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The Anti-ESG Equity Premium

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The Anti-ESG Equity Premium

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Abstract

In this paper, I estimate the monthly alpha of sin stocks as a means to assess the influence that ESG investors exert on the public equity markets. I hypothesize that the systematic avoidance of sin stocks leads to the outperformance of a broad sin portfolio relative to conventional market benchmarks. Further, given the increase in the proportion of ESG-oriented assets under management in recent years, I hypothesize that the observed alpha in more recent periods exceeds that of prior periods. Consistent with the first plank of my hypothesis, I provide strong evidence for the outperformance of sin stocks over time despite time-varying alpha. Conversely, I find that the alpha in more recent time periods associated with an increase in the proportion of ESG-oriented capital has deteriorated and turned negative, inconsistent with the second plank of my hypothesis. I then propose a theory to explain this divergence in results from my hypothesis.

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§1: Introduction*

While socially responsible, or ESG, investing has gained traction in the financial world in recent years, the presence of such investors is no new phenomenon. The Social Investment Forum estimates that in 2001, ~$2.3 trillion of assets under management underwent some sort of social screen.[1] This figure at the time represented ~12% of the entire asset management industry, which suggests that socially responsible investors have wielded market influence for at least a couple of decades.

Such influence merits further study. In this paper, I examine the effects that socially responsible investors have on public equity markets. I first draw on a theory that links stock returns to the presence of green investors in the market (Heinkel et. al. 2001). This theory suggests the presence of ESG investors changes the expected risk-reward dynamic of certain categories of securities. In particular, exclusionary ethical investing leads to the avoided firms yielding superior expected risk-adjusted returns as compared to that of ESG-friendly stocks. This theory then motivates this study and informs my hypothesis development.

The relevant literature is both broad and growing, and prior studies have led to mixed results. Hong and Kacperczyk (2009) study the economic effects of social norms in the context of the stock market. The study finds that a portfolio long sin stocks and short comparable companies achieves 26 basis points per month of alpha under the Fama-French

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[1] The Forum for Sustainable and Responsible Investment is the leading provider of sustainable investing research and publishes an oft referenced biennial report on the status and growth of the asset class.

4-Factor model. But the work of Statman (2000) suggests another conclusion, that an ESG portfolio offers comparable expected risk-adjusted returns to that of a neutral portfolio that includes stocks with poor ESG characteristics.[2] The appropriate definition and selection of either sin or ESG stocks presents a material complication to these studies. Hong and Kacperczyk (2009) point out that the number of sin stocks is endogenous and depends on the degree to which equity investors eschew stocks out of social concerns. Moreover, recent work from Ahmed et. al. (2022) concludes that ESG ratings fail to capture the genuine social responsibility of a given firm, leading to potential disagreements about which firms are in fact sinful.

In this study, I use the methodology of Hong and Kacperczyk (2009) but with updated data, through 2021.[3] Key motivation for this lies in the growth of ESG institutional capital, both in nominal terms and as a proportion of total assets under management across the globe. As of the end of 2019, "one out of every three dollars under professional management in the United States—$17.9 trillion—was managed according to sustainable investing strategies," per The Forum for Sustainable and Responsible Investment.[4] The theory from Heinkel et. al. (2001) suggests that if a greater proportion of capital is managed under social constraints, then the sin premium will be greater. That is, the greater the proportion of ESG capital in the market, the greater the sin stock alpha, ceteris paribus.

[2] An implicit further conclusion then is that stocks with poor ESG characteristics, or sin stocks, do not generate meaningful alpha—at least on the basis of these characteristics alone.
[3] Hong and Kacperczyk (2009) includes data up until the end of 2006.
[4] See <https://www.ussif.org/sribasics> for more information.

But my results do not bear this out. While the results of Hong and Kacperczyk (2009) find a premium of 26 basis points per month from 1965-2006, I find a premium of 19 basis points per month from 1965-2021 given the same dependent variable and model. The deterioration of and negative alpha from 2007-2021 accounts for this difference in results. During this period, I find zero basis points of alpha. This result contrasts with the second plank of my hypothesis.

