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THE 'IMMORALITY PREMIUM' AND THE RELATIVE UNDERVALUATION OF SIN STOCKS

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ABSTRACT

This thesis investigates various categories of sin stocks and thus brings to light up-to-date findings and patterns within the "dark" side of stock market investing. Institutional and private investors may cite a moral obligation to avoid investing in companies that deal with alcohol, tobacco, defense, gambling, and adult entertainment; however, this study demonstrates how moral tendencies can lead them to sacrifice potentially higher financial returns. The returns produced by sin stocks are averaged, risk-adjusted, and used in conjunction with the Capital Asset Pricing Model to provide a more accurate estimation of expected returns due to the atypical behavior of sin stocks and, consequently, their relative undervaluation. The broad analysis of current sin stock returns and risk measures against the stock market index serves to accomplish two principal functions: the first mission is to modernize the previous research on the subject that was based on outdated information in order to determine if the trends of the past research are still relevant and applicable today; the more important objective, however, is that the newly discovered CAPM formula modification will provide a strong starting point for supplementary research and more rigorous statistical analysis geared at uncovering further abnormalities within the realm of sin stocks.

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Chapter 1

Introduction

In the world of financial analysis and investments, accurate valuation models have always been of paramount importance in regard to correctly pricing equities and treasuries. Investors that are able to accurately forecast their expected returns are able to take advantage of other investment opportunities and potentially earn even greater returns. Modern portfolio theory is dependent on an investor making rational decisions based on statistics and basic financial principles. In line with this theory, most investors currently hold portfolios comprised of several different securities, mutual funds, electronically traded funds, and government bonds in order to take advantage of the benefits of diversification and maximize their utility.

Behavioral finance theory acknowledges that investors frequently leverage personal preferences, beliefs and intuitions to influence their investment decisions even though these biases can cause an investor to make statistically irrational decisions. In turn, the investor's emotional biases or cognitive errors can cause him to lose money (negative returns) or create an instance where he suffers an opportunity cost (equal risk, greater return possibility).

The common set of values held by the population translates into the social norms that govern society, which are often reflected in an investor's decision-making strategies. When a company manufactures a product that violates social norms or the company is associated with an activity that violates social norms, they are frowned upon by most of society and thus labeled as a sin stock. Due to emotional biases, investors generally avoid sin stocks to subsequently avoid the stigma associated with 'giving bad companies capital to do more bad things.' The

availability of sin stocks in the market combined with the population's interest in aligning their investment strategies with social norms creates a gap in the stock market. This disparity between sin stocks and non-sin stocks leads to divergence from some common valuation models and causes the sin stocks to behave differently than would be expected from a non-sin stock of similar capital structure and risk. This research study will focus on establishing a connection between the market index and sin stocks, in terms of risk and returns, and utilizing this information to construct a pricing model to estimate the expected returns of sin stocks. The goal of this model is to ultimately assist in closing the gap of the unknown that separates sin stocks and non-sin stocks.

Chapter 2

Literature Review

The Capital Asset Pricing Model and Modern Portfolio Theory

The Capital Asset Pricing Model (CAPM) is a theory that was discovered and published in the 1960s by William Sharpe and is used for calculating the expected return of an investment given the risk-free rate and the systematic risk of the portfolio assuming that the specific risk of individual securities have been diversified away. There are limitations to the theory due to the following underlying assumptions: there are no taxes or transaction costs, all investors have identical investment horizons, and all investors have the same opinions on expected returns, volatilities, and the correlation of available investments (Nyakudya). Despite these limitations, the linear nature of the theory makes it efficient and simple to quickly identify broad stock market patterns and subsequently abnormalities therein.

Harry Markowitz's modern portfolio theory suggests that investors should maximize their returns while minimizing risk by splitting their total investment between a well-diversified portfolio stocks and treasury securities based on a ratio determined by their level of risk aversion. Calculating the volatility of a security is most frequently and straightforwardly accomplished through regressions and analysis of historical price and trading data, however this is only an estimation of possible future volatility and not a guaranteed, forward-looking metric. When the particular fluctuations of a stock's returns are correlated with the returns of the market index, this correlation combined with the standard deviations of returns allows the investor to estimate the

overall riskiness of the stock relative to the market in a volatility measure known as beta. In alignment with the risk and return relationship, the Capital Asset Pricing Model suggests that the arbitrage process will decrease the returns of low beta stocks and increase the returns of high beta stocks until an equilibrium point is reached, and in combination with constant trading and the incorporation of new information, the markets will be kept in this equilibrium ("*Tutorial: The Capital Asset Pricing Model*").

The Capital Asset Pricing Model is not perfect tool, however it does provide a general point of reference in which deviations from the norm can be easily be observed. The variables and coefficients required for further analysis and calculations based upon CAPM are straightforward and will provide a relevant starting point for further and more in-depth analysis and investigation.

Socially Responsible Investing

Given current market trends and concentrated efforts towards sustainability and corporate social responsibility, it is important to recognize the boom in socially responsible investing (SRI). According to Jacquelyn Humphrey and David Tan, socially responsible investments are selected based on a screening process that considers non-financial issues and is therefore more dependent on behavioral finance. If a firm is positively screened, it means that the company has desirable characteristics, such as environmentally friendly products, good customer service, community involvement, etc. and will therefore be included in the investment portfolio. Negative screening excludes firms that are involved in undesirable activities that go against social norms, such as alcohol, tobacco, gambling, and defense (Humprey, Tan 2014). Firms that

engage in positive activities are said to be at a competitive advantage to firms that do not because it enables them to attract superior management and employees that have good relationships within the communities in which they operate, thus leading to higher firm profitability and superior returns (Lado and Wilson 1994; Turban and Greening 1997). To the contrary, however, it has been observed that negative screening reduces returns and increases risk because investors forego potentially profitable opportunities by excluding stocks from their portfolios on non-financial grounds (Adler and Kritzman 2008; Fabozzi et al 2008; Statman and Glushkov 2009). A recent study conducted by Gunther Capelle-Blancard and Stephanie Monjon reinforces these findings and concludes that higher sector-specific screening intensity reduces risk-adjusted returns (Capelle-Blancard and Monjon 2014).

