how these factors apply to M&A activity.

### *Evidence, Features and Manifestations of Overconfidence*

In this section, we will list some additional aspects of overconfidence that could impact our study of merger behavior:

- Looking at probability calibration, Alpert and Raiffa (1982) indicate that if subjects are given direct (and, from our perspective, hyperbolic and confrontational) feedback on their performance in assessing the probabilities of otherwise unknowable events or data, their performance improved over subsequent iterations.
- Also on the subject of calibration, Lichtenstein, Fischhoff and Phillips (1982) suggest (1) subjects are more overconfident when performing complex tasks and are increasingly under-confident as the tasks get easier, (2), the calibration levels of different individuals cannot be easily compared given the differences between their tasks and the need to have many observations to correctly determine precise calibration levels, and (3) if subjects are trained on their specific tasks or compelled to write down reasons their assessments may be wrong, their calibration levels increase.
- In an application of confirmation bias to merger activity, Bogan and Just (2009) analyzed the information that two groups of subjects (MBAs and alumni executives) reviewed in assessing merger opportunities in a laboratory environment and concluded that subjects sought information that confirmed a tendency to pursue a merger (savings or revenue data) and avoided information that did not confirm that tendency (costs, integration issues).
- Daniel *et al.* (2005), who looked at self-attribution bias, indicate that the confidence of investors in their decisions rises when they are affirmed by the market results, but that it does not fall when it is not affirmed, again resulting in increasing levels of overconfidence over time.
- Menkhoff and Nikiforow (2009) observe that the impulses that lead to overconfidence resist learning; indicating subjects do not revise their probability estimates in the face of contradictory evidence. While at a first glance, this may seem to contradict the findings of Alpert and Raiffa above, we believe the difference in the respective results can be found in the nature of the feedback or learning. In Alpert and Raiffa's work, the feedback was highly intrusive and meant to, for lack of a better phrase, make a strong impression on the subjects. In Menkhoff and Nikiforow's work, subjects were left to reach the conclusions on their own, and they, in this study, chose not to revise their estimates.
- Kahneman and Tversky (2000) observe, first, that subjects do not believe the particular risks of a given situation or opportunity either apply to them or will affect them, and, second, that overconfidence is "likely to make opponents believe they can prevail and hence do not have to make concessions."
- Daniel *et al.* (2005) discuss two additional aspects of overconfidence: first, overconfidence increases the volatility of stock price changes by mediating different and differently inaccurate perceptions of the "correct" price of a stock; and, second, if subjects believe they are or their



information is “special” in some manner, they are more likely to be overconfident, valuing private information more than public information. They define overconfidence in terms of self-attribution, using a broad body of work on self-attribution to establish this definition.

- Malmendier and Tate (2005) indicate overconfident managers will “fail to reduce personal exposure to company-specific risk,” indicating these managers will display more risky behavior in their personal finance decisions if they are overconfident.

## Mergers and Acquisitions

In discussing mergers, we begin with two general observations. First, mergers add little or no value to the acquirer. While there is some dispute about this conclusion (see Andrade *et al.*, 2001),<sup>7</sup> the general consensus in the literature is that mergers do add value, but the overwhelming majority (if not all) of that value is captured by the target firm’s shareholders.

Second, mergers are equal parts analysis and narrative. In other words, given the analytical ambiguity that can accompany a merger decision, there are decidedly personal components to the decisions of both the acquirer management and the target management. This is not to pass judgment but merely to indicate that otherwise irrational behaviors may be either grounded in individually rational factors, or deeply ingrained in the individuals, is to ignore a significant portion of the analysis. To truly know what happened in a given merger, it is necessary to know its story, which is likely complex, irrational and dramatic.

