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THE EFFECTS OF MERGERS & AQUISITIONS ON ACQUIRERS' SYSTEMATIC RISK

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ABSTRACT

This paper examines the effects of mergers and acquisitions (M&A) on acquirers' betas in order to draw conclusions about what happens to such betas after the completion of M&A deals. Perhaps surprisingly, I find that acquirers' post-deal betas do not reflect the weighted average of pre-deal acquirer and target betas, but rather, appear to overweight *target* firms' betas.

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Chapter 1

Introduction

Since its conception in the late 1950s, the concept of systematic risk measured through beta (β) has been imperative to the pricing of all financial instruments. This pricing mechanism becomes especially important in the event of a merger or acquisition, given the relative size and complexity of the assets involved. However, as noted by Hackbarth and Morellec[1], the asset pricing implications of M&A deals have not been widely investigated. It has been widely taught among the academic community that following an acquisition, firm-level betas should be calculated as a weighted average of the two standalone companies on the basis of some exogenous factor, typically enterprise value. However, there is very little empirical evidence to support this widely-held claim.

Empirical evidence produced by Hackbarth and Morellec's model shows a clear run-up (run-down) in the beta of the bidding firm prior to the announcement of a merger followed by a clear drop (rise) in beta at the time of announcement when the acquiring firm has a higher (lower) beta than its respective target. While this evidence provides insight on the behavior of standalone betas in the time surrounding mergers and acquisitions, the evidence does not analyze any potential differences between the expected theoretical beta of the *combined* firm and the actual empirical beta of said firm following the merger of two standalone companies. This paper

[1] *Stock Returns in Mergers and Acquisitions* (2008) by Dick Hackbarth and Erwan Morellec investigates stock returns surrounding mergers and acquisitions and corresponding firm-level betas through a real options model.

challenges the validity of the commonly-held notion that the systematic risk or beta of a combined firm is a weighted average of the two standalone companies with respect to the exogenous factor, enterprise value.

In chapter 2 of this paper, I analyze the contribution of this study to the understanding of beta as a measure of systematic risk through the capital assets pricing model, as well as its relation to mergers and acquisitions. This will lay the foundation for my calculations.

In chapter 3, I address the data set used and the observations that were included in the regression analysis. Furthermore, I discuss the specifics of each calculation, and outline some of the variables that were controlled for within the dataset.

Chapter 4 serves to show the end results of my regression analysis, and presents the interpretation of this data to analyze the underlying hypothesis.

Chapter 5 offers concluding remarks and further highlights contributions of this study to the academic community of finance.

Chapter 2

Background

The primary purpose of this paper is to contribute to existing literature about expected returns surrounding M&A activity and to further investigate the effects that systematic risk have on future expected returns. In 2019, there were ~13,000 M&A deals within the United States.

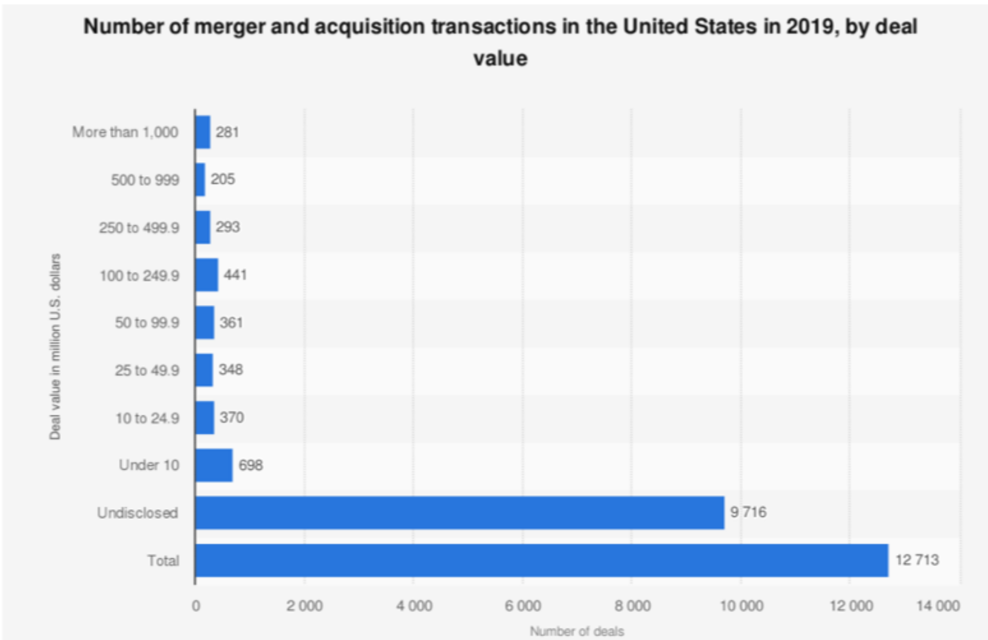


Figure 2-1: M&A Deals

Source: Stata

There have been numerous empirical studies within the academic community on the motives behind M&A activity, the success and failure of M&A activity, and other factors surrounding the subject. Yet, there has been very little evidence that one specific factor (i.e. payment method, synergistic opportunity, previous acquisition experience, etc.) can be acclaimed as a strong determinant of M&A success (King, Dalton, Daily, and Colvin 2004). Even less understood are the pricing implications that these deals have on excess returns and the implications that they have on the systematic risk profiles of the firms involved. While it is widely taught among academics that post-merger betas should be a weighted average of the two standalone firms proportionate to size, this has not been explored empirically.

This paper aims to focus specifically on the changes in firm-level beta that are observed among the standalone firms and the combined firm in the pre-merger and post-merger phases (Appelbaum et. al. 2000a, 2000b). Note that there are several conflicting theories surrounding the phases of M&A. Most notably, Boland (1970) divides the M&A process into 2 phases, pre-merger and post-merger. However, this does not account for the period in-between the announcement and the closing of the merger. For this study, I exploit the equity returns of U.S. firms involved in mergers and acquisitions in order to assess the effects that such deals have on acquiring firms' systematic risk.

I believe that this paper contributes to existing literature in several ways. First, it is one of the only papers to my knowledge that compares the beta of a combined firm following the closing of a merger to that of the two standalone firms. Many papers have investigated abnormal returns for different time windows surrounding M&A deals (Andrade, Mitchell, & Stafford 2001, Swaminathan, Murshed, & Hulland 2008, Aintablian & Roberts 2005, Scholtens & Wit 2004, Athanasoglou, Asimakopoulos, & Georgiou 2005, Pandey 2001). Furthermore, there are papers that address abnormal returns surrounding M&A within specific regions. Shah & Arora (2014) measures the effects of M&A on abnormal returns of both bidder and target firms in the Asian-Pacific market. Yet, none of these papers address how the calculation of beta for the combined entity may be influenced by the betas of the two prior entities, nor do they address the time window in question. Additionally, this paper seeks to broaden the scope of past literature to investigate if returns of post-merger firms are more correlated to bidding firms, as opposed to a pure weighted average based on enterprise value. In other words, this paper questions whether the expected returns of combined firm are equal to the actual returns by exploiting a theoretical "portfolio of betas".