The History of Sin Stocks

The most common sectors that are screened out of portfolios are firms involved in the alcohol, tobacco, sex, gambling and defense industries. Stocks in these companies have been collectively referred to as sin stocks. These companies either manufacture products or are involved with actions that are thought, at least by the majority of people, to violate social norms. Hong and Kacperzyk observed that specifically in the case of sin stocks, some investors are willing to pay an economic opportunity cost by foregoing higher returns to uphold their social norms (Hong and Kacperzyk 2007). Consistent with this study, "*Sin Stock Returns"* by Frank Fabozzi further supports Hong and Kacperzyk's results and recognizes the presence of a return premium, beyond the difference in underlying fundamentals in sin stocks, therefore making it clear that there is an economic benefit associated with investing in sin (Fabozzi et al. 2008).

Hong and Kacperzyk argue that the recent growth of the socially responsible investment class is what has led to sin stock neglect and therefore the cheap price of sin stocks. Furthermore, they concluded that there is significantly less analyst coverage of sin stocks because institutional ownership in sin stocks is less than that of institutional ownership in comparable stocks. Specifically, institutional ownership in sin stocks is 18% less than institutional ownership in non-sin stocks because institutions may have policies against investing in sin stocks or just do not want to be associated with sinful activities (Hong and Kacperzyk 2009; Egan 2013).

Under the assumption that markets are efficient, the relative advantage of sin stocks should have been arbitraged away fairly quickly and should no longer exist, however that is not the case. Brian Borzykowski comments that even though sin stock companies sell products that are bad for your health or exploit human weaknesses, they can provide investors with hard-to-find income in today's low interest rate environment. In addition, because the usual income-generating sectors (utilities, telecoms and pipelines) are now so expensive, neglected sin stocks are generally cheaper yet they still pay a hefty yield and are as safe as any large-cap stock. These stocks also provide some protection against a market crash and recession because history has shown that alcohol and tobacco will be bought regardless of the economic outlook. Borzykowski continues to suggest that sin stocks do not just provide safety today, but also have long-term potential. Keith Summers, a portfolio manager at Tricoastal Capital Management explains the hierarchy of sin when it comes to these stocks, "The more damaging the vice is to the body, the better it is for the portfolio." (Borzykowski 2012). Of the sectors of sin stocks, gambling is the riskiest because it is extremely susceptible to economic ups and downs, and has become too dependent on discretionary spending (Borzykowski 2012; Fabozzi et. al 2008). In respect to sin stocks, dividend yield is more important than price to earnings ratio as a valuation

tool because in today's low-return environment, paying a little more for a high-yielding and growing investment makes sense (Borzykowski 2012).

In a more quantitative approach, Larry Fauver and Michael Mcdonald calculate that sin stocks have an 8% lower Tobin's Q which means that the firm's are undervalued in relation to their assets (Fauver and Mcdonald 2014). Neglect on moral grounds impacts a firm's equity returns and a sin stock portfolio produces an annual return of 19%, which significantly outperforms common benchmarks and the market in terms of both, risk and return (Fabozzi et al 2008). Fauver and Mcdonald demonstrate that sin stocks are relatively larger as measured by assets and have greater free cash flows to assets on average. This translates into greater growth opportunities because capital expenditures to sales ratios are higher. Fauver and Mcdonald also indicate that the potential sin stock premium does not result from the small stock premium because sin stocks are larger than most non-sin stocks. This data makes CAPM a more relevant measure than Fama and French's three-factor model due to the fact that the former "utilizes size and value factors in addition to the market risk factor in CAPM, realizing that value and small cap stocks outperform markets on a regular basis" ("*Fama and French Three Factor Model Definition").* It is important to note that the abnormal behavior exhibited by sin stocks is only observable in nations where sin stocks are considered sinful (like the United States). The average sin firm's Tobin Q is 8% lower and this is economically significant (Fauver and Mcdonald 2014).

The VICEX fund is a 5-star rated mutual fund comprised entirely out of sin stocks and was founded in 2002. Upon comparison with the S&P 500 as a benchmark, one can clearly see that this equally risky (beta of slightly less than 1) fund outperforms the market with a 9.36% average annualized return compared to the 6.5% average annualized return of the S&P 500

(Egan 2013). This disparity is what originally led me to investigate further into the realm of sin stocks. While the above studies provide valuable information regarding sin stocks and their returns, they fail to deliver a way to quantitatively estimate the returns that can be generated by sin stocks. There is evidence that sin stocks have outperformed the market in the past, however this research is lacking in specifying an average return premium (which I will call an "immorality premium" because it signifies an investor's willingness to invest against social norms) and incorporating it into a dedicated sin stock pricing model.

This research study will result in an extension and slight modification of CAPM tailored specifically for portfolios comprised of sin stocks in the following categories: alcohol, tobacco, gambling, defense, and adult entertainment. The foundation of the CAPM will remain similar to the original but will incorporate a weighted factor depending on the composition of the sin portfolio in order to account for the inherent undervaluation of these stocks, more accurately forecasting the expected returns of sin stocks.

Chapter 3

Constructing a Portfolio of 'Sin'

In order to run regressions to determine the behavior of the sin industry relative to the market as a whole, it is important to first select and screen the sample securities. After the sample stocks are selected they will be sorted into their respective categories, also referred to sectors: Alcohol, Gambling, Defense, Tobacco, and Adult Entertainment. Within each sector, the data will be compared to the S&P500 Index in various methods, and the resulting outputs will lead to more knowledge about the performance and risks of these sin stocks. Since the literature focused on sin stocks is scarce, the majority of research is outdated and several questions still exist concerning sin stocks. For example, will these sin stocks behave the same as they have in the past? Will the sin stocks generate excess returns on a risk-adjusted basis? If so, how much do they return and do these returns vary between the different categories of sin? Are there better or worse sin categories for risk/return tradeoff? Are there enough sin stocks available to make specific sin portfolios worthwhile for an investor?

Due to the fact that no true classification as sin exists in the Global Industry Classification Standard or the Bloomberg Industry Classification System, I will narrow down the sample from within several broader category classifications. The first subsector of sin investigated alcohol, in which I found the broader list of Brewers, Wineries, and Distillers of Spirits. Of these choices, I further collapsed the sample to include stocks available in the United States so that the securities will be thought to violate social norms and therefore exhibit different

characteristics from non-sin stocks. With these boundaries in consideration, I completed the "Alcohol" section of the sin portfolio, as shown below.

