

GAMBLING ON SIN STOCKS

by

Grant Ginsburg

Submitted in partial fulfillment of the  
requirements for Departmental Honors in  
the Department of Finance  
Texas Christian University  
Fort Worth, Texas

May 7, 2019

## GAMBLING ON SIN STOCKS

Project Approved:

Steve Mann, Ph.D.

Department of Finance

Richard Denne, Ph.D.

Department of Geology

## **ABSTRACT**

The goal of this thesis is to analyze the performance, risk-adjusted performance and valuation multiples of “Sin” stocks relative to that of the S&P index, and use this data to determine if investing in this industry has proven successful over the years. A commonly shared difficulty in analyzing sin stocks that I found through my research was how broad or narrow the sources definition of what constituted a “sin” stock was when defining their sin portfolios. Alcohol, firearms, gambling and tobacco appeared to be the four industries that were widely agreed upon and classified as sin stocks. Because of these findings, the Sin Portfolio that I put together included a market-weighted portfolio of 33 stocks trading in the alcohol, firearms, gambling and tobacco industries. It is worth noting that I also illustrated a more granular perspective that assisted in my understanding of what industries might have served as headwinds and tailwinds for the overall Sin Portfolio’s performance by more specifically analyzing each sub-industry, as I did with the entire portfolio. Qualitative analysis included using the TCU database to search for different sources that addressed sin stocks, and I then used this information to help mold my understanding of the industry, including where it has been and where people believe it is going. From a quantitative perspective, I analyzed public companies that are participants in the Sin Industry using both Bloomberg and the Wharton Database (WRDS). By using these resources, I was able to pull current and historical numbers related to my portfolio for analyzing ratio performance, as well as regress the returns of my unified portfolio verse that of the S&P index for different periods of time. The time periods included 5-years, 10-years and 20-years, as well as the Dot.Com era and the Great Recession.

Based on my findings, investing in a sin stock portfolio proved to be an effective means of outperforming the broader market, besides the most recent 5-year period. The out/under-

performance of each sub-sector (alcohol, firearms, gambling and tobacco) varied based on the time period being used. Specifically, it is clear that investing in gambling does not act as a defensive play during the economic downturn when compared to the other three Sin industries. The lack of following that sin stocks have received due to moral principles proved to be a tailwind for my Sin Portfolio. Law and regulation play a substantial role for companies operating within these industries, which, in turn, plays a large role in their success because this sin industries receive a risk-premium. In the end, my findings prove that a Sin Portfolio of 33 stocks was near resilient during the different assessed time periods compared to a morally conscious investor.

## TABLE OF CONTENTS

<b>INTRODUCTION.....</b>	<b>6</b>
<b>RESEARCH QUESTIONS .....</b>	<b>8</b>
<b>LITERATURE REVIEW .....</b>	<b>9</b>
<b>Defining the Sin Industry: What Constitutes a Sin Stock?.....</b>	<b>9</b>
<b>Reasons / Theories behind Sin Stock Outperformance .....</b>	<b>10</b>
<i>Neglect.....</i>	<i>10</i>
<i>Recession-Proof .....</i>	<i>15</i>
<i>Monopolistic: High Barriers to Entry.....</i>	<i>16</i>
<i>Litigation Risk &amp; Negative Press .....</i>	<i>16</i>
<i>Information Risk .....</i>	<i>17</i>
<b>Sin Stock Performance .....</b>	<b>19</b>
<b>METHODOLOGY .....</b>	<b>22</b>
<b>RESULTS .....</b>	<b>25</b>
<i>Performance Results.....</i>	<i>25</i>
<i>Valuation Results .....</i>	<i>31</i>
<b>CONCLUSION .....</b>	<b>37</b>
<b>WORKS CITED.....</b>	<b>39</b>

## INTRODUCTION

As the United States trends towards becoming a more health conscious and environmentally friendly nation, people have attempted to veer away from unhealthy habits. Public companies are beginning to realize that this is a macro trend and responding accordingly to appease current investors, while concurrently attempting to persuade new investors. Environmental, social and governance (ESG) metrics are now a set of standards that judge and rank the “morality” of a company’s fundamental operations. Furthermore, this is then used by socially conscious investors to screen out any company that does not perform under specified ethical standards. With all of this being said, more addictive habits like smoking and drinking continue to be detrimental to an individual’s health, yet businesses operating within these segments continue to thrive because of their ability to maintain such a sticky customer-base. This prompted me to exploring industries that were repeatedly referred to as unethical because I believed the lack of following coupled with the strong fundamentals related to companies referred to as sin stocks offered an opportunity for investors that were willing to go against social norms to receive abnormal returns.

Two quotes from Aimee Steen that resonated with me throughout the duration of my thesis read, “Everyone has vices, but not everybody agrees on the ethics of investing in them,” followed by her saying, “Defining precisely what a sin stock is poses a task in itself. Everybody has different ethical standards, with practices acceptable to one being abhorrent to another.” The proceeding quotes played a substantial role in my analysis because I had to decide what I defined as a sin stocks, and ultimately use this to construct my final Sin Portfolio. Due to different ethical standards held by an array of different types of investors, it is nearly impossible to perfectly define the Sin Industry. Because of this, I chose four industries that were widely agreed upon as being related to sin: (i) Alcohol, (ii) Firearms, (iii) Gambling and (iv) Tobacco.

Once my final Sin Portfolio was constructed, I regressed their returns to that of the S&P over different periods of times, as well as compare valuation metrics and how they have changed over time. Let me be clear that this thesis does not necessarily compare ethical to unethical investing because my Sin Portfolio was regressed against the SPX, not a fund solely focused on ESG investing. I believe the outperformance of my Sin Portfolio compared to the broader market was a result of elements related to ethical investing, including the fact that fewer investors are willing to invest in vice or sin shares, therefore, less risk is shared among the shareholders and that less tracking by analysts and institutions have resulted in less research reports for investors to use during analysis.

## RESEARCH QUESTIONS

The thesis attempts to answer multiple research questions, which include:

1. Do investors in sin stocks receive abnormal returns because of their lack of following based on ethical and moral standards?
2. Are sin stocks a defensive play that will perform well during an economic downturn?
3. Are sin stocks value investments based on different ratios and valuation metrics?
4. Is sin stock outperformance a facet of these industries being addictive in nature, therefore, does it aid in their ability to profit off human weakness by maintaining loyal customer-bases?



## LITERATURE REVIEW

### **Defining the Sin Industry: What Constitutes a Sin Stock?**

Defining exactly what industries should be classified as related to sin has been a difficult task for investors. Sin is defined as “any act regarded as such a transgression, especially a willful or deliberate violation of some religious or moral principal” and by theology as “deliberate disobedience to the known will of God” (Fabozzi, 2008). It is nearly impossible for all individuals to agree on what they view as ethical because different societies have different interpretations of what they consider to be unethical behavior. Due to this, defining sin stocks has become controversial in itself. People are constantly in disagreement over which industries are utilizing operations that are sinful, typically taking advantage of consumer’s cravings by offering addictive products that can also be detrimental to their health if overly consumer (Hong, 2009). A quote that illustrates the disagreement amongst what investors view as immoral reads, “One person’s taboo is another person’s sacred cow” (Phillips, 2011).

The industries that appeared to be consistently viewed as unethical included: (i) alcohol, (ii) gambling and (iii) tobacco, which together have come to be known as “Triumvirate of Sin” (Trinks, 2017). Firearms was the other industry that commonly was thought to be related to sinful behavior. Other industries including adult entertainment, pharmaceuticals and oil/energy were sometimes referred to as sinful, but this was less consistent than the four previously mentioned industries. To reiterate, most people have different ethical standards, so giving an exact definition of what makes up the Sin Industry would be incorrect. Instead, each individual investor defines their view of unethical investments by utilizing their own moral compass. Though this is subjective, it is not incorrect because an activity viewed as sinful to one might be deemed

completely moral by someone else. With that being said, it has become widely agreed upon that alcohol, firearms, gambling and tobacco are activities associated with sin (Blitz, 2017).

## **Reasons / Theories behind Sin Stock Outperformance**

### ***Neglect***

Sin stocks are perceived negatively by a large group of investors, in turn, causing these stocks to lack a large following. This stems from the fact that investors, both individuals and institutions, are making investment decisions based on social pressures to fit in, rather than from rational economic reasoning (Kim, 2011). The following six reasons depict why sin stocks are neglected, as well as how this neglect benefits the investor who is willing to put personal beliefs aside when making investment decisions.

#### ***i. Adhering to Social Norms***

Per a survey asking investors if they use personal beliefs in valuing stocks, the most common response for why people avoided sin stocks was “because it won’t look good” (Fabozzi, 2008). Fabozzi argues that this holds true for individual investors because they are free to make whatever decisions they deem necessary when it comes to investing, even if it involves missing out on returns to maintain their moral standards. On the other hand, Fabozzi does not believe this reasoning can be justified by institutional investors because it is their fiduciary duty to make money for their clients (Fabozzi, 2008). This neglect by socially responsible investors has contributed to abnormal returns amongst sin stocks because the limited following has lowered valuations to levels that are not in line with fundamentals (Kim, 2011).