Secondly, this paper seeks to contribute to existing literature surrounding the behaviors of firm beta following a merger or acquisition. While it is not the first paper to address changes in beta activity following M&A activity, it does investigate new areas. Hackbarth and Morellec (2008) prove that prior to the announcement of a merger, when the acquiring firm has a higher (lower) beta than its respective target, it experiences a run-up (run-down) in beta followed by a clear drop (rise) in beta at the time of announcement. Fos and Yang (2020) find that the effects of negative stock market index returns on all-equity deals are stronger for high acquirer market betas than that for deals with low acquirer market betas, reporting statistical significance in lower chances of deal completion, decreased bidder CAR, and decreased target CAR. Furthermore, Fos and Yang report that lower abnormal returns among acquirers and targets in all-equity deals are more likely to reflect changes in expected M&A synergies rather than abnormal sensitivity to macroeconomic conditions. I add to this literature by isolating the behavior of combined firms after the closing of the merger rather than after the announcement, and further by observing behaviors across both negative and positive index return windows as well as across all different methods of payment.

Finally, this paper will contribute to general knowledge regarding the behavioral changes of firm beta in the event of M&A. Since the derivation of theory surrounding mean-variance approximations to expected utility (Markowitz 1952, 1959), abnormal returns of assets have been modeled by a positive, linear regression where beta serves as the regression slope.

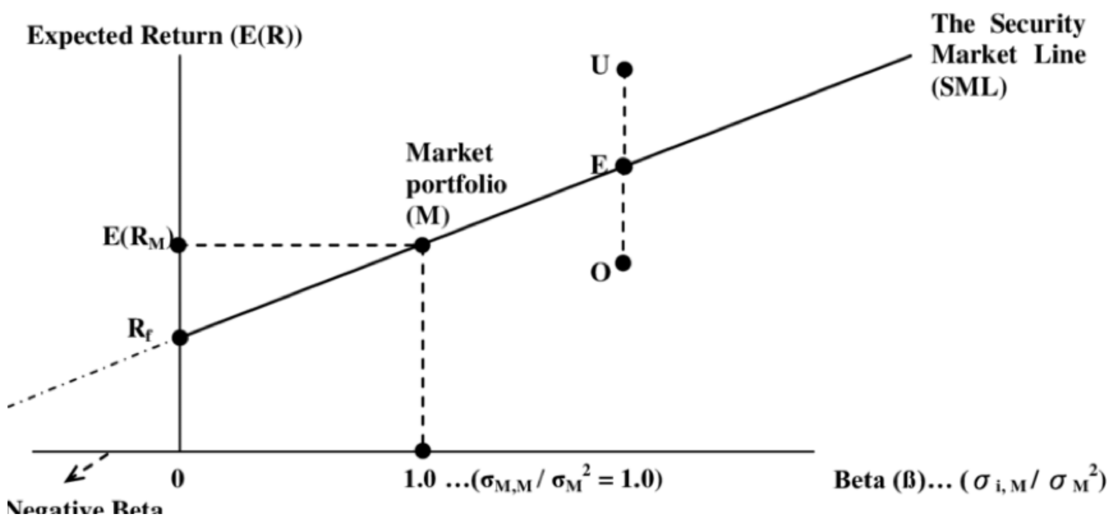


Figure 2-2: Model of the Security Market Line

Source: Researchgate

Bill Sharpe furthered this theory with the development of the capital assets pricing model (1964), which shows that the expected return of any security is equal to the sum of the risk-free rate of return and the product of the market risk premium and the security beta. In other words, it shows that expected returns have a direct relationship with beta. The theory proposed by Sharpe was expanded upon by John Linter (1965), who generalized the model saying that risk optimization did not just apply to individual portfolio theory, but also to corporations' decisions to issue stock, serving as a significant extension from the theory made famous by Modigliani & Miller (1958). This was further refined by Fischer Black (1972), in which he explicitly defines the market beta of any asset as a function of the return on asset *i* and the return on the market. The beta of an asset is derived by the covariance between the return on the asset and the return on the market divided by the variance of the market.

$$\beta_i^s = \frac{cov\ (r_i^s,\ r_m^s)}{var(r_m^s)}$$

This foundation for systematic risk with relation to capital structure was laid by the two famous papers published by Modigliani & Miller (1958 & 1963) on capital structure irrelevance theory. The findings of the paper resulted in two fundamental propositions. Proposition I states that firm value is independent of capital decisions, implying that firm value is derived from assets, not capital structure (assuming a perfect capital market absent of asymmetric information, transaction costs, bankruptcy costs, and taxation). Proposition II claims that increases in leverage increases firm risk of bankruptcy, thus increasing the firm's cost of equity and cost of debt. However, the fraction of debt versus equity in the capital structure change dramatically, thus resulting in a net-zero effect on the weighted average cost of capital (WACC). MM (1963) refines the theory to include the effects of taxes, indicating that firm value increases as the amount of debt increases in the capital structure. This is due to the rising magnitude of the tax shield resulting from tax deductibility on debt interest payments. This proved that the cost of capital would fall proportionately to the amount of debt increase that is realized within a firm's capital structure, as shown in Figure 2-3.

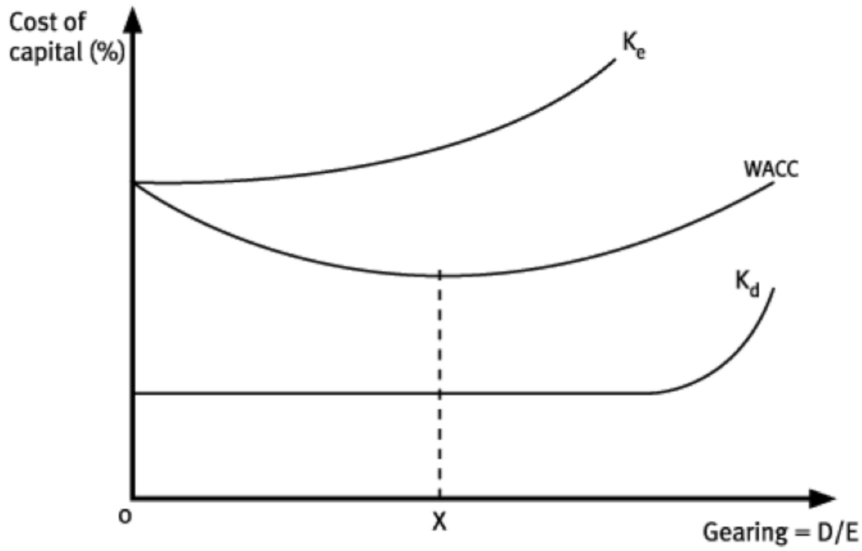


Figure 2-3: MM Capital Structure Theory

Source: Kaplan Knowledge Bank

Thus, a new calculation for asset beta was derived in order to calculate the systematic risk at the firm level, indicating that the beta of any firm is a function of its debt beta β_D, equity beta β_E, and debt-to-equity ratio where t_c is the effective tax rate.