Table 1 Alcohol Sin Stocks

Alcohol	
Company Name	Ticker
Anheuser Busch InBev	BUD
Boston Beer Company Inc	SAM
Brown-Forman Corp	BF.A
Constellation Brands	STZ
Craft Brew Alliance	BREW
Diageo PLC	DEO
Leucadia National Corporation	LUK
Molson Coors Brewing Company	TAP
Willamette Valley Vineyards. INC	WVVI

Identifying the Alcohol securities was straightforward, however identifying the stocks for the Defense and Weapons category required much more deliberation, as not all of the companies within the GICS classification of Aerospace and Defense actually manufacture weapons or munitions.

After investigating the potential securities to be listed within the Defense category of the sin stocks in the sample, I made sure that all of the referenced companies were involved either entirely or partially in the production or assembly of weapons, weapon technology, or munitions.

Table 2 Defense Sin Stocks

Defense	
Company Name	Ticker
Boeing	BA
General Dynamics	GD
General Electric	GE

IBM	IBM
ITT Corp	ITT
KBR Inc	KBR
Northrop Grumman	NOC
Oshkosh	OSK
Raytheon Company	RTN
Smith and Wesson Holding Corp	SWHC
Sturm, Ruger and Co. Inc	RGR
United Technologies Corporation	UTX

Selecting the stocks for the Tobacco subsector yielded the following results.

Table 3 Tobacco Sin Stocks

Tobacco	
Company Name	Ticker
Altria Group Inc	MO
Alliance One	AOI
Lorillard Inc	LO
Phillip Morris International	PM
Reynolds American Inc	RAI
Schweitzer-Mauduit International Inc	SWM
Universal Corporation	UVV
Vector Group LTD	VGR

Determining which companies to include in the sample for Casinos and Gambling was restricted due to the fact that a large amount of the sample was recently reduced due to mergers and acquisitions or casinos going private. The final securities selected under Gambling are listed below.

Table 4 Gambling Sin Stocks

Gambling	
Company Name	Ticker
Caesars Entertainment	CZR
Churchill Downs	CHDN
Full House Resorts Inc.	FLL
Gaming and Leisure Properties Inc	GLPI

International Game Technology	IGT
Las Vegas Sands Corp	LVS
Melco Crown Entertainment	MPEL
MGM Resorts International	MGM
Monarch Casino and Resort Inc	MCRI
Penn National Gaming Inc	PENN
Pinnacle Entertainment	PNK
Scientific Games Corp	SGMS
Wynn Resorts	WYNN

The only remaining public company involved primarily with Adult Entertainment is Rick's Cabaret which underwent a name change to RCI Holdings.

Table 5 Adult Entertainment Sin Stocks

Adult Entertainment	
Company Name	Ticker
RCI Holdings	RICK

The analysis and selection of the sample sin stocks for data examination returned a total of 43 different companies that are involved in business generally thought to violate the social norms of United States culture and way of life. This is a sufficient sample size and also evenly spread among the four major sin categories of Alcohol, Tobacco, Gambling and Defense. This sample size is also consistent with the sample sizes of sin stocks used in prior research studies.

Chapter 4

Methodology and Data Collection

After the sample of sin stocks was selected, the investment horizon was specified to span ten years, starting on January 1st, 2005 and ending December 31st, 2014. The reason for this holding period was to include approximately the same amount of time before and after the financial crisis of 2008 and to investigate a new holding period that was not considered in previous research. This holding period will help to observe the effect of the stock market crash on the behavior patterns of the sin stocks, since the previous research and literature asserts that the sin stocks are more resistant to a recession.

I extracted the month-to-month returns over the investment horizon using the FactSet API Excel Add-In for each individual company and also the S&P500 Index. After collecting the total compound returns, since high dividends and splits are a fundamental of sin stock returns, I ran a regression of the monthly returns to determine the monthly standard deviation of returns. This monthly standard deviation was calculated utilizing the excel function and the array of returns of the sin stocks and the S&P500 Index. After calculating the standard deviations, I used the correlation function between the monthly sin stock returns and the S&P500 returns to help me determine the 10-year, monthly betas of the sin stocks. Using the formula below, I was able to determine the relevant stock betas for each of the sin firms since they are necessary for calculating Jensen's Alpha and the Treynor Ratio.

Figure 1 Beta Formula

$$\beta_i = \frac{COV_{im}}{\sigma_m^2} = \frac{\rho_{im}\sigma_i}{\sigma_m}$$

Using the market values of each of the companies as their weights for each respective sin category, I used this general method to estimate the relative performance of the sin stocks. In order to avoid negative equity risk premiums, I imported Damodoran's calculated equity risk premiums from his research into the spreadsheet and aligned the premiums with the respective months to which they correlated. The Jensen's Alpha and Treynor Ratios for each individual subsector and for the entire value-weighted portfolio of all sin stocks were calculated using the formulas below.

Figure 2 Jensen's Alpha

$$Jensen\ \alpha = R_p - r_f - \beta_p\left(b - r_f\right)$$

Figure 3 Treynor Ratio

$$Treynor\ Ratio = \frac{r_p - r_f}{\beta_p}$$

The outputs from these formulas were utilized to plot data points on a graph using the security market line of the S&P500 Index as a benchmark. The principal assumption is that

points above the security market line indicate a natural undervaluation and points lying below the line indicate an overvaluation. Additional investment opportunity horizons were constructed for each sin category and the entire portfolio of all value-weighted sin stocks. Finally, a pivot table was created where an investor would be able to estimate his investment opportunities by changing the contributing weights of each individual sin category to the entire sin portfolio. The alpha calculated for each individual sin category multiplied by the contributing weight to the final sin portfolio combined with the average riskiness of the portfolio will be the new way to more accurately estimate the returns generated by these sin stocks.

After completing the regressions for the Alcohol, Tobacco, Gambling, Defense, and Adult Entertainment portfolios as separate entities, I combined them in a value-weighted portfolio and compared it to the S&P500 market benchmark. Below is a truncated example of the spreadsheet layout used to collect and analyze the historical prices from the FactSet Excel Add-In. Each row represents one month starting 1/1/2005 and ending 12/31/2014. Willamette Valley Vineyards Inc. (WVVI) returns for the first two years of the holding period are shown below. The columns next to the WVVI stock returns are the S&P500 Index returns, the monthly Treasury bill return for the 3 month-note, and Damadoran's equity risk premium.

