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Behaviors That Impact the Economic Outcomes of Mergers & Acquisitions; The Premium Price Paid and Return on Investment

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Pepperdine University

Graziadio School of Business

BEHAVIORS THAT IMPACT THE ECONOMIC OUTCOMES OF MERGERS &

ACQUISITIONS; THE PREMIUM PRICE PAID AND RETURN ON INVESTMENT

A dissertation submitted in partial fulfilment

of the requirements for the degree of

DOCTOR OF BUSINESS ADMINISTRATION

by

Darryl Laws

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David Smith, Ph.D. – Dissertation Chair

This dissertation, written by

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under the guidance of a Dissertation Committee and approved by its members, has been submitted to and accepted by the Pepperdine Graziadio Business School in partial fulfilment of the requirements for the degree of

DOCTOR OF BUSINESS ADMINISTRATION

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DEDICATION

THIS DISSERTATION IS DEDICATED TO MY DAUGHTERS, ISABELLA AND SAMANTHA LAWS, WITH THE ENCOURAGEMENT THAT NO MATTER WHAT AGE YOU ARE YOU SHOULD REACH TO ATTAIN YOUR GOALS.

ACKNOWLEDGMENTS

CEO & Chief Investment Officer, Jermyn Street Capital Partners, Inc. 2004 – Present
  La Jolla, CA; Houston, TX; London, UK.

Jermyn Street Capital Partners is a private equity fund manager, Merchant Banker specializing in vetting, structuring, valuing, and negotiating investments and acquisitions on its' behalf and that of nine (9) prominent wealthy families. We currently have $450 million AUM and advise families with over $3 BN combined net worth.

Managing General Partner, **Caledonian Private Equity Partners,** 2003–2004
  London, U.K.

Investments in conventional energy power plants worldwide.

General Partner, Fortis Bank AG Private Equity, PE Fund Restructuring, 2002 – 2004
  Brussels, Belgium and Paris, France.

Restructured and disposed of the NesBic Cte I, II, III PE portfolio assets for Credit Lyonnaise, Bank Vontabel, Fortis Bank AG.

Mg. Partner, **Blue C Ventures**, January 2000 – January 2002
  Vienna, Austria, Paris Area, France, London, UK.

Lead acquisition/investment team focused upon acquiring twelve (12) software developers and integrators for the media industry throughout the European Union.

CEO & Founder, **The Laws Company, Ltd.**, 1987 – 1998
  Newport Beach, CA and London, UK.

My Commercial Real Estate development company was financially backed by Metropolitan Life Insurance, the Constantine family office (UK), the Guinness Trust (UK) and Independence Bank, Century Federal Savings & Loan, and NU West Ventures (Hong Kong). I developed a portfolio worth $750,000,000 of high-rise office buildings, industrial parks, and retail shopping centers in Denver, CO, Atlanta, GA, Riverside, CA, San Diego, CA., Dallas, and Houston, TX

Sr. Vice President, First City Industries, Inc., 1985 – 1987
  Beverly Hills, CA

Sr. Vice President on a hostile take-over and mergers and acquisitions team owned by the infamous corporate raiders Samuel and William Belzberg. We collaborated with Boone Pickens and Carl Icahn on hostile takeovers: Ashland Oil, Unocal, Bekins Moving & Storage, Scovil Industries, Continental Airlines.

Vice President, Drexel Burnham Lambert, 1982 – 1985
    Beverly Hills, CA

Arranged junk bond and conventional financing for hostile take-overs of TWA Airlines, CalCan, Colombia Savings & Loan, and Unocal.

Development Manager, **Trammell Crow Company**, 1979 – 1981
    San Diego, Tysons' Corner, Dallas, and Houston.

Developed the Imperial Bank Tower, a class "A" office tower comprised of 720,000 sf at 600 "B" Street, downtown San Diego and 1,000,000 sf. LTV Tower in Dallas, Texas.

Development Project Manager, **Ernest W. Hahn, Inc.**, 1976 – 1979
    El Segundo, CA

Project development executive over saw architecture and engineering and construction, arranged equity and debt financing, managed the development and lease-up of three (3) regional malls; Palm Desert Town Center, Corta Madera Town Center, and Carolina East Mall.

Project Manager, **Moran / Saudi ARAMCO Joint Venture**, 1974 –1976
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Project manager on the construction of an oil refinery in joint venture with Zapata Builders in Houston, Texas.

City of Westminster, Dept. of Urban Planning – Financial Analyst, 1973
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Analyzed social-economic, cost-benefit, and risk impacts of various subsidized programs' implementation.

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Graziadio Business School, Pepperdine University, 2018-2022
Doctor of Business Administration

Harriot Watt Business School, Edinburgh University, 2009-2014
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California State University-Long Beach, 1975-1976
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Bachelor's degree, Business/Commerce and Political Science

ABSTRACT

This quantitative study explores the impact of overconfidence bias, lying for strategic advantage, and co-operation (or non-cooperation) among 29 highly experienced private equity fund and investment managers. Using four structured experiments, M&A professionals were assigned buyer and seller roles and allowed to choose among investment opportunities. Within a game theory framework, the buyers and sellers bargained over the purchase price. The results of these experiments were explored using a linear regression format. The skill level of the participants was measured using a financial literacy test prior to the experiments and two overconfidence measures were constructed. Lying for strategic advantage was an embedded behavior, and co-operation versus non-cooperation was observed. Results suggest that more experienced buyers, along with more skilled buyers, were able to achieve a lower price paid and higher ROI. Lying for strategic advantage was not found to have an impact on the price paid by buyers. Cooperation was not found to have a statistically significant impact. However, results suggest that when lying and cooperation is employed by a buyer, they can achieve a lower price paid for an acquisition, thus a higher ROI. These findings contribute to our understanding of outcomes observed from private equity transactions.

Keywords: Overconfidence, lying for strategic advantage, cooperation, non-cooperation

CHAPTER 1: INTRODUCTION

Overview

Human behavioral interaction during investment decision-making embedded in game theory structured experiments provides an excellent contextual framework for insight into strategic human behavioral interaction during the negotiation of a private company acquisition transaction. In an experimental setting, indigenous factors such as the potentially significant economic outcomes for one or multiple participants bias behavior(s) can be isolated, observed, and recorded. In this context, a framing effect occurs because financial decisions involve clear incentives (Beckman & Menkhoff, 2008). The operating assumption of behavioral economics is that cognitive biases (see Appendix C for a Glossary of Terms) often prevent people from making rational decisions, despite their best efforts (Ariely, 2009).

Nash (1950, 1951) suggested two game theory approaches to resolve bargaining problems: axiomatic and strategic. The axiomatic approach is indicative of the cooperative strategy in negotiations. In contrast, the strategic approach depicts outcomes, such as a noncooperative game in a merger or acquisition (M&A) transaction (Rubenstein, 1987). Nash (1953) surmises the second approach to bargaining as the non-cooperative, dominant strategic strategy. This stratagem entails a lack of cooperative sharing of vital decision-making information. Specifically, the dominant strategic strategy is exemplified in a context in which the dominant players possess information that gives them an advantage. Crawford (2003) refers to this framework as a type of zero-sum or noncooperative game in which there is only one winner. An example is in American football, in which each team seeks to win and does not cooperate by sharing their strategy.

Bargaining theory is the branch of game theory dealing with the analysis of bargaining problems, in which the participants negotiate over the division of some economic benefit or

goods ending in an enforceable agreement between the participants (Kuhn & Harsanyi, 1995).

Nash (1950) defined it as "a solution to a bargaining problem means determining a division of

the economic benefit or interests" (p. 1). In addition, Nash (1950) developed cooperative

theories, such as two-person collaborative or interest-based negotiation, that involves the parties

in an effort to meet each other's needs and satisfy interests jointly. Thus, the outcome to the

bargaining is of mutual benefit. Nash (1950) refers to these outcomes as nonzero-sum games.

Crawford (1982) stated that "the common belief is that inefficient outcomes are consistent with

rational behavior by well-informed bargainers" (p. 608).

This research concentrated on two-person cooperation games by isolating three human

cognitive behaviors: overconfidence bias, lying for strategic advantage, and

cooperation/noncooperation. This research examines their potential impacts on the economic

outcome from the buyer participants' vantage point.

Overconfidence is the tendency of individuals to consider themselves above average on

positive characteristics (Alicke, 1995; Kruger, 1999). Overconfident decisions often indicate a

loss of contact with reality and an overestimation of one's own competence or capabilities,

especially when the person exhibiting it is in a position of power. In this research,

overconfidence is defined as the difference between the participant's belief in their competence

abilities in M&A negotiations, their experience, and their actual competency. Performance will

be measured as Return on Investment (ROI) on investment or over/under payment for purchase.

Ariely (2008) states that, in general, anything that causes emotion (e.g., sexual arousal,

hunger, anger, compassion) can lead to irrational behavior. Emotions are inherently nonrational.

The reasons we lie boils down to two principal objectives: to prevent something we find

undesirable from happening or to help us secure something we find desirable but anticipate

that we will not succeed in getting if we are honest about things. Crawford (2001) posited that lying for strategic advantage about planned actions, or intentions, is a common feature of economic and political as well as military life. Such lying frequently takes the form of active misrepresentation, as opposed to less than full, honest disclosure.

Co-operation is the deviation from self-interest where individuals show regard for others well-being, fairness principles, or a general willingness to empathize. Communication collusion in resolving a coordinated problem. For example, consider a free and open share of transaction information between buyers and sellers such that equilibrium is achieved in expectation and economic outcome. In this instance, co-operation is a nominal behavioral action. This contrasts with non-cooperation, during which binary economic events with financial stakes an individual maintains his personal self-interest above other individuals without showing regard for others well-being, disavowing fairness principles, and exhibiting general unwillingness to empathize.

Problem Addressed

The primary problem addressed in this study is: does behaviors of a buyer, manifested as overconfidence and cognitive behaviors that are exemplified by lying for strategic advantage and cooperation/noncooperation by private equity and investment fund managers (Wang et al., 2018), each have an economic impact on the purchase price and ROI for the acquisition of a private company?

The impact of overconfidence bias behavior has been previously examined for CEOs of publicly traded companies, stockbroker's trading habits (Trinugroho & Sutami, 2011), and empirical examination of company sales via Dutch auctions by researchers in economics and behavioral finance (Bennett et al., 2020). In contrast, game theorists have investigated dishonesty and misrepresentation of the facts or circumstances (i.e., cheap talk) in communication, referred

to as signals (i.e., mis-direction), using university students in laboratory experiments to examine strategic advantage in lying and withholding information and cooperation versus noncooperation (Charness, 2000; Crawford et al., 2013; Smith et al., 2002).

From this study, practitioners and researchers can better understand that private equity and investment fund managers (buyers) do not benefit from exhibiting overconfidence bias and better-than-average (BtA) behavior in their investment (financial) interaction in decision-making. This study also found that they are not significant predictors of their impact on ROI or the premium price paid for by buyers in the acquisition of a private company. Further, skill level and years of work experience significantly predicted the premium price paid by buyers.

Interaction (between lying and cooperation) was a significant predictor of the premium price paid by buyers. For every one-unit increase of interaction, there is a corresponding -$1,220,000 decrease in the premium price paid. If you doubt that lying can be beneficial, Gneezy et al. (2011) suggested "a lie can harm the liar but help the other person, referring to these "altruistic white lies" and that "the consequences of black lies where the liar benefits at the expense of the others are likely to have very different distributional concerns compared to the consequences of white lies where both parties benefit" (p. 2).

Much information is available in repositories such as PitchBook, Bureau Van Dijk, and Dealogic regarding CEOs paying premium prices for public company M&A. An example is KKR's sale of The Bountiful Company to Nestle in April 2021 for $5.75 billion. KKR's financial basis in the company was $4 billion. Thus, the premium to market paid was more than 40%. According to Moeller at al. (2004), the average premium paid for United States public acquisitions between 1980 and 2001 was 68% for large companies.

Latham and Watkins' M&A lawyers reported that the market is driven by private and public M&A transactions. However, private M&A is more prevalent because there are more private companies than public companies (Katz et al., 2021). The ready availability of financing is the driving factor, particularly for a private company and private equity firms' deal-making, for which acquirer stock is not available as transaction consideration (Katz et al., 2021). "While corporate buyers may share operational synergies with the target firm, financial buyers rely primarily on improving the stand-alone value of the target firm or buying undervalued assets" (Dittmar & Li, 2011, p. 1). "Moreover, financial buyers face shorter investment horizons than corporate buyers and incentivize target management differently" (Roosenboom & Fidrmuc, 2009, p. 15).

Pikulina and Rennenboog (2017), whose paper I modeled this dissertation's research framework after, posited that "the lack of researcher collaboration concerning the relationship between overconfidence and investment could be explained by practical difficulties, such as an appropriate reference point or a person's ability. Thus, challenges exist when identifying whether an individual overestimates or underestimates their skills" (p. 2). In real-world situations, assessing individuals' degree of overconfidence and cognitive bias behaviors is problematic, including determining who is overconfident amongst the private equity fund managers and how robust their level of overconfidence is. It should be noted that Pikulina and Renneboog (2017) use the measure of financial knowledge, skill level, and investment risk to investigate overconfidence.

Game theory structured experimental simulations of financial transactions are of significant value to game theory research, as they allow for the isolation of the effect of a particular bias on individual behavior by buyers and sellers. Moreover, according to Friedman

and Sunder (1994), experimental data are relatively easy to interpret. Biais et al. (2009) suggested that "the study of controlled environments allows more confident inferences about cause and effect" (p. 17). An experimental setting supports overcoming several problems by communicating contextual information to the participants, such as fundamental asset value, expected dividends on an asset over a specified period, terminal value (multiples on earnings before interest, taxes, depreciation, and amortization, also known as EBITDA), and discount rates for calculating the present value. These components are controllable in a game theory structured experiment, creating favorable conditions for observing subjects' behavioral interaction during events with a potentially significant economic outcome to each participant and allowing the researcher to extrapolate to a larger representative population.

The first aim of this research was to construct a comprehensive measure of private equity fund managers and investment managers' (buyers) overconfident bias and cognitive bias using their Calibration Based Overconfidence (CBO) score and BtA scores. The use of these confidence measurements provided a foundation for examining how cognitive bias and boundedly rational behaviors, (e.g., lying for strategic advantage, noncooperation and cooperation) impact the purchase price premium paid and the ROI for the acquisition of a privately held company, the dependent variables (DVs) of this study.

In psychology, a cognitive bias is a phenomenon underlying irrational decisions, which is a mistake in reasoning, evaluating, remembering, or other cognitive processes. Cognitive bias often results from maintaining personal preferences and beliefs regardless of contrary information. "Alternatively, rational behavior is often explicitly defined as analytical, logical, and conscious" (Dane et al., 2011, p. 4).

Pikulina and Renneboog (2017) define overconfidence as "the difference between persons' belief about their competence in the financial domain and their abilities" (p. 1). An example of this (using this study's context) would be a participant overestimating their competencies and experiences in M&A negotiations versus objective measures of their competency, such as performance-based ROI or whether a premium price was paid for purchasing the private company. For this study, the following constructs (variables) of behavior are utilized: (1) lying for strategic advantage and (2) cooperation versus non-cooperation and the interaction between the two amongst participants during human interaction during negotiations and decision-making for the acquisitions because of their being used as a strategy tool by buyers and seller. Thus, the need to investigate their impacts in the premium price paid and ROI when acquiring a privately held company.

The two overconfidence measurements examined for this study were derived from researchers who used particular methods, or factors of interest, and did not combine several approaches to ascertain a more precise measurement. A few of the noteworthy methods that were used together included a financial knowledge test, a determination of skill level score (Pikulina & Renneboog, 2017), a CBO score that is a calibration-based measure (Michailova, 2010), and a BtA score (Alicke, 2005). Ultimately, measures of CBO score, skill level, and BtA were selected as the predictor variables for testing their respective impact on the DVs, the premium price paid, and ROI because of their relevance.

The CBO score is operationalized as the difference between a participant's average confidence in their responses and the actual reported number of correct answers to the 20-question financial knowledge test. The BtA or "is defined as the participant's assessment of their financial knowledge and abilities as being better than their peers in the sample group" (Alicke,

2005, p. 85). Finally, skill level is based on the percentage range of the participant's correct answers to the financial knowledge test. Skill level was calculated by how the participants performed on the financial knowledge test and the ROI achieved on their respective acquisition transaction relative to their skill level. An example of skill level assessment can be in a participant's overestimation and over-placement refer to the inclination of a participant in the experiments conducted to overestimate their performance on the financial knowledge test and how they perceive their performance compared to their peers and their taking higher risk than their skill level and capabilities.

The experimental methodology was sequentially deployed and enabled me to assess the participants' financial knowledge as performance-based measures of their CBO score and whether they perceived themselves as being BtA when undertaking an investment decision. Camerer and Lovallo (1999) posited that "these effects extend to economic decision-making in experiments" (p. 307).

"Overconfidence also relates to the agency problem" (Jensen & Meckling, 1976, p. 10). A significant body of literature supports agency theory as responsible for private equity and investment managers driving their fees and transaction remuneration by employing limited information sharing with sellers and their limited partners (Appelbaum & Batt, 2016; Eisenhardt, 1989; Jensen, 1986; Sapienza, 2000). For example, Appelbaum and Batt (2016) described fee churning and nondisclosure of fees charged (e.g., monitoring charges, charging back-office fees that should be part of management fees, failure to share monitoring fees with limited partners, charging an M&A broker fee for each acquisition transaction, and sharing fees with third-party consultants contracted to provide due diligence services). The relevance here is that often private

equity and investment firms will engage in acquisitions to earn fees unnecessarily at the cost of a reasonable yield to their limited partner investors.

I investigated the impact of private equity and investment fund managers' (buyers) overconfidence behavior and cognitive bias behaviors and their impact on financial events such as a company acquisition or sales with an economic outcome by conducting a series of experiments designed to simulate various levels of transactional risk and economic reward in private company acquisition settings to address the following research questions:

1. How does a private equity or investment fund manager's (buyer's) bias behavior impact the purchase price premium paid in a merger or acquisition transaction for a private company?

2. Can the buyer's employment of strategies such as: lying for strategic advantage and co-operation versus non-cooperation during negotiations be used tactically by a private equity and investment fund manager (buyers) to diminish the seller's price expectations in an acquisition transaction private company?

The first construct that I tested was with CBO score, skill level, and years of work experience as IVs and premium price paid as the DV. Although the model was not a good fit, it was found that both skill level ($p = .02$) and years of work experience ($p = .01$) were significant predictors of premium paid price. Both had a negative relationship with the premium price paid. In this regression, the confidence measure examined was CBO score. The skill measurement investigated was the aforementioned skills level score.

The second regression model was with BtA, skill level, and work experience as IVs and premium price paid as the DV. The regression model was found not to be a good fit for the data;

however, it was found that both skill level ($p = .02$) and years of work experience ($p = .01$) are significant predictors of premium paid the price.

For this study, I chose to focus on two primary measures of overconfidence (i.e., CBO and BtA) and the performance-based measure skill level. The data collection methods were used to ascertain whether a private equity and investment fund manager's overconfident bias behavior during the negotiation interactions increased the probability of this behavior impacting the purchase price.

The study's findings showed that among the private equity and investment fund manager (buyers) who were participants ($n = 16$), there was: 1) skill level was a significant predictor of the premium price paid. An increase in skill level would have a corresponding decrease in the premium price paid, 2) years of work experience was a significant predictor of the premium price paid. An increase in years of work experience would have a corresponding decrease in the premium price paid, and 3) CBO score and BtA were not significant predictors of either premium price paid or ROI.

The traditional argument among academics is that "there is no conventional method of overconfidence measurement for financial and economic experiments" (Malmendier & Tate, 2004, p. 13). Examples of how researchers approached the issue include Malmendier and Tate's (2004) use of empirical data from Forbes 500 firms, Dhir and Mital's (2012) as well as Dionne and Le Haye's (2015) use of proxies from game theory, historical data from public auctions, specifically designed tests, and tasks applied by other researchers.

Does it matter that the prior researchers focused on public companies because of the availability of data? Yes. I posit that these prior studies were conducted explicitly using publicly traded company data that often do not provide the full picture of findings relevant to private

equity M&A professional practitioners. Why? Specifically, because data points to the fact that more than 70% of the M&A in the United States are for the purchase of private companies by private investors, private equity firms, investment managers or buyers/operators whose acquisition costs often are below $100 million dollars and not reported (Katz et al., 2021).

In addition to the four experiments used in the study being designed specifically to assess the impact of the predictor variables, the experiments also compared the participants' performance-based measurements (financial knowledge and skill) while considering the participants' perceptions of their skill and capabilities and their investment choice of risk taken, which is characteristic of optimism bias. Optimism bias is defined as overestimation of abilities, achievement, abilities and or success to be higher than actual (Pakulina, 2017). Thus, I sought to isolate the drivers underlying the behaviors related to paying premium prices and ROI in acquiring private companies.

The current study differs from Malmendier and Tate's (2004) approach of employing a historical data set from 1980 to 1994. Malmendier and Tate (2004) investigated whether CEOs decided to convert personal stock options because of their confidence in their leadership ability. They identified overconfidence as when the CEOs failed to exercise their stock options when they were at the threshold of 'in the money' or held the options longer because of their overconfidence in their leadership abilities. It is my opinion that solely using publicly traded company CEO data skews the ability to make an inference to CEOs of private companies, knowing that the latter constitute a larger amount of the M&A transactions conducted in the U.S.

This study employed four simulated business acquisition transactions in experiments, which included various levels of transactional risk and economic reward embedded in the construct described above. Using these experiments, I accumulated data on performance, ability,

risk taken, and behavior interaction. The current interest of the investment firms, bankers, and Wall Street brokerage houses motivated Jiang (2016) and Dittmar (2011) to investigate why private equity and investment fund managers (buyers) pay lower prices for acquisitions than corporate CEOs. This question led Doukas and Petmezas (2007) to analyze managers' overconfidence behavior in M&A and examine how individual-level overconfidence behavior results in higher prices and investment aggressiveness when investment fund managers incorporate incomplete information into their game and thus drive their psychological pricing. Kose and Liu (2010) analyzed and demonstrated the impact of CEO overconfidence and the behavioral bias interaction on the acquisition premium paid in 1,890 public company M&A transactions between 1993 and 2005. Bargeron et al.'s (2008) findings clarified the distinction between private equity and investment fund managers and public company CEOs. The incentives are higher for private equity firm managers for several reasons, including: "(a) most transactions are cash deals; (b) these (public) CEOs pay a considerable difference in purchase premiums; (c) synergy gains by acquisitions made by private equity firms are less motivating, but that target firms' shareholders earn 63% higher premiums if a public company buys their company" (Bargeron, 2008, p. 390).