The theory that I draw on is static in that the model does not account for unexpected changes in the proportion of socially responsible investors present in the market. If there were an unexpected change in this proportion, then this must impact the alpha. I propose that such an explanation accounts for the deterioration in alpha under updated data. I elaborate on this point later in the paper.

The remainder of the paper proceeds as follows: in Section 2, I explain the motivating theory, and in Section 3 I both further review and reconcile the literature. Then in Section 4 I discuss the selection of sin stocks and in Section 5 provide an overview of the data collection process and research design. I follow this with an analysis and discussion of the results in Sections 6 and 7. In Section 8 I conclude and offer final thoughts on the study.

§2: Motivating Theory and Hypothesis Development[5]

As an illustration, consider a simple world with two types of investors: neutral, or those that seek to maximize returns, and ESG investors. Further, two types of firms exist: dirty and clean, or socially irresponsible and socially responsible. The dirty or socially irresponsible firms may reform their business practices as a means to become socially responsible. This then means that in practice, three types of firms exist: clean firms, clean firms that used to be dirty, and dirty firms. Firms that are clean are acceptable to all investors as candidates for investment. On the one hand, the ESG investors will only invest in clean firms, whereas on the other hand, the neutral investors have no explicit preference for firm type (their only goal is to maximize risk-adjusted returns). The dirty, unreformed stocks are *only* acceptable to the neutral investors, however. This then means that fewer investors are willing to own the stock, and the share prices of such stocks reflect this lack of demand through a lower price. Holding the number of investors in the market constant, any increase in the proportion of ESG investors will further decrease the price of the dirty stocks. This implies the presence of fewer and fewer neutral investors, which makes for less supply of capital to dirty firms. In order to compensate these investors for the risk of holding a higher proportion of dirty firms than they otherwise would in a world in which all investors were neutral, a higher expected return is demanded.[6] This all manifests itself in the form of a lower share price.

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[5] In this entire section, I draw on Heinkel et. al. (2001).

[6] It can be assumed that these neutral equity investors optimize for both mean and variance. Given the CAPM, this means that these investors will hold a portfolio that lies on the capital market line (CML). The CML consists of various combinations of a risk-free asset and a risky portfolio. The investors certainly disagree on the relative weights between the risky portfolio and the risk-free asset, but all of these investors will hold the same portfolio of risky assets—which is the market portfolio. As these neutral investors then in the stylized world increase the weights of sin stocks, variance of the portfolio increases given the increase in idiosyncratic risk (greater

In some sense, a greater expected return associated with a lower stock price is counterintuitive but consider a stylized example of a firm that produces exactly $1 of cash flow per year, per share of stock. Say that this business is debt-free and distributes all levered free cash flow to equity holders in the form of a tax-free dividend. If the stock price is exactly $10, then the expected total return is 10% per year. But now say that this business is dirty, and the presence of ESG investors limits the supply of capital, which pushes the stock price down to $5. This presence of ESG investors has not impaired the business's expected future cash flows, either. The expected return has now risen to 20%, hence the lower stock price, all else equal, *even without ESG investors returning to buy the stock*, yields a greater expected return.[7] The return of ESG investors to the stock only increases the expected return beyond 20% for investors that purchase the stock at $5.

Further, if we abstract away from the numerical figures in the above and say that a firm produces cash flow μ, a firm's cost of capital under an efficient market should be $\mu/price$.[8] That is, the cost of capital is equivalent to the expected return for those that provide capital to the business. In our example, those that provide capital are only common equity holders. From this we can observe a 1:1 inverse relationship between price and the cost of

concentration in a subset of equities, namely, dirty stocks). These investors will then demand a greater expected return ("mean") in exchange for the risk.

[7] Expected return for these equity holders is still the levered free cash flow divided by the stock price, which results in 1/5 = 20%.

[8] An efficient market requires that all stock prices be equal to the present value of all current and future cash flows. In other words, the price of all stocks should in fact reflect the true fair value of the business. If cash flow is μ in a given year, this means that $\mu/price$ is the expected return on investment for equity holders.

capital.[9] As the price falls, the cost of capital rises, which in turn further raises the expected return for the stock at its new price.