Table 6 Monthly Returns and Standard Deviation Example

Monthly Returns and Standard Deviations					
Ticker	Ticker	S&P Index	S&P Index	Monthly t-bill return (3M)	Damadoran's
WVVI	WVVI	SP50-SPX	SP50-SPX	T-BILL	Risk Premium
Monthly Returns	STD. DEV	Monthly Returns	STD. DEV		
0.5%	0.093322	(2.5%)	0.0422	0.207%	0.3%
5.1%		1.9%		0.227%	0.3%
(0.6%)		(1.9%)		0.228%	0.3%
9.3%		(2.0%)		0.237%	0.3%
16.7%		3.0%		0.244%	0.3%
(1.0%)		(0.0%)		0.255%	0.3%
(4.0%)		3.6%		0.278%	0.3%
9.2%		(1.1%)		0.287%	0.3%
21.2%		0.7%		0.289%	0.3%
14.7%		(1.8%)		0.324%	0.3%
1.8%		3.5%		0.322%	0.3%
(16.5%)		(0.1%)		0.333%	0.3%
40.8%		2.5%		0.364%	0.3%
2.5%		0.0%		0.386%	0.3%
(7.9%)		1.1%		0.384%	0.3%
0.0%		1.2%		0.398%	0.3%
4.1%		(3.1%)		0.403%	0.3%
29.1%		0.0%		0.416%	0.3%
(14.2%)		0.5%		0.425%	0.3%
(10.6%)		2.1%		0.420%	0.3%
(14.9%)		2.5%		0.407%	0.3%
18.0%		3.2%		0.424%	0.3%
8.8%		1.6%		0.419%	0.3%
(7.0%)		1.3%		0.417%	0.3%

Data provided by FactSet

The regressions from this data provided me with the necessary variables to compute the formulas for risk-adjusted return measures as shown in the sample below.

Table 7 Alcohol Category Risk-Adjusted Return Sample

Alcohol Portfolio	A Portfolio	BUD
Average monthly return ANNUALIZED		16.0%
Market Value		194490.56
Weight in Portfolio		0.573437863
		Beta
		0.598669206
Correlation Coefficient between S&P500 Monthly Returns and Stock Monthly Returns		0.287732511
Contributed Beta to entire Value-Weighted Alcohol Porfolio		0.34329959
Value-Weighted Alcohol Portfolio Beta (summation of individual stock betas multiplied by weight)		0.71118394
Contributed Return (Stock return multiplied by weight)		9.168%
Value-Weighted Alcohol Portfolio Return		15.451%
Alpha of Value-Weighted Alcohol Portfolio	10.3077%	
CAPM Expected Return for Alcohol portfolio	5.1437%	
Treynor Ratio of Value-Weighted Alcohol Portfolio	0.143940462	

This methodology was repeated in the same manner for each category of the sin stock sample pool until all of the relevant data was acquired and the pertinent metrics were computed.

Chapter 5

Data Analysis and Implications

Establishing the S&P Index Benchmark

Using the Capital Asset Pricing Model as a baseline and benchmark, the security market line for the S&P500 Index was plotted on a monthly risk vs. return graph. The y-intercept of the graph is the average monthly risk-free rate of the 3-month Treasury bill and the slope was the average equity risk premium, which is the monthly S&P Index return less the risk-free rate divided by the market benchmark beta of 1. The table showing the X and Y values of the S&P500 Index Security Market Line can be located in the Appendix. The monthly and annualized S&P500 Index SML is displayed below and will be used as a simple point of reference for the remainder of the data analysis.

Figure 5 S&P Index SML Monthly

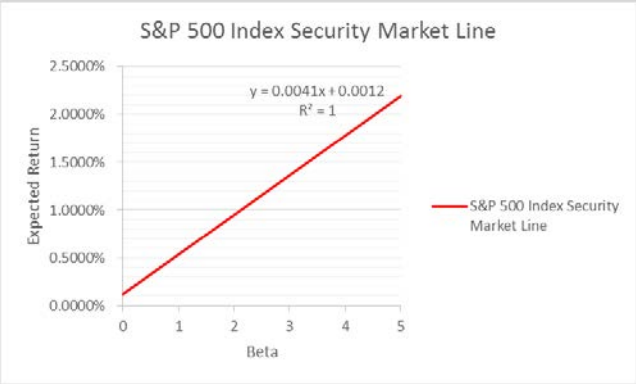
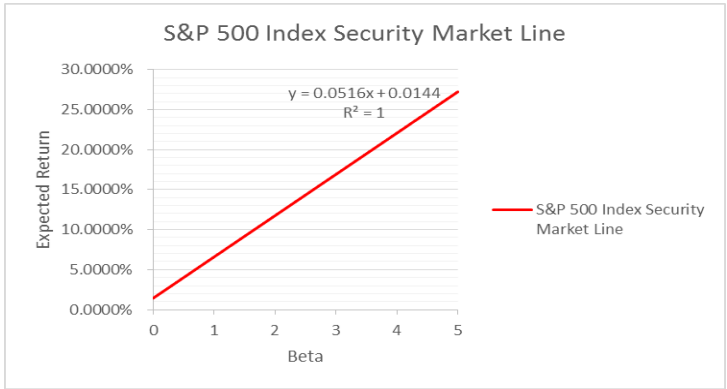