I tested a second construct to examine whether lying for strategic advantage impacted the buyers' economic outcome, the premium price paid, and acquisition negotiations. Ariely (2008) makes the case that people lie for two principal objectives: a) to prevent something we find undesirable from happening or b) to help secure something desirable but unobtainable if remaining honest. Crawford (200) posited that "lying for strategic advantage about planned actions or intentions is a common feature of economic, political, and military life. Such lying

frequently takes the form of active misrepresentation instead of less than completely honest disclosure" (p. 2).

The first regression model developed to test hypothesis 2 was for buyers only using lying for strategic advantage, skill level, and years of work experience as the IVs and premium price paid as the DV. The regression model was found to be a good fit of the data, $F(3,10) = 5.20$, $p = .024$, with an adjusted R^2 of .493. It was found that both skill level ($p = .007$) and years of work experience ($p = .004$) are significant predictors of premium paid the price among buyers. Lying for strategic advantage was found to not be a significant predictor of a buyer paying a premium price or for ROI for the acquisition of a private company. As an aside, lying for strategic advantage was measured by empirical observation by reviewing the video recordings (Omwuegbuzie et al., 2009) of the four experiments and noting the number of times that the buyers and sellers misrepresented the pertinent financial achievement and operational facts that the buyer or seller failed to disclose or make full and honest disclosure of (Crawford, 2001).

The third construct that I examined was the impact of noncooperation versus cooperation on the economic outcome of the sale of a private company. Premium price paid (buyers and sellers) and ROI were used as the specified acquisition transactions in which this behavior was embedded with the companies' sellers. Noncooperation was defined as during binary economic events with financial stakes, an individual maintains his self-interest above other individuals without showing regard for others' well-being, disavowing fairness principles, and exhibiting complete general unwillingness to empathize. Cooperation/noncooperation was measured by empirical observation by reviewing the video recordings of the four experiments and noting the number of times that the buyers and sellers did or did not share pertinent financial achievement and operational facts that the buyer or seller failed to disclose, thus either enabling or disabling

equilibrium between the buyers and the seller. The sellers in the experiments were instructed by being provided written overview of each of their roles and the tenets of the transaction's economics. From this perspective, I concluded that noncooperation is a nominal behavior action. Nash (1950) clarified the term cooperation by stating that "cooperation implies that the players (buyers and sellers) have complete freedom of communication of information and complete information on the structure of the game" (p. 151). Nash (1950) further posited that "either player may secure a commitment (enforced contract) upon himself if he desires" (p. 152). Fudenberg et al. (2012) concluded that "cooperative strategies yield higher payoffs than noncooperative strategies in treatments with cooperative equilibria" (p. 720).

The first regression model developed to test hypothesis 3 was for buyers using cooperation/non-cooperation, skill level, and years of work experience as the IVs and premium price paid as the DV. The regression model was found to be a good fit of the data, $F(3,10) = 4.31$, $p = .034$, with an adjusted R^2 of .433. It was found that both skill level ($p = .015$) and years of work experience ($p = .007$) were significant predictors of premium paid price among buyers. Both had a negative relationship with the premium price paid. For every one-unit increase of skill level, there was a corresponding –\$9,340,000 decrease in the premium price paid. This was in contrast to every one-unit increase of years of work experience, which resulted in a corresponding -\$1,433,805 decrease in the premium price paid. The findings for all 16 buyer participants were that the noncooperative strategy was inferior to cooperation during negotiations. In other words, cooperation was not statistically significant. When buyers cooperated, they paid a lower premium price and had a higher ROI.

A second regression model was run for buyers only with interaction (between lying and cooperation), skill level, and years of work experience as the IVs and premium price paid as the

DV. The regression model was found to be a good fit of the data, $F(3,10) = 7.05$, $p = .008$, with an adjusted R^2 of .583. It was found that interact ($p = .045$), skill level ($p = .002$), and years of work experience ($p = .001$) are significant predictors of the premium paid the price paid amongst the buyers.

In addition to examining the buyers' non-cooperative behavior in the four experiments, I observed the games (experiments) live and recorded notes when cooperation occurred and by whom. I detected that older, more experienced M&A practitioners, and females (buyers) exercised their cooperation by sharing information on their transactions more readily, whether they were buyers or sellers.

Investment Decision-Making

The process of M&A can be allocated across three functions: "the self-evaluation of the target enterprise, an assessment of the value of the target enterprise by the buyer, and the game process played between the buyer and seller for the purchase/sale of the targeted private company" (Jiang & Zhang, 2016, p. 22). My proposition was consistent with Bergeron's (2008) notion that private equity and investment fund managers (buyers) do not overpay for private company acquisitions because they are more selective in the price and willing to pay for their target acquisition than public company CEOs. Dittmar and Li (2011) found that financial buyers pick have superior skills in identifying targets and negotiating good deals and that the key determinants or the difference in premiums paid is the target's high potential for value improvement based upon information not available publicly.

Significance of the Proposed Research

I found that the strategies which may be employed by private equity and investment fund managers each have little utility of in achieving their desired goal of maximizing their ROI and decreasing the premium price paid for the acquisition of a private company.

The significance of this study is that prior studies have focused on the overconfidence of the CEOs of public companies and their stock trader's mentality (CEOs whom are driven to pursue M&A in an attempt to drive the stock price up). In this regard, public CEOs pay more attention to remuneration than the day-to-day operations of the business. Malmendier and Tate (2005) considered CEOs who overestimate the future return of their companies measured by failure to divest company specific risk on their personal accounts. They examine overconfident CEOs who defer the exercise of their stock options and infer his overconfidence in his to keep the stock price rising because he wants to profit from expected price increases. Smit and Moraitis (2010) examined the Vodaphone acquisitions teams' judgment biases. Other scholars have examined cognitive bias and irrational behavior in a game theory context but with student participants (e.g., Agarwal, 2011). At the time of this study, no researchers have published results concerning the premium prices paid for private companies resulting from the impact of a private equity fund manager's overconfidence bias and cognitive bias behavior.

Limitations

The primary limitation of this study was the ability to recruit an adequate sample size. The pre-study estimation suggested that a sample size of 60 participants could provide sufficient power for statistical tests. After consulting a statistics advisor and using the study criteria for knowledgeable participants, I chose a purposefully selected non-probable sample of 32 M&A professionals.

Implications

  The outcomes from this study fill a void in the existing literature and provide new knowledge to private equity firms investment managers, investment funds managers, and private M&A professionals by enabling them with strategies to control the impact of overconfidence bias and cognitive bias behaviors on the premium price paid for a private target company. In addition, the results provide factual evidence and inferential statistics that support hypothesis # 3 that these cognitive behaviors impact private company sale prices. The remainder of this study is organized as follows: Chapter 2 consists of a literature review, Chapter 3 contains the data collection methods and instruments, Chapter 4 includes the measurements and data analytics, and Chapter 5 is a discussion of the results and implications.

CHAPTER 2: LITERATURE REVIEW

Theoretical Framework

Theoretical frameworks start with investigating the relationship between variables and evaluating existing theories to build a blueprint for a dissertation inquiry (Miles et al., 2014). I chose a thematic approach to write the literature review for this study. Thus, this literature review was organized by theme or category, which is by the IVs. The thematic structures that I examined were: 1) patterns in the literature that are more pronounced than others, 2) central themes, and 3) evidence of these themes.

Two exiting theories that underpin the foundation of this research are derived from Nash (1950). Essentially, bargaining theory is the branch of game theory dealing with the analysis of bargaining problems, in which the participants bargain over the division of some economic benefit or goods. Nash (1950) posits that "a solution to a bargaining problem means determining a division of the economic benefit or interests" (p. 155). Nash (1950) developed co-operative theories such as two-person collaborative or interest-based negotiation that involves the parties to meet each other's needs and satisfy interests jointly. Thus, the outcome is of mutual benefit. Nash (1950) refers to these outcomes as non-zero-sum games. The four experiments developed for this paper are relevant as they each provide the investigative vehicle of the two-person bargaining process over an economic outcome, namely the $1500 reward for the highest ROI.

Nash (1950) developed four axioms that are relevant to all bargaining solutions:

1. Any solution should be invariant under positive linear transformations of the utility function.
2. The solution should be efficient in the sense of Pareto optimality.
3. Irrelevant alternatives should not change the outcome of the solution.
4. Bargaining problems with symmetric outcomes should have symmetric solutions.

The axioms relevance to this paper are that "if these conditions are satisfied, then there is a unique solution, namely, the outcome that maximizes the product of the other players' utilities" (Nash, 1950, p. 155). Thus, if these conditions are satisfied amongst the participants in the four experiments conducted for this research, then the outcome should be beneficial to participants.

Hypotheses Development and Rationale

These four axiomatic frameworks of Nash (1950) offered a constructive methodology for gaining insight into private equity fund and investment fund manager's (financial buyers) cognitive bias behavioral motivations, personality traits, and their negotiation interaction behavior during decision-making for a M&A transaction for privately held companies in experimental settings. I purposefully developed the experiments to examine these human interactions more closely. At this juncture, a road map was needed in which to focus on literary works that complimented the hypotheses and the rationale for this study. The following questions arose when considering these four axioms in the context of private equity and investment fund managers' investment (acquisition) decision-making:

- How does the buyer's overconfidence impact decision-making in M&A?
- What overconfidence biases are manifested in the M&A process?
- How do you measure overconfidence in private equity and investment fund managers?
- What theories of overconfidence measurement are valid and what are not?
- Does lying for strategic advantage impact the economic outcome in a private company transaction?
- How does noncooperation impact the buyer's economic outcome in a private company acquisition?

Behavior Impacting on Decision-Making in M&A

Gaughan (2002) posits that there are three main goals: "first, expansion, which is typically caused by the need for rapid growth. Second, the creation of synergies such as

combining business lines of products that complement one another. Third, financial factors, such as undervaluing the asset or tax incentives" (p. 8). Financials factor could include a CEO's motivation to acquire or merge with another company to drive his company's stock price up to increase impact upon the value of his stock options. The three of these goals or motivations lead to an expected economic outcome or benefit for the buyers and sellers and give impetus to their pursuing them (Motis, 2007).

Bradley et al. (1988) and Dyer (2004) suggested that the value of a new combined entity is greater than the sum of its previously separate values. Another motivation or goal is derived from agency issues between managers and shareholders (Eisenhardt, 1989). Jensen (1986) proposed that managers may rationally pursue their objectives at the expense of shareholders' interests. Roll (1986) offered an alternative motive for undertaking acquisitions is managerial hubris. Alternatively, Jensen (1986) advocates that disgorging cash from a company's balance sheet will hobble a CEO's acquisitive instincts. Roll (1986) suggested the hubris hypothesis, or that managers of acquiring firms make valuation errors because they are too optimistic about the potential of combined synergies in a buyout or merger. As a result, managers often overbid a target company to the detriment of their firm's investors.

These themes segue into the literature review of research conducted by other authors on the IVs of this study (i.e., overconfidence bias, lying for strategic advantage, and co-operation versus non-cooperation) and their respective impacts upon the DVs, the premium price paid for a private company and the ROI.

Smit and Moraitis (2010) and Malmendier and Tate (2004) posit that overconfident CEOs and their management teams are more likely to destroy value. Park and Yoo (2017) emphasized the need to capture the extent of CEO overconfidence hubris. Hambrick and Mason (1984) first

described this concept as the Upper Echelon Theory, the ability of the CEO to impose his overconfident views on the decision of the firm and how they impact organizational outcomes.

The common void in the current research is that none examine CEOs of privately held companies financially backed by private equity or investment fund managers who often scrutinize and monitor the CEOs of their portfolio companies more closely than CEOs of publicly traded companies.

Doukas and Petmezas (2007) posited that self-attribution tends to reinforce individual overconfidence. Alicke (2005) asserted that "this bias is analogous to the better than average (BtA) effect suggesting that individuals believe that they have above-average abilities" (p. 85). Dhir and Mital (2012) referred to this "exaggerated sense of self as overly optimistic about their assessments of integration plans, which alter their abilities to appropriate targets and scenarios to realize synergies, and thus, overvalue targets" (p. 60). Doukas and Petmezas (2007) stipulated that "self-attribution bolsters overconfidence and managers who suffer from this bias are more likely to be overconfident in their judgment and overestimate the positive or negative outcome of a merger" (p. 7). Doukas and Petmezas (2007) stated that in the M&A framework "overconfidence is displayed in two forms: first, a manager may overestimate the synergy gains of a potential merger. Typically, this overvaluation originates from the manager's belief that his leadership skills are better than average and is often followed by his or underestimation of the downside of the merger due to his illusion of his having control over its outcome" (p. 2). "This kind of overconfidence has the propensity to induce value-destroying mergers" (Malmendier & Tate, 2004, p. 2). Choi et al. (2017) examined overconfidence coupled with self-attribution bias effects on top corporate investment managers. They found that the two exacerbates the stickiness of investment cash flow sensitivity.

Doukas and Petmezas (2007) posited that "managerial overconfidence is often more pronounced in acquisitions in which there is little information about the target in which cases the managers are more likely to rely upon their own erroneous beliefs and acquisition decision-making skills" (p. 2). Typically, this arises when the CEO has had a series of successful acquisition transactions that have enhanced their confidence to the level that they perceive that they cannot fail. Thus, I am of the opinion that experiments in private company acquisitions are ideal for testing the overconfidence hypothesis because managers' subjective evaluations of the potential gains or losses are more likely to motivate their investment decisions and the economic results manifest themselves in the outcomes whether or not a premium price is paid for a private company or the desired ROI achieved.

Renneboog and Vansteenkiste (2019) defined overconfidence as "a bias in which people believe that they are smarter and more informed than they are, which is why they overestimate their abilities to make a reasonable and optimal decision" (p. 650). Li and Tang (2010) suggested that overconfidence is highly associated with risk-taking. Baker and Wurgler (2011) stated that it "leads to an increased number of mergers and acquisitions deals that lead to diversification, often of dubious value" (p. 52). Skvortsova (2021) asserted that "the impact of two cognitive biases, namely CEO overconfidence and availability bias, defined as the distortion that arises resulting from the availability of the most recent information, significantly influences CEO behavior encouraging them to be irrational in M&A deals" (p. 3).

Hayward and Hambrick (1997) studied the impacts of senior managers' overconfidence on firm decisions and outcomes, including acquisition premiums investment distortion. Hayward's (2006) findings suggested that firms with overconfident managers typically pay higher premiums for acquisitions and rely on internal financing rather than external. Hambrick

and Mason (1984) explored the upper echelons perspective, finding that the managers' background characteristics can predict organizational outcomes. Malmendier and Tate (2015) suggested that overconfident managers often miss their internal earnings forecasts and undertake more value-destroying mergers.

These outcomes could be particularly profound in the kind of environment surrounding successful private equity and investment fund managers who may have previously executed many successful accretive value transactions. In this context, "overconfidence can be construed to be an unrealistic belief held by the acquiring manager's and CEO's teams that they can manage and operate the assets of a private target company more efficiently than its current management team" (Hayward & Hambrick, 1997, p. 103-127).

The consistent gap in this literature is that it does not contrast private equity and or investment fund M&A investment professionals' acquisitions of privately held companies to publicly traded companies. Most private equity funds highly leverage their acquisitions to preserve the use of the fund's available capita. This enables the fund to deploy its capital for other acquisition transactions and to financially shore up the balance sheet of those portfolio companies whom they have previously purchased.

Consequently, unlike public CEOs, CEOs of private equity or investment fund sponsored companies make one-off strategic acquisitions as opposed to acquisitions that are purportedly for growth through the acquisition of companies that either provide access for a company's products to be distributed and sold into new markets or new intellectual property that sustains their revenues in a dedicated sale channel. This is relevant to this research as I seek to prove that overconfidence behavior exhibited by a private equity and investment fund manager (buyers) impacts the economic outcome in an acquisition of a privately held company.

Malmendier and Tate (2005) stated that "the biggest challenge for the analysis of overconfidence is to construct a plausible measure of overconfidence. Bias beliefs naturally defy direct and precise measurement" (p. 2). Malmendier and Tate (2004) proposed two approaches to measuring the overconfidence of public company CEOs. The first was a revealed beliefs argument. Hayward et al. (2004) purported that CEOs' (not unlike private equity fund managers') beliefs about the company's future successful performance are derived from their portfolio of successful transactions. The second approach captures how outsiders (the public) perceive them. Malmendier and Tate (2004) classify CEOs as overconfident based on their portrayal in the press. The first approach requires detailed information about CEOs portfolio transactions in their company's stocks and options.

Malmendier and Tate (2005) referred to a unique panel of data set on Forbes 500 companies, collected by Yermack (1995) and Hall and Liebman (1998), that provided these details including duration, exercise price, and vesting period of each executive option package. They constructed a measure of overconfidence using CEOs compensation packages from publicly traded companies, often including extensive stock-based compensation. Typically, CEOs hold their options until they are well in the money and buy, rather than sell, their company's stock. As suggested by Malmendeir and Tate (2015), "One way to potentially measure overconfidence is to look at CEOs who hold options beyond rational thresholds" (p. 40). Hall and Murphy (2002) suggested exercising options when entering the final year of duration when the option value exceeds 40%. Malmendier and Tate (2005) considered a sample of CEOs with options beyond these benchmarks and compared those who exercise options (the rational) to CEOs who continue to hold (the overconfident). They computed the returns CEOs earned due to their trading decisions to check whether these exercise decisions were driven by inside

information. They found no evidence that CEOs achieved abnormal returns by holding options beyond rational benchmarks. Hall and Murphy (2002) posited that overconfidence should be removed and risk taking inserted: "There is a statistically significant relationship between the increase in option holdings by executives and the subsequent increase in firm risk" (p. 6).

What Behaviors Cause Irrational Decision-Making?

Classical economic theory assumes that individuals are rational (Smith, 1776). However, irrational behavior continually manifests itself in decisions that do not maximize utility and lead to economic loss in M&A. Irrational behavior is not isolated to a few individuals but can become a dominant choice for many people in specific societal and business contexts. A classic example is the tulip mania in Holland in 1695. The American Psychology Association defines irrationality as the state, condition, or quality of lacking rational thought. The term is typically used in relation to cognitive behavior (e.g., thinking, decision making that is illogical or delusional). In psychology, the phenomenon that causes irrational decisions is called cognitive bias, which a mistake in reasoning, evaluating, remembering, or other cognitive processes, often occurring because of holding onto one's preferences and beliefs regardless of contrary information.

Ariely (2008) posited that "the defining qualities of irrational decisions often occur outside of conscious thought and are emotionally charged" (pp. 128-129). Bernard (1938) suggested that emotions can complement rational decision choices; thus, decisions imbued with emotions are not synonymous with irrationality. While irrational decision-making could be valuable in making good decisions, Bernard (1938) suggested it is unreliable because it is unquantifiable. Bernard (1938) posited that irrational behavior is not well expressed in words or as reasoned judgment; thus, discerning the value of decisions made through irrational behavior is challenging.

Overconfidence bias, or overoptimism, manifests itself as the circumstance in which managers pay excessively for a target company by overvaluing their competency to run it (Roll, 1986). Doukas and Petmezas (2007) argued that "overconfidence results from a self-attribution bias" (p. 6). Specifically, "overconfident managers feel to have superior analytical skills, decision-making abilities exceeding their peers, and better information than the seller" (Doukas & Petmezas, 2007, p. 8).

The void in the literature is that there is no presence of studies of private equity and investment fund managers of how cognitive biases encourages private equity fund and investment managers to promote their judgments in decision-making and engage in highly complex acquisitions transactions that are not necessarily homogenous with exiting investment strategy and/or asset portfolio strategy of the private equity or investment fund's respective charter. In the world of finance, these fund managers tend to underestimate acquisition risks and overestimate potential synergy from a business acquisition due to their overconfidence.

When investigating other measures of overconfidence, Lambert and Bessiere (2012) expanded on these arguments using evidence from experiments to conclude that investment professionals and bankers were biased by their overconfidence. Lamber and Bessiere (2012) showed that overconfidence affected these professionals' (bankers) valuation and investment choices, and risk aversion did not affect their investment decisions. "Overconfidence is lower when people are given detailed information" (Camerer & Malmendier, 2007, p. 246). Dhir and Mital (2012) implied that "decisions based on overconfidence often indicate a loss of contact with reality and individuals' overestimating their competence or capabilities, notably when the person exhibiting this state is in a position of power" (p. 65).

The study of overconfidence includes several branches of behavioral economics and psychology disciplines. First, the literature on experiments contains results documenting the tendency of individuals to consider themselves above average on positive characteristics (Alicke, 2005; Kruger, 1999). Second, using an experimental approach, Menkhoff and Schmeling (2010) concluded that younger, experienced investors tend to believe more strongly in having above-average abilities. In this regard, age and work experience are significantly related to overconfidence. This was not the case for gender. Beckman and Menkhoff (2008) found the effect size of excess over confidence by women was small in fund management when they conducted a survey of 649 fund managers (125 women) in the US, Germany, Italy, and Thailand.

"The BtA effect also affects the attribution of causality" (Alicke, 2005, p. 86). Because "individuals expect their behavior to produce success, they attribute outcomes to their actions when they succeed and to bad luck when they fail" (Miller & Ross, 1975, p. 213). This self-serving attribution of results reinforces overconfidence. Miller and Ross (1975) found that overconfident managers are more likely to pursue acquisitions when they have abundant internal resources. Doukas and Petmezas (2007) observed that "overconfident managers use more cash to finance their mergers" (p. 5) more often than other managers who leverage the target private company's revenue.

Pikulina and Rennenboog (2017) confirmed that the higher the subject's overconfidence in their financial knowledge the higher their chosen investment risk level. Broihanne et al. (2014) concluded that "the risk that finance professionals are willing to take on is positively influenced by overconfidence" (pp. 64-65). Brozynski et al. (2004) found in the survey that they conducted that the degree of risk taking does decrease with experience. In corporate finance, Malmendier and Tate (2005) observed the impact of overconfidence on over investment or preference for

debt financing. Menkhoff et al. (2006) surveyed 117 German fund managers and analyzed the

relationship between experience, overconfidence, and risk-taking. The authors found that

overconfidence decreases with experience as does risk-taking. Lambert et al. (2012) found that

bankers were strongly influenced by overconfidence in investment choice and valuation and that

risk aversion had no effect on investment decision-making. Beckman and Menkhoff (2008)

found that the framing effect, financial decisions involving clear incentives, reduces the gender

difference in risk aversion. Beckman and Menkhoff (2008) posit that "there seem to be two

separate forces which reduce the gender difference in risk aversion, familiarity with risk and risk

decision under financial framing" (p. 2) amongst women that are considered financial experts.

They continue their study by testing whether risk behavior is associated with overconfidence and

tournament behavior.

I concurred with Lambert and Bessiere's (2012) assessment that the impact of

"overconfidence in investment decision-making should be assessed at varying stages of the

dynamic process: the judgment, the valuation, and the decision process" (p. 1116). Asaoka

(2019) concurred by stating that "practitioners typically deploy the use of the one-factor capital

asset pricing model (CAPM). Private equity financiers and financial analyst professionals in the

mergers and acquisitions industry know that CAPM modeling is predicated upon substantial

human discretion and judgment elements, which cannot guarantee that the value will be

objective" (p. 9).