Theory indicates that mergers in general should not add value if the purpose of the merger is to combine the cash flows of the two organizations. There must be some other reason for pursuing a merger. While this reason generally takes the form of what are called “synergies,” Andrade *et al.* (2001) discuss a number of reasons mergers may make sense: efficiency, market power, market discipline (removing inefficient managers), responses to deregulation and opportunities for diversification. Bogan and Just (2009) add to this list by noting that mergers may provide opportunities to exploit market inefficiencies by purchasing the undervalued equity of a target company.

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<sup>7</sup> The shortest form of the argument, which is expressed in terms of a long-term perspective, would be that, first, measuring a merger’s impact and saying with confidence that an acquirer did or did not achieve abnormal returns, is difficult at best, and, second, that the positive returns from a merger are primarily improvements in efficiency.

As mentioned earlier, mergers are large and often significant corporate events. While this may seem obvious, it leads to several implications which are relevant to M&A. We list a few.

- The decision to proceed with a merger profoundly impacts both the acquirer and the target firm and the management of each. In other words, these are not decisions to be taken lightly.
- By announcing a merger, management of the acquirer is indicating they expect the merger will somehow enhance their profitability, and hence their cash flow, either directly or indirectly through strategic benefits such as market expansion or removing competitors.
- As strategic decisions depend heavily on the input of senior management, mergers have a significant personal component to them, i.e., purely analytical considerations could generate a number of outcomes, and the people involved must select what course they wish to pursue.
- The announcement of merger decisions can be large media events which are scrutinized closely.

With this level of importance and scrutiny, we would expect to see more mergers that produce significant value for the acquirer. The fact that we do not see this justifies studying the impact of behavioral factors.

Roll (1986), Andrade *et al.* (2001), and Fuller *et al.* (2002) discuss whether it is possible to sort out all the impacts of a merger on stock price, beyond a three or five day window, or even across a quarter. Specifically, do an acquirer's stock price movements, even in the shorter windows, reflect more about the business as a whole or the merger activity? They conclude that it is not possible to clearly discern the impact of a merger announcement on a stock price, and Fuller *et al.* (2002) offer the following additional considerations: is the merger enough of a surprise to the market to capture the thoughts of the market on the merger; what is the ratio of the sizes of acquirer and target (the smaller the target, the more difficult to measure the change in acquirer stock price; but also, the larger the target, the harder it will be to realize abnormal returns); and how quickly can the merger be completed (the longer it takes, the harder to distinguish the unique impact of the merger).

Fuller *et al.* (2002) and Andrade *et al.* (2001) also discuss the implications of paying for a merger with equity or with cash, the former doing more to align the interests of target and acquirer. Fuller reiterates the theory that an acquirer may offer stock if they believe it is overvalued but later concludes that payment considerations are primarily driven by the target. They also discuss the implications of

acquiring private firms as opposed to public firms, concluding that better opportunities to achieve positive results for acquirers exist with private targets (a liquidity premium, tax considerations, negotiating power, integration considerations, etc.).

Finally, Fuller *et al.* (2002) explore the effects of pursuing multiple mergers in a short time period, which they consider to be five or more mergers in a three year period. This becomes particularly relevant to later studies of overconfidence in mergers. Their main finding is that cumulative abnormal returns are lower on the higher-order (i.e., the fifth or higher) acquisitions. They attribute this to the lower negotiating ability of a “serial acquirer” to get a price that will produce those returns.

## **Overconfidence in Mergers and Acquisitions**

The authors of studies we examine in this section all conclude that overconfidence negatively impacts both the decision-making process and the quality of the outcomes. One specific manifestation of this is the “winner’s curse,” or the outcome that a company paid too much for an acquisition. While the determination of what is “too much” is of course subjective, this represents one way to assess whether or not a manager was overconfident in pursuing a merger. We discuss several studies and how they demonstrate and measure the impact of overconfidence on a merger.