Figure 4 S&P Index SML Annualized



Sin Stock Modified CAPM

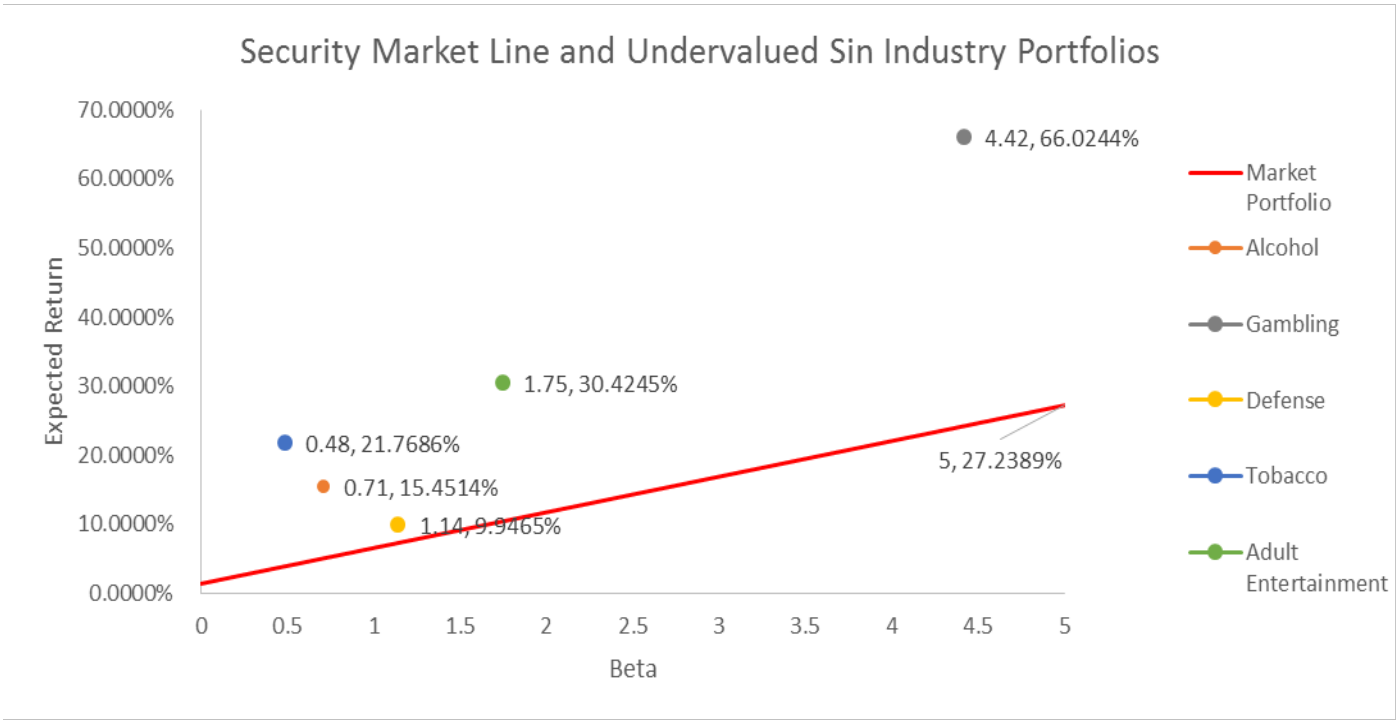
The sin stock data collected proved at first glance to be consistent with what the previous studies on sin stocks had discovered and indicates that sin stocks still do produce a return premium above the market index. The risk-adjusted return measures also suggest that investors who avoid sin stocks are suffering an opportunity cost based upon their moral preferences. The compound returns, betas, and risk-adjusted return measures for each of the sin stock categories are represented in the table below.

Table 8 Data Analysis Results by Category

	Average Return Annualized	Beta	Alpha	Treynor
Alcohol	0.154514458	0.711184	0.103077	0.14394
Gambling	0.660243617	4.416859	0.415569	0.146233
Defense	0.099465271	1.141756	0.025575	0.074546
Tobacco	0.217686402	0.484311	0.17808	0.419843
Adult Entertainment	0.304244991	1.745196	0.198888	0.166109

The beta and return calculations for each of the sin categories enabled me to plot the points on the graph of the S&P security market line in a simplified sense as if they were individual stocks. This enabled me to determine whether the sin stocks are undervalued or overvalued. The category value-weighted sin portfolios are plotted against the security market line in the figure below.

Figure 6 Security Market Line and Sin Industry Portfolios



In alignment with the principles of the Capital Asset Pricing Model, the graph above indicates that the value-weighted sin category portfolios are undervalued relative to their risk. Table 9 provides the necessary variables required to make the specialized modification to CAPM for a portfolio of sin stocks. Under the assumption that the portfolio of sin stocks maintains a

value-weighted proportion within each sin category, then the alphas of each category can be multiplied by their representative weight within the portfolio and added to the market risk premium and risk free rate to yield a closer prediction of the expected return of the portfolio. The new modification to the CAPM formula is as follows:

- r_f = risk-free rate
- r_m = return of the market index
- ß = beta of the sin portfolio
- α = alpha of specified sin category
- W = contributing category weight to entire sin portfolio

$$\text{Expected Return } (E_r)_{\text{Sin Portfolio}} =$$

$$[r_f + ß(r_{m-} r_f)] + [(\alpha_{alcohol}*W_{alcohol}) + (\alpha_{gambling}*W_{gambling}) + (\alpha_{defense}*W_{defense}) + (\alpha_{tobacco}*W_{tobacco}) + (\alpha_{adult\ entertainment}*W_{adult\ entertainment})]$$

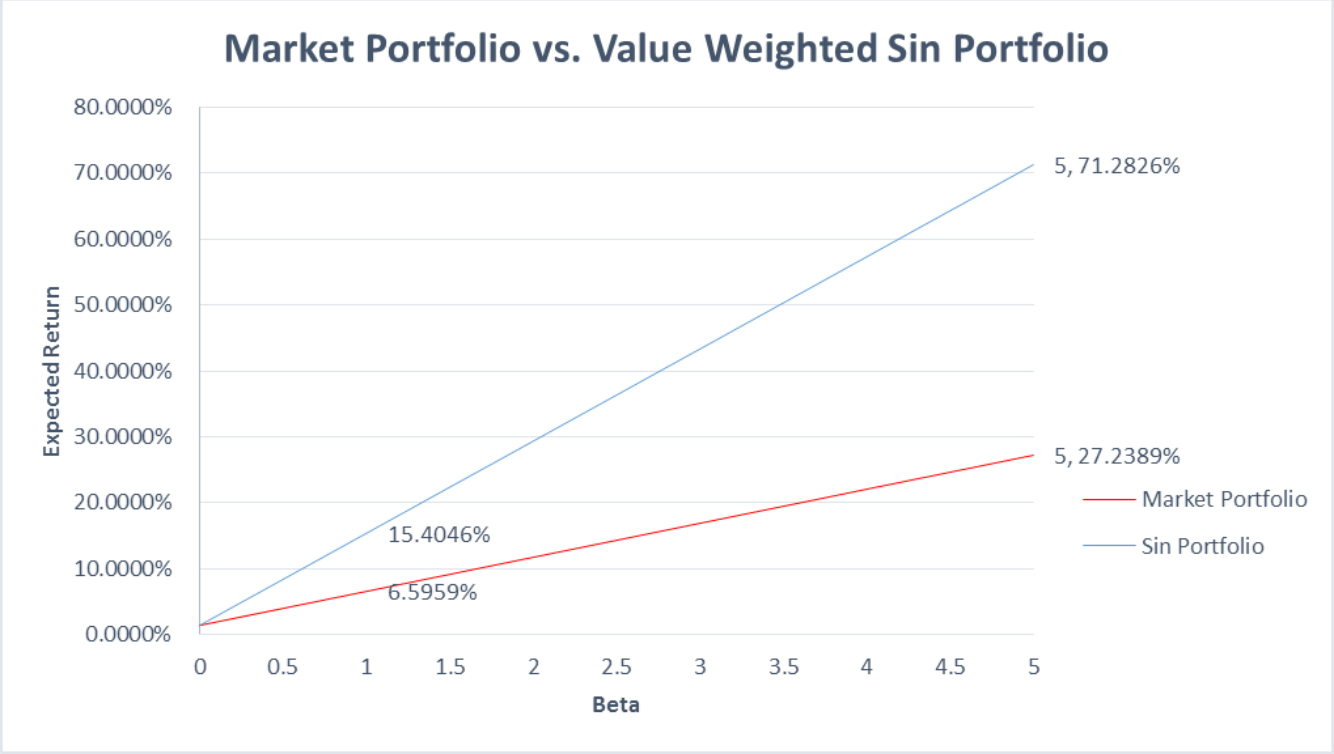
Value-Weighted Portfolio of All Sin Stocks