How do these varying perspectives fit into this research? These elements have been

incorporated into the four-game theory structured experiments in this research by examining how

overconfidence bias, lying for strategic advantage, cooperation/non-cooperation, and the

interaction of the latter two variables influence the valuation of a company by focusing upon the

premium price paid for a privately held company and the ROI achieved by private equity and investment fund managers as a result of their judgment and decision making.

Lying for Strategic Advantage in M&A

Ariely (2008) makes the case that most people are both honest and dishonest. Ariely (2008) stated that "most circumstances that elicit emotions, sexual arousal, hunger, anger, and compassion, can lead to irrational behavior. Emotions are inherently nonrational" (pp. 128-129). According to Ariely (2008), "individuals' dishonesties and lies center on two main objectives: 1) preventing an undesirable outcome and 2) securing desirable outcomes that people anticipate as unobtainable or unsuccessful when viewing the situation realistically" (p. 271).

"Lying for strategic advantage is about planned actions or intentions. Lying in these cases frequently takes the extreme form of active misrepresentation instead of less than complete and honest disclosure" (Crawford, 2001, p. 2). Crawford (2001) proposed a model of active misrepresentation toward competitors or enemies, allowing for the possibility of bounded rationality. Although Crawford's (2001) statement is about lying in general and is not in reference to private equity fund managers, this behavior action or emotion commonly manifests itself among private equity and investment fund managers during M&A transactions in which there is a substantial economic outcome potential to each of the buyer and seller. "The assumption of such abound simplifies many aspects of the analysis of games with communication" (Crawford, 2001, p. 8). Furthermore, Crawford (2001) devised this model with sequential equilibria agents, as rational players exploiting boundedly rational players who are not fooled during the two-person bargaining process like that which takes place in a private equity manger or investment manager negotiating the purchase price of a privately held company.

These strategies are simple, portable behavioral strategies (Crawford, 2001). Negotiations in which no one is exploited are typical of equilibrium amongst the negotiation parties.

      An example non-directional cheap talk, or a statement with little meaning, is of former President Bush's regrettable 1988 campaign promise: read my lips no new taxes! (Royko, 1988). Crawford (2001) explained that this example depicts two standard features of these behaviors, one involving misrepresentation via agreements, statements, or non-statement that in themselves have little or no direct costs and the other occurring in situations where the parties have predominantly conflicting interests leading to successful deception benefits for the deceiver at the expense of the deceived. Numerous researchers modeled the features of these examples as communications via costless messages (Charness, 2000; Crawford, 2001).

      In a model including costless messages, the assumption is that players ignore these messages when the system is in equilibrium (i.e., when symmetry in communications exists). "If a player could benefit by responding to the other player's message, their response could hurt the other player, who could change their message to create an advantage using uninformative or asymmetrical information" (Crawford, 2001, p. 8). A mortal player in this model is depicted when they rationally maximize their payoff, like a private equity fund manager in a zero-sum game acquisition transaction. "Their beliefs are unsustainable for an equilibrium to exist because that requires symmetrical beliefs and communications" (Crawford, 1998, p. 288). Thus, in equilibrium with symmetrical communications, no information is conveyed by the messages, but neither are the players fooled (Crawford, 2001). In this model, equilibrium is a combination of decision rules or strategies, distinct for each decision-maker. "Each player's strategy maximizes their personal expected utility or payoff given the strategies of others who operate in the same way" (Crawford, 2001, p. 8) (Crawford, 2016, pp. 136-137). Myerson (1999) wrote "the

generality, tractability, and precision of equilibrium analysis have made this analysis an approach of choice in most economic applications of game theory" (p. 1077). Crawford and Costa (2013) concluded that researchers use experimental research to clarify players' initial responses and how they often deviate systematically from equilibrium.

Gratch et al. (2016) found that negotiators did not have perfect access to opponents' preferences but by inferences made by exchanging information during negotiations. "In buyer and seller negotiations, the opponent's preferences are inferred by exchanging written purchase offers and counter-proposals" (Baarslag et al., 2012, p. 4). "In these negotiations, preferences are most commonly inferred from explicit preference statements" (Nazari & Gratch, 2016, p. 730).

Gneezy (2011) posited that "in some cases, a lie can harm the liar but help the other person; these are altruistic white lies. People may choose such lies because they care about the other person's payoffs" (p. 2). Gneezy (2011) referred to the second type of white lie as Pareto improvement (i.e., when both sides earn more due to the lie). "When there is no cost for lying, an expectation is that people frequently tell lies of this type" (Gneezy et al., 2011, p. 2). Gneezy (2011) posited that understanding when people tell white lies is crucial to understanding deception. As Gneezy (2011) stated, "First, people who are reluctant to tell Pareto white lies demonstrate an aversion to lying independent of their preferences' social or economic outcome. Such people refrain from lying not because of the consequences but because they view lying as an immoral act in itself. This provides the best test of the pure cost of lying" (p. 2).

Fehr and Schmidt (1999) conceptualized black lies, which involve the liar accruing benefits at the other's expense and are likely to have very different profit payoff concerns than the consequences of white lies where both parties benefit. Gneezy et al. (2011) posited that "contrasting white lies with black lies supports explanations of the interaction between payoff

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distribution and aversion to lying" (p. 2). This tact underscores a private equity and investment fund managers' purpose in employing black lies. The contrast helps identify different professionals on the sale side of an acquisition transaction that private equity or investment fund manager may encounter. For example, the expected motivation to tell a selfish black lie is that the player puts more weight on the liar's payoffs. In contrast, "the motivation to tell an altruistic white lie may arise from placing higher importance on another's payoff in the liar's utility function" (Gneezy, 2011, p. 2).

Dreber and Johannesson (2008) demonstrated gender differences in the tendency to lie. Notably, "men are more likely to tell a selfish black lie" (Dreber & Johannesson, p. 197). Contrasting men's and women's behaviors concerning lying support testing of gender distinct interactions regarding payoff distribution and lying aversion. They concluded statistical significance when testing black lies; in other words, men tend to tell a black lie more often than women. In the domain of selfish black lies (Gneezy et al., 2001), the experimental results are consistent with those of Dreber and Johannesson (2008) because men were more likely to tell a selfish black lie. Moreover, men were significantly more likely to tell a Pareto white lie. However, women were considerably more likely than men to tell an altruistic white lie.

In this study, I had embedded the use of lying for strategic advantage by both the buyers and the sellers in several of the experiments (transactions), of which the participants' genders were both male and female, to investigate whether lying for strategic advantage impacts upon the premium price paid and the ROI achieved by buyers employing the behavior and applying control variables (i.e., skill level, years' work experience, and financial knowledge).

Cooperation Versus Non-Cooperation

Nash (1950) introduced the distinction between cooperative and noncooperative bargaining in two-person negotiations (games): "cooperation is meant to imply that the players have complete freedom of communication and complete information on the structure of the game. It assumes that either player may secure an enforceable commitment contract if he desires" (pp. 48-49). Each player is not supposed to have a commitment before entering the game (negotiation). The committed player should have an advantage provided that the other player is rational, and that the commitment allows some mutually profitable agreement. As a natural solution for noncooperative games, Nash (1951) introduced the concept of equilibrium points. Nash (1950) posited "a two-person bargaining situation involves two individuals who have the opportunity to collaborate for mutual benefit in more than one way … non-action taken by one of the individuals without the consent of the other can affect the well-being of the other one" (p. 24).

The literature gap that is most ostensible relative to cooperation versus noncooperation is that cooperation and noncooperation are nominal human behavioral actions often driven by the relevant context's circumstances such as conflicting personalities.

Fudenberg et al. (2012) posited that cooperative strategies yield higher payoffs than uncooperative strategies in the treatments with cooperative equilibria. Rigdon et al. (2007) examined how cooperation can be sustained once it emerges. Cooper (2014) suggested that cooperation is consistent with equilibrium play if the players understand that cheating will be punished. Thus, "one might conclude that communication and cooperation stabilize collusion but is insufficient to generate persistent collusion" (Cooper, 2014, p. 273). Nash (1950) stated "a solution means a determination of the amount of satisfaction each individual should expect to get

from the situation, or, rather, a determination of how much it should be worth to each of these individuals to have the opportunity to bargain" (p. 155). However, Von Neuman and Morgenstern (1944) idealized that the individuals are highly rational in this situation, a nonzero-sum game.

Fudenberg (2012) posited that, outside the laboratory, actions are often observed with noise, an awkward or inconvenient action that may have been well-intentioned. Similarly, a self-interested action may wind up accidentally benefiting another. Although there are evolutionary arguments for cooperation in repeated games with efficient actions, the evolutionary arguments for cooperative equilibria are even more robust with imperfect observations, as the possibility that punishment may be triggered by mistake. These potential mistakes decrease the viability of unrelenting or grim strategies with a single erroneous or outlier observation by never cooperating again (Axelrod & Hamilton, 1981).

Human Negotiation Behavior

Multi-issue negotiations have been studied extensively from the perspectives of game theory (Nash, 1950, 1951), behavioral game theory (Roth, 1995), and psychology (Pruitt, 1981). Research has clarified the critical and systematic differences between rational predictions and actual human behavior. In particular, "people rarely act out of pure self-interest" (Gneezy, 2011, p. 2). Instead, they exhibit other-regarding preferences, such as the desire for fairness and reciprocity. Most human negotiators strive for fair and efficient solutions (Nash equilibrium) and often discover these to the extent they engage in reciprocal information exchange. However, "this creates the opportunity for malicious negotiators to misrepresent their preferences for strategic gain" (Gratch et al., 2016, p. 729).

The misrepresentation game can be significantly simplified if we know the other player's preferences before the negotiation (Gratch et al., 2016). This prerequisite might occur if the other participant truthfully reveals their preferences, or the liar has conducted sufficient research to estimate them accurately (Crawford, 2001). When the opponent's preferences are known, the game can be cast as an optimization problem for all possible preference weights on each issue, identifying the set of weights that maximizes the value to self while seeming fair (Gratch, 2016).

The cooperative principle of language suggests that human negotiators feel bound by social norms of honesty (Crawford, 2001) and engage in reciprocal information exchange (Crawford & Costa, 2013). If preference information is provided by one party, the other party should reciprocate. This exchange implies that a negotiator cannot elicit their opponent's preferences without giving up some information in return. "Premature lies can limit the liar's options" (Gratch et al., 2016, p. 731).

Although each of these authors has written articles about cheap talk, misrepresentative statements, deception, or noise in terms of their impact upon economic outcomes, no one has examined them using an environmental context of game theory structured experiments solely using private equity firms and investment funds investment managers in an environment which could control their respective behaviors' impacts in order to examine more closely the impact upon the premium price paid for privately held companies and upon the ROI.

Agency

"Corporate managers are agents of the shareholders, a relationship fraught with conflicting interest" (Jensen & Meckling, 1976, p. 1). Hill and Jones (1992) define an agency relationship as "one in which one or more persons (the principals) engages another person (the agent) to perform some service on their behalf, which involves delegating some decision-making

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authority to the agent" (p. 132). Hill and Jones (1992) stated that "both principal-agent and stakeholders-agent relationships involve explicit and implicit contracts between the stakeholders and managers, leaving managers with direct control over the decision-making apparatus" (p. 133). Eisenhardt (1989) stated that the agent will not always act in the best interests of the principal, that the cornerstone of agency theory is the assumption that the interest of the principals and the agent diverge. Sapeinza et al. (2000) posited that "agency problems are exacerbated because the interest of management is in conflict with shareholders (goal conflict) and because shareholders have less access to information than management on which to make an educated decision regarding the performance of the management" (p. 332). This is commonly referred to as information asymmetry.

Eisenhardt (1989) outlined the fundamental assumptions of agency: "1) goal divergence between the principal and the agent, 2) hidden information before or after contracting the agent, and 3) the principal and agent have different risk preferences which may lead to different actions being taken" (p. 58). Sapienza et al. (2000) stated that "in venture capital-backed firms, goal conflict is caused by: issues of valuation, exit timing, and allocation of resources and effort" (p. 332). Sapienza et al. (2000) suggested that company managers have incentives to follow their agendas over those of their investors once financed. The nature of the investment term allows for an extended period in which management can misuse funds at their disposal and use discretion.

Berger et al. (1998) identified governance and control mechanisms that could significantly impact entrenched managers: "1) the side for the board of directors, CEOs are less entrenched due to special monitoring by the boards, 2) the threat of dismissal, 3) a large stockholder joining the board, 4) the threat of a takeover, and 5) stock compensation-based

performance incentives" (p. 61). Schliefer and Vishny (1986) suggested that the more significant the shareholding, the more willing and capable owners should monitor the manager.

Fenn et al. (1995) suggested that the following mechanisms that private equity firms employ to align incentives of their portfolio company CEOs: "1) imposing strong discipline on the company brought about by using a large amount of debt to finance the transaction, 2) the use of equity-based management compensation, and 3) the use of market-related mechanisms including for exit strategies" (p. 27). Millison and Ward (2005) indicated that "in general, the right to exercise share options for CEOs is conditional on meeting performance targets that can only vest over a stipulated period" (p. 76). It should be noted that often private equity firms incentivize the CEOs of their portfolio companies to ensure that high standards of governance are maintained. Still, they also hold substantial equity share positions and are strongly represented on the boards of directors.

Dhir and Mital (2012) wrote that "there are two main theories; (a) rational responses to agency costs and (b) non-rational response to managerial hubris that has been detrimental to explain why managers make value-destroying acquisitions" (p. 59). Asaoka (2019) posited that M&A involves significant risk-taking that must be made amidst much uncertainty and typically within a limited timeframe. "Risk is something which should be priced into value, as is insufficient liquidity and size. Emotion poses another type of risk; it may deserve equal attention in the decision-making, and valuation process" (Asaoka, 2019, p. 9). Jensen (1986) stated that "underbidding is the failure to pay the price required to secure a critical target may result from psychological framing (bias) of the opportunity in isolation and not recognizing new growth opportunities or fully appreciating the value of a target as part of a larger consolidation strategy" (p. 323).

Agency and Opportunistic Behavior

Agency and opportunistic behavior have been the central idea of agency theory in M&A transactions. According to theory, agents or hired fund managers and limited partner investors objectives are not always aligned or congruent. The idea is that hired fund managers and limited partner investors' objectives are often misaligned. Agents often make decisions based on self-serving interest rather than the private equity fund stakeholder's interest, including the company shareholder. This self-interested decision-making is rational from the CEO's perspective but not aligned with the principals' interest (Hill & Jones, 1992; Jensen, 1986). "The information available to the agent/fund managers may be complete, but their decisions are not optimal for the stakeholder's interest. Agents' decisions may derive from monetary or nonmonetary benefits" (Eisenhardt, 1989, p. 58). Thus, limited partner investors can provide incentives to their private equity general partners (GPs) and incur agency costs or apply controlling mechanisms, again incurring agency costs to the agents or fund managers to do away with greedy decisions and ensure normative decision-making by its agents. For this study, and from an M&A professional practitioner's perspective, I limited this discussion to three constructs: private equity fund manager's overconfidence bias, lying for strategic advantage, and co-operation versus non-co-operation.

Private Equity Agency Relationship and Fees

Jain (2008) summarized the legal constructs of a GPs management agreement. The prevalent legal structure used by private equity sponsors is the limited partnership and that partnership investment vehicles customarily have a finite life of seven to 10 years. A limited partnership has a GP and is typically owned by the private equity fund sponsor. A fund typically has one or more limited partner investors. Jain (2008) indicated that "the General Partner's

management company assesses fees to the limited partners to defray their operating expenses during the business. Typically these expenses are comprised of: salaries, employee benefits, office expenses, travel, business entertainment, equipment rental, bookkeeping, conducting due diligence on acquisition targets, and fund reporting and administration" (p. 2). In larger sponsored funds, the management fees typically range between 1% to 2.5% of the total funds committed during the fund's investment period by the limited partners. For smaller funds, usually under $30 million, the fees may approach 3.5%. Jain (2008) posited that "ancillary agency fees are assessed by the management company to its limited partners as well. The management company receives fees for these services, including investment banking transaction fees, portfolio company monitoring fees, and director's compensation" (pp. 2-3).

Jain (2008) reflected upon carried interest as "profit-sharing that accrues to the general partner over and above the agency fees that his management company receives" (p. 3). In a typical private equity and or venture capital fund capital stack, the priority of distribution is customarily payable subordinate to the return of the principal capital invested to both the limited partners and the GP, reimbursements of management fees charged to the limited partner investors after the individual transaction has to meet a hurdle rate in order payout a preferred return of 8%, which is an industrywide standard. The carried interest is the principal part of the GP or fund managers compensation. According to Jain (2008),

Theoretically, the fee structure supposedly aligns with the limited partners' and general partners' economic interests. When selling an asset of the limited partnerships' the general partner customarily disburses: 1) the preferred return to each entity having directly or indirectly spent its capital on the transaction, 2) the recapture of management fees, and 3) the carried interest to limited partners than to general partners of the fund followed by others who constitute

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the limited partnership. Typically, the allocation is 80%/20%, with 80% going to the limited partners and 20% to the general partner (p. 3).

Purchase Price Premiums Paid by the Private Equity Fund (Buyers)

Dittmar and Li (2011) found that financial bidders in private equity firms differ from strategic corporate bidders in their motives and methods of acquisitions. They purported that "financial bidders are typically cash-rich, with more readily available access to senior leveraged debt and sub-debt, more skilled at identifying undervalued targets with high potential for cost-cutting" (Dittmar & Li, 2011, p. 1). In contrast, corporate buyers typically seek companies that share operational synergies with them and provide new sales channels. Still, "financial buyers rely primarily on improving the stand-alone value of the target firm or buying undervalued assets" (Roosenboom et al., 2009, p. 4). Dittmar et al. (2011) suggested that "financial buyers face shorter investment horizons than corporate buyers and possibly incentivize target management differently" (p. 22). Why are their differences? Bargeron et al. (2008) and Roosenboom et al. (2009) posited that the explanation is that public companies and private firms acquire different types of firms. Roll (1986) suggested that CEOs with overconfidence biases play a significant role in the overpayment of acquired companies.

Baker et al. (2009) indicated that behavioral factors could impact the pricing of targets in acquisition transactions. Agarwal and Zeephongsekul (2011) suggested "equilibrium price is closer to the acquirer's offer in a two-party transaction using a game theory analysis" (p. 1437). The two-person M&A model is an incomplete information game between the acquirer and the target. "Both players must agree to a price suitable for the sale of the target company to the acquirer. This form of the game includes three stages in which the acquirer can choose the "increase bid," "the reduced bid," or "the stable bid" strategy" (Agrawal et al., 2011, p. 1438).

They define the payoff for each as the increased bid has a payoff of -1 if the acquirer must pay a higher price and +1 to achieve a zero-sum game (Agrawal et al., 2011).

Sale Price Premium

Malmendier and Tate (2008) concluded that "the existence of market mechanisms amplifies the effect of behavioral biases, and sellers tend to optimally choose these amplifying market mechanisms that impact these biases to maximize their profits" (p. 1). Malmendier and Tate (2008) suggested that "results occur via two mechanisms, including behavioral biases that likely substantially influence the outcomes" (p. 1). Malmendier and Tate (2008) question the philosophical underpinnings of neoclassical economics: markets attenuate the effects of behavioral biases. Motis (2007) stated that "mergers are a means of appropriating private company information, affecting bidding and premiums" (p. 18). Dionne and Le Haye (2015) empirically tested determinants of premiums identified in past studies, assuming asymmetric information in M&A. They concluded that significant stakeholders of a target's shares had a distinct advantage, and these stakeholders encouraged agents to take actions that increase long-run value. Dionne and La Haye (2015) concluded that informed buyers lower the premiums paid in acquisitions.

Conclusions

This literature review has focused on examining the explanatory variables of behaviors, and how biases can change the relationships between predictors and the outcome(s) aggregated and investigated in this research. The literature supports the idea that premium price paid and ROI could depend on overconfidence biases, lying for strategic advantage, and co-operation/non-co-operation motivation and their respective behavior impacts. Thus, these variables warrant a

deeper investigation of the relationships to private equity fund manager overconfidence and each IVs respective impact(s).

Based on the literature and evidence described in this review, I developed four experiments incorporating acquisition and investment transactions using two-person business decision-making interaction simulating the bargaining problems that occur during acquisition transactions. Each of the experiments (transactions) has distinct levels of business risk for the participating private equity fund managers and M&A professionals to achieve a competitive ROI for the financial reward of $1,500 offered to the participant with the highest ROI. These mock transactions/experiments enabled me to collect relevant data for modeling the potential causal relationships among the causal variables of overconfidence bias, lying for strategic advantage, and cooperation/non-cooperation in strategic decision-making by private equity and investment fund managers affecting private company acquisitions. To increase the reliability and validity of the results, I determined the need to design each experiment carefully and incorporate the context and inter-relatedness of variables in the experiments.

CHAPTER 3: RESEARCH DESIGN AND METHODS

This quantitative study employed four experiments similar to the two-person interactive game theory approach to modeling a private equity and investment fund manager's overconfidence behavior as one of three primary IVs and behavioral interaction during decision-making negotiations with economic outcomes. The other IVs examined were lying for strategic advantage and cooperation versus noncooperation. These variables were embedded into the context of the four-game theory structured experiments that were intended to discern the participants' overconfidence bias and cognitive bias behavior traits, whether rational and irrational, and to depict how the control variables (e.g., BtA, CBO, skill and years' work experience) mediate decision-making relationships between buyers and sellers in private company acquisition transactions and the impacts of these independent and control variables on the premium purchase price paid and the ROI, the DVs.

Quantitative research can include theory deductively through testing and verifying theory or inductively by systematically manipulating one or more variables. "Inductive investigation furthers understanding of how manipulations impact the outcomes of interest" (Creswell, 2018, pp. 63-64). The experiments were specifically designed to extract causal information concerning the relationships among the variables (Field, 2018).

Research Design and Approach

I employed a quantitative research design by using two-person behavioral interaction games similar to game theory games inset in four separate experiments that simulated differing degrees of risk while examining interactive decision-making during the acquisition of private companies. Similar to Jones and Hynie (2017), I used the combination of a contest for an economic payoff in a contextual setting simulating investment transactions and the participant

roleplaying in the four experiments to examine the participants' strengths, behavioral traits, and the importance of the relationships between specific pairings of three constructs. The three constructs were: 1) private equity fund and investment manager's overconfidence bias, 2) lying for strategic advantage, and 3) cooperation versus non-cooperation and the interaction between lying and cooperation during the negotiations for the acquisition/sale of a private company. To more closely examine the inter-relationships and glean a deeper understanding of the mediating and moderating variables influences, I utilized experiments similar to game theory games with 29 purposefully selected private equity and investment fund managers M&A professionals participated in one of the four experiments on the Zoom platform in games implemented once in realistically simulated business transaction contexts and conditions. Three participants played roles in the experiments played four games twice, rendering permutations of $(29 \times 1) + (3 \times 2) = 32$ data points for the variables: overconfidence, lying for strategic advantage, and cooperation versus non-co-operation during transaction negotiations**.**

Quantitative research methods may include theory deductively in quantitative theory testing and verification or inductively. In experiments, one or more variables are systematically manipulated to evaluate the impacts on the outcomes of interest (Creswell, 2018). Goldman et al. (1998) defined quantitative research as explaining phenomena by collecting numerical data analyzed using mathematically based methods (i.e., inferential statistics). The data collected from the participants' communications, interaction during decision-making and the economic outcomes of the experiments were expected to link the primary variables operationalized constructs traits and characteristics about the population to the concepts under study. The key variables examined were:

- IVs: overconfidence bias, lying for strategic advantage, and co-operation/non-co-operation and interaction (between lying for strategic advantage and cooperation).