$$\beta_A = \left[\frac{D(1 - t_c)}{D(1 - t_c) + E}\right]\beta_D + \left[\frac{E}{D(1 - t_c) + E}\right]\beta_E$$

These propositions laid the groundwork for the distinction between unlevered and levered beta, which is essential in evaluating the variance in stock returns relative to the market. Hamada (1972) proves that value and size premiums can be attributed to differences in leverage and that these leverage differences are not reflected in equity betas. Thus, the Hamada equation indicates that the unlevered beta of a firm is a function of the firm's equity beta, but removes the effects of leverage from the capital structure.

$$\beta_U = \left[\frac{1}{1 + (1 - t_c)\frac{D}{E}}\right]\beta_E$$

This further assumes that the debt beta of the firm is zero. While this is unlikely, it is widely true that debt betas are very low in relation to equity betas, and therefore, debt systematic risk is usually negligible within the overall systematic risk of the firm. Given that M&A activity can have significant effects on many of these properties, this study attempts to draw conclusions about beta in order to see if the combined firm beta will be proportionate to the subsidiary enterprise values.

In the next section, I will discuss the data compilation and methodology that was used to conduct my experiment.

Chapter 3

Data & Methodology

This section serves to explain the chosen sample of data and the methodology that was used within the analysis. The section will define the source and application of the data used in the study, explain the specifics behind the application of said data, and address specific changes that were made to the data in order to control for certain variables that could skew the empirical results.

My measure of systematic risk is derived first by calculating a top-down equity beta. Monthly stock return data since January of 1980 was used (as opposed to daily) in order to smooth returns and to avoid abnormal trading, such as Black Swan events. This data set was further restricted to only include data that was obtained through the Wharton Research Data Base (WRDS) CRSP U.S. stock dataset. Additionally, the set was restricted to equities that trade on exchanges residing in the United States in order to avoid the effects of varying international measurements surrounding equities trading as well as inconsistent global regulations regarding the completion of mergers and acquisitions.

This provided the foundation needed to calculate systematic risk for each company among the observations. I then merged this data with corresponding monthly market data obtained from Kenneth French's Data Library at the Amos Tuck School of Business, Dartmouth College. The calculation for excess return on the market includes all publicly traded equities on the NYSE, AMEX, and NASDAQ.

$$R_{it} - R_{Ft} = a_i + b_i(R_{Mt} - R_{Ft}) + e_{it}$$

For the purpose of this paper, the equity beta calculation is most concerned with the month-end excess return on the market $R_{it} - R_{Ft}$ where R_{it} represents the monthly return on a given index and R_{Ft} represents the monthly risk-free rate of return. Stock return data was adjusted to account for months ending on non-trading days. With this data, I was able to calculate a measure of equity systematic risk for stock specific returns relative to the market, which will be defined as beta β.

The equity beta of each firm was then calculated by inputting 36-month, rolling stock returns, coupled with the corresponding market risk premium, into a regression. Monthly stock return data begins in January of 1980 while calculated betas begin in January of 1983. I used rolling stock data in order to capture correctly updated excess returns to accurately correspond with the market return.

$$\beta_i^s = \frac{cov\,(r_i^s,\ r_m^s)}{var(r_m^s)}$$

Following my calculation of equity beta for each standalone company, I then calculated the unlevered asset beta of each company using the Hamada equation, reflecting the Modigliani-Miller / CAPM relationship, in order to remove any effects of leverage in the capital structure. The decision to remove leverage was made due to the fact that many firms in the data set had vastly different capital structure profiles. Therefore, by removing leverage, the estimate would be far more comparable across several different industries. Furthermore, I used adjusted liabilities for my calculation of debt in the capital structure due to the inconsistency of reported liabilities among the firms in the dataset. Adjusted liabilities removes the effects of *other liabilities* from *total liabilities*.

$$\beta_A = \left[\frac{1}{1 + (1 - t_c)\frac{D}{E}}\right]\beta_E$$

I then calculated the unlevered betas of the combined firms following M&A activity using data obtained from the SDC Platinum deal database using the same process. The SDC data includes only deals that involve publicly-listed U.S. targets and publicly-listed U.S. acquirers. Furthermore, in order for the deal to be included into the final sample, the deal must have been completed. This decision was made to negate any deals that were announced yet not completed, which would potentially skew the results given that the betas of the standalone subsidiaries would theoretically not change if the deal was not executed.

With all of the unlevered betas now calculated, I constructed a formula for weighted average in order to get the weighted average beta for the two standalone entities if they were to be synthetically merged. This will serve as the *expected beta* of the combined firm. With data obtained from COMPUSTAT in the Wharton Research Database, I calculated a weighted average based on firm enterprise value. Enterprise value for firm *i* and the weighted average were calculated as follows:

$$EV_i = Assets - Equity + Market\ Cap$$[2]

$$Weighted\ Average\ Beta = \left(\frac{EV_A}{EV_A + EV_T}\right)\beta_A + \left(\frac{EV_T}{EV_A + EV_T}\right)\beta_T$$

I then compared the returns of the combined entities for the 36-month period following the closing of an M&A deal with the weighted-average of the two standalone firms. Matching standalone and combined firms was done using PERMNO identification in order to compare the returns of the standalone with the returns of the combined entity. The decision to calculate combined entity betas using equity returns after deal *closing,* as opposed to after deal *announcement,* is because the target firm does not legally become absorbed by the acquiring firm until the deal has closed. As mentioned, this could yield false data points[3].

Empirical Strategy

Once unlevered betas were obtained for the standalone acquirer, the standalone target, and the combined entity, I ran several regressions. The objective of the regression analysis is to test the statistical significance of the difference between the actual beta of the combined entity and the weighted average beta of the two standalone subsidiaries. Stata software was used to run all regressions.

[2] COMPUSTAT code ATQ for assets and LTQ for liabilities
[3] See Appendices A & B for dataset changes from the beginning of the study until the end.