This decision to adhere to social norms, even if it is costly, is consistent with Becker’s model of discrimination. Becker’s model suggests that employers are willing to

avoid hiring a certain group of people, even if this decision ultimately is negative to the overall performance of their company. People do not want to be seen as outcasts by their peers, so rather than focusing on results, investors jump on the ethical bandwagon and avoid veering away from the social norm (Kim, 2011).

**ii. *Reduced Risk Sharing***

Due to the fact that less people invest in sin stocks, the risk is reduced amongst the shareholders of these companies (Phillips, 2011). This stems from the neglect these companies receive due to their “sinful” operations. This limited risk sharing has been profitable for investors who are willing to let go of the idea of conforming to society, and instead make investment decisions based on traditional economic theories.

**iii. *Negative Screening***

In general, diversification is good for a portfolio as it reduces systematic risk, so by deciding to screen out an entire class of stocks, investors are paying a price by limiting their ability to diversify (Hong, 2009). The mean-variance theory attempts to validate the previous claim by inferring that limiting ones diversification abilities should be reflected by poor investment performance (Belghitar, 2014). Screening out socially sensitive stocks has resulted in a return premium for investors who take advantage of the undervaluation sin stocks have received due to unjustifiable neglect (Borgers, 2015). Portfolio efficiency can be diminished by socially responsible investors who screen out sin stocks, thus resulting in underperformance compared to conventional portfolios. Investing in controversial stocks has historically resulted in significant outperformance, so screening these stocks out of the portfolio yields subpar performance. Screening comes with a price,

specifically the opportunity cost of avoiding investment in sin stocks that have proven to continually outperform (Trinks, 2017).

***iv. Low Analyst Coverage & Institutional Ownership***

As a result of negative screening and attempting to conform to social standards, sin stocks have a lower following by analysts, as well as less institutional ownership. Specifically, pension funds, endowments, religious organizations and universities are performing these screens as previously discussed to avoid investing in sin stocks. As these investor groups are more exposed to public scrutiny, they have responded by avoiding investment in industries that bear the burden of public pressure. In turn, this has resulted in a lower following by analysts, since they typically provide research for institutional investors (Hong, 2009). These analysts are tasked with doing in depth analysis on specific stocks, which aids investors in making decisions, so by lacking in analyst coverage, sin stocks inevitably become more difficult to value and understand.

This information asymmetry allows hedge funds, who are not nearly as subject to social norm pressures, to take advantage of the arbitrage that was a result of these companies being unjustly undervalued because of neglect. In an analysis by Hong ranging from 1980-2006, sin stock comps had on average around 28% of their shares held by institutions versus sin stocks who had approximately 23% of their shares held by institutions. Regarding analyst coverage during the period ranging from 1976-2006, sin stock comparable companies based on Fama and French industry groupings were covered by approximately 1.7 analysts versus sin stocks, who were covered by around 1.3 analysts, representing a 21% reduction (Hong, 2009). Investing on the basis of pleasing societal

views has reduced the coverage sin stocks receive, thus allowing investors to take advantage of the unjust undervaluation given to sin stocks.

The Social Investment Forum estimates that around \$12 trillion dollars (26%) of the \$46.6 trillion dollars of U.S. professionally managed assets at year-end 2017 undergo some type of social screen. This indicates that socially responsible investing (“SRI”) represents a substantial amount of total assets under management (“AUM”), therefore, can have a material impact on the value of sin stocks (Hong, 2009).

v. ***The Shunned-Stock Hypothesis***

According to the shunned-stock hypothesis, socially responsible investors make investment decisions unrelated to financial performance. This individual has been classified as a values-driven investor. By focusing on the unquantifiable damages of an investment that are typically not valued in money, these ethical investors have produced a shortage of demand for sin stocks, while concurrently creating an excess demand for socially responsible investments. As a result of sin stock’s lack of coverage, an information gap is formed that causes investors to neglect stocks solely because they are unaware of their existence (Derwall, 2011). This has caused sin stocks to trade at a discount due to their lack of following, which as previously discussed reduces the risk sharing amongst the smaller group of investors willing to hop off the SRI bandwagon.

This theory is in-line with the findings of Hong and Kacperczyk (2009), which concluded that by avoiding sin stocks, specifically alcohol, gambling and tobacco, norm-constrained investors have caused sin stocks to become underpriced, which has led to higher expected returns. Two assumptions that are critical to the shunned-stock hypothesis include: (i) social investors are values-driven and (ii) values-driven investors have to be

substantial enough in number to impact security prices (Derwall, 2011). It is unclear whether people avoid investing in sin stocks to uphold their own moral standards or if this avoidance stems from societal pressures. Regardless, it has created an opportunity for people willing to invest in sin stocks to receive abnormal returns, at the expense of some potential community backlash. The size of values-driven investors is significant to the overall market, as seen by 26% (basically \$1 out of \$4) of U.S. professionally managed assets are SRI assets.

**vi. *The Irrelevance Proposition***

In an attempt to relate market pricing and social standards, the irrelevance proposition claims that the expected return of a stock is solely determined by the market risk premium. Because of this, a stock's expected return should be unrelated to individual preferences or noneconomic factors (Fabozzi, 2008). This theory is meant to question why social policies appear to have an impact on the financial market, when they should be unrelated. Fabozzi says, "Legislators make laws and the judicial system enforces them, religions define moral standards and people are bound by the resulting values through social pressure. Financial markets facilitate the creation of economic values and are designed to maximize the wealth of the participants." Based on the findings of most researchers, stock prices have been impacted by factors related to social conformity, specifically regarding individuals adhering to social norms, thus challenging the validity of this traditional investing theory. Using the irrelevance theory, it should be in the fiduciary duty of investors to maximize returns, which is clearly not the case if different groups of investors filter out sin stocks even though they outperform.

### ***Recession-Proof***

When assessing sin stocks, it is important to see how they perform during economic downturns compared to the overall market. When focusing on the “Triumvirate of Sin,” which refers to alcohol, gambling and tobacco, in addition to firearms, there has been significant outperformance during recessions. For some consumers, these are products that they simply cannot live without, therefore, these customers typically remain loyal even during poorer economic times (Steen, 2012). According to Jason Hollands, a managing director at Bestinvest, “Tobacco, alcohol and weapons manufacturing are quite defensive sectors, which tend to be quite resilient across the economic cycle.” Most users of these products do not view these items as discretionary expenses, but rather the addictive nature of the products keeps them coming back for more throughout the duration of a downturn. Though these industries produce controversial products, people indulge at their own free will (Pacyniak, 2008).

During a recession, sin stocks reduce portfolio volatility because of them being defensive in nature. During the Great Recession, people would expect consumers to stop spending money on indulgences, yet sin stocks remained robust (Gustafson, 2008). When consumers are forced to make sacrifices because of financial instability, they typically reward themselves by clinging to these addictive products, in turn, creating a sticky stream of revenue for the company. To reiterate, individuals indulge during both good and bad economic times (Waxler, 2004). Tom Galvin, who commissioned a report on vice stocks during his time as chief investment officer at Credit Suisse said, “ It turns out that demand for drinking, smoking, and gambling remain pretty steady and actually increase during economically volatile conditions” (Investment Week, 2018). This further validates the claim that vice investing during a recession offers a defensive property that one would not get with most industries.

### ***Monopolistic: High Barriers to Entry***

Starting a company that offers sinful products generally comes with stringent regulations that contain restrictions on how sin industries are able to operate (i.e. to open an adult or gaming business, one must first go through a high level of scrutiny before being able to attain the permits and licenses that are required to operate). Looking outside of the United States, a large proportion of the governments around the world control the alcohol and tobacco businesses, in turn, creating government monopolies (Fabozzi, 2008). Other industries viewed as sinful, like firearms producers and pharmaceutical companies have extremely high research and development (“R&D”) costs that make it difficult for new competitors to enter the market. Fabozzi believes that the resilience of sinful industries has earned them monopolistic power that should be rewarded with excess returns (Fabozzi, 2008).

### ***Litigation Risk & Negative Press***

As mentioned above, a facet of operating within a sinful industry is intense regulation and scrutiny. Phillips gives an example where regulations levied on adult phone services in Australia as a result of the Telecommunications Bill of 1999 had a substantial impact on the business, though he does not go into specifics (Phillips, 2011). Another example can be seen with tobacco companies, who faced a significant amount of litigation risk until they finally settled with state governments in 1997 (Hong, 2009). Lawsuits can be expensive for these companies to deal with, but they have come to understand that this risk is inevitable and must face it head-on. Sinful industries face a lot of risk when it comes to the press. Regardless if the story is true or not, the stock price will likely be punished due to the public overreacting. Fabozzi refers to this as headline risk (Fabozzi, 2008). The operations of sinful industries are controversial, therefore, these industries are continually monitored on their ethicality, which is almost always viewed as immoral



(Grougiou, 2015). This acts as a headwind for these companies because by not conforming to social norms, they will always operate with negative press.