- DVs: The impact of the above-listed predictor or causal variables upon the premium price paid and the ROI for acquiring a private company.

- Controls: skill, BtA, CBO score, and years' work experience.

Statement of Hypotheses

- H1: When overconfidence bias is exhibited by an M&A professional (buyer) in investment decision-making, it increases the premium price paid for a private company acquisition, thus decreasing the ROI.

- H2: When lying for strategic advantage is used by an M&A professional (buyer) in M&A, it reduces the premium price paid for the private company acquisition, thus decreasing the ROI for the transaction.

- H3: Noncooperation between an M&A professional (buyer) and a private company seller increases the premium price paid for the purchase price of a private company and diminishes the ROI for the transaction.

Experiment Settings Used for Human Behavior Interaction Observation

Experiments provide the mechanism for insight into strategic human behavior interaction, whether it is rational or irrational, during the negotiation of M&A transactions with significant economic outcomes. Contemporary game theory has two forms: non-cooperative game theory (Nash, 1950, 1951) and co-operative game theory (Myerson 1977; Von Neumann & Morgenstern, 1944). Von Neumann and Morgenstern (1944) and Nash (1950, 1951, 1953) have suggested two-game theory approaches to resolve bargaining problems: axiomatic or strategic (Kuhn & Harsanyi, 1995).

The axiomatic approach (cooperative theory) assists by providing a set of valuable axioms (Nash, 1950). On the other hand, the strategic dominant strategy model depicts outcomes in a non-cooperative game in an M&A context. M&A fall under the premise of zero-sum or noncooperative two-player games. Nash (1950, 1951) essentially formed two theoretical frameworks that offer insight into private equity fund and investment fund manager's (financial buyers) personality characteristics and negotiation behavior during an M&A transaction for a private company.

Bargaining theory is the branch of game theory dealing with the analysis of bargaining problems, in which participants bargain over the division of some economic benefit or goods. Nash (1950) posits that a solution to a bargaining problem means determining a division of the economic benefit or interests. Nash (1950) developed co-operative theories such as two-person collaborative or interest-based negotiation that involves the parties to meet each other's needs and satisfy interests jointly. Thus, the outcome is of mutual benefit or nonzero-sum games. An example I observed during the four experiments conducted was older, more experienced male investment professionals disregarded their instruction not to cooperate and immediately agreed to share transaction information to attain an agreement more quickly and win the $1,500 price for the highest ROI. Further, female participants openly shared transaction information that leveled the playing field for both buyers and sellers.

I selected the use of the two-person human interaction and decision-making game theory model because the assumption is that of incomplete information used between the buyers and sellers of a private target company, where both players must mutually agree to a price appropriate for both. The buyers' behavior bias often manifested itself during the negotiating or communication game. A game theory structure is ideal for modeling the effects of the human

behaviors examined in this study. Based on their expected payoff, the buyers and sellers must choose to share information openly, lie or refrain from lying for strategic advantage, or assume co-operation or non-cooperation with the other.

Study Population and Sampling

Sample Population

The purposeful sample of 32 M&A professionals was comprised of males ($n = 26$) and females ($n = 6$) from the nationwide population of private equity and investment fund managers. These individuals are legally required to have FINRA registered securities and wealth management licenses. The two participating M&A attorneys were U.S. Securities Exchange registered and are licensed to practice securities law in multiple states. Principal-agent problems are not uniformly present amongst the diverse sample selected. These two theoretical frameworks of Nash (1950, 1951) potentially offer insights into private equity fund and investment fund managers' (financial buyers) personality characteristics and negotiation behavior during a merger and or an acquisitions transaction.

Sample for Experiment

I used a purposeful sample of M&A professionals for the four-game theory structured experiments intended to simulate various degrees of transactional risk and behavioral interactions during economic decision-making with expected economic outcomes. I chose a purposeful or non-probability sampling (Patton, 1980) because these participants can offer rich information concerning the study phenomenon and context. Although a purposeful sample is a non-probability sampling technique, the method can lead to a sample representative of the larger population because of the participants' respective transactional expertise, significant professional years' work experience of 15-20 years, and educational attainment.

Units of Analysis

The selection criteria for inclusion in the sample of 32 participants required they were private equity and M&A professionals who are leaders in their respective fields (i.e., these participants had to be private equity fund managers, M&A investment bankers, family office fund managers, corporate M&A team leaders, or securities lawyers). They were expected to articulate their experiences related to the behavioral phenomena under investigation. Their ages were 34 to 64 years old ($M = 38.2$ for women and $M = 52.5$ for men). The mean educational attainment was 6.5 years of university for men and 6.2 for women. Ethnicity and race were stratified in the sample. They included one African American male, two Asian American (one man and one woman), one man identifying as Hispanic American, an Indian male, and 22 were Caucasian males and females. These individuals were the units of analysis and proportionately represented the demographics of the private equity profession and related industries.

Units of Observation

The observation unit was the players' behavioral interaction and responses in the context of the four simulated acquisition transaction scenarios and the impact of their decision-making upon the premium price paid for private companies and their ROI. The units selected proportionate represent the demographic comprising the private equity community.

Each participant possessed a minimum of 15 to 20 years of M&A experience in their respective fields of M&A law, M&A corporate finance, M&A transactional structuring, and M&A negotiation tactics and strategies. Some of the participants were involved in a short survey conducted in a qualitative research class. From the survey results, I discovered that each participant possessed firsthand experience working in transaction negotiations and dealing with irrational behaviors, particularly private equity fund manager overconfidence. Additionally, the

criteria for selection included that the participants have actively worked on an average of three M&A transactions per year for the past five years. As a sidenote, except for my engagement and work with the firms of the two M&A lawyers, I had not worked with either M&A lawyer directly. There was no prior or current financial relationship between any participants and me.

Steps were taken to overcome both sampling error and bias (Ruel, 2016). Steps were attempted, such as spending a significant amount of time locating and recruiting women with private equity investment track records to participate. Furthermore, an extra effort was made to ensure gender and racial-ethnic diversity representation in the sample. The expected level of confidence in the sample and the data were those calculations that supported the inferences. I cross-referenced the confidence interval calculations to Cohen's (1992) power primer.

Specifying the "ES" was the most challenging part of power analysis. The difficulty was partly due to the generally low level of consciousness of the magnitude of phenomena under study (Cohen, 1992). Although the sample of 32 sample participants were chosen from the start by estimation and then recruitment, I realized the potential to increase the sample size to achieve a higher confidence level and validity. I used G*Power to compute the effect size of the sample. According to Cohen (1992), power, by definition, is the ability to find a statistically significant difference when the null hypothesis is false. The power of the study was determined by three factors: the sample size, the alpha level, and the effect size. I sought to determine the appropriate sample size for each test and justify a sample size. To answer this question, I chose the alpha level and estimated the effect size. Cohen (1977, 1988) justified the use of levels of effect sizes. G*Power, *t*-test, and descriptive statistics were calculated at the end of each of the three periods over which the experiments were conducted to assure that the data were robust (Table 1 and 2).

INSERT TABLES 1 AND 2 ABOUT HERE

At the onset, I estimated that the sample size would require 15 participants per factor examined. 90 invitations were sent alongside a disclosure letter. Initially, a negligible response was received, so the invitations were sent to a second group of 25 persons. Ultimately, 32 purposefully selected M&A professionals agreed to participate. This fell short of the sample size estimate of 45 persons needed.

Coverage and sampling errors were factored into the regression models reliability and validity. The data were checked for type I and type II errors according to Cohen (1992), who stated "that the statistical power of a significance test is the long-term probability, given the population effective sample and when the effective sample is not equal to zero, that H, is false and error exists in failure to reject the hypothesis" (p. 158).

A one-way ANOVA was used to assess whether a significant difference existed between private fund managers ($n = 16$), family office investment managers ($n = 6$), SEC lawyers ($n = 7$), and investment bankers ($n = 3$). Results of the ANOVA (Table 3) revealed that there were significant differences in the means of BtA, $F(3,28) = 3.01$, $p = .057$, and marginally significance of CBO, $F(3,28) = 2.24$, $p = .11$.

INSERT TABLE 3 ABOUT HERE

To generalize the sample to the population in the quantitative research design, I employed triangulation on the experimental data generated from the four experiments: the financial knowledge questionnaire, the participants' CBO scores, and BtA scores. The data collected from

the instruments were used as IVs and regressed on the two primary DVs to analyze and develop results to address the research questions.

Response errors, non-response errors, and bias were mitigated by storing participants' information on a dedicated server accompanied by their responses and scores on the financial knowledge test collected via Qualtrics or the dedicated server that was password encrypted to prevent third party access the research data. Providing instructions to all participants at the onset of each of the three experiments allowed the participants not to be biased toward any particular measurement. The construct of the questions used in the experiments avoided dichotomy and was balanced with open-ended and closed-ended questions. There were no forced choices in experimental scenarios, which included a neutral option, risk-averse transaction.

Data Collection Methods and Instruments

I incorporated four experiments structured similar to the game theory model. The participants were private equity and investment fund managers, M&A investment bankers, family office fund managers, and SEC registered securities lawyers. The behavioral interactions of the participants were recorded in the context of experiments exhibiting overconfidence, lying for strategic advantage, and cooperation versus non-cooperation during private company acquisition transactions. The aim was to understand how these variables impacted the DVs, the premium price paid and ROI for a private company.

The theoretical propositions that I investigated were as follows:

- Whether overconfidence bias impacts M&A decision-making for investment and acquisition of private companies.

- How is overconfidence defined in investment decision-making circumstances?

- Does overconfidence bias behaviors, lying for strategic advantage, non-cooperation, and the interaction between lying and cooperation impact the premium price paid for companies?
- Do these predictor/causal variables have an impact on ROI?

Experiments in Behavioral Interaction Design & Investment Scenarios

Many researchers have theorized a relationship between overconfidence, investment decisions, and the assumptions generated from the activities of public company CEOs. However, these relationships remained without much support and were not well-defined when the current study began. Most attempts by other authors to examine these relationships were through experimental studies using students as participants. Roll (1986), Doukas (2007) and Malmendier and Tate (2004, 2005, 2008) posit that self-confidence and self-efficacy are considered as necessary ingredients for success.

This study incorporated four simulated investments or acquisition transactions via experiments structured similarly to a game theory experiment modeled to uncover private equity fund and investment managers' human behavioral interactions during games with an economic outcome or payoff by both participants, using three IVs: overconfidence, lying for strategic advantage, and cooperation/noncooperation. I also examined the interaction between lying and cooperation during negotiations and decision-making and how the control variables (gender, skill, educational attainment and years of work experience) depicted the relationship(s) between buyers and sellers in an M&A transaction and how these variables impact the premium price paid and ROI for a private company, the DVs.

Overconfidence via Financial Knowledge Testing

 Subsequent research was conducted on various authors' direct measures of overconfidence of the participant's direct financial knowledge and confidence in their ability, specifically in investment decisions. Table 4 shows the participant's skill level was assigned after the financial knowledge test. Several measures were tested, such as the CBO score and BtA, particularly to ascertain if overconfidence results in the participants making aggressive, risky investment decisions based on their perception of their skill level being higher. Table 5 presents the average skill level of the participants for each chosen experiment. Table 6 shows the behavior and outcomes summary.

INSERT TABLES 4, 5, AND 6 ABOUT HERE

In step 1 of the experiment, I used the sample group participants' overconfidence in their financial knowledge as a proxy for their beliefs about their skill level and compared it with the sample group's actual skill level to obtain their respective estimations of skill and BtA measures (Pikulina & Renneboog, 2017). Specifically, the following question was asked after the financial knowledge testing: "what do you perceive your investment abilities to be in comparison to your peers?" Finally, in step 2, I used Explanatory Factor Analysis (EFA) with ProMax oblique rotations to obtain correlations among the responses to investment level choices.

Overconfidence was measured by the CBO score, which is the difference between the participants' average confidence in their answers to the test and the actual correct answers they gave (Pikulina and Renneboog, 2017), and BtA, or an over placement of a subjects' assessment of their financial knowledge and abilities being better than the other private equity fund and investment managers comprising the sample. Both over-estimation and over-placement refer to

an inclination to over-estimate performance either in comparison with the actual performance or with the performance of their peers (Pikulina & Renneboog, 2017). This study further researched overconfidence employing the use of the difference between the participant's belief in their competitive abilities in M&A negotiations and their years' work experience and their actual competency.

After measuring ability and overconfidence using a financial knowledge test comprised of 20 questions, the participants were asked to make investment choices in a set of different investment projects (average investment choice - RISK), in which their payoff depended on their financial knowledge, their skill, and their choice of investment's risk level (Pikulina & Renneboog, 2017). The average choice of RISK is equal to the participant's investment level in their choice of the experiment (transaction). Out of 32 participants, 15 overestimated their test scores and thought more highly of their capabilities.

To quantify skills, I used performance on a financial knowledge test and compared this to participants assessment and assignment of the likelihood that their perception of their performance is correct. The M&A professionals averaged 58% correct answers. The higher the average confidence level of the private equity fund manager and investment fund professionals, the higher their respective performance on the financial knowledge test was.

CBO was used to investigate whether subjective confidence levels accurately reflect participant performance (Michailova, 2010; Pikulina, 2017). The CBO is the difference between a subject's average confidence in their answers and the actual number of correct answers reported. Positive values of CBO indicate that the subjects' confidence in their financial knowledge is higher than actual performance and that the participants believed they had more

correct answers than they did – in other words, they were overconfident (Pikulina & Renneboog, 2017). A negative CBO value implied that the subject underestimated their financial knowledge.

After taking the financial knowledge test, most participants appeared to be overconfident in their choice of risk level taken on the investment experiments. Interestingly, overconfidence was the case for most male participants but not female participants. This aligned with Beckmann and Menkhoff (2008) findings in their 649 participants survey (124 women financial experts). A female Asian American participant scored 100% on the financial knowledge test and was very competitive on her achieved ROI in the experiment she participated in. Private equity and investment fund managers and investment managers CBO scores appeared to be better calibrated due to their higher performance than their peers (SEC lawyers, investment bankers, and family office investors) in the sample. The sample groups' average CBO of 0.03 was above zero.

Before conducting the experiments, an empirical comparison of the subjective average investment choice or risk level to the subjects' actual skill level was mad. When participants drew numbers from a hat to pair teams, the first to select their number was designated as the buyer in the experiment (transaction) and the second as the seller. As expected, the private equity fund managers had higher skill levels than other M&A professionals (i.e., SEC lawyers, investment bankers, and family office investors). Finally, the use of BtA in this research employed the use of Alicke's (2005) definition: "the better than average effect pertains to self-versus average per comparisons on behavior and trait dimensions whereas optimistic bias involves comparison about life events such as winning the lottery and getting divorced" (p. 85).

Experiment 4 was incorporated into the research to attain information on those participants who may be risk averse. Risk averse was defined Markowitz (1952) as "when the investor receives more utility from the actuarial value of a gamble obtained with certainty than

form the gamble itself" (p. 77). Risk aversion behavior is often a reflection of economic cycles, political uncertainty, age, and even cultural factors (Jianakoplos & Bernasek, 2006). I was interested to assess whether risk aversion is symptom of a lack of skills level, under-confidence in capability, or reflective of the participant's age.

Experiment Setting

32 private equity and M&A investment professionals were grouped in three cohorts (12-12-8). The experiments were conducted using a sequential series of Zoom calls. Two participants engaged by assuming the role of either a buyer or seller as a pair after randomly assigned their roles. In addition, they chose one of four simulated investment acquisition transactions (experiments). The acquisition or investment transactions included distinctions of varying risk levels and potential ROIs, specifically for behavioral interactions during the decision-making and purchase/sale negotiations.

To more closely examine the inter-relationships and glean a deeper understanding of the mediating and moderating variables influences, I utilized experiments similar to game theory games with 29 purposefully selected private equity and investment fund managers M&A professionals participating in one of the four experiments to realistically simulate business transaction contexts and conditions. Three participants played roles in the experiments twice, rendering permutations of: $(29 \times 1) + (3 \times 2) = 32$ data points.

Stratified data were collected for demographics and control variables, including skill level, gender, educational attainment, and years of work experience to examine the differences in behavioral responses among the groups.

Experiment Objective

In step 1 of the experiment, the research sought to ascertain the individual's actual competence level versus their belief in their skills. The level of overconfidence was measured with BtA, or when the participants believed their skills were superior to others, and with excessive optimism (overestimation), or when the participants perceived their ability, achievements, and or control to be higher because of their perception that they have better than average skills level (Moore & Healy, 2008). This behavior distinguished itself in the participant's overestimation of their accurate answers on the financial knowledge test compared to their actual performance and that of the other sample groups' participants.

Experimental Design

An experiment is used to extract answers to the cause and effect and how they relate to one another (Field, 2018). I sought to examine the impact of the IVs on the DVs using an experiment design, that included random selection and pairing of 32 purposefully selected participants were placed into two cohorts of 12 and one cohort of eight M&A professionals. They participated in one of the four 2-persons game theory experiments. These experiments simulated the investment/acquisition of private companies. The experiments were implemented in two steps in three Zoom calls.

I assessed participant's skills and overconfidence in investments (acquisitions) by asking them to complete a 20 question financial aptitude test. The participants were asked to choose a correct answer from multiple choices. There was no time limit to complete the test. The individual participants were asked to assign the probability of their answers being correct after the financial knowledge test and before the actual experiments were conducted. One-half of each cohort (50%) were verbally advised of their test scores. They functioned as the control group.

The control group was monitored for excessive overconfidence resulting from their being cognizant of their performance. Their performance was compared to the non-control groups financial knowledge test scores and ROI results during the statistical analysis. All 32 participants were asked to rank their skills and their test scores. The participant's average probability of answering the questions correctly corresponded to their subjective confidence level in their financial knowledge skill ranking (Pikulina & Renneboog, 2017).

All participants were then asked to make investment decisions using one of four simulated M&A transactions, which included distinct degrees of risk and ROIs. The four distinct investment scenarios concerned overconfidence bias, advantage, lying for strategic advantage, and cooperation versus non-cooperation. Their economic payoff depended on their investment level in their respective investment choice (risk level) and skills shown and paying the right price resulting from their negotiations in the first portion of the experiment. Valuation metrics were embodied in the content of each experiment/transaction that enabled the participants to calculate a plausible purchase price. The participants' economic payoff was maximized when they made investment decisions relative to a risk level that was congruent with their actual skill level.

Regarding the experiments, in each transaction, the participant's potential reward depended on their respective skillsets and the amount they invested and the ROI derived from it. The payoff was maximum when the participants made investment decisions equal to their achieved skills level findings (Holt & Laury, 2002; Pikulina & Renneboog, 2017). Their economic payoff depended on their investment level in their respective investment choice (risk level) and skills shown and paying the right price resulting from their negotiations. Valuation metrics were embodied in the content of each experiment / transaction that enabled the participants to calculate a plausible purchase price in which to maximize their ROIs.

16 participants were told what the assessment of their investment skills was, forming the control group. The control groups financial test results, skills level, and ROIs were statistically compared to the non-control group who were apprised of their skills level to validate or invalidated their skills levels and tenets of: overconfidence, lying for strategic advantage, and co-operation versus non-cooperation.

Once the participants were paired they were secluded into a virtual breakout room in which they collaboratively choose the experiment that they wanted to work on. Each buyer (investor) was given an endowment of $5 million to invest in a chosen transaction from four experiments simulating various levels of risk and ROI. The participants were told that they were allowed to "leverage up" senior debt (3:1) to pursue a larger acquisition transaction. Each seller was given the pre-money value of their company and the initial capitalization to have a benchmark from which to negotiate a sale. Participants were assigned a role to lie about certain facts or co-operate versus non co-operate in the negotiating process. Each seller was given a company valuation to achieve on the sale of their company. Similarly, each seller was assigned a role to act overconfident, lie about certain facts, or co-operate / non co-operate in the negotiating process.

Each participant was instructed that their objective was to maximize their ROI through decision-making and interaction in negotiating while exhibiting their inherent traits (via their assigned roles). Levels of ROI were spread across each of the four experiments investment/acquisition transactions simulating (a) a mediocre transaction, (b) a high risky transaction) a high yield transaction, and (d) acquisition of a company for synergies without significant cash flow (i.e., risk avoidance). For more details on the basic instructions participants were given, see Appendix B.

The four basic transactions simulated acquisition/investment transactions were designed with different degrees of risk and ROI and presented to the participants with the four embedded factors. To guarantee an optimal investment choice level for each participant's skills level, the revenue function was constructed such that earnings = revenues + endowment - the cost of the investment (Pikulina & Renneboog, 2017). Their economic payoff depended on their investment level in their respective investment choice (risk level) and skills shown and paying the right price resulting from their negotiations.

The participants' economic payoff was maximized when they made investment decisions congruent with their actual skill level, years' work experience. Earnings were at the highest only when the chosen investment level equals a participant's actual skill level. Underestimating and overestimating one's skill can lead to sub-optimal investment selections (Pikulina & Renneboog, 2017). The context scenarios included bias and rational and irrational behaviors showing overconfidence, lying for strategic advantage, and cooperation versus noncooperation. For a complete overview of the four experiments, please see Appendix B.

Final Payment

Before subjects received feedback about their performance, I collected the participants' risk preferences (choice of risk level chosen), demographic characteristics, and beliefs about their skill level and those of their peers. Post experiment, the participants were given the data on their actual earnings in each investment (acquisition) transaction/experiment. So that the competition for the $1,500 prize was fair to those participants who played one game, one investment transaction (experiment) was selected to calculate each participant's final earnings. Subsequently, I computed the participants' last earnings and determined the winner with the highest ROI.

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CHAPTER 4: DATA ANALYSIS AND FINDINGS

Data Analysis and Measurement of Operation via Experiments Results

Four experiments were used to test the three hypotheses for private equity fund and investment fund manager's (buyers') overconfidence behavior, lying for strategic advantage, and cooperation/noncooperation throughout acquisition negotiations and investment decision-making and how these IVs individually, or in combination, impact or effect an increase of the premium price paid for a company and the ROI achieved by a buyer by a buyer for a targeted private company acquisition.