Now consider the effect of an increase in the proportion of ESG investors in the market. The effects that I have outlined so far are only exacerbated as ESG investors make up a greater share of total participants in the public equity markets. More socially responsible investors in the market suggests the presence of even fewer neutral investors willing to own dirty firms. This leads to even less diversification (and even more concentration) in the paradigmatic neutral investor's portfolio and less capital available for dirty firms. This greater portfolio concentration and limited flow of capital leads to even lower share prices of sin stocks, which then leads to even greater expected returns for those that are willing to own the sin stocks. In summation, the more ESG investors present as a percentage of total investors, the more attractive the sin stock investment opportunity becomes for the neutral investor.[10]

Heinkel, Kraus, and Zechner further note that a consequence of the adjusted risk-sharing amongst investors is that all three types of firms plot off of the security market line. The abnormal returns are not due to better investment opportunities, but instead due to the different market prices of risk that investors demand (Heinkel et. al. 2001). Dirty firms plot

[9] At a stock price of $10, the expected return is 10%. But as the stock price falls to $5, the expected return increases to 20%, hence when the price falls by ½, the expected return increases 2x.

[10] The opportunity cost for the ESG investors here can be severe. As a real-world example, consider CalPERS. In 2000, their investment committee decided to divest from tobacco stocks. The fund then officially divested in 2001. Some claimed that this decision was based on litigation risk and fundamental analysis, but there were certainly discussions of the apparent lack of social responsibility in owning such equities. Wilshire Associates, the pension system's investment consultant, calculated a total opportunity cost of ~$3.6 billion as of June 30, 2018.

above the security market line and both clean and reformed firms plot below the security market line. This is then associated with positive abnormal returns for the former and negative abnormal returns for the latter. Such deviations from the security market line should then be detected as Jensen's alpha, both to the upside and the downside.

As with any theory, limitations exist. The public equity markets are much more complex than the stylized market painted above. There are more than two types of investors and more than two or three types of firms, and market participants sometimes sell shares of a given stock short.[11] Further, ESG investors range in motivation and agenda. Some use ESG data as a means to analyze potential risks to a business's fundamentals, and in some sense this type of investor is just like the neutral investor in the stylized market—an investor that seeks to maximize returns, optimizing for mean and variance. But other ESG investors exclude particular stocks from portfolios as a means to enact change, or at least attempt to enact change. The stylized example considers this latter type of ESG investor as the paradigmatic green investor. Note that one recent study surveyed portfolio managers across the world that represent ~43% of global assets under management. Of these respondents, ~82% said that they use ESG information and data sources throughout the investment process and of this group, ~33% said that they do so because they think that this is an effective way to bring about change at the businesses they boycott (Amel-Zadeh and

[11] Heinkel, Kraus, and Zechner's illustrative market includes a restriction on selling shares short, but such a restriction does not change the overall conclusion or theory. Rather, the fact that reformed firms keep the same technology as the dirty firms and do not adopt the clean technology necessitates such a restriction.

Serafeim 2018).[12] I include this datapoint to note that while disagreement will always exist with respect to the role that ESG data and investing should play in the financial markets, the presence of ESG investors that make investment decisions on the basis of social goals merits no debate.

I submit then that the theory should have real world implications. This leads me to my hypothesis: sin stocks outperform conventional market benchmarks, detectable through positive and significant Jensen's alpha. Further, the alpha varies with time given dependence on the proportion of ESG capital under management. I hypothesize that this is detectable through an increase in the alpha in the period from 2007-2021 that follows the work of Hong and Kacperczyk (2009) given the growth of ESG capital.

[12] This is in some sense an additional datapoint to corroborate the statistic included earlier from the Social Investment Forum on the proportion of institutional assets that are managed within the confines of a social screen.

