MERGERS AND ACQUISITIONS IN FOOD AND AGRIBUSINESS: RETURNS, DRIVERS, AND LONG RUN PERFORMANCE

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This thesis is dedicated to all those who thought I'd never make it…Honestly, I'm as surprised as you are.

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LIST OF ABBREVIATIONS

Abbreviation	Description
MM	Market Model
MAR	Market Adjusted Model
AR	Abnormal Returns
CAR	Cumulative Abnormal Returns
COAR	Compounded Abnormal Returns
BHAR	Buy and Hold Abnormal Returns

ABSTRACT

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Food and agribusiness in the U.S is a dynamic and ever changing business. The industry has seen booms and busts, considerable consolidation, and continued globalization in the past few decades. Businesses operating within its sectors have had to demonstrate flexibility and adaptability as the industry's landscape consolidates at the consumer, supplier, and producer level. One strategy companies have used to grow and position themselves throughout years of industry consolidation has been merger and acquisition (M&A) transactions.

During the eleven years from 1985 and 1995, the food industry was listed in the top 10 M&A most active industries ten times. It was counted in the top five for six of those years (Adelaja et al. 1999). This highlights the significance M&A has played in food and agribusiness. Despite the prevalence of M&A, there exists much dispute on the value of it, and whether it is beneficial to shareholders at all. The impact of M&A on shareholder value and company performance following a transaction or transaction's announcement is the focus of this paper.

M&A transactions are analyzed in the short and long run according to the abnormal returns calculated following a transaction's announcement. The long run impact is further analyzed using changes in financial performance following a transaction. Abnormal returns are calculated using the market and market adjusted

normal returns models. Generalized sign z and Patell z statistical tests were used to analyze cumulative abnormal returns over multiple event windows. The conclusions of this paper focus on the 0-1 day event window and the calculations are subject to backdating. Average cumulative abnormal returns for acquirer shareholders were found to be roughly 1% following a transaction's announcement for the 0-1 day event window, while target shareholders reported a 17% gain. Both results were statistically significant at the .05 or less level.

Long run buy and hold abnormal returns (BHAR) for acquirers were measured over the event window -1 to 36 months following a transaction's announcement. The market adjusted model reported a mean loss of 7.6% for acquirer shareholders during this time period. Detrimental long run performance is further supported by the analysis of financial metric changes in acquirer firms during the years following a transaction. Asset turnover, debt to equity, and return on equity were found to be lower on average in the years following a transaction than prior.

Lastly, OLS regressions were used to examine drivers of abnormal returns. Acquirer abnormal return regressions report variables reflecting acquirer return on assets, target return on assets, cash transactions, and transactions in the food and beverage retailing industry as all statistically significant factors impacting acquirer return. Coefficients for transactions in food and beverage retailing as well as cash transactions were positive. Acquirer and target ROA variables had negative coefficients in acquirer return OLS regressions. Target abnormal return regressions report variables reflecting cash transactions, hostile transaction, and competitive transactions as all statistically significant factors impacting returns. The coefficients on these variables were positive. Short run market and market adjusted model abnormal returns were found to be very correlated and differ greatly only in long run calculated returns.

CHAPTER 1. INTRODUCTION TO MERGERS AND ACQUISITIONS

1.1 Motivation –M&A Transactions in the World Today

On December 11, 2015, DuPont and Dow Chemical announced an all-stock merger of equals. The intention of this merger was to create one large company that would spin-off three independent companies over the next two years. However, an article published less than three months after the merger's announcement reported DuPont shares down 26.8% and Dow Chemical down 24.4% (Neely 2016). Although part of this decline in value is certainly driven by an economic recession in the industries within which DuPont and Dow Chemical operate, the overall investor pessimism is rather surprising given the synergies and strategic benefits of the deal; for example, the resultant ag focused spinoff of the merger will control over a 40% share of the U.S. corn seeds and related genetics sector (Neely 2016).

The Dow/DuPont deal is set to change the landscape of certain subsections in the agricultural industry. Furthermore, this transaction represents only one example of a slew of mergers and acquisitions that have shaken the food and agribusiness sectors over the last few years. In addition to the Dow and DuPont transaction, several other large deals have occurred. The world's largest pork processor and hog producer, Smithfield Foods, was purchased by the Chinese company Shuanghui International Holdings in late 2013. Tyson Foods purchased Hillshire Brands in 2014; and less than a year later consumer food giants Kraft and Heinz announced their own intention to merge. These transactions foretell of coming changes to the food and agribusiness sectors, industries which are no strangers to transformation. Merger and acquisition (M&A) waves have revolutionized and restructured these industries several times in the last few decades and continue to prompt change and adaption today.

To gain insight into the importance M&A has had historically, one needs only to review the transactions that characterize the fourth, fifth, and sixth merger waves[1]. Often times macro events and policy changes precipitate these waves, but regardless of the factors that initiate them each wave's impact has been noted for its significance on the food and agribusiness sectors by researchers, businessmen, and investors. For example, during the eleven years and two waves that span 1985-1995, the food industry alone was included among the top 10 M&A most active industries ten times. It was counted in the top five for six of those years (Adelaja et al. 1999).

Mergers and acquisitions act to change industry competition, concentration, and investor return in many sectors of the world economy. They're a commonly used inorganic and strategic growth method of companies across the globe. Over 44,000 transactions valuing more than 4.5 trillion US dollars were cited worldwide in 2015 alone (IMMA 2016). This has helped establish the field of M&A as a continued interest of policy makers, academic researchers, investment bankers, accountants, and business executives.

1.2 Problem Statement

David Fubini, Colin Price, and Maurizio Zollo, the authors of *Mergers: Leadership, Performance, and Corporate Health,* identify the goal of every M&A transaction as rooted in the pursuit of generating or protecting company value. However, many factors make it difficult to determine in a given M&A transaction the extent to which each of these goals is accomplished. The ambiguity is exacerbated as various approaches can be used to determine a company's value pre and post transaction, and it can be difficult to segment value created from an acquisition and value intrinsic to the original company in the years surrounding the deal. Depending on how a company's value is calculated,

[1] Although disputes regarding the existence and length of waves exist, they are largely identified by the following time periods: first wave, 1893-1904; second wave, 1919-1929; third wave, 1955-1970; fourth wave, 1974-1989; fifth wave, 1993-2000; sixth wave, 2003-2008; seventh wave, 2011-present.

differing and even opposing conclusions about the value generation of a merger or acquisitions can be determined.

Commonly, specific segments or subsets of the larger body of M&A transactions have been found to be unique or divergent in their average value creation. However, uncertainty regarding factors and their influence on transaction's value-creation for both acquiring and target company shareholders is a contentious debate. Questions concerning the extent common factors impact value continue. Indeed, some researchers have questioned whether M&A creates value at all. These inquires have been posed to general M&A transactions, particular companies, and specific industries.

This paper seeks to provide insights into the problem of ambiguity regarding whether M&A transactions in the food and agribusiness industry create or destroy value and evaluate the extent to which attributes like relative size, deal value, and industry influence the returns of target and acquirer shareholders. Long run performance changes of acquirers are also examined. Specifically, transactions will be assessed using shareholder returns for the acquiring and target companies. Normal return models are compared with realized returns to isolate the impact of a transaction's announcement. The analysis conducted seeks to capture both the short and long run impact of M&A transactions to shareholder interests as well as provide insight into the long run performance of acquirers. Given the complex nature of mergers and acquisitions, the dynamic nature of the food and agribusiness sectors, and the strong precedents of prior research in the field of M&A, an overview of company valuation approaches, historical industry and sector idiosyncrasies, and established methods of M&A analysis is provided in Chapter 2 – the literature review.

1.3 Hypotheses & Stages of Analysis

The goal of this paper is to explore the value created by mergers and acquisitions in the agriculture, food and beverage, food and beverage retailing, and tobacco industries. Two normal return models are used to analyze the impact M&A transaction

announcements have on investor returns of acquiring and target companies. Company returns are examined over long and short event windows and tested for significance. Individual company returns are later regressed upon to elicit and quantify driving influencers of value. An examination of long run changes in performance of acquirers is included to supplement shortcomings of long run abnormal return analysis. Figure 1 displays a broad outline of the processes and steps through which the conclusions of this paper are obtained. Four main stages or processes are identified in development of the final conclusions reached in this study. The stages are as follows: stage 1, data collection processes; stage 2, event study and abnormal return calculations; stage 3, OLS regressions; and stage 4, long run acquirer performance analysis. Each section builds on the prior conclusions of the previous stage or is used to justify the approaches and analysis of later sections. Several distinct hypotheses have been identified and the analysis of this paper will focus specifically on them. The hypotheses have been grouped according to the stages and chapter within which they are addressed. A comprehensive analysis of all hypotheses and the general conclusions of this paper is provided in the conclusion of this paper – Chapter 8.

Stage 2, Chapter 5: Testing Presence of Abnormal Returns

Hypothesis 1: Average abnormal returns in the short run are zero for acquiring firms after a transaction's announcement.

Hypothesis 2: Acquirer subsets will not vary in the short run reported average returns according to the relative size, value, and industry characteristics of the transaction.

Hypothesis 3: Average abnormal returns in the short run are zero for target firms after a transaction's announcement.

Hypothesis 4: Target subsets will not vary in the short run reported average returns according to the relative size, value, and industry characteristics of the transaction.

Hypothesis 5: Average abnormal returns in the long run are zero for acquiring firms after a transaction's announcement.

Hypothesis 6: Acquirer subsets will not vary in the long run reported average returns according to the relative size, value, and industry characteristics of the transaction.

Stage 3, Chapter 6: Testing Significance of Drivers of Abnormal Return

Hypothesis 7: Acquirer abnormal returns are not significantly impacted by industry.

Hypothesis 8: Acquirer and target abnormal returns are not significantly impacted by relative size of the transaction.

Hypothesis 9: Acquirer and target abnormal returns are not significantly impacted by deal value of the transaction.

Hypothesis 10: Acquirer and target abnormal returns are not significantly impacted when the transaction's payment method is cash.

Hypothesis 11: Hostile transactions will not have an impact on the returns of targets.

Hypothesis 12: Target abnormal returns are not significantly impacted when multiple bidders are present.

Stage 4, Chapter 7: Examining Long Run Financial Performance of Acquirers

Hypothesis 13: Acquirer current ratios are decreased in the long run.

Hypothesis 14: Acquirer asset turnover are decreased in the long run.

Hypothesis 15: Acquirer total debt ratios are decreased in the long run.

Hypothesis 16: Acquirer return on equity are decreased in the long run.

These hypotheses are posed with the intent of providing clarity while building on prior literature and foundational economic principles. For example, the first hypothesis that M&A transactions create value for acquirers is built off the notion that the occurrence of M&A transactions and the assumption companies operate rationally imply M&A transactions must be more likely to benefit the acquirer. Were this not the case, transactions would not occur. This is not to say that some transactions don't destroy value, but rather there is more opportunity than risk incentivizing the occurrence of M&A transactions. The next hypothesis, hypothesis 2, is included to examine whether the opportunity and risk associated with transactions vary according to particular attributes. Different market sectors may vary in their structure and have inherently unique risks which may interact with the returns experienced by acquirer or target firms. Deals of larger value or relative size may also alter the risk and return of

the parties involved. These notions have been supported by prior studies and are further elaborated upon in the literature review.

Hypotheses 3 and 4 are similar to the first two, but focus on analyzing the experience of target firm shareholders. Unlike acquirers, it is far more likely that these firms should experience significant returns as acquirers should often have to incentivize participation with a premium. Although a premium or positive return may be strongly expected as target firms do not bear many of the risks in a transaction, questions regarding the significance of such returns prompts the third hypothesis. Hypothesis 4 mirrors hypothesis 2 in its inquiry into the returns of different market segments or transaction groups of target firms.

The last two hypotheses in the stage 2 section explore the long run experiences of acquiring firm investors. Similar to hypotheses 1 & 2 or 3 & 4, these hypotheses examine the general returns of acquirer sub segments in the long run. They are unique, however, as they include adjustments to stock prices following the actual transaction instead of just the announcement. The returns, thus, measure in part the actual impact of a transaction rather than just the markets speculation following a transactions announcement.

Hypotheses 7-12 of stage three rely on the results of OLS regressions. These regressions are discussed in the methodology section, but the variables included in them are used to test and quantify the impact certain drivers have on abnormal returns experienced by shareholders. The dependent variable regressed upon are the returns calculated for each transaction in stage 2. Because they are built upon each other, the conclusions of stage 2 hypotheses influence the credibility of the conclusions of stage 3.

The last four hypotheses act to supplement the long run analysis of acquirer returns. The models and approaches used to calculate abnormal returns lose much of their power in long run analysis. This will be further discussed in the literature review, but the analysis of changing performance metrics in firms that participate in M&A transactions allows for new insights and an additional viewpoint of the impact M&A

transactions have on acquirers. These hypotheses do not however, lend themselves to statistical testing and are analyzed graphically.

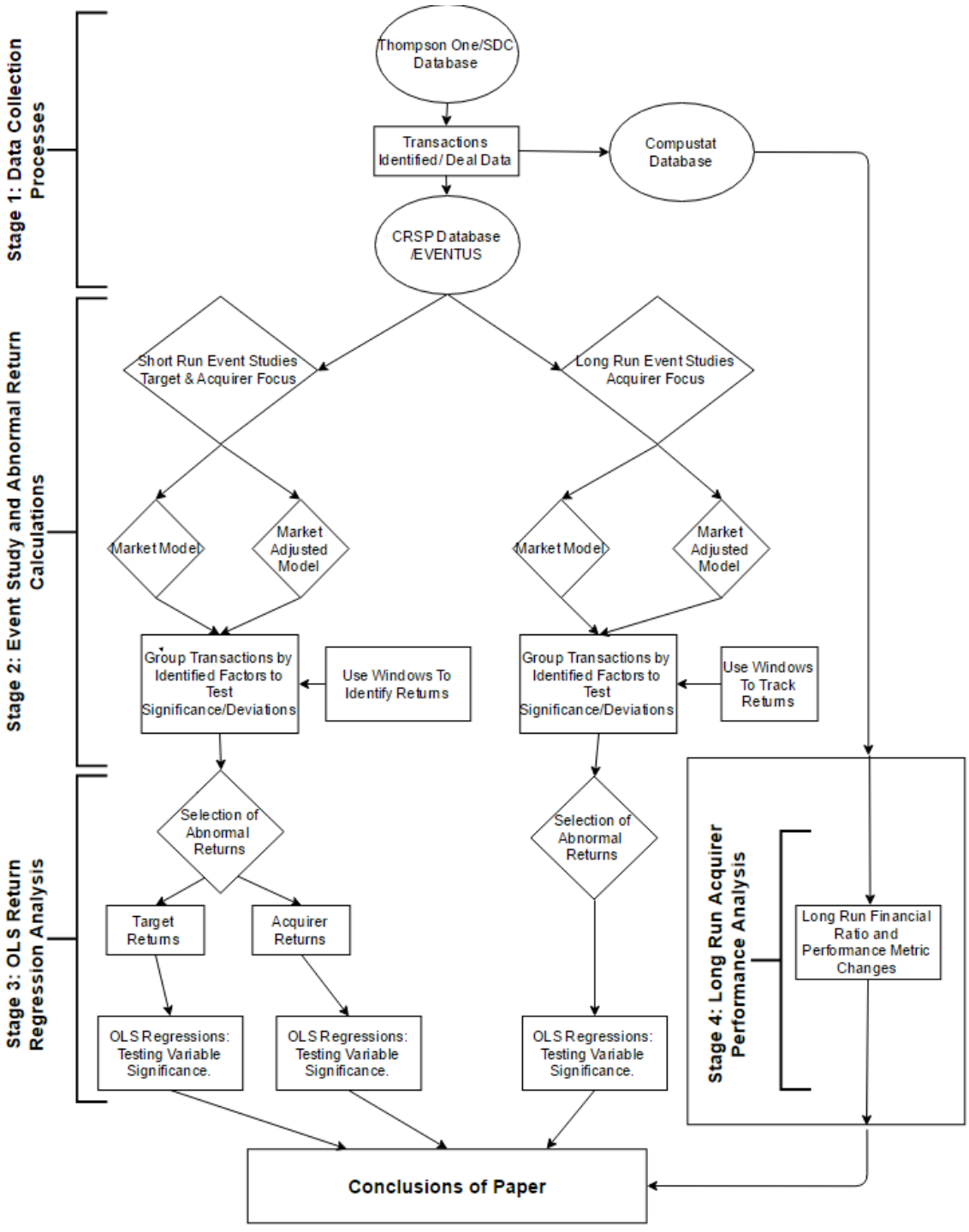

Figure 1: Flow Chart Outline of Paper

1.4 Conclusion

This paper seeks to elaborate on current perceptions of mergers and acquisition in the context of food and agribusiness. Recent consolidation trends and market restructuring has brought M&A in these industries into the spotlight. However, research papers into the particular returns of acquirers and targets specific to this industry are limited. The ideas expressed in this paper are intended to help cultivate a better understanding of these returns in researchers and businessmen alike.

Sixteen hypotheses are listed, but the insights provided are not limited to the conclusions of these inquiries. Many trends or unexpected characteristics arise throughout the progression of the paper and, depending on their applicability, are addressed. Others are left for future researchers to explore. As with all research, there exist limitations to the models, approaches, and analyses of this paper and these limitations are address and conveyed as clearly as possible to the reader throughout the paper.

Lastly, analysis and hypotheses addressed in this paper are chosen for their applicability to the paper's intended readers. Multiple approaches are used to maximize the accuracy of the conclusions listed. Ideally, this paper will provide a foundation for those without prior knowledge of the role of M&A and new insights to those with a mastery of the field. The next section will elaborate on the findings of prior studies and academic perception of M&A in food, agribusiness, and in general.

CHAPTER 2. LITERATURE REVIEW

2.1 Valuation processes, Markets and Event Studies

There are four predominant methods for company valuation: discounted cash flow valuation, liquidation and accounting valuation, relative valuation, and contingent claim valuation (Damodaran 2006). The practice of identifying a company's true value and the difficulties that must be overcome calculating this value is itself an area of study which has garnered a significant amount of research. Furthermore, the continued debate between whether the stock market can be 'gamed' or whether the market is an unpredictable random walk makes calculating a company's true value a contentious and difficult task[2]. Multiple processes through which investors calculate a company's value are discussed in this paper, but most analysis conducted places the task of valuing the companies studied on the market. It does this by using stock price data surrounding the date of a transaction's announcement. The insights thus rely on the views of financial markets. The assumption of market efficiency is implicit. Even so, the common valuation approaches are reviewed as markets are driven according to the valuation conclusions of investors using the approaches outlined in the following paragraphs.

The approaches used by a researcher to measure worth or value of a company are important because the method employed can greatly impact the results concluded. Without an accurate method to determine the initial value of a company and its post-transaction value, no meaningful inferences can be drawn from the transaction. If the method is not comprehensive -- capable of capturing the multitude of factors that drive profits and subsequently value -- the insights of the study will be limited. In the most

[2] For more information on random walk theory see Burton Malkiel's seminal 1973 work *A Random Walk Down Wall Street*

severe cases, a study's finding could provide errant results or a conclusion that does not accurately reflect the true nature of the transactions studied. Depending on the goals of a study, a researcher may also need to give consideration to an approach where changes in worth systemic to the original firm and those driven by the transaction are clearly separable.

2.1.1 Discounted Cash Flows

Valuation methods attempt to relate value to the level of uncertainty surrounding expected future cash flows. This is most clearly seen in the discounted cash flows method. Quite simply, this approach claims the value of an asset should be the present value of the expected cash flows of the asset discounted back at a rate that reflects the riskiness of each cash flow. This approach is widely praised but requires the estimation of future cash flows for a company, a somewhat arduous and speculative task.

2.1.2 Liquidation and Accounting Valuation

Liquidation and accounting valuation are primarily driven by the notion that a business is comprised of assets and the value of the assets should sum to the value of the business. This approach works well for large established businesses in developed markets where growth opportunities are not readily available. The shortcoming in this method comes from the fact that many investors ascribe value to the potential for growth in both a company and its cash flows. This potential for growth may involve factors and investments not shown on a balance sheet. As Damodaran (2006) states,

"for companies with lucrative growth opportunities, asset-based valuations will yield lower values than going concern valuations[3]."

2.1.3 Relative Valuation

Relative valuation involves the valuation of an asset based on how comparable assets are priced in the market. Investors estimate a stock's value by looking at the market pricing of similar stocks. Often times financial ratios pertaining to variables like earnings, cash flows, book value, or sales are used to provide insight into a company's true value. Damodaran (2006) again identifies three steps to relative valuation: finding comparable assets that are priced by the market, scaling the market prices to a common variable, and adjusting for differences across assets.

Liu, Nissim and Thomas (2002) provide insights into the accuracy and employment of common multiples in pricing over 19,000 firm-year observations spanning seventeen years following 1982. They identify multiples capturing forecasted earnings per share perform best in explaining pricing differences, while sales multiples suffer inaccuracy. It should be noted that if the market is correct in its pricing of stocks, discounted cash flow and relative valuation should converge as a firm's true value is derived. Lastly, most valuations are considered to fall under the classification of a relative valuation. Damodaran (2002) notes that almost 90% of equity research valuations and 50% of acquisition valuations rely on inferences drawn from multiples and comparable companies. They are thus relative valuations. This claim is not extended to academic research on the impact of M&A, but rather the speculative processes by which transaction deal values are negotiated in the market.

[3] Going concern value is the value of a business that is expected to continue operating into the future as opposed to the value of its liquidated assets.

2.1.4 Contingent Claim Valuation

The last method, contingent claim valuation, uses option pricing models to measure the value of assets that share option characteristics. This method and the models employed in it has arguably seen the most development in recent years following the Black-Scholes pricing model in 1973. However, it is an approach not widely used in the analysis of M&A. Contingent claim valuation has been mainly praised for its ability to better model companies given particular circumstances. For example, Damodaran (2006) suggests a "biotechnology firm with a single promising patent for a blockbuster cancer drug wending its way through the FDA approval process cannot be easily valued using discounted cash flow or relative valuation models." It may more aply be described using contingent claim analysis. Despite this, contingent claim valuation use in the general M&A analysis is minimal as other approaches have been preferred by academia and industry alike.

2.1.5 Stock Price Adjustments and Market Efficiency

Literature regarding M&A transactions can outsource the valuation process by assuming market efficiency and accuracy. This is perhaps the most common practice in academic research. Using the prices of public company stocks following the announcement of an M&A transaction, researchers can gain insight into the perceived value generation investors believe will occur. This is usually done through the use of an event study. The event study methodology is largely built on a foundational paper authored by Fama, Fisher, Jensen, and Roll in 1969. Their work, titled *The Adjustment of Stock Prices to New Information*, focuses on common stock price adjustment following the release of information regarding a stock split. Implicitly, event study methodology is heavily influenced by capital market perceptions of value. The realized or actual impact of an event is assumed to be encoded in the price changes of a stock after the event is made publically known. Market efficiency is crucial and expected to adjust a stock's market value accurately according to the information available to investors. It is

investors, then, who utilize valuation techniques and the open market to determine a price reflective of the company's true value.

Event study methodology has been used to analyze the impact of many kinds of informational releases in addition to M&A related events. Pivotal to an event study analysis is the modeled second state, or the researcher's prediction of what would have occurred had the event not happened. It is with the normal returns estimated by a normal returns model that abnormal returns, returns not prompted by ordinary market movements, are judged and the event's influence determined. Event study methodology, its application in M&A research, and its use in this paper are further discussed in section 2.4 and Chapter 4.

2.2 Food and Agribusiness M&A

Given the number of M&A transactions in the food and agribusiness industry during the last few M&A waves, there have been a number of publications concerning the state and future of M&A in agriculture. Several unique characteristics of the food and agribusiness industries have been historical driving factors of M&A and the focus of many publications. The food and agribusiness sectors, particularly the agribusiness sector, are prone to cyclical boom and bust periods. These periods can lead to changes in farm income, land values, and financial structuring as farmers adjust how they fund their projects. Cash flush periods for farmers can lead to similar prosperity for those who supply products and services for farmers, and this in turn can lead to industry conditions that prompt M&A activity.

The food and agribusiness industries' cyclical natures and their tendency to develop cash flush periods suggest they should be viewed as a separable entity from other M&A literature. This flushness is often most visible in company free cash flows. By definition, free cash flow is cash flow in excess of that required to fund all projects that have positive net present values when discounted at the relevant cost of capital (Jenson 1986). This surplus of cash flow and its relation to M&A has led to the development of

the free cash flow theory of takeovers. The theory presented is motivated by the idea that cash flush companies may be prone to participate in M&A due to managerial rather than shareholder interests. This can cause a significant agency cost -- a cost born by hiring an entity to act on behalf of shareholders -- occurs through M&A because common managerial interests may not align with what is optimal for shareholders. This theory also aligns with the general perception that M&A destroys value for acquirers.