The quantitative data collected from the four-game theory simulated investment transactions/experiments were used for testing with inferential statistics and OLS regression analysis those relationships. These methods led to confirming or rejecting the three buyer-focused hypotheses:

- H1: When overconfidence bias is exhibited by an M & A professional (buyer) in investment decision-making, it increases the premium price paid for a private company acquisition, thus decreasing the ROI.

- H2: When lying for strategic advantage is used by an M & A professional (buyer) in M&A, it reduces the premium price paid for the private company acquisition, thus decreasing the ROI for the transaction.

- H3: Noncooperation between an M & A professional (buyer) and a private company seller increases the premium price paid for the purchase price of a private company and diminishes the ROI for the transaction.

EFA and Principal Components Analysis (PCA) are techniques for identifying clusters of related variables (Field, 2018). These methods were used along with linear regression analyses to depict

conditional probabilities. When regressions analysis was conducted, collinearity was present among several of the IVs. I used EFA and PCA techniques because they serve three primary goals: (1) understanding the numerical relationship structure of a set of variables, (2) using "EFA" to examine more closely the construction of the experiments to measure the underlying variables, and (3) reducing the number of variables to a more manageable size while retaining as much information as possible (Fields, 2018). I employed EFA with Promax and oblique rotations to reduce the set of the explanatory variables to a smaller set of dimensions referred to as factors and components. Factor analysis was used to explain the maximum variance in a correlation matrix with the smallest number of explanatory constructs (variables). These explanatory constructs are latent variables or factors and they represent a cluster of variables correlated with others. Finally, I used PCA to explain the maximum total variance using a correlation matrix by transforming the original variables into linear components.

The correlation matrix (Table 7) shows a Promax rotation of EFA which demonstrated a strong correlation between correct answers on the financial knowledge test and skill level, $r = .942$ ($p < .001$) and financial test score .941 ($p < .001$). Further, the CBO score was strongly correlated to the number of correct answers -.629 ($p <.001$) and skill level -.490 ($p < .001$). Additionally, years of work experience was found to be negatively correlated to the financial knowledge test score -.353 ($p < .05$). The KMO Bartlett's test of sampling adequacy was .56, above the 0.5 suggested level as a minimum requirement for sampling adequacy.

INSERT TABLE 7 ABOUT HERE

A one-way ANOVA was used to assess whether a significant mean difference exists between the participant groups consisting of four groups: private fund managers, family office

investment managers, SEC lawyers, and investment bankers. Results of ANOVA revealed that there were no significant differences in BtA, $F(3,28) = 3.01$, $p = .05$, and CBO, $F(3,28) = 2.24$, $p = .11$, amongst the four groups of occupation (Table 2).

Testing for Confirmation of H1

Overconfidence was measured using CBO, BtA, and the performance-based measure skill level coupled with years' work experience. They were tested for their respective economic impacts on the purchase price paid (dependent variables = premium price paid and ROI) for the acquisition of a privately held target company for acquisition.

Simple linear and OLS regression models weas used to predict the relationships between the overconfidence and the DVs. In these four simulated acquisition transactions, 32 participants engaged in the experiments, buyers ($n = 16$) and sellers ($n = 16$). However, in two experiments, the participants failed to conclude a result ($n = 14$). Before running the regressions, Pearson correlations were conducted to determine which demographic variables should be controlled for in the analysis. Premium price paid was not significantly correlated with gender, occupation, years of work experience, or educational attainment. Additionally, ROI was not significantly correlated with gender, occupation, years' work experience, or educational attainment. Consequently, these demographic variables were not controlled for in the regressions.

To quantify their actual skill level, each participant's performance on the 20-question financial knowledge test was administered on the Qualtrics platform and one-on-one during a Zoom call. In addition, half the participants were advised of their skill level performance after they took the test. Participants were told that a prize of $1,500 would be given to the participant with the highest ROI on their acquisition transaction. ROIs are based on the choice of level of

risk in the investment that support the participants engagement in their selection of experiments (transaction).

Table 5 compares the average skill level assigned to the participants in each of the four experiments and the corresponding subjective choice level of risk that they undertook based upon the participants' biased assessment of their skills. Interestingly, the average skill level for the high yield investment/experiment was 2.89. Participants with financial knowledge test scores between 60-69% constituted the crux of the buyers/sellers in the high yield experiment while participants with the higher skill level (3.5) focused on the risky experiment (transaction).

Table 7 presents the study's experiments participants' statistical summary, by gender, of the 32 participants' number of correct answers, confidence level, CBO scores, and BtA. The number of correct answers to the financial knowledge test of females ($M = 16.33$, $SD = 2.34$) was higher than that of males ($M = 14.23$, $SD = 2.89$). Lastly, majority of males ($n = 18$, 69.2%) had a higher perception of themselves being BtA than the female participants ($n = 4$, 66%).

Table 8 presents the consolidation of correlation of the predictor's skill level, CBO score, BtA, and years of work experience with ROI. The Pearson's correlation analysis revealed that skill level and ROI have a significant positive correlation ($r = .473$, $p = .011$). This indicates that as the skill level increases, the ROI also increases. In addition, the results showed that skill level and CBO score have a significant negative correlation ($r = -.490$, $p = .004$). This indicates that as the skill level increases, the CBO score also increases. Lastly, the results revealed no significant correlation between CBO score and ROI. The variables age, gender, and work experience did not differentiate themselves from one another, as expected. The second table presents the Pearson correlation analysis among BtA, skill level, years' work experience against overall ROI. The results showed that skill level positively correlated with overall ROI ($r = .473$, $p = .011$). This

indicates that as the skill level increases, so does the overall ROI. Meanwhile, the results also

showed that years of work experience had a significant negative correlation between the ROI of

those who overpaid ($r = -.805$, $p = .016$). This indicates that as the years of work experience of

those who overpaid increases, the ROI decreases. The is contrary to other authors findings, likely

due to the lack of would have size of the experiments' participants. Had there been greater age

diversity amongst the participants, then there may have been a greater difference in years of

work experience.

INSERT TABLE 8 ABOUT HERE

Table 9 depicts the regression result of predicting the impact upon ROI using the IVs

skill level, CBO score, and years of work experience of males. The regression model was not

found to be a good fit of the data $F(3,18) = 2.925$, p = ns and consequently had a low R^2 (.216).

INSERT TABLE 9 ABOUT HERE

Table 10 presents the regression results focused on the buyers predicting average

investment (risk-taking) using gender, age, and years of work experience as predictors. The

regression model with the three predictors was significant, $F (3, 24) = 3.707$, $p = .025$ but had a

low adjusted R^2 (.231). However, no significant predictors of average investment were found

amongst gender, age, and years of work experience.

INSERT TABLE 10 ABOUT HERE

Four multiple linear regression models were developed to test Hypothesis 1. The DVs

were the premium price paid and ROI, while the IVs were CBO, BtA, skill level, and years of

work experience. Moreover, control variables (age, education, gender, and ethnicity) were tested

for significance in predicting the DVs, but none were significant. Refer to Table 11 for the

results for the four regression models that were developed to test this hypothesis.

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                INSERT TABLE 11 ABOUT HERE
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H1 Regression Results

The first regression model (Table 11, Column 1) used CBO score, skill level, and years of

work experience as IVs and premium price paid as the DV. The regression model was found not

to be a good fit of the data, $F(3,10) = 3.61$, $p = ns$, with an adjusted R^2 of .378. However, it was

found that both skill level ($p = .021$) and years of work experience ($p = .011$) were significant

predictors of premium price paid. Both had a negative relationship with the premium price paid.

The second regression model (Table 11, Column 2) was with BtA, skill level, and years

of work experience as IVs and premium price paid as the DV. The regression model was found

not to be a good fit of the data, $F(3,10) = 3.71$, $p = .050$, with an adjusted R^2 of .385. However, it

was found that both skill level ($p = .020$) and years of work experience ($p = .010$) were

significant predictors of the premium price paid. Both had a negative relationship with the

premium price paid.

The third regression model (Table 11, Column 3) was with CBO score, skill level, and

years of work experience as IVs and ROI as the DV. The regression model was found not to be a

good fit of the data, $F(3,10) = 1.08$, $p = ns$, with an adjusted R^2 of .018.

The fourth regression model (Table 11, Column 4) was with BtA, skill level, and years of

work experience as IVs and ROI as the DV. The regression model was found not to be a good fit

of the data, $F(3,10) = 1.08$, $p = ns$, with an adjusted R^2 of .018.

Findings Summary for H1

1. Skill level was a significant predictor of the premium price paid. An increase in skill level has a corresponding decrease in the premium price paid.

2. Years of work experience was a significant predictor of the premium price paid. An increase in years of work experience has a corresponding decrease in the premium price paid.

3. CBO score and BtA were not significant predictors of either premium price paid or ROI.

Test for Confirmation of H2

To test hypothesis 2, a working definition for each of lying for strategic advantage, deception, and misrepresentation was needed. The following were used:

- Gaining an information advantage by learning the opponent's preferences without revealing your preferences (Gratch et al., 2016).

- Identifying a false set of preferences to communicate to one's opponent that 1) maximize one's reward from a negotiation, 2) subject to the constraint that the other party believes the negotiated agreement or price to be fair and efficient.

In three of the four simulated investment experiments (2, 3, and 4), I embedded diverse motivations for lying to gain strategic advantage, deception, and non-co-operation by the buyer or seller in a simple ultimate bargain game. The games included deception by the seller regarding the private company's sale price (valuation) over which they were negotiating. Furthermore, I empirically verified the use of deception by re-watching the recorded Zoom videos to look for the buyer's explicit verbal communication of their price allocation together with their offer

(valuation), and comparing their actions to implicit deception, whereby the buyer conveys such information solely through their offers (Gneezy, 2011).

H2 Regression Results

The first regression model developed to test hypothesis 2 was for buyers only using lying for strategic advantage, skill level, and years of work experience as IVs and premium price paid as the DV. The regression model was found to be a good fit of the data, $F(3,10) = 5.20$, $p = .024$, with an adjusted R^2 of .493. It was found that both skill level ($p = .007$) and years of work experience ($p = .004$) are significant predictors of premium paid the price among buyers. Both have a negative relationship with the premium price paid.

The second regression model was for sellers only using lying for strategic advantage, skill level, and years of work experience as IVs and premium price paid as the DV. The regression model was found not to be a good fit of the data, $F(3,10) = .19$, $p = ns$.

The third regression model reflects the buyers' choice in the experiment using lying for strategic advantage, skill level, and years of work experience as IVs and ROI as the DV. The regression model was found not to be a good fit of the data, $F(3,10) = 1.51$, $p = ns$.

Lastly, the fourth regression model was for sellers only using lying for strategic advantage, skill level, and years of work experience as IVs and ROI as the DV. The regression model was found not to be a good fit of the data, $F(3,10) = 1.39$, $p = ns$.

Findings Summary for Hypothesis 2

1. Skill level and years of work experience were significant predictors of the premium price paid for buyers.

2. Lying for strategic advantage was not a significant predictor of premium paid the price or ROI for both buyers and sellers.

Test for Confirmation of H3

All four experiments were conducted, with the 28 unique participants engaged in the game theory structured experiments. Four of the 28 participants participated in more than one experiment, in which their assignment was noncooperation roles or lying for strategic advantage, a form of deception. Deception occurred more often amongst the sellers. This over-assigning of participants to roles also occurred because a key for each transaction centered on the seller's motivation to sell and their perception of the company's value.

Furthermore, roles were assigned in which participants' intended actions were implemented with noise (i.e., meaningless information that did not benefit either buyer or seller). In a few cases, such as in experiment 4 concerning the Netflix stock transaction, the buyer and seller colluded to achieve a mutually beneficial economic outcome. In this example, they agreed to share a commission of 75% to the buyer and 25% to the broker.

The research goals for testing H3 were to (a) understand whether and when the participants cooperated or not, (b) develop a sense of strategies that participants used, and (c) determine if the cooperation or noncooperation impacted the outcome of the sale price and if the buyer over or underpaid.

OLS was used to examine the impact of the two IVs, noncooperation and asymmetrical information sharing's effects, on each DV. In addition, OLS linear regression analysis was used to examine whether the buyers' or sellers' lack of cooperation and not sharing crucial information relative to the pending sale of a private company impacted the economic outcome. That is, whether the buyer over-paid or under-paid for the target private company acquisition.

H3 Regression Results

The first regression model developed to test hypothesis 3 was for buyers using non-cooperation, skill level, and years of work experience as IVs and the premium price paid as the DV. The regression model was found to be a good fit of the data, $F(3,10) = 4.31$, $p = .034$, with an adjusted R^2 of .433. It was found that both skill level ($p = .015$) and years of work experience ($p = .007$) are significant predictors of premium paid the price among buyers.

The second regression model was for buyers only used interaction between lying and cooperation, skill level, and years of work experience as IVs and the premium price as paid as the DV. The regression model was found to be a good fit of the data, $F(3,10) = 7.05$, $p = .008$, with an adjusted R^2 of .583. It was found that interact ($p = .045$), skill level ($p = .002$), and years of work experience ($p = .001$) are significant predictors of premium paid the price among buyers. All three have negative relationships with the premium price paid.

Findings Summary for Hypothesis 3

1. Skill level and years' work of experience were significant predictors of buyers' premium price.
2. Interact was a significant predictor of the premium price paid for buyers.
3. Further, female participants openly shared transaction information that leveled the playing field for both buyers and sellers

Empirical Observations

Empirical observations using recorded video (Onwuegbuzie et al., 2009), suggest the non-cooperative strategy as inferior to the strategy chosen by most buyers, which was to cooperate. This is supported by the debriefing feedback that I received from the four participants whom

negotiated in experiment 3. Participant 21 remarked, "the selling effort without cooperation in disclosing underlying facts and figures eroded trust and triggered the need for more due diligence of the purchase". Participant 20 stated, when asked about non-cooperation versus cooperation, "non-cooperation caused the perception that the parties were not aligned in their respective desires to buy / sale the asset. A transparency approach always leads to a long-term partnership".

Further, cooperation was more frequent among the older, more experienced male investment professionals. They disregarded their instructions not to cooperate and immediately agreed to share transaction information so that they could attain an agreement more quickly and win the $1,500 price for the highest ROI.

The central focus of these four hypotheses was to contrast rational and bounded rational behavior in making acquisition decisions. I posit that overconfidence, lying for strategic advantage, and cooperation / non-cooperation are all fundamental drivers that influence acquisition decisions and partial to the economic forces and financial analysis favoring the acquisition of private companies. The vulnerability of judgment biases in a private equity and investment fund manager's strategy, the perception of the risk involved, and mispricing negotiated bargaining with the seller for acquiring a private company have become increasingly complicated and sophisticated. Thus, it can be argued that private equity fund managers can form a more rational and dynamic strategy by applying extension-based game theory tools that incorporate behavior analysis of overconfidence, lying for strategic advantage, and noncooperation in acquisition decision-making.

CHAPTER 5: DISCUSSION

Problem Addressed

The primary questions addressed in this research was: "Does cognitive bias in private equity and investment fund managers' behavior, manifested as overconfidence, lying for strategic advantage and the interaction between lying and non-cooperation, have an economic impact upon the purchase price for the acquisition of a private company? If so, does it impact the return on investment?"

Research Questions

1) How does a private equity or investment fund manager's (buyer's) bias behavior impact the purchase price premium paid in an M&A transaction for a private company?

2) Can the buyer's employment of strategies such as lying for strategic advantage and cooperation versus noncooperation during negotiations be used tactically by a private equity and investment fund manager (buyers) to diminish the seller's price expectations in an acquisition transaction of a private company?

Significance of the Proposed Research

The significance of this study is that prior results have focused on the overconfidence of the CEOs of public companies and their stock trader's mentality. These authors have considered the impact on a company's stock prices by examining the overconfident CEOs deferring the exercise of their stock options to a later date because of their confidence in their leadership abilities (Malmendier & Tate, 2015). Smit and Moraitis (2010) examined judgment biases. However, other scholars have examined irrational behavior in a game theory context but with student participants (Agarwal, 2011). At the time of this study, no researchers have published results concerning the premium prices paid for private companies resulting from the impact of a private equity fund and

investment fund manager's overconfident bias behavior and their employment of the use of lying for strategic advantage and or cooperation versus noncooperation.

Summary of Findings for H1 - Overconfidence

I investigated how individuals' confidence in their abilities affects their bias in decision-making behaviors and willingness to take risks of varying degrees through acquisitions and prudent investment tactics. The regression analysis conducted did not support this proposition. Congruent with my monetary incentives, most participants accurately estimated their skill levels. However, several of the participants in the four experiments with substantially lower skill levels than their peers misjudged their abilities. These participants took on higher risk than their respective skill levels. The four experiments exemplified that skill level is advantageous and predictably leads to accurate investment risk levels and of premium price paid for a private company acquisition.

Additionally, eight of the experiments' participants over-paid for their acquisitions, while 18 participants, 56%, appropriately choose their investment risk levels based on their skill level and ultimately under-paid for the company they acquired or sold. The remaining six persons paid actual value for their acquisitions based on the valuation metrics provided the participants.

The regression results of the four experiments demonstrated that private equity and investment fund managers' performance reasonably resulted in higher-than-average confidence in their financial knowledge due to their years of professional work experience. Findings revealed that years of work experience was a significant predictor of the premium price paid. An increase in years of work experience would have a corresponding decrease in the premium price paid. Additionally, skill level was a significant predictor of the premium price paid by the buyers. An increase in skill level would have a corresponding decrease in premium price paid.

H1 was not validated by the CBO score and BtA was not a significant predictor of either premium price paid or ROI. This result may be attributed to the small sample of 32 participants being an adequate size to support sufficient G*Power in many tests.

Summary of findings for Hypothesis 2

The regression model developed to test H2 was for buyers only with lying for strategic advantage, skill level, and years of work experience as independent variables and premium price paid as the dependent variable. It was found that both skill level ($p = .007$) and years of work experience ($p = .004$) are significant predictors of premium paid.

The subsequent regression analysis of the same predictors for the premium price paid and ROI results demonstrated that there were no significant predictors of premium paid. Consequently, H #2 was not validated.

Video recorded evidence from empirical observation (Onwuegbuzie et al., 2009) of the experiments confirmed that the more confidence the participants had, the less likely they were to rely on lying for strategic advantage. Although there was moderate tactical use of lying for strategic advantage amongst the participants, it was observed and recorded by the researcher that the six women participants in the experiments were less likely to lie and more likely to cooperate in negotiations. Although it was not reflected in the regression analysis, empirical observations were recorded by me, noting that the private equity and investment fund managers (buyers $n = 16$) lied when they expected the lie could cost them little in terms of credibility with the opposing participant in the negotiations. It was further observed that lying ended up helping the sellers of the companies in the experiments. Empirical observation via recorded video did demonstrate that private equity and investment fund managers in the experiments lied

significantly more when they perceived a more considerable gain through lying. These observations are consistent with Ariely's (2008) observations.

I recorded empirical observations and noted that female participants were more likely to lie when the lie hurt the sender (seller) a little but helped the receiver (buyer) a lot. 24 of the buyers and sellers did not lie even when lying resulted in a pareto improvement. In other words, inputs from the seller and outputs from the buyers in the communication process are not balanced, and that the buyers are sensitive to the communication process and the buyers' cost/benefit associated with lying.

Summary of findings for H 3 - Cooperation vs. Noncooperation

My empirical observations (Onwuegbuzie et al., 2009) that were recorded demonstrated that the non-co-operative strategy employed by the buyers in the experiments' four acquisition transactions was inferior to the strategy to cooperate with the seller.

The regression analyses indicate that skill level and years' work of experience were both significant predictors of the premium price paid for buyers, and that the interaction between lying for strategic advantage and non-cooperation was a significant predictor of the premium price paid for buyers. Additionally, empirical observation showed that cooperation was more frequent among the older, more experienced male investment professionals. They disregarded their instruction not to cooperate and immediately agreed to share transaction information so that they could attain an agreement more quickly and win the $1,500 price for the highest ROI.

I suggest that the participants who exhibited their behaviors might be guided by opportunism, self-esteem, and risk-taking character. The more cooperation between the buyer participants who cooperated in the acquisition price negotiations the lower premium purchase price paid by the private equity fund manager (buyer). Empirical observation distinguished that

cooperation was more frequent among the older experienced participants and women than the younger less experienced participants. The participants in the four experiments exhibited Fudenberg's (2012) suggestions of outcomes occurring in repeated games (experiments) with a known and constant probability that interaction could continue between the participants following each round.

Conclusions

All facts combined from the regression analyses, descriptive data, and empirical observations did not support the validation of H1 and H2. However, the regression analysis for the validation of H3 supports the fact that skill level and years of work experience resulted in lower premium prices being paid which result in higher ROIs on the acquisitions made. Thus, skill level and years' work experience are significant predictors of the premium price paid for acquiring a private company.

The review of literature distinguishes that overconfidence often can lead to sub-optimal choices in cases with high-risk stakes in the context of investment decision-making. For example, overestimation of one's abilities leads to excess entry into competitive transactions. Overconfident individual participants in the experiments overestimated their ability to select good quality investment transactions. As a result, they often over-paid to purchase a private company which considerably reduced their ROIs. All these findings suggest that biased overconfidence and irrational behaviors of lying for strategic advantage and noncooperation had less impact on decision-making than I had expected.

Implications for Advancing Theory

The concept of measuring behavioral interactions in the four experiments constructed to simulate decision-making behavior illustrates the economic importance of understanding

overconfidence, lying for strategic advantage, and cooperation versus non-co-operation in acquisition negotiations and decision-making by private equity and investment fund managers. In addition, the analysis identified those participants with financial knowledge and skills levels that did not need to employ such behavior versus those who did and employed the strategies to attain economic benefit.

Theoretical Frameworks

Theoretical frameworks start with investigating the relationship between variables and evaluating existing theories to build a blueprint for a dissertation inquiry (Miles et al., 2014). I chose a thematic approach to writing this literature review. The thematic structures that I examined were patterns in the literature that are more pronounced than others, central themes, and evidence of these themes.

Implications for Business Practice

I have no intention of publishing this dissertation. Hence, it is doubtful there are implications in business practices in the greater business community. However, I have gained more knowledge than when first entering my DBA program. Undoubtedly, I will enlist this knowledge in future negotiations with partners as they navigate through the acquisition process with sellers. In addition, likely, I will share findings with other private equity fund managers and investment managers with whom I am close.

Limitations

From the final IRB approval date, this research study was in peril because of the IRB restrictions placed upon the researcher from conducting the experiments live. The original filing had indicated that the Health Department regulations in San Diego County allowed for outdoor dining for up to 75% capacity of a facility. The IRB deemed this was not allowable because of

the restrictions imposed by Los Angeles County Health Department, where the campus is located, which had more severe restrictions. Furthermore, the COVID-19 pandemic placed a burden on the busy schedules of the 32 M&A professionals as such as it was difficult to maintain the participants' continued involvement in the experiments for follow questions and comments.

REFERENCES

Alicke, M., & Govorun, O. (2005). The Better-than-Average Effect, The Self in Social Judgement, *Journal of Personality and Social Psychology Press*, *68*, 85-105.