The examples used above to indicate the presence of overconfidence (survey questions about driving skills or fund manager competence) certainly are direct, but they are not practical in a real-time corporate event. First, there are incentive compatibility problems if the question is asked directly: what CEOs, for example, would directly tell their boards of directors that they are the below-average CEOs? Moreover, in telling a history of the event, it is unrealistic to expect that people would paint themselves in a bad light. Next, one of the nuances within overconfidence is whether the individual even knows if they are overconfident. Finally, in the middle of a merger, it is unlikely to think that a group of executives would take the time to answer questions that would, directly or indirectly, measure their overconfidence.

This discussion leads us to the conclusion that we need both a method to demonstrate overconfidence and a method to evaluate the success or failure of a merger. The hope is that we can

establish a correlation between overconfident managers and unsuccessful mergers. Without being deeply immersed in the story of a given merger, it is unlikely that we would find the proverbial smoking gun. One example would be a quotation from a manager to the effect: “Of course, I was willing to pay extra for the target. I knew I could achieve the synergies necessary to make it profitable.” As discussed above, even if a manager believed that, they would likely not get caught saying it out loud.

In reviewing these studies, we are looking to (1) gain a higher degree of granularity in examining the impact of overconfidence in mergers, (2) evaluate the specific conclusions of each author, (3) if patterns exist, develop them, and (4) if the conclusions are not persuasive, use the works to develop an alternative approach for future research.

### *The Hubris Hypothesis*

Roll (1986) is generally acknowledged to be the first person to examine the effect of overconfidence in mergers. Specifically, he developed what he called the “hubris hypothesis.” He starts by observing that the “takeover premium,” or the amount by which an offer exceeds the market valuation of the target, also exceeds the “economic impact” of the merger, or the gain in target market value less the loss in acquirer market value. Put more simply, acquirers pay too much. Furthermore, if the takeover premium exceeds the economic impact of a merger, hubris, or overconfidence, is a part of the difference.

The hubris hypothesis states that the bidder<sup>8</sup> believes that the market is incorrectly estimating their ability to achieve the economic value in the merger.<sup>9</sup> Even with the market’s feedback, bidders choose to proceed because they believe they can realize that value. The hubris hypothesis predicts the share price of the bidder should: (1) decrease upon announcement of a merger bid, (2) increase if the bidder loses or abandons the bid, and (3) decrease on winning the bid.

In trying to prove his claims, Roll finds that there are significant measurement challenges in being able to either provide support or not provide support to what sound like easily testable hypotheses. As

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<sup>8</sup> Again, for purposes of brevity, we will use the term “bidder” or “acquirer” to refer to the individual actor or organization that is acquiring the “target”.

<sup>9</sup> As a side note, his perspective is that the true economic value of any merger is less than zero, based on the addition of cash flows less transaction costs.

noted above, he argues it is too difficult to separate the relative impacts of a number of different influences on share prices to say definitively that the price of a given stock increased or decreased as a result of a merger announcement, or even how to interpret a given movement. To give one example, can we say with certainty that the loss of a M&A bid to another bidder is good news for a given acquirer because they have avoided a value-decreasing event or does it signal that the acquirer had insufficient resources to pay for the transaction, which is bad news? He notes “these problems of contaminating information make it difficult to interpret bidding firm price movements.” Roll discusses the efforts of other studies to address these issues. He ultimately concludes that the evidence is “inconclusive” with regard to bidder price movement. He reaches a similar conclusion about the announcement effect and introduces the possibility of nonhubris factors in explaining the data.

Roll proceeds to establish his position about the presence of hubris in a number of unconvincing arguments. (See Appendix 1 for a more detailed discussion of these arguments.) That said, on an intuitive level, we agree with Roll’s hypothesis and we believe a better approach would have been to explore ways in which evidence could provide support for it.

This leaves us with some troubling conclusions. First, although Roll’s hubris hypothesis makes intuitive sense and seems to have a set of easily identifiable metrics to detect its presence, Roll cannot marshal the evidence to support them. Furthermore, he needs to resort to a number of thinly veiled rhetorical gambits to establish his conclusions. Rather than get into an ultimately inconclusive discussion of the evidence for each point, we suggest that the larger point is one that Roll himself makes repeatedly. Namely, it is impossible to isolate the effects of the merger on stock price. By using bidder price movements as his metric, he himself makes his hypothesis untestable. This makes the specification of the hubris hypothesis as the null hypothesis even more troubling. Also, if hubris is not the only factor in explaining the outcomes of mergers, we should be concerned about its explanatory strength.