Headline risk, coupled with litigation risk, has made it difficult for these companies to brand themselves positively in the eyes of the public, thus resulting in a discount to their valuation (Fauver, 2014). In response to being perceived so negatively by the eyes of the public, sin firms have attempted to rebrand themselves with large charitable donations, as well as becoming more environmentally friendly within their operations (i.e. in the last decade, Phillip Morris has donated \$1 billion in the form of cash and food to numerous charitable organizations and Anheuser-Busch has become the world's larger recycler of used aluminum cans (Kim, 2011). Though these sin firms are improving their environmental, social and governance ("ESG") to appeal to socially conscious investors, it is uncertain whether these attempts have actually attracted new investors. This relates to the theory of discrimination that I previously discussed, which states that agents will take a financial hit to stay away from a specific group of people.

### ***Information Risk***

It is unclear whether neglect based on social standards and the risks associated with the operations of sinful industries have a positive or negative outcome on their financial reporting quality. Because of this disagreement, two outcomes will be highlighted. One side argues that the deep pockets these sin companies have been able to produce with superior financial performance has attracted the attention of plaintiffs who are looking to take down businesses that already receive extreme scrutiny from the public. As a result of this, this side argues that companies are intentionally attempting to downplay financial performance in an attempt to push litigators away, meaning financial statements are not accurately portraying sin company's performance. This understatement of financial performance leads to lower earnings numbers being reported, which

leads to information asymmetry between investors and the actual success of the firm. This side concludes that lower financial reporting quality results in higher expected returns because of an information gap (Kim, 2011).

The opposing side argues that rather than allowing increased scrutiny to jeopardize financial integrity, it instead forces sin firms to increase their earnings and financial reporting quality. Sin firms understand that they face a lot of social pressures, so to avoid unwanted attention and exposure to potential lawsuits, these companies attempt to be transparent with high quality financial reporting. Further, due to the neglect sin firms receive because their operations are deemed unethical by the public, these firms are incentivized to produce high quality financial reports in order to attract investors (Kim, 2011).

To test this hypothesis, an examination of sin stock prices were gathered and checked against accounting performance measures to see what degree of share price was reflected by the accounting quality. The results indicated that earnings for sin stocks were significantly lower than that of comparable industries, but it was unclear whether this was due to poor earnings quality or fundamental issues with the underlying company. To sort these different reasons out, three measures of financial reporting quality were observed: (i) predictive ability of earnings for future cash flows, (ii) e-loading measure and (iii) timeliness of loss recognition in earnings (Kim, 2011). The study concluded that compared to a relevant control group, sin firms are better able to predict future cash flows based on reported earnings, as well as earnings that identify losses in a quicker time horizon. These findings were inconsistent with the hypothesis that stated sin firms outperform due to poor financial reporting quality that increases information risk. On the contrary, the findings were in-line with the idea that sin firms are impulsively neglected based on non-economic rationale

related to social norms, despite the high quality of information depicted in the financial statements (Kim, 2011).

The findings in this study further confirmed the belief that sin firms intentionally increase the quality of their financial reporting to entice new investors. By improving the quality of their financial statements, sin firms are attempting to diminish information asymmetry and adverse selection, decrease their cost of capital and increase liquidity by attracting a larger group of investors. Investors willingly neglect sin firms at an alarming level, even after these firms demonstrate a push towards attracting ethical investors with high financial reporting quality and have begun to demonstrate awareness of ESG criteria, while continuing to outperform (Kim, 2011).

### **Sin Stock Performance**

This section will briefly discuss the historical results of sin stocks based on different research papers used throughout the literature review by source. The results are not comparing apples-to-apples because of differences in stock picks, time periods and valuation techniques.

Richey (2012) regressed the monthly returns of 33 sin stocks over the period ranging from October 2007 to October 2012 against the returns of the S&P 500 to find the alpha of his entire portfolio, as well as the alphas of each sub-industry.

On an individual stock basis, he found that 22 of the 33 stocks (~67%) has positive alphas over the 5-year duration, but only seven of these alphas had a t-stat that was deemed significant. Looking at the equally-weighted sin stock portfolio, the alpha was 0.0071411, which resulted in an annual risk-adjusted return of ~8.6% higher than one would have earned by investing in the S&P. The t-statistic of the portfolio was significant at the 5% level. Looking at performance by industry which included alcoholic beverages, gaming/casinos, soft drinks and tobacco, he found

that only gaming underperformed the market during his defined time frame. Tobacco was the only industry that produced a significant alpha. The results by industry can be seen below:

	No. of Firms	Parameter	Coefficient	Std. Error	t-statistic	
<b>Alcoholic Beverages</b>	<b>12</b>	Alpha	0.0035091	0.0071816	0.49	
		Beta	0.9852416	0.0327662	30.07	***
<b>Gaming and Casinos</b>	<b>4</b>	Alpha	-0.016016	0.0120812	-1.3	
		Beta	1.117518	.0946696	11.8	***
<b>Soft Drinks</b>	<b>8</b>	Alpha	0.0061533	0.0068997	0.89	
		Beta	0.9953666	0.0314799	31.62	***
<b>Tobacco and Cigs.</b>	<b>9</b>	Alpha	0.0088431	0.0056331	1.57	*
		Beta	0.9805326	0.0407462	24.06	***

Note: The symbols \* and \*\*\* represent significance at the 10% and 1% levels, respectively. Results are from a two-tailed test.

Fabozzi, Ma and Oliphant (2008) sampled the returns of 267 companies covering 21 national markets over the time period ranging from January 1970 to June 2007. The average sin stock produced daily, monthly and annual returns of 0.076%, 1.64% and 19.02%, respectively. During this same time period, the average stock market produced an average annual return of 7.87%. Further, the six sin industries (Adult Services, Alcohol, Defense, Gaming, Medical and Tobacco) analyzed in the study produced annual returns of at least 13%, with alcohol producing the lowest annual return of 13.45% and gaming with the highest annual return of 33.50%. Looking at sin stock performance in 21 national markets, the results were also impressive, with sin stocks in Taiwan performing the worst with an annual return of 6.55% and the United States being the highest performer producing an annual return of 27.46%.

Two types of returns were computed in the analysis (i) excess market return or excess return<sub>1</sub> and (ii) risk-adjusted excess return or excess return<sub>2</sub>. The excess market return was calculated as the difference between the individual stock return and the national market index return. The risk-adjusted excess return was calculating using CAPM. Over the 37-year time period, not a single sin industry produced a negative alpha. Looking at the different markets over this same

37-year period, only 2 of the 42 excess return figures were negative: Portugal and Taiwan. This is likely due to only 1 stock being observed in these countries, therefore, the sample size lacks significance. Lastly, the annual returns of the sin portfolio were observed each year from 1970 to 2007. Key highlights from this 37-year return analysis include: (i) the sin portfolio produced negative returns in 2 years versus 9 years of negative returns in the overall market, (ii) the sin portfolio produced double-digit returns in 31 of the 37 years and (iii) regarding both excess return measures, the sin portfolio outperformed the relevant market index in 35 of 37 years. The results demonstrate consistent outperformance by the sin portfolio, which reflects the idea that adhering to social norms has caused firms to bear a financial burden by filtering out sin stocks. The consolidated sin portfolio returns from the study are pictured below:

**Sin Portfolio Returns, 1970–2007**

Sin Universe	Daily Return	Std. Dev.	Monthly Return	Std. Dev.	Annual Return	Std. Dev.
Total Return (%)	0.076 (9.80)*	0.77	1.642 (7.87)*	4.46	19.02 (7.65)*	15.31
Market Return	0.032 (4.46)*	0.69	0.695 (3.71)*	3.84	7.87 (3.32)*	14.09
Excess Return1	0.044 (4.05)*	0.45	0.947 (4.16)*	3.74	11.15 (3.51)*	14.55
Excess Return2	0.053 (6.17)*	0.42	0.960 (5.77)*	3.95	13.71 (5.78)*	10.31

## **METHODOLOGY**

When conducting my research, I went through a 5-step process that included: (i) Defining a Sin Stock Portfolio, (ii) Pulling Returns, (iii) Regressing Returns Against the SPX, (iv) Evaluating / Comparing Valuation Metrics and (v) Consolidating Results.

### ***i. Defining a Sin Stock Portfolio***

In order to analyze how sin stocks have performed in the past, I first had to decide on what industries I would constitute as commonly viewed as unethical. After completing my literature review, it became clear to me that the Alcohol, Firearms, Gambling and Tobacco Industries were all generally viewed as being sinful in their operations. As I continue to reiterate, this could have been expanded to an array of other industries based on different definitions of how individuals define sin stocks, but I believed my narrower interpretation more fairly and accurately depicts a Sin Portfolio by honing in on industries that are universally interpreted as being unethical. Because of this, the four aforementioned industries made up my Sin Portfolio that was then further segmented into each industry's own corresponding basket.