The existence of Jenson's conflict of interest is agued to be most visible in the allocation of excess funds. Managers may prioritize company growth in order to benefit from increased personal power and compensation instead of returning excess cash to investors (Jenson 1986). This incentive to grow can lead to value destroying pursuits. As Jenson states regarding his observations of business practices in the late 80's,

> Conflicts of interest between shareholders and managers over [dividend] payout policies are especially severe when the organization generates substantial free cash flow. The problem is how to motivate managers to disgorge the cash rather than investing it at below the cost of capital or wasting it on organization inefficiencies.

This notion is later applied to the food sector when he states, "Food industry mergers also appear to reflect the expenditure of free cash flow. The industry apparently generates large cash flows with few growth opportunities (Jenson 1986)." Likewise, an article published in the New York Times identifies tobacco, forestry, food, and oil as industries where large free cash flows and agency problems were prophesied to lead to an increase in takeovers and overall industry restructuring (Jenson B 1986).

A more general perspective of the motives for M&A transactions in the food industry is provided by Goldberg (1983). He suggests M&A transactions are driven by factors relating to size, growth, economies of scale, profitability, market share, market power, synergy, diversification, tax incentives, and managerial hubris. Specifically concerning the transactions of the fourth wave during the 1980's, Declerk (1992)

suggests that managerial and operational synergy motivations can be main drivers. This belief parallels the claims of Jensen's work and commentary on M&A transactions in the food sector.

Lastly, the overall continuous consolidation of food and agribusiness firms in the last few decades has not gone unnoted. Publications covering the consolidation process may not strictly focus on M&A as it relates to the consolidation phenomenon, but the overall structural change it has impacted on sub-sectors comprising the food and agribusiness industries have been noted. There is no doubt M&A has worked as a vessel to facilitate this change. This claim is evidenced by Marion and Kim (1991) who show mergers and acquisitions played a major role in the concentration of six selected food industries. They identify M&A as the causal agent for two-thirds of the increase in four-firm concentration between 1977 and 1988. This consolidation as well as the role of M&A is recognized also by Boehlje (2002) and exemplified in his observations regarding the concentration of production to a limited number of firms in the food processing, food retailing, ag machine, and poultry industries – often with five or less companies controlling a lion share of the market.

Firm level data has been used to analyze and predict the role companies play in larger, macro trend phenomenon. For example, research has been done to identify the firm level factors that influence the likelihood for a company to be targeted and taken over (Adelaja et al. 1999). Adelaja and his co-authors use public firm data to suggest that firm liquidity, debt or leverage, profitability, sales growth, stock earnings capacity, and market-to-book ratio are all important factors in determining the likelihood that a firm is pursued as a M&A takeover target. Additional findings of their research suggest that the attitude surrounding the transaction, number of prior bids, and degree of officer control are important factors to whether a takeover is successful. The two models presented in their publication reported a 74.5 and 62.9% accuracy, indicative that there is as they state a "systematic nature of M&A activities."

Firm level data has also been used to examine the changes to shareholder value of food and agribusiness companies following a transaction. Declerck (1992) found

acquiring firm shareholders to have marginal benefits while target firms in high concertation food industry segments could earn up to 9% above normal returns and a 15% premium on market price due to accquirer efficiency and market power gains prompted by the transaction.

Agricultural biotechnology mergers and their impact on competition are examined using two large scale mergers and event study methodology in King, Wilson, and Naseem (2002). The two transactions were selected and analyzed with the intent of providing insight and motivation toward biotechnology industry consolidation that occurred in the early 90's. Their findings are inconclusive, reporting a negative abnormal return according to the market model to one firm and a positive abnormal return to the other. Overall, the paper focuses more on the competitive nature and impact M&A can have on a consolidated industry as a whole, particularly when an industry is dominated by several large firms.

2.3 Impacts of M&A on Acquirers vs Targets

2.3.1 Acquirer Impact Summary

There are a number of publications that seek to determine the question of whether M&A transactions provide benefits to acquiring firms on average. Although intuition would suggest that the acquiring firms must benefit or M&A would not occur, the empirical evidence largely, though not exclusively, suggest that M&A transactions destroy value for acquiring shareholders. This is supported by Kengelbach and Roos (2011) of the Boston Consulting Group who studied approximately 26,000 transactions completed between 1988 and 2010 and found acquirers to most often have slightly negative returns following the announcement of an acquisition. An article published in the *Harvard Business Review* states the failure rate of acquisition in most studies is between 70 and 90% (Christenson et. al. 2011). One possible reason for the poor

success rate has been discussed during the examination of Jensen's free cash flow theory and agency problems in the prior section.

It is important to remember that many factors can drive the returns experienced by acquiring shareholders. The goal of an acquirer -- to generate more value than cost incurred during a transaction – is very ambitious and bears the risk in a transaction since most of the value generation hinges on the uncertain predictions made by the acquirer. Commonly, researchers will try to find trends by grouping acquirers of similar size, industry, or nationality. Likewise, transactions are often broken down by specific characteristics such as target to acquirer relative size, cross border classification, and method of payment by acquirer. Different sub-segments of the overall body of M&A transactions have been found to have varying returns. Several key studies and their findings regarding acquirer returns are discussed below and showcase how particular acquirers have surpassed the odds and generated value using M&A.

A study by Gao & Sudarsanam (2003) found M&A transactions create value for the acquirers observed. Specifically, Sudarsanam & Gao found that high tech acquisitions can be value creating for both parties when transactions are constrained to high tech firms. The authors, however, do acknowledge that high tech acquisition firms in the years they studied (1990s) largely underperformed industry peers and comparably sized companies who shared similar book-to-market ratios. They provide additional information regarding less quantitative components of M&A analysis by highlighting a negative relationship between managerial shareholdings and post-acquisition performance in the high tech sector. This brings to light the increasingly popular notion that non-financial factors like managerial hubris and human error prompt or motivate bad transactions. They conclude their analysis by finding that high managerial ownership reduces risk aversion and can lead to overinvestment when acquiring an industry related company.

A second pivotal paper showcases both an uncommon, accounting based analysis approach as well as suggests that high value transactions are different in the

returns they provide to acquirers. Healy, Palepu and Ruback (1992) analyze the post-acquisition performance of the largest 50 mergers of the 80's. They use pre-tax operating cash flow scaled by total asset to measure performance. Their analysis, which compared the performance of the combined post-merger firm to the sum of the acquiring and target firm prior to the transaction showed a significant post-merger performance increase. According to their analysis, 70% of firms showed above-average performance. Also identified was a strong relationship between stock return and realized cash flow returns.

Lastly, size and market structure seem to be influential factors to acquirer returns. Kim and Singal (1993) and Singal (1996) examine airline company mergers in the USA. Their studies found increased market power and efficiency following an M&A transaction. Abnormal stock returns were linked to the changes in profitability experienced by the companies, supporting the view that the stock market anticipated profit changes. Their publications suggest transactions that impact market structure provide better returns than general M&A. This study is notable because its results may be applicable to other capital-intensive, limited competitor product sectors like those in food and agribusiness. Mulheron and Boone (2000) found acquisitions in the 1990's to be value generating and value to be tied to relative size of the target to acquirer. They reported a combined average target and bidder return of 3.5% at the announcement of an acquisition. Their work analyzed 1,305 firms across 59 identified industries. Mullheron and Boone also analyzed divestitures in their research and found that such transactions could also provide positive returns.

Overall, it's widely accepted that acquirers struggle to create the value needed to cover premiums paid in M&A transactions. Each transaction is different, however, and sweeping generalizations cannot capture the circumstance of every deal. Prior studies and findings should be acknowledged but hesitantly applied in broader contexts.

2.3.2 Target Impact Summary

The returns to shareholders of target firms are consistently found to be positive and significant. This makes intuitive sense since the shareholders of a targeted company must be incentivized to participate in a transaction. This incentive is most clearly seen in the premium above the traded stock price offered to a public M&A target. The idea that target companies win in a transaction may not be questioned, but many have sought to quantify the return and identify drivers of it.

A survey of Jensen and Ruback (1983) summarizes the results of 13 empirical studies covering transactions from 1956 to 1981. The target shareholders' of the studies analyzed reported abnormal returns of 20-30% around the time of announcement. This is in line with Mulherin and Boone's (2000) report of an 18.4% median abnormal return to shareholders during the three days surrounding a target's acquisition announcement. Mulherin and Boone's insight uses the stock market data of targeted companies during the first eight years of the 1990's and thus spans most of the fifth wave. Regarding the actual drivers of target returns from M&A activities, less intuitive conclusions have been drawn. For example, poorer performance in targeted banks may lead to higher abnormal returns for target shareholders following a transaction's announcement (Beitel & Wahrenburg 2002). This may be partly due to the models used to determine return, but the idea is not outlandish on its own. The notion is that poorly managed companies may hold greater opportunity for an efficient acquirer. Beitel & Wahrenburg (2002) suggest the shareholders of targets benefit from the transfer of corporate control when the target is poorly managed prior to a transaction because "target assets are … transferred from bad managers to better managers with M&A-transactions." Therefore, poorly run companies are more attractive to acquirers because assets are underutilized, and this appeal has a tangible impact on target shareholder returns.

Identifying trends in targets of M&A transactions is at least as difficult as examining acquirers and may in fact be the greater challenge. This is because targets respond to the offers of an acquirer, and the offer of an acquirer is commonly driven by factors exogenous to the target. Still, there are certain characteristics like target ROA

that have been identified to influence target shareholder returns. Furthermore, target models like the one presented by Adalaja (see the Food and Agribusiness M&A section) suggest there is a nature or commonality to targets of M&A.

2.4 M&A in Event Study Literature

2.4.1 General Overview of M&A in Event Studies

In the general body of M&A analysis, a particular method deserves extended focus and discussion. Since the initial emergence of event study methodology, the number of publications using this analytical approach has increased at a seemingly exponential rate. Just ten years ago Kothari and Warner (2006), recognized over 500 event studies published during the years 1974 through 2000. They go on to discussed many of the basics of event study methodology and reaffirmed the idea that much of the original concepts have not changed since its introduction.

At its core, an event study is the estimated difference in market returns between what occurred and what would have been experienced had an event not happened. Using an estimation window[4] to develop expectations of a company's standard response to market movements, normal returns of a stock during an event window can be predicted. The returns can then be compared to the realized returns experienced to gain insight into the impact of the event. The actual returns experienced less the normal returns calculated provide the abnormal returns attributed to an event. Graphically, the event study methodology is captured in Figure 2. Specific normal models and event window lengths can vary from study to study, but the general event study methodology is the same. MacKinlay (1997) and Campbell, Lo, and MacKinlay (1997) discuss the origins and breadth of event study particularities. The relation of event studies to tests

[4] Estimation Window: a period over which parameters are estimated.

of market efficiency is reviewed in Fama (1991). Again, it is imperative to understand that conclusions drawn from event studies using financial data reflect investor perceptions of financial markets and thus implicitly rely on an assumption of market efficiency.

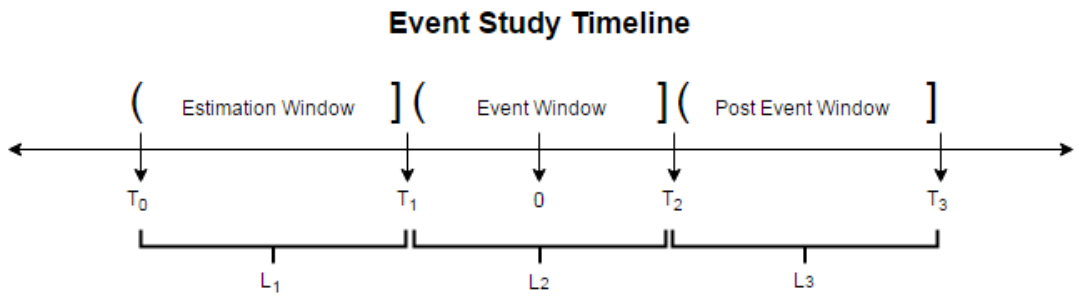

Figure 2: Event Study Timeline

2.4.2 Short Run Event Studies

The period length over which an event is analyzed is the most widely used attribute for segmenting event study publications. Studies are typically designated either long or short run. Although there is no specific numeric time length separating short and long run event studies, the general accepted rule is to categorize studies concerned with periods longer than one year as long-run. This is not to say that others have not used stricter definitions as contemporary research has had greater access to more periodic daily or intraday data.

Short run event studies are relatively problem free and straightforward. Many researchers are quite comfortable with the process of valuing the market reaction to new information over the short run. It is easy to isolate the effect of a single event on a stock's price over a short time period as the likelihood of significant subsequent events is minimal. Analysis of a transaction becomes increasingly difficult over longer periods of study. This prompts most researchers to favor short run studies. Simply stated, most

researchers “have more confidence and put more weight on the results of short-horizon tests than long-horizon tests” (Kothai and Warner 2006). This has led most publications to use data spanning no more than a few months surrounding an event. Thus the relationship between realized returns and the event in question is clearest. Overall, event study methodology does not come to drastically different conclusions regarding the impact of M&A from other analysis methods, but event studies have a particular advantage in their ability to test numerous firms in an easy, pragmatic manner with minimal data requirements.

Recent developments and shifts in the conceptual framework of short run event studies are limited mostly to the emergence of intraday studies in high frequency trading. To this author’s knowledge, data this periodic has not been used to study M&A. Tests for statistical significance in short run event studies have become more sophisticated, but this development has had far stronger implications for their long-run counterparts (Kothari and Warner 2006). Common statistical tests for short run event studies are presented by Patell (1976) and Cowan (1992). Their standardized cumulative abnormal return and sign test respectively, have become staples in short run event study analysis.

2.4.3 Long Run Event Studies

Long-run event studies are subject to much greater concern and have been far more impacted by developments in recent years. Findings in the early 90’s led to their results being considered dubious and prompted some researchers to state “the analysis of long-run abnormal returns is treacherous” (Lyon, Barber, and Tsai, 1999). This condemnation is largely driven by several biases and perhaps fatal issues that arise in long run event studies that are avoidable or negligible in their short run counterparts.

The most notable issue in long run event studies is whether or not the abnormal returns calculated in an event study can reasonably be tied to the event. Concerns of whether abnormal returns are driven more by initial mispricing of a stock or the M&A

transaction observed are not clearly answered. This unpleasant truth is captured by Kothari and Warner (2006) as they state the following regarding long run studies:

> Whether the apparent abnormal returns are due to mispricing, or simply the result of measurement problems, is a contentious and unresolved issue among financial economists. The methodological research in the area is important because it demonstrates how easy it is to conclude there is abnormal performance when none exists. Before questions on mispricing can be answered, better methods than currently exist are required.

Furthermore, the possibility that abnormal returns may be driven by mispricing is made irrelevant if risk adjustment is necessary. Many firms may not be characterized by a stationary risk factor years after an event. Normal return models that use an estimation window to calculate a risk beta may not accurately capture the proper normal returns years after an event. This inaccuracy could cause an inflation in abnormal returns reported. This is particularly true if the event structurally changes the risk of the firm. Short run returns are not greatly influenced by an incorrect beta, but long run analysis using an improper risk estimator can cause substantial flaws. If this were not enough, a correct risk estimator is still dependent on the validity of the researcher's normal return model, a problem highlighted by the statement, "it is unclear which expected return model is correct, and therefore estimates of abnormal returns over long horizons are highly sensitive to model choice" (Kothari and Warner 2006).

Even placing aside these noted issues, there are many more difficulties to overcome. Long-run studies usually make use of the buy and hold return (BHAR) metric for determining abnormal returns. The mathematical calculation of this return is discussed in the methodology section, but it has been argued as the most appropriate approach for the long run studies because it more closely aligns with the actual experience of investors (Roll 1983). Furthermore, the BHAR approach avoids biases arising from security microstructure issues in portfolios subject to frequent rebalancing

(Blume and Stambaugh 1983) (Roll, 1983). Even so, the buy and hold method is not without its limitations.

Lyon and Barber (1996) identify the use of long run buy and hold returns as still subject to new listing, rebalancing, and skewness biases. A new listing bias arises because abnormal returns of long run event studies must utilize firms with available long post-event history return data while firms that constitute the portfolio index of such studies may include new firms that begin trading subsequent to the event. A rebalancing bias occurs because compound returns of a reference portfolio, such as an equally weighted market index, are typically calculated assuming periodic rebalancing, while the returns of sample firms are compounded without rebalancing. Lastly, a skewness bias occurs because long run abnormal returns are inherently positively skewed. This is easily understood since stock returns are bounded below by -100% (loss of all value) but limitless in their potential to generate cumulative positive returns. Barber and Lyon suggest the use of control firms for detecting long-run abnormal stock returns. The criteria they use to create a control firm portfolio is dependent on firm size and book-to-market ratios, and their reported test statistics are well-specified in this approach. As they note, this setup negates or limits the impact of new listings, rebalancing, and skewness to some extent, but problems in power still persist.

The problem of long run skewness is further addressed by Arnold R. Cowan and Anne M. A. Sergeant (1996), who analyze the impact small sample sizes can have on skewness and returns. They observe many prior publications have used extremely small sample sizes ranging from 38[5] to 221[6] transactions and merely ignore the presence of biases. Other publications analyze several thousand transactions and lessen the problem of skewness. Similar to Barber and Lyon's work, Cowan and Sergeant suggest the use of benchmark portfolios that have had their new-listing and rebalancing biases removed. However, their analysis still finds what they identify as severe misspecification of

[5] Clark and Ofek 1994
[6] Lakonishok and Vermaelen 1990

parametric tests caused from skewness. Although they find a negative relationship between skewness and sample size, their data finds longer time periods increase the bias experienced. They conclude their paper by suggesting the use of either a two-group test using winsorized abnormal returns or bootstraping[7] to provide well-specified and more powerful analysis. However, they do acknowledge that bootstrap tests are subject to detect more negative than positive abnormal returns during analysis.

The fundamental problem with long run event studies is that there are very little conclusive insights to be found. Their overall power is seemingly trivial even as power has increased in recent years. A primary example is provided by Jegadeesh and Karceski (2004) who show that even with an ostensibly large cumulative abnormal returns performance (25% over 5 years) in a sample of 200 firms, the rejection of the null hypothesis[8] is typically less than 50%. Overall, long run event studies appear to be a researcher's pursuit of currently unattainable insights.

2.5 Normal Return Models

2.5.1 Normal Return Models

Several references have been made to normal return models. In an event study, a normal return model is used to calculate the expected or normal returns had an event not occurred. There are multiple models that are commonly used in event study literature, and each model has its proponents. The three that will be discussed below are the market adjusted model, market model, and Fama-French three factor model. Before reviewing these normal return models, a mention should be made of the joint test problem inherent in all event studies.

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[7] Bootstrapping in a test or metric involves the practice of random sampling with replacement.
[8] that abnormal returns for this period are zero

In the previous section, it was mentioned that long run event studies are very sensitive to model choice. This issue captures one implication of the joint test problem. Put simply, the joint test problem stems from the fact that event studies are not just a test of whether an event produced abnormal returns, but of whether a particular model accurately represents reality. Citing Kothari and Warner (2006) again, the issue is summed up by their statement:

> While the specification and power of a test can be statistically determined, economic interpretation is not straightforward because all tests are joint tests. That is, event study tests are well-specified only to the extent that the assumptions underlying their estimation are correct. This poses a significant challenge because event study tests are joint tests of whether abnormal returns are zero and of whether the assumed model of expected returns (i.e. the CAPM, market model, etc.) is correct.

The correct (or most correct) model is a contentious issue, and often different models offer particular advantages and inevitable shortcomings. In this regard, the proper model may be more an issue of which assumptions and limitations a researcher is willing to accept.

2.5.2 The Market-adjusted, Market, and Fama-French Three Factor Models

The market-adjusted model is by far the simplest and most intuitive model for normal returns. As the name suggests, it is built on the assumption that the return of a company should be the return of the market. Therefore, abnormal returns are just the difference between the reported stock's return following an event and a market index. This model has the advantage of being direct and simple in its assumptions. However, it could be critiqued for being too simple. The model lacks complexity or adjustment for risk, and most researchers and investors believe that risk drives returns. Therefore, the

assumption that all companies should receive the return of the market in a specified time period is not considered very realistic.

As an alternative, the market model presented by (Brown & Warner, 1980) is an attractive alternative to the shortcomings of the market-adjusted model. Indeed, the market model is cited as the most frequently used model for calculating normal returns (Strong, 1992). Using a pre-event estimation window it estimates a beta representing a stocks reaction to movements in a market portfolio. In this manner it acts to capture returns driven by company risk. The notable problem with this, however, is the strong assumption that a stock will behave in a static manner to market movements. This is increasingly less valid over longer periods of analysis.

One of the biggest developments in normal return modeling came in the form of the Famma–French three-factor model (Fama and French 1993). By using three variables to account for both the tendency of small cap and low price-to-book ratio stocks to outperform the market, they provided another method to calculate the normal returns in an event study. This three-factor model has been widely praised because of the high R-squared (Fama et al 1992). Since its inception, a number of publications have made use of its predictive power. Others have altered it in order to account for shortcomings it has experienced in its application globally. The model has been argued as most appropriate only when used with consideration to local country specific factors (Griffin 2002). Foye, Myramor and Pahor (2013) suggest a respecified three factor model that utilizes an estimate of accounting manipulation in emerging markets. Although noted, these amendments have not been applied to M&A analysis.

2.5.3 Regressions upon Abnormal Returns

Aside from the difficulties relating to calculating abnormal returns and selecting a normal returns model, there exists an increasing amount of literature seeking to elicit the drivers of abnormal returns using OLS regressions. These publications differ from

traditional event studies in that they regress upon the abnormal returns reported by the normal return models employed. Although event studies typically test whether abnormal returns are significant enough to reject the null hypothesis of non-zero returns, it usually does not try to directly link these abnormal returns to industry, deal, or company characteristics. Regressing upon the abnormal returns directly allows certain factors thought to be driving abnormal returns to be more definitively tested and is more detailed in the aim to analyze M&A transactions.

One such paper showcasing this analysis is provided by Felix Magnusson and André Lindberg (2013). Their paper focuses on cross border transactions of Swedish firms and evaluates how payment methods impact abnormal returns using OLS regressions. Interestingly, they find positive returns to bidding firms are significant when the method of payment utilizes a stock option. However, when reviewing target abnormal returns their study did not conclude a preference on payment options.

A clearer insight into M&A abnormal return drivers is provided by Meinshausen, and Schiereck (2011). Their paper covers 192 transactions in the European fashion industry. Using the market model and a three day event window, they find significant abnormal returns to acquirers. They then regress the calculated abnormal returns on financial and transaction variables to further analyze the deals. The regressions they report show consistent statistical significance regarding an acquirer's ROE and market capitalization. Not surprisingly, deal value and a binary variable measuring the competition surround the deal were also significant. The process of using OLS regressions to identify key drivers of abnormal return may be an exciting pursuit, but it unfortunately builds another layer of assumptions on an already complex analysis.

2.6 Conclusion

A number of publications exist that examine the returns of both target and acquirer shareholders. The general consensus of these papers have held that target shareholders benefit from transactions while acquirer shareholder experience negative

or insignificant returns. This paper seeks to answer whether these generalizations apply to niche food and agribusiness based companies as well.

In addition to evaluating these transactions and the returns they provide to shareholders, the analysis performed in chapter six seeks to elicit drivers of returns and quantify their impact. This paper intends to test, verify, and build upon the conclusions of prior literature regarding M&A transaction. Furthermore, it intends to focus on the food and agribusiness sectors specifically.

CHAPTER 3. DATA COLLECTION SUMMARY

The data gathered for this paper comes from three sources. The Thompson-one (formerly known as SDC) database is used to identify the merger and acquisition (M&A) transactions for analysis. Thompson-one also provides information about key deal attributes and allows querying of transactions according to attributes selected by a user. The database is a starting place for many studies looking to research large business transactions and often supplemented with other business data sets. The Center for Research on Security Price (CRSP) and the Compustat dataset are used in this study to accumulate additional information regarding the companies and M&A transactions selected. Compustat provides substantial financial information for companies in the years before and after a transaction, but lacks the observation count for strong analytics. Therefore, its role in this research paper is secondary to conclusions drawn from Thompson-one and CRSP data.