In order to test this inquiry, the following hypothesis was adhered to:

$$H_0:\ \beta_C = \left(\frac{EV_A}{EV_A + EV_T}\right)\beta_A + \left(\frac{EV_T}{EV_A + EV_T}\right)\beta_T$$

$$H_1:\ \beta_C \neq \left(\frac{EV_A}{EV_A + EV_T}\right)\beta_A + \left(\frac{EV_T}{EV_A + EV_T}\right)\beta_T$$

This hypothesis tests whether or not the actual beta of the combined firm is equal to the expected beta of the two subsidiaries when combined using a weighted average, where β_C represents the actual empirically observed beta of the combined firm. EV_A and β_A represent the enterprise value and the beta of the acquiring firm, respectively, while EV_T and β_T represent the enterprise value and the beta of the target firm, respectively.

If the actual beta of the combined firm β_C is equal to the expected weighted average beta of the subsidiaries, then the null hypothesis will be accepted. If the actual beta of the combined firm β_C is not equal to the weighted average, then the null hypothesis will be rejected. This hypothesis was chosen due to the expectation that the beta of the "portfolio" of the acquirer and target firms following the completion of the takeover should equal the weighted average betas of the two firms prior to the takeover announcement.

Regression Analysis

Four different regressions were used to test this hypothesis. Below are the mathematical equations for the regression where $Beta\_Diff$ is the difference between the expected beta of the combined firm and the actual beta of the combined firm and the subscript FE denotes a fixed effect. Table 3-1 serves as the summary statistics for the regression output.

$$(1)\ Beta\_Diff = \alpha_0 + \beta_1 Acquirer\_Beta + \beta_2 Target\_Beta + \varepsilon_i$$

$$(2)\ Beta\_Diff = \alpha_0 + \beta_1 Acquirer\_Beta + \beta_2 Target\_Beta + Year_{FE} + \varepsilon_i$$

$$(3)\ Beta\_Diff = \alpha_0 + \beta_1 Acquirer\_Beta + \beta_2 Target\_Beta + Year_{FE} + Target\_Industry_{FE} + \varepsilon_i$$

$$(4)\ Beta\_Diff = \alpha_0 + \beta_1 Acquirer\_Beta + \beta_2 Target\_Beta + Year_{FE} + Target\_Industry_{FE} + Target\_IndustryYear_{FE} + \varepsilon_i$$

Variable	Mean	Std Dev	Median	p25	p75	# Observations
Acquirer beta	0.761	0.851	0.555	0.195	1.051	1,623

Table 3-1: Summary Statistics

Chapter 4

Results

The data and corresponding regression analysis offer results that are contrarian to the original hypothesis. As seen in Table 4-1, the regression output indicates that the relationship between the weighted average beta of the bidding and acquiring firms and the post-acquisition beta of the firm are not the same, thus rejecting the null hypothesis. In fact, the results appear to support the hypothesis that post-acquisition betas are more heavily influenced by the standalone target company, rather than the standalone bidding company.

Weighted-Average Betas

	(1) Post-Acquisition β minus Wtd. Avg. β	(2) Post-Acquisition β minus Wtd. Avg. β	(3) Post-Acquisition β minus Wtd. Avg. β	(4) Post-Acquisition β minus Wtd. Avg. β
Acquirer β	-0.4116***	-0.4231***	-0.5402***	-0.6598***
	(0.0562)	(0.0503)	(0.0578)	(0.0794)
Target β	-0.0053	0.,0028	-0.0552	0.0031
	(0.0376)	(0.0386)	(0.0355)	(0.0486)
Year FE	No	Yes	Yes	No
Target Industry FE	No	No	Yes	No
Year x Target Industry FE	No	No	No	Yes
Observations	1,623	1,623	1,478	892
R-Squared	0.259	0.297	0.456	0.601

Notes: *** $p<0.01$, ** $p<0.05$, * $p<0.1$

Table 4-1: Weighted-Average Betas

In all of the tests that were performed, I find that the difference between the post-acquisition beta and the weighted average beta of the two firms with the standalone company betas and find that the regression coefficient is actually more negative for the acquiring company than it is for the target company. This can be seen in Figure 4-1, which shows the correlation of the sample data for acquiring and target companies relative to the combined firm. Figure 4-2 shows the post differentials relative to year.