From here, I was tasked with finding publicly traded companies that operated in the four baskets. Rather than blindly searching companies, I looked into the holdings of different ETFs that were focused on investing in certain vices, including VanEck Vectors Gaming ETF (BJK), AdvisorShares Vice ETF (ACT) and Invesco Dynamic Leisure and Entertainment (PEJ). Along with this, I used intuition and research to compile the remainder of my portfolio. In the end, the sub-segments, alcohol, firearms, gambling and tobacco, were composed of 10, 5, 10, and 8 different stocks, respectively. This resulted in a unified Sin Portfolio that included a total of 33 stocks, which I believed would bear

significance due to being well-diversified, rather than comparing the returns of individuals companies. It is worth noting that throughout this selection process I was making real-time adjustments to eliminate companies that lacked historical and/or transparent data. The following graphic depicts the names and tickers of the publicly traded companies used in my analysis, separated by basket:

Sin Portfolio							
Alcohol		Firearms		Gambling		Tobacco	
Company Name	Ticker	Company Name	Ticker	Company Name	Ticker	Company Name	Ticker
Boston Beer Co Inc/The	SAM	American Outdoor Brands Corp	AOBC	Las Vegas Sands Corp	LVS	British American Tobacco Plc	BTI
Dom Perignon Moet Hennessy Louis Vuitton Se	LVMUY	Sturm Ruger & Co Inc	RGR	Mgm Resorts International	MGM	Philip Morris International Inc	PM
New Age Beverages Corp	NBEV	Vista Outdoor Inc	VSTO	Wynn Resorts Ltd	WYNN	Altria Group Inc	MO
Diageo Plc	DEO	Olin Corp	OLN	Gaming And Leisure Properties Inc	GLPI	Bio-One Corp	BICO
Northwest Brew Alliance Inc	BREW	Sportsman'S Warehouse Holdings Inc	SPWH	Melco Resorts & Entertainment Ltd	MLCO	Vector Group Ltd	VGR
Constellation Brands Inc	STZ			Caesars Entertainment Corp	CZR	Universal Corp/Va	UVV
Tolson Coors Brewing Co	TAP			Boyd Gaming Corp	BYD	Schweitzer-Mauduit International Inc	SWM
Kohlschütter-Busch Inbev Sa/Nv	BUD			Red Rock Resorts Inc	RRR	Turning Point Brands Inc	TPB
Permco Ricard Sa	PDRDY			Penn National Gaming Inc	PENN	Pyxus International Inc	PYX
Ambev Sa	ABEV			Churchill Downs Inc	CHDN		

## ii. Pulling Returns

My next step included pulling the returns of every company in my Sin Portfolio. I felt as if a single time- period would not be sufficient in analyzing returns, so I defined four different periods: (i) 20-year, (ii) 10-year, (iii) Dot.Com Recession and (iv) Great Recession. By looking specifically at returns during the last two recessions, I was able to understand how my Sin Portfolio performed during economic downturns, in order to see if historical results proved that investing in sin stocks provided a safe haven for investors by being defensive in nature.

I also had to ultimately decide how to weight the returns of my portfolio. I ended up market-weighting the returns of all 33 companies to avoid issues that might have arisen with an equally-weighted portfolio because the smallest companies in an equally-weighted could have skewed my results if they either substantially under/over-performed. All returns in my analysis are inclusive of dividends.

**iii. *Regressing Returns against the SPX***

Using the Wharton Database (WRDS), I regressed each company's return to that of the SPX for the corresponding time-period. This enabled me to see if the over/under-performance in the Sin Portfolio was better than that of an investor in the SPX index, which is a commonly used benchmark as the broader market. From here, I used the hypothetical investment of a dollar during each time-period versus that same dollar investment in the SPX to see what it ultimately grew to on both a numeric and percentage basis.

**iv. *Evaluating / Comparing Valuation Multipliers***

Along with analyzing returns, I looked at numerous valuation metrics and ratios including standard deviation, beta, Sharpe ratio, Price-to-Earnings (P/E), Price-to-Cash Flow (P/CF), Price-to-Book (P/B) and Enterprise Value to EBITDA (EV/EBITDA). I pulled year end numbers over the last 20 years for each of the companies in the Sin Portfolio and used this data to interpret how relatively expensive and/or cheap stocks have changed over time based on the aforementioned valuation multiples.

**v. *Consolidating Results***

In order to make the vast amount of data readable, I consolidated the returns and then built charts for each defined time period to compare overall performance. Along with this, a consolidated graphic illustrating the total return, hypothetical return of \$1 investment, standard deviation, CAGR, beta, annualized alpha and Sharpe ratios were depicted for each time period. The results were not limited to solely comparing the overall Sin Portfolio to that of the SPX, but I also included the previously mentioned metrics for each basket of the baskets that went into the Sin Portfolio. By evaluating these findings, I was able to make final conclusions that will be discussed in a later section.



## RESULTS

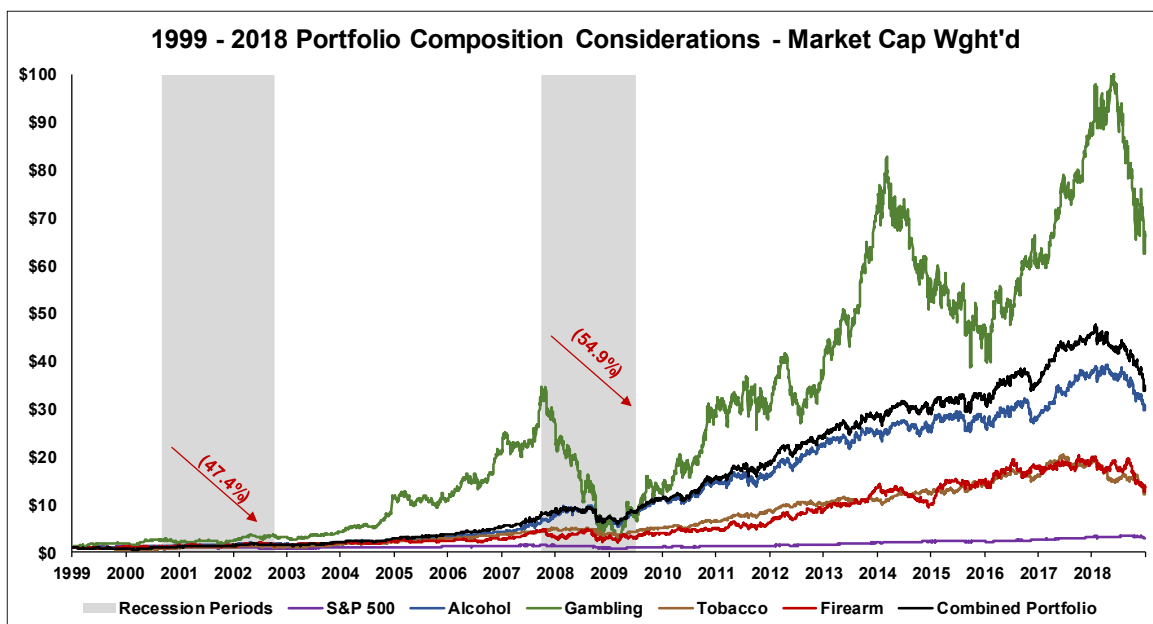
### *Performance Results*

I looked at the performance of my overall Sin Portfolio, along with the performance of each individual basket pertaining to Sin Industries using a market-weighted portfolio. As my defined period went back 20 years, some stocks did not trade during the entirety of that time, therefore, I had to exclude that company from the returns to avoid diluting the average. I will now discuss highlights of the results by period, mainly focusing on the Sin Portfolio:

#### *i) 20-Year Returns*

Based on my results, the overall Sin Portfolio and each sub-industry drastically outperformed that of the S&P 500 over the last 20 years. The results are shown below:

20-Year Performance Metrics						
	S&P 500	Alcohol	Gambling	Tobacco	Firearm	Sin Portfolio
TR	198.2%	2,970.2%	6,614.1%	1,130.3%	1,291.0%	3,393.0%
Return of \$1 Investment	\$2.98	\$30.70	\$67.14	\$12.30	\$13.91	\$34.93
StDev	18.8%	27.1%	42.8%	22.1%	32.0%	20.5%
CAGR	5.6%	18.7%	23.4%	13.4%	14.1%	19.4%
Beta	1.00	0.70	1.30	0.53	1.03	0.67
Annualized Alpha	-	17.3%	23.4%	11.9%	11.6%	16.3%
Sharpe	0.21	0.69	0.55	0.61	0.44	0.95

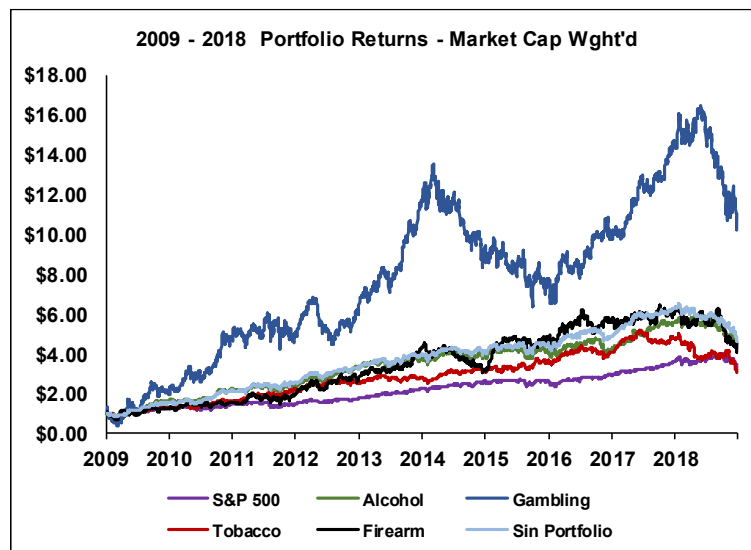
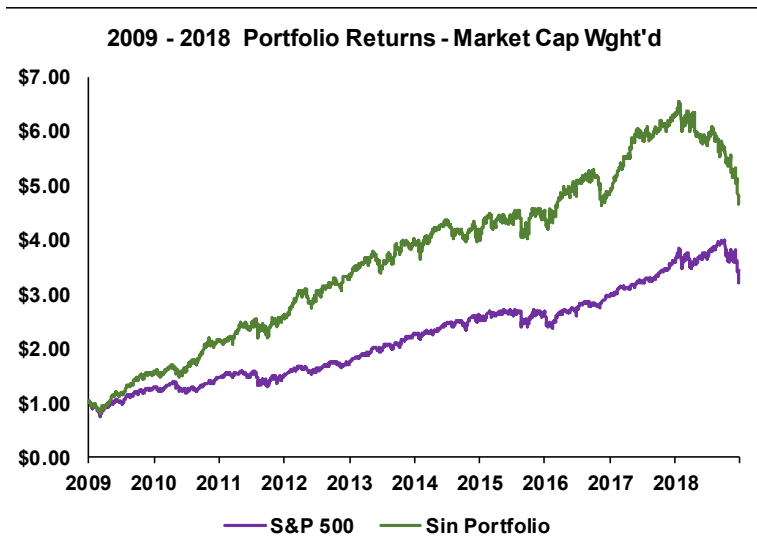


