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Impact of Recurring Revenue in Technology Business Acquisition Premiums

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ABSTRACT

Recurring revenue has gained increased attention in investor sentiment following the COVID pandemic. Despite the numerous claims regarding the valuation benefits accruing to companies with recurring revenue business models, there is virtually no academic research that attempts to confirm the significance of this relationship. This paper explores companies in the software industry that have been recently acquired and comparatively measures their reliance on recurring revenue relative to the acquisition premium paid. A multivariable regression is used and analyzed to quantify the impact of recurring revenue on deal premiums. Assessing the significance of this relationship has large implications for mergers and acquisitions that occur in the software industry.

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INTRODUCTION

Post-COVID M&A Environment

During the time following COVID there were a few identifiable trends in the M&A environment that have led to a resurgence in deal volume following the pandemic. Dry powder in private equity, all-time low interest rates, large stimulus packages, and the possibility of changed tax structures following the 2020 election all combined for an immense increase in deal volume to occur ("M&A in a post-COVID world" 2022). These factors combined to heavily influence General and Limited Partners (GPs and LPs) of Private Equity firms to put pressure on funds to generate deals more quickly during this opportune time.

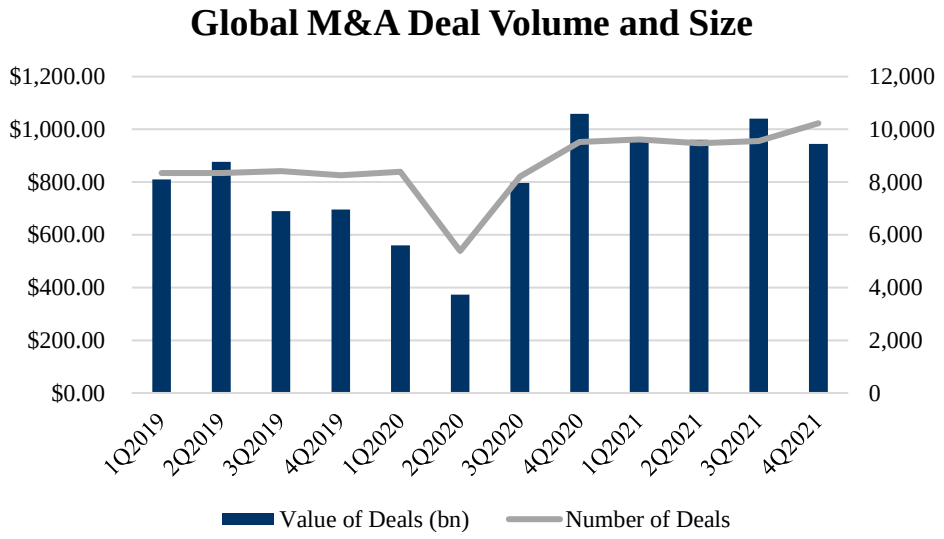

Figure 1. Global M&A Deal Volume and Size

Adapted from Moore (2022)

However, following the pandemic there was a significant change of emphasis on the characteristics acquiring companies used to value future sources of income. "M&A in a post-COVID world" (2022) includes a survey, completed in 2021, showing that 94% of respondents expect to use earnouts in 70% of their deals moving forward due to the uncertainty of the

economy in the future. It is very common for buyers to apply these terms to deals now, but often to the dissatisfaction of the target firm.

Additionally, the importance of operating cash flow increased drastically as supply chains worsened globally. Buyers focused their efforts much more significantly on the ability for a company to have shorter Days Sales Outstanding (DSO) and longer Days Payable Outstanding (DPO) ratios to be able to support any unexpected fluctuations ("M&A in a post-COVID world" 2022). The importance of these metrics within the cash conversion cycle has grown in the eyes of an investor as the ability to withstand uncertain economic events has become more prevalent.

The factors that presented themselves in the post-COVID M&A environment caused buyers to deploy capital much more quickly than in previous years, while doing so into companies with firm characteristics that most commonly represent a recurring revenue business model. The economic environment and preference of firm characteristics combined to form the importance of recurring revenue in valuation.

Predictability of Recurring Revenue

The importance recurring revenue has on valuation is due to its predictability which can be witnessed by its increasing presence in the "subscription economy." Streaming platforms, such as Netflix, Amazon Prime, and Hulu, have been utilizing this business model for years and have seen predictable cash flows and praise from investors for their efforts as well. Goodbread (2023) recognizes the most important part of businesses switching to a recurring revenue model is the predictability of income which allows for those companies to better prepare for the future as well as weather economic downturns.

"The Subscription Economy Index" (2023) documents the financial results of subscription-based business over that of its peers in the S&P 500. In its March 2023 report, Zuora stated that on a revenue basis, "subscription-based companies have grown 3.7x faster than the S&P 500" ("The Subscription Economy Index" 2023). This measurement was taken over a period of 11 years and demonstrates the increased benefits of recurring revenue in recent time.

Apple, Inc. (AAPL) Recurring Revenue Valuation

In recent years, Apple has been transitioning its business model to subscription services to convert its revenue into a recurring method. This shift has taken the notice of many investors who have designated specific parts of the company's valuation to efforts of its recurring revenue streams. Erik Woodring of Morgan Stanley in July of 2022 stated, "a sharp shift to a subscription-like model could add about $1 trillion to Apple's market cap" (Zambonin 2022). This statement clearly demonstrates the large impact recurring revenue is believed to have one of the world's largest companies in a significant magnitude.

In addition, despite iPhone sales missing expectations during Apple's 1Q2024 earnings report due to increased competition in China, the company's largest area of growth came from its services segment that helped buoy the stock price as the segment increased 11% q/q to $23.12 billion in sales (Nellis 2024). Apple's valuation is purposefully shifting from its prior dominance as a hardware innovator to its continued strength over its peers in the services business.

Recurring Revenue and M&A

As seen through the importance of recurring revenue in recent trends as well as for one of the largest companies in the world, it is has become common practice for investment banks to

focus heavily on the importance of recurring revenue in M&A transactions to increase valuation deal estimates. Vista Point Advisors, a technology-focused investment bank in San Fransico, states on their website, “Buyers value recurring and scalable revenue models (like SaaS) more than they do transactional revenue (like services businesses). We advise companies how to position and transition their revenue makeup to models that most impress buyers” (“The Role of an Investment Bank in Positioning Your Business”). This quote demonstrates the intent of the investment bank to properly frame businesses it works with to recurring revenue business models because of the success it has for increasing the deal premium being paid.

The knowledge about the importance of recurring revenue is already widespread in the M&A industry for technology companies, yet little work has been done to demonstrate the true connection of recurring revenue to the enhancement of valuation gained by a target firm due to the prevalence of recurring revenue in its business. Although this paper does not comment on the due diligence done by buyers to justify a deal premium, it analyzes the extent recurring revenue factors into the excess purchase of a company over its market valuation.