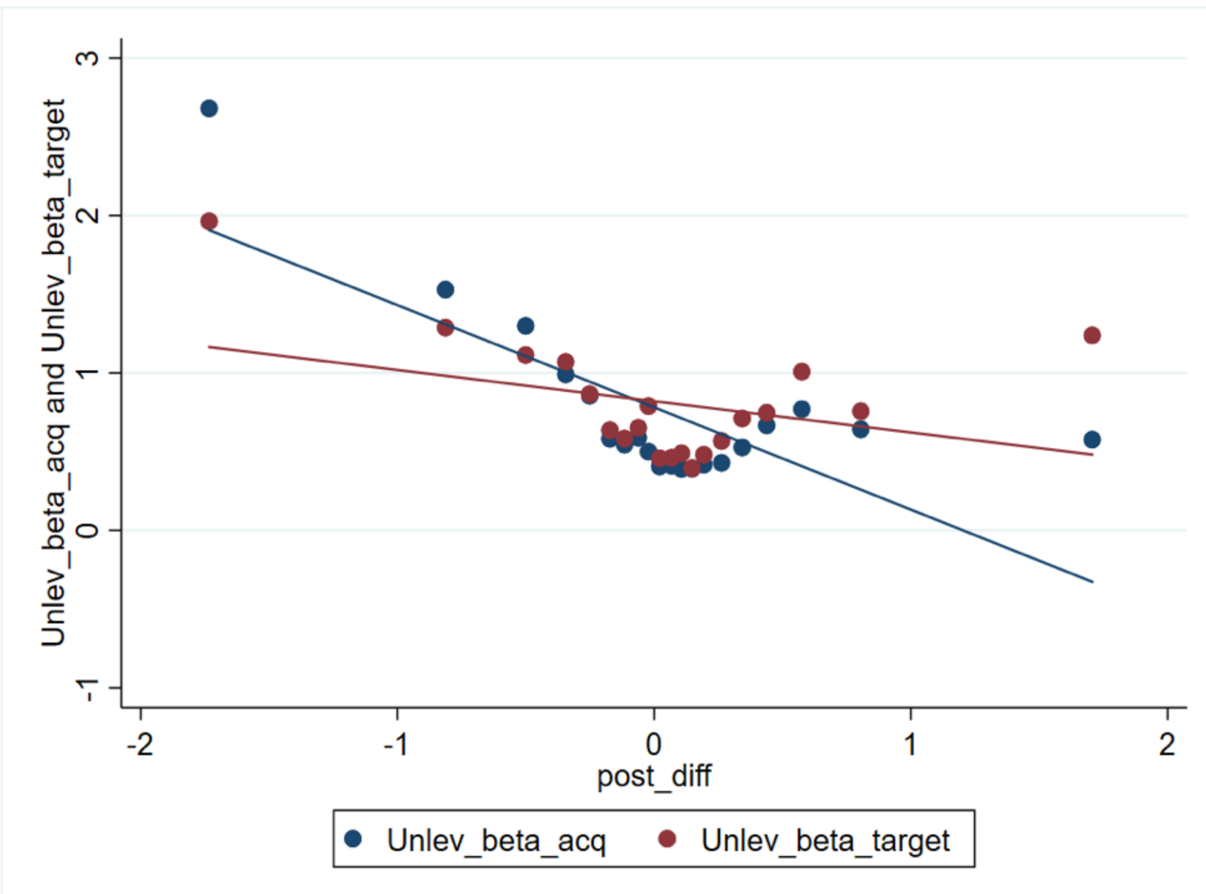


Figure 4-1: Expected vs. Actual Betas

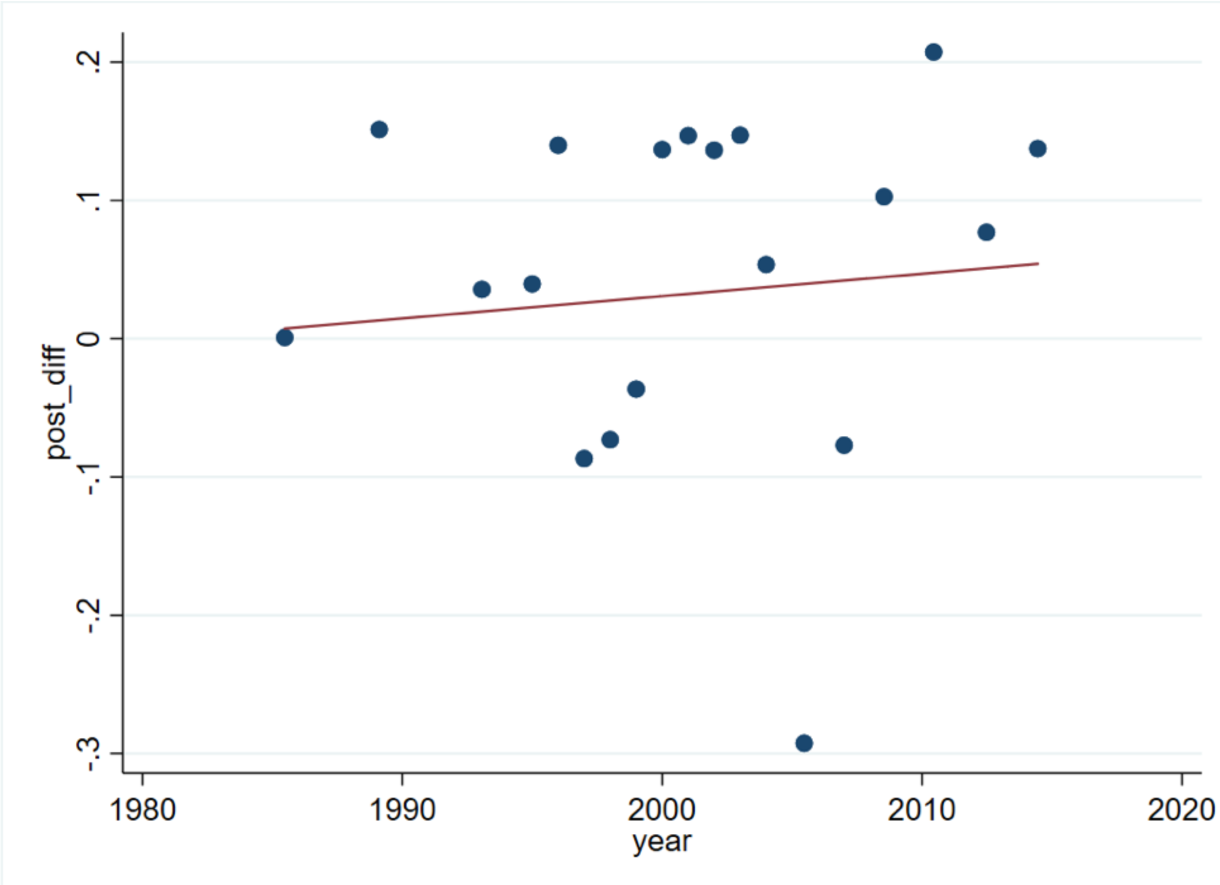


Figure 4-2: Beta Differential Distribution by Year

This implies that the difference between the actual post-acquisition beta and the more theoretical weighted average beta is more directly related to the target and less to the acquirer. The first part of this chapter will serve to describe the different types of OLS regressions that were administered while the latter part of this chapter will discuss potential causes of the results that were realized.

OLS Regression – No FE

The first test (1) that was run was an ordinary least squares regression with no fixed effects. This was done to get a baseline relationship between the variables. The data in each of the following regressions was Winsorized, which replaces some of the outlying and extreme values in the dataset with more standardized values at the edges of the 95% confidence interval. Using the 1,623 observations that were matched in the dataset, the regression returned a negative coefficient between the acquirer's beta and the difference equation, at the 1% significance level. The regression also indicates that the coefficient between the target beta and the difference equation is not statistically different from zero.

OLS Regression – Year FE

The second test (2) that was run was an ordinary least squares regression with a fixed effect for the year of the M&A deal. As has been extensively researched, mergers and acquisitions happen in waves given specific market conditions (Ahern and Harford 2014)[4]. Therefore, it is necessary to test the causal relationship without the influence of aggregate macroeconomic variables related to specific time periods. For example, excess stock returns surrounding M&A deals during the dot-com boom in the late 1990s will be different from those of M&A deals during the 2008 financial crisis. In order to remove the effects of market conditions related to time, this regression adds a "dummy" variable that captures these effects. Using the 1,623 observations that were matched in the dataset, the regression returned a negative coefficient between the acquirer's beta and the difference equation, at the 1% significance level.

[4] See Appendix C for the number of M&A deals per year in the final dataset.

The regression also indicates that the coefficient between the target beta and the difference equation is not statistically different from zero.

OLS Regression – Year FE & Industry FE

The third test (3) that was run was an ordinary least squares regression with fixed effects for both year and for the four-digit SIC industry code of the target company. It is important to control for differences in industry among the data set due to the fact that M&A volume can be concentrated within specific industries at different times. Using the late 1990s again as an example, M&A deals were far more heavily concentrated in the technology sector than in any other. Therefore, this regression uses an industry "dummy" variable and the year "dummy" variable used in the previous regression. Using the 1,478 observations that were matched in the dataset, the regression returned a negative coefficient between the acquirer's beta and the difference equation, at the 1% significance level. The regression also indicates that the coefficient between the target beta and the difference equation is not statistically different from zero.

OLS Regression – Year Industry FE

The fourth test (4) that was run was an ordinary least squares regression with a year x target industry fixed effect. This is different from the previous regression due to the fact that this effect controls for variance among industries within given time periods as opposed to controlling for each variable separately. Using the 892 observations that were matched in the dataset, the regression returned a negative coefficient between the acquirer's beta and the difference equation, at the 1% significance level. The regression also indicates that the coefficient between the target beta and the difference equation is not statistically different from zero.