3.1 Thompson One / SDC Database

The Thompson-one database is set up to allow users to query lists of merger and acquisition transactions by several attributes. The database lists details and dates of many business events dating back over thirty years. Eight query criteria are used to identify the transactions analyzed in this study. This subset of observations was selected to maximize the information available regarding the companies involved in each M&A transaction. The criterion used are shown in Table 1. They are also listed below. The number of transactions that met each additional query criteria is shown to the criteria's right in Table 1. The first imposed requirement returns over 300,000 business

transactions, but the final dataset of useable observations for this study is whittled down to just over 200 M&A transactions. This drops slightly further according to available data in CRSP. The eight Thompson-one criterion I use are:

1) Observations are limited to the Thompson-one M&A database.
2) Observations are limited to disclosed value M&A transactions.
3) Observations are limited to transactions with a target mid industry listed as agriculture & livestock, food and beverage, food and beverage retailing, or tobacco.
4) Observations are limited to transactions with an American acquiring company.
5) Observations are limited to transactions with an American target company.
6) Observations are limited to transactions with a public acquiring company.
7) Observations are limited to transactions with a public target company.
8) Observations are limited to transactions listed as completed or unconditional.

Many of the query criteria were imposed for intuitive reasons. For example, the industry listings were selected to specialize research into four specific food or agribusiness sectors. Choosing to analyze only American acquirers who pursue American targets provides a standardized market within which transactions occurred. Although the American economy has by no means remained static from the late 1970's to the early 2010's, the market has been far more regulated and protected than many foreign markets. Thus using American companies focuses the research of this paper but rules out the possibility significant regulation variation impacting transaction success. The concern that varying market regulation can interact with investor returns in an event study is evidenced in Bartholy and Flugt (2009).

The later attribute requirements, from company public status to deal status, are applied to select transactions with sufficient data available for the event study and OLS regressions performed in chapters 5 and 6. Table 2 shows the final variable dataset gathered from Thompson-one. These values are also defined in Table 2. Quantitatively,

financial variables are summarized in Table 3 while binary variables are shown in Table 4. Several variables are not directly provided by Thompson-one but are instead created from data provided by the database. For example, return on assets (ROA) and return on equity (ROE) are calculated using the company data reported by Thompson One. Relative size and the dummy variables used to identify hostile, competitive, and related industry transactions are also generated indirectly from Thompson-one. Because of this, some observations are dropped in later regressions when insufficient or missing data was provided by Thompson One.

A descriptive summary of the non-binary variables mean, median, standard deviation, minimum, and maximum values are shown in a table format in Table 3. Most variable statistics report expected values. For example, target companies were found to underperform acquirers on average. Furthermore, the average ROA of target firms was lower than both the mean and median acquirer ROA. This may suggest poorly managed companies are more likely to become targets of M&A. This notion is supported by noting target return on equity averaged a little less than zero. Unprofitable firms may find participating in M&A more beneficial to shareholders than continued operation. However, overall target observations reported a broad range of values for ROE. This is to be expected as many targets were quite small and volatile net incomes may appear overdramatized when displayed in percentage metrics. Specifically, target ROE ranged from a maximum value of 261% to an equally extreme negative return of -184%. The existence of transactions with high ROE targets may indicate that companies can be pursued for both under or over performance.

Unlike the other financial variables, statistics pertaining to relative size and value require greater scrutiny. Because relative size is calculated using acquirer and target sales, it is subject to some extreme results[9]. This phenomenon can be explained by transactions involving companies focused on different products. A producer of a low

[9] Several large relative size observations were thought to be outliers. Regressions in Chapter six were run without them but these observations were re-added after their impact was not deemed significantly detrimental or errant.

turnover, high margin product acquiring a producer of a high turnover, low margin product would have an inflated transaction size. The definition of relative size in this paper is meant to be a proxy of company market size and deal risk but is subject to shortcomings. Other measurements of size have similar shortcomings as companies may have value in intangible assets or be financially structured differently according to their industry, making comparison a prevalent challenge for other considered metrics. Reviewing the transaction values at which deals were made, the data lists a mean value of $1,030.73 million. This value seems to be inflated by several large transactions. This can be inferred from the smaller median of $164.38 million, larger standard deviation of $2,914.80 million, and minimum observation of $1.26 million.

Table 4 highlights the binary variables used in the OLS regressions. Again the observations are broken into industry, payment, and deal characteristic groups with the observation counts listed to the right. The counts are the number of transactions that identify as having the variable be listed as true. These variable groups are identified to determine if the returns experienced by investors after a transaction's announcement vary by particular attributes of the transaction. It should be noted that the deal characteristics have been tailored to this study. Hostile observations are transactions identified by Thompson-one as being such. Competitive transactions are transactions with greater than three bidders and are used to designate competitive deals. Lastly, related industry transactions are deals where both acquirer and target companies share the same Thompson-one mid industry classification.

Table 1: Thompson-one Querying List

Query Criteria	Request	Operator	Description/Code	Count
1	Database	Include	All Mergers & Acquisitions	n/a
2	Deal Type (Code)	Include	Disclosed Value M&A	305658
3	Target Mid Industry (Code)	Include	Food & Beverage Retailing Agriculture & Livestock Food and Beverage Tobacco	18511
4	Acquiror Nation (Code)	Include	United States of America	4072
5	Target Nation (Code)	Include	United States of America	3500
6	Acquiror Public Status (Code)	Include	Public	1754
7	Target Public Status (Code)	Include	Public	271
8	Deal Status (Code)	Include	Completed Unconditional	206

Table 2: Thompson-one Variable Definitions

Variable	Definition
Value of Transaction ($mil)	The value of the transaction in millions of dollars
Acquirer ROA	Acquirer Net Income / Acquirer Total Assets
Target ROA	Target Net Income /Target Total Assets
Target ROE	Target Net Income/ Target Equity
Relative Size	A transaction size proxy using Target Sales LTM/ Acquirer Sales LTM
Industry Dummy (x3)	A binary variable dependent on the targets industry (Ag, Food & Bev, Food & Bev Retailing)
Payment Dummy (x2)	A binary variable dependent on the deal's payment structure of stock or cash.
Hostile Transaction	A binary variable denoting whether the transaction was hostile
Competitive	A binary variable denoting whether there were three or more bidders for a target company
Related Industry	A binary variable denoting whether the acquiring and target company where listed in the same Thompson One industry category

Table 3: Thompson-one Variables Non-binary Summary

Summary Statistic	Value of Transaction ($mil)	Relative Size	Target ROA	Acquirer ROA	Target Roe
Mean	1030.73	1.25	0.01	0.05	-0.01
Standard Error	211.46	0.48	0.01	0.00	0.03
Median	164.38	0.23	0.04	0.05	0.03
Standard Deviation	2914.80	5.91	0.18	0.06	0.39
Skewness	5.49	10.02	-2.44	-1.53	0.50
Range	25051.16	67.69	1.75	0.44	4.45
Minimum	1.26	0.00	-1.07	-0.24	-1.84
Maximum	25052.41	67.70	0.67	0.20	2.61
Count	190	151	171	156	172

Table 4: Thompson-one Binary Variables Summary

Industry	Obs. Out of 190	Payment Consideration	Obs. Out of 190	Deal Characteristics	Obs. Out of 190
Agriculture & Livestock	17	100% Cash	75	Hostile	9
Food & Beverage Retailing	89	100% Stock	41	Considerations > 3	42
Food and Beverage	79			Related Industry	123

3.1.1 Selected Transactions & Data Trends

The analysis of this paper focuses on transactions in four industries: Food and Beverage, Food and Beverage Retailing, Agriculture and Livestock, and Tobacco. Acquiring companies were not constrained to any particular industries, but target companies were restricted to one of these four. This approach ensured adequate observations while still maintaining a food and agribusiness focus. The breakdown of each company purchases by each industry is shown in Figure 3. Figure 5 shows the company sales of each industry. By comparing the two graphs it is clear that more public

purchases of companies were made by agriculture and livestock companies than there were sales of companies in the industry. The same is true of tobacco, which listed two sales and six purchases. Food and beverage had twenty-two more industry sales than purchases. Food and beverage retail had a less significant disparity between sales and purchases of 19. Only 29 transactions with companies operating outside of the four identified industries purchased public food and agribusiness firms. This represents approximately 15% of all transaction and suggests that most M&A occurs among firms in closely related industries.

Figure 4 and 6 are similar to 3 and 5, but display the value of the purchases and sales in each industry. One particularly important attribute worth noting is the substantial dollar value the tobacco industry represents given the low sales count. This is visible in Figure 3. For having only two transactions, over 15% of the total sales value belonged to the sale of two tobacco companies. Furthermore, tobacco companies held 35% of total purchase value. Agricultural transactions appear to have close to the same percentage of total value as observation count. Food and beverage companies had greater valued transactions on average since the industry had only 42% of the total number of sales transactions in Figures 3, but 50% of the sales value in Figure 5. Food and beverage retailing, however, had almost 50% of the sales transactions but only 24% of the cumulative transaction sales value. This is also demonstrated by their lower purchase count, and purchase value in figures 4 and 6 respectively.

Table 5 and Figure 7 show the historical waves of M&A transactions in the United States and provide a basis for evaluating the scope and limitations inherent in this paper's dataset. Table 5 displays the number of transactions in a given year, the summed value of each year's transaction, the percent of each year's transaction count compared to the total observation count, and the percent of each year's summed transaction value compared to the cumulative total value of $195,839 million. Several years are worth noting due to the substantial number of transactions that occurred (see 1996-1998) or because of the value of the transactions (see 2000 and 2014).

Historically, there have been five identified waves of company mergers and industry consolidation. This paper's observations overlap the fourth wave, fifth wave, sixth, and contentious seventh wave. These waves are not particular to the food and agribusiness sector but are nonetheless visible in Table 5 and Figure 7. Figure 7 displays the number of public and private transactions in food and agribusiness during the years of this paper. The fifth wave (1993-2000) is clearly seen as transaction counts peak during the mid-90s before returning to lower numbers. Figure 7 was generated using transactions reported in Thompson-one's database and may not include every transaction of the period. The focus on the purely public segment of the overall transaction population shown in Figure 7 has been discussed, but the intention has always been to maximize the available data and transparency in each transaction.

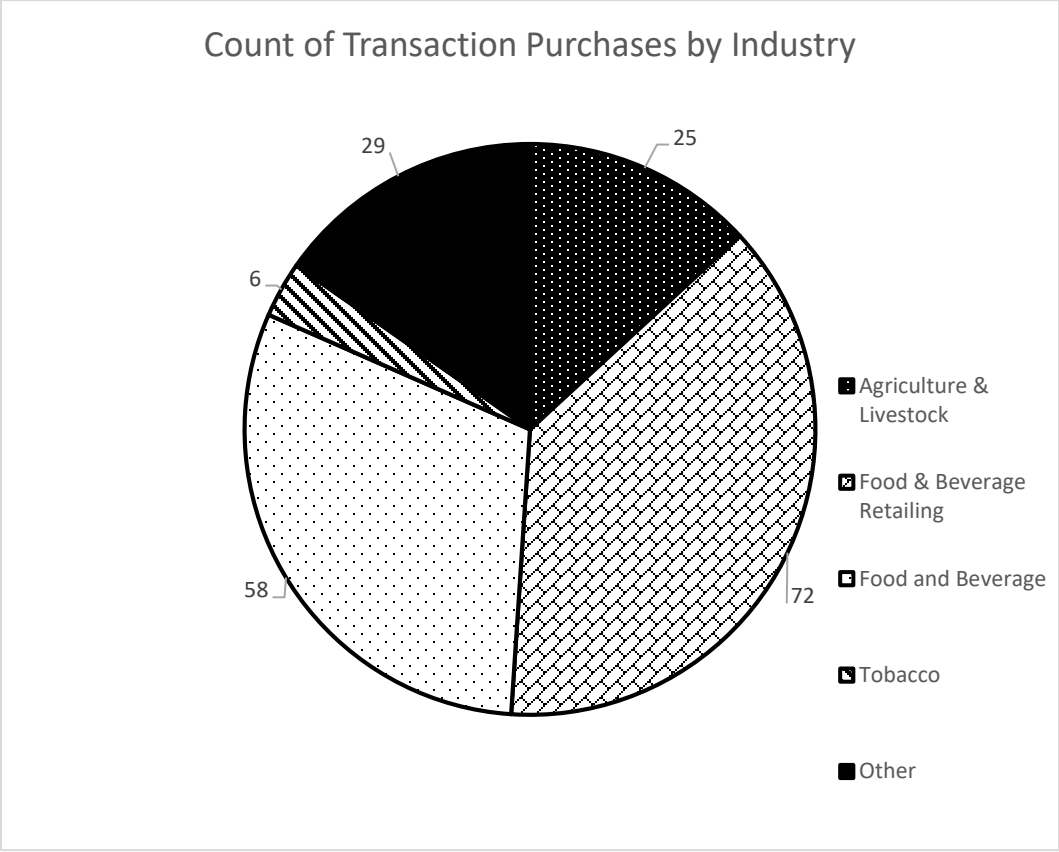

Figure 3: Count of Transaction Purchases by Industry

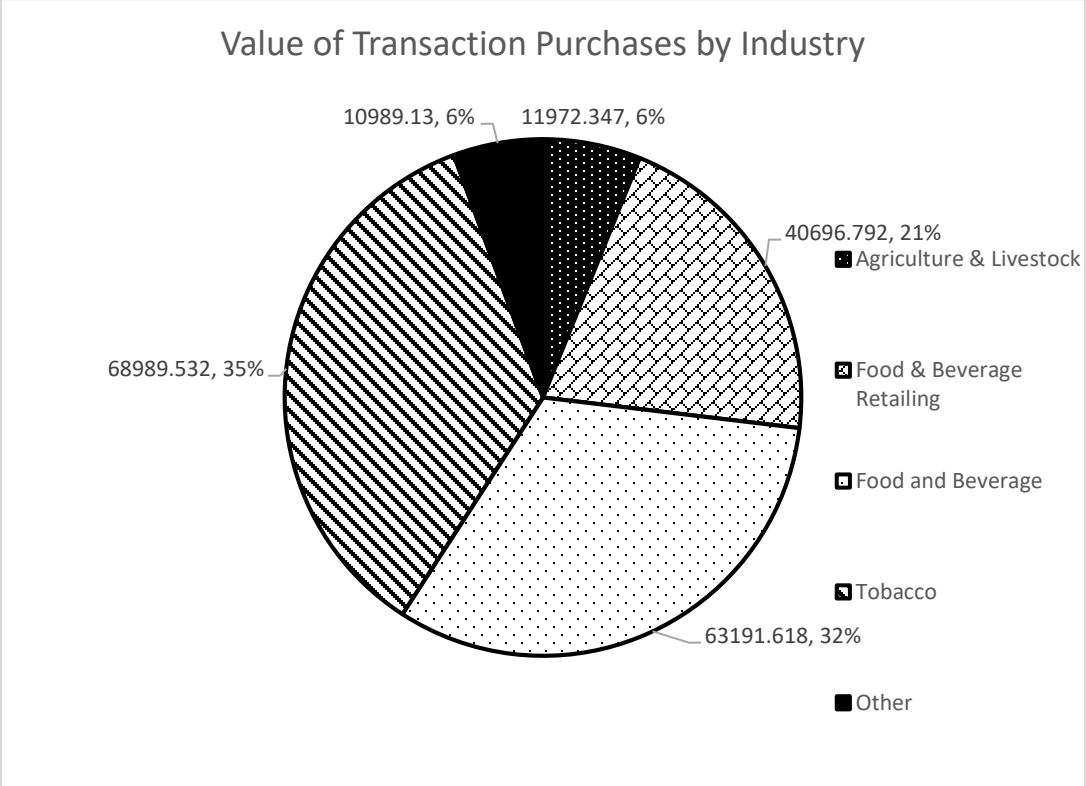

Figure 4: Value of Transaction Purchases by Industry

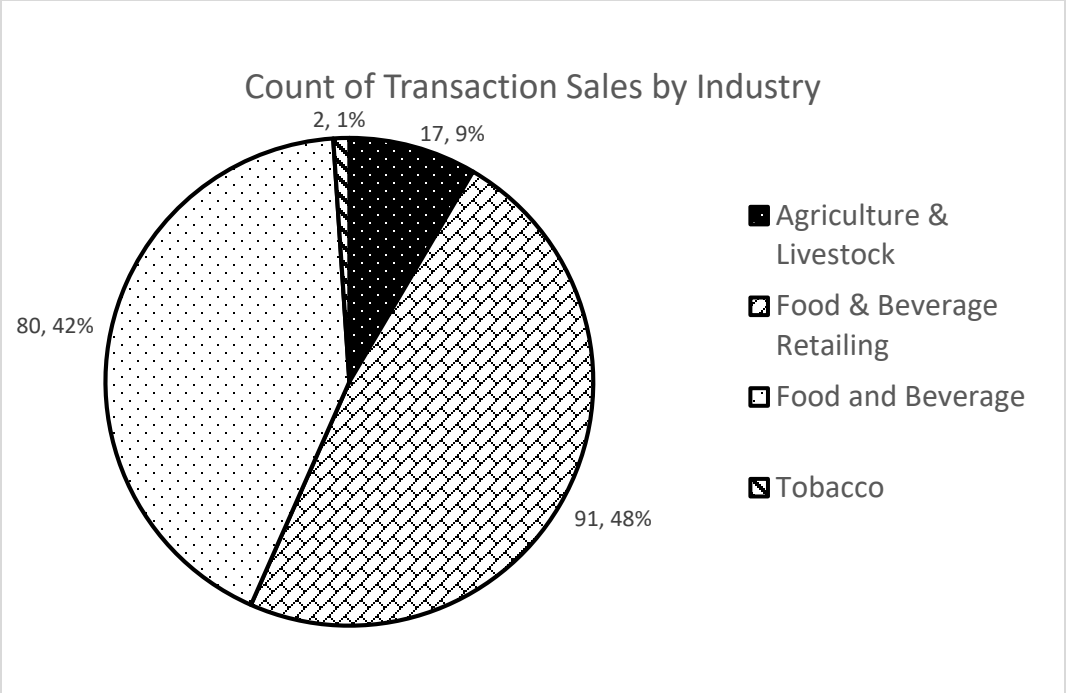

Figure 5: Count of Transaction Sales by Industry

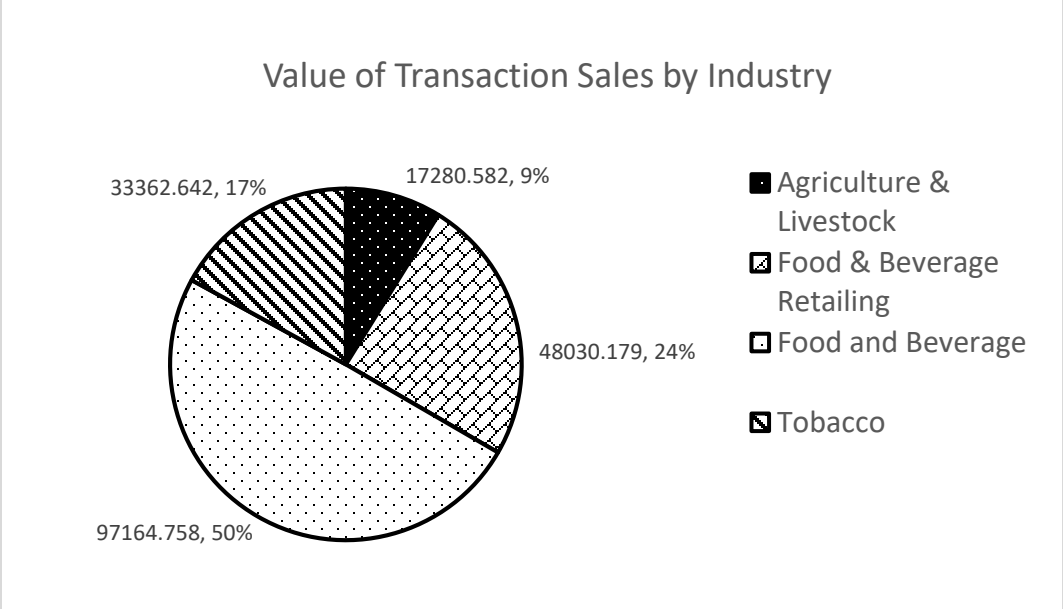

Figure 6: Value of Transaction Sales by Industry

Table 5: Transaction Observations by Year

Row Labels	Count of Date Announced	Sum of Value of	Percent of Total Transaction Count	Percent of Total Value
1978	2	749.434	1.1%	0.38%
1980	1	78.996	0.5%	0.04%
1981	3	1082.584	1.6%	0.55%
1982	3	551.6	1.6%	0.28%
1983	5	619.104	2.6%	0.32%
1984	5	1532.956	2.6%	0.78%
1985	6	5408.9	3.2%	2.76%
1986	10	1154.905	5.3%	0.59%
1987	5	895.48	2.6%	0.46%
1988	12	5169.335	6.3%	2.64%
1989	5	210.31	2.6%	0.11%
1990	3	42.05	1.6%	0.02%
1991	4	1899.3	2.1%	0.97%
1992	4	1762.088	2.1%	0.90%
1993	3	22.245	1.6%	0.01%
1994	9	2528.308	4.7%	1.29%
1995	6	659.055	3.2%	0.34%
1996	13	4889.358	6.8%	2.50%
1997	18	9263.074	9.5%	4.73%
1998	14	15213.229	7.4%	7.77%
1999	7	5520.819	3.7%	2.82%
2000	13	59106.023	6.8%	30.18%
2001	7	5792.425	3.7%	2.96%
2003	2	313.577	1.1%	0.16%
2004	2	1859.787	1.1%	0.95%

Table 5: Continued

2005	1	34.248	0.5%	0.02%
2006	4	3602.029	2.1%	1.84%
2007	5	12743.294	2.6%	6.51%
2008	2	2355.172	1.1%	1.20%
2009	4	4433.756	2.1%	2.26%
2010	1	1162.527	0.5%	0.59%
2012	2	5598.839	1.1%	2.86%
2013	2	2861.17	1.1%	1.46%
2014	7	36723.442	3.7%	18.75%
Grand Total	190	195839.419	100.0%	100.00%
Average	5.6			

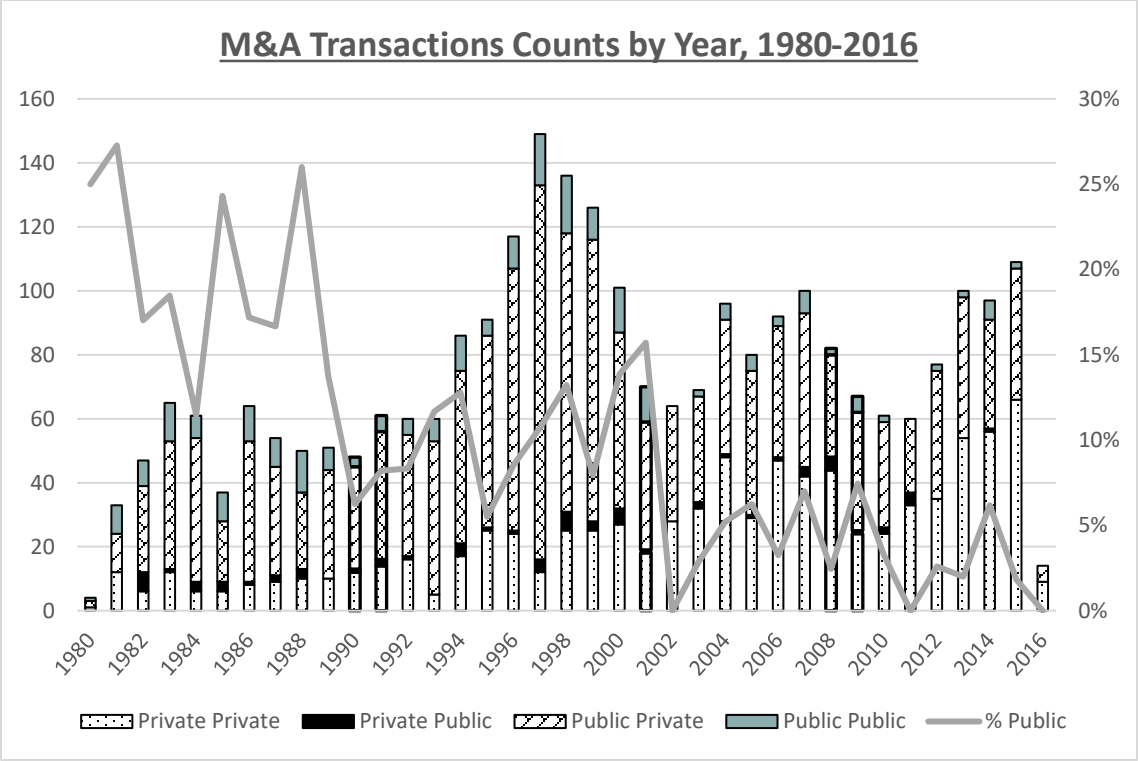

Figure 7: Overall Food and Agribusiness M&A Transactions by Year

LEGEND: The graph above displays the number of M&A transactions broken into four sub segments according to the Thompson database. The four segments in the key list the status of the acquirer in a transaction followed by the targets status. According to this key, the gray bars at the top that are labeled Public Public represent public acquirers who perform transactions with public targets. The gray line represents the percent these transactions reflect the total M&A count in a given year. Four years have had a thicker outline applied to indicate a recession.