§3: Literature Review and Reconciliation

Studies that seek to answer a similar question as this study—that of the performance of ESG and sin stocks—to date yield mixed evidence. In some respect, this seems due to the fact that studies use varying methodologies. Consider one prominent and well cited paper already noted that constructs an index composed of companies that operate in the group of industries known as the "Triumvirate of Sin"—tobacco, alcohol, and gaming—and focuses on this index's performance as compared to that of the market and comparable companies in the food, hospitality, and other related industries (Hong and Kacperczyk 2009). The paper provides strong evidence for the effects of social norms on markets through the study of sin stocks. The authors find that there is a material price effect of 15-20% on these stocks, as the expected returns and costs of capital rise as a result of large institutional investors avoiding the assets. This then translates to 26 basis points of monthly alpha for a portfolio that is long sin stocks and short comparable companies using a conservative Fama-French market benchmark. In addition to this price effect, the authors find that institutional managers shun sin stocks and that these sin stocks receive less analyst coverage, controlling for various business characteristics. Further, the authors suggest a couple reasons that sin stocks should be cheaper than other stocks and thus be expected to outperform, inspired by a prominent prior study (Merton 1987). First, the neglect of sin stocks by select, large swaths of capital leads to depressed prices relative to fundamentals given a capital supply and demand imbalance. Second, given the limited risk sharing between investors, the CAPM cannot hold. The upshot is idiosyncratic risk and not just beta matters for asset pricing. The increased risk

of litigation associated with sin stocks is well known, and this risk further increases the expected returns.

Now consider another study that concludes socially responsible portfolios offer comparable returns to that of conventional portfolios, through the study of the Domini Social Index (DSI) as compared to the S&P500 (Statman 2000). The author argues that the DSI is a justifiable index to use as a proxy for a socially responsible portfolio, but the constituents of the portfolio deserve consideration. Under the period of study, the DSI includes 400 total stocks. 250 of these stocks are *also in the S&P500*. Then 100 more companies were added to provide industry representation along with 50 other stocks with strong ESG characteristics. The DSI then looks much more like a common market portfolio than a portfolio of ESG stocks.[13] Given this methodology for the selection of ESG stocks and the broad diversification, the results are of no surprise.

In order to illustrate this point, consider an example in which I use Fama and French (1997) industry return data from 1965-2021, on an annual basis. This data includes equity returns for 48 different industries. During this time period, based on the median annual return, industry group 17—construction materials—was the best performer. This median return is 22.45% per year, over 57 years. I then calculate the return of a synthetic portfolio over these 57 years that allots equal weight to all 48 industry groups. The median return over the period is 13.89%. Then I calculate the return on a new equally weighted portfolio,

[13] On BlackRock's website today, it is clear that the DSI 400 seeks to track a broad portfolio representative of the entire economy, like the S&P500 index or the Dow Jones Industrial Average, except its managers apply a screen to weed out alcohol, tobacco, adult entertainment, weapons, and fossil fuels.

but this time exclude construction materials. The median return of this updated portfolio is 13.88% per year. Say that you were to invest $1 in each of these portfolios at the beginning of the period. At the end of the period, in the former case your $1 would be worth $1,659 and in the latter case your $1 would be worth $1,647. Forget statistical significance and noise in the data. In nominal terms, the difference is di minimis. As a portfolio's asset constituency is diversified, any given asset's return contributes less to the total return of the whole portfolio, no matter the performance of the asset. In this case, the huge outperformance of construction materials makes a negligible impact on the diversified portfolio's return, even over a long period.

I want to then suggest a critical disanalogy between the study focused on the Triumvirate of Sin, and Statman (2000) that uses the DSI as a proxy for an ESG portfolio. The authors in the former use a *positive* screen for sin stocks. That is, the authors seek to isolate a group of sin stocks from the rest of the market, and then compare this constructed portfolio to conventional equities. Conversely, the latter uses a *negative* screen for ESG stocks, in which a small handful of "bad" companies are removed from a market portfolio, and then this portfolio is compared to the market. The result is that the two portfolios in the latter are much more similar than not, which makes drawing conclusions about the relevant question—the performance of ESG stocks—quite difficult.