In an effort to determine if the entire world of sin will still generate excess returns in relation to the market index, the value weighted portfolio of all sin categories was used to construct the tables and graph below.

Table 9 Value Weighted SIN Portfolio

Value Weighted SIN Portfolio				
	Return	Beta	Market value	Weight
Alcohol	0.1545	0.71118394	339165.8842	0.230693
Gambling	0.6602	4.416858932	93929.84539	0.063889
Defense	0.0995	1.141755941	748632.4283	0.509203
Tobacco	0.2177	0.484311442	288370.2541	0.196143
Adult Entertainment	0.3042	1.745196459	106.6596	7.25E-05
SIN Portfolio	0.1712	1.122759618	1470205.072	

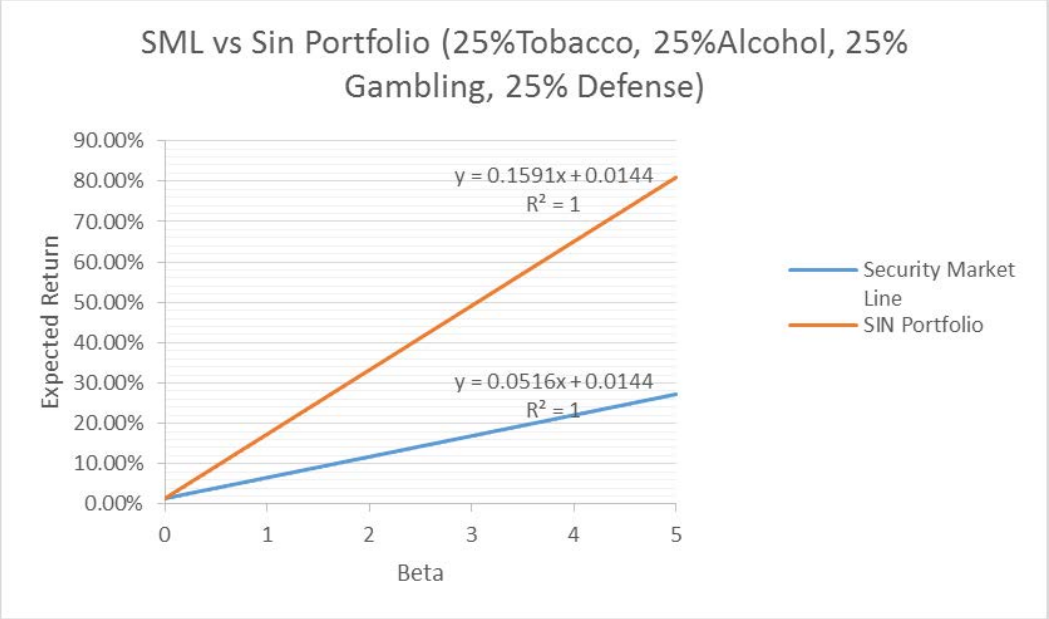
Figure 7 Market Portfolio vs. Value Weighted Sin Portfolio



Further evaluation of the entire sin portfolio compared to the market portfolio demonstrates the 'immorality premium' that investors are rewarded for investing in companies involved in business endeavors that violate social norms. Table 9 demonstrates that certain sin categories perform better than others on a risk-adjusted basis and therefore it may not be ideal to invest in a value-weighted portfolio of sin stocks across the different sin categories. In order to define new possibilities while keeping the portfolio diversified, the individual categories will retain their same value-weighted holdings, but the entire sin portfolio will vary its weight in each of the different sin categories, thus constructing new capital allocation lines. For instance, due to the fact that there is only one stock in the Adult Entertainment category and its market value is insignificant, it will not provide the necessary diversification benefits and therefore it will be omitted from the new combinations.