3.1.2 Transaction Value & Value Groupings

The transactions studied in this paper are grouped based on industry, value, and size. Industry groups are created using Thompson-one industry classifications, but transaction value and relative size grouping are created using careful analysis and

author discretion. Table 6 shows the size classifications and the number of observations that fell into each category. The ranges of each size category were determined using Figures 8, 9, and 10. The groupings were largely aligned with changes in the rate of deal value to observation percentile.

Figure 8 displays the transaction deal value over the percentile of all observations in this study. Transactions in the final category are shown above the highest solid line in the graph and consist of seven transactions ranging from $5,000 to just under $25,000 million dollars. Roughly 70% of transactions were under $500 million. As is evident in the Figure 8, these transactions are drastically larger than the majority of observation deal values.

Reviewing Figure 9, the third category of transactions is now shown as the highest tier. Although it was already clear from Figure 8 that observations in the medium value grouping were reporting significantly higher deal values than the other 70% of observations, the difference is more strongly noted given the adjusted axes. Likewise Figure 10 shows the axes adjusted again to highlight changes in the value to percentile rate of the data. The bottom tier held 40% to the transactions with deal values not exceeding 100 million.

Table 6: Categories by Value

Value Category	Transaction Value (millions)	Number of Transactions
Very Low	0-100	77
Low	100-500	58
Medium	500-5000	48
High	5000+	7

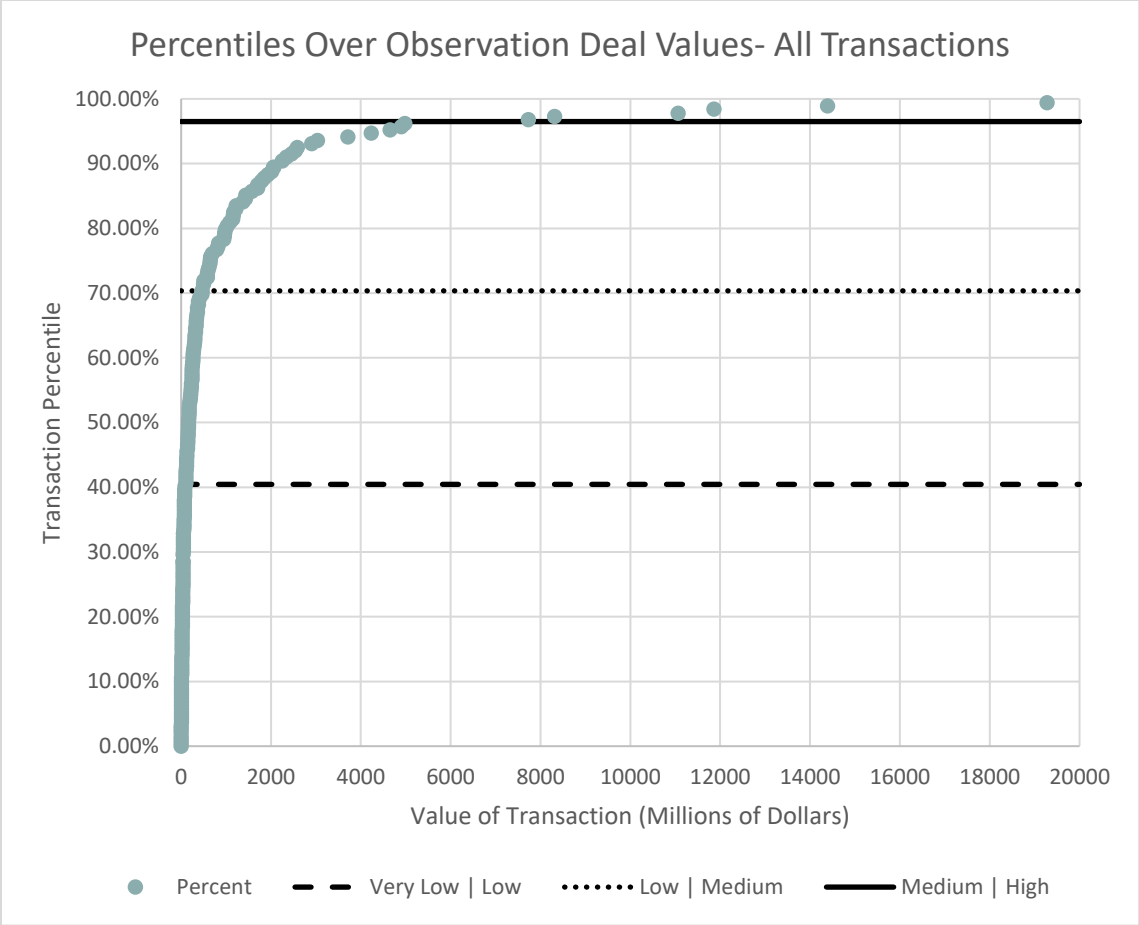

Figure 8: Observation Value over Percentile – All Transactions

The graph above shows observation percentile over deal value. Using the graphics 14-16 and author discretion, four transaction value groups are defined; very low value, 0-100; low value, 100-500; medium value, 500-5000; and high value acquisitions exceeding 5000 million.

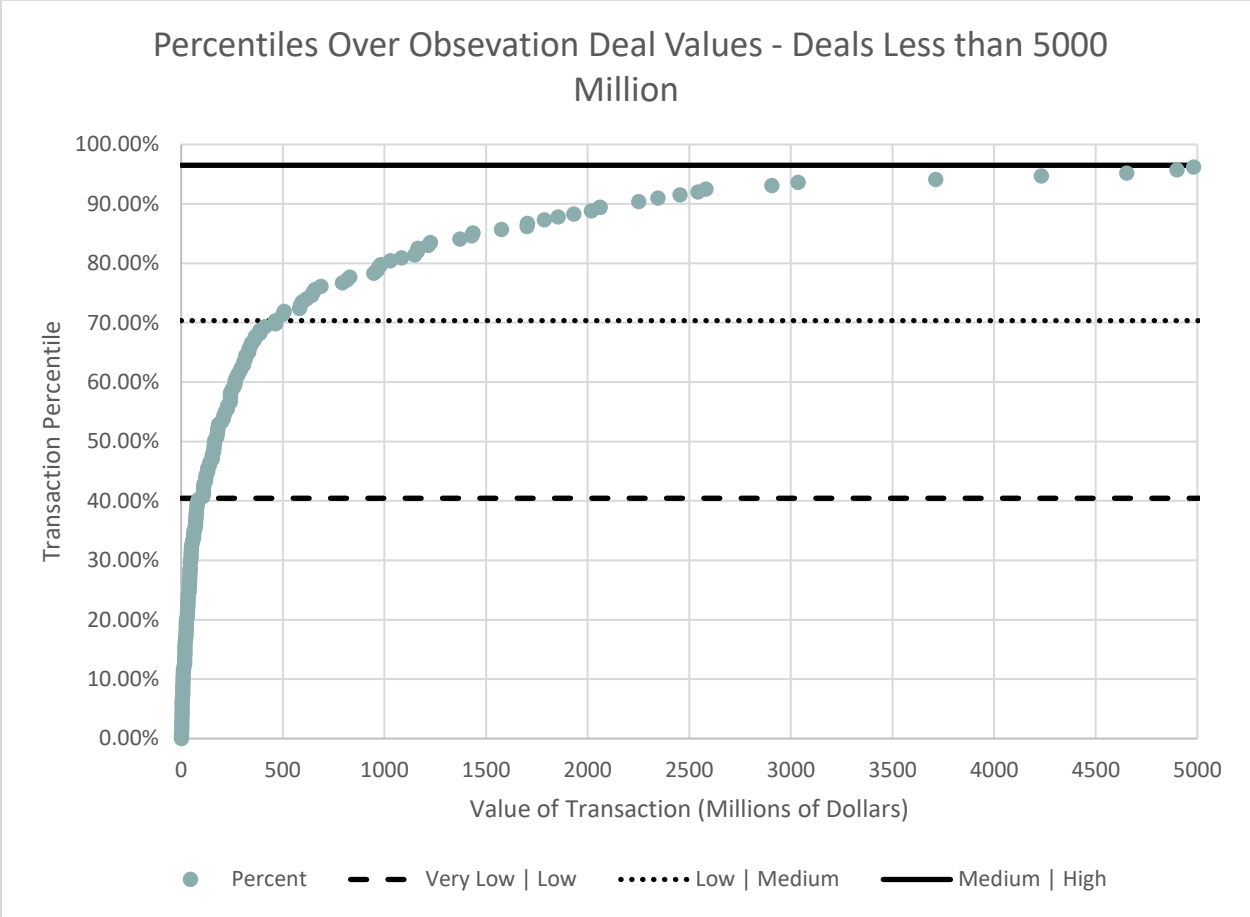

Figure 9: Observation Value over Percentile – Transactions Less than 5000 Million

The graph above shows observation percentile over deal value. Using the graphics 14-16 and author discretion, four transaction value groups are defined; very low value, 0-100; low value, 100-500; medium value, 500-5000; and high value acquisitions exceeding 5000 million.

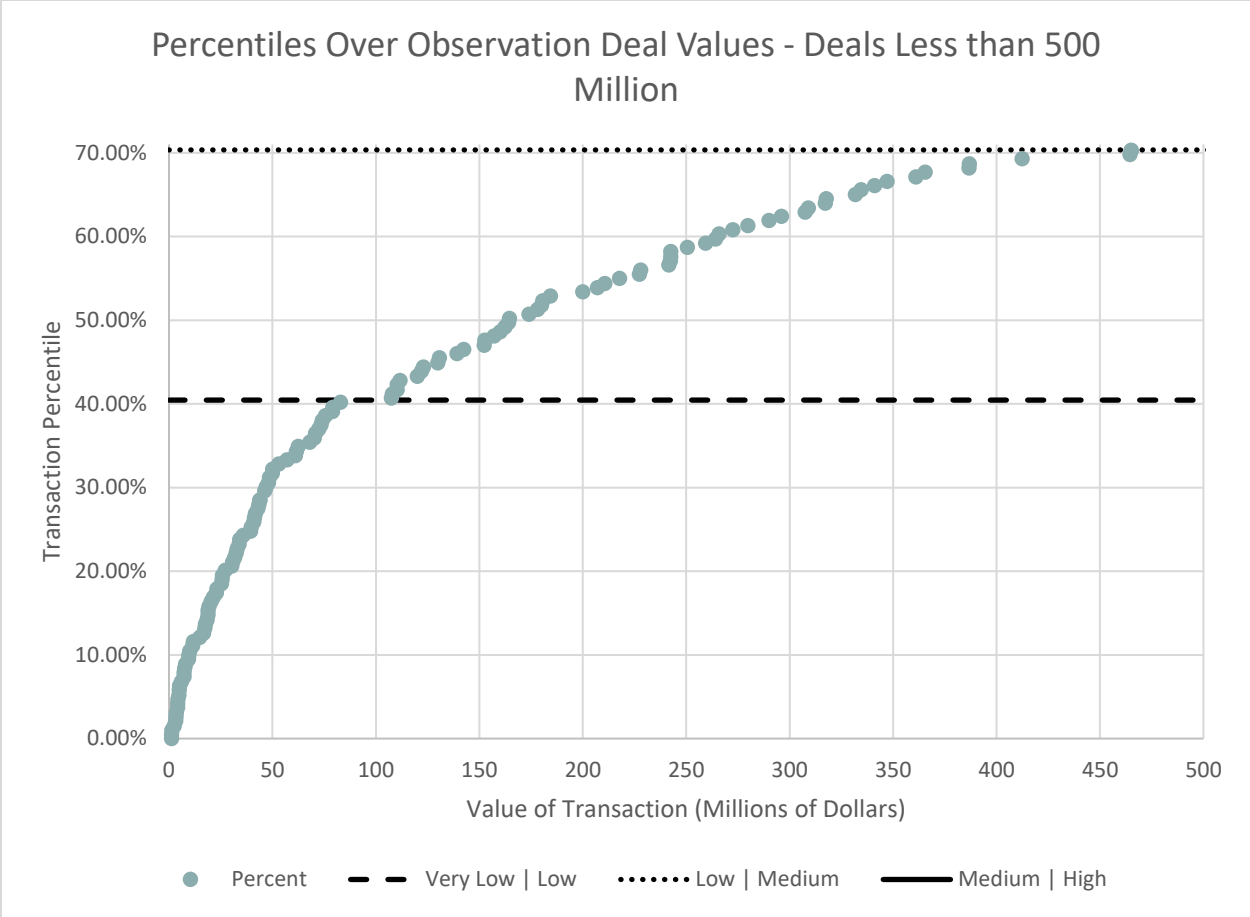

Figure 10: Observation Value over Percentile – Transactions Less than 500 Million

The graph above shows observation percentile over deal value. Using the graphics 14-16 and author's discretion, four transaction value groups are defined; very low value, 0-100; low value, 100-500; medium value, 500-5000; and high value acquisitions exceeding 5000 million.

3.1.3 Relative Size & Relative Size Grouping

The third attribute by which transactions are grouped in this study is relative size. It is calculated using the last twelve months of sales of the target company over the sales of the acquirer for the same time period. The intent of this metric is to calculate

the riskiness of a transaction. Ideally, this will also help to identify transactions that have a market structure or market share impact. For example, a company that acquires a firm with the same total sales would be participating in a transaction that is likely more risky and perceptively different than a large firm that acquires a small firm with a small comparative total sales value. The first firm would be more likely to have to finance the acquisition and the impact of the transaction would be much more noticeable both in the industry and within the company's operations.

Sales have been chosen to approximate the relative size of the transaction, but this method is not without limitations. As previously mentioned, the transactions size can be distorted when companies focused in different markets or on different products interact. Any company that generates its net income through a large volume of low margin sales will appear inflated when compared to a high margin low volume producer and vice versa. If the data were readily available, company stock would probably be the best measure to compare a target to an acquirer. Capital assets, net income, and other financial aspects are not used because, like sales, they can vary by industry, product, or short run company performance and are thus also subject to distortions.

Table 7 displays the number of transactions within each relative size group. The data has been broken into three categories. The smallest group includes all transactions where the acquired firm had less than one fourth the acquirer's sales. The number of transactions in this group is roughly double that of the other two. Following the format of Figures 8-10, Figure 11 shows the percentiles over the reported relative sizes of the transactions. The changes across relative size are not as distinguishable as they were in the deal value graphics of figures 8-10. Furthermore, not all transactions are displayed with the axes of figure 11. Approximately 8% of transactions reported a relative size value greater than 200%.

Table 7: Relative Size Categories

Relative Size Category	Relative Size	Number of Transactions
Low Relative Size	0-25%	80
Medium Relative Size	25-75%	39
High Relative Size	75%+	32

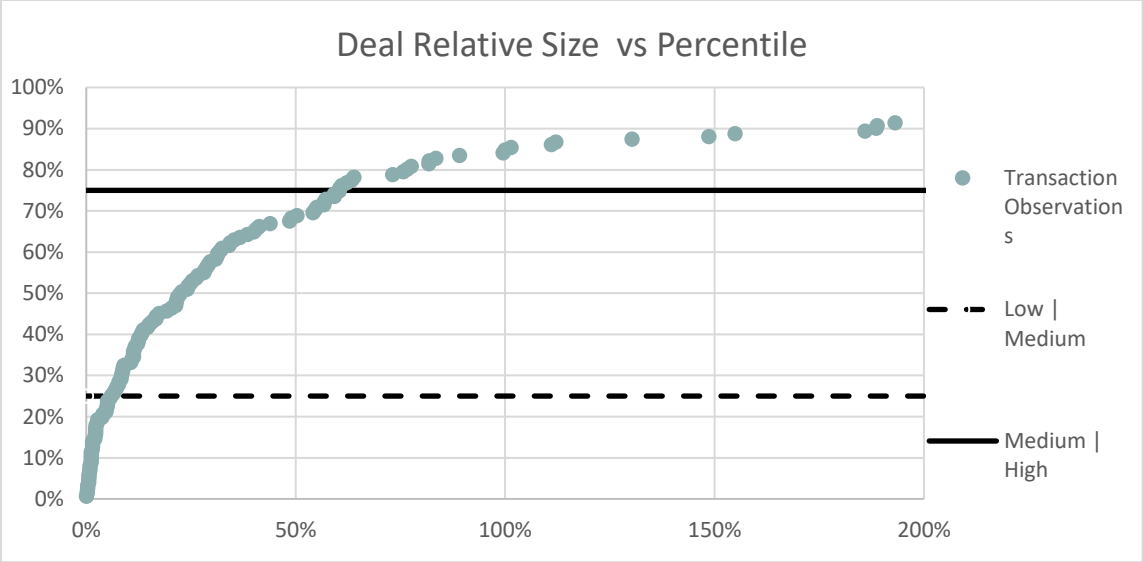

Figure 11: Relative Size over Percentile

Similar to transaction value groupings, relative size categories are made by author's discretion after reviewing the graph above. Relative size has been broken into low risk, 0-25% sales increase; medium risk, 25-75%; and high risk, 75%+.

3.2 CRSP / Eventus Databases

The Center for Research in Security Prices (CRSP) provides the necessary stock history and market data to perform the event studies used to evaluate M&A transactions in this paper. CRSP has data available for most publicly listed companies in

the AMEX, Nasdaq, and NYSE stock markets. CRSP also offers indexes for the evaluation of stock returns relative to certain market sector movements.

Eventus is a software program that pulls data from CRSP to allow users to perform event studies quickly and easily. Using a selected normal returns model, abnormal returns can be calculated within Eventus. Eventus allows abnormal returns to be aggregated according to user preferences, but the general format Eventus reports abnormal returns and statistical testing in is consistent. This format is similar to that of Table 8. The specific methods to calculate the aggregated abnormal returns are listed in Table 8 as well as the significance tests used to test abnormal returns in this paper. The actual process of aggregating returns and testing is discussed in the methodology section.

Figure 2 was initially presented in the literature review and displays a graphical elaboration on how event studies are conducted. It is now revisited to highlight the specific CRSP stock market data Eventus pulls to compute abnormal returns. The Figure consists of three windows. The estimation window identified by the time period L_1 is used to estimate parameters. Normal return models like the market model use prior stock data, OLS regressions, and estimated parameters to calculate normal returns during the event window. The event window, L_2, is the time period during which abnormal returns are calculated. The event, in the case of this paper the announcement of an M&A transaction, occurs at time T=0. Figure 2 has been tailored to display the long and short run time specifications of this paper in Figures 12 and 13. These figures are presented in the methodologies section, but the stock price data pulled by eventus is discussed in the following paragraphs.

Regarding short run event studies, the estimation window for a company in the event studies performed in chapter 5 require a minimum of 30 days to a maximum of 225 days of prior stock price data. This window is used to estimate the beta coefficients of the market model discussed in 4.1.1 of the methodology chapter. The OLS estimation regressions are restricted to using only market data in the period 30 days prior to the event. The event window is composed of the abnormal returns calculated during the

sixty days surrounding the event. This paper lists six windows, but focuses on the (0-1) day period. Statistical tests are included and vary for short and long run event studies.

The cumulative abnormal returns (CAR) calculated in the paper are subjected to back dating. This means transactions announced during market closures are instead dated back to the nearest market business day. For example, transactions announced on weekends or holidays would have CAR calculations start the day before the market closure and then skip to the next opening of the market for the window (0-1). The process of backdating is included to allow for the inclusion of two transactions that were announced on a Sunday as well as any transactions that may have occurred before a holiday or other market closure. Furthermore, the 0-1 window allows CAR calculations to capture the immediate impact of at least one day of a market's reaction to an announcement. This window is advantageous because, although the date a transactions is announced is known, the time of the announcement is not available in Thompson one data. Transactions, then, may be announced after the market closes and thus the day of the announcement would not capture the market's initial response.

The long run event studies of this paper require monthly data for a minimum of 6 months prior to the month before a transaction. A maximum of 36 months data is allowed during the estimation window. The event windows for long run studies in this paper, requires 37 additional months market price observations. This requirement reduces the number of observations available for long-run analysis.

Table 8: Eventus Report Format

Event Window	**Observations available For this Window**	**Event Study Abnormal Return**	**Positive vs. Negative Return Observations**	**Significance Tests of Abnormal Returns**
The time period over which abnormal returns are calculated. Listed as (T_1,T_2).	Lists the number of observations N for a given time period.	Listed as either Cumulative abnormal Returns (CAR) for short run studies, or Compounded abnormal returns (COAR) for long.	The number of positive CAR or COAR observations to negative observations.	The Patell Z, Generalized Sign Z, and skewness corrected T test are used and discussed in the methodology section.

3.3 Compustat Database & Company Financials

Compustat is a database that provides information regarding company financials. Using it, many changes in performance metrics during the years surrounding a transaction can be obtained. However, the number of companies for which data is available is rather limited. Because of this, Compustat financial information is not used in regression analysis. However, the availability of seven years financial information for 55 acquirer's involved in M&A transactions provides insights too valuable to dismiss. In order to add value to the long run analysis of impacts M&A has on acquirer performance, the Compustat dataset is analyzed.

Table 9 displays many company financial metrics available on Compustat. Given the low observation count, the inferences of the data in the table should be taken with caution. The figure does not show individual company performance, but rather displays the percent of the 55 companies for which each financial ratio increased during the time period listed at the top. Multiple time periods are compared using different spans of the seven years of financial information available. The transaction year is listed as zero in the table headings. This table will be revisited as a supplement to the long run acquirer

conclusions of the paper, but it should be understood that its findings are subject to limitations beyond just observation count.

Data available on Compustat is more common for larger, North American companies. Thus the conclusions drawn from Compustat data may be representative of only this population. Many of the event study transactions include lower valued firms that may have deals not accurately reflected by the fifty-five companies in the Compustat database. Furthermore, in order to have seven years financial data the companies in Compustat are inherently biased to reflect only transactions that did not cause fatal impacts. This may cause financial metrics to appear to be more improved.

Table 9: Compustat Financial Performance Improvement Table

Financial Ratio	**Definition**	**- 1 to 0**	**-1 to 1**	**- 3 to 0 vs. 0 to 3 Averages**
Current Ratio	Current Assets / Current Liabilities	43%	41%	63%
Return On Capital Employed	Profit Before Interest and Tax / Average Capital Employed	38%	36%	59%
Return On Assets	Profit after Tax / Total Assets	45%	39%	63%
Net Profit Margin	Profit after Tax / Sales	43%	36%	70%
Total Debt Ratio	Total Debt / Total Assets	66%	66%	70%
Interest Coverage Ratio	Interest / Profit Before Interest and Tax	63%	66%	73%
Asset Turnover Ratio	Sales / Average Total Assets	32%	34%	55%
Working Capital	Current Assets- Current Liabilities	46%	50%	66%
Return On Equity	Net Income / Equity	54%	45%	63%

CHAPTER 4. METHODOLOGY

4.1 Event Study Windows and Models

This paper makes use of two normal return models to calculate the abnormal returns of its event studies. The first is the market model. The second is the market-adjusted model. Short-run studies rarely differ greatly in the abnormal returns reported using these models. In long-run studies, additional assumptions made in the market model can lead to significantly different abnormal returns from the market adjusted model. Table 10 highlights the variables and notations of the models presented in 4.1.1 and 4.1.2.

The normal models used are presented in the next two sections, but the specific time frameworks used for long and short run event studies are presented first. These windows are used in tandem with normal return models to calculate abnormal returns that occur during the event window. Figure 12 and 13 display the specific windows over which abnormal returns are calculated. The time periods used were briefly discussed during the data section and shown again in Figures 12 and 13. Reiterated, the windows in the short run are calculated using daily data. In the long run, monthly observation prices are used. One exception to the timeline shown in Figure 13 occurs. In one case detailed in chapter 5, all windows are pushed back an additional 6 months in order to examine company performance before a transaction.