The declines being illustrated by the arrows represent SPX performance during the Dot-Com Bubble and the Great Recession, respectively. The above graphics demonstrate that an investor willing to associate him/herself with sin stocks would have drastically outperformed the broader index. During this period, gambling stocks were the most volatile with a standard deviation of 42.8% (more than double that of the Sin Portfolio) and had the highest beta at 1.30 (almost double that of the Sin Portfolio), but still returned a substantial 6,614% versus a 198% return by the SPX. Looking at risk-adjusted return, the Gambling Industry actually only performed better than the SPX and Firearms Industry, which shows that total return can be deceiving to investors. The Sin Portfolio returned 3,393% turning a \$1 investment into \$34.93 versus an investment in the SPX, which turned \$1 to \$2.98. The Sin Portfolio also performed significantly better on a risk-adjusted basis as seen by its Sharpe ratio of 0.95 versus that of 0.21 of the SPX. The Sin Portfolio's annualized alpha was 16.3% and had a CAGR of 19.4%.

## ***ii) 10-Year Returns***

Based on my results, the overall Sin Portfolio and each sub-industry other than tobacco outperformed that of the S&P 500 over the last 10 years on a total return basis. For the 10-year period, I also included a graph only picturing the Sin Portfolio versus the SPX. The results are shown below:

<b>10-Year Performance Metrics</b>						
	<b>S&amp;P 500</b>	<b>Alcohol</b>	<b>Gambling</b>	<b>Tobacco</b>	<b>Firearm</b>	<b>Sin Portfolio</b>
<b>Total Return</b>	<b>242.7%</b>	<b>358.9%</b>	<b>1,002.5%</b>	<b>212.7%</b>	<b>346.2%</b>	<b>380.8%</b>
<b>Return of \$1 Investment</b>	<b>\$3.43</b>	<b>\$4.59</b>	<b>\$11.03</b>	<b>\$3.13</b>	<b>\$4.46</b>	<b>\$4.81</b>
<b>StDev</b>	<b>16.3%</b>	<b>20.1%</b>	<b>41.5%</b>	<b>16.0%</b>	<b>28.7%</b>	<b>16.5%</b>
<b>CAGR</b>	<b>13.1%</b>	<b>16.5%</b>	<b>27.1%</b>	<b>12.1%</b>	<b>16.1%</b>	<b>17.0%</b>
<b>Beta</b>	<b>1.00</b>	<b>0.95</b>	<b>1.68</b>	<b>0.58</b>	<b>1.17</b>	<b>0.82</b>
<b>Annualized Alpha</b>	<b>-</b>	<b>4.4%</b>	<b>10.3%</b>	<b>4.9%</b>	<b>3.2%</b>	<b>6.0%</b>
<b>Sharpe</b>	<b>0.80</b>	<b>0.82</b>	<b>0.65</b>	<b>0.76</b>	<b>0.56</b>	<b>1.03</b>



Unlike the 20-year period, the outperformance of the Sin Portfolio over the last 10 years was not nearly as substantial. The Sin Portfolio returned 380.8% turning \$1 into \$4.81 versus the SPX's return of 242.7% turning \$1 into \$3.43. With a standard deviation of 16.5%, a beta of 0.82 and a Sharpe ratio of 1.03, the Sin Portfolio was still the most attractive investment when adjusted for risk. To briefly highlight some of the sub-baskets, although the Tobacco Industry had the lowest total return, it also had the lowest standard deviation and beta at 16% and 0.58, respectively and higher Sharpe ratios than that of the gambling and firearm baskets. Though the total return for tobacco does not appear appealing, it provided consistent returns with little volatility and low correlation with the overall market, thus proving to be a smart, defensive investment.

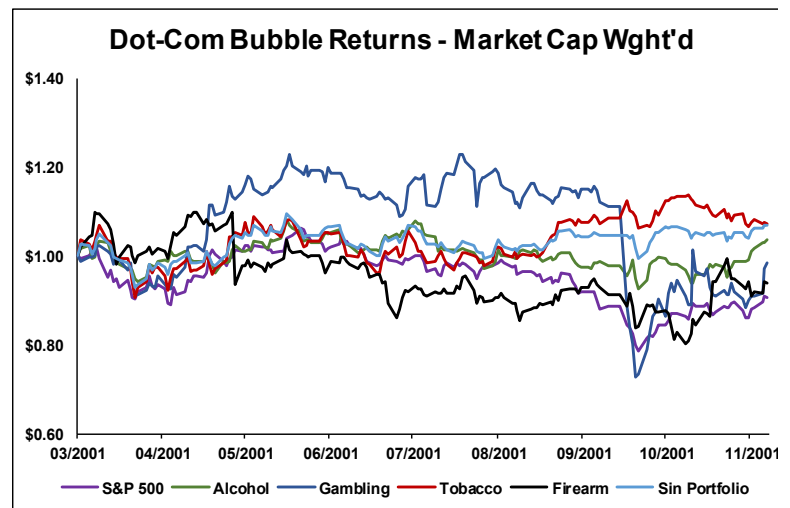
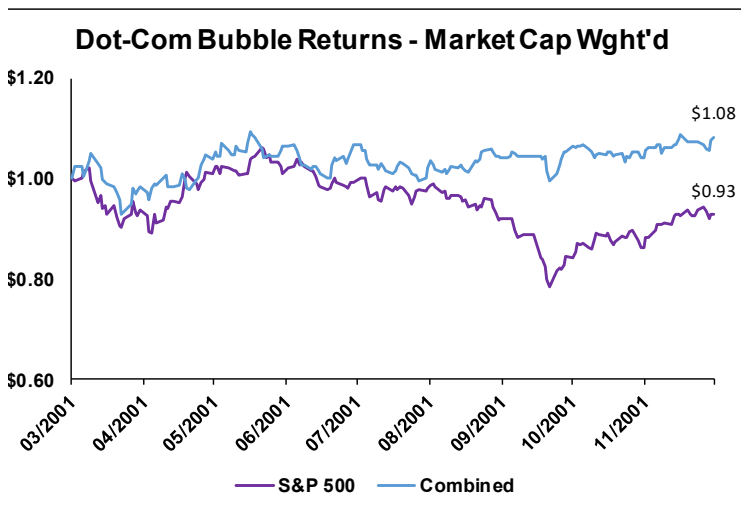
The following two periods highlight the last two economic recessions. As a common theme found in my research was sin stocks being defensive in nature, I decided to back this assertion up by looking at proven historical performance of sin stocks during the Dot-Com Bubble and the Great recession. The results are discussed below:

### iii) Dot-Com Bubble Returns

Similarly to the 20-year period, the overall Sin Portfolio and each sub-industry outperformed that of the S&P 500 during the Dot-Com Bubble on both a total return and risk-adjusted return basis.