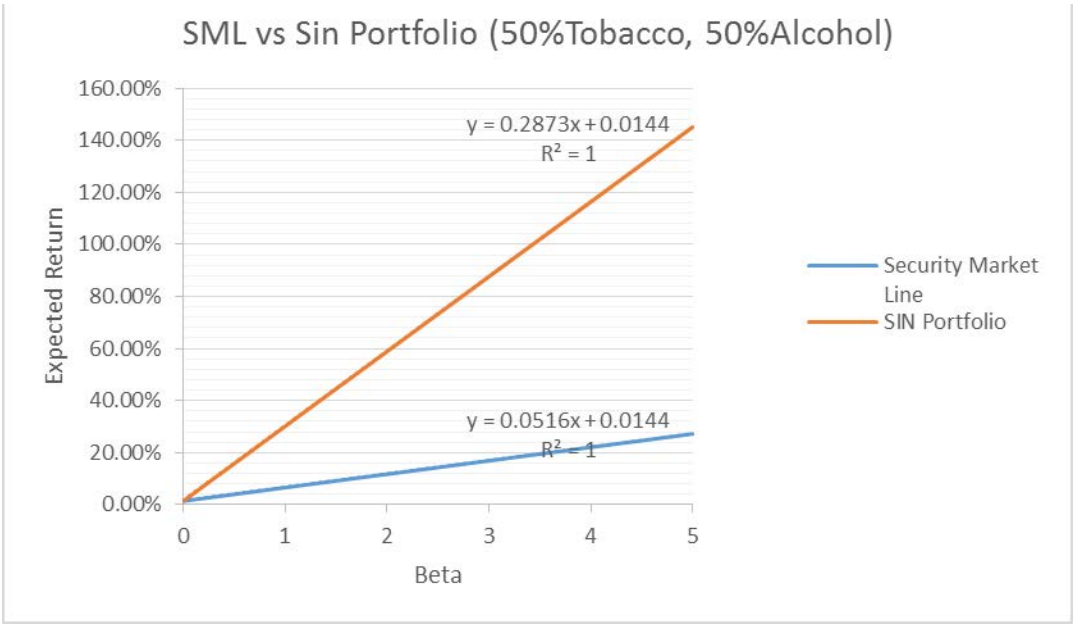
If an investor decided to invest equally in the four major sin stock categories, his expected risk and return payoff would be represented in Figure 8.

Figure 8 Equally Weighted Sin Portfolio



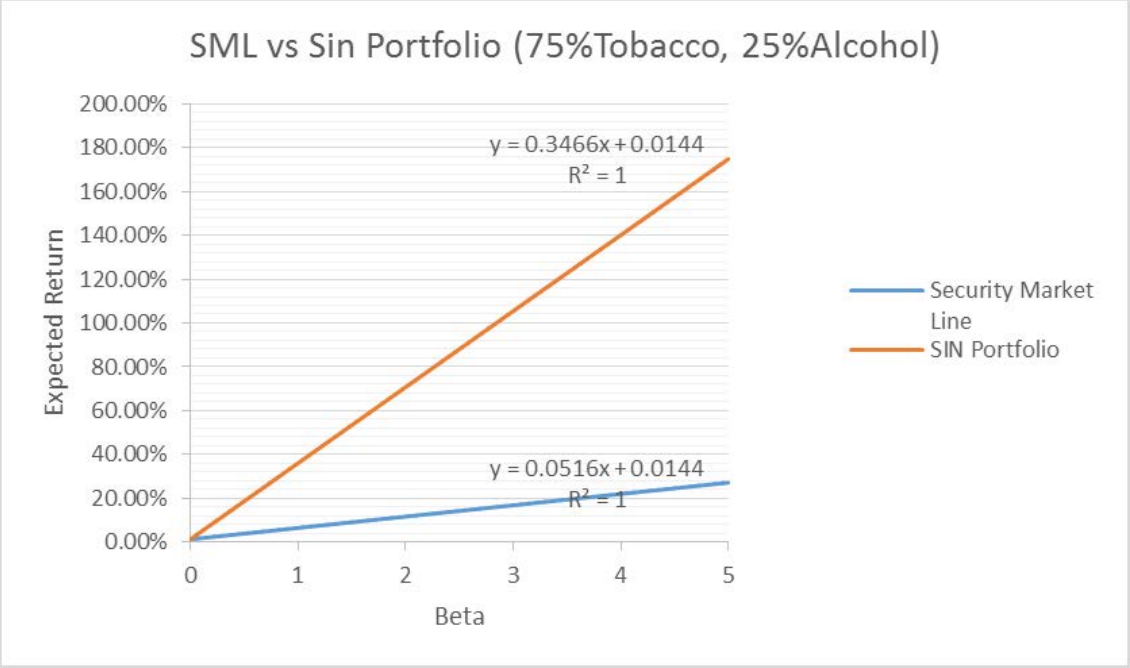
Furthermore, a capital allocation line for a sin stock portfolio composed of an equal weighting of tobacco and alcohol is exhibited in Figure 9.

Figure 9 Sin Portfolio (50% Alcohol, 50% Tobacco)



Since the tobacco industry has been relatively stable and has a lot of current potential with the growth in electronic cigarettes, the next capital allocation line allots a 75% weight to the tobacco portfolio and 25% to alcohol. The graph of this tobacco and alcohol sin portfolio is exhibited in Figure 10.

Figure 10 Sin Portfolio (75% Tobacco, 25% Alcohol)



Chapter 6

Conclusions and Further Research

The findings of this preliminary research on sin stocks are consistent with my hypothesis that the 'immorality premium' does in fact exist. These sin stocks commonly outperformed the broader market on a risk-adjusted basis. After evaluation of the abnormal sin stock behavior, it became possible to make a slight modification and addition to the basic Capital Asset Pricing Model to account for the consistent undervaluation across the entire sin industry. When constructing a portfolio of sin stocks, it is conceivable to calculate the weights of an investor's stock choices within each sin category, and since each sin category has an estimated alpha, it can be multiplied by that category's overall contribution to the sin portfolio and therefore yield a more accurate prediction of returns.

Perhaps the most crucial outcome of this study is that it suggests the need to investigate the complex relationship between investor psychology and behavioral finance perspectives as they specifically relate to sin stocks. After extracting and revealing the evidence of sin stock excess returns, it beckons the question; to what extent will an investor relinquish their moral avoidance of sin stocks and invest in sin? Do morally constrained investors have a certain "price" that sin companies will be able to exploit in order to convince the stockholder to invest? Would mainstream acceptance and investment in sin stocks diffuse the excess returns and cause the sin stock industry to be assimilated into the same behavior patterns as non-sin stocks and thus mirror the market index?

With regard to my future involvement with this topic, I plan on further developing this research as I pursue the next level of my education in an effort to earn a Master's degree in Business Administration. In the meantime, I will continue monitoring the behavior of these stocks using real-time market movements to observe how consistent and true the sin stock CAPM modification holds as a predictive tool.