LITERATURE REVIEW

Mergers and Acquisitions Reasoning

Mergers and acquisitions have long been a focus of corporations in the pursuit of financial success. There are two fields for which researchers have attempted to explain the rationale of why mergers and acquisitions occur: behavior empire-building and synergistic opportunities. The behavioral finance explanation for mergers and acquisitions can be seen in the personal gains for top level executives. Trautwein (1990) demonstrates that because acquisitions increase the size of a firm, the overall deal will have a positive effect on the top executives' compensation. This would be a direct argument for empire-building as managers are incentivized to be in control of more assets which in-turn increase their compensation significantly. Additionally, Haleblian & Finkelstein (1999) argue that the relationship between acquisition experience and learning for management is likely to be curvilinear. This literature demonstrates that as managers increase the number of acquisitions undertaken there is declining marginal returns for the ability of those new companies to be successful for the combined firm. Therefore, the only real benefit of increasing the number of acquisitions undertaken would be for "empire-building" purposes.

Despite the evidence and incentive alignments for the "empire-building" theory, there are also beliefs that mergers and acquisitions may occur for the belief of synergistic valuation. Mitchell and Mulherin (1996) demonstrate that mergers occur in waves and are often focused in one industry. This work, expanded upon by Andrade, Mitchell, and Stafford (2001), shows that deregulation of the industry is the common denominator. Under the assumption that acquiring firms know that performance of an acquisition is based on a curvilinear relationship with relatedness to the acquirer (Palich, Cardinal, and Miller 2000), it is evident managers are

engaging in mergers and acquisitions at appropriate times of undervaluation for their targets due to deregulation. In this line of thinking, managers are not pursuing "empire-building" in their decision-making, but rather are making informed decisions on the potential change in valuation for target assets due to the decrease in regulation associated with them.

Justification of Deal Premiums

For this paper, the focus will revolve around the idea that synergies are the underlying justification for these mergers and acquisitions to occur. These synergies should be directly comparable to the premium paid for the target company as the incremental gains from the acquisition should be compared to the incremental amount paid for the future incremental discounted cash flows of the combined corporation. In regards to the amount of this payment, Bradely, Desai, and Kim 1988 state "That the bidding firm that can affect the highest-valued reallocation of the target resources can always fashion the highest-valued (winning) bid." As a result, acquiring companies should only be willing to pay in premium in they believe to have a better capacity to allocate amongst themselves than the target would thereby be able to (Bradely, Desai, and Kim 1988). This would then equivalate, from the perspective of the acquiring company, as a measure of their conviction of the resources in the company that they are buying.

However, Sirower (1997) takes a less idealistic approach to the rationale of premiums. He argues that managers attempt to identify synergies; however, their efforts are miscalculated due to three causes: a lack of understanding of the acquisition strategy, lack of knowledge of the target company, and challenges faced through integration. Therefore, signaling that the premium paid for a target company is not fully accurate to the overall outcome of the deal, yet does further

the idea of Bradely, Desai, and Kim (1988) whose research points to the conviction of the acquiring company as the driving point for the premium paid.

Conceptionally if managers are setting premiums based on their conviction of the synergies, then the implication is that they are convinced that the target's characteristics justifies the valuation paid. Naturally, the next important question is what target firm characteristics are driving forces for those premiums.

Academic research has broadly pointed to four deal characteristics that have an impact on the premium being paid. Jarrell and Poulsen (1989) demonstrate that as the target firm increases in size relative to the acquirer, the acquirer experiences a greater magnitude of appreciation in share price. This induces managers to be more willing to pay higher premiums for larger companies and leads to higher share price appreciation for the acquirer.

Huang and Walking (1987) show with significance that cash offers lead to higher returns for acquirers because of the tax benefits shareholders experience in which they demand higher premiums in situations that will force them to pay immediate taxes on their gains. Cash offers would therefore lead to higher acquisition premiums in all cases. This same paper also demonstrates that tender offers yield significantly higher premiums than mergers as the acquiring firm has to make an offer to shareholders beyond the degree of resistance and because the takeover is usually completed with cash (Huang and Walking 1987).

Finally, Schwert (2000) demonstrates with significance that unsolicited deals often lead to higher premiums paid to target shareholders. This phenomenon occurs as unsolicited deals need to be priced at a level to convince shareholders to avoid the negotiation process. Therefore, a control will be needed to adjust for these higher premiums as the paper aims to focus on the impact of recurring revenue on the deal premiums of only technology companies.

Technology Industry

This of course draws interest towards technology companies that can be seen making headlines with quite higher acquisition premiums. Below is a chart showing the average M&A Deal Premium by sector in 2018:

Sector	Average M&A Deal Premium in 2018
Healthcare	36.6%
Technology	36.3%
Consumer Products and Services	30.7%
Retail	29.5%
Industrials	28.3%
Financials	26.4%
Materials	24.7%
Consumer Staples	24.1%
Real Estate	21.7%
Energy and Power	18.8%
Media and Entertainment	16.9%
Telecommunications	14.8%

Figure 2. Technology Acquisition Premiums

Adapted from "U.S.: Average M&A premiums by industry 2018"

Previous academic research has explored the reasoning associated with the firm characteristic of R&D growth. Laamanen (2007) demonstrated with statistical significance that higher R&D investment-to-market ratios and R&D growth rates of target firms lead to higher premiums. Utilizing the logic from Bradely, Desai, and Kim (1988), this effectively means that the acquiring firm believes it is better able to reallocate the target R&D resources better than the market believes the target would be able to, even if the assessment of that acquiring company were to be overstated due to lack of understanding and integration ability Sirower (1997).

However, something that is not pointed out in Laamanen (2007) is the importance of the information asymmetry in the acquisition premium offered for a target technology company. Information asymmetry is the target firm's greater fundamental understanding of itself in contrast to the acquiring firm in the negotiation process. However, information asymmetry also exists inversely in the post-acquisition environment. Cohen (2012) describes that the target technology firm themselves may incorrectly assess the resources and intentions for their own company in the post-acquisition environment. Having knowledge of this beforehand typically leads the target firm to have more tedious negotiation cycles thereby driving up the acquisition premium solely to minimize risk of failure to integrate fully.

Recurring Revenue

One area, however, that is relatively unexplored in academic research is premiums based on recurring revenue. This is quite an interesting dilemma as a significant number of articles on the internet state the value of recurring revenue to be higher and more useful than that of non-recurring revenue (Eyamie 2021, Tice 2022, Miller 2023). One of them even explicitly states that "Introducing subscriptions to your product or service could increase your valuation by up to *eight times* that of a comparable business with little recurring revenue" (Eyamie 2021). These articles appear to believe it is common knowledge that the more recurring revenue in a firm the higher value the firm would be able to be sold for. Academics have not drawn their focus to recurring revenue since it is not required to be reported by GAAP. Any and all mention of recurring revenue on financial statements is from non-GAAP standards, which are ultimately not regulated.