The results are shown below:

Dot-Com Recession - Performance Metrics						
	S&P 500	Alcohol	Gambling	Tobacco	Firearm	Sin Portfolio
Total Return	(7.2%)	8.7%	5.7%	7.0%	0.1%	9.9%
Return of \$1 Investment	\$0.93	\$1.09	\$1.06	\$1.07	\$1.00	\$1.10
StDev	21.6%	19.1%	45.4%	25.0%	35.3%	17.4%
CAGR	(9.5%)	11.8%	7.7%	9.4%	0.1%	13.5%
Beta	1.00	0.19	1.20	0.28	0.50	0.28
Annualized Alpha	-	15.6%	31.6%	15.4%	11.0%	17.7%
Sharpe	(0.44)	0.62	0.17	0.38	0.00	0.77



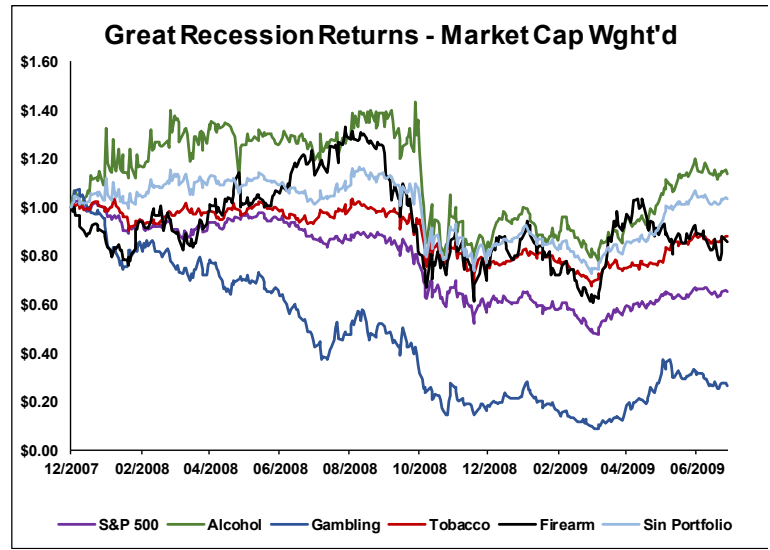
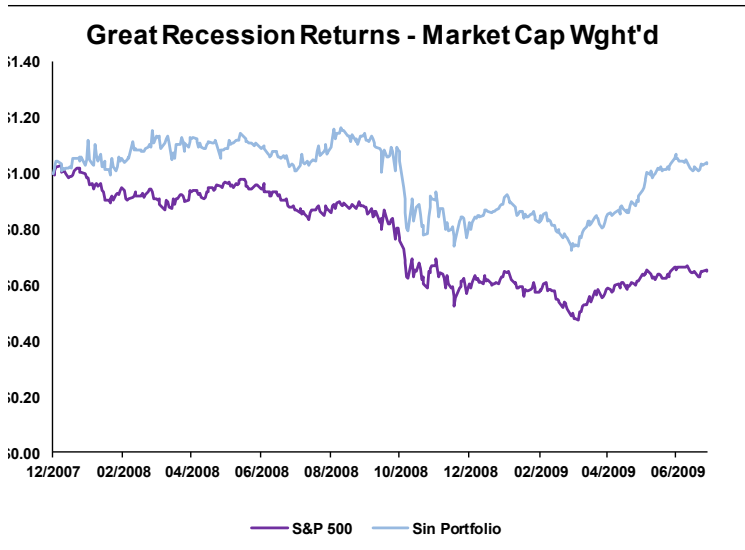
Looking specifically at the Sin Portfolio during the Dot-Com Bubble, it returned 9.9% turning a \$1 investment to \$1.10 versus the SPX which, detracted 7.2% turning \$1 to \$0.93. The Sin

Portfolio also had the best risk-adjusted return based on a Sharpe ratio of 0.77 versus the SPX at -0.44 and the lowest standard deviation at 17.4%. The betas were extremely low for the Sin Portfolio, Alcohol Basket, Firearm Basket and Tobacco Basket at 0.28, 0.19, 0.50 and 0.28, respectively. The Gambling Basket illustrated quite the contrary having a beta of 1.20 and standard deviation well above the others at 45.4%. Although the Gambling Basket was a riskier investment based on volatility and beta, it still returned 5.7% and had a Sharpe ratio of 0.17 versus a -7.2% return and -0.44 Sharpe ratio of the SPX. This is explained by the Gambling Basket's 31.6% annualized alpha, proving that performance was solely driven upwards by the industry in itself, not the broad market. The Sin Portfolio outpaced the SPX in every metric during the Dot-Com Bubble, which further validates the point that investing in vice is a defensive play that can generate returns during poor economic times.

#### *iv) Great Recession Returns*

The final time period I analyzed was the Great Recession. The Sin Portfolio again outperformed the market, with the only sub-industry to underperform being the Gambling Basket. The results are shown below:

<b>Great Recession - Performance Metrics</b>						
	<b>S&amp;P 500</b>	<b>Alcohol</b>	<b>Gambling</b>	<b>Tobacco</b>	<b>Firearm</b>	<b>Sin Portfolio</b>
<b>Total Return</b>	<b>(35.5%)</b>	<b>8.9%</b>	<b>(74.4%)</b>	<b>(12.5%)</b>	<b>(15.7%)</b>	<b>0.5%</b>
<b>Return of \$1 Investment</b>	<b>\$0.65</b>	<b>\$1.09</b>	<b>\$0.26</b>	<b>\$0.88</b>	<b>\$0.84</b>	<b>\$1.00</b>
<b>StDev</b>	<b>37.6%</b>	<b>59.7%</b>	<b>95.1%</b>	<b>31.5%</b>	<b>59.6%</b>	<b>37.3%</b>
<b>CAGR</b>	<b>(24.3%)</b>	<b>5.6%</b>	<b>(57.9%)</b>	<b>(8.1%)</b>	<b>(10.3%)</b>	<b>0.3%</b>
<b>Beta</b>	<b>1.00</b>	<b>0.76</b>	<b>1.55</b>	<b>0.63</b>	<b>1.27</b>	<b>0.74</b>
<b>Annualized Alpha</b>	<b>-</b>	<b>48.5%</b>	<b>(8.6%)</b>	<b>10.0%</b>	<b>39.8%</b>	<b>25.4%</b>
<b>Sharpe</b>	<b>(0.65)</b>	<b>0.09</b>	<b>(0.61)</b>	<b>(0.26)</b>	<b>(0.17)</b>	<b>0.01</b>



During the Great Recession, the Sin Portfolio returned 0.5% and had a Sharpe ratio and beta of 0.01 and 0.74, respectively versus the SPX which returned -35.5% and had a Sharpe ratio of -0.65. The betas of the Alcohol, Gambling, Tobacco and Firearms Baskets were 0.76, 1.55, 0.63 and 1.27, respectively. The low betas in the Alcohol and Tobacco baskets further validates the claim that consumers do not let go of their bad habits during an economic downturn, therefore, investing in these sinful industries can be a defensive mechanism for an investor's portfolio. The Gambling Basket returned -74.4% during the Great Recession and also had the highest beta and standard deviation at 1.55 and 95.1%, respectively. Gambling, unlike the other three baskets that make up the Sin Portfolio, specifically alcohol and tobacco, is more likely an activity that is tied to discretionary income. Therefore, I am not surprised that it is a much more volatile industry when compared to alcohol and tobacco which are both tied to individual addictions / weaknesses, thus people will continue to drink and smoke when times are tough, but probably will not gamble away their income on a game of roulette during an economic downturn.

## Valuation Results

I compared four valuation metrics, as well as a dividend yield analysis for the Sin Portfolio and its four respective baskets to that of the S&P 500 over a 20-year period. All numbers have been pulled in using Bloomberg. The Sin Portfolio average has been outlined in a red, dashed line for viewing purposes. The metrics I used included: (i) P/E Ratios, (ii) P/CF Ratios, (iii) P/B Ratios, (iv) EV/EBITDA Ratios and (v) Dividend Yields. The aforementioned metrics are discussed in more detail below.

### i) Price-to-Earnings (“P/E”) Ratio

A consolidated graphic of the P/E Ratios is shown below:

P/E Valuation Comparison						
	Alcohol Portfolio	Firearms Portfolio	Gambling Portfolio	Tobacco Portfolio	Portfolio Average	S&P
1999	16.19	31.07	20.38	7.38	18.75	29.32
2000	17.23	10.86	13.43	8.30	12.46	24.11
2001	19.13	29.91	21.27	28.46	24.69	26.70
2002	21.95	25.18	17.06	9.80	18.50	19.13
2003	16.22	80.11	19.77	27.30	35.85	20.56
2004	17.21	33.77	666.22	43.44	190.16	18.54
2005	19.49	69.80	66.41	16.71	43.10	16.91
2006	34.10	176.18	60.94	21.90	73.28	16.55
2007	39.51	27.24	50.98	29.01	36.69	17.45
2008	16.86	18.90	51.63	14.40	25.45	16.73
2009	23.18	10.94	128.13	11.28	43.38	18.92
2010	30.37	12.68	42.75	14.20	25.00	15.41
2011	23.85	21.45	32.21	15.72	23.31	13.43
2012	27.78	14.52	31.44	17.36	22.78	14.39
2013	50.69	11.45	70.24	16.79	37.29	17.41
2014	41.24	13.41	26.36	25.33	26.58	18.37
2015	35.95	19.42	25.08	22.32	25.69	18.78
2016	60.86	21.86	21.26	17.36	30.33	20.54
2017	30.61	12.29	37.31	29.19	27.35	21.74
2018	35.82	24.26	16.13	16.22	23.11	16.49

The P/E ratio for the Sin Portfolio tends to be higher than the market. This ratio measures how much an investor can expect to invest to receive one dollar of earnings. From 1999 to 2018, the Sin Portfolio’s P/E has increased 23% from 18.75 to 23.11 versus a 44%% reduction in the S&P from 29.32 to 16.49. The Gambling and Tobacco Portfolios were less expensive than the S&P with

P/E ratios of 16.13 and 16.22, respectively. The Alcohol Portfolio was the Sin Portfolio’s most expensive basket, having a P/E of 35.82. The Alcohol and Tobacco Baskets have become substantially more expensive over the 20-year period based on a P/E multiple with increases of ~121% and ~120%, respectively. Though the Sin Portfolio is more expensive than the S&P, the drastic 20-year outperformance discussed in the previous section justifies this slightly higher valuation.