## *Laboratory Analysis of Overconfidence*

Camerer and Lovo (2000) do not examine merger behavior directly, but they do look at market entry, which has many of the same characteristics: large corporate events, high degree of uncertainty and the need to select and pursue a strategy among several alternatives. They use a game environment, so they are able to control a number of outside influences and test directly whether people would increasingly choose to enter a market if they had some verification of their own skill level.

They find that decisions to enter their artificial market are more prevalent if subjects are betting on their own skill rather than a random assessment of where they stand in comparison to their peers. They also identify an additional dynamic, which they call “reference group neglect”, where subjects tend to ignore the otherwise obvious fact that everyone else is trying to achieve the same success they are, and that there is no clear indication that any one player would be more likely to succeed than any other. If subjects display a higher level of reference group neglect, they are more likely to pursue entry. They also note that if the game is to be structured as a hierarchical tournament, subjects will become increasingly overconfident as they progress, whether or not this reflects skill, luck or some combination of the two.

Bogan and Just (2009) examine the information retrieval patterns in subjects evaluating merger opportunities. Their results support the presence of confirmation bias in merger situations. They also try to separate overconfidence from confirmation bias (by observing differences in their subject pools, MBA students and corporate executives). However, we believe that asserting that either executives or MBAs are more overconfident than the other is problematic. While these results provide clear evidence for overconfidence, they do not provide the type of direct evidence we seek in actual mergers. So, we return to the question; how can we establish the pattern of these behaviors in real-life merger situations?

## *Managerial Optimism and Corporate Finance*

Heaton (2002) expands the conversation about how to apply overconfidence to corporate finance activities, but he completes his discussion with only a list of testable hypotheses. Specifically, he indicates that optimistic managers, who believe their equity to be undervalued, may decline positive NPV

projects that require external financing. Second, if managers are overconfident, they believe they can achieve positive cash flow with projects that are really negative-NPV projects. He indicates that “the common objections to behavioral economics have less vitality in corporate finance than in asset pricing,” suggesting that arbitrage opportunities are more difficult to execute on corporate finance projects and that managers are less likely to learn from mistakes because of less frequent and more noisy feedback as well as longer feedback loops.

The testable hypotheses he mentions that are most relevant to our study are biased cash flow forecasts and takeover resistance. He does not provide any guidance on how these could be tested, but these seem to us to be the type of direct performance metrics that could provide the link between overconfidence and merger activity. We include the specific areas for examination later.

### *Overpayments and Synergies*

Hietala, Kaplan and Robinson (2003) create a theoretical model to enable the use of stock price movements to calculate synergies, stand-alone and combined values of the relevant firms and how the value of the merger will be split between acquirer and target. Their model indicates that there are only two circumstances in which it is possible to apply their model: when a merger is not consummated and when there are exactly two bidders. Even in these circumstances significant additional information is necessary, such as independent estimation of the parameters and assumptions or there being no fundamental change in the essential business of the acquirer between announcement and completion of the merger. In explaining the behaviors concerning mergers, they also suggest that hubris (as described by Roll, 1986) can explain the behavior of overpaying to acquire the target and add that non-financial benefits (empire building, satisfaction of having won a contested merger) also help explain the behavior.

They apply their model to the battle for Paramount between Viacom and QVC and conclude that although QVC was a better match (higher estimated synergies) for Paramount, Viacom won because of the hubris of Sumner Redstone, the public face of Viacom during the merger contest. They further

estimate that Viacom overpaid \$1.5 billion for Paramount. Finally, they note that by forcing more cash into the deal, the merger contest refuted the theory that overvalued equity is used to finance mergers.