However, due to the immediate widespread prevalence of recurring revenue in business valuation, as seen online, it can be reasoned that management would be inclined to more frequently mention “recurring revenue” or “Annual Recurring Revenue (ARR)” in non-GAAP reporting to increase the perceived value of the company. Therefore, the more times “Recurring Revenue” or “ARR” are mentioned in reporting, the higher the value management perceives recurring revenue to make of their entire business. This would then implicate more challenging negotiations (Cohen 2012) and potentially higher acquisition premiums as the acquiring firm may believe it would be able to better reallocate those recurring revenue resources (Bradely, Desai, and Kim 1988), or overestimate the understanding of the acquisition strategy, lack of knowledge of the target company, and underestimate the challenges faced through integration (Sirower 1997).

HYPOTHESIS

The current market environment places an important level of valuation on recurring revenue as a business model. The valuation of Apple, Inc. and the selling strategy of Vista Point Advisors point to a deliberate shift of investor sentiment towards recurring revenue being a valuable resource. Additionally, prior academic research highlights the strong desire of the acquiring firm to calculate premiums on its ability to reallocate the resources of the target firm (Bradely, Desai, and Kim 1988). This combines to generate above average high deal premiums seen in the technology industry ("U.S.: Average M&A premiums by industry 2018") to leave multiple unknowns regarding the reasoning for excess in price paid for acquisitions. It is important to note for the purposes of this paper that the premium paid by the acquiring company is based on their own analysis. No opinion is given on its calculation of the premium, only analysis of the extent recurring revenue impacts the overall premium value.

Overall, it is expected that recurring revenue will have a small positive relationship with the premium paid for technology company acquisitions. However, it is anticipated that this relationship will not be of statistical significance to the overall multivariable regression, or as statistically significant as the other control variables used in prior academic research. It is expected that the two control variables mentioned in Laamanen (2007) will have the highest positively related statistical significance as the sampled data will be exclusively focused on the technology industry. In contrast, the remaining control variables are expected to show positive relationships with the premium paid metric, but at a lesser significance than the technology-focused controls.

DATA AND METHODOLOGY

Screen for Companies

Refinitiv was used to pull Software and IT Service M&A deals. This specific technology sector was chosen as the target companies were more likely to use the recurring revenue business model. The screen was modified to include deals from 2008 to 2023, and for the simplicity of data analysis, only for target and acquirors only based in the U.S. Additionally, target firms were filtered to only include those traded on NYSE and NASDAQ to ensure consistency of currency for comparison.

There are six control variables that needed to be calculated and were pulled from the Refinitiv platform as well. The screen pulled the necessary statistics: acquisition announcement date, tender offer flag, deal started as unsolicited flag, percentage of deal paid by cash, price paid by acquiror for target shares, R&D expense over the last 12 months, R&D expense four years prior, and the target market value four weeks prior to acquisition.

Once the data was pulled into Excel, FactSet was used to further screen for the necessary characteristics of target firm equity value and acquiror firm equity value as well. Once all filters were applied and non-usable deals were removed, 33 deals remained.

Deal Premium Calculation

The deal premium was calculated as according to Eaton, Liu, and Officer (2021) which demonstrated that, on average, mergers after the 1990s are privately initiated 112 days prior to the announcement date and begin to experience a stock price appreciation 105 days before the announcement date. For every company in the screen, the date for premium calculation was found for 105 days prior to the acquisition announcement date and the stock price was pulled

from FactSet for that specific trading day. The deal premium was then calculated using the formula below:

Deal Premium = (Price paid by acquiror for target shares / Stock price of target 105 days prior to acquisition announcement date) – 1

Following the calculation of all deal premiums, a significant outlier for a premium of 1,667.77% was removed from the data set for being far above three standard deviations of the mean which is a value of 963.25%.

Recurring Revenue Measurement

As discussed above in the findings of Bradely, Desai, and Kim (1988), an acquiring firm's premium is reflective of its belief to better reallocate the resources of the target firm. Therefore, if the null hypothesis were to be disproven, target firms with greater reliance on recurring revenue would be more inclined to mention "recurring revenue" or "annual recurring revenue" in earnings calls. This would lead to potential acquiring firms being more inclined to pay higher premiums as they perceive their ability to reallocate that characteristic of target firms to a greater extent.

To measure this phenomenon, each company's last available earnings call transcript was pulled from Seeking Alpha and a keyword search was individually performed for "recurring revenue," "annual recurring revenue," "subscribe," and "license." The results for each keyword search were recorded and then summed to generate a total column of how heavily the target firm believes its valuation is based recurring revenue. It is important to note that no earnings call

transcripts available for one of the companies and therefore it was removed from the dataset. Leaving 31 deals to be analyzed through the regression.

Control Variable Finalization

The statistics pulled from the screen were then modified to fit the necessary requirements of the multivariable regression. There were four control variables associated with typical M&A deals. The first control variable was relative equity value of the target over the acquirer as demonstrated to have a positive correlation in Jarrell and Poulsen (1989). The second control variable, as mentioned in Huang and Walking (1987), was whether the deal was a full cash offer or not using a dummy variable with higher premiums being associated with full cash deals due to the tax benefits of them. The third control variable, also mentioned in Huang and Walking (1987), was whether the deal was a tender offer or not using a dummy variable with higher premiums being associated with tender offers. The fourth control variable was whether or not the offer was unsolicited using a dummy variable with higher premiums being associated with unsolicited offers as shown in Schwert (2000).

The final two control variables were for technology deals specifically. Laamanen (2007) demonstrated with statistical significance that higher R&D investment-to-market ratios and R&D growth rates of target firms lead to higher premiums. The R&D investment-to-market ratio was calculated by taking the R&D expense over the last 12 months over the market value of the target firms four weeks prior to the announcement date. The R&D growth rates of the target firms were calculated by using the percent growth of R&D expense from the last 12 months over R&D expense from four years prior.