**ii) Price-to-Cash Flow (“P/CF”) Ratio**

A consolidated graphic of the P/CF Ratios is shown below:

Price / Cash Flow Valuation Comparison						
	Alcohol Portfolio	Firearms Portfolio	Gambling Portfolio	Tobacco Portfolio	Portfolio Average	S&P
1999	8.71	21.66	8.34	3.68	10.60	16.90
2000	8.12	10.06	5.42	4.89	7.12	15.68
2001	15.44	11.64	6.08	13.03	11.55	13.11
2002	12.96	19.51	7.85	7.87	12.05	9.74
2003	11.94	11.77	7.67	19.11	12.62	10.63
2004	10.54	83.59	20.59	12.11	31.71	12.47
2005	14.98	18.31	30.34	19.81	20.86	13.04
2006	11.98	15.87	22.74	12.43	15.75	16.53
2007	18.78	17.01	30.01	8.32	18.53	15.54
2008	24.64	24.30	8.26	11.51	17.17	5.82
2009	7.45	5.71	8.88	38.41	15.11	7.82
2010	13.14	11.43	10.02	11.51	11.53	8.36
2011	13.11	7.95	6.86	20.31	12.06	7.21
2012	10.18	10.16	10.75	10.71	10.45	8.51
2013	22.73	8.30	17.59	14.97	15.90	9.17
2014	20.52	11.10	10.04	13.50	13.79	10.95
2015	18.65	11.33	10.64	14.12	13.69	10.67
2016	37.68	11.09	8.31	20.11	19.30	12.31
2017	22.76	11.62	10.61	14.29	14.82	14.66
2018	16.21	6.31	8.36	15.00	11.47	10.76

The P/CF valuation of the Sin Portfolio is slightly higher than that of the S&P at 11.47 versus 10.76, respectively. This metric measures the price over the Sin Portfolio relative to its operating cash flow per share. Unlike the P/E ratio that measured earnings relative to stock price, the P/CF ratio measures the amount of cash a company is able to generate relative to its stock price. The Alcohol and Tobacco Baskets have become drastically more expensive during the defined 20-year



time horizon increasing approximately 86% and 307%, respectively. On the other hand, the Firearms Basket's P/CF ratio has contracted by ~71% and the Gambling Basket has remained basically stable with the exception of 2004-2007. The Sin Portfolio's P/CF ratio in 2018 is only ~8% higher than its 1999 ratio, while the S&P's has declined ~36%. I view the gradual decline in the S&P's P/CF as the market coming to the realization that the S&P is trading at too high of multiples that must contract in order to become fairly valued.

### *iii) Price-to-Book ("P/B") Ratio*

A consolidated graphic of the P/B Ratios is shown below:

Price / Book Valuation						
	Alcohol Portfolio	Firearms Portfolio	Gambling Portfolio	Tobacco Portfolio	Portfolio Average	S&P
1999	1.59	2.16	2.65	1.73	2.03	4.99
2000	1.78	2.22	1.60	12.51	4.52	4.03
2001	1.97	2.27	2.44	3.93	2.65	3.44
2002	2.62	2.87	1.85	5.48	3.20	2.78
2003	2.23	3.92	2.32	2.15	2.65	3.11
2004	1.87	2.95	6.59	2.08	3.37	2.91
2005	1.91	2.79	4.32	7.79	4.20	2.73
2006	2.11	3.60	5.54	3.98	3.81	2.83
2007	1.97	4.55	5.39	5.52	4.35	2.77
2008	1.43	2.54	1.14	9.17	3.57	2.00
2009	1.76	3.46	1.26	6.10	3.15	2.15
2010	2.98	2.05	2.62	8.96	4.15	2.17
2011	2.84	2.92	2.39	122.49	32.66	2.05
2012	2.67	5.24	3.05	6.13	4.27	2.14
2013	4.28	4.36	7.74	5.95	5.59	2.59
2014	4.79	3.44	3.55	9.25	5.26	2.82
2015	5.35	2.97	3.17	10.93	5.61	2.76
2016	7.43	2.84	10.50	4.27	6.26	2.92
2017	3.07	4.27	6.62	4.20	4.54	3.26
2018	3.51	2.20	3.90	3.16	3.19	2.96

The 2018 P/B ratios of the Sin Portfolio (3.19) and the S&P (2.96) indicate that the Sin Portfolio is priced similarly with the market. Over the 20-year period, the P/B of the Sin Portfolio increased ~57% while the P/B of the S&P decreased ~41%. The P/B ratio is calculated by dividing the market price per share, which is merely the current share price, by the book value per share, which is obtained by using the reported numbers that are found in the company's financial statements.

Similarly to the results of both the P/E and P/CF ratios, the Sin Portfolio is trading at more expensive levels while the S&P has become a cheaper investment.

***iv) Enterprise-Value-to-EBITDA (“EV/EBITDA”) Ratio***

A consolidated graphic of the EV/EBITDA Ratios is shown below:

EV / EBITDA Multiple Comparison						
	Alcohol Portfolio	Firearms Portfolio	Gambling Portfolio	Tobacco Portfolio	Portfolio Average	S&P
1999	10.90	5.44	10.09	6.39	8.21	14.36
2000	10.83	4.53	8.81	5.95	7.53	12.23
2001	12.26	8.73	8.71	8.84	9.63	12.91
2002	9.81	10.60	8.15	5.66	8.56	11.19
2003	12.27	13.72	8.84	10.65	11.37	12.52
2004	11.59	13.00	24.01	15.55	16.04	12.32
2005	12.66	13.21	28.75	9.29	15.98	11.42
2006	18.28	28.91	25.84	11.99	21.26	10.92
2007	21.20	10.41	29.17	7.51	17.07	10.66
2008	13.03	5.11	10.27	6.73	8.78	7.83
2009	9.14	6.66	10.96	7.15	8.48	9.31
2010	12.01	6.01	13.27	7.92	9.80	9.01
2011	10.62	8.90	9.49	8.75	9.44	8.16
2012	11.15	7.07	11.24	8.19	9.41	9.01
2013	18.63	5.56	19.42	9.05	13.17	10.20
2014	17.06	5.98	12.39	10.18	11.40	11.17
2015	14.67	9.79	11.94	11.04	11.86	12.19
2016	20.53	8.27	11.82	10.52	12.78	12.36
2017	16.25	7.54	13.77	11.71	12.32	13.29
2018	15.76	7.65	11.01	9.60	11.00	11.84

The last valuation multiple I will be discussing is EV/EBITDA. This ratio compares the value of the company to its cash earnings minus non-cash expenses. Unlike the previous three metrics that depict the Sin Portfolio as more expensive than the S&P, the EV/EBITDA of the Sin Portfolio is slightly less than that of the S&P at 11 versus 11.84. Looking at the period ranging from 1999-2018, the EV/EBITDA multiple of the Sin Portfolio increased by ~34% while the EV/EBITDA of the S&P has declined ~18%. The slight difference in the current EV/EBITDA multiple indicates that the Sin Portfolio is priced in-line with the market.

Looking at all four valuation metrics in unison, the Sin Portfolio is slightly more expensive than the S&P. The average of the four valuation metrics of the Sin Portfolio have increased 30.64% since 1990, while these same metrics have decreased ,on average, 34.58% for the S&P. While sin stocks have become more expensive, they have also outperformed the market. I believe investors have punished the S&P, while concurrently realizing that investing in stocks that are viewed as unethical have historically resulted in a positive alpha in both good and bad economic times.

#### ***v) Dividend Yield***

Rather than stopping with the previous valuation metrics, I felt as if coupling this data with dividend yields would provide a deeper analysis of the Sin Portfolio versus the S&P. Specifically, this illustrates that income appreciation that is received from the different investment portfolios. It is worth noting that in 2018, only 16 of the 33 stocks in the Sin Portfolio paid a dividend. Dissecting this further, 3/10 (30%), 7/10 (70%), 5/8 (62.5%) and 1/5 (20%) stocks paid a dividend in the Alcohol, Gambling, Tobacco and Firearms Baskets, respectively.