While this explanation and model are highly compelling, the severe limitations of its use and its additional informational requirements make it impractical. However, we agree with the fundamental direction and the focus on valuing the components and dynamics of the transaction itself in estimating the impact of overconfidence on a merger.

### *Self-Attribution Bias*

Doukas and Petmezas (2007) examine whether overconfident managers are able to produce higher returns. Also, they focus more specifically on self-attribution bias. Their definition of overconfidence in an M&A context is that the managers overestimate synergies, underestimate merger risk, and believe that their equity is undervalued. Their measure of overconfidence is whether a company pursues multiple mergers in a short period of time (reflecting the Fuller, *et al.* (2002) standard of five or more mergers in three years). Their data is announcement returns with an additional discussion of whether insiders increased their ownership stakes. They conclude that overconfident managers realize lower announcement returns than bidders who are not overconfident and that the announcement returns go down with subsequent mergers. They offer additional conclusions about the dynamics of private acquisitions: namely, the lack of objective (market) data makes subjective or intuitive evaluations more likely to influence decisions and the considerations of the owners of private firms (e.g., liquidity, taxes) may also influence the outcomes.

While their approach is attractive and their conclusions compelling, we find a number of methodological concerns with the applicability of their results. First, while we agree with their definition of overconfidence, their measurement seems not to directly measure the components of their definition. Second, they use data (announcement returns) that a multitude of other studies found to be inconclusive at best. Next, they extend their discussion of the effect of overconfidence on mergers to include the observation that a first merger, if it goes well, gives the acquirer a “taste” for more mergers and fosters



overconfidence, which is seen in the lower returns of subsequent mergers. They also account for a subject's first merger as though it were equivalent to a single acquisition. We find this to be inconsistent with the earlier results that the impulses that create overconfidence can be overcome by learning. In other words, if managers are overconfident, they were overconfident before their first merger. We also believe that the mergers under examination are not the first large corporate finance events in the careers of the relevant CEOs. Finally, their data set is based on UK firms, the characteristics of which they contrast to firms in the US. However, they ignore those contrasts in discussing the results of their data. For example, they describe the higher prevalence of cash payments by acquiring firms in the UK, but then indicate that this is proof of the Heaton (2002) theory that overconfident managers do not seek external financing, even though Heaton was discussing a US sample. Either they are interested in differentiating UK firms, or they are interested in providing data for Heaton's assertion, but they cannot simultaneously achieve both.

### *CEO Overconfidence*

We combine the discussion of two articles by Malmendier and Tate (2005, 2008) because the overlap between them is extensive. They begin by defining CEO overconfidence in terms of the CEO's personal investment strategy. Specifically, do the CEOs hold and not exercise in-the-money stock options in the belief that the stock price will continue to appreciate? Do CEOs hold options until the last possible period in which to exercise them before exercising them? Do they continually buy more company stock? If they answer any of these questions yes, they classify the CEO as overconfident.

The specific measures of overconfidence are: (1) whether or not the CEO has continually exercised less than 67% of in-the-money options by the fifth year (ten years being the normal window for options), (2) whether or not the CEO has only exercised options within the last year before expiration, and (3) whether the CEO has bought company stock (on a net basis) in more years than they sold it. They then argue that these measures are not dependent on firm performance or either firm or CEO characteristics. The effect of overconfidence is hence independent of other firm or CEO attributes. These measures are also independent of alternate explanations for the behavior. Finally, they add a discussion of whether

press coverage of the merger independently confirms their results. We find a number of these explanations unsatisfying and relegate that discussion to Appendix 2.