Table 10: Notation Table for Normal Returns

Notation	Definition
AR_{jt}	The abnormal return for company j at time t
R_{jt}	The real return for company j at time t
$E(R_{jt})$	The expected real return for company j at time t
R_{mt}	The market portfolio return at time t
α_t	Unique company conditions impacting return
β_t	Portfolio responsiveness to changes in the market portfolio
ε_{jt}	Error term in an OLS regression for observation of company j at time t
t_1 or t_2	Two unspecified moments of time

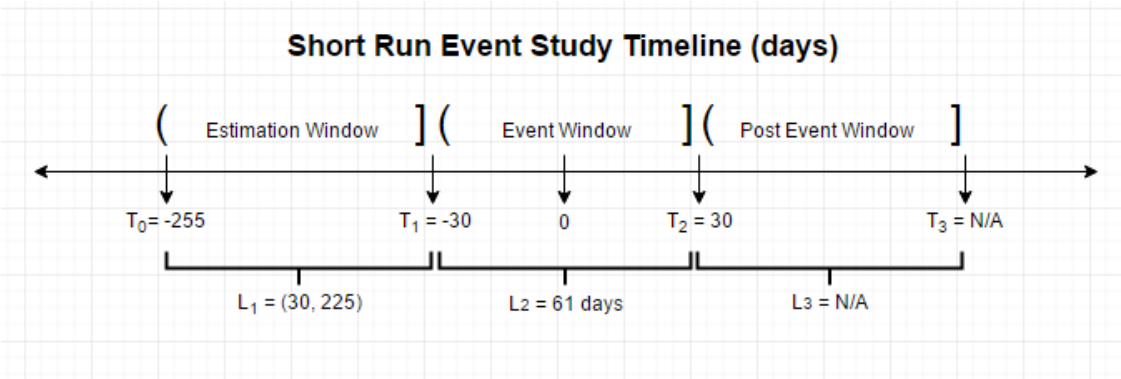

Figure 12: Short Run Event Study Timeline

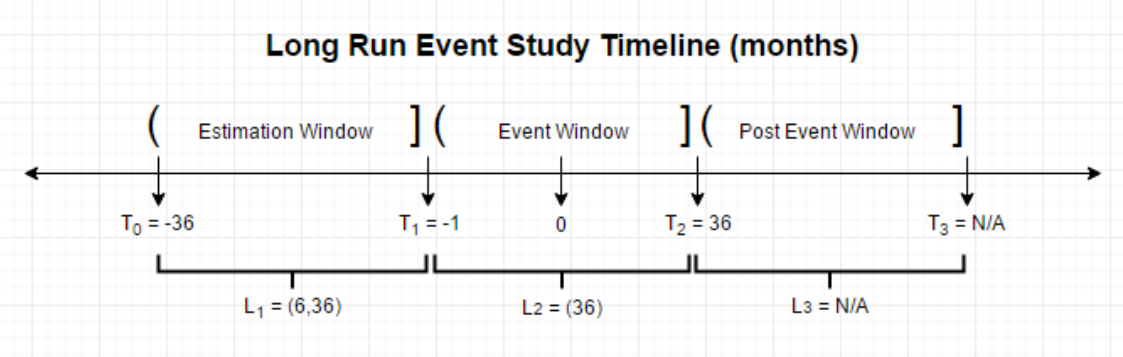

Figure 13: Long Run Event Study Timeline

4.1.1 The Market Model

The most popular method for calculating normal returns is the market model. This model is outlined mathematically in Brown and Warner (1980) using the notation below.

$$E(R_{jt}) = \alpha_j + \beta_j R_{mt} + \varepsilon_{jt} \qquad \text{Equation 1}$$

Here $E(R_{jt})$ represents the expected return of company j's stock on day t. The variables α_j and β_j are model parameters estimated using OLS regression and a previously decided estimation window. R_{mt} is the return on the benchmark index. The value R_{mt} is provided by Eventus and is the change in the AMEX, Nasdaq, and NYSE markets during the time period analyzed. Lastly, the error term ε_{jt} is included at the end of the equation. Once the normal returns for every company j and day t have been calculated using the above model, abnormal returns are calculated using the equation below.

$$AR_{jt} = R_{jt} - E(R_{jt}) \qquad \text{Equation 2}$$

This simple calculation gives the difference between a stock j on day t's actual return and the value of the return as estimated by the market model. Its difference is the stock's abnormal return.

4.1.2 Market-Adjusted Model

The market-adjusted model is the simplest model available for calculating abnormal returns. It is incredibly intuitive and its abnormal returns are merely the difference between a given stock R_{jt} and a portfolio's or market's returns R_{mt}. No OLS regressions or parameters are needed in its calculation.

$$AR_{jt} = R_{jt} - R_{mt} \qquad \text{Equation 3}$$

The simplicity of the market adjusted model and its lack of strong assumptions make it appealing to many researchers. Unlike the market model, there is no assumption of a static time insensitive company characteristic. Performance relative to the overall markets drives each firm's abnormal returns.

4.2 Abnormal Returns

4.2.1 Cumulative Abnormal Returns CAR

There are two commonly used measures of aggregated abnormal returns. These measures are useful for statistical testing of abnormal returns. The first is found by summing a stock's abnormal returns during a period and is called the stock's cumulative abnormal return (CAR). Choosing two date's t_1 and t_2, a cumulative abnormal return can be calculated by summing the abnormal returns between the two moments. By doing this over the different periods, cumulative abnormal returns for multiple event windows can be calculated. This is mathematically represented below.

$$CAR_{j[t_1:t_2]} = \sum_{t_1}^{t_2} AR_{jt} \qquad \text{Equation 4}$$

The cumulative abnormal returns in this paper are tested for significance using the Patell test and generalized sign z test.

4.2.2 Buy and Hold Abnormal Returns BHAR

Similar to cumulative abnormal returns, buy and hold abnormal returns are calculated over a time period t_1 to t_2. However, unlike cumulative abnormal returns, buy and hold abnormal returns are compounded over the time period analyzed. These returns are considered to be more reflective of investor experience in the long run.

$$\mathrm{BHAR}_{j[t_1:t_2]} = \prod_{t_1}^{t_2}(1 + \mathrm{R}_{jt}) - \prod_{t_1}^{t_2}(1 + \mathrm{R}_{mt}) \qquad \text{Equation 5}$$

Simply stated, buy and hold abnormal returns are the difference between the realized buy-and-hold returns and the normal buy-and-hold return of a portfolio R_{mt}.

4.3 Statistical Tests on Returns

Three statistical tests are used to test abnormal returns calculated in the market and market adjusted models. The Patell Z, generalized sign Z, and skewness corrected T test are used to identify whether abnormal returns are significantly non-zero. The Patell and skewness corrected tests are parametric tests. The Patell is used on short run CAR returns, while the skewness corrected is used to test long run abnormal returns. The generalized sign Z is a non-parametric test. It is also reported for long run windows.

4.3.1 The Patell Test Statistic

The Patell test is arguably the most prevalent parametric test for abnormal returns in event study literature (Patell 1976). The standardized residual test, often referred to as the Patell t-test, tests the null hypothesis that the cumulative average abnormal return is equal to zero.

The test statistic is shown below:

$$\mathrm{z}_{\mathrm{Patell,t}} = \frac{\mathrm{ASAR}_t}{\mathrm{S}_{\mathrm{ASCAR}_t}} \qquad \text{Equation 6}$$

Here, $ASAR_t$ is the sum over the sample of standardized abnormal returns and S_{ASARt} is the standard deviation of those abnormal returns. Boehmer, Musumeci and

Poulsen (1991) elaborate on the Patell statistic and show that, given the lack of an event-induced variance increase, the Patell test is well specified and has appropriate power. However, they find that if the variance of a stock's returns increases around the event date, the standardized residuals test rejects the null hypothesis too often.

4.3.2 The Generalized Sign Z Test

The second test used is the generalized sign test proposed by Cowan (1992). This test uses the null hypothesis that, under the assumption of no abnormal returns, the number of stocks with positive abnormal cumulative returns would be similar to the fraction of positive cumulative abnormal returns from the estimation period of the study. When the number is significantly higher, the null hypothesis is rejected and the event is said to have had an impact on the returns of the stock.

The generalized sign test statistic developed by Cowan (1992) is shown mathematically by:

$$Z_{COWAN} = \frac{w - n\mathcal{P}}{\sqrt{n\mathcal{P}(1-\mathcal{P})}} \qquad \text{Equation 7}$$

where w is the number of stocks in the event window for which the cumulative abnormal return is positive and n is the number of stocks. Furthermore

$$\mathcal{P} = \frac{1}{n}\sum_{i=1}^{n}\frac{1}{mi}\sum_{i=T_0}^{T_1} S_{it} \qquad \text{Equation 8}$$

where m_i is the number of non-missing returns in the estimation window for event i and S_{it} assumes either the value 1 or 0 depending on if the firm experiences positive abnormal returns during the period. The generalized sign Z statistic mentioned is best applied to short run studies and is not advised over longer event studies without severe discretion.

4.3.3 The Skewness Corrected T Test

The skewness corrected T test was first introduced in the early 90's (Hall 1992). The null hypothesis tested of no abnormal returns is tested using the statistic:

$$t_{SABHAR} = \frac{ABHAR(h)\sqrt{n}}{S_{BHAR}} + \frac{\gamma}{3\sqrt{n}}\left(\left(\frac{ABHAR(h)\sqrt{n}}{S_{BHAR}}\right)^2 + \frac{1}{2}\right) \qquad \text{Equation 9}$$

where ABHAR(h) is the sample mean of $BHAR_i(h)$s, and S_{BHAR} is the sample standard deviation of $BHAR_i(h)$ over the n sample of firms. The characters i and h represent the individual BHAR returns for event windows of h months. Lastly, γ is an estimate of the skewness coefficient of $BHAR_i(h)$. The skewness corrected T test is included in long run analysis, but is subject to a number of shortcomings. Therefore, the inferences drawn from it should be cautiously reported.

4.4 Regressions on Returns

This paper attempts to find the factors that influence abnormal returns of acquirers and targets in the food and agribusiness industries through two primary methods. First, the event studies are grouped using industry, size, and value subsets. Each subset is tested using the Patell and generalized sign z test statistic. The variations in the subsets are used to justify exploration into driving factors of abnormal returns according to industry, size, deal value, and several other transaction attributes.

Three sets of OLS regressions are performed on the abnormal returns of acquirers in the short run, targets in the short, and acquirers in the long run. Variables from Thompson-one are included in the OLS regressions. Their significance is tested with the intent of identifying and quantifying impactful drivers of return. Three regression models, each with different variable sets, are presented and performed on each set of abnormal returns. For clarity, the regression models have been labeled as variable sets A, B, and C. The dependent variable is the CAR of short run acquirer or target firms as calculated using the market or market adjusted model. However, in the regressions of acquirer firms in the long run, the dependent variable switches to the

BHAR as calculated by the market or market adjusted model. Table 11 displays the variables and sets. A check mark is used to indicate whether a variable is included in sets A, B, and C for acquirer regressions. Asterisks denote variables used in target regression sets A, B, and C. The first five variables in Figure 24 are continuous and the last 8 are binary variables. Equation 7 lists a general mathematic notation of the OLS regressions performed. The symbol **ε** denotes the error term in each OLS regression.

$$Y = B_0 + B_1X_1 + B_2X_2 + B_3X_3 + \ldots + B_nX_n + \varepsilon \qquad \text{Equation 10}$$

Simplicity, intuition, and exploration motivate the three variable sets used in the OLS regressions of Chapter 6. Variable set A includes only the continuous variables thought to impact transactions. Variable set B was developed according to the conclusions of Chapter 5 and the significance cash transactions have held in other studies identified in the literature review. Variable set C is used to explore other possible driver. Of the three sets, set B will be the focus of many of the conclusions derived in this paper.

Table 11: OLS Regression Variable Sets

X-Var	**Description of Variables**	**Variable Set A**	**Variable Set B**	**Variable Set C**
X_1	Deal Value	✓*	✓*	✓*
X_2	Acquirer ROA	✓	✓	✓
X_3	Target ROA	✓*	✓*	✓*
X_4	Target ROE	✓*	✓*	✓*
X_5	Relative Deal Size	✓*	✓*	✓*
X_6	Payment of Stock – Binary			✓*
X_7	Payment of Cash – Binary		✓*	✓*
X_8	Target Industry Food and Bev – Binary			✓*
X_9	Target Industry Food and Bev Retailing –Binary		✓	✓*
X_{10}	Target Industry Ag & Livestock – Binary			✓*
X_{11}	Hostile Transaction – Binary		*	✓*
X_{12}	Competitive Transaction - Binary		*	✓*
X_{13}	Related Industry - Binary			✓*

CHAPTER 5. EVENT STUDY RESULTS

The event study results of this paper suggest statistically significant market reactions to a transaction's announcement. This is true for both acquirer and target shareholders. Market and market adjusted event study abnormal returns remain very similar in the short run but deviate in the long run. The short run abnormal returns also display an accumulation of abnormal returns in the days leading up to the transaction, particularly for target companies. Both acquirers and targets received positive average cumulative abnormal returns in the 0-1 event window. Acquirers did not have positive mean compounded abnormal returns in the long run.

The short run abnormal returns of acquiring and target firms will be analyzed individually in sections 5.2 and 5.3, but a general overview of the short run returns in both the market and market adjusted models is provided first. A list of descriptive statistics for the abnormal returns of targets and acquirers in both models is shown in Table 12. Multiple event windows and their abnormal returns are discussed in sections 5.2 and 5.3. The differences in reported abnormal returns between the normal return models in the short run are addressed in section 5.5. Long run abnormal returns are less easily analyzed than their short run counterparts and are addressed in their own section -- 5.4.

5.1 General Short Run Results

Concerning the short 0-1 day event window shown in Table 12, target and acquirer cumulative abnormal return (CAR) values differ drastically in their spread and range. This is observed from the maximum and minimum CAR values reported by either

model for the target and acquirer firm subsets. The difference is further shown by the large standard deviation of target returns compared to acquirers. The mean for acquirers is slightly positive, hovering just over 0.5% for the CAR of both the market and market adjusted return models. However, targets were found to have a mean CAR exceeding 17%, a positive value. Both acquirer and target short run abnormal returns displayed positive skewness. This can be seen from the larger mean values compared to the medians or by looking at the reported skewness levels. Overall, the CAR values reported are similar to the returns of other studies.

Figure 14 displays a list of all the transactions and the weekday they occurred. Announcements made on Fridays or before holidays provide additional time for investors to process and develop their perceptions given a 0-1 event window. Thus these transactions may be different than those that occur at the beginning or midweek. However, these transactions are included because Friday was the second most popular announcement day and removing these observations would have drastically dropped the observations available in the event study. No sizeable trend was found in the months of announcement. The range of announcements per month is between 12 and 22 but averages just over 15. The number of transactions in each particular month is shown in Figure 15.

Table 12: Summary Statistics of Short Run Returns

Descriptive Statistic	*Acquirer Market Model CAR*	*Acquirer Market Adjusted CAR*	*Target Market Model CAR*	*Target Market Adjusted CAR*
Mean	0.96%	1.04%	17.70%	17.64%
Standard Error	0.58%	0.58%	1.67%	1.66%
Median	-0.22%	-0.21%	13.59%	13.76%
Mode	4.36%	2.24%	10.13%	9.15%
Standard Deviation	7.60%	7.60%	20.06%	20.01%
Skewness	0.987	0.943	0.816	0.787
Range	62.72%	61.73%	125.56%	123.73%
Minimum	-27.25%	-26.52%	-28.17%	-27.52%
Maximum	35.47%	35.21%	97.39%	96.21%
Count	186	186	148	148

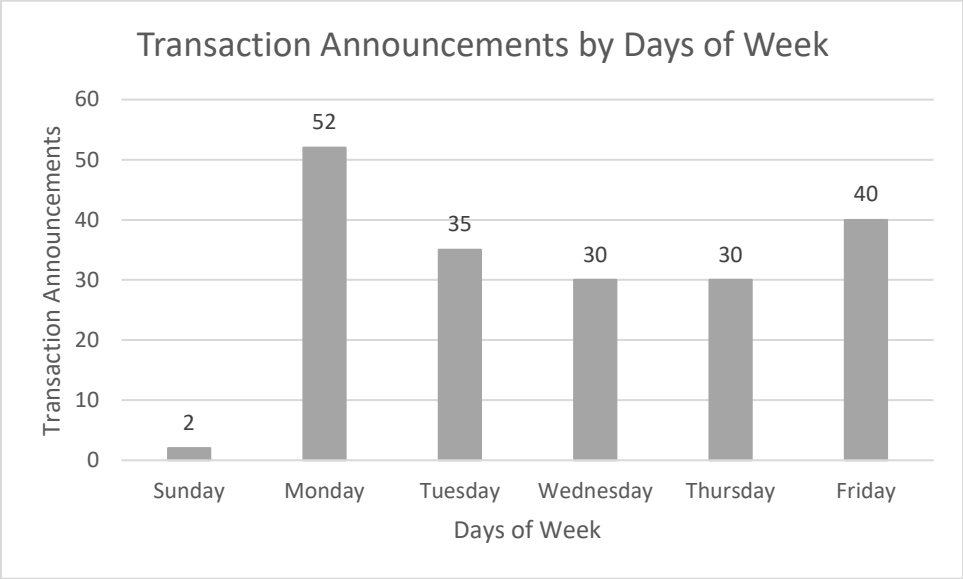

Figure 14: Transactions By Day of Week

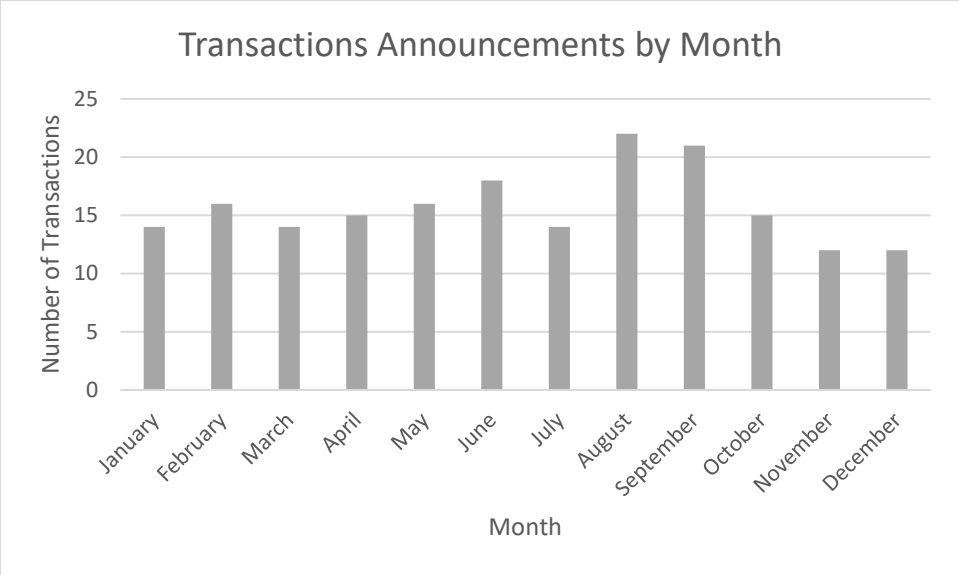

Figure 15: Transactions By Month

5.2 Acquirer Short Run Event Study Results

Figures 16 and 17 display the abnormal and cumulative abnormal returns for the market and market adjusted model during the sixty days surrounding a transaction's announcement. Table 13 displays the cumulative abnormal returns as well as the Patell and generalized sign z statistical test for several event windows within these sixty days. These tests are performed against either the null hypothesis that abnormal returns should be zero or that the number of firms experiencing positive abnormal returns is significantly divergent from the market. Table 13 includes the ratio of firms reporting positive to negative cumulative abnormal returns for each event window analyzed.

Investors often speculate on transactions prior to their announcement (Figures 16 and 17). On average, these expectations are optimistic as transactions are predicted to create more value for the average acquirer than destroy. This is visible from the slight upward slope of the cumulative abnormal return lines in both the market and market adjusted models. Given the assumption that these models accurately reflect the normal returns in an 'eventless' timeline, the cumulative abnormal returns represent future

value generation of a transaction as speculated by the market. In the market model, this value generation appears to occur as a roughly 2.5% increase in cumulative average abnormal returns over sixty days surrounding the event. The market adjusted model reports a slightly larger CAR of roughly 4%. These returns are not tested but are indicative of positive speculation before an announcement and positive expectations regarding the deal following the transaction's announcement.

The results of the event study process are shown in the event windows of Table 13. The last three windows are for the day of the announcement, day after an announcement, and both days combined. The window including the day of the announcement does not include two weekend transactions. Backdating in this case would not measure the impact of the transaction as only the prior announcement day's returns would be calculated. The day of the event is not statistically significant. The day after the event is, however, significant for the Patell test at the 0.001 level. The combined days are significant at the 0.05 level. The abnormal returns these tests are analyzing is listed in Table 13 but are observable in Figures 16 and 17 by the immediate jump that occurs at the y-axis. Figures 16 and 17 have other jumps in their axis that may be due, in part, to larger market movements that occur over weekends. It is not easy to remove this effect without restricting the analysis to only transactions that occur on the same weekday and are not backdated.

Although all windows report positive abnormal returns, the bottom three windows report a larger number of negative observations than positive observations. This implies that, although the average cumulative abnormal return is positive for an announcement, investors perceive most transactions to be value destroying. Given the positive average cumulative abnormal return of all transaction, transactions with positive CARs are often larger in absolute value than transactions that experience negative CAR.

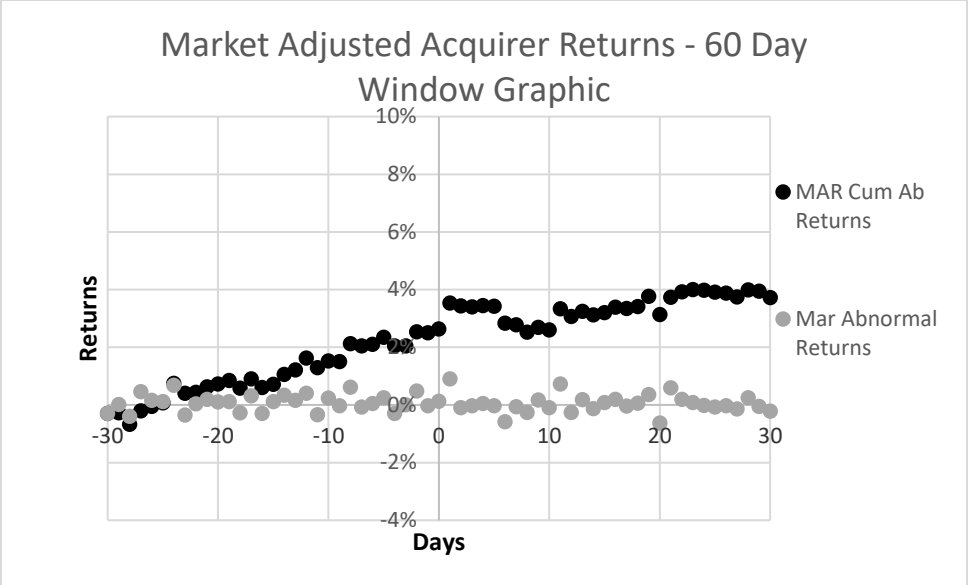

Figure 16: Market Adjusted Acquirer Returns – 60 Day Window Graphic

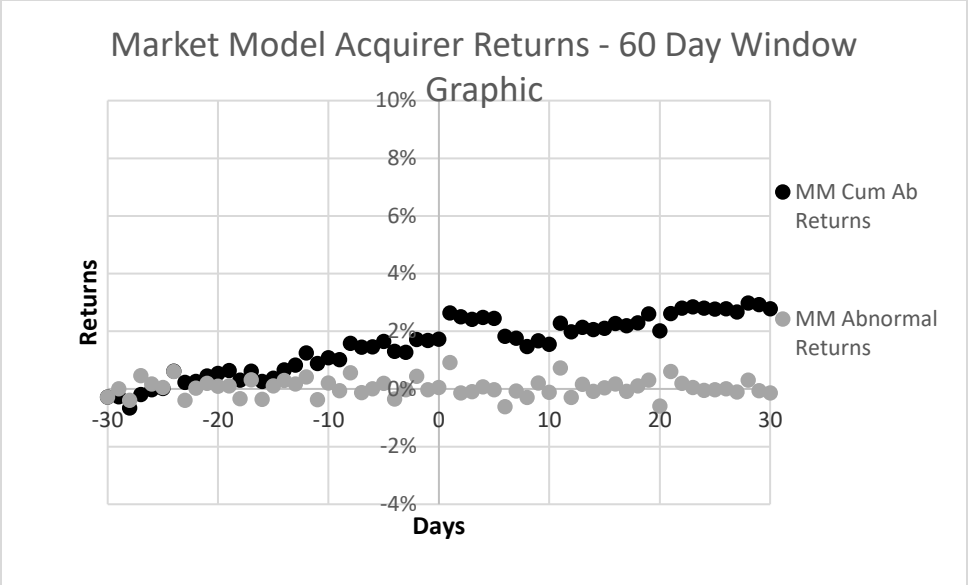

Figure 17: Market Model Acquirer Returns – 60 Day Window Graphic

Table 13: Acquirer Short Run Abnormal Return Windows

Acquirer Short Run Abnormal Return Windows

Market Model					
Window	**Observation Count**	**Cumulative Abnormal Return**	**Positive vs. Negative Return Observations**	**Patell Test**	**Generalized Sign Z**
(-15,+15)	186	1.82%	97:89	0.679	1.478$
(-5,+5)	186	0.99%	97:89	1.216	1.478$
(-1,+2)	186	0.79%	89:97	0.799	0.303
(0,0)	184	0.05%	88:98	0.107	0.157
(+1,+1)	186	0.91%	82:104	2.787***	-0.726
(0,+1)	*186*	*0.96%*	*89:97*	*1.976**	*0.303*

Market Adjusted					
Window	**Observation Count**	**Cumulative Abnormal Return**	**Positive vs. Negative Return Observations**	**Patell Test**	**Generalized Sign Z**
(-15,+15)	186	02.6%	104:82	0.921	2.480**
(-5,+5)	186	1.34%	102:84	1.551$	2.186*
(-1,+2)	186	0.91%	87:99	1.124	-0.018
(0,0)	184	0.13%	87:99	0.533	-0.018
(+1,+1)	186	0.90%	85:101	2.663**	-0.312
(0,+1)	*186*	*1.04%*	*91:95*	*2.260**	*0.57*

5.2.1 Acquirer Returns by Size, Value, and Industry

Further analyzing the 0-1 event window, Figure 31 displays the returns of acquiring firms according to the attributes by which transactions from Thompson-one were grouped. The market and market adjusted model CARs are both shown, but the statistical tests apply only to the market model. This model is preferred in the short run as its normal returns are predicted using the firm's characteristics and past performance instead of just the return of the market. The two models provide very similar results for most observations and cases of significance for one model are almost always true for both in the short run.