Statistical Summary of Data

Following the completion of obtaining all data for the target firms, the 31 remaining respective deals summary statistics were generated. The statistics are visible below:

	Premium Paid	Recurring Revenue Metric	Relative Size	Cash Offer	Tender Offer	Unsolicted Offer	R&D Growth	R&D Investment Ratio
Mean	43.92%	9.71	17.97%	0.74	0.23	0.00	136.26%	8.04%
Median	37.37%	8.00	8.16%	1.00	0.00	0.00	82.51%	5.59%
Standard Deviation	38.37%	12.75	23.22%	0.44	0.43	0.00	175.35%	6.04%
Sample Variance	14.72%	162.68	5.39%	0.20	0.18	0.00	307.46%	0.36%
Skewness	127.56%	2.51	175.85%	(1.16)	1.38	-	270.31%	124.76%
Range	174.58%	61.00	83.47%	1.00	1.00	0.00	896.24%	21.46%
Min	(10.85%)	0.00	0.33%	0.00	0.00	0.00	(15.96%)	2.25%
Max	163.72%	61.00	83.80%	1.00	1.00	0.00	880.28%	23.72%

Figure 3. Statistical Summary of Data

Multivariable Regression

To properly test for the significance of the Recurring Revenue Metric, a multivariable regression analysis was completed to explore the explanatory results of each variable in the overall premium being paid for each deal. The first statistic of the Premium Paid was the dependent variable (Y) in the regression with the Recurring Revenue Metric being the main independent variable (X_1) being tested and the remaining five acting as the control variables in the regression (X_{2-6}). It is important to note that all remaining deals were solicited offers and therefore the Unsolicited Offer control variable was removed. The standard equation for a Multivariable Regression for this number of variables is:

$$Y = \alpha + \beta X_1 + \beta X_2 + \beta X_3 + \beta X_4 + \beta X_5 + \beta X_6 + \varepsilon$$

Where:

Y is representative of the dependent variable

α is representative of the y-intercept

β is representative of the slope coefficient for each variable

X is representative of the independent variables

ε is representative of the error term

The multivariable regression was run using Excel's Data Analysis tool. The output generated through Excel includes the multiple R statistic that represents the multiple correlation between the response variable and the six predictor variables. Additionally, the output includes the adjusted R squared value that is the proportion of variance in the response variable that can be explained by the independent variables being tested. A Y-Intercept value was generated to represent the expected mean value of the Premium Paid when all independent variables are zero. Also, coefficients are generated for each independent variable representing the direction and magnitude of the correlation between each variable and Y represent. Finally, T Stat and P-Values are generated for each independent variable to determine their significance and probability of being recurring important to the Premium Paid metric. For this analysis, a T Stat greater than or equal to 2.00 will be considered significant while a P-Value less than or equal to 0.10 will be considered significant. In addition to each of these statistics generated, Excel also calculates confidence intervals at the 95% and 90% levels for each of the independent variables that were used for this analysis.

RESULTS OF STUDY

Results Overview

The summarized results include the statistical metrics described at the end of the last chapter. Primarily, the Recurring Revenue Metric is reviewed heavily in addition to the most impactful and least impactful control variables from the dataset.

Ultimately, the test of the Recurring Revenue Metric proved to be not significant and the regression was weaker overall as well. The multiple R statistic was 0.53 which demonstrates an average level of prediction between the response variable and the 6 predictor variables. Additionally, the adjusted R square, or the proportion of variance in the response variable to the independent variables being tested, was only .10 therefore showing a very small result. Below is the table of generated regression statistics:

Regression Statistics	
Multiple R	0.52642158
R Square	0.27711968
Adjusted R Square	0.0963996
Standard Error	0.36472553
Observations	31

Figure 4. Regression Statistics

Finally, the Y-Intercept value was .07 showing that even when all independent variables were zero a company would still on average achieve a 7% premium.

Recurring Revenue Metric

The Recurring Revenue Metric proved to be a statistically insignificant measure in the regression. The Recurring Revenue metric actually had a negative coefficient of -0.009. This is

vastly different than the hypothesis that had previously suggested a positive relation between the Recurring Revenue Metric and the Premium Paid. Below is the Recurring Revenue Line Fit Plot from the multivariable regression as well as a chart showing a linear regression between the metric and Premium Paid:

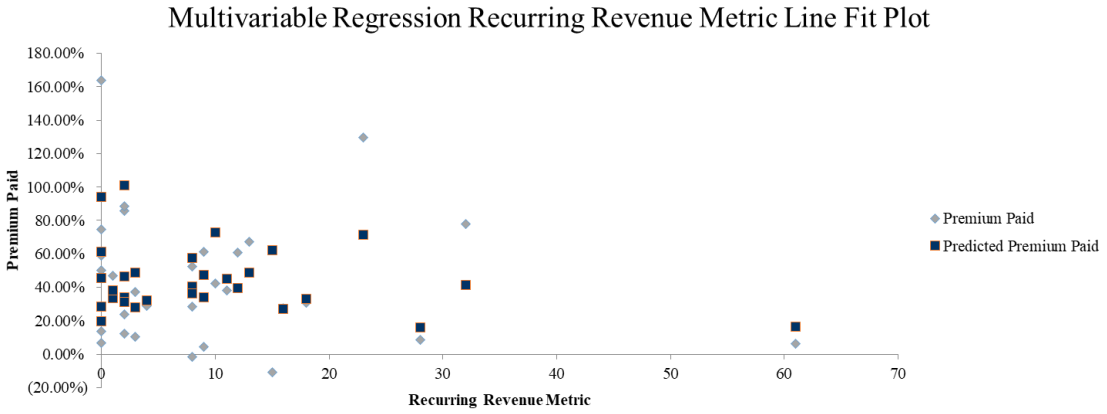

Figure 5. Multivariable Regression Recurring Revenue Metric Line Fit Plot

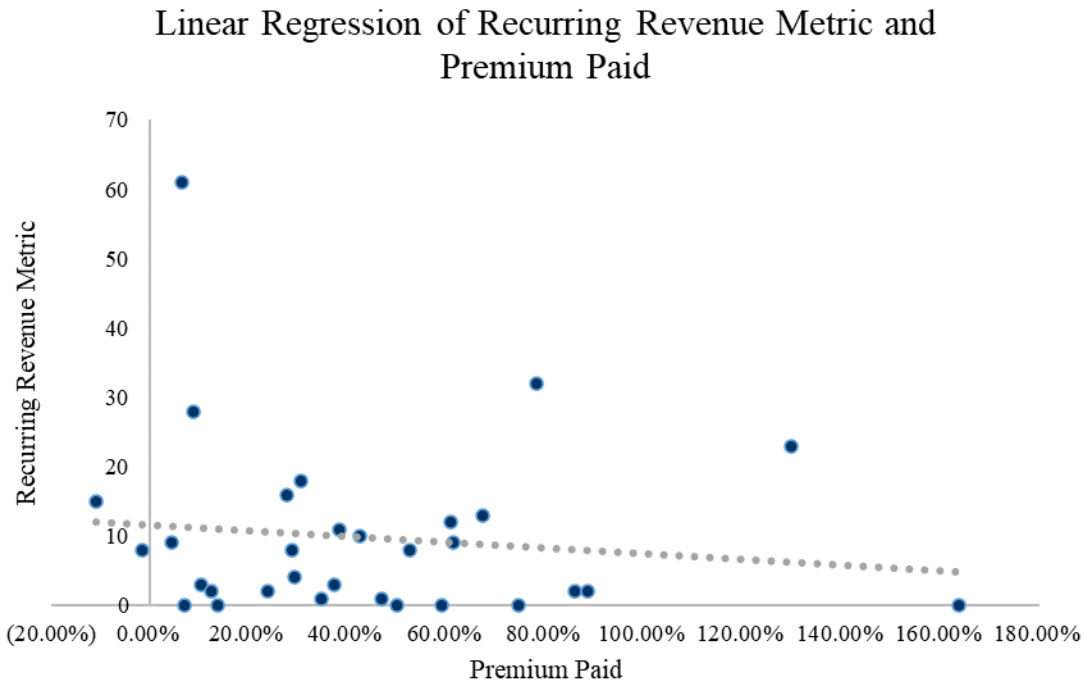

Figure 6. Linear Regression of Recurring Revenue Metric and Premium Paid

Additionally, the T Stat and P-Value were -0.16 and 0.88 respectively and both demonstrate the insignificance of the Recurring Revenue Metric on the Premium Paid. Finally, the confidence interval at both 95% and 90% included zero, demonstrating the unlikeliness the metric had any importance to the tested regression. Below is the summary of the Recurring Revenue Metric results:

	Coefficients	*Standard Error*	*t Stat*	*P-value*	*Lower 95%*	*Upper 95%*	*Lower 90.0%*	*Upper 90.0%*
Recurring Revenue Metric	-0.000854879	0.005425759	-0.157559331	0.876122156	-0.012053096	0.010343338	-0.010137714	0.008427956

Figure 7. Recurring Revenue Metric Results

Control Variables

The control variables proved to generally be more significant to the regression in comparison to the Recurring Revenue Metric statistic. Below is the summary of the control variable results compared to the Intercept and Recurring Revenue Metric as well:

	Coefficients	*Standard Error*	*t Stat*	*P-value*	*Lower 95%*	*Upper 95%*	*Lower 90.0%*	*Upper 90.0%*
Intercept	0.07356102	0.207830584	0.353947038	0.726469232	-0.355380224	0.502502263	-0.282012602	0.429134642
Recurring Revenue Metric	-0.000854879	0.005425759	-0.157559331	0.876122156	-0.012053096	0.010343338	-0.010137714	0.008427956
Relative Size	0.370921655	0.324240637	1.143970289	0.263918031	-0.298278129	1.040121439	-0.18381584	0.92565915
Cash Offer	0.209648355	0.178204804	1.176446143	0.25095397	-0.158148285	0.577444994	-0.095239052	0.514535761
Tender Offer	0.127746856	0.184218805	0.693451767	0.494683254	-0.252462071	0.507955782	-0.187429796	0.442923508
R&D Growth	0.080974144	0.039689731	2.040178713	0.052483091	-0.000941434	0.162889722	0.013069695	0.148878593
R&D Investment Ratio	0.155934262	1.179137567	0.132244334	0.895893506	-2.277686066	2.58955459	-1.861431071	2.173299595

Figure 8. Independent Variable Regression Summary Statistics

Noticeably the R&D Growth statistic proved to be statistically significant, and the R&D Investment Ratio was the least significant of all metrics calculated. These will be explored further in the following sections.

R&D Growth

R&D growth was the only variable to have statistically significant T Stat and P-Value figures in comparison to the 2.00 and 0.10 levels respectively set in the previous chapter. Below is the R&D Growth Line Fit Plot from the multivariable regression as well as a chart showing a linear regression between the metric and Premium Paid:

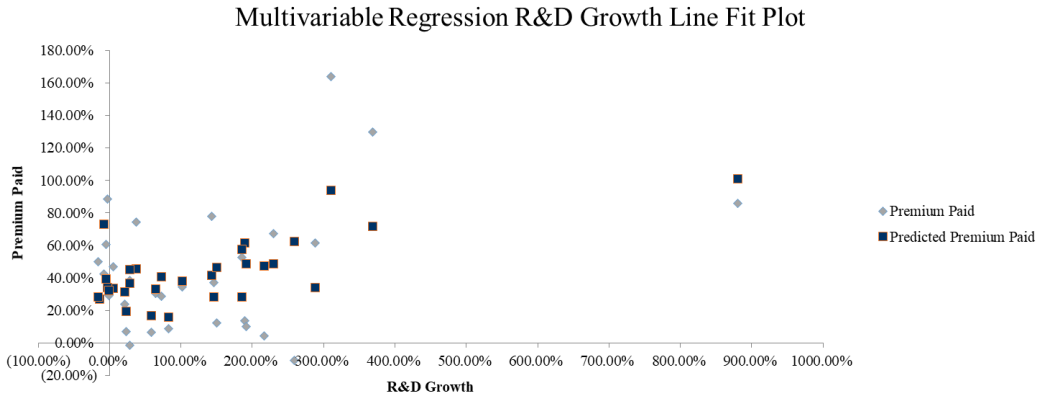

Figure 9. Multivariable Regression R&D Growth Line Fit Plot

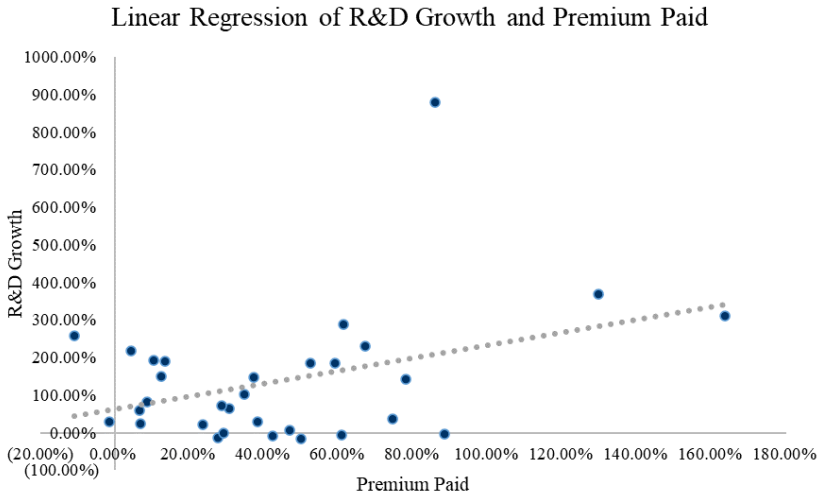

Figure 10. Linear Regression of R&D Growth and Premium Paid

R&D Investment Ratio

The R&D Investment Ratio was the weakest variable in the study with a T Stat of .13 and a P-Value of .90. Below is the R&D Investment Ratio Line Fit Plot from the multivariable regression as well as a chart showing a linear regression between the metric and Premium Paid:

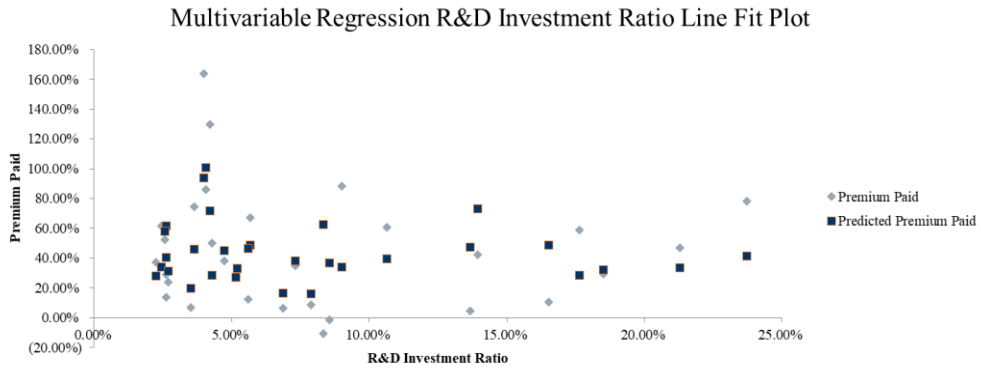

Figure 11. Multivariable Regression R&D Investment Ratio Line Fit Plot

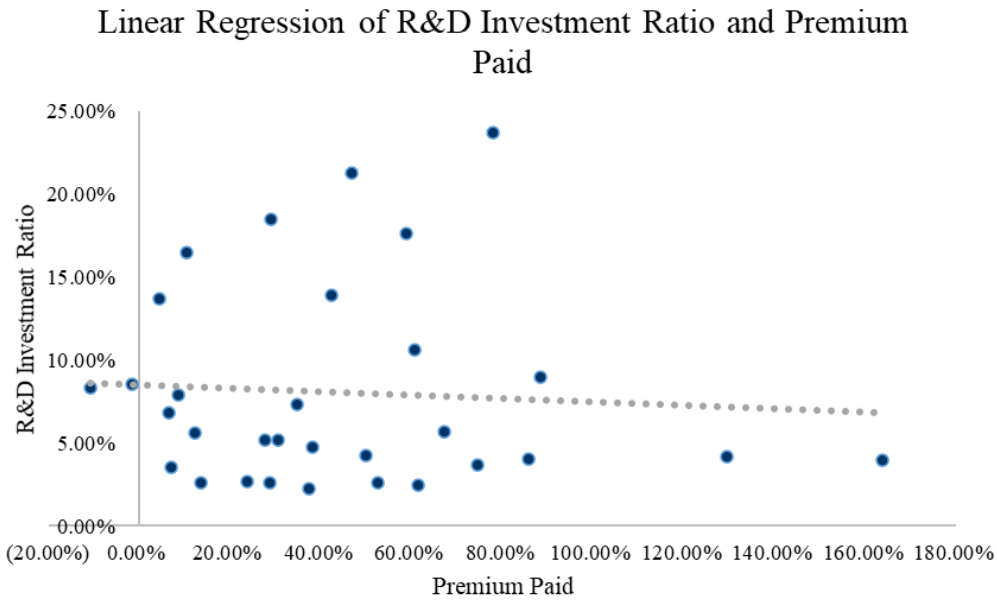

Figure 12. Linear Regression of R&D Investment Ratio and Premium Paid

ANALYSIS AND APPLICATION OF STUDY

Hypothesis Evaluation

Ultimately, the initial hypothesis is rejected. The Recurring Revenue Metric showed a slightly negative correlation with the Premium Paid. This is likely due to the inaccurate measure of recurring revenue used to measure the importance of the metric to each individual firm. Additionally, due to the popularity of recurring revenue increasing more drastically in years after the COVID pandemic, the Recurring Revenue Metric yielded less optimal results for companies acquired between the start of the sample period and the COVID pandemic. Although the majority of companies in this sample utilized recurring revenue business models, the importance placed on the model in earnings calls was far less in years prior to COVID. Finally, the result of the Recurring Revenue Metric not being statistically significant and of smaller magnitude comparably to the control variables was in-line with the hypothesis apart from the R&D Investment Ratio.

The expectation that the two control variables mentioned in Laamanen (2007) showing higher significance than the others was accurately represented by the R&D Growth metric, but not the R&D Investment Ratio. The R&D growth metric results align with previous research as acquirors would highly value companies that have been successful in increasing R&D efforts as the acquiror would ultimately be able to better reallocate the benefits of the finalized product in comparison to the smaller firm (Bradely, Desai, and Kim 1988). The R&D Investment Ratio did not align with previous research largely due to two specific companies with larger premium paid amounts. Despite significant R&D growth, ExactTarget, Inc. and Demandware, Inc. both had low levels of R&D Investment in contrast to their market values. Interestingly, both of these companies were acquired by Salesforce.com, Inc. which may provide insights into that specific

acquiror's strategy. It could be possible that Salesforce.com, Inc. targets firms who have the potential to increase R&D more, but may not be able to at the moment due to other financial constraints such as high interest rates for borrowing or previously high levels of debt.

Finally, the remaining control variables did all demonstrate positive correlations and at a lower statistical significance than the R&D Growth technology-focused variable. These variables have been proven in academia many times before and are the status quo for M&A deal premiums.

Application of the Results

Implementing the results of the study would encourage potential acquirors of technology-focused companies to not pay higher premiums for firms that talk heavily about recurring revenue in non-GAAP reporting. It could be possible that the firms making the attempt to heavily talk about recurring revenue are believing that speaking about that business model will inflate the value of their business, as mentioned in many of the online articles (Eyamie 2021, Tice 2022, Miller 2023), when the underlying business is not worth as much.

Ultimately, the outcome of the results would encourage acquirors to target firms with growing R&D operations as the larger firm will be able to better reallocate the final product developed from that research. This would align with the premiums seen in "U.S.: Average M&A premiums by industry 2018" as the intellectual property of Healthcare and Technology companies can be disruptive to more widespread established industries and patented for longer periods of time.

Shortcomings of Data and Methodology

The largest data limitation was the lack of consistency in procuring the Recurring Revenue Metric. Utilizing the earnings call transcripts yielded results for many firms as it was a point of emphasis for their valuation; however, many businesses did not mention or calculate recurring revenue metrics despite having that form of revenue stream. Ultimately, one of the most critical factors relating to the success of the Recurring Revenue Metric was the date of acquisition. Companies that were acquired after the pandemic typically yielded better results for the Recurring Revenue Metric.

In addition to the Recurring Revenue Metric, the dataset itself was severely filtered due to benefits of simplicity for choosing the United States as the Target and Acquiror country. However, one of the biggest setbacks in the dataset generation was the need to calculate the equity value of the Acquiror for the Relative Size metric. This had a drastic impact on the dataset forcing nearly all financial sponsors out of the final sample. Before including the equity value for Acquiror requirement, the sample was nearly five times the size.