They explain the effect of overconfidence on the CEO's behavior. Specifically, overconfident CEOs overestimate the returns of their merger activities (or corporate investment projects more generally), and they believe the stock is undervalued. These characteristics lead to the behaviors of overpaying for targets (under the belief that they can generate the returns to pay for them) and an aversion to external financing (since the equity is currently undervalued).<sup>10</sup> Malmendier and Tate also argue that CEO overconfidence enables the prediction that the market will react more negatively to the merger announcements of overconfident CEOs because the market has made the same assessment. They predict overconfident CEOs will conduct more mergers than non-overconfident CEOs and that overconfident CEOs are more likely to pursue diversifying mergers, which serve as a proxy for deals that are less likely to add economic value to the acquirer. They conduct statistical analyses that confirm their predictions, testing their results against a number of controls.

While Malmendier and Tate clearly perform a rigorous analysis, we are left with the feeling that something is just not quite right. Is a CEO's personal financial management style indicative of their behavior in a merger? The answer may be yes, but there is also a significant chance that alternate explanations exist. One example is that the CEOs of the companies Malmendier and Tate are studying are wealthy enough to allow influences such as the signaling effect of option exercise, board pressure and procrastination to significantly influence their behavior. Moreover, while CEO personal financial management style may be an indicator of overconfidence, it does not establish the direct manner in which the overconfidence impacts the merger. As a final concern, we note that in the article describing corporate investment policies, they find that their results are not independent of factors such as the CEO's education and employment history, birth cohort and accumulation of titles, which they collectively group as the "style" of the CEO. In other words, their explanation of CEO behavior may only apply to certain

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<sup>10</sup> Ironically, this would lead to CEOs forgoing merger opportunities they would need external financing to complete, reducing the number of mergers pursued by overconfident CEOs.

segments of the CEO population. In a more systematic approach, Cao (2009) argues that personal finance behaviors of CEOs are not good proxies for overconfidence. Using the same dataset as Malmendier and Tate, he argues stock mispricing and growth opportunities can also explain the stock option exercise delay they observe. Specifically:

- If a firm is undervalued and the CEO has inside information about future opportunities, delaying option exercise may be rational.
- If a firm is overvalued, a CEO may not want to send such a signal to the market and hence delay option exercise.<sup>11</sup>
- If a firm faces the prospect of significant growth opportunities, option exercise delay is a rational behavior.

He takes the argument further by asserting that the option exercise behavior is driven by these effects, not any determination of overconfidence. Cao also indicates that while overconfidence is an important factor in assessing corporate investment decisions, “more precise measures” need to be established.

While Malmendier and Tate have taken on the task of directly linking CEO overconfidence to merger behavior, we find their model unconvincing. There are too many leaps of faith necessary to firmly establish the links, and there are too many other explanations for their results.

## **Finding Direct Evidence of Overconfidence in Mergers**

Having not found the evidence to support the type of direct link between CEO overconfidence and merger behavior that theory would suggest we turn to the question, what would be necessary to establish and prove such a link? This problem can be broken down into two parts: First, what testable hypotheses would establish the presence of overconfidence? Second, what types of data would be necessary to prove or disprove these hypotheses?

We start by observing that, in order to determine that overconfidence is an issue in a given acquisition, we would need to first determine that an acquirer overpaid for the target. This leads us to a

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<sup>11</sup> The other components of this piece of the argument are that CEOs receive a large number of benefits by virtue of the firm being overvalued, and there is a cost that accompanies option exercise in the form of the signal that the exercise sends to the market. This leads to the conclusion that a rational CEO would be cautious about exercising options or, more precisely, that delaying exercise is consistent with a rational behavior model.

discussion of whether it is possible to statistically study M&A transactions. The answer seems to be “not with much precision.” Specifically, sorting out the effects of a merger on stock price seems to be elusive, if not impossible. If measuring the impact of a merger on stock price unleashes a host of measurement issues, establishing the presence of a behavioral characteristic is even that much more difficult. By clearly establishing that an acquirer overpaid for a target and simultaneously establishing the presence of overconfidence (as defined in the specific study) in the decision-making process, it would be possible to say that overconfidence led to the overpayment for the target. But, both of these premises are problematic to verify through direct evidence and have not been established in the articles we reviewed.