Many past studies examine mutual fund performance. But even amongst studies that focus on mutual fund performance, the evidence is mixed. One paper finds that socially responsible mutual funds have a track record of worse performance as compared to that of

conventional funds available to investors (Geczy et. al. 2003). In this particular study, the authors note that the results depend on the chosen model. For instance, under the CAPM, the authors find that the cost of investing in socially responsible mutual funds is only a few basis points per month. Then, even if you assume no managerial skill and instead believe in factor models in which superior returns are associated with varying exposure to size, value, and momentum, then the cost of investing in ESG funds becomes much more material—at least 30 basis points per month.[14] That said, Statman's paper also examines the performance of ESG mutual funds as compared to that of conventional mutual funds from 1990-1998. While the ESG mutual funds posted inferior performance to both the S&P 500 and the DSI, these funds did not report performance below that of conventional mutual funds at a level of statistical significance (Statman 2000).

Beyond studies of particular portfolios, one well-cited paper provides evidence that increases in corporate social responsibility (CSR) ratings per Kinder, Lydenberg, Domini are associated with negative future stock returns (Di Giuli and Kostovetsky 2013). The authors find no evidence that increases in a company's CSR budget converts to any value for the business. Further, the study finds no evidence of increased sales to offset the increased expenditures associated with an increase in a CSR budget—hence an increase in a CSR budget is both associated with an increase in a firm's CSR rating as well as negative future stock returns and a decline in the firm's ROA. The CSR expenses can be thought of as a

[14] Here I reference some common Fama-French factors, which I will discuss further later in the paper.

transfer of wealth from equity owners to other stakeholders.[15] This study then offers a potential further, supplementary theory that might explain why many studies find that ESG stock portfolios underperform conventional portfolios.

Despite the recent popularity of corporate social responsibility ratings, evidence is growing that such ratings are of little use to investors that seek to gain a genuine understanding of a business's true social responsibility. One recently published paper considers Russia's invasion of Ukraine on February 24th, 2022, as a means to put this theory to the test (Ahmed et. al. 2022). Swift and fierce public outrage followed the invasion. Western leaders denounced the Russian maneuver in unison, but the responses from Western-based corporations with assets in the country varied. Some ceased operations, while some stayed quiet, and others offered words of sympathy for Ukrainians while continuing to conduct business in Russia. In what would seem to be a pivotal moment for corporations to flex their ESG credibility—particularly those that tend to benefit from high CSR and ESG ratings through lower costs of capital—many companies did not withdraw from the country. Moreover, in this event study, ESG scores did not demonstrate any relation to whether or not a company suspended operations. Firms with a high ESG score prior to the invasion were no less likely to withdraw from Russia than firms with a low ESG score. It seems then that when businesses face a genuine test, corporate social responsibility as inferred from the ratings is illusory.

[15] The stakeholders could be any number of groups of individuals. What is important is that these stakeholders referenced *are not* the shareholders of the business.

The result and conclusion in Ahmed et. al. (2022) leads me to a point worth brief discussion. As a thought experiment, let us take the results and corresponding conclusion as true. Even in such a case, this conclusion has no bearing on the motivating theory and hypothesis, for the theory only requires particular public perceptions and thus certain investor behavior to exist to have explanatory power, and not some specific firm behavior. In the identification of sin stocks then, my focus is on public perceptions of a firm and its associated operations, rather than firm behavior. Value judgements as they relate to true firm goodness or badness are of no concern to this study.

§4: Sin Stock Selection

As discussed in the prior section, the selection of sin stocks for the index under consideration is critical to the results in a study that concerns total equity returns. In this study I replicate the selection process found in Hong and Kacperczyk (2009). The authors focus on the alcohol, tobacco, and gaming industries, as do I in stock selection.

Public perceptions and attitudes towards companies change over time. For instance, many oil and gas companies today are considered to be anti-ESG or sin stocks but would certainly not qualify as sin stocks back in the middle of the 20th century.[16] While public perceptions and attitudes can be difficult to quantify, a study on this topic must account for relevant shifts as the results rely on these very public perceptions that impact price and thus expected and realized returns.[17]

Tobacco presents an interesting case as its use has been documented for thousands of years, and only in recent years has smoking been labeled a sinful activity. Prior to modern medicine, some societies considered tobacco products medicinal, such as Native American tribes. In the early 1900s, the mass production of cigarettes exploded—in 1901, manufacturers produced 3.5 billion sticks in the United States. But then in 1964, the Surgeon General released a report on the severe health consequences of smoking tobacco. Such a

[16] This has been driven by climate activism. Certainly, many disagree on whether or not oil and gas companies do in fact engage in sinful activities. But to be considered a sin stock in the sense required for the relevant theory to apply, *everyone* in the market need not believe that the business activities of a firm are in fact sinful. Rather, only a *subset* of investors must 1) believe the business activity is sinful and 2) shun ownership of the stock on this basis.