Due to the restrictions of the sample size, the methodology itself was subjected to much higher standard error values that majorly disrupted the ability to find statistically significant results for any of the variables.

Extension of the Study

For future analysis, any ability to procure more accurate readings of recurring revenue would benefit this study greatly. Relying so heavily on earnings call transcripts proved to be beneficial for some companies but was very biased to more recent years as the trend of speaking about recurring revenue has gained traction only more recently. Additionally, if the sample size

were to be increased, through expanding into differing sectors or including more years, then the likelihood of more significant results would increase greatly. Finally, the ability to combine these two suggestions to perform this analysis on only post-COVID years and in more sectors would increase the legitimacy of the Recurring Revenue Metric and the number of deals that had the ability to be sampled.

Additionally, finding a method to keep financial sponsors as Acquirors in the dataset would benefit the application of this study greatly. The need to have Acquiror equity value for the Relative Size metric was detrimental to the sample size. For the purpose of this analysis, with the large amount of Technology Private Equity deals exist, it could be argued that changing the method the Relative Size metric from the control variables is calculated would be beneficial. Although doing so increases the probability of error as it does not align with previous academic research, the benefit of including financial sponsors far outweighs this cost. It could be possible to repeat previous studies that included this control variable with alternatives and determining an adequate replacement that could be applied in this study.

It is believed that the hypothesis of recurring revenue positively impacting deal premiums has merit to it, but the fallacy of the data collected contributed to the non-statistically significant results of the regression. Future papers with the proper means of data collection should attempt to understand if the valuation of recurring revenue is legitimate for its long-term implementation, or if it is an investor fad that may generate a bubble, such as the dot-com bubble of 2000 or potentially the AI trends of today. The ability to understand the full implications of recurring revenue has a significant impact on future technology M&A deals.

CONCLUSION

The large amount of current investor sentiment regarding recurring revenue would suggest the importance of the business model being able to increase deal premiums. Online articles and Investment Bank sales methodology all agree that recurring revenue increases a company's ability to be sold at a higher price. Despite the prevalence of this sentiment, there is no academic research that explores the effects of recurring revenue on M&A deal premiums.

Ultimately, the results were indicative of no significant relationship between the importance of recurring revenue in a company's business model to its final deal premium. The control variables, and specifically R&D Growth, from previous academic research were much more important to the calculation of the final deal premium. The results of this study broadly support previous academic research but show contrast with current investor sentiment regarding the importance of recurring revenue.

From this study, it was determined a company's willingness to continually mention recurring revenue in earnings calls may be indicative of desperation for a higher valuation rather than one that is truly deserved. However, considering the lack of legitimately for the Recurring Revenue Metric and small sample size, more research should be done to confirm these findings. Further studies should focus on developing a more legitimate Recurring Revenue Metric as well as expand the study to include more sectors and financial sponsors as acquirors as well. The importance of recurring revenue to investors has been growing and, in contrast to the findings of this paper, will likely continue to develop as a critical piece of business valuation in the coming years.

BIBLOGRAPHY

Andrade, Gregor, Mark Mitchell, and Erik Stafford. 2001. "New Evidence and Perspectives on Mergers." *Journal of Economic Perspectives*, 15(2): 103-120.

Boone, A. L., & Mulherin, J. H. (2007). How Are Firms Sold? *The Journal of Finance*, *62*(2), 847–875.

Boone, A.L. and Harold Mulherin, J. (2008) "Do auctions induce a winner's curse? New evidence from the corporate takeover market." *Journal of Financial Economics*, 89(1): 1–19.

Bradley, M. Desai, A. and Kim, E (1988) "Synergistic gains from corporate acquisitions and their division between the stockholders of target and acquiring firms." *Journal of Financial Economics*, 21(1): 3-40

Cohen, R. M. (2012). "Characteristics Of Mergers And Acquisitions In The Technology Driven Sector." Cluj-Napoca: Babes Bolyai University.

Eaton, G.W., Liu, T. and Officer, M.S. (2021) "Rethinking Measures of Mergers & Acquisitions Deal Premiums." *Journal of Financial and Quantitative Analysis*, 56(3): 1097–1126.

Eyamie, T. *(2021).* Why Recurring Revenue Increases Your Business Valuation. *Stax Bill*. Retrieved December 12, 2023, from https://staxbill.com/recurring-revenue-increases-business-valuation/

Goodbread, J. (2023, October 27). Council Post: The Truth About Recurring Revenue. *Forbes*. Retrieved February 17, 2024, from https://www.forbes.com/sites/forbesfinancecouncil/2023/10/27/the-truth-about-recurring-revenue/

Haleblian, J., & Finkelstein, S. (1999). The Influence of Organizational Acquisition Experience on Acquisition Performance: A Behavioral Learning Perspective. *Administrative Science Quarterly*, *44*(1), 29–56.

Huang, Y.-S. and Walkling, R.A. (1987) "Target abnormal returns associated with acquisition announcements: Payment, acquisition form, and managerial resistance." *Journal of Financial Economics*, 19(2): 329–349.

Jarrell, G. A., & Poulsen, A. B. (1989). "The Returns to Acquiring Firms in Tender Offers: Evidence from Three Decades." *Financial Management*, 18(3): 12–19.

Laamanen, T. (2007)." On the Role of Acquisition Premium in Acquisition Research." *Strategic Management Journal*, 28(13), 1359–1369.

M&A in a post-COVID world. (2022, May 19). *Grant Thornton*. Retrieved February 15, 2024, from https://www.grantthornton.com/insights/articles/advisory/2022/ma-in-a-post-covid-world

Miller, T. (2023, March 28). Selling the Recurring vs. The Non-Recurring Revenue Business. *TKO Miller*. Retrieved December 12, 2023, from https://www.tkomiller.com/blog/selling-the-recurring-vs-the-non-recurring-revenue-business

Mitchell, M.L. and Mulherin, J.H. (1996) The Impact of Industry Shocks on Takeover and Restructuring Activity. Journal of Financial Economics, 41, 193-229.

Moore, K. (2022, April 30). Global M&A Activity in Q1 2022 Following Staggering Growth in 2021. *E-Crypto News*. Retrieved February 17, 2024, from https://e-cryptonews.com/global-ma-activity-in-q1-2022-following-staggering-growth-in-2021/

Nellis, S. (2024, February 2). Apple iPhone target is billions short of Wall Street's as China sales lag. *Reuters*. Retrieved March 4, 2024, from https://www.reuters.com/technology/apple-quarterly-profit-revenue-top-wall-street-targets-china-lags-2024-02-01/

Palich, L. E., Cardinal, L. B., & Miller, C. C. (2000). Curvilinearity in the Diversification-Performance Linkage: An Examination of over Three Decades of Research. *Strategic Management Journal*, *21*(2), 155–174.