If we ask more detailed questions about how we could directly establish these two claims, the problems become easier to see. Specifically:

- What is the time window in which to establish whether an acquirer overpaid? This will be determined by the specific objectives and criteria of the individual acquisition. Applying a uniform standard to a dataset of multiple acquisitions would not be informative.
- What confidence do we have in the determination that an acquirer overpaid? This is an inherently subjective determination, and, given the organizational politics associated with these high-profile events, any conclusion one way or the other is suspect. In other words, there are no disinterested parties in these transactions.
- What type of measure could establish success or failure in an acquisition? Specifically, is this a binary (overpaid/not overpaid) type of question? Is there a measure, such as percent of objective achieved, which measures relative success or failure? How do we account for non-quantitative objectives?
- How do we establish the presence of overconfidence in the merger process? Do we distinguish between levels of overconfidence (e.g., hopeful optimism compared to brash ego trips)? How direct does our evidence need to be? How many other causes could equally explain our results, if our measure is less direct? How much of what is being attributed to overconfidence is actually the result of taking a calculated risk? How is that different from overconfidence?

The point is to show that direct evidence will be hard to establish, much less find and apply to these situations.

We take the approach of holding a merger accountable to itself. That is, what are the objectives of the merger when it is was proposed and “sold” to investors and the press? Were projected synergies realized? Were revenue growth opportunities realized? Were nonquantitative strategic objectives

realized? Evaluating mergers in this manner requires access to some form of pre-merger statement of objectives or financial models and comparing them to results within the timeframes established in these objectives or models. In terms of the types of conclusions reached, our initial hypothesis is that a four-tiered conclusion would be appropriate: “unsuccessful,” “low success,” “moderate success,” or “highly successful.”

The notion of establishing the presence of an overly optimistic cash projection (based on Heaton’s work) at first seems daunting: how do we know it is overly optimistic? However, by using the original projections themselves, we can eliminate many of the problems discussed above and, at the same time, create a basis for establishing the presence of overconfidence. The concerns in undertaking this type of study, however, would be the individual nature of each merger. As mentioned, mergers are highly individual and unique in nature. In the absence of an existing dataset, we would have to rely on the belief that once a specific dataset is established, patterns in the data would emerge that would allow for more systematic analysis.

The other aspect of Heaton’s discussion focuses on takeover resistance. Establishing the presence of this aspect of merger transactions would require some level of subjective evaluation (e.g., how much of the stated resistance is negotiation posturing?). With that caveat, we believe it is possible to establish more detailed criteria for making this determination when confronted with a specific dataset.

Using the work of Heaton (2002) as a starting point, we offer the following list of areas within specific mergers to establish the relationship between overconfidence and mergers:

- Cash flow projections: what were the projected synergies, what assumptions drove them, what revision process did they undergo, how well did they predict what happened
- Merger negotiations: what happened, what financing options were discussed and what determined the final financing structure, what was the attitude of the respective parties, what issues delayed consummation of the merger, what negotiating stances did each party assume
- Feedback: did the market react to the announcement of the merger; if so, how did this impact the negotiations and behaviors of the respective parties
- Personal Issues: what role did either ownership or personnel considerations play in the completion of the merger

- Financing: did the acquirer seek external financing, either directly in pursuit of the merger or at a later time (six to twelve months); if so, how much of the external financing was explicitly (or implicitly) dedicated to financing the merger
- Integration Planning: how comprehensive was the integration planning; how detailed or specific; what happened after the merger was completed
- Tax Consequences: to what extent did the individual or corporate tax liabilities affect the structure, timing or pricing of the merger?

While we understand the measurement issues in collecting this data, these represent the places we would most likely find evidence of the direct relationship between overconfidence and mergers. This brings us back to a point we made earlier, namely that mergers are part analysis, part narrative. This list of questions suggests a case study approach to analyzing a set of mergers. However, we are concerned that the methodological concerns that accompany case studies would prevent us from reaching broad-based conclusions. A solution to this dilemma is to use a dataset that is limited in some way, either by industry or timeframe or transaction structure, and use a case study approach to supplement and validate the results of the quantitative analysis.