Potential Explanations for Results

There is no one explanation for the results of this experiment that can be directly singled-out as the main driver. Furthermore, there are few tests that currently exist that can test the true driving factor of these results. However, there are several interesting possibilities that could explain that the surprising results of these tests, which are mainly concerned with behavioral biases that could skew the results.

The first explanation is that the target is influencing firm performance through a "new toy" effect. Schoar (2002) proves that conglomerate (acquiring) firm stock prices are negatively affected by a net decrease in productivity caused by acquisitions. This is a result of increased use of resources and focus on the newly acquired subsidiary, which in turn diverts attention from the incumbent subsidiary. Therefore, this could potentially cause the conglomerate firm's systematic risk (beta) to more-closely correlate to the newly-acquired target subsidiary rather than the incumbent subsidiary.

Another potential explanation is increased salience that is derived from the deal announcement or completion. Frydman and Wang (2019) find that the disposition effect, a behavioral finance anomaly where investors tend to realize gains faster than losses[5], is increased

[5] Closely related to prospect theory (Kahneman & Tversky 1979)

when a firm experiences a salience shock (i.e. an M&A deal). This could potentially cause investors to more-heavily weight the target valuation when analyzing the conglomerate's overall firm value.

Chapter 5

Conclusion

In conclusion, the effects of mergers and acquisitions on excess stock returns and beta are still being widely explored within the academic community. The purpose of this paper was to contribute to existing literature surrounding the behavior of firm-wide betas before and after a merger or acquisition. This empirical study specifically challenged the notion that the beta of a combined firm would be same as the theoretical weighted average beta of the two standalone entities proportional to firm enterprise value. The study was conducted by calculating firm betas for the bidding, target, and combined firms using 36-month rolling monthly stock return data and monthly market return data. Weighted averages were then constructed using balance sheet and market value of equity data for each firm as a proxy for size. The analysis was conducted by regressing the difference between the actual and expected betas of the combined entity with the beta of each standalone subsidiary to look for positive and negative relationships.

The results indicate an interesting relationship. While the original hypothesis was that firm-wide beta of a combined entity would be more heavily influenced by the acquiring company (represented by a positive regression coefficient in the data), the results indicate that firm-wide betas are actually more strongly influenced by the target firm. There are several potential reasons behind this relationship including a potential "new toy" effect or increased salience due to M&A.

The conclusions drawn by the results of this paper provide the foundation for an interesting argument within the community of finance. For one, beta is an important measure of systematic risk that can help to predict returns for portfolio managers. By understanding the behavior of company returns surrounding mergers and acquisitions, portfolio managers can better predict the returns of these companies. Furthermore, these results also contribute to existing literature surrounding the effects of mergers and acquisitions on returns. Therefore, both analysts and company management can better understand and predict the effects that M&A activity will have on future enterprise profitability.

Appendix A

Entire Dataset - Number of M&A Deals per Year

Year	Frequency	Percent	Year	Frequency	Percent
1978	18	0.05	1999	1701	4.76
1979	16	0.04	2000	1487	4.16
1980	30	0.08	2001	1243	3.48
1981	232	0.65	2002	1021	2.86
1982	268	0.75	2003	1006	2.81
1983	445	1.24	2004	980	2.74
1984	630	1.76	2005	996	2.79
1985	670	1.87	2006	994	2.78
1986	779	2.18	2007	909	2.54
1987	705	1.97	2008	753	2.11
1988	775	2.17	2009	688	1.92
1989	983	2.75	2010	608	1.70
1990	965	2.70	2011	631	1.76
1991	980	2.74	2012	638	1.78
1992	1034	2.89	2013	570	1.59
1993	1117	3.12	2014	643	1.80
1994	1404	3.93	2015	641	1.79
1995	1574	4.40	2016	576	1.61
1996	1732	4.84	2017	575	1.61
1997	2012	5.63	2018	467	1.31
1998	1985	5.55	2019	274	0.77
			Total	35755	100.00

Appendix B

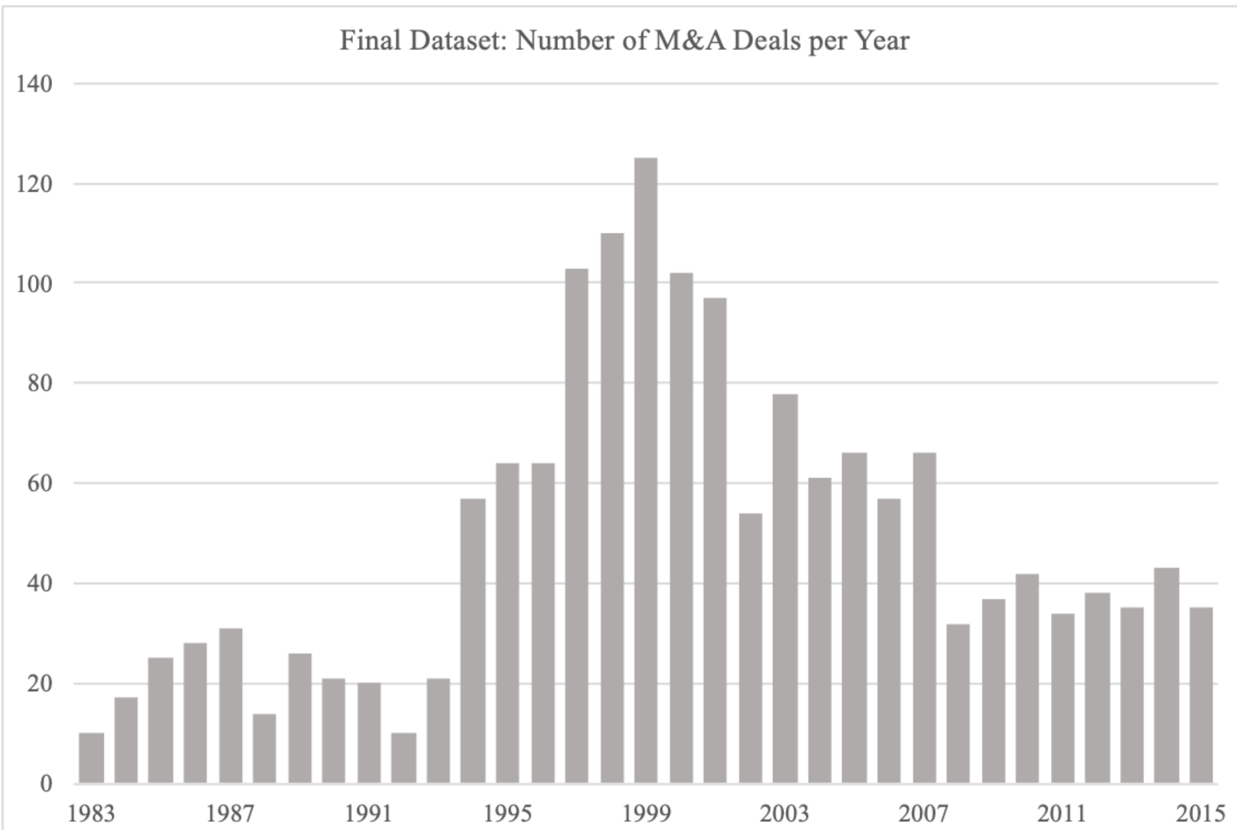
Final Dataset - Number of M&A Deals per Year