Sirower, M.L. and Sahni, S. (2006) "Avoiding the "Synergy Trap": Practical Guidance on M&A Decisions for CEOs and Boards." *Journal of Applied Corporate Finance*, 18(3): 83–95.

Schwert, W.G. (2000) "Hostility in Takeovers: In the Eyes of the Beholder" *Journal of Finance*, 55(6): 2599-2640.

Tice, C. (2022, September 21). Recurring revenue: Why it's the gold standard when you sell, plus how to lean into this model. *They Got Acquired*. Retrieved December 12, 2023, from https://theygotacquired.com/resources/recurring-revenue/

The Role of an Investment Bank in Positioning Your Business. (n.d.). *Vista Point Advisors.* Retrieved March 4, 2024, from https://vistapointadvisors.com/perspectives/role-investment-bank-positioning

The Subscription Economy Index. (2023 March). *Zuora.* Retrieved February 17, 2024, from https://www.zuora.com/wp-content/uploads/2023/03/Zuora_SEI_2023_Q2.pdf

Trautwein, F. (1990). Merger Motives and Merger Prescriptions. *Strategic Management Journal*, *11*(4), 283–295.

U.S.: Average M&A premiums by industry 2018. (n.d.) *Statista*. Retrieved March 15, 2024, from https://www.statista.com/statistics/978494/average-premiums-in-the-united-states-by-industry/

Zambonin, B. (2022, July 25). How Apple Stock Could Top A $3 Trillion Market Cap, According To This Expert. *Apple Maven*. Retrieved March 4, 2024, from https://www.thestreet.com/apple/apple-services/how-apple-stock-could-top-a-3-trillion-market-cap-according-to-this-expert

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EDUCATION

The Pennsylvania State University | Schreyer Honors College — **University Park, PA**
Smeal College of Business | B.S. in Finance — Graduation May 2024
The College of the Liberal Arts | Minor in Economics

RELEVANT EXPERIENCE

Financial Technology Partners / FT Partners — **New York, NY**
Incoming Investment Banking Analyst — *Jan 2025*
Investment Banking Summer Analyst — *Jun 2023 – Jul 2023*
- Completed a final project that consisted of converting customer data of a client into a three-statement financial model as well as the generation of DCF, precedent transaction, and comparable company analyses that were presented to a team of senior bankers at the firm
- Completed comprehensive training through Wall Street Prep and on-site programs to better support the firm as a junior analyst
- Collaborated with deal team in fulfilling client analysis requests through mediums of Excel, PowerPoint, and S&P Capital IQ

Nittany Lion Fund, LLC — **University Park, PA**
Fund Manager | Consumer Discretionary — *Apr 2021 – May 2023*
- Managed Consumer Discretionary portfolio valued at ~$1.70 MM within Penn State's ~$14.00 MM private investor capital, student-run investment fund by publishing daily trading emails, earnings report filings, and equity pitches with a goal of outperforming the S&P 500
- Completed an M&A analysis for Amazon.com, Inc. (AMZN) and The Trade Desk, Inc. (TTD) as well as an LBO for Kohl's Corp. (KSS) that included three-statement models, discounted cash flow valuations, and deliverables with key drivers for transactions
- Developed strong quantitative skills using the discounted cash flow valuation to discover undervalued holdings in the sector
- Presented forward-looking individual and group stock pitches for numerous companies to be critiqued and voted on by Fund Managers

Director of PSIA — *Jan 2023 – May 2023*
- Led the 200-member Penn State Investment Association and presented educational sessions pertaining to finance at weekly meetings
- Organized two new initiatives to improve awareness of organization as well as retention of members throughout semester

Director of Compliance — *May 2022 – Aug 2022*
- Oversaw measurement and tracking of compliance measures for the Fund through the directed use of portfolio analytics and composed a weekly announcement that issued allocation guidance for Fund Managers in their respective portfolio structuring efforts

Director of Weekly Reports — *Aug 2021 – Dec 2021*
- Improved cooperative, analytical, and Excel skills by compiling weekly reports on the 11 sectors of the S&P 500 for investors

PPG Industries — **Pittsburgh, PA**
Corporate External Reporting Intern — *May 2022 – Jul 2022*
- Demonstrated strong application of GAAP accounting concepts in development of 10-Q and 11-K financial reporting documents to be filed with the Securities and Exchange Commission as well as submitted to C-Suite executives for 2Q2022
- Forecasted future implications of carbon pricing on internal decision-making through quantitative research and modeling in Excel

LEADERSHIP EXPERIENCE

Penn State Interfraternity Council/Panhellenic Dance Marathon™ — **University Park, PA**
Finance Director — *Apr 2023 – Apr 2024*
- Worked as one of 16 Directors in the world's largest student-run philanthropy committed to enhancing the lives of children and families battling pediatric cancer while providing funding for critical research through its sole beneficiary Four Diamonds
- Led a committee of 23 Captains and 100 Committee Members to securely process all monetary donations received throughout the fiscal year in an effort to uphold the financial integrity of THON 2024's fundraising total of $16,955,683.63
- Analyzed propriety data from DonorDrive for thousands of donations to develop presentations for the Executive Committee to lead the creation of new campaign initiatives throughout the year and enhance peer-to-peer fundraising incentives
- Created THON 2024's budget to manage expenses for 16 committees to ensure an operational fundraising efficiency of 95%

Assistant Treasurer — *Apr 2022 – Apr 2023*
- Tracked organizations' fundraising efforts throughout the year to assist in calculating THON 2023's fundraising total of $15,006,123.46
- Wrote organization-wide messaging for solicitations and events as well as cultivated the target audiences for all messages sent
- Calculated THON's fundraising total for its 17 day Dream Forward campaign from 28 different sources amounting to $1,266,034.16
- Selected amongst Captains to help lead THON's End of Year giving campaign utilizing fundraising initiatives to increase donations

First-Year Committee Captain — *Dec 2021 – Mar 2022*
- Led 30 first-year volunteers, promoting fundraising, and delegating responsibilities to spur donations through effective strategies

Administrative Assistant — *Sep 2021 – Mar 2022*
- Managed THON 2022's budget, tracking expenses of committees and events, with the use of Excel to streamline cash disbursements

HONORS & INTERESTS

- **Honors:** The Evan Pugh Scholar Award, The President Sparks Award, The President's Freshman Award, Schreyer Academic Excellence Scholarship, Wilmer & Patricia Harris Honorary Scholarship, National Guard Service Before Self Award
- **Interests:** Competitive soccer and volleyball, basketball, weight training, spikeball, ultimate frisbee, healthy cooking, Rubik's Cube