The first subsection of Table 14 displays the observations according to the transaction value groups in which they were categorized. The table lists the average CAR of the group for the market and market adjusted models. The largest transaction value group reported a particularly high mean cumulative abnormal return and was statistically significant at the 0.001 level for the Patell test and the .05 level for the general sign z test. However, there are only seven observations in this group, so the results should be taken with caution. The smallest valued transactions were statistically significant at the 0.05 level for the Patell test and averaged a cumulative abnormal return of roughly half what was reported for the largest value group. Low and medium valued transactions were not found to be significant in any manner. Medium valued transactions were the only group to report negative average CAR.

By industry, several sectors were found to be significant. Particularly, food and beverage retailing reported a positive market model average cumulative abnormal return of 2.49% for 82 transactions. It was statistically significant for the Patell test at the .001 level. Food and beverage companies reported a negative market model mean cumulative abnormal return of .62% for a similar sized observation count but the CAR values were only significant at the .05 level. The sole tobacco observation was significant, but the lack of other observations makes generalizing the results to the industry as a whole an ill-advised venture.

The last category of observations had a lower number of observations as data was not available for all transactions. Only high relative size transactions were significant, averaging a market model cumulative abnormal return of 2.04%. The returns reported a significance levels of .01 for the Patell and 0.1 for the generalized sign z test statistic. The total for all the observations in the event window of 0-1 days is shown at the bottom of Figure 31 but was already presented in Figure 30.

Table 14: Acquirer Abnormal Returns By Group – 0-1 Day Event Window

Acquirer Abnormal Returns By Group: (0-1 days)

	Group	N	MAR	MM	Patell Z	Sign Z
Value	Large	7	4.05%	3.95%	3.983***	1.955*
	Medium	45	-0.53%	-0.62%	-1.263	-0.194
	Low	54	0.53%	0.57%	0.639	-0.272
	Small	73	2.02%	1.86%	1.912*	-0.149
Industry	Ag	16	0.32%	0.40%	-0.458	-0.655
	F&B Ret	*82*	*2.71%*	*2.49%*	*4.451****	*0.097*
	F&B	79	-0.65%	-0.62%	-2.092*	0.031
	Tobacco	2	2.21%	2.28%	2.276*	1.465$
Rel. Size	*High*	*30*	*2.15%*	*2.04%*	*3.017***	*1.340$*
	Medium	37	-0.20%	-0.18%	-0.482	-0.55
	Low	77	0.47%	0.43%	-0.012	-0.701
	Total	**186**	**1.04%**	**0.96%**	**1.976***	**0.303**

5.3 Target Short Run Event Study Results

Figures 18 and 19 display the average abnormal and average cumulative abnormal return of targets for the market and market adjusted model during the sixty days surrounding a transaction's announcement. Likewise, Table 15 displays the

cumulative abnormal returns, positive to negative observation ratios, Patell statistic, and generalized sign Z statistic for several event windows during this sixty day period. Unlike acquirers, the returns for targets are particularly large and significant.

Taking a closer look at Figures 18 and 19, a difference between the abnormal returns for targets compared to acquirers is apparent. For example, the cumulative abnormal return buildup prior to the transaction's announcement is much more apparent. Furthermore, the largest jump in abnormal returns clearly occurs on the day of and the day after a transaction. Abnormal returns are largest on the day of the announcement and cumulative average abnormal returns level off almost immediately after the transaction. This makes sense as the target company's value should assume a relatively transparent value – the price of the deal value. Again, this shift occurs over two days in the graphs because transactions may be announced on weekends or too late in the business day for market adjustments to occur.

Looking at Table 15, there are several important results that should be highlighted. All windows were significant for both the Patell and generalized sign Z test. The observation count for the window consisting only of the day of the transaction drops as two observations occur on Sunday and backdating would not capture the impact of the event for this period. Lastly, the most significant Patell statistic occurs on the 0-1 window.

Again, attention should be drawn to the number of positive to negative observations for each event window. For targets, the ratio is particularly significant. However, according to the models employed, there are still targets who received negative abnormal returns in every window analyzed. Reasons for negative target abnormal returns are discussed in section 5.5. Still, during the 0-1 window only 22 of a 148 transactions had negative cumulative abnormal returns. This highlights the notion that target shareholders rarely suffer from participating in transactions.

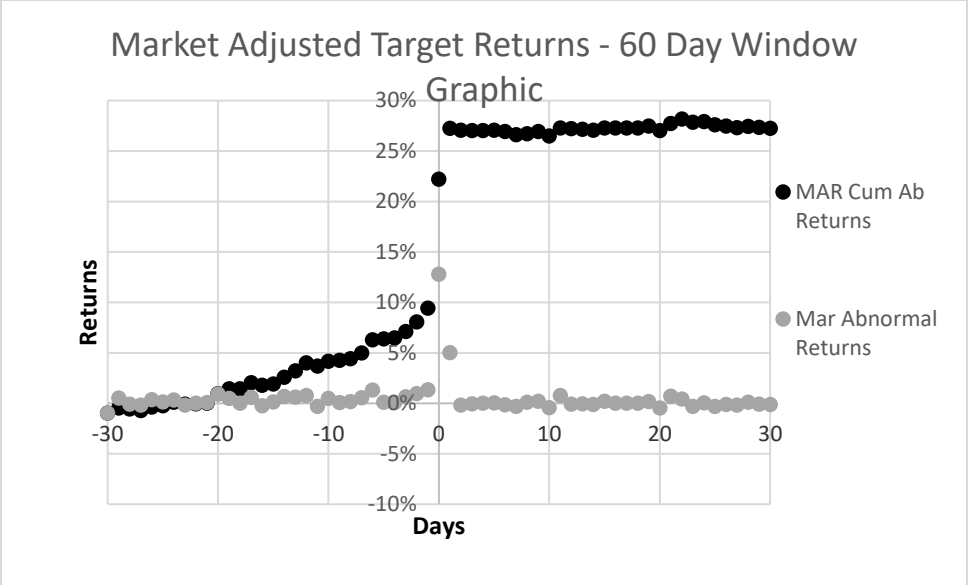

Figure 18: Market Adjusted Target Returns – 60 Day Window Graphic

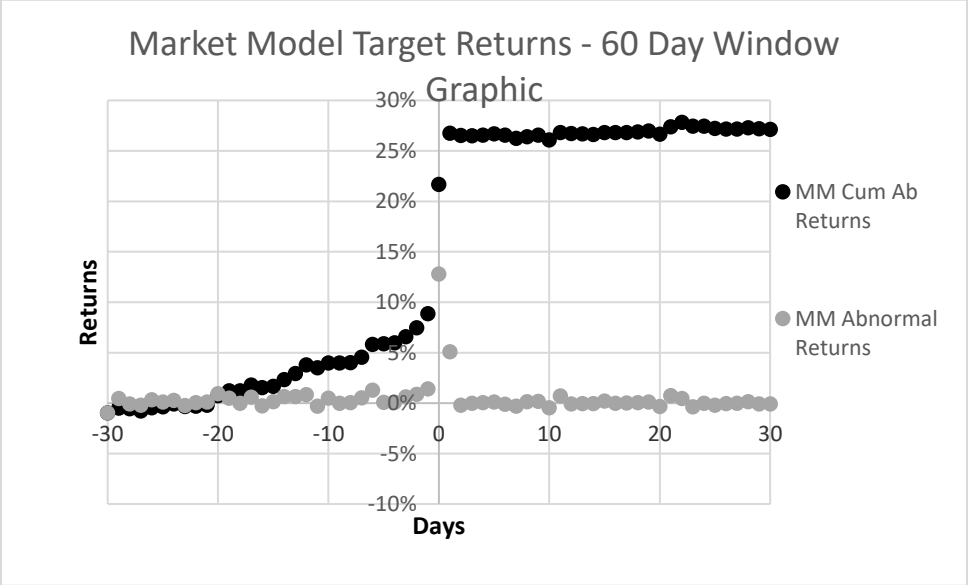

Figure 19: Market Model Target Returns – 60 Day Window Graphic

Table 15: Target Short Run Abnormal Return Windows

Target Short Run Abnormal Return Windows

Market Model					
Window	**Observation Count**	**Cumulative Abnormal Return**	**Positive vs. Negative Return Observations**	**Patell Test**	**Generalized Sign Z**
(-15,+15)	148	25.12%	131:17	21.015***	10.402***
(-5,+5)	148	20.68%	127:21	30.800***	9.907***
(-1,+2)	148	18.90%	127:21	45.228***	9.742***
(0,0)	146	12.79%	119:27	58.632***	8.633***
(+1,+1)	148	5.08%	87:61	25.792***	3.474***
(0,+1)	*148*	*17.70%*	*126:22*	*59.531****	*9.247****

Market Adjusted					
Window	**Observation Count**	**Cumulative Abnormal Return**	**Positive vs. Negative Return Observations**	**Patell Test**	**Generalized Sign Z**
(-15,+15)	148	25.31%	135:13	20.629***	11.061***
(-5,+5)	148	20.61%	127:21	30.266***	9.741***
(-1,+2)	148	18.82%	127:21	44.814***	9.741***
(0,0)	146	12.79%	119:27	58.484***	8.631***
(+1,+1)	148	05.02%	87:61	25.392***	3.143***
(0,+1)	*148*	*17.64%*	*126:22*	*59.151****	*9.576****

5.3.1 Target Returns by Size, Value, and Industry

The statistical significance of CARs for target groups during the 0-1 event window is clearly shown in Table 16. Almost every group was significant at the 0.001 level. For this reason, most differences in this section come from looking at differences in the extremity of test statistic significances for each group instead of just general significance. As previously noted these test statistics are performed against the null hypothesis that no abnormal returns occur during the event window.

Looking at the transaction value groupings of Table 16, the largest test statistic was reported for medium valued transactions. This was true for both the Patell and generalized sign z test statistic. Large valued transactions were the least significant, reporting the least positive mean cumulative abnormal return. This group also only had six observations to test. Interestingly, small transactions reported average cumulative abnormal returns roughly double large transactions and approximately 8% less than low or medium valued observations.

Industry groupings were again all extremely significant. Food and beverage transactions were most statistically significant for the Patell and generalized sign z, while the singular tobacco observation was least significant for both tests. The food and beverage industry also reported the highest average cumulative abnormal returns of any industry. Agriculture and food and beverage retailing trailed by less than 5%.

By relative size, medium and low grouped transactions both reported average cumulative abnormal returns of approximately 20%. Low valued transactions were the most significant for both statistical tests. High relative sized transactions scored the lowest values across the board, reporting only a 13.05% mean cumulative average abnormal return.

Table 16: Target Abnormal Returns by Group – 0-1 Day Event Window

Target Abnormal Returns by Group: (0-1 days)

	Group	N	MAR	MM	Patell Z	Sign Z
Value	Large	6	6.58%	6.75%	7.827***	1.773*
	Medium	45	21.64%	21.77%	53.667***	6.123***
	Low	46	20.59%	20.76%	35.825***	4.965***
	Small	51	12.74%	12.63%	14.297***	4.680***
Industry	Ag	13	15.53%	15.63%	16.952***	3.182***
	F&B Ret	71	16.02%	16.06%	33.407***	5.922***
	F&B	63	20.08%	20.15%	47.727***	6.304***
	Tobacco	1	6.00%	5.96%	2.818**	1.095
Rel. Size	High	25	13.05%	13.12%	15.311***	3.521***
	Medium	32	20.00%	20.24%	35.905***	3.815***
	Low	64	20.10%	20.14%	42.360***	6.381***
	Total	**148**	**17.64%**	**17.70%**	**59.533*** **	**9.247*** **

5.4 Acquirer Long Run Event Study Results

5.4.1 Acquirer Long Run Event Windows

The results of long run event studies are more complex than short run results. Their interpretation and the conclusions suggested from their analysis may not reflect reality for a number of reasons. Joint test problems as well as changes in companies, markets, and economies make the accuracy of normal returns difficult to maintain over longer time periods. The abnormal returns reported by a study have been argued to be more driven by the normal return model employed than by the actual impact of the

event. This difference is most notably seen in the mean compounded abnormal returns of Table 17.

As with the prior two sections, there are multiple windows shown in Table 17. However, this time, the windows assume values between -6 to 36 months after a transaction's announcement. The abnormal return metric displayed is the mean buy and hold compounded returns for acquirers during each window. The generalized sign Z and skewness corrected test are displayed, but should not be given much weight for longer windows. The issues with these tests as well as the overall problems associated with long term models were discussed in depth during the literature review.

Specifically focusing on the first two windows, there is a notable trend in average abnormal returns. In the months prior to a transaction, the market and market adjusted models report positive abnormal performance. These abnormal returns are significant for both the -6 to 0 and -1 to 0 windows according to the generalized sign Z and skewness corrected tests for the market adjusted model. The market model reports significance for both tests at the 0.05 level for the -1 to 0 window and significance at the 0.1 level for the skewness corrected t-test during the -6 to 0 month event window. Lastly, it should be noted that the -6 to 0 month window displays fewer observations as the timeline had to be moved back an additional 6 months to accommodate this window and not all observations had data available to meet the requirements discussed in Chapter 3.

The statistical significance of longer windows is not widely mentioned as it is increasingly less reliable. The market adjusted model calculates abnormal returns as the difference between the return of a stock and the return of the market. Therefore, the mean compounded abnormal return for the -1 to 36 month window of -7.63% for all transactions indicates companies who participate in M&A transactions underperform the market in the long run. Even without concrete statistical testing, this result suggests a negative impact of M&A. This idea is strengthened by the strong abnormal performance prior to the transaction as shown in the -6 to 0 window. In fact, these results would be supportive of Jenson's idea that cash flush businesses may be prone to

inefficiency and value loss as managers are incentivized to perform detrimental transactions (1986). However, the implied assumption in the market adjusted model is that companies' returns should be compared to the returns of the market, an axiom that doesn't hold given common perceptions of varying intrinsic risk in stocks. If the majority of stocks in this analysis are low risk, comparison to the market over three years might not reflect the true value being received by investors as little consideration is given to the security of the investment. However, this explanation seems to contradict the strong outperformance of the firms prior to the transactions announcement.

Table 17: Acquirer Long Run Abnormal Return Windows

Acquirer Long Run Abnormal Return Windows

Market Adjusted

Window	Observation Count	Mean Compounded Ab. Return	Positive vs. Negative Observations	Generalized Sign Z	Skewness Corrected
(-6,0)	134	10.15%	78:56>	1.833*	3.980***
(-1,0)	140	6.55%	81:59>	1.687*	4.137***
(0,+6)	140	4.35%	80:60)	1.518$	1.824*
(0,+12)	140	1.10%	66:74	-0.849	0.291
(0,+24)	140	-3.90%	62:78(	-1.525$	-0.622
(0,+36)	140	-14.17%	50:90<<<	-3.554***	-1.679*
(-1,+36)	140	-7.63%	56:84<<	-2.539**	-0.78

Market Model

Window	Observation Count	Mean Compounded Ab. Return	Positive vs. Negative Observations	Generalized Sign Z	Skewness Corrected
(-6,0)	134	4.94%	70:64	1.227	1.469$
(-1,0)	140	5.18%	76:64>	1.699*	2.595**
(0,+6)	140	-3.92%	56:84<	-1.688*	-1.365$
(0,+12)	140	-17.62%	49:91<<	-2.873**	-3.422***
(0,+24)	140	-81.91%	47:93<<<	-3.211***	-3.989***
(0,+36)	140	-346.13%	40:100<<<	-4.397***	-2.205*
(-1,+36)	140	-387.22%	40:100<<<	-4.397***	-2.073*

5.4.2 Acquirer Market Model Returns by Size, Value, and Industry

Focusing specifically on the market adjusted model of compounded abnormal returns (COAR), there is a wide array of reported value generation. For example, large transactions reported a mean compounded abnormal return of over 20%, while low valued transactions reported an almost equally negative result. Small valued transactions were close to zero, implying the mean compounded abnormal return for companies involved in these transactions appears to be very close to the return in the market.

Regarding the industry sub segments, tobacco no longer has any observations with three years of post-transaction data. Agriculture shows market adjusted abnormal returns close to 16%. Food and beverage retailing reports very negative and significant mean COAR. Food and beverage transactions list a positive mean compounded abnormal return of 6.29%. The abnormal returns shown in this section may be related more to industry booms and busts than M&A transactions. This would certainly explain the immense range, and consolidation has historically aligned with strong and weak economic states.

The last section of Table 18 shows the long term abnormal returns by relative size. The largest relative size transactions reported the largest mean compounded abnormal returns. Low relative size transactions reported a negative mean compounded abnormal returns of approximately 12%. These results may reflect the higher risk higher reward nature of the market. Relative size is calculated by target and acquirer sales, and thus the returns these sub segments have may be driven by this calculation. Low relative size transactions may be composed of mostly large, established companies acquiring small firms. In contrast, observations with high relative size values may reflect smaller riskier business ventures.

Overall, the acquirer companies involved in transactions underperformed the market by -7.63% over the roughly three year period compounded returns were calculated. This result does not support the idea that M&A creates value, but it does not necessarily refute the notion. The companies observed may be experiencing lower

returns for industry or risk reasons. To strengthen and provide further meaning to the long run returns of acquirers, Chapter 7 provides an analysis of long run performance of companies involved in M&A transactions.

Table 18: Acquirer Abnormal Returns by Group- -1-36 Month Window

Acquirer Abnormal Returns by Group: (-1 to +36 Months)

	Group	N	MM	MAR	Gen Z	Skew T
Value	Large	5	11.31%	20.74%	-0.343	0.517
	Medium	31	-84.59%	-11.60%	-0.843	-1.018
	Low	42	-131.40%	-18.28%	-1.475$	-2.205*
	Small	62	-743.97%	-0.71%	-1.910*	-0.038
Industry	Ag	12	-40.47%	15.88%	1.094	0.843
	F&B Ret	65	-746.11%	-24.90%	-3.098***	-2.097*
	F&B	62	-82.54%	6.29%	-0.955	0.403
Rel. Size	*High*	20	-108.09%	14.12%	-1.605$	0.374
	Medium	31	-67.69%	6.96%	-0.347	0.396
	Low	61	-110.22%	-11.97%	-2.009*	-1.196
	Total	140	-387.22%	-7.63%	-2.539**	-0.78

5.5 Model and Return Comparison and Discussion

5.5.1 Market Model to Market Adjusted Model

Figures 20 and 21 show the market and market adjusted model cumulative abnormal returns for acquirer and target observations respectively. The market model abnormal returns are displayed using the x–axis and market adjusted abnormal returns are captured by the y-axis. A 45 degree line has been added to show that neither model appears to consistently over or under predict the abnormal returns compared to the other during the 0-1 day window.

The strong relationship between the two models' reported abnormal returns, is most clearly seen by the correlation of their returns. Regarding the acquirer abnormal returns shown in Figure A, a correlation of .997 was found between the returns reported by the market model to those reported by market adjusted model. This correlation is even stronger for target abnormal returns, which reported a correlation value of .999 for the two models.

Although these correlations are very high, it should be understood that these models deviate from each other quite quickly as the event window length increases. The market model predicts normal returns using prior stock price movements, which may not reflect the company as accurately over longer periods of time. In contrast, the market adjusted model compares a stock price's movements after an event compared to the general market. To assume a particular stock should bear the same risks and returns of the market over longer time periods is a strong and often erroneous conclusion. Therefore, the similarity between the abnormal returns of the market and market adjusted model during the 0-1 window should not be generalized to longer time periods.

Figure 22 shows the compounded abnormal returns of acquirer companies involved in transactions in the long run. The abnormal returns are compounded over the period of -1 to 36 months post transaction and utilize monthly data. It should be noted

that the axes are not the same. The market model reports a number of observations at far more extreme values over the near three year period. There are still a number of observations that are near the 45 degree line, meaning the two models report nearly the same return, but a substantial number of market model observations are significantly more negative. Furthermore, the correlation between the returns of the two models drops heavily in the long run, coming to a value of 0.589. This difference is largely put on the market model as the compounded abnormal returns appear too large to be reflective of reality.