## **Conclusion**

Our findings indicate that the metrics developed in the research literature do not satisfactorily establish the presence of overconfidence in the context of M&A activity. We believe research can be extended in the following areas: more complete analysis of the overconfidence hypothesis and development of other manifestations of it in a merger context, deeper review of the empirical results of Doukas and Petmezas and Malmendier and Tate, including review of their data, and creation of relevant case studies.

## *Appendix 1: Roll's Argument for the Existence of Hubris*

Roll summarizes his discussion of the data by first describing his theory that mergers should not be expected to provide positive value (see footnote 8) and indicating that hubris should be considered to be the null hypothesis in this study because it is consistent with strong-form efficiency of markets, which he defines as an outcome where (1) asset prices fully reflect all available information and (2) either product or labor markets cannot achieve better results simply by reorganizing existing resources. Then, he indicates that the “currently available results...provide no really convincing evidence against...the hubris hypothesis.” We find this argument unconvincing. To assert that your hypothesis is the null hypothesis and that the evidence cannot refute it is to produce a significantly different result than saying that the evidence does not sufficiently support your hypothesis. To assert that a behavioral consideration is significantly impacting merger transactions is not a null hypothesis.

Roll briefly discusses alternatives to the hubris hypothesis including: agency questions, systematic biases in market pricing, whether shareholders have stopped bidders from pursuing these transactions, and that hubris is itself an inefficiency, so it is not consistent with strong-form efficiency. He dismisses these points by asserting: (1) the hubris hypothesis does not depend on agency considerations, (2) systematic biases would affect targets and bidders equally, (3) diversified stockholders would own both target and acquirer and would hence be indifferent to mergers as long as transaction costs were small, and (4) strong-form efficiency does not preclude individual irrationality but indicates that the market will self-correct when it appears.

We find these dismissals to be unconvincing. First, even if hubris is not dependent on agency factors, neither are they mutually exclusive. This is not sufficient to dismiss agency theory. His second dismissal is true only if the systematic biases do not pertain to the dynamics of mergers. If, however, the market came to automatically penalize acquirers on the announcement of a merger, based on past results of mergers, this argument would not hold. Third, while this argument may be theoretically true, perfect diversification, particularly within an industry, is not guaranteed in the real world. Finally, the response

does not address the main point. The question is less about the specific definition of strong-form efficiency, and more about the fact that Roll is both claiming that hubris is consistent with strong-form efficiency and is itself a form of inefficiency. While this may bear out, more needs to be said to resolve this contradiction, especially if Roll is claiming that hubris should be considered to be the null hypothesis in this analysis.



## *Appendix 2: Malmendier and Tate's Discussion of Other Factors*

Malmendier and Tate argue that inside information does not affect the presence of overconfidence because, *ex post*, the CEOs who hold their options do no better than those who exercise them. Moreover, they argue these behaviors are independent of signaling because the market does not respond to CEO option exercise, only CEO share purchases. Finally, they argue the behaviors are independent of a procrastination explanation because by pursuing either the investment opportunities in general or the mergers in particular, the CEOs are clearly indicating they are not by nature procrastinators. This last point seems dubious at best.

They do consider other factors—positive inside information, board pressure, risk tolerance, taxes—but dismiss all of them except overconfidence as either not consistent with increases in merger activity or not supported by the data. Without specifically discussing each point, we suggest that these considerations, especially board pressure, deserve a more detailed discussion. Specifically, the number of additional influences that enter into personal finance decisions (e.g., liquidity) have not been sufficiently addressed by Malmendier and Tate to warrant so quick a dismissal.

Finally, as an independent verification of their conclusions, they examine the business press characterizations of a CEO as “confident” or “cautious” (or related terms) and conclude that the press reaches the same conclusions about particular CEOs as they do.

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