Year	Frequency	Percent
1983	10	0.62
1984	17	1.05
1985	25	1.54
1986	28	1.73
1987	31	1.91
1988	14	0.86
1989	26	1.60
1990	21	1.29
1991	20	1.23
1992	10	0.62
1993	21	1.29
1994	57	3.51
1995	64	3.94
1996	64	3.94
1997	103	6.35
1998	110	6.78

Year	Frequency	Percent
1999	125	7.70
2000	102	6.28
2001	97	5.98
2002	54	3.33
2003	78	4.81
2004	61	3.76
2005	66	4.07
2006	57	3.51
2007	66	4.07
2008	32	1.97
2009	37	2.28
2010	42	2.59
2011	34	2.09
2012	38	2.34
2013	35	2.16
2014	43	2.65
2015	35	2.16
Total	1623	100.00

Appendix C

M&A Distribution per Year



Bibliography

Abeywardhana, D. K. Y. “Capital Structure Theory: An Overview.” *Accounting and Finance Research*, vol. 6, no. 1, Jan. 2017, p. 133. *www.sciedu.ca*, doi:10.5430/afr.v6n1p133.

Aggarwal, R. K., and A. A. Samwick. “Why Do Managers Diversify Their Firms? Agency Reconsidered.” *Journal of Finance* 58, no. 1 (February 2003): 71–118. https://doi.org/10.1111/1540-6261.00519.

Agrawal, Anup, Jeffrey F. Jaffe, and Gershon N. Mandelker. “The Post-Merger Performance of Acquiring Firms: A Re-Examination of an Anomaly.” *The Journal of Finance* 47, no. 4 (1992): 1605–21. https://doi.org/10.2307/2328956.

Ahern, Kenneth R., and Jarrad Harford. “The Importance of Industry Links in Merger Waves.” *The Journal of Finance*, vol. 69, no. 2, 2014, pp. 527–76. *Wiley Online Library*, doi:10.1111/jofi.12122.

Always Control for Year Effects in Panel Regressions.Pdf. https://www.dartmouth.edu/~ethang/Lectures/Class17/Always%20Control%20for%20Year%20Effects%20in%20Panel%20Regressions.pdf. Accessed 25 Mar. 2020.

Bao, Jack, and Alex Edmans. "Do Investment Banks Matter for M&A Returns?" *The Review of Financial Studies*, vol. 24, no. 7, July 2011, pp. 2286–315. *academic.oup.com*, doi:10.1093/rfs/hhr014.

Benjamin Bennett and Robert A. Dam, Merger Activity, Stock Prices, and Measuring Gains from M&A, SSRN Electronic Journa, 10.2139/ssrn.3000574, (2018).

Bharath, Sreedhar T., and Guojun Wu. "Long-Run Volatility and Risk Around Mergers and Acquisitions," 2005.

Black_1972_article.Pdf. http://www.stat.ucla.edu/~nchristo/statistics_c183_c283/black_1972_article.pdf. Accessed 26 Feb. 2020.

Bozos, Konstantinos, Dimitrios Koutmos, and Wei Song. "Beta Risk and Price Synchronicity of Bank Acquirers' Common Stock Following Merger Announcements." *Journal of International Financial Markets Institutions & Money* 27 (December 2013): 47–58. https://doi.org/10.1016/j.intfin.2013.07.007.

Campbell, Joanna Tochman, David G. Sirmon, and Mario Schijven. "Fuzzy Logic and the Market: A Configurational Approach to Investor Perceptions of Acquisition Announcements." *Academy of Management Journal* 59, no. 1 (February 2016): 163–87. https://doi.org/10.5465/amj.2013.0663.

Capron, Laurence, and Jung-Chin Shen. “Acquisitions of Private vs. Public Firms: Private Information, Target Selection, and Acquirer Returns.” *Strategic Management Journal* 28, no. 9 (September 2007): 891–911. https://doi.org/10.1002/smj.612.

“Chapter 16: Capital Structure.” *Default*, https://kfknowledgebank.kaplan.co.uk/acca/chapter-16-capital-structure. Accessed 28 Feb. 2020.

Damodaran, Aswath. *Acquisition Valuation*. p. 49.

“Disposition Effect.” *Breaking Down Finance*. *breakingdownfinance.com*, https://breakingdownfinance.com/finance-topics/behavioral-finance/disposition-effect/. Accessed 15 Apr. 2020.

Does Market Misvaluation Drive Post-Acquisition Underperformance in Stock Deals? | Elsevier Enhanced Reader. doi:10.1016/j.iref.2010.12.005. Accessed 11 Dec. 2019.

Edmans, Alex, et al. “The Real Effects of Financial Markets: The Impact of Prices on Takeovers.” *The Journal of Finance*, vol. 67, no. 3, 2012, pp. 933–71. *Wiley Online Library*, doi:10.1111/j.1540-6261.2012.01738.x.

Fos, Vyacheslav and Yang, Jun, The Effects of the Aggregate Stock Market on Mergers and Acquisitions (January 17, 2020). Available at SSRN: https://ssrn.com/abstract=3521484 or http://dx.doi.org/10.2139/ssrn.3521484

Frydman, Cary, and Baolian Wang. “The Impact of Salience on Investor Behavior: Evidence from a Natural Experiment.” *The Journal of Finance*, vol. 75, no. 1, 2020, pp. 229–76. *Wiley Online Library*, doi:10.1111/jofi.12851.

H13.Pdf. http://finance.wharton.upenn.edu/~jwachter/fnce100/h13.pdf. Accessed 26 Feb. 2020.

Hackbarth, Dirk, and Erwan Morellec. “Stock Returns in Mergers and Acquisitions.” *The Journal of Finance*, vol. 63, no. 3, 2008, pp. 1213–52. JSTOR.

Hamada, R.S. (1972) “The Effect of the Firm's Capital Structure on the Systematic Risk of Common Stocks,” The Journal of Finance, 27(2):435-452. hhttp://people.stern.nyu.edu/adamodar/pdfiles/AcqValn.pdf

Huang, Qianqian, et al. “The Role of Investment Banker Directors in M&A.” *Journal of Financial Economics*, vol. 112, no. 2, May 2014, pp. 269–86. *ScienceDirect*, doi:10.1016/j.jfineco.2014.02.003.