Appendix

	Average Monthly Return	Beta	Alpha	Treynor
Alcohol	0.012008986	0.711184	0.007802	0.010917
Gambling	0.022790397	4.416859	0.002853	0.004891
Defense	0.007848838	1.141756	0.001814	0.005834
Tobacco	0.016534232	0.484311	0.01329	0.031686
Adult Entertainment	0.022382165	1.745196	0.013786	0.012144

Damadoran's Equity Risk Premiums	
YEAR	**$R_p = (R_m - R_f)$**
2005	4.08%
2006	4.16%
2007	4.37%
2008	6.43%
2009	4.36%
2010	5.20%
2011	6.01%
2012	5.78%
2013	4.96%
2014	5.78%

S&P Index SML Monthly	
SLOPE	0.004149
INTERCEPT	0.001188
Beta	**Expected Return**
0	0.1188%
0.25	0.2225%
0.48	0.3198%
0.5	0.3263%
0.71	0.4139%
0.75	0.4300%
1	0.5337%
1.14	0.5925%
1.25	0.6374%
1.5	0.7412%
1.75	0.8449%
2	0.9486%
2.25	1.0523%
2.5	1.1560%
2.75	1.2598%
3	1.3635%
3.25	1.4672%
3.5	1.5709%
3.75	1.6747%
4	1.7784%
4.25	1.8821%
4.42	1.9513%
4.5	1.9858%
4.75	2.0896%
5	2.1933%

S&P Index SML Annualized	
SLOPE	0.051608
INTERCEPT	0.014351
Beta	**Expected Return**
0	1.4351%
0.25	2.7253%
0.48	3.9346%
0.5	4.0155%
0.71	5.1054%
0.75	5.3057%
1	6.5959%
1.14	7.3275%
1.25	7.8861%
1.5	9.1763%
1.75	10.4665%
2	11.7566%
2.25	13.0468%
2.5	14.3370%
2.75	15.6272%
3	16.9174%
3.25	18.2076%
3.5	19.4978%
3.75	20.7880%
4	22.0782%
4.25	23.3683%
4.42	24.2295%
4.5	24.6585%
4.75	25.9487%
5	27.2389%

Value-Weighted Sin Portfolio	
SLOPE	**0.139695**
INTERCEPT	**0.014351**
Beta	**Expected Return**
0	1.4351%
0.25	4.9275%
0.5	8.4199%
0.75	11.9123%
1	15.4046%
1.25	18.8970%
1.5	22.3894%
1.75	25.8818%
2	29.3741%
2.25	32.8665%
2.5	36.3589%
2.75	39.8513%
3	43.3436%
3.25	46.8360%
3.5	50.3284%
3.75	53.8208%
4	57.3131%
4.25	60.8055%
4.5	64.2979%
4.75	67.7903%
5	71.2826%

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ACADEMIC **VITA**

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EDUCATION:

Schreyer Honors College, University Park, PA
The Pennsylvania State University *Class of May 2015*
Smeal College of Business
B.S. Finance
Minor – Spanish

HONORS:

Honors Thesis – Finance "The Immorality Premium and the Relative Undervaluation of Sin Stocks"
Allen W. Scholl Scholarship recipient
Dean's List 7/7 semesters

RELEVANT COURSEWORK:

Finance/Business classes focusing on:
Institutions and Financial Markets, Security Analysis and Portfolio Management, Multinational Financial Management, Financial Trading and Applications, Organizational Management, Business Ethics and Sustainability

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EXPERIENCE:

Tandigm Health, Philadelphia, PA *June 2014-August 2014*

Intern, Back Office and Infrastructure

Self-starter with demonstrated ability to identify needs, work independently, and deliver value.
Made contributions across a number of areas within Tandigm's operations including Compliance, Accounting, and Procurement as well as various other projects.

Finance:

- Procurement-Project Manager
- Managed timeline and status report, including distribution to stakeholders
- Led cross-functional meetings between Tandigm and IBC (involving accounting, procurement, finance)
- Followed up with stakeholders to ensure deliverable targets were met

Compliance:

- Assisted with compliance deliverables, including policies, processes, traceability matrix, and assisting with the overall function document structure/framework
- Assisted with operational activities, including posting / publishing workforce reminders and employee exclusions checks

Accounting:

- Learned about and assisted with month-end close activities
- Assisted with budgeting activities

Other Business Contributions:

- Researched and presented updated metrics on healthcare quality
- Developed interim workspace plans (driven by staffing plans) which helped identify required timeline to move to new office; assisted with modifications to existing space
- Supported Tandigm teammates and consultants with a variety of ad-hoc needs
- Active participant in day-long strategic planning workshop, including compiling workshop outputs (which included a multi-year strategic milestone plan)
- Escalated issues as needed

BuxMont Medical Associates, Warrington, PA *May 2013 - January 2014*

Project leader, medical record back-scanning

- Organized a group of 6 employees to facilitate the transition from paper medical records into scanned, workable electronic medical records within an advanced medical database management system
- Worked over 40 hours per week including nights and weekends in order to make sure that the team was reaching weekly goals and progressing efficiently

Lion's Den, State College, PA *September 2013-Present*

Independent Contractor for entertainment services, promotions and marketing

- Advertising via social media in order to stimulate interest in and develop the brand ElectroNites, a new electronic dance music concept which I introduced to the State College night life scene
- Live DJ performances 1-2 times per week from 10 p.m.-3 a.m.

Cheer Central All Star Gym, Phillipsburg, PA *February 2014-Present*

Coed cheerleading stunt coach

- Responsible for private and group instruction of boys and girls ages 8 and older on the safety, technique and finesse of cheerleading stunting skills
- Hours varied depending upon season and team practice schedules

Mobile Disc Jockey, State College, PA *September 2011-Present*

Self-employed entertainer known as "DJ Marky-Mark"

- Engaged by clients to provide music programming, content, and Master of Ceremonies services
- Maintained ongoing contracts with divisions of Penn State University and various fraternities

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INVOLVEMENT:

Penn State Cheerleading Team *Fall 2011-Present*

Team Captain

- Motivational and instructional leader for NCAA Division 1 Cheer team
- Responsible for leading crowds of over 110,000 people at Beaver Stadium
- Responsible for leading Pep Rallies and weekly President's Tailgate event for VIPs
- 2014 UCA World Champion, 2015 UCA National Finalist

Wall Street Journal Business Association *Fall 2014-Present*

Founding Vice-President

- Collaborated with colleagues to start a club focused on encouraging students studying business and economics to increase their readership in the Wall Street Journal

Tau Kappa Epsilon Fraternity *Fall 2011-Present*

Philanthropy Chair

- Active member in fraternity functions and social events
- Coordinator of philanthropy within the Penn State Greek community.

SKILLS:

Technical: Microsoft Excel Spreadsheet Modeling, Database Management Systems processing

Languages: English, Spanish

References available upon request