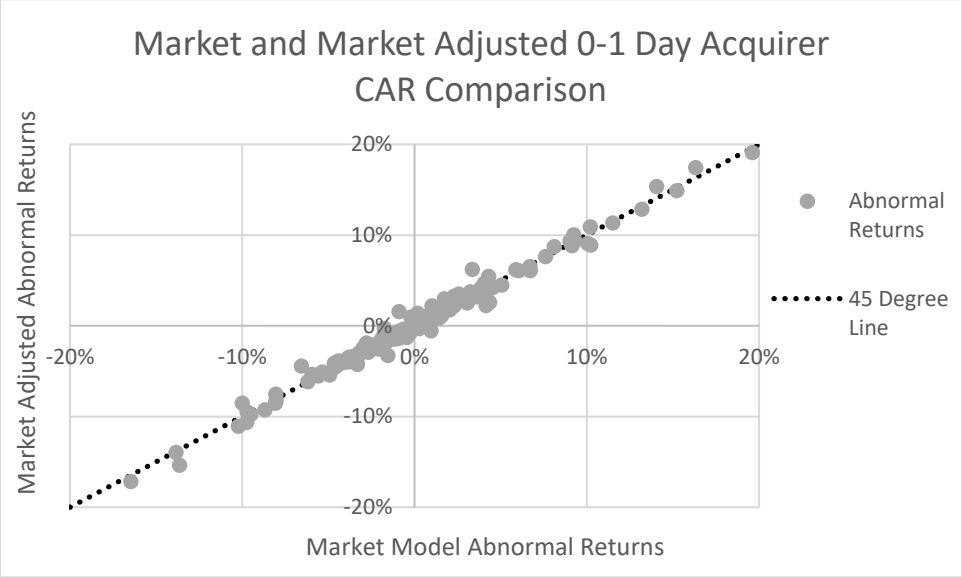

Figure 20: Short Run Market and Market Adjusted 0-1 Day Acquirer CAR Comparison

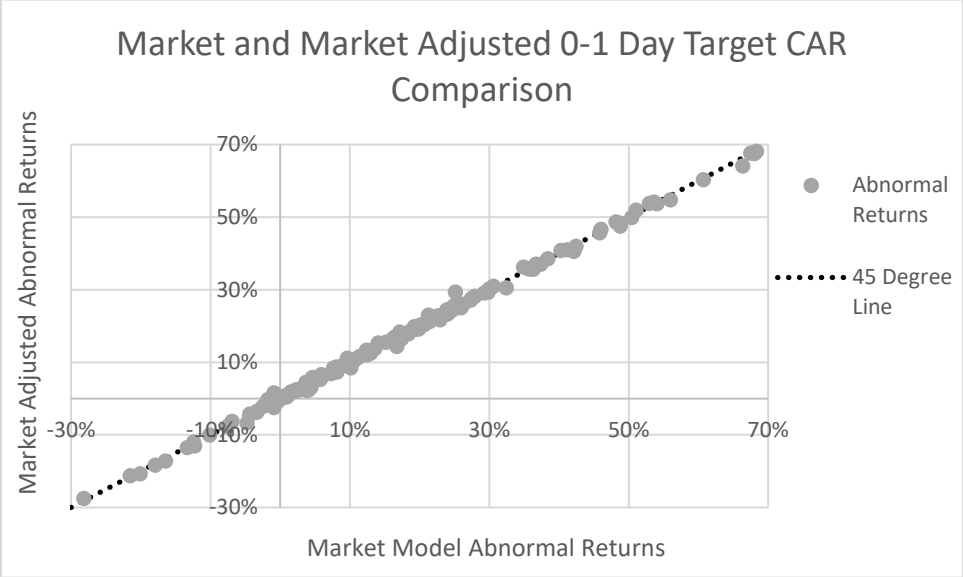

Figure 21: Short Run Market and Market Adjusted 0-1 Day Target CAR Comparison

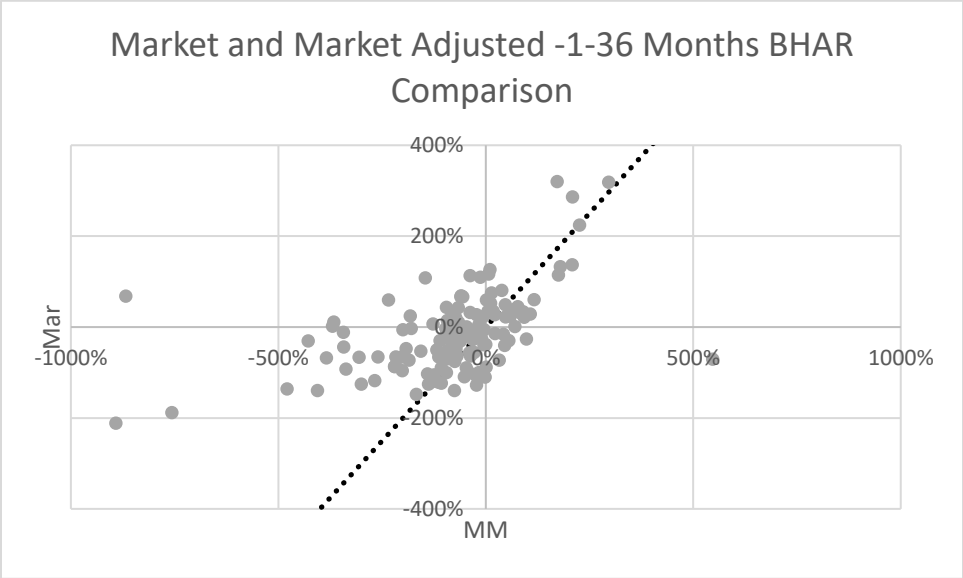

Figure 22: Long Run Market and Market Adjusted -1-36 Months Acquirer BHAR Comparison

5.5.2 Target to Acquirer Returns

The last two Figures (23 and 24) show the abnormal returns of acquirers and targets for the market and market adjusted model during the 0-1 day event window. Target abnormal returns are listed on the x axis and acquirer returns are on the y axis. The graphs display two main trends.

First, not every target has positive abnormal returns. Because only public transactions are being evaluated, the target stock price should be reflective of the company's value and the transaction deal should not occur for a value below the cumulative stock value. It would seem reasonable that a premium should be payed to incentivize targets to sell, always leading to positive abnormal returns. These negative CAR may be the result of prior speculation by investors. Well telegraphed announcements would have a build of target stock price and may be subject to over speculation. The announcement and certainty that comes with it would correct this over speculation and would show as a negative abnormal return in the event window 0-1 days. This serves as a possible explanation, but it does not appear that the majority of transactions are telegraphed as many announcement events have significantly larger CAR for targets during the 0-1 day time period.

The second notable trend would be the drastic difference between the two group's returns. The graphs have been given the same axes to help illustrate this difference. The long drawn out observation cluster along the x axis demonstrates that targets are the 'winners' by and large in deals. Furthermore, the close hovering around the x axis suggests the difficulty acquirers have in negotiating strongly favorable deals.

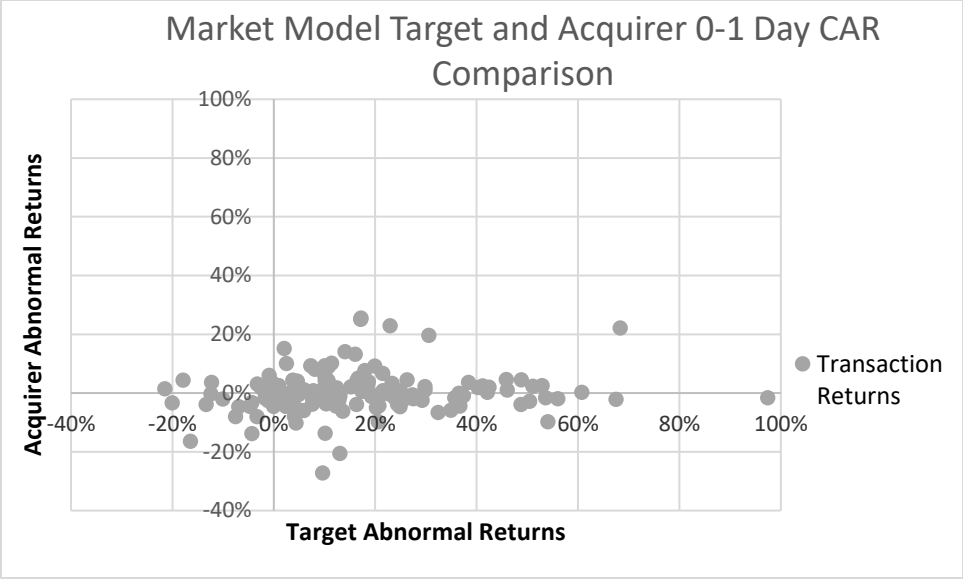

Figure 23: Market Model Target and Acquirer 0-1 Day CAR Comparison

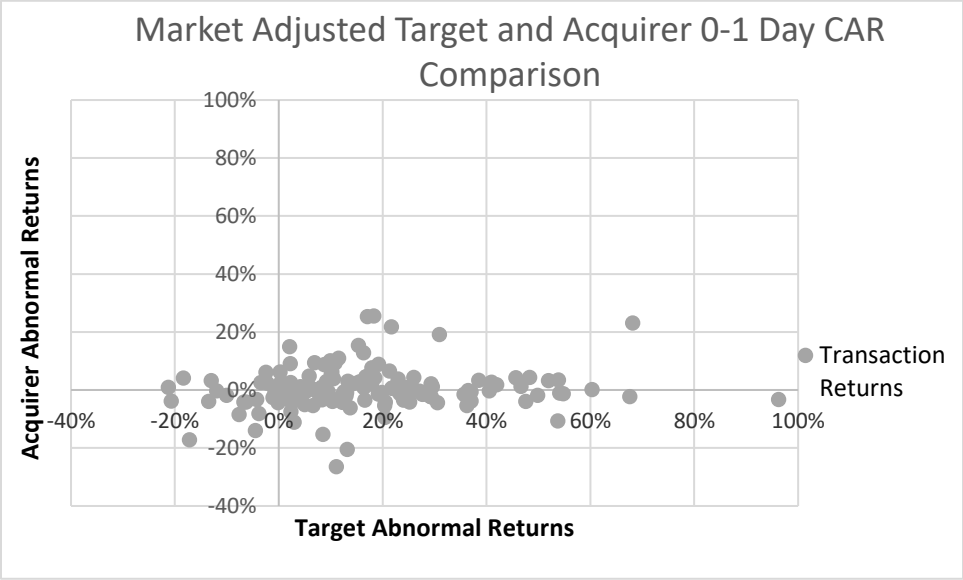

Figure 24: Market Adjusted Target and Acquirer 0-1 Day CAR Comparison

5.6 Conclusion

Multiple hypotheses were presented in chapter 1 of this paper. These hypotheses are now revisited. The prior analysis suggests several trends occur in merger and acquisitions of food and agribusiness firms. Each hypothesis is listed as either being rejected or failed to be rejected. The hypotheses are numbered, with an explanation for its acceptance or rejection following.

Hypothesis 1: Average abnormal returns in the short run are zero for acquiring firms after a transaction's announcement.

Results: Rejected. The positive mean cumulative abnormal return of .96% for the 0-1 day event window and its statistical significance at the .05 level according to the Patell test suggest acquiring firms do receive positive abnormal returns on average.

Hypothesis 2: Acquirer subsets will not vary in the short run reported average returns according to the relative size, value, and industry characteristics of the transaction.

Results: Rejected. The positive market model cumulative abnormal returns of 3.95% and .001 significance for large transactions, 2.49% and .001 significance for food and beverage retailing transactions, and 2.04% and .01 significance for transactions with high relative size values suggest certain attributes may be correlated with higher or lower returns for acquirers in the short run.

Hypothesis 3: Average abnormal returns in the short run are zero for target firms after a transaction's announcement.

Results: Rejected. The positive mean cumulative abnormal return of 17.70% for the 0-1 day event window and its statistical significance at the .001 level according to the Patell and generalized sign z test suggest target firms do receive positive abnormal returns on average.

Hypothesis 4: Target subsets will not vary in the short run reported average returns according to the relative size, value, and industry characteristics of the transaction.

Results: Rejected. Although every group reported positive significant values when tested against the null hypotheses that no abnormal returns were present in the subsets, the variance in statistical significance of CARs according to the Patell and generalized sign z suggest the subsets vary from each other.

Hypothesis 5: Average abnormal returns in the long run are zero for acquiring firms after a transaction's announcement.

Results: Failure to reject. Given the limitations of the generalized sign z and skewness corrected T test, the significance of returns is not considered reliable enough. Compounded abnormal returns are reported as negative in the long run for both the market and market adjusted model, but the dataset studied only underperforms the market by 7.64% over three years.

Hypothesis 6: Acquirer subsets will not vary in the long run reported average returns according to the relative size, value, and industry characteristics of the transaction.

Results: Rejected. Using only the compounded abnormal returns reported by the market adjusted model for each group, there is substantial variation in returns. However, these returns may not be directly related to the transactions. Positive returns in the market adjusted model for the food and beverage industry compared to large negative returns in food and beverage retailing suggest the industries are different.

These hypotheses provide an initial foundation for the impact of M&A. Chapter 6 and 7 will further develop the analysis of M&A transactions in food and agribusiness. Furthermore, these chapters will use more specific characteristics and test particular variables for significance. Focus will be on determining the exact impact variables have on returns and whether performance in the long run is favorably impacted

CHAPTER 6. OLS REGRESSIONS ON ABNORMAL RETURNS

Abnormal returns by group were the focus of discussion in chapter 5, and the statistical tests employed have tested the null hypothesis that abnormal returns are zero. From the results of chapter 5, it can be ascertained that certain groups do experience significant non-zero abnormal returns following a transaction's announcement. This is most evident from the cumulative abnormal returns of target firms. Overall, Chapter 5 suggests that both acquirer and target shareholders benefit from M&A transactions on average.

It seems that certain segments of the acquirer and target observations experience uniquely significant average abnormal returns. To explore the drivers of these abnormal returns and quantify their impact, OLS regression analysis is performed in the following chapter. The OLS regressions use the decimal form abnormal returns calculated in chapter 5 as dependent variables. The independent variables are also in decimal form, thus their coefficients are understood as the impact on returns should the variable increase or decrease by 100%. Dividing this coefficient by one hundred gives the percentage change a 1% increase has on abnormal returns. The coefficients of dummy variables represent the decimal form of the variable's impact on abnormal returns. The deal value variable is measured in millions of dollars.

6.1 Acquirer Short Run Return OLS Regressions & Models

Figure 25 shows six OLS regressions. The figure can be divided into two normal model sections, each with three variable set regressions. The dependent variable in the

regressions is either the market model or market adjusted CAR during the period 0-1 day event window surrounding the transaction's announcement. Values for coefficients of each variable as well as the p-value of their statistical significance are listed. Significant variables in each model have been bolded. The variable sets were introduced in section 4.4 of the methodology chapter. The focus of discussion will largely revolve around the results of regressions using variable set B.

The observation count as well as the R-squared of each regression is listed below the model's numbering. The three variable sets have been selected for either simplicity, intuition, or exploration. For example, regressions using variable set A are intentionally run using only the most direct variables of this study. Regressions using variable set B utilize variables suspected of impacting returns according to the literature review or conclusions of chapter 5. Lastly, regressions using variable set C include a number of additional independent variables. These regressions are used to explore other possible drivers and observe if any major shifts occur in the coefficients or significance of other regressions.

Reviewing regressions using variable set A in Figure 25, the only statistically significant variables are acquirer and target return on assets (ROA). Both of these variables are significant at the .1 level. The coefficients are the same for the variables in both the market and market adjusted return regressions. Given how similar the abnormal returns in each model are in the short run, this result is not surprising (see section 5.5.1 for comparison of normal return models). This trend is true for each market model with its paired market adjusted variable set equivalent in the short run.

Interestingly, the ROA variables of acquirer and target firms have negative coefficients and 0.1 level significance for almost every regression in Figure 25. Given the decimal form of ROA variables in the data, a negative coefficient on target ROA values suggests acquirers of more poorly managed assets will not feel as strong an impact from the negative coefficient. For example, if a target firm had an ROA near zero the negative coefficient would be negligible in the regressions prediction of abnormal returns. Larger ROA's would drive down prediction abnormal returns for the acquirer. Remembering

the summary of variable ranges, standard deviations, and means first presented in table 3, it is important to understand the impact these variables may have on returns. Target ROA had a mean value of .01 and standard deviation of .18, while Acquirer ROA had a mean of .05 and standard deviation of .06. At their mean levels, the predicted impact each has on abnormal return is very small. The large standard deviation of target variables coupled with its range of 1.75 suggest that it may be very impactful in determining return. Acquirer ROA has a much smaller standard deviation and no reported observations with greater than an absolute value ROA of .25.

Targets with lower ROA values may penalize acquirer returns less as it may be perceived that there are larger opportunities for value to be generated from better utilizing the assets purchased. All other things held constant, negative ROA values in target companies would correspond with larger abnormal returns in acquirers given the negative coefficient in Figure 25. This would align with the ideas presented by Beitel and Wahrenburg (2002) where transactions involving poorly managed targets hold greater value generation potential.

The regressions using variable set B include only the variables most suspected of being influential drivers. This model also reports the most number of statistically significant variables. The value of the transaction is significant at the .1 level and the coefficient is positive, suggesting the greater the value of a transaction the more likely the abnormal returns experienced will be positive. As with models 1 and 4, ROA variables have negative coefficients and remain significant. Target ROA, however, has become significant at the .05 level and the coefficient is slightly more negative. The dummy variables representing a transaction in the food and beverage retailing industry and a cash transaction have positive coefficients and statistical significance at the .1 level. Furthermore, their impact on abnormal returns is more intuitive. A transaction in this industry or paid for with cash is suggested to have a 2 or 3% higher cumulative abnormal return in the market or market adjusted model respectively.

The last two regressions, 3 and 6, report the highest R-squared values. This is not a particularly surprising result as they regress on variable set C, the largest variable set. Model 3 reports only target ROA as a statistically significant variable, and lists it at the .05 level. Acquirer ROA reports too big a p-value to be statistically significant at the .1 level in model 3 but drops down to significance in model 6. Target ROA is again significant at the .05 level in model 6. These are the only significant variables for regressions 3 and 6.

Acquirer Short Run Return Regressions

	Market Model						Market Adjusted Model					
	Model 1		*Model 2*		*Model 3*		*Model 4*		*Model 5*		*Model 6*	
Variable Set	*Set A*		*Set B*		*Set C*		*Set A*		*Set B*		*Set C*	
Obs. N/ R-Squared	139	0.057	139	0.099	139	0.124	139	0.056	139	0.102	139	0.126
Variable	**Coefficient**	**P-value**	**Coefficient**	**P-value**	**Coefficient**	**P-value**	**Coefficient**	**P-value**	**Coefficient**	**P-value**	**Coefficient**	**P-value**
Deal Value	0.00	0.149	**0.00**	**0.060$**	0.00	0.152	0.00	0.163	**0.00**	**0.063$**	0.00	0.154
Acquiror ROA	**-0.20**	**0.097$**	**-0.23**	**0.072$**	-0.21	0.101	**-0.21**	**0.091$**	**-0.23**	**0.068$**	**-0.22**	**0.095$**
Target ROA	**-0.09**	**0.056$**	**-0.10**	**0.028***	**-0.11**	**0.027***	**-0.09**	**0.064$**	**-0.10**	**0.032***	**-0.10**	**0.032***
Target Roe	0.01	0.727	0.02	0.424	0.02	0.343	0.01	0.760	0.02	0.437	0.02	0.357
Relative Size	0.00	0.967	0.00	0.744	0.00	0.746	0.00	0.939	0.00	0.704	0.00	0.705
Stock					-0.01	0.779					-0.01	0.705
Cash			**0.02**	**0.075$**	0.03	0.117			**0.03**	**0.067$**	0.03	0.126
Food & Bev					0.04	0.699					0.04	0.703
Food & Bev Ret			**0.02**	**0.078$**	0.06	0.529			**0.03**	**0.058$**	0.06	0.522
Ag & Liv					0.04	0.686					0.04	0.690
Hostile					-0.03	0.592					-0.03	0.552
Competetive					0.02	0.23					0.02	0.305
Related Industry					0.01	0.441					0.01	0.411
Constant	0.01	0.125	-0.01	0.601	-0.06	0.585	0.02	0.103	-0.01	0.585	-0.06	0.596

Figure 25: Acquirer Short Run Return Drivers Regressions

6.2 Target Short Run Return OLS Regressions & Models

Reviewing Figure 26, the regressions for target abnormal returns for both the market and market adjusted model are again shown in the format presented in Figure 26. Overall, the models estimating the target returns report a higher R squared for each variable set regressed upon than for their acquirer counterparts. The variable sets have remained the same with the exception that acquirer ROA has been dropped as a variable. It does not seem reasonable to regress using a variable inherent to an entity outside the target firm and transaction. All other variables have been retained in their sets.

It is immediately apparent that the variables significant in predicting abnormal returns for targets are not the same as those that were significant for acquirers. With the exception of the simplest variable set, only dummy variables reported significance in target regressions. Models 1 and 4 report relative size of the transaction as significant at the .1 level. The coefficient is negative, implying transactions where the acquirer is of similar size offer lower returns to targets. This may be indicative of lower premiums acquirers are will to offer given the higher risks that may be associated with transactions of this nature. Besides relative size, the constant in these models is positive and significant at the .001 level. This significance is maintained at the .001 level for all models except the largest regressions 3 and 6. It is not reported significant in models 3 and 6.

Models 2 and 5 regress using variable set B. Again, regressions using this variable set report the most number of statistically significant variables. Variables measuring whether the transaction was hostile and competitive were significant at the .1 level. Both of these variables had positive coefficients, driving abnormal returns up by 19 and 8 % respectively. Cash transactions had an increase of 9% in abnormal returns associated with them and were significant at the .05 level. Models 2 and 5 had a .001 statistically significant constant. The reported constant value was 15%, an approximate 7% drop from the value reported in regressions 1 and 4.

The kitchen sink models reported only one statistically significant variable. Hostile transactions had a 21 to 22% increase in abnormal returns for models 3 and 6. This variable was significant at a higher level than reported in any other model, dropping below the .05 threshold. The value of the transaction variable was notably close to dropping below the .1 level and is the only other variable with a mentionable small p-value. The kitchen sink models shown in regressions 3 and 6 did report the highest R-squared of the variable sets regressed on targets.

Target Short Run Return Regressions

	Market Model						Market Adjusted Model					
	Model 1		***Model 2***		***Model 3***		***Model 4***		***Model 5***		***Model 6***	
Variable Set	***Set A***		***Set B***		***Set C***		***Set A***		***Set B***		***Set C***	
Obs. N/ R-Squared	119	0.066	119	0.166	119	0.176	119	0.068	119	0.156	119	0.180
Variable	**Coefficient**	**P-value**	**Coefficient**	**P-value**	**Coefficient**	**P-value**	**Coefficient**	**P-value**	**Coefficient**	**P-value**	**Coefficient**	**P-value**
Deal Value	0.00	0.327	0.00	0.246	0.00	0.109	0.00	0.323	0.00	0.242	0.00	0.102
Target ROA	-0.19	0.339	-0.24	0.212	-0.27	0.197	-0.19	0.328	-0.25	0.203	-0.27	0.190
Target Roe	-0.05	0.547	-0.02	0.756	-0.05	0.544	-0.05	0.550	-0.02	0.762	-0.05	0.543
Relative Size	**-0.01**	**0.079$**	-0.01	0.152	-0.01	0.236	**-0.01**	**0.072$**	-0.01	0.141	-0.01	0.223
Stock					-0.07	0.248					-0.07	0.230
Cash			**0.09**	**0.026***	0.06	0.213			**0.09**	**0.024***	0.06	0.213
Food & Bev					-0.18	0.493					-0.18	0.475
Food & Bev Ret					-0.24	0.366					-0.24	0.349
Ag & Liv					-0.25	0.365					-0.25	0.351
Hostile			**0.19**	**0.057$**	**0.21**	**0.040***			**0.20**	**0.054$**	**0.22**	**0.038***
Competetive			**0.08**	**0.068$**	0.06	0.252			**0.08**	**0.067$**	0.06	0.258
Related Industry					-0.01	0.822					-0.01	0.825
Constant	**0.22**	**0.00*****	**0.15**	**0.00*****	0.40	0.140	**0.21**	**0.000**	**0.15**	**0.00*****	0.41	0.132

Figure 26: Target Short Run Return Drivers Regressions

6.3 Acquirer Long Run Return OLS Regressions & Models

As previously mentioned, there is some doubt as to whether the abnormal returns of the market model and market adjusted model accurately reflect the actual impact of a transaction on a firm in the long run. With this understanding, the results of OLS regressions upon these returns should be taken cautiously.

As with section 6.1, six regressions are presented in Figure 27. The prior sections used OLS regressions on CAR returns, and significance mainly varied according to the variable sets regressed upon. Long run returns use BHAR as a dependent variable and variable significance appears to be most impacted by the normal return model employed in the BHAR calculation. Looking at the market model regressions, the variable set A regression has three instances of statistical significance. The value of the transactions is significant at the .1 level, along with the regression's constant. Acquirer ROA is significant in all three market model regressions, often at the .05 or less level.

High valued transactions may provide better opportunities for companies to control markets or capitalize on economies of scale. The negative constant aligns with the common narrative that transactions generally destroy value. Reviewing the coefficient on acquirer ROA, the strong negative value coefficient is rather unexpected. The implication of this is that acquirers with higher ROA suffer lower abnormal returns. This could perhaps be indicative of managerial optimism when pursuing an acquisition. The market model uses past performance to predict abnormal returns. A company operating very efficiently who acquirers a significant amount of new assets may make the assumption it can continue to operate at prior levels of efficiency, but not achieve this in reality.

Given this narrative, the acquiring company's offer price might be made under the assumption that certain performance would be maintained. If this performance did not occur, the transaction could represent an over expenditure and negatively impact the actual returns experienced by company investors. Alternatively, this coefficient could be capturing Jenson's cash flush theory of M&A. A company experiencing a cash flush time period may have its ROA drop significantly. Unless the company is able to

quickly reinvest a large inflow of excess cash, it could be reasonably suggested that cash would begin to represent a larger portion of total assets in a company. Even under the best circumstances a company cannot hope to get significant interest returns from its cash holdings, so excess cash in otherwise efficient companies would actively disguise itself as a sign of poor performance. Since lower ROA companies are less adversely affected by the strong negative coefficient of the acquirer ROA variable, this possibility provides an explanation for an otherwise unintuitive result.

Reviewing the market adjusted model, no variables remain significant. This is somewhat surprising since the model compares the returns of a company to the returns of the market. Since no variables remain significant, it could be suggested that the variables used to capture the impact of a transaction's announcement are not impactful in predicting the abnormal return of a company three years later. As many of our transactions were small in value or small in relative size, they may not be defining influences to the returns of an acquirer over such a long time period.