Ansoff, H. I., (1965). *Corporate strategy: An analytic approach to business policy for growth and expansion.* McGraw-Hill.

Appelbaum, E., & Batt, R. (2016). Fees, Fees, and More Fees: How Private Equity Abuses Its Limited Partners and U.S. Taxpayers, *Center for Economic and Policy Research*, 1-42.

Antoniou, A., Arbour, P., & Zhao, H. (2008). How much is too much: are merger premiums too high?. *European Financial Management*, *14*(2), 268-287.

Aggarwal, N. (2011). *Psychological Pricing in M&A Using Game Theory*, International Congress on Modelling and Simulation.

Ariely, D. (2008). *Predictably Irrational*, Harper Collins Publishers.

Ariely, D. (2009). The End of Rational Economics, *Harvard Business Review*, 1-12.

Asaoka, D. (2019). Behavioral analysis of mergers and acquisitions decisions, *Corporate Board: Role, Duties and Composition*, *15*(3), 8-16.

Axelrod, R., & Hamilton, W. D. (1981). The evolution of cooperation, *Science*, *211*(4489), 1390-1396.

Baarslag, T., Hindriks, K., Jonker, C., Kraus, S., & Lin, R. (2012). The first automated negotiating agents competition (ANAC 2010). In *New Trends in agent-based complex automated negotiations* (pp. 113-135). Springer.

Baker, M., Pan, X., & Wurgler, J. (2009). The psychology of pricing in mergers and acquisitions. *Unpublished working paper. Harvard Business School*.

Baker, M., Pan, X., & Wurgler, J. (2011). Behavioral Corporate Finance: an updated Survey, *Working paper. Harvard Business School*.

Bargeron, L., Schlingemann, F., & Stultz, R. (2008). Why do private acquirers pay so little compared to public acquirers? *Journal of Financial Economics*, *89*, 375-390.

Battigalli, P., Chiarella, C., & Gatti, S. (2017). *M&A Negotiations with Limited Information: How do Opaque Firms Buy and Get Bought?* Institute for Economic Research, University of Bocconi.

Battigalli, P., & Dufwenberg, M. (2009). Dynamic psychological games. *Journal of Economic Theory*, *144*(1), 1–35.

Beckman, D., & Menkhoff, L. (2008). *Will Women be Women? Analyzing the Gender Difference among Financial Experts,* University of Hannover, Discussion paper 391.

Belot, M., Crawford, V. P., & Heyes, C. (2013). Players of Matching Pennies automatically imitate opponents' gestures against strong incentives. *Proceedings of the National Academy of Sciences*, *110*(8), 2763-2768.

Bennett, M., Mullard, R., Adam, M. T., Steyvers, M., Brown, S., & Eidels, A. (2020). Going, going, gone: competitive decision-making in Dutch auctions. *Cognitive Research: Principles and Implications*, *5*(1), 1-22.

Bernard, C., (1938), The Functions of the Executive, Harvard University Press.

Bhagat S, Shleifer A, & Vishny A. (1990). *Hostile Takeovers in the 1980's: The Return to Corporate Specialization.* Brookings Papers on Economic Activity: Microeconomics, 1– 72.

Bhalla, M., Goel, M., Konduri, V. S. K., & Zemel, M. (2018). Firms of a feather merge together: Information flows, familiarity bias and M&A outcomes. Paper presented at Chicago Booth-India Quantitative Marketing Conference, December 17, 2018, IIM Bangalore.

Biais, B., & Weber, M. (2009). Hindsight bias, risk perception and investment performance, *Management Science*, *55*(6), 1018-1029.

Bradley, M., Desai, A, & Han, K. E. (1988). Synergistic Gains from Corporate Acquisitions and Their Division between the Stockholders and Acquiring Firms, *Journal of Financial Economics, 21*, 3–40.

Branconi, M. (2020). *Limits in game-theoretic representations of M&A negotiations: the influence of psychological and behavioral factors* [White paper]. Libera Università Internazionale degli Studi

Breitmeyer, Y. (2015). Cooperation, but No Reciprocity: Individual Strategies in Repeated Prisoner Dilemma, *American Economic Review*, *105*(9), 2882-2910.

Broihanne, M., Merli, M., & Roger, P., (2014). Overconfidence, risk perception and risk-taking behavior of finance professionals*, Finance Research Letters*, *11*(2), p. 64-73.

Brozynski, T., Menkhoff, L., & Schmidt, U., (2004). *The Impact if Experience on Risk Taking, Overconfidence and Herding of Fund Managers: Complementary Survey Evidence,* University of Hannover, Discussion paper no. 292..

Bruner, R. F. (2001). *Does M&A Pay? A Survey of Evidence for the Decision-Maker*. Batten Institute, Darden Business School, University of Virginia.

Camerer, C., & Lovallo, D. (1999). *Overconfidence and excess entry: an experimental approach,* American Economic Review, 89(1, 306–318.

Camerer, C. F., & Malmendier, U. (2007). Behavioral economics of organizations. In *Yrjö Jahnsson Foundation 50th Anniversary Conference, Jun, 2004, Espoo, Finland; This book is based on the aforementioned conference.* Princeton University Press.

Campbell, C., Gallmeyer, M., Johnson, S., Rutherford, J., & Stanley, B. (2011*).* CEO optimism and forced turnover, *Journal of Financial Economics, 101*(3), 695–712.

Charness, G. (2000). Self-Serving cheap talk: A Test of Aumann's Conjecture. *Games and Economic Behavior*, *33*(2), 177–194.

Charness, G., & Dufwenberg, M. (2006). Promises and Partnership. *Econometrica, 74*(6), 1579–1601.

Christian, L.M., & Dillman, D.A. (2004). The Influence of Graphical and Symbolic Language Manipulations to Self-Administered Questions. *Public Opinion Quarterly, 68*, 57–80.

Cohen, J. (1977). A Power Primer, *Psychological Bulletin*, 112(1), 155-159.

Couper, M.P. (2008). *Designing Effective Web Surveys,* Cambridge University Press.

Court, A. (2015). *Test Models of Belief Bias: An Experiment*, Nova School of Business and Economics.

Crawford, V. P. (1982). A Theory of Disagreement in Bargaining, *Econometrica*, 50(3), 607-638.

Crawford, V. P. (1997). *Theory and Experiment in the Analysis of Strategic Interaction.* Cambridge University.

Crawford, V. P. (1998). A Survey of Experiments on Communication via Cheap Talk, *Journal of Economic Theory*, *78*, 286-298.

Crawford, V. P. (2001). Lying for Strategic Advantage: Rational and boundedly rational misrepresentation of intentions. *American Economic Review*, *93*(1),133–149.

Crawford, V. P. (2013). Structural Models of Nonequilibrium Strategic Thinking: Theory, Evidence, and Applications*, Journal of Economic Literature*, *51*(1), 5-62.

Crawford, V.P. (2013). Boundedly Rational versus Optimization-Based Models of Strategic Thinking and Learning Games, *Journal of Economic Literature*, *51*(2), 512-527.

Crawford, V.P. (2016). New Directions for Modeling Strategic Behavior: Game-Theoretic Models of Communication, Coordination and Cooperation in Economic Relationships, *Journal of Economic Perspectives*, *30*(4), 131-150.

Crawford, V. P., & Kuo, P. S. (2003). A dual Dutch auction in Taipei: the choice of numeraire and auction form in multi-object auctions with bundling, *Journal of Economic Behavior & Organization*, *51*(4), 427-442.

Creswell, J.W., & Creswell, J.D. (2018). Research Design, Qualitative, Quantitative and Mixed Methods Approaches, Sage.

Cuypers, I. R., Cuypers, Y., & Martin, X. (2017). When the target may know better: Effects of experience and information asymmetries on value from mergers and acquisitions. *Strategic Management Journal*, *38*(3), 609-625.

Cyert, R. & March, J. (1963). *A Behavioral Theory of the Firm*. Prentice-Hall.

Dane, E., Baer, M., Pratt, M. G., & Oldham, G. R. (2011). Rational versus intuitive problem solving: How thinking "off the beaten path" can stimulate creativity. *Psychology of Aesthetics, Creativity, and the Arts*, *5*(1).

Dane, E., & Pratt, M. G. (2007). Exploring intuition and its role in managerial decision making. *Academy of Management Review*, *32*(1), 33-54.

Dhir, S. & Mital, A. (2012). *Decision-Making for Mergers and Acquisitions: The Role of Agency Issues and Behavioral Bias,* John Wiley & Sons.

Dionne, G., & Le Haye, M. (2015). Does Asymmetric Information Affect the Premium in Mergers and Acquisitions*, Canadian Journal of Economics*, 48(3).

Dittmar, A., & Li, D. (2001). It Pays to Follow the Leader Acquiring Targets Picked by Private Equity, *Journal of Financial and Quantitative Analysis, 47*(5), 901-931.

Doukas, J., & Petmezas, D. (2007). *Acquisitions, Overconfident Manages and Self-Attribution Bias,* Durham Business School.

Dreber, A., & Johannesson, M. (2008). Gender differences in deception. *Economics Letters*, *99*(1), 197-199.

Dyer, J. H., Kale, P., & Singh, H. (2004). *When to ally and when to acquire* (pp. 109-115). Harvard Business Review.

Battigalli, P., & Dufwenberg, M. (2009). Dynamic psychological games. *Journal of Economic Theory*, *144*(1), 1-35.

Dufwenberg, M., & Gneezy, U. (2000). Measuring beliefs in an experimental lost wallet game. *Games and economic Behavior*, *30*(2), 163-182.

Eckbo, E. (2000). *The Handbook of Corporate Finance: Empirical Corporate Finance,* Elsevier.

Eisenhardt, K. M. (1989). Agency Theory: An Assessment and Review, *The Academy of Management Review*, *14*(1), 57–74.

Eshraghi, A., & Taffler, R. (2012). *Fund Manager Overconfidence and Investment Performance,* University of Edinburgh Business School.

Fabrigar, L. R., Wegener, D. T., MacCallum, R. C., & Strahan, E. J. (1999). Evaluating the use of exploratory factor analysis in psychological research, *Psychological Methods*, *4*(3).

Fehr, E., & Schmidt, K. M. (1999). A theory of fairness, competition, and cooperation. *The Quarterly Journal of Economics*, *114*(3), 817-868.

Fenn, G., & Liang, N. (1996). *The Economics of Private Equity Markets*, Federal Reserve Bulletin, Board of Governors, Dallas Federal Reserve Bank, pg. 51-54.

Field, A. (2018). *Discovering statistics using IBM SPSS Statistics.* Sage.

Filipovic, Z. (2018). *Strategic M&A announcement timing, information asymmetry, and behavioral biases* (Doctoral dissertation). Università della Svizzera Italiana (Swiss Finance Institute, University of Lugano).

Friedman, D., & Sunder, S. (1994). *Experimental methods*. Cambridge Books.

Fudenberg, D., & Rand, D. (2012). Slow to Anger and Fast to Forgive: Cooperation in an Uncertain World*, American Economic Review*, *102*(2), 720-749.

Gaughan, P. (2002) *Mergers and Acquisitions and Corporate Restructurings*.

Gencheva, D., & Davidavičienė, V. (2016). Reduction of the Information Asymmetry in Mergers & Acquisitions Through the Means of Payment. *Journal of System and Management Sciences*, *6*(2), 16-32.

Gneezy, U., & Erat, S. (2011). White Lies*, Management Science*, 1-11.

Gneezy, U. (2005). Deception: the role of Consequence, *American Economic Review*, 384-394.

Goldman, R. N. (1998). Interactive Statistics: Preliminary Edition. *The American Statistician*, *52*(3).

Gratch, J., Nazari, Z., & Johnson, E. (2016). *The Misrepresentation Game: How to win at negotiation while seeming like a nice guy*, USC Institute for Creative Technologies, 728-737.

Hall, B. J., & Murphy, K. J. (2002). Stock options for undiversified executives, *Journal of Accounting and Economics*, *33*(1), 3-42.

Hambrick, D. C., & Mason, P. A. (1984). Upper echelons: The organization as a reflection of its top managers, *Academy of Management Review*, *9*(2), 193-206.

Harford, J. (2005). What drives merger waves? *Journal of Financial Economics*, *77*(3), 529-560.

Hayward, M,, & Hambrick, D.C. (1997). Explaining the Premium Paid for Large Acquisitions: evidence of CEO Hubris. *Administrative Science Quarterly*, *42*(1), 103–127.

Hayward, M., Shepherd, D.A., & Griffin, D. (2006). Hubris Theory of Entrepreneurship. *Management Science, 52*(1), 160–172.

Hayward, M., Rindova, V., & Pollock, T. (2004). Believing One's Own Press: The Causes and Consequences of CEO Celebrity*, Strategic Management Journal*, *25*, 637-653.

Hietala, P., & Kaplan, S. (2002). *What is the Price of Hubris? Using Takeover Battles to Infer Overpayments and Synergies*, National Bureau of Economic Research, Working Paper 9264.

Hill, C., & Jones, T. (1992). Stakeholder, Agency Theory. *Journal of Management Studies*, *29*, 131–154.

Holt, C., & Laury, S. (2002). Risk Aversion and Incentive Effects, *American Economic Review*, *92*(5), 1644-1655.

Jain, S. (2008). Key Contractual Considerations in Private Equity Fund Placements. *Citi Alternative Investments, July*.

Jensen, M. C. (1986). Agency Costs of Free Cash Flow: Corporate Finance and Takeovers, *American Economic Review*, *76*, 323–329.

Jensen, M., & Meckling, W. (1976). Theory of the Firm: Managerial Behavior. Agency Cost and Ownership Structure, *Journal of Financial Economics*, *3*, 305-360.

Jianakoplos, N. A., & Bernasek, A. (2006). Financial risk taking by age and birth cohort. *Southern Economic Journal*, *72*(4), 981-1001.

Jiang, Y., & Zeng, M. (2016). *A Game-Theoretic Study of Enterprise Mergers and Acquisition: The Case of RJR Nabisco Being Acquired by KKR,* Business and Management Studies, Red Fame Publishing.

Jones, J. M., & Hynie, M. (2017). Similarly torn, differentially shorn? The experience and management of conflict between multiple roles, relationships, and social categories. Frontiers in Psychology, *8*, 1732.

Joshi, A., Kale, S., & Chandel, S. (2015). Likert scale: Explored and Explained, *British Journal of Applied Science and Technology*, *7*(40), 396-403.

Kahneman, D., & Tversky, A. (1972). Subjective probability: A judgment of representativeness. *Cognitive Psychology, 3,* 430-454.

Kateeinan, D., & Tversky A. (1979). *Prospect Theory: An Analysis of Decision Under Risk.* *Econometrica*, *47*, 263–291.

Katz, R., Eitman, A., & Mohan, B. (2021). M&A Report 2021, *International Finance Law Review*, 78-82.

Konyukhovskiy, P., & Nastych (2013). Mergers and Acquisitions stochastic cooperation Games*, International Journal of Economic Behavior and Organization*, *1*(2), 20-26.

Kose, J., Liu, Y., & Taffler, R. (2010). *It Takes two to Tango: Overpayment and Value Destruction in M&A Deals,* Leonard Stern School of Business, NYU.

Kris, P., & Nagel, R. (2013). *Implicit vs. Explicit deception in ultimatum games with incomplete information,* University of Zurich, 1-20.

Kruger, J. (1999). Lake Wobegon be gone! The" below-average effect" and the egocentric nature of comparative ability judgments. *Journal of Personality and Social Psychology*, *77*(2).

Kruger, J., & Dunning, D. (1999). Unskilled and unaware of it: how difficulties in recognizing one's own incompetence leads to inflated self-assessments. *Journal of Personality and Social Psychology*, *77*(6).

Kuhn, H., & Harsanyi, J. (1994). The Work of John F. Nash, Jr. in Game Theory, a Nobel Seminar.

Langer, E. J. (1975). The illusion of control. *Journal of Personality and Social Psychology*, *32*(2).

Langevoort, D. C. (2010). The behavioral economics of mergers and acquisitions. *Transactions: Tenn. J. Bus. L.*, *12*, 65.

Lambert, J., & Bessiere, V. (2012). Does Expertise influence the impact of overconfidence on Judgment, Valuation and investment decisions? *Journal of Economic Psychology, 33*, 1115-1128.

Leland, H. (2007). Financial Synergies of the Firm: Implications for Mergers, Spinoffs and Structured Finance, *Journal of Finance*, 62(2).

Lukas, E., & Heimann, C. (2010). Bedingte Kaufpreisanpassungen, Informationsasymmetrien und Shareholder Value: Eine empirische Analyse deutscher Unternehmensübernahmen. Working Paper Series.

Luypaert, M., Defrancq, C., & Huyghebaert, N. (2016). Influence of family ownership on the industry-diversifying nature of a firm's M&A strategy: Empirical evidence from Continental Europe, *Journal of Family Business Strategy*, *204*.

Martin, J.D., & Sayrak, A. (2003). Diversification and shareholder value: a survey of recent literature, Journal of Corporate Finance, *9*(1), 37–57.

Malmendier, U., & Tate, G. (2004). Who makes Acquisitions? CEO Overconfidence and the Market's Reaction, *European Financial Management*, 649-659.

Malmendier, U., & Tate, G. (2004). *CEO Overconfidence and Corporate Investment*, National Bureau of Economic Research, Working Paper No. 10807.

Malmendier, U., & Tate, G. (2015). Behavioral CEOs: The Role of Managerial Overconfidence, *Journal of Economic Perspectives*, *29*(4), 37-60.

Malmendier, U., & Szeidl, A. (2008). *Fishing for Fools*, UC Berkeley and NBER.

Malmendier, U. (2018). Behavioral corporate finance. In B. D. Burnheim, S. Dellavigna, & D. Laibson (Eds.), *Handbook of Behavioral Economics: Applications and Foundations 1*, Vol. 1, 277-379.

Maquiera, C., Megginson, W., & Nail, L. (1998). Wealth creation versus wealth re-distributions in pure stock-for-stock mergers. *Journal of Financial Economics*, *4*, 3–33.

Markowitz, H. (1952). Portfolio selection. *Journal of Finance, 7*, 77–91.

McCabe, K. A., Rigdon, M. L., & Smith, V. L. (2003). Positive reciprocity and intentions in trust games. *Journal of Economic Behavior & Organization*, *52*(2), 267-275.

Menkhoff, L., & Schmeling, M. (2010). *Overconfidence, Experience, and Professionalism: An Experiment,* Kiel Institute for World Economy.

Michailova, J. (2011). Development of Overconfidence Measurement Instrument for the Economic Experiment, *Journal of Economic Literature*, 6-7.

Miles, M. B., Huberman, A. M., & Saldaña, J. (2018). *Qualitative data analysis: A methods sourcebook*. Sage publications.

Miller, D. T., & Ross, M. (1975). Self-serving biases in the attribution of causality: Fact or fiction? *Psychological Bulletin*, *82*(2), 213.

Moeller, S. B., Schlingemann, F. P., & Stulz, R. M. (2004). Firm size and the gains from acquisitions. *Journal of Financial Economics*, *73*(2), 201-228.

Moeller, S. B., Schlingemann, F. P., & Stulz, R. M. (2004). *Do acquirers with more uncertain growth prospects gain less from acquisitions?* National Bureau of Economic Research.

Moeller, S. B., Schlingemann, F. P., & Stulz, R. M. (2004). Does investor diversity of opinion, information asymmetry, or uncertainty resolution affect acquirer returns?. *Charles A. Dice Center Working Paper No. WP*, *19*.

Moore, D. A., & Healy, P. J. (2008). The trouble with overconfidence. *Psychological Review*, *115*(2).

Motis, J. (2007). Mergers and acquisitions motives. *Toulouse School of Economics EHESS (GREMAQ) and the University of Crete.*

Myerson, R. B. (1999). Nash equilibrium and the history of economic theory. *Journal of Economic Literature*, *37*(3), 1067-1082.

Nash, J. F. (1950). Equilibrium points in n-person games. *Proceedings of the national academy of sciences*, *36*(1), 48-49.

Nash, J.F. (1950). The Bargaining Problem, E*conometric*, *18*, 155-162.

Nash, J.F. (1953). Two-Person Cooperative Games, *Econometrics*, *21*, 128-140.

Nash, J. (1951). Non-cooperative games. *Annals of Mathematics*, 286-295.

Nash, J. F., & Shapley, L. S. (1950). A simple three-person poker game. *Contributions to the Theory of Games*, *1*(24), 105-116.

Nazari, Z., Lucas, G. M., & Gratch, J. (2015, August). Opponent modeling for virtual human negotiators. In *International Conference on Intelligent Virtual Agents,* Springer, 39-49.

Onwuegbuzie, A. J., Johnson, R. B., & Collins, K. M. (2009). Call for mixed analysis: A philosophical framework for combining qualitative and quantitative approaches. *International journal of multiple research approaches*, *3*(2), 114-139.

Patton, M. Q. (1980). Qualitative evaluation methods-Beverly Hills.

Pallier, G., Wilkinson, R., Danthiir, V., Kleitman, S., Knezevic, G., Stankov, L., & Roberts, R. D. (2002). The role of individual differences in the accuracy of confidence judgments. *Journal of General Psychology, 129*(3), 257-299.

Park, H., & Yoo, Y. (2017). A Literature Review on Chief Executive Officer Hubris and Related Constructs: Is the Theory of Chief Executive Officer Hubris An Antecedents Or Consequences? *Journal of Applied Business Research*, *33*(4), 705-720.

Pedhazur, E. J., & Schmelkin, L. P. (1991). Measurement, Design and Analysis: An Integrated Approach. Lawrence Erlbaum Associates. *Inc.*

Pikulina, E., Renneboog, L., & Tobler, P. (2017). Overconfidence and Investment: An Experiment Approach, *Journal of Corporate Finance*, *43*, 175-192.

Pruitt, D. G. (1983). Strategic choice in negotiation. *American Behavioral Scientist*, *27*(2), 167-194.

Ragsdale, C. (2018). *Spreadsheet Modeling and Decision Analysis*, Cengage Learning.

Renneboog, L., & Vansteenkiste, C. (2019). Failure and success in mergers and acquisitions, *Journal of Corporate Finance*, *58*, 650-699.

Rigdon, M. L., McCabe, K. A., & Smith, V. L. (2007). Sustaining cooperation in trust games. *The Economic Journal*, *117*(522), 991-1007.

Roll, R. (1986). The hubris hypothesis of corporate takeovers. *Journal of Business*, 197-216.

Roosenboom, P., Fidrmuc, J., & Teunissen, T. (2009). *Do Private Equity Investors Really Acquire Target Firms for Less?* Rotterdam School of Management, Erasmus University.

Roth, A. E., & Erev, I. (1995). Learning in extensive-form games: Experimental data and simple dynamic models in the intermediate-term. *Games and Economic Behavior*, *8*(1), 164-212.

Royko, M. (1988). *Boss: Richard J. Daley of Chicago*. Penguin.

Rubenstein, A. (1987). *A Sequential strategic theory of bargaining*, Advances in Economic Theory, Cambridge Press.