Kahneman, Daniel, and Amos Tversky. “Prospect Theory: An Analysis of Decision under Risk.” *Econometica*, vol. 47, no. 2, 1979, pp. 283-291. *JSTOR*, www.jstor.org/stable/1914185. Accessed 15 Apr. 2020.

Kenneth R. French – Data Library. https://mba.tuck.dartmouth.edu/pages/faculty/ken.french/data_library.html. Accessed 30 Jan. 2020. Library.

Kyoko Yagi, Kimitoshi Sato and Katsushige Sawaki, The Valuation of Mergers and Acquisitions in the Stock Market Based on the Real Options Approach, *SSRN Electronic Journal*, 10.2139/ssrn.3183516, (2018).

Lintner, John. "The Valuation of Risk Assets and the Selection of Risky Investments in Stock Portfolios and Capital Budgets." The Review of Economics and Statistics, vol. 47, no. 1, 1965, pp. 13–37. JSTOR, www.jstor.org/stable/1924119. Accessed 26 Feb. 2020.

Mehrling, Perry, and Aaron Brown. *Fischer Black and the Revolutionary Idea of Finance*. John Wiley & Sons, 2011.

Miller, Merton H. "The Modigliani-Miller Propositions After Thirty Years." The Journal of Economic Perspectives, vol. 2, no. 4, 1988, pp. 99–120. JSTOR, www.jstor.org/stable/1942779. Accessed 26 Feb. 2020.

Modigliani, Franco, and Merton H. Miller. "Corporate Income Taxes and the Cost of Capital: A Correction." The American Economic Review, vol. 53, no. 3, 1963, pp. 433–443. JSTOR, www.jstor.org/stable/1809167. Accessed 26 Feb. 2020.

PII: 0304-405X(77)90041-1 | Elsevier Enhanced Reader. doi:10.1016/0304-405X(77)90041-1. Accessed 24 Jan. 2020.

Rangel-lafuente, Roger H. *The Pennsylvania State University*. p. 53.

Schoar, Antoinette. "Effects of Corporate Diversification on Productivity." *The Journal of Finance*, vol. 57, no. 6, Dec. 2002, pp. 2379–403. *DOI.org (Crossref)*, doi:10.1111/1540-6261.00500.

Shah, Priyanka, and Parvinder Kaur Arora. *M&A Announcements and Their Effect on Return to Shareholders: An Event Study*. 2014. *Semantic Scholar*, doi:10.5430/afr.v3n2p170.

Tanna, Sailesh, and Ibrahim Yousef. "Mergers and Acquisitions: Implications for Acquirers' Market Risk." *Managerial Finance* 45, no. 4 (April 8, 2019): 545–62. https://doi.org/10.1108/MF-09-2018-0446.

Unlevered Beta. https://xplaind.com/550221/unlevered-beta. Accessed 30 Jan. 2020.

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EDUCATION

The Pennsylvania State University | Schreyer Honors College — **University Park, PA**
Smeal College of Business | B.S. in Finance | Beta Gamma Sigma — *Graduated May 2020*
The College of Liberal Arts | Minors in Economics and Spanish

RELEVANT EXPERIENCE

The Goldman Sachs Group — **New York, NY**
Investment Banking Summer Analyst | Leveraged Finance — *May 2019 – May 2020*
- Staffed on several syndicated leveraged loan and high yield bond deals including an LBO, best-efforts M&A deal, fungible add-on, and a refinancing across numerous sectors including technology, industrials, media, and consumer
- Conducted company & credit due-diligence, built market-update decks, synthesized comparable analyses, helped organize a deal roadshow, compiled data for sales memorandums, structured daily & weekly reports, updated databases
- Engaged in discussions with client executives, financial sponsors and investors regarding pricing and covenant terms

Nittany Lion Fund, LLC — **University Park, PA**
Director of Outreach — *Dec 2018 – May 2019*
- Marketed the organization to the Penn State community by speaking at various class lectures and involvement fairs
- Moderated a panel of senior mentors and aided in presentational development for underclassmen members of the Fund

Lead Portfolio Manager | Financials Sector — *Dec 2017 – Dec 2018*
- Managed a total of ~$1.20 MM within the Financials Sector as part of the ~$8.50 MM student-run equity fund
- Researched current and potential holdings as well as created valuations using fundamental analysis, research reports, DCF models, dividend discount models, and comparable analysis to aid in the selection of future holdings

Associate Fund Manager | Information Technology & Financials Sectors — *May 2017 – Dec 2017*
- Co-managed a total of ~$3.00 MM between both Sectors as part of the ~$8.50 MM equity fund
- Served as the Co-Director of Weekly Reports; responsible for compiling, editing, and submitting a weekly report to 77 individual investors detailing all trades and performance for the Fund's 74 total equity investments

Federated Hermes, Inc. — **Pittsburgh, PA**
Investment Management Summer Analyst | Taxable Money Markets — *May 2018 – Aug 2018*
- Conducted maturity yield, duration, composition, and correlation-based analysis for prime, government, and SEC 2A-7 compliant funds within the Company's ~$265.00 bn money markets division, one of the largest of its kind in the world
- Prepared comparative prospectus and portfolio analysis for the Company's largest competitors using the R coding platform, completed reports for ratings agencies used to evaluate portfolio liquidity, and evaluated cash flows trends
- Analyzed various potential investments across multiple asset classes including asset-backed commercial paper programs, farm credit programs, repo & term repo agreements, and other forms of corporate and government debt

Penn State Investment Association — **University Park, PA**
Educator | Former Analyst — *Aug 2016 – May 2019*
- Personally organized a semester-long stock market competition for ~200 members, engaging students to conduct individual security analysis through the application of a $100.00 k "paper" investment portfolio
- Presented educations on accounting, ratios analysis, and valuation methods to prepare members for success in finance

LEADERSHIP

The Wall Street Boot Camp I & II — **University Park, PA**
Certified Member — *Dec 2016 – Dec 2017*
- Constructed a financial model including an operating model, a discounted cash flows model, and a comparable analysis
- Developed skills in Bloomberg, FactSet, and Microsoft Office to better analyze and interpret annual filings

Phi Chi Theta Professional Business Fraternity | Alpha Iota Chapter — **University Park, PA**
Active Member | Former Corporate Relations Chairman — *Apr 2017 – Aug 2019*
- Assisted in organizing a fraternity case competition, resume workshop, and several company information sessions

HONORS, SKILLS & INTERESTS

Awards: President's Freshman Award, National Honors Society, Spanish National Honors Society, Beta Gamma Sigma member, Delivered "Speaker-at-Large" Graduation Address