A consolidated graphic of the Dividend Yields is shown below:

Dividend Yield Comparison						
	Alcohol Portfolio	Firearms Portfolio	Gambling Portfolio	Tobacco Portfolio	Portfolio Average	S&P
1999	1.26%	4.04%	0.80%	3.51%	2.40%	1.11%
2000	2.29%	3.62%	0.71%	3.09%	2.43%	1.20%
2001	1.42%	4.96%	0.69%	2.87%	2.48%	1.35%
2002	1.56%	5.14%	0.69%	2.80%	2.55%	1.79%
2003	2.88%	3.99%	1.27%	2.34%	2.62%	1.55%
2004	0.75%	3.63%	0.75%	2.16%	1.82%	1.94%
2005	1.09%	4.07%	0.87%	2.30%	2.08%	1.80%
2006	1.43%	4.84%	0.94%	2.17%	2.35%	1.77%
2007	1.57%	4.14%	1.22%	2.11%	2.26%	1.93%
2008	2.97%	4.42%	3.35%	4.85%	3.90%	3.15%
2009	2.85%	4.57%	2.81%	3.83%	3.51%	2.12%
2010	3.45%	3.90%	2.55%	3.55%	3.36%	1.88%
2011	3.07%	4.07%	2.84%	3.22%	3.30%	2.12%
2012	3.06%	3.71%	2.66%	3.47%	3.22%	2.24%
2013	2.33%	2.77%	2.63%	3.70%	2.86%	1.89%
2014	3.06%	3.51%	3.73%	3.89%	3.55%	1.95%
2015	1.14%	4.64%	3.96%	3.75%	3.37%	2.15%
2016	1.06%	3.12%	3.56%	3.55%	2.82%	2.09%
2017	1.23%	2.25%	2.36%	2.82%	2.16%	1.89%
2018	1.95%	3.98%	3.65%	5.77%	3.84%	2.15%

Looking at historical dividend yields, the Sin Portfolio has returned more income to shareholders than the S&P in the form of dividends. During the Great Recession (2008-2009), the Sin Portfolio cut its dividend yield by 39 basis points from 3.90% to 3.51% while the S&P's dividend yield took a much larger hit with 103 basis point reduction from 3.15% to 2.12%. This further validates the claim that sin stocks are defensive in nature, thus are capable of sustaining positive returns during an economic contraction. Specifically, the Tobacco Portfolio had a 2018 dividend yield of 5.77%, which is more than two times that of the S&P. After coupling performance with valuation metrics and dividend yields, the Sin Portfolio has historically proven to be a great investment.

## CONCLUSION

My original thesis was: investing in sin stocks will result in superior risk-adjusted returns because people avoid them to adhere to societal norms rather than using rational economic reasoning. In order to check the validity behind my claim I performed a quantitative analysis by regressing the returns of a market-cap weighted Sin Portfolio I constructed of 33 stocks, belonging to four industries consistently viewed as sinful by the general public, against the returns of the S&P 500 over four different time periods. The four industries included: (i) alcohol, (ii) firearms, (iii) gambling and (iv) tobacco. The four time periods included: (i) 20-year period ranging from 1998 to 2018, (ii) 10-year period ranging from 2008 to 2018, (iii) the Dot-Com Recession ranging from March 2001 to November 2001 and (iv) the Great Recession ranging from December 2007 to June 2009. Original rationale behind this thesis included: neglect based on moral standards reduces risk amongst the smaller investor base in sin stocks, less tracking by analysts and ownership by institutions results in information asymmetry due to less research reports being available, sin stocks are unjustly undervalued relative to the overall market and sin industries profit off human weakness by offering addictive products.

The results were consistent with the Sin Portfolio outperforming the S&P 500 during all four time periods. During the 20-year, 10-year, Great Recession and Dot-Com Bubble the Sin Portfolio returned 3,393%, 380.8%, 0.5% and 9.9%, respectively, versus the SPX, an index tracking the S&P 500, which returned 198.2%, 242.7%, -35.5% and -7.2%. The higher dividend yield of the Sin Portfolio, with the exception of 2004, was a tailwind for its total return, as well as an attractive element for potential investors. The beta of the Sin Portfolio during the 20-year, 10-year, Great Recession and Dot-Com Bubble was 0.67, 0.82, 0.74 and 0.28. Low betas, along with higher Sharpe ratios indicate lower risk associated with the Sin Portfolio.

Neglect of sin stocks from investors, either to uphold individual values or to fit in with society, has proven to be detrimental to portfolio performance based on my results. This neglect stems from individuals and moves its way upwards to the institutional investors. By focusing on social norms instead of financial returns, as seen with the screening out of sin stocks, socially responsible investors are inevitably increasing portfolio volatility. This avoidance of sin stocks is the root of information asymmetry because less analyst research is required for the niche group of investors that are willing to jump off the bandwagon and resist the urge of allowing society to control their ultimate investment decisions. Firms are conforming to social standards at the expense of performance. Sin stock outperformance during recessionary periods further confirms the fact that vice investing is defensive and reduces portfolio volatility. Consumers willingly indulge in sinful activity during both good and bad economic times. When an individual's finances are running low, they do not typically cut out bad habits like smoking and drinking, but rather cling to these indulgences as they provide a sense of comfort. The addictive nature of sinful products, coupled with high barriers to entry, has enabled the industries to become somewhat monopolistic. Further, the backlash sin firms receive from the press and the constant litigation risk is clearly rewarded with a performance premium based on my results.

Regardless of how important it is to please societal demands by maintaining high moral standards, doing so by completely filtering out sin stocks is extremely costly to the investment portfolio's overall performance and, thus, is irrational and ineffective, as it is their fiduciary duty is to maximize returns for their clients. I conclude that overall investor neglect, less tracking by analysts, reduced risk as seen with low volatility and betas and monopolistic characteristics create an opportunity for investors in a sin portfolio to substantially outperform the market.

## WORKS CITED

- Belghitar, Y., Clark, E., & Deshmukh, N. (2014). Does it pay to be ethical? evidence from the FTSE4Good. *Journal of Banking and Finance*, 47, 54-62. doi:10.1016/j.jbankfin.2014.06.02
- Blitz, D., & Fabozzi, F. (2017). Sin stocks revisited: Resolving the sin stock anomaly. *Journal of Portfolio Management*, 44(1), 105-111. doi:10.3905/jpm.2017.44.1.105
- Bloomberg L.P. (2019) Various data pulls. Retrieved Mar. 20, 2019 from Bloomberg database.
- Borgers, A., Derwall, J., Koedijk, K., & ter Horst, J. (2015). Do social factors influence investment behavior and performance? evidence from mutual fund holdings. *Journal of Banking and Finance*, 60, 112-126. doi:10.1016/j.jbankfin.2015.07.001
- Cheung, W., & Lam, D. (2015). Comparing the price of sin: Abnormal returns of cross-listed casino gaming stocks in the hong kong and US markets. *International Journal of Hospitality Management*, 45, 73-76. doi:10.1016/j.ijhm.2014.12.002
- Derwall, J., Koedijk, K., & Ter Horst, J. (2011). A tale of values-driven and profit-seeking social investors. *Journal of Banking and Finance*, 35(8), 2137-2147. doi:10.1016/j.jbankfin.2011.01.009
- Entine, J. (2003). The Myth of Social Investing: A critique of its practice and consequences for corporate social performance research. *Organization & Environment*, 16(3), 352-368. doi:10.1177/1086026603256283
- Fabozzi, F., Ma, K., & Oliphant, B. (2008). Sin stock returns. *Journal of Portfolio Management*, 35(1), 82-82. doi:10.3905/JPM.2008.35.1.82
- Fauver, L., & McDonald, M. B. (2014). International variation in sin stocks and its effects on equity valuation. *Journal of Corporate Finance*, 25, 173-187. doi:10.1016/j.jcorpfin.2013.11.017
- Fund groups clamp down on 'sin' stocks in portfolios. (2018). *Investment Week*, , 12-12.
- Galema, R., Plantinga, A., & Scholtens, B. (2008). The stocks at stake: Return and risk in socially responsible investment. *Journal of Banking and Finance*, 32(12), 2646-2654. doi:10.1016/j.jbankfin.2008.06.002
- Grougiou, V., Dedoulis, E., & Leventis, S. (2016). Corporate social responsibility reporting and organizational stigma: The case of "sin" industries. *Journal of Business Research*, 69(2), 905-914. doi:10.1016/j.jbusres.2015.06.041
- Gustafson, M. (2008). "sin stock" markets boom while pocketbooks go bust. *Private Label Buyer*, 22(11), 12.
- Hong, H., & Kacperczyk, M. (2009). The price of sin: The effects of social norms on markets. *Journal of Financial Economics*, 93(1), 15-36. doi:10.1016/j.jfineco.2008.09.001

- Kim, I., & Venkatachalam, M. (2011). Are sin stocks paying the price for accounting sins? *Journal of Accounting, Auditing & Finance*, 26(2), 415-442. doi:10.1177/0148558X11401222
- Phillips, P. J. (2011). Sin stocks in self managed superannuation funds. *Australasian Accounting Business & Finance Journal*, 5(2), 39-51.
- Pacyniak, B. (2008). 'sin stocks' surge as recession wears on. *Candy Industry*, 173(10), 6.
- Richey, G. (2013). Does Running with the "Devil" Provide a Risk-Adjusted Abnormal Return? An Investigation of U.S. "Sin Stocks". Retrieved from <https://www.irjaf.com/>
- Sabherwal, S., Sarkar, S. K., & Uddin, M. R. (2017). Political party affiliation of the president, majority in congress, and sin stock returns: Presidency, congress, and sin stock returns. *Financial Management*, 46(1), 3-31. doi:10.1111/fima.12141
- Steen, A. (2012). Investments: Stretching morals with sin stocks. *Money Management*,
- Trinks, P. J., & Scholtens, B. (2017). The opportunity cost of negative screening in socially responsible investing. *Journal of Business Ethics*, 140(2), 193-208. doi:10.1007/s10551-015-2684-3
- US SIF Trends Report. (2018, October 31). Retrieved from <https://www.ussif.org/fastfacts>
- Waxler, C. (2004). *Stocking up on sin: How to crush the market with vice based investing*. Hoboken, N.J: Wiley.