Sapienza, H., & Korrsgarrd, M. (2000). Effects of Agency Risk and procedural justice onboard process in venture capital back firms, *Entrepreneurship & Regional Development*, 331-351.

Schaffer, N., & Presser, S. (2003). The Science of Asking Questions, *Annual Review Sociology*, 65-88.

Scharfstein, D. S., & Stein, J. C. (1990). Herd behavior and investment. *The American Economic Review*, 465-479.

Scharfstein, D. S., & Stein, J. C. (2000). The dark side of internal capital markets: Divisional rent-seeking and inefficient investment, *The Journal of Finance*, *55*(6), 2537-2564.

Schwert, G. W. (1996). Markup pricing in mergers and acquisitions, *Journal of Financial Economics*, *41*(2), 153-192.

Skvortsova, I., & Vershininia, A. (2021). Do Cognitive Biases Impact M&A Performance in Emerging Markets? Evidence from Russian Firms, *National University of Higher School of Economics*, 1-28.

Smit, H., & Moraitis, T. (2010). Playing at serial acquisitions. *California Management Review, 53*(1), 56–89.

Staw, B. M. (1976). Knee Deep in the Big Muddy: A study of escalating commitment to a course of action*, Organizational Behavior and Human Performance*, *16*, 27–44.

Trinugroho, I., & Sembel, R. (2011). Overconfidence and excessive trading behavior: An experimental study. *International Journal of Business and Management*, *6*(7), 147.

Tversky, A., & Kahneman, D. (1974). Judgment under Uncertainty: Heuristics and Biases: Biases in judgments reveal some heuristics of thinking under uncertainty. *science*, *185*(4157), 1124-1131.

Van Bockstaele, B., Verschuere, B., Moens, T., Suchotzki, K., Debey, E., & Spruyt, A. (2012). Learning to lie: Effects of practice on the cognitive cost of lying. *Frontiers in psychology*, *3*, 526.

Van den Honert, R.C. (1995). *Game-Theoretic Models for Mergers and Acquisitions,* PhD dissertation, University of Cape Town.

Van Rooij, M., & Lusardi, A. (2011). Financial Literacy and stock market participation*, Journal of Financial Economics*, *101*(2), 449-472.

Von Neumann, J., & Morgenstern, O. (1944). Theory of Games and Economic Behavior. Princeton University Press.

Wang, D., Wang, Y., Yang, J., Huang, Z., & Cui, R. (2021). Managerial Cognitive Bias, Business Transformation, and Firm Performance: Evidence from China, *SAGE Open*, *11*(1).

Wang, Z., Jusup, M., Shi, L., Lee, J. H., Iwasa, Y., & Boccaletti, S. (2018). Exploiting a cognitive bias promotes cooperation in social dilemma experiments. *Nature communications*, *9*(1), 1-7.

Wansink, B., Kent, R. J., & Hoch, S. J. (1998). An anchoring and adjustment model of purchase quantity decisions. *Journal of Marketing Research, 35*(1), 71–81.

Yermack, D. (1995). Do corporations award CEO stock options effectively? *Journal of financial economics*, *39*(2-3), 237-269.

Zhang, W. (1996). *Game Theory and information economics*, Shanghai Joint Publishing.

LIST OF TABLES

Table 1

Descriptive Statistics of the Participants

	N	Min	Max	*M*	*SD*	*Premium Price Correlation*	*ROI Correlation*
Gender:						.303(*p* = .117)	.173(*p* = .379)
Male	26(81.3%)						
Female	6 (18.8%)						
Occupation							
PE Mgrs.	16(50.0%)						
Fam. OM	6(18.8%)						
SEC Law	7(21.9%)						
Inv. Banker	3(9.4%)						
Yrs. Exper.	32	9	38	23.16	9.17	-.187 (*p* = .340)	-.103(*p* = .603)
Edu. Attain.	32	4	9	6.53	1.29	-.179(*p* = .361)	.097(*p* = .624)
Fin. Test score	32	35%	100%	73.97%	41.30%	-.206(*p* = .294)	.473(*p* = .011)
Corr. answers	32	7	20	14.63	2.88	-.203(*p* = .301)	.482(*p* = .009)
Skill level	32	1	5	3.19	1.12	-.196(*p* = .316)	.473(*p* = .011)

Table 2

Participants Summary Statistics by Gender

	Gender	*N*	*Mean*	*SD*
Correct Answers	Male	26	14.63	2.89
	Female	6	16.33	2.34
Confidence Level	Male	26	75.96	11.32
	Female	6	81.67	10.33
CBO Score	Male	26	0.048	0.099
	Female		0.000	0.04

Table 3

ANOVA Results for BtA and CBO score by Occupation

Occupation		BtA $F_{(3,28)} = 3.01$, $p = .05$			CBO $F_{(3,28)} = 2.24$, $p = .11$		
		Mean Difference	SE	Sig.	Mean Difference	SE	Sig.
PE fund managers	Family office investment managers	0.15	0.21	1.00	-0.10	0.04	0.13
	SEC lawyers	0.53	0.20	0.07	-0.03	0.04	1.00
	Investment bankers	-0.19	0.27	1.00	-0.08	0.06	1.00
Family office investment managers	PE fund managers	-0.15	0.21	1.00	0.10	0.04	0.13
	SEC lawyers	0.38	0.24	0.74	0.07	0.05	0.89
	Investment bankers	-0.33	0.30	1.00	0.03	0.06	1.00
SEC lawyers	PE fund managers	-0.53	0.20	0.07	0.03	0.04	1.00
	Family office investment managers	-0.38	0.24	0.74	-0.07	0.05	0.89
	Investment bankers	-0.71	0.30	0.14	-0.05	0.06	1.00
Investment bankers	PE fund managers	0.19	0.27	1.00	0.08	0.06	1.00
	Family office investment managers	0.33	0.30	1.00	-0.03	0.06	1.00
	SEC lawyers	0.71	0.30	0.14	0.05	0.06	1.00

Table 4

Number of Correct Answers and Assigned Skill Level

	10 or less (<50%)	12-13 (60-69%)	14-15 (70-79%)	16-17 (80-89%)	18+ (90% +)
Skill Level	1	2	3	4	5

Note. 32 participants (16 buyers, 16 sellers)

Table 5

Average Skill Level for Each Experiment Type

	Mediocre	Risky	High Yield	Loss Aversion
Choice Exp. #	1	2	3	4
Average skill level	3.27	3.5	2.89	3.25

Note. 32 participants (16 buyers, 16 sellers)

Table 6

Behavior vs Outcomes Summary

	N	%
Paid actual value	6	18.8%
Over paid	8	25.0%
Under paid	18	56.3%

Note. 32 participants (16 buyers, 16 sellers)

Table 7

Correlations from EFA

	BtA	+Answers	ROI/choice	Education	Skill lev.	Fin. Test	CBO Score
BtA		.053	.045	.228	-.008	.046	.251
Gender	-.022	.289	.173	-.137	.209	.297	-.205
Skill level	-.008	.942**	.473*	.040		.941**	-.490**
CBO score	.251	-.629**	-.115	.157	-.490**	-.629**	
Work exp.	-.190	-.379*	-.103	.096	-.456**	-.353*	.023
ROI choice	.045	.482**		.097	.473*	.473*	-.115

** Correlation is significant at the 0.01 level (2-tailed). * Correlation is significant at the 0.05 level (2-tailed). KMO Bartlett's test = 0.56.

Table 8

Correlations to Return on Investment

	ROI/Invest choice	CBO score	Skill
ROI/Invest. choice	1.00		
CBO score #	-.115 (p = .560)	1.00	
Skill level	0.473 (p = .011)	-.490 (p = .004)	1.00

Pearson correlations

	ROI
Occupation	-.278 (p = .153)
BtA	.045 (p = .819)
Skill level	.473 (p = .011)
Years' work experience	-.103 (p = .603)

Table 9

Regression Table for Skill Level, CBO, and Years' Work Experience Predicting ROI

	Unstandardized Coefficient		Standardized Coefficient	t	p	Collinearity Statistics	
	B	SE	B			Tolerance	VIF
(Constant)	-1.870	1.060		-1.764	.095		
Skill level	.526	.182	.803	2.893	.010	.485	2.061
CBO score	2.028	1.692	.287	1.198	.246	.651	1.536
Years' Work Exp	.037	.023	.402	1.621	.122	.609	1.643

*$F (3, 18) = 2.925$, $p = .062$ $R^2_{adj} = .216$

Table 10

Regression Table for BtA Predicting Average Investment w/ Controls

Model	Unstandardized Coefficients		Standardized Coefficients	t	p.
	B	SE	β		
(Constant)	33086527.20	52640275.66		.629	.536
Gender (F = 1, M = 0)	96229409.25	37737094.93	.525	2.550	.018
Years' work experience	-542038.660	1800046.68	-.062	-.301	.766
BtA	9124829.870	28286298.67	.055	.323	.750

*$R^2adj = .231$, $F (3,24) = 3.707$, $p = .025$

Table 11

Regression Results for Hypothesis 1

Part A.

Regression Results for H #1 (N = 16 buyers), regressing the independent variables: CBO score, financial test score and Years' work experience on Premium price paid. (Coefficients in 1,000,000s, Col 1 & 2)

	Col. # 1	Col. # 2	Col. # 3	Col. # 4
	Dep Var: Prem Price t p	Dep Var: Prem Price t p	Dep Var: ROI t p	Dep Var: ROI t p
CBO/	-2.43 (p = .678)		.32 (p = .941)	
BtA		-3.48 (p = .58)		-.02 (p = .968)
Fin. Test	-90.5 (p = .021)	-91.9 (p = .020)	4.35 (p = .106)	4.34 (p = .108)
Years' Work Exp	-1.37 (p = .011)	-1.43 (p = .010)	0.03 (p = .393)	0.03 (p = .410)
Constant	98.2 (p = .014)	100.30 (p = .013)	-3.07 (p = .235)	-3.04 (p = .254)
F, R^2_{adj}	F (3,10) = 3.61, R^2_{adj} = .376	F (3,10) = 3.71, R^2_{adj} = .385	F (3,10) = 1.08, R^2_{adj} = .018	F (3,10) = 1.08, R^2_{adj} = .018

Part B.

Col. # 1. Coefficient results.

Premium price paid	Coefficient	Std. Err. t	t	p
CBO score	-2,300,000	56,800,000	0.678	-.43
Financial Test score	-9,500,000	33,200,000	0.021	-2.72
Yrs. work Experience	-1,374,609	442,007.5	0.011	-3.11
_constant	98,200,000	33,000,000	0.014	2.98

Part C.

Col. # 2. Coefficient results.

Prem. price paid	Coefficient	Std. Err.	*t*	*p*
Better than Avg.	-3,481,579	5,981,109	-0.58	0.573
Financial Test score	-91,900,000	33,100,000	-2.78	0.020
Yrs. work Experience	-1428535	449760.5	-3.18	0.010
Constant	103,000,000	33,800,000	3.04	0.013

Column # 3. Coefficients from the Regress ROI / Invest Choice on: CBO score, Financial Test score, Yrs. work Experience.

ROI Invest / Choice	Coefficient	Std. Err.	*t*	*p*
CBO score|	.3191325	4.189937	0.08	0.941
Financial Test score|	4.354762	2.447629	1.78	0.106
Yrs. work Exp.	290,727	.032579	0.89	0.393
Constant	-3.071439	2.430135	-1.26	0.235

Part D.

Column #4. Coefficients from the Regress ROI / Invest Choice on: BtA, Financial Test score Yrs. work Experience

ROI Invest Choice	Coefficient	Std. Err.	*t*	*p*
Better than Average	-.0183313	.4443113	-0.04	0.968
Financial Test score	4.3389	2.458382	1.76	0.108
Yrs. Work Exp.	.0287119	.0334108	0.86	0.410
Constant	-3.036847	2.511151	-1.21	0.254

APPENDIX A: IRB APPROVAL LETTER

PEPPERDINE

NOTICE OF APPROVAL FOR HUMAN RESEARCH

Date: October 29, 2020

Protocol Investigator Name: Darryl Laws

Protocol #: 20-07-1408

Project Title: Irrational Behavior in Mergers and Acquisitions

School: Graziadio School of Business and Management

Dear Darryl Laws:

Thank you for submitting your application for exempt review to Pepperdine University's Institutional Review Board (IRB). We appreciate the work you have done on your proposal. The IRB has reviewed your submitted IRB application and all ancillary materials. Upon review, the IRB has determined that the above entitled project meets the requirements for exemption under the federal regulations 45 CFR 46.101 that govern the protections of human subjects.

Your research must be conducted according to the proposal that was submitted to the IRB. If changes to the approved protocol occur, a revised protocol must be reviewed and approved by the IRB before implementation. For any proposed changes in your research protocol, please submit an amendment to the IRB. Since your study falls under exemption, there is no requirement for continuing IRB review of your project. Please be aware that changes to your protocol may prevent the research from qualifying for exemption from 45 CFR 46.101 and require submission of a new IRB application or other materials to the IRB.

A goal of the IRB is to prevent negative occurrences during any research study. However, despite the best intent, unforeseen circumstances or events may arise during the research. If an unexpected situation or adverse event happens during your investigation, please notify the IRB as soon as possible. We will ask for a complete written explanation of the event and your written response. Other actions also may be required depending on the nature of the event. Details regarding the timeframe in which adverse events must be reported to the IRB and documenting the adverse event can be found in the *Pepperdine University Protection of Human Participants in Research: Policies and Procedures Manual* at community.pepperdine.edu/irb.

Please refer to the protocol number denoted above in all communication or correspondence related to your application and this approval. Should you have additional questions or require clarification of the contents of this letter, please contact the IRB Office. On behalf of the IRB, I wish you success in this scholarly pursuit.

Sincerely,

Judy Ho, Ph.D., IRB Chair

cc: Mrs. Katy Carr, Assistant Provost for Research

APPENDIX B: RESEARCH INSTRUMENTS

Finance Knowledge Test Questions

This Finance Test is designed to help you assess your knowledge of important finance concepts, terminology definitions, and frequently used calculations. The substance of the test is used to determine your skill level in: finance including reading Financial Statements, Corporate Finance, and Math for Corporate Finance. If you pass this test with 80% or above (16 questions or more), it is likely that you have a strong background in finance.

- 1. The concept of present value relates to the idea that*
    - o The discount rate is always higher when you invest now than in the future
    - o The discount rate is always higher when you invest in the future than now
    - o The money you have now is worth less today than an identical amount you would receive in the future
    - o The money you have now is worth more today than an identical amount you would receive in the future
- 2. The formula for calculating future value (FV) is*
    - o $FV = PV/(1+r)^n$
    - o $FV = PV/(1+r)*n$
    - o $FV = PV \times (1+r)^n$
    - o $FV = PV \times (1+r)*n$
- 3. If you were able to earn interest at 3% and you started with $100, how much would you have after 3 years?*
    - o $91.51
    - o $109.27
    - o $291.26
    - o $103.00
- 4. Based on the numbers given below, calculate the net present value (NPV) of this project.*

Required rate of return	12%			
Time	0	1	2	3
Future value	-500	100	250	380

   - o 59.06
   - o 459.47
   - o 230.00
   - o 205.36
- 5. What is an annuity?*
    - o An investment that has no definite end and a stream of cash payments that continues forever
    - o A stream of cash flows that start one year from today and continue while growing by a constant growth rate

- - A series of equal payments at equal time periods and guaranteed for a fixed number of years
  - A series of unequal payments at equal time periods which are guaranteed for a fixed number of years
- 6. Calculate the price of a dividend paying stock using the following information, assuming the price is equal to the present value of all future dividends one will receive from owning the stock. (Hint: treat the stock as a growing perpetuity)*

Dividend	$4.50
Growth rate	2%
Required return	12%

  - $37.50
  - $32.14
  - $42.60
  - $45.00
- 7. What is a par value of a bond?*
  - The amount borrowed by the issuer of the bond and returned to the investors when the bond matures
  - The overall return earned by the bond investor when the bond matures
  - The difference between the amount borrowed by the issuer of bond and the amount returned to investors at maturity
  - The size of the coupon investors receives on an annual basis
- 8. When the price of a bond is above the face value, the bond is said to be*
  - Trading at par
  - Trading at a premium
  - Trading at a discount
  - Trading below par
- 9. Which of the following is true when a bond is trading at a discount?*
  - Coupon Rate > Current Yield > Yield to Maturity
  - Coupon Rate < Current Yield < Yield to Maturity
  - Coupon Rate = Current Yield = Yield to Maturity
  - Coupon Rate < Current Yield = Yield to Maturity
- 10. The concept of time value of money is that*
  - The cash flows that occur earlier are more valuable than cash flows that occur later
  - The cash flows that occur earlier are less valuable than cash flows that occur later
  - The longer the time cash flows are invested, the more valuable they are in the future
  - The future value of cash flows is always higher than the present value of the cash flows

- 11. What is the enterprise value of a business?*
  - o The market value of equity of the business
  - o The book value of equity of the business
  - o The entire value of the business without giving consideration to its capital structure
  - o The entire value of the business considering its capital structure
- 12. Which of the following is the formula to calculate cost of capital?*
  - o Total assets/Net debt x Cost of debt + Total assets/Equity x Cost of equity
  - o Net debt/Equity x Cost of debt + Equity/Net debt x Cost of equity
  - o Net debt x Cost of debt + Equity x Cost of equity
  - o Net debt/Total assets x Cost of debt + Equity/Total assets x Cost of equity
- 13. Company A has a capital structure of $80M debt and $20M equity. This year, the company reported a net income of $17M. What is Company A's return on equity?*
  - o 117.6%
  - o 21.3%
  - o 85.0%
  - o 28.3%
- 14. Which of the following is not an investment grade credit rating?*
  - o BB+
  - o BBB+
  - o BBB
  - o BBB-
- 15. Which of the following is not true about private equity funds?*
  - o Private equity funds are pools of capital invested in companies which represent an opportunity for high rate of return
  - o Exit strategies for private equity funds include Initial Public Offerings (IPOs) and leveraged buyout (LBO)
  - o Venture capital is an example of private equity funds
  - o Private equity funds are usually invested for unlimited time periods
- 16. ____ underwriting commitment is when the underwriter agrees to buy the entire issue and assume full financial responsibility for any unsold shares.*
  - o Best efforts
  - o Firm commitment
  - o All-or-none
  - o Full-purchase
- 17. The correct order of capital stack from the most to least secured is*
  - o Equity > Subordinated debt > Senior debt
  - o Subordinated debt > Senior debt > Equity
  - o Senior debt > Subordinated debt > Equity
  - o Senior debt > Equity > Subordinated debt

- 18. Which of the following is not a financing activity?*
  - o Repayment of long-term debt
  - o Issuance of equity
  - o Investments in businesses
  - o Payment of dividends
- 19. What is working capital?*
  - o Equity Capital + Retained Earnings
  - o Equity Capital - Total Liabilities
  - o Total Assets - Total Liabilities
  - o Current Assets - Current Liabilities
- 20. Which of the following is not true about goodwill?*
  - o Goodwill needs to be evaluated for impairment yearly
  - o Goodwill is treated as a tangible asset in accounting
  - o Goodwill is a result of purchasing a company for a price higher than the fair market value of the target company's net assets
  - o Goodwill can be comprised of things such as good reputation, loyal client base, and brand recognition

Answers to the Finance Knowledge Test Questions

- 1. The concept of present value relates to the idea that*
  - o The discount rate is always higher when you invest now than in the future
  - o The discount rate is always higher when you invest in the future than now
  - o The money you have now is worth less today than an identical amount you would receive in the future
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- o The difference between the amount borrowed by the issuer of bond and the amount returned to investors at maturity
  - o The size of the coupon investors receive on an annual basis
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  - o Goodwill can be comprised of things such as good reputation, loyal client base, and brand recognition

Moderator's Script for Game Theory Experiment Participants

Measures of Skill and Overconfidence (Step # I)

You (participants) will be asked to answer twenty (20) financial knowledge questions to measure your skill level, which corresponds to the level of your financial knowledge. For each question, you are asked to choose the correct answer from several alternatives. The financial knowledge questionnaire is loaded on Qualtrics. Here is the link: **www.login.qualtrics.com/login**. Login ID: Darryl.laws@pepperdine.edu Password: password5432. Your responses and your scores will be stored on this platform. This test should not take more than thirty minutes.

After making your choice for each question, the researcher will assign a probability that the choice is correct (between 50% and 100%; both extremes are also allowed). A participant's average probability that you have correctly answered the questions corresponds to your subjective confidence in your financial knowledge. This probability will be assigned by the researcher. The researcher expected that the participants with higher confidence levels will choose higher investment levels in Step # 2.

Table I: Number of Correct Answers and Skill Level					
Number of correct answers	10 or less	12 or 13	14 or 15	16 or 17	18 +
50% < 60%+	70%+	80%+	90%+		
Skill level	1	2	3	4	5

Investing (Step # II) From the onset of step 2, the participants estimated and reported their skill level (Table I). The participants' skill level was constant during step 2 and is defined only by the

number of correct answers given in step 1. Half of the participants were not informed about their performance in step 1. This control group was tasked with forming a guess about the number of correct answers they gave and the resulting skill level without being told (Table 3).

Investment levels in Step 2. The basic tenets of the four (4) experiments included:

- In each transaction, the participant's potential reward depended on their respective skillsets attained in Step I and the amount that they invested and the ROI derived from it.

- The payoff was maximum when the participants made investment decisions that were equal to their achieved skills level findings (Pikulina and Renneboog, 2017), (Holt and Laury, 2002).

- **Control group** – 16 of the participants were told what the assessment of their investment skills was in Step 1. The control group's results were statistically compared to the group that had been apprised of their skills level so as to validate invalidated skills levels and tenets: overconfidence, lying for strategic advantage, and co-operation versus non-cooperation.

- The **non-control** group's decisions were solely based on their beliefs in their skills level, having been advised of their scores in Step I. (n=16).

- Half of the participants (n=16) were designated as a control group and told of their performance and their skill level in accordance with Table # 1. The control group is shown Table # 2.

- **Experiments** – thirty-two (32) participants were assigned roles as either a buyer (n=16) or a seller (n=16) of a private company in one of the four (4) acquisition (investment) scenarios that the researcher predesigned.

- Twenty-nine (29) participants engaged in one experiment one (1) time, and three (3) participants engaged in a second experiment (game) with unique or different pairings.

- The participants were pseudo-randomly paired without either being aware of the other's skill level, work experience, and educational attainment.

- Each buyer (investor) was given an endowment of $5 million to invest in a chosen transaction from four (4) experiments simulating various levels of risk and ROI.

- The participants were told that they were allowed to "leverage up" senior debt (3:1) in order to pursue a larger acquisition transaction.

- Each seller was given the *pre-money* value of their company and the initial capitalization so that they had a benchmark from which to negotiate a sale.

- Coupled with # 9 above, participants were assigned a role to lie about certain facts or to co-operate versus non co-operate in the negotiating process. (Basic Instructions pg. 148).