Acquirer Long Run Return Regressions

	Market Model						Market Adjusted Model					
	Model 1		*Model 2*		*Model 3*		*Model 4*		*Model 5*		*Model 6*	
Variable Set	*Set A*		*Set B*		*Set C*		*Set A*		*Set B*		*Set C*	
Obs. N/ R-Squared	109	0.090	109	0.105	109	0.13	111	0.038	111	0.042	111	0.078
Variable	**Coefficient**	**P-value**	**Coefficient**	**P-value**	**Coefficient**	**P-value**	**Coefficient**	**P-value**	**Coefficient**	**P-value**	**Coefficient**	**P-value**
Deal Value	**0.00**	**0.068$**	0.00	0.115	0.00	0.165	0.00	0.517	0.00	0.553	0.00	0.568
Acquiror ROA	**-8.15**	**0.010****	**-8.43**	**0.012***	**-8.73**	**0.012***	-1.96	0.286	-2.29	0.239	-2.32	0.245
Target ROA	0.61	0.621	0.76	0.543	0.81	0.528	0.94	0.196	0.97	0.189	1.17	0.125
Target Roe	-0.17	0.765	-0.29	0.627	-0.45	0.465	-0.36	0.289	-0.35	0.311	-0.52	0.156
Relative Size	0.01	0.716	0.01	0.617	0.02	0.595	-0.01	0.694	-0.01	0.69	-0.01	0.733
Stock					-0.61	0.294					-0.21	0.528
Cash			-0.08	0.845	-0.47	0.368			0.10	0.68	-0.11	0.695
Food & Bev					0.22	0.756					0.11	0.798
Food & Bev Ret			-0.49	0.204	-0.18	0.804			-0.11	0.639	0.01	0.986
Hostile					1.03	0.39					0.02	0.978
Competetive					-0.44	0.479					-0.56	0.112
Related Industry					-0.39	0.366					-0.30	0.222
Constant	**-0.49**	**0.054$**	-0.21	0.546	0.17	0.827	0.09	0.558	0.11	0.576	0.44	0.322

Figure 27: Acquirer Long Run Return Drivers Regressions

6.4 Regression Comparisons and Discussion

As previously stated, the three regression variable sets have been presented for simplicity, intuition, and exploration. Comparing the three models across windows and return models bring to light several trends that add support for the conclusions each individual normal returns model reports. Their differences also shed light on their limitations, particularly regarding the long run regressions using market and market adjusted abnormal returns.

The short run regressions using target and acquirer abnormal returns align with each other almost exactly according to the regression variable sets used. The similarity suggests that both models are able to capture the impact of a transaction's announcement. The regressions on the abnormal returns experienced by acquirer's reported more significant continuous variables. Target abnormal return regressions marked binary variables as being significant drivers of abnormal returns. It does not appear that target returns were greatly impacted by the target firm's business performance. Many of the binary variables in the target regressions represent deal characteristics that are not directly controllable or influenced by targets. Target regressions reported higher R squared values, although all models did not exceed a decimal R squared value of .2.

Lastly, the differences in significant variables were most notable when comparing long vs short run regressions. Long run regressions report a general lack of significance and the returns themselves may be dubious. The divergence between similarity in the market and market adjusted model appear to cause some variables to lose or gain significance. Many of the abnormal returns and their implications in long run analysis should not be taken without further support.

6.5 Conclusion

Of the three regression variable sets, the rejection or failure to reject of hypotheses will reflect the results of variable set B regressions. The hypotheses were first presented in Chapter 1. They are restated below along with an explanation for their rejection or failure to reject.

Hypothesis 7: Acquirer abnormal returns are not significantly impacted by industry.

Results: Rejected. The food and beverage retailing industry was significant at the .1 level for the short run regression models 2 and 5 of acquirer regressions. It was associated with a 2-3% increase in abnormal returns of acquirers. Industry was not included in the reported target regressions and was not found significant in test regressions.

Hypothesis 8: Acquirer and target abnormal returns are not significantly impacted by relative size of the transaction.

Results: Fail to reject for acquirers and targets. Relative size was not significant for any OLS regressions performed on target market and market adjusted abnormal returns for variable set B. Furthermore, it was only significant at the .1 level. Given these conclusions, it does not seem likely that relative size has a linear relationship to abnormal returns.

Hypothesis 9: Acquirer and target abnormal returns are not significantly impacted by deal value of the transaction.

Results: Reject for acquirers. Fail to reject for targets. Deal value was statistically significant for the return of acquirers at the .1 level in the short run regressions on CAR values of the market and market adjusted normal return model. Deal value was not significant in predicting target abnormal returns.

Hypothesis 10: Acquirer and target abnormal returns are not significantly impacted when the transaction's payment method is cash.

Results: Reject for acquirers and targets. Regressions models 2 and 5 of both acquirers and targets reported cash transactions as being beneficial to shareholders. Although more pronounced in targets, cash transactions were favorable to acquirers too. Cash

transactions may be correlated with strong company performance in acquirers. Targets may prefer cash transactions for several reasons. Cash payment allows investors to easily reinvest according to their preference without incurring transaction costs. It may also reflect a less risky scenario as the actual merger or acquisition may not occur until several months following a transaction.

Hypothesis 11: Hostile transactions will not have an impact on the returns of targets.

Results: Rejected. The hostile transaction variable was statistically significant for target regressions at the .1 level for the short run regression models 2 and 5. It was associated with a 19-20% increase in abnormal returns of targets in the short run. This suggests that acquirers often pay heavy premiums during hostile transactions.

Hypothesis 12: Target abnormal returns are not significantly impacted when multiple bidders are present.

Results: Rejected. Competitive transactions reported a 8% increase in abnormal returns for targets in models 2 and 5. This makes sense as bidders may continue to drive up the premium associated with the transaction, allowing targets to extract more if not all the value in the merger or acquisition.

These hypotheses are made with consideration to short run abnormal returns. The lack of credible significance in long run regressions make definitive statements difficult to justify. Chapter 7 reviews financial performance of acquirers in the long run and provides another approach to analyzing M&A in the long run.

CHAPTER 7. LONG RUN PERFORMANCE CHANGES

To elaborate and shed light on the impact of M&A in the long run, chapter 7 analyzes financial ratios of acquirers in the years following a transaction. Using the Compustat data and financial performance metrics discussed in chapter 3, pre-transaction company performance for 55 firms is compared to post transaction performance. The results are not statistically tested, but display possible trends in the financial performance of acquirers following M&A transactions.

7.1 Performance Increases or Decreases

Table 8 (displayed in chapter 3.3) shows a number of performance metrics and their definitions. The three furthest right columns display the percent of the fifty-five observations that had a metric increase in value over the time period -3 to 3 years. Note that these are metric increases and not necessarily performance improvements, as a rise in the total debt ratio is not considered a financial improvement.

Looking at the first of the three most right columns, the changes in company performance from a year prior to a transaction to the transaction year are shown. Year zero is the year of the transaction. Metrics reporting less than 50% show a greater percentage of firms reporting a lower value post transaction. For example, the current ratio, return on capital employed, return on assets, net profit margin, asset turnover ratio, and working capital are all lower than 50% for -1 to 0 years. Interestingly, the last column, which shows the average of three years prior transaction to the average of three years post transaction, has each of these metrics above 50%. This suggests that

there may be an initial hit to performance but that long run performance benefits.

Several metrics are above 50% in the -1 to 0 year time frame. Total debt ratio, interest coverage ratio, and return on equity all have a higher percentage of firms reporting an increase in the metrics value during the 0-1 time period. These percentages increase in reported value over longer time periods, as indicated from the two rightmost columns. With the exception of return on equity, however, these increasing values are unfavorable. The total debt ratio and interest coverage ratio's reported values of over 70% suggest that most companies take on larger debt obligations in the years following a transaction. This would be expected in the -1 to 0 column, but its occurrence over longer time periods suggests a detrimental effect of M&A.

7.2 Performance Metrics Over Time

The data used to create Table 8 has been graphically displayed in Figures 28-31 using individual observations. The graphs shed light on the changes in performance of companies regarding current ratios, asset turnover ratios, total debt ratios, and return on equity values following a transaction. The graphs show each company's change across time, with the metrics value before a transaction shown on the x axis and its post transaction value shown on the y axis. This allows the shift in performance for all observations as a whole to easily be viewed and analyzed.

Looking at the first graph, Figure 28 shows the current ratio changes after a transaction. The first thing to note is that 45 degree line shows which observations have improved and which have deteriorated. Every point below the line has a higher prior current ratio than post transaction. Likewise points above the line express the opposite trend. Points on the line represent no change in reported performance. Gray dots show a comparison the current ratio prior to a transaction to the value three years after the transaction. Black points use three years of reported current ratios post transaction instead of just the individual third year. Looking at the current ratios points, there are

no strong conclusions that can be drawn. Black dots appear to be more centered on the line, an expected result given it utilizes a three year average.

Figure 29 displays the change in asset turnover. Unlike Figure 29 several key characteristics of the data are visible. More observations lie below the 45 degree line. Furthermore, the further an observation lies from the origin the more likely it is to lie farther below the 45 degree line. Intuitively, this suggests that high turnover firms that acquire have difficulty utilizing the newly acquired assets as efficiently as it utilized its own assets prior to the transaction. Firms that reported a lower turnover in the year prior to a transaction still report this performance decrease but the severity is less extreme. This is inferred from the close proximity of observations to the 45 degree line nearer the origin.

The third graph, Figure 30, displays the total debt ratio. The results of this graph are clearer than the prior two and suggest a more negative implication of M&A. As evident from the graph, a majority of the observation points lie above the 45 degree line. It is very clear that debt levels have risen for most acquirers three years after a transaction. Most observations that are below the 45 degree line are not significantly below it. Several transactions above the line are significantly so, and the debt level of a number of companies have close to doubled. Although it should be expected that the amount of debt would increase after a transaction, the company should be acquiring assets as well. To see the debt level rise so notable and remain higher after three years is troubling.

The last graph, Figure 31, displays the return on equity of firms in the years before and after a transaction. This is perhaps the most troubling graph, as it shows a rather disturbing possibility. Note that the range on the y-axis is significantly larger. In particular, it includes far more negative values. Although a good deal of observations surround the 45 degree line, a number of firms report a decrease in ROE following a merger or acquisition. More concerning is the fact that the decrease appears to have the potential to be drastically negative. Although this decrease in ROE could be caused by a number of factors, it could be reflective of increased interest payments from larger

debt obligations eroding income of equity holders. If this is the case M&A transactions would be detrimental in at least some instances.

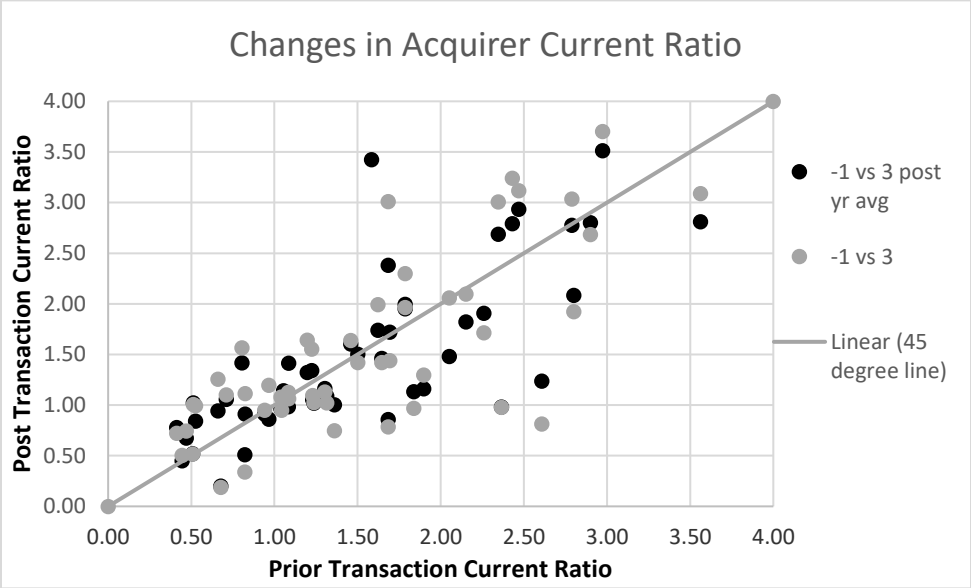

Figure 28: Changes in Acquirer Current Ratios Graphic

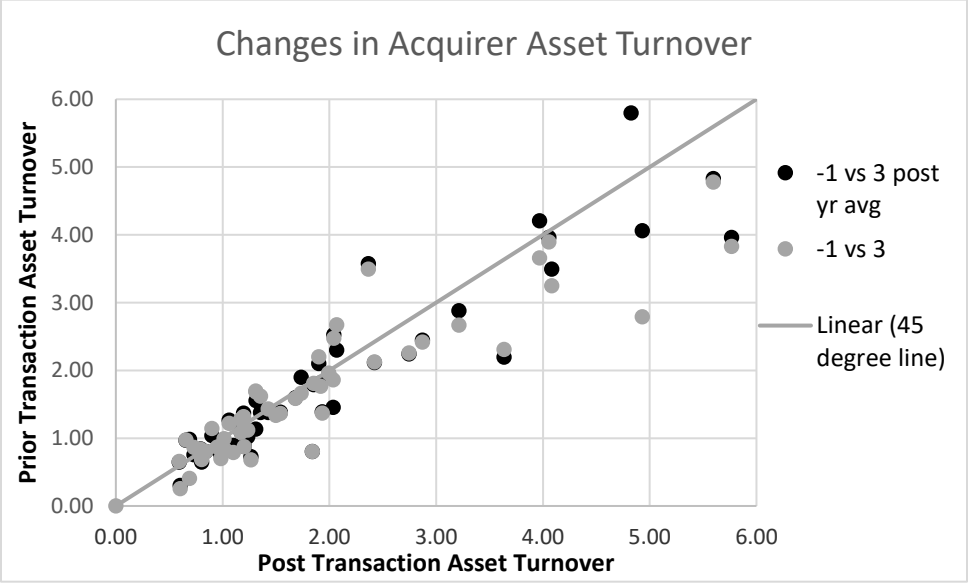

Figure 29: Changes in Asset Turnover Ratios Graphic

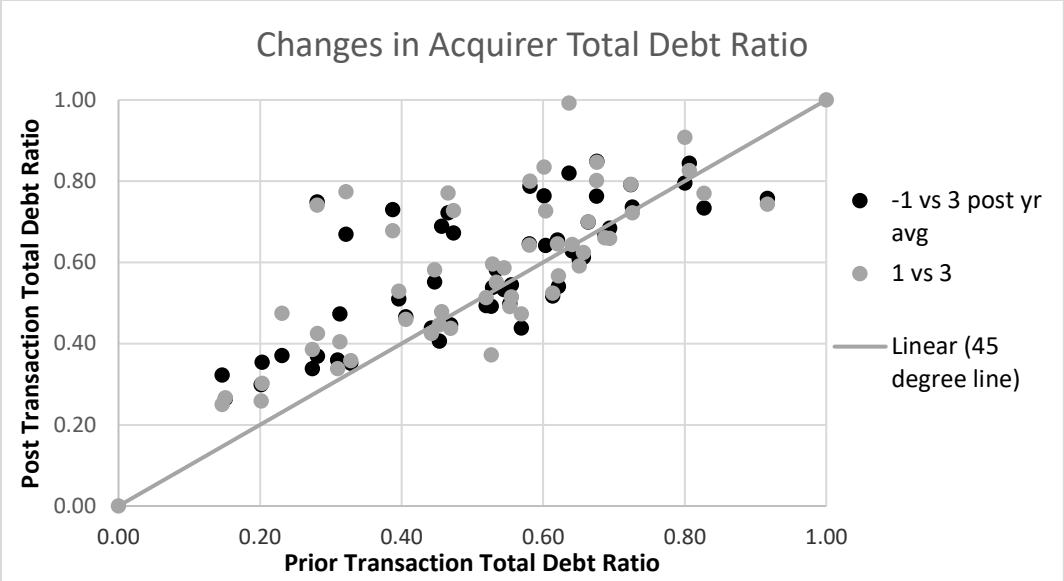

Figure 30: Changes in Total Debt Ratios Graphic

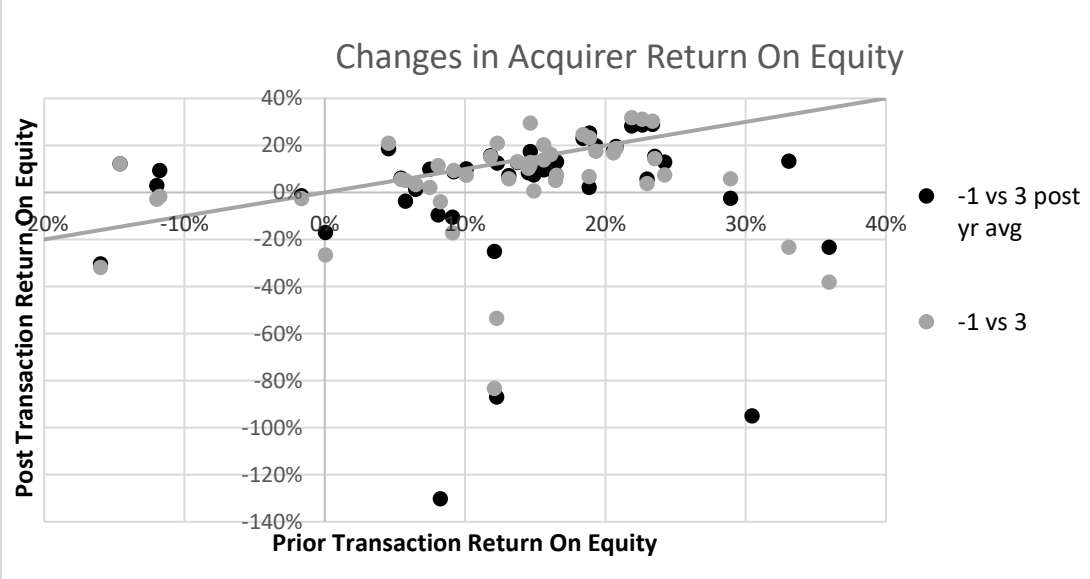

Figure 31: Changes in Return on Equity Graphic

7.3 Conclusion

The hypotheses listed below were first addressed in Chapter 1. They are not statistically tested, but revolve around the observable trends of acquirers according to graphical analysis. They are restated below along with an explanation for their acceptance or rejection.

Hypothesis 13: Acquirer current ratios are decreased in the long run.

Results: Inconclusive. After reviewing Figure 28, there does not appear to be a clear trend to changes in the reported acquirer current asset ratios post transaction.

Hypothesis 14: Acquirer asset turnover are decreased in the long run.

Results: Accepted. From Figure 29, it seems clear that asset turnover has decreased in the years following a transaction. This is evident by the majority of observations below the 45 degree line. It appears that larger return on asset ratios prior to a transaction are more visibly lowered in post transaction years.

Hypothesis 15: Acquirer total debt ratios are decreased in the long run.

Results: Rejected. From Figure 30, a clear number of observations report higher debt ratios in the years following a transaction than lower ratios. Not only are many firms reporting larger total debt ratios, but they are reporting significantly larger debt ratios. The post transaction values are often much higher than pre transaction. This suggests firms are not benefitting from M&A transactions.

Hypothesis 16: Acquirer return on equity are decreased in the long run.

Results: Accepted. The motivation of M&A should be to generate larger returns for shareholders in the long run. Unfortunately, Figure 31 suggests that most acquiring firms did not experience increases in return on equity following a transaction. Even more alarming, several firms experienced significant negative ROE values in the years following a transaction. This may be caused from increase debt and interest obligations eroding income from businesses.

The above hypotheses and their conclusions align much closer with the general

notion that M&A destroys value for acquirers. However, this section makes the conclusion that the three years following a transaction adequately capture the long run impact of M&A. Strategic M&A may not provide payoffs to shareholder over the examined period. To this extent, the above analysis is limited.

CHAPTER 8. CONCLUSION

The general conclusions of this paper have been broken into two segments below. Short run conclusions and long run conclusions are addressed individually and then discussed in relation to each other. Lastly, future research focuses and topics of interest are suggested in the last section.

8.1 Short Run Impact of M&A – Acquirers and Targets

In the short run, M&A transactions are found to be beneficial for both acquirer and target firms on average. Analyzing the market response to the announcement of a transaction, non-zero positive mean abnormal returns were found using both the market and market adjusted normal return models for both parties involved in the transactions studied. Acquirers averaged an approximate 1% cumulative abnormal return over the period studied, while targets reported a value nearer 17%. Although average abnormal returns were positive for acquirers, the majority of acquiring companies reported negative cumulative abnormal returns surrounding the announcement of a transaction.

Deal value, acquirer ROA, Target ROA, cash payment, and food and beverage retailing transactions were found to be statistically significant impactors of short run acquirer returns. Acquirer and target ROA had negative coefficients while the other three variables had positive coefficients. These returns were driven by market perceptions regarding the deals and not their later consequences. Target ROA was the most statistically significant driver for acquiring firms. The significance of ROA in acquirer and target firms may suggest that investors make assumptions off asset

performance differences between companies involved in a merger or acquisition. Specifically, lower performing companies appear to be perceived by investors as having large opportunities for the acquirer.

Cash payment, deal attitude, and competition were statistically significant variables driving returns in target companies. The three variables had positive coefficients in the OLS regressions performed. Cash transactions were most significant while hostile transactions were associated with an increased 20% abnormal return to target firm shareholders. Financial variables were not significant to target firms. This suggests the negotiated terms of a deal are more likely to determine the extremity of abnormal returns experienced by target shareholders.

8.2 Long Run Impact of M&A -- Acquirers

According to the market model, acquirer shareholders suffer significant losses in the long run. However, joint test problems and boom bust cycles make the results of the market model difficult to analyze. The market adjusted model suggests acquiring firms provide shareholders mean compounded abnormal returns 7.6% less than the market for the companies studied. This value does not factor in intrinsic company risk.

Regarding the long run financial performance ratio changes in acquirers, the results are rather discouraging. Most clear changes in performance following a transaction suggest a negative long run impact. Firm asset turnover ratios, debt to equity ratios, and return on equity appear far more likely to decrease in the years following a transaction. Return on equity particularly seems prone to drastic decreases. This may be indicative of loss from unrealized market or performance gains made during the negation of the transaction.

The long run analysis of chapters 6 and 7 suggest an overall detrimental nature to M&A for acquirers. This coincides with much of the general consensus on the topic. Still, not all transactions appear to have caused loss to shareholders. Investor optimism

reflective of positive abnormal returns in short run analysis may be rooted in the same ideas that prompt firm managers to pursue M&A.

8.3 Further Research

There are limitations to the research conducted in this paper. Future researchers may wish to give consideration to multiple findings not deeply addressed in this paper as well as explore several briefly touched topics. Lastly, future research may wish to re-analyze and revisit the conclusions of this paper pending the development of new techniques, theories, and analytical tools.

Future research will hopefully be able to more powerful detect the abnormal returns linked to M&A. Current abnormal returns are calculated with normal return models that may not be sensitive enough and may be influenced by other events or factors. Just as the CAPM model has lost much of its former prominence as a normal returns model of event studies, new models may provide better analysis in the future. This may already be occurring as the Fama-French three factor model increases in popularity among researchers.

Perhaps the most powerful extension to this paper's analysis will come from stronger statistical significance testing of long run abnormal returns. Contemporary tests are fraught with shortcomings, leaving most of their analysis subject to skepticism. However, unlike normal return models, there are no notable potential solutions to the obstacle of long run abnormal return testing.

The analyses of the chapters above has cast a wide net. Reviewing both acquirers and targets has allowed a general analysis of the food and agribusiness industries, but future papers may wish to focus on specific populations within food and agribusiness sector. There may be trends specific to food and beverage, food and beverage retailing, agriculture and livestock, or tobacco firms that require a more focused analysis. This could include a more focused analysis of specific industry characteristics and their impact on M&A. For example, the agricultural and livestock

industry has particular idiosyncrasies and nuances that may be worth researching. Specifically, risks in production may impact the industry as unpredictable factors such as droughts, diseases, and policy changes can drive industry consolidation. This extends into food and beverage production companies as changes in competition for inputs may prompt vertical integration of the supply chain. The unique characteristics of subsectors may be particularly valuable to businessmen.

Lastly, a foundational set of variables impacting abnormal returns are established in this paper, but future research may wish to test other company attributes or deal characteristics. Better proxies for relative size may come from new datasets and the seventh wave of M&A may provide new data points for analysis. Ideally, this paper will be a template for future successful research.

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