[17] This should be relatively clear. If socially responsible investors do not in fact shun stocks, or socially responsible investors do not even exist, then the motivating theory has next to no practical implications for the global capital markets.

report led to further governmental regulation of the industry, and in 1965, Congress passed the Federal Cigarette Labeling and Advertising Act, which mandated a label on all cigarette packages that warned consumers of the health risks associated with smoking. Given this legislation, it is reasonable to conclude that at this point in time, public perceptions had turned against the practice of smoking. Public tobacco companies were now sin stocks.[18, 19]

The case of alcohol is quite different. Citizens around the world have been aware of the health risks of excessive alcohol usage far prior to the 1965 tobacco legislation. Further, governments regulated the consumption of alcohol prior to the 1960s. The most notable example is the passage of the 18th Amendment to the United States Constitution, which banned the production and distribution of alcohol. This legislation codified Prohibition into law in 1919. While the passage of the 21st Amendment repealed the 18th Amendment, this did not put an end to the perceived sinfulness of excessive alcohol consumption. That said, alcohol is often perceived as less sinful that smoking, in part due to the greater popularity of the former. Only 27% of men today abstain from alcohol consumption, and 42% of women. The implied proportion of American adults that do consume alcohol on a regular basis well exceeds the smoking rate in the United States, 12.5% as of 2020.[20]

Like alcohol, some have preached against the vices of gambling, such as evangelist Billy Sunday and Social Gospel founder Walter Rauschenbusch, well prior to 1965 (Vacek

[18] Research in prior decades suggested that tobacco led to lung cancer and other side effects. I use the 1965 legislation as a conservative marker for a shift in public opinion.
[19] I draw on information from a Swedish Health Services report that provides a historical overview of tobacco use in the United States, <https://www.swedish.org/history-of-tobacco-in-america>.
[20] Here, I leverage a report on alcohol in the United States from the NIH and a CDC report on smoking: <https://www.nih.gov/books/alcohol>, <https://www.cdc.gov/tobacco>.

2011). Gambling has been a popular pastime dating back centuries, as one study notes that sailors on Columbus's ships played games of chance against each other in 1492. But some social groups, like the Puritans of Massachusetts and the Quakers in Pennsylvania, passed laws banning the practice in 1638 and 1682. The stringent regulation over time justifies the sin stock label for gaming businesses. Moreover, like alcohol and tobacco, gambling's addictive properties have only hurt the public's perception of the industry. For instance, in 1980 the American Psychiatric Association listed "pathological gambling" as a mental disorder (Fenich 1996).

Companies in further industries are often considered sin stocks as well. Examples include firearm businesses, weapons manufacturers, and companies operating in the adult entertainment and sex industry. Material limitations to the inclusion of such further categories of businesses exist, however. In the case of firearm businesses and weapons manufacturers, the ESG status is murky at best.[21] Then in the case of the adult entertainment and sex industries, few businesses trade on the public markets in the first place. Another paper that has studied sin stocks across the globe considers adult entertainment businesses, and through July 2007, the authors only identify 21 total stocks in the industry (Lobe and Walkshäusl 2011).[22] Further, in the context of their whole index that also includes tobacco,

[21] In fact, I might go further to suggest that a case can be made for the social responsibility of weapons manufacturers (aerospace and defense businesses) today more than ever. In what some pundits consider a fight for democracy, the U.S. Department of State has committed to providing more than 8,500 Javelin anti-armor systems, as one example, to Ukraine as of November 23, 2022 (<https://www.state.gov/ukraine>). It seems reasonable to suggest then that a business aiding in such a fight around the world has strong social characteristics in the eyes of many.

[22] Keep in mind when comparing this figure to the count of stocks from a given industry in my own index, that this other study covered the entire globe. I only focus on stocks traded in the United States.

alcohol, gaming, weapons, and nuclear