- Each seller was given a company valuation to achieve on the sale of their company.

- Similarly, each seller was assigned a role to act overconfident or to lie about certain facts, or to co-operate / non co-operate in the negotiating process.

- **Participant's objective** - each participant was instructed that their objective was to maximize their ROI through decision-making and interaction in negotiating while exhibiting their inherent traits (via their assigned roles).

- **Levels of ROI** were spread across each of the four experiments investment/acquisition transactions simulating (a) a mediocre transaction, (b) a high risky transaction) a high yield transaction, and (d) an acquisition of a company to be acquired for its synergies without significant cash flow (i.e., risk avoidance).

Basic Instructions to participants: The following instructions to the cohorts'

participants were posted on the Zoom platform home screen prior to each participant being

separated into a session for the respective simulated transaction/experiment. Essentially, the

instructions given them were (see Basic Instructions, p. 150):

- You will be paired into groups of two; as a buyer (investor) or seller.

- You will be assigned separate roles, as either a buyer's or seller's perspectives and
  objectives at the onset of the experiment. (The first person to draw a number from the
  hat for paring is designated as the buyer.)

- Your role as a buyer or seller will not alternate in experiments. You will not be paired
  with the same person if you participate in other experiments (transactions).

- In each experiment, you will have ninety (90) minutes to arrive at an outcome: an
  agreed purchase price (purchase/sale), non-agreement, or some form of a compromise
  agreement.

- Each of the thirty-two participants in the cohort will have a chance to participate in
  one of the four experiments.

- The buyer (investor) will be given an endowment of $5 million to invest in each of the
  experiments' simulated transactions with various levels of ROI.

- The buyers will be allowed to leverage (3:1, debt to equity) their purchases, buy stock
  short and or long, and negotiate owner carried back financing.

- The cost of capital was factored into each participant's ROI at 8% per annum
  (accumulatively) (refer to experiment's overview win Appendix).

- Coupled with this, the buyer/seller will be given a behavioral role of overconfidence
  bias, or lie for strategic advantage or co-operate or non-cooperate, about certain facts

in the negotiating process. (Note: These were assigned at the time in which the investment choice the experiment was chosen by the buyer with the seller agreeing.)

- The researcher will monitor the experiments in addition to video recording them and noting the behavior roles that may not be assigned but may manifest themselves in the negotiation interaction. Note: In running the regression models, values will not be imputed for the individuals' behavior in these instances. However, the causal variables that were used by the respective participant will categorize that participants as having exercised the respective behavior (causal variable).

- The seller will be given a company valuation to achieve on the sale of their company. Similarly, the seller will be assigned a role to co-operate or non-cooperate, asymmetrical information, or lie about cert facts in the negotiating process.

- **Participant's objective** - each participant is to try to maximize your ROI through negotiations while exhibiting their respective inherent traits coupled with those from their assigned roles) of: asymmetrical information sharing, lying for strategic advantage, and co-operate or not co-operate in the negotiations.

- **Levels of ROI** are calculated on the one or the average of the two transactions (experiment) in which you participated in.

- The participants' average ROI computation will be based on the one experiment in which you achieved your best result.

- **Zoom call experiment timeline**: 10 minutes for instructions at commencement, 90 minutes to negotiate, 10-15 minutes to debrief at the end of each game.

- Each participant received a $100 Amazon gift card for proving the researcher their time.

- The participant with the highest ROI amongst all experiments combined received a $1,500 gift card.

Experiments - Simulated Acquisition/investment transaction (Step 2).

- At the onset of step 2, half of the participants decided (perceived) on their personal skills level. Their skill level was constant during the investment process in step 2 and was defined only by the number of correct answers they gave on the financial knowledge test in step 1 (Pikulina and Renneboog, 2017).

- Fifty percent of participants were not told about their performance in the skills assessment in step 1. However, these control group participants each formed a belief about the number of correct answers they gave and the resulting skill level (Pikuina, 2017).

- In the experimental task, the participants choose an investment level to maximize their earnings in different investment transactions.

- In each transaction, the participant's earnings are equal to the realized revenues plus their initial endowment.

- The cost of the investment transaction depends on the negotiated level of the acquisition price paid for the private company.

- The players were allowed to leverage their respective acquisitions in each experiment.

- The participants will interact with one another as a seller and buyer, each assimilating a role assigned to them in the scenarios depicted below with each type of investment transaction.

- The researcher has developed a moderator's script to instruct the participants and to give them a thumbnail sketch of the experiments. (See Moderator's Script).

- Each game theory experiment will be preceded by the researcher posting the instructions to the participants on the Zoom screen for all participants to read.

- These instructions to the participants will include the context of the game, the participant's respective roles, and the expectation of a negotiation position for the buyer/seller in each experiment.

- The researcher found an IT expert that had run virtual speeches and campaign platforms for local candidates for the California State legislature and United States Congress 2020 elections. The expert possessed a license with ZOOM for up to 100 participants on six computers. The IT expert-created six moderator accounts on each on six different computers so that the researcher could run the experiments concurrently while sitting in their facility, which has the necessary bandwidth to do so, and monitor and moderate each experiment when necessary. The IT expert recorded the experiments and stored them on the videos on three zip drives without accessing the files. Once the files were downloaded, they were transferred to the zip drives in the researcher's presence. The recorded videos were transferred the same day the experiments were conducted and in the researcher's presence. At no time did the IT expert of their team take control of the videos.

- A test run was be conducted on December 15 2020, with a few persons in the researcher's private equity fund's office to debug any flaws in the design and implementation plan. However, the test run participants were not part of the study experiments.

The pairing of Participants for the Experiments

Participants were pseudo-randomly paired by pulling numbers out of a baseball hat at the onset of each round of experiments conducted in December 2020 and January and February 2021.

M&A transactions for a private company investment overview. The four basic transactions simulated acquisition/investment transactions were each designed with different degrees of risk and ROI and presented to the participants with the four embedded factors. To guarantee an optimal investment choice level for each participant's skills level, the revenue function was constructed such that earnings = revenues + endowment - the cost of the investment (Pikulina and Renneboog, 2017). Earnings were at the highest only when the chosen investment level equals a participant's actual skill level. Both underestimation and overestimation of one's skill can lead to sub-optimal investment selections (Pikulina and Renneboog, 2017). To maximize earnings, participants with skill level 1 should choose investment level 1, subjects with skill level 2 should choose investment level 2, and so on (Pikulina and Renneboog, 2017). The context scenarios included bias and rational and irrational behaviors showing overconfidence, lying for strategic advantage, and co-operation versus non-cooperation.

Experiment #1. Mediocre Investment Transaction Overview

A business associate of 20 years approaches you and asks you to acquire a controlling stake of 60% of the shares in their private company for $5 million. The company has struggled for 12 months during the COVID-19 economic slowdown. He wants to continue to run the company as its CEO. Due to cash flow restraints, the company cannot ramp up the production of its primary product, which has constant demand. The company will be valued at $80 million post-licensing. The company averages net margins of 9% while its peers are attaining 14%. You

know that he is an average businessman and you could install a CEO to run the company for you more profitably. Apple's worldwide sales for the iMac, which the IP would be incorporated into, are $1.2 BN annually.

- **Scenario applied**: Non-cooperation (inclusive of asymmetrical information sharing). The sellers in this experiment were given written and verbal instructions prior to the experiments to not cooperate, to misrepresent facts surrounding the tenets of the transaction. Empirical observation via recorded videos confirmed that the participants following or not following their instructions.

- **Cumulative additions.** The buyer (investor) does not disclose: 1) that the fund does not permit more than 20% of their fund size to be allocated to one transaction and that $5 million exceeds their mandate, 2) that he believes that he can convince their managing partner of the PE fund to provide the equity capital required to do the transaction, 3) a friend in the Apple investment department has advised him of Apple's interest in licensing of the borrower's company's intellectual property and a potential royalty stream of payments at 4% per annum after the IP has been incorporated into the hardware of the new iMacs that are manufactured and sold by distributors.

Prompts for the buyer:

- An investor is conservative, greedy, and short-sighted when it comes to achieving the mandate for deploying the fund's capital. He wants to acquire the whole company cheaply and squeeze the seller out by offering him some cash and an earn-out structure that does not provide the seller any compensation until the buyer has recouped half of their investment back in the first three years.

Prompts for the Seller:

- The private company owner, the borrower, knows that their company's value will increase to 16 X after Apple signs the license agreement and pays its' initial licensing fee. The licensing fee is $1.5 million, and the annual royalty stream payments are 4%. The royalty is paid out in arrears annually, and the first payment is due in one (1) year.

- The seller does not disclose: 1) that he is desperate because the banks will not lend capital to the company so that he can launch the new product that their R&D department has developed from its new intellectual property. The new IP has significant profit potential. It attracted Apple's interest in licensing it and incorporating it into their new iMac at an industry trade show. A licensing deal with the borrower's company for intellectual property would result in a potential four percent (4%) royalty stream of payments per annum after the IP has been incorporated into Apple's iMac then manufactured and sold to distributors.

Experiment #2. High-risk investment Transaction. This was not depicted as high risk when given to the participants. It was denoted simply as investment #2. An oilman approaches you seeking an investment of $5 million for a 25% working interest in an oil field with proven reserves and operating wells. The company's six oil wells are producing 1,500 barrels of oil per day total. The oilman's overhead is 18% of revenue from the oilfield. The company's annual sales are $45 million. Currently, the oil market is flooded with an excessive oil supply, and there is no storage available for the surplus commodity. Due to this oversupply, the selling price of a barrel of oil is constant at $45 a barrel (West Texas Intermediate pricing). There is a potential war occurring in Armenia. A peace accord in Iraq has not been reached, and Iran's oil is prohibited from being sold in international markets due to U.S. sanctions. The cost of storage of

oil is estimated to be .55 cents per barrel per month. The company currently has 500,000 barrels in storage. Transportation to market costs $1.50 per barrel. Their extraction cost is $13 per barrel.

The company's revenues and output are affected by erratic shocks due to wars, politics, and the country's domestic economy in which the oil is extracted. These shocks do not depend on a manager's skill and cannot be predicted. These shocks of spikes can cause erratic swings in market values of: -1.50, -1.40, -1.30, -1.20, -1.10, 0, 1.10, 1.20, 1.30, 1.40, or 1.50 dollars per barrel with equal probability. Their extraction cost is $13.00 per barrel.

Scenario applied: Lying for strategic advantage.

- **Prompt - Buyer:** Lying for strategic advantage drive the buyer's motivation. The buyers in this experiment were given written and verbal instructions in the breakout sessions prior to the experiments to lie for advantage about material facts surrounding the tenets of the transaction in order to observer whether or not it impacted the premium price paid for the privately held company. Empirical observation via recorded videos confirmed that the participants followed or not follow their instructions.

- **Prompt - Seller:** Fein cooperation. The seller knows a refiner who will refine their oil more cheaply per barrel than other refiners but does not disclose this. The seller wants to retain the savings between the cheaper refinery and the typical market cost to refine the oil.

Experiment #3. High Yield Acquisition Transaction. This transaction was not depicted as a high-yield investment transaction when described to the participants. The transaction was denoted as investment # 3.

To provide participants with stronger investment incentives, the researcher introduced an investment transaction called the *high yield transaction*. In this investment transaction, their economic payoff depended on their investment amount in their respective investment choice (risk level) and skills shown and paying the right price resulting from their negotiations in step 1. (Valuation metrics were embodied in the content of each experiment / transaction that enabled the participants to calculate a plausible purchase price.) The participants' economic payoff was maximized when they made investment decisions congruent with their actual skill level (see Table 3).

Investment Transaction. Desmond has entered into a purchase agreement to acquire six (6) existing *Buffalo Wild Wings* restaurants in Dallas, Texas, with a revenue run rate of $28 million annually and an EBITDA of $5.1 million in 2019. The restaurants' revenues are up to $50,000 year over year as of June 2020. He is arranging the company's equity capital stack and requires an additional $5 million of equity. Desmond is willing to pay an 8% hurdle rate (preferred return) on the capital invested quarterly in arrears to secure a private equity investor. He is offering 20% equity ownership of the company's common shares. At the end of five (5) years, he expects to drive revenues up to $75 million with a $9.3 million "Trailing Twelve Months" (TTM) EBITDA. He intends to sell the asset at a multiple of 6 x TTM EBITDA at that time. Note: he has cash on hand of $250,000 and an inventory of $450,000. There are no soft drink company rebates available from Coca-Cola. The rent factor is 6% of the company's gross sales, and the G & A cost is 3.5% of the gross sales.

- **Scenario applied:** Lying for strategic advantage by the seller and noncooperation. The buyers in this experiment were given written and verbal instructions in the breakout sessions prior to the experiments whether or not to cooperate or to not

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cooperate about material facts surrounding the tenets of the transaction in order to observer whether or not it impacted the premium price paid for the privately held company. Empirical observation via recorded videos confirmed that the participants following or not following their instructions.

- The PE fund manager (buyer) is an astute and experienced business investor. ROI yield on investment and safety and security of the investment drives his motivation.

- Both the buyer and seller are informed and realize that they may have to compromise; however, not beyond the reach of their expected best prices.

- **Prompt- seller:** The private company seller is cooperative but cautious.

- **Prompt – buyer:** The buyer is confident that he can acquire more than 35% of the company and a seat on the Board of Directors to protect their investment via voting control of the company.

Experiment #4. Cash Preservation (Loss Aversion) Transaction. An acquisition for synergies with no cash flow. Some of the participants, specifically family office-fund managers are loss averse and set a maximum investment threshold on their initial endowment of $5 million. In this case, while making their investment choice of risk, their conservative judgement of their skill level and their personal confidence in their ability impacts their choice of risk taken and they choose to deploy a marginal amount of the endowment capital in what they perceive to be a non-risk investment choice. This preservation of capital transaction provided participants with identical incentives so that the researcher could assess their appropriate skill level irrespective of their actual or believed skill level and determine their loss aversion perspective. In this investment transaction, the costs of the investment level are the same for each participant.

Investment Transaction. Your broker calls you and tells you an institutional block of 2,000,000 shares held by a pension fund that invested in Netflix's stock because its revenues are going through the ceiling from subscription revenues during the stay-at-home regulations for COVID-19. You ask yourself, "How many shares do you buy if they are selling at $100 shares?"

In the meantime, the Netflix stock price splits and increases to $300 per share during the first thirty days that you own the publicly traded shares. Your broker tells you to hold the stock as their analysis indicates that it should be held longer for a much larger profit.

- COVID-19 cases start to decrease, and people are returning to work and school. Do you hold the stock or sell?

- **Scenario applied**: Cautious, careful, risk avoidance of loss. The buyers in this experiment were given written and verbal instructions in the breakout sessions prior to the experiments how to avoid taking risk and to be cautious of how the seller communicated material facts surrounding the tenets of the transaction in order to observer whether or not it impacted the premium price paid for the privately held company. Empirical observation via recorded videos confirmed that the participants following or not following their instructions.

- **Prompt – seller:** The seller is compelled as a public company to make full disclosure - symmetrical information but not cooperative in making disclosing all of the facts.

- **Prompt – buyer:** Lying for strategic advantage. He does not have the liquidity to acquire the block of shares but wants to buy them. He may have to borrow from the broker-dealer, but he does not want the broker to know.

1. **Player's roles defined**:

- **The buyer** is driven by the rapid appreciation in Netflix's stock value and the ability to quickly dispose of the shares if the pandemic outlook significantly changes after a vaccine is approved and turns a quick profit. The private equity buyer has three friends who are mutual fund managers whose respective funds own 12% of the shares in the market. He knows that he can buy their shares in street names without filing a form 13-D disclosing their holdings. This would position him to either conduct a hostile takeover or arbitrage the shares.

- However, Netflix has attained a multi-billion dollars market capitalization in the past twelve months. It is in dire need of new management and human infra-structuring to continue its value trajectory.

- **Seller:** Because of its poor management regime, there is minimum cooperation afforded investors who seek more information.

2. **Prompt for buyer and seller**:

- The broker-dealer has noted that the buyer has been slow to repay the firm in the past when he has shorted stock and that most likely he will require the buyer to leave the shares in *street name* on the firm's books during the holding period so the broker-dealer may liquidate them in the event the buyer cannot repay.

APPENDIX C: GLOSSARY OF TERMS

1. **Agency** - An agency relationship is defined as a condition under which one or more owners or private equity fund managers, (the principal(s), engage a manager (the agent) to perform a service on their behalf which involves delegating decision-making authority to the agent.

2. **Asymmetrical information**. the unequal distribution of information between a buyer and seller in a merger or acquisition transaction.

3. The **axiomatic** game theory approach is depicted by the co-operative approach amongst the players.

4. **Behavioral biases.** Behavioral bias can explain by an example of a fund manager who sincerely believes that an acquisition or merger is in the best interests of their stockholders or in later case limited partner investors but that their belief is not rationally based.

5. **Behavioral economics** – the operating assumption of behavioral economics is that cognitive biases often prevent people from making rational decisions, despite their best efforts (Ariely, 2009).

6. **Better-than-Average.** When individuals assess their relative skill, they tend to overestimate their acumen relative to their peers (Larwood & Whittaker, 1977). Belief that the decision-maker is more intelligent than others (Deavees et al, 2009).

7. **Bounded rationality** decision making is defined as when individuals make decisions their rationality is limited by the tractability of the problem and the cognitive limitations of their mind.

8. CBO score is the difference between a participant's average confidence in their responses and the actual reported number of correct answers to the 20-question financial knowledge test. Overconfidence occurs when one's belief in one's ability exceeds reality. Studies that compare

average confidence to average success rates are called calibration studies. A person is deemed "well calibrated" if, over a large set of trials, his or her average confidence rating is equal to his or her success rate.

9. **Cognitive bias** is a phenomenon underlying irrational decisions, which is a mistake in reasoning, evaluating, remembering, or other cognitive processes. Cognitive bias often results from maintaining personal preferences and beliefs regardless of contrary information.

10. **Co-operation.** The deviation from self-interest where individuals show regard for others well-being, fairness principles, or a general willingness to empathize. Communication collusion in resolving a coordinated problem. Example: the free and openly sharing of transaction information between buyers and sellers as such that equilibrium is achieved in expectation and economic outcome. In this instance co-operation is a nominal behavioral action.

11. **Deception.** any distortion of or withholding of fact with the purpose of misleading others. For example, a researcher who has not disclosed the true purpose of an experiment to a participant has engaged in deception.

12. **Equilibrium**. is defined as a combination of decision rules or strategies, one for each decision maker or player, in which each player's strategy maximizes their personal expected utility or payoff given the strategies of others who are deciding in the same way.

13. **Escalation of commitment / a.k.a. sunk cost fallacy.** Escalation of commitment refers to the psychological condition whereby people continue to support or believe in something that is repetitively failing (Dhir and Mital, 2012).

14. **Fund manager's overconfidence.** From a practitioner's perspective overconfidence is typically defined as an executive's exaggerated self-confidence or pride (Dhir and Mital, 2012).

15. *Irrational –* The American Psychology Association the state, condition, or quality of lacking

    rational thought. The term is typically used in relation to cognitive behavior, e.g., thinking,

    decision making that is illogical or delusional. In psychology the phenomenon that causes

    irrational decisions is called cognitive bias, which a mistake in reasoning, evaluating,

    remembering, or other cognitive process, often occurring as a result of holding onto one's

    preferences and beliefs regardless of contrary information.

16. **Lying -** Dan Ariely, a behavioral economist at Duke University, in books Predictably

    Irrational and the (Honest) Truth About Dishonesty, makes the case that we are all probably

    both. He states that in general, anything that causes emotion — sexual arousal, or hunger, or

    anger, or compassion — can lead to irrational behavior. Emotions are inherently nonrational.

    The reasons we lie boil down to two principal objectives: to prevent something we find

    undesirable from happening or to help us secure something we find desirable but anticipate

    we won't succeed in getting if we're honest about things. Crawford, (2001) posited that

    lying for strategic advantage about planned actions, or intentions, is a common feature of

    economic and political as well as military life. Such lying frequently takes the form of

    active misrepresentation, as opposed to less than full, honest disclosure.

17. **Non-cooperation.** During binary economic events with financial stakes an individual

    maintains his personal self-interest above other individuals without showing regard for others

    well-being, disavowing fairness principles and exhibiting complete general unwillingness to

    empathize.

18. **Overconfidence**- Overconfidence is the tendency of individuals to consider themselves

    above average on positive characteristics (Kruger, 1999; Alicke, 2005). Overconfident

    decisions often indicate a loss of contact with reality and an overestimation of one's own

    competence or capabilities, especially when the person exhibiting it is in a position of power.

    The difference between the participant's belief in their competence abilities in mergers and

acquisitions negotiations, their experience, and their actual competency (performance = ROI on investment or over / under paid for the purchase of the private company).

19. **Premium price.** The acquisition or merger premium for a publicly traded company is defined as the difference between the offer price and the market price of a target company after the announcement of the transaction. Whereas the acquisition premium of a privately held company is the difference between the estimated real value of a company and the actual price paid for it. Premium prices paid (overpayment) were assessed by using researching Business Valuation Resources and Pratt's business valuation publications for (private and public) companies sold for the last five years.

20. **Rational behavior** is often explicitly defined as analytical, logical and conscious (Dane et al. 2011; Dane and Pratt 2007; Denes-Raj and Epstein 1994; Epstein 1994; Evans 2010; Kaufmann et al. 2014; Reber et al. 2007).

21. **Strategic dominant** game theory approach model depicts outcomes in a non-co-operative game in a merger or acquisition transaction. The strategic dominant game strategy is simply the lack of cooperation in sharing information that is vital to the decision-making in an interaction in which the dominant player possess the information that gives him an advantage.

22. **Zero sum** *or non-cooperative game is a game* in which there is only one winner such as in football.

APPENDIX D: EMPIRICAL OBSERVATIONS AND PREDICTIONS

Quantitative research is generally empirical in nature; it relies upon observation and in some cases, experimentation. Quantitative research is usually highly structured, with results which have numerical values. Quantitative research is empirical research where the data are in the form of numbers. These results can be compared with other number-based results.

Empirical evidence is primarily obtained through observation during experimentation. The observations or experiments are known as primary sources. Observational research can help us understand more about causal associations between treatments and outcomes and more about the world in general. These non-interventional studies have become valuable tools in because they offer broad ways to answer real-world clinical research and product usage questions.

Onwuegbuzie, Burke and Colling (2009) provide a philosophical justification for analyzing qualitative and quantitative data within the same study. First, they presented several recent typologies of analyses in science research that incorporate both mono-methods (i.e. purely quantitative research or purely qualitative research) and mixed research studies. Second, they discuss what has been referred to as the fundamental principle of empirical data analysis, wherein both qualitative and quantitative data analysis techniques are shaped by an attempt to analyze data in a way that yields at least one of five types of generalizations.

Via my experiments simulating acquisitions transactions I was able to investigate one-off profit maximization occurrence amongst private equity and family office fund managers as well as investment bankers and SEC registered attorneys and by using make generalization solely to the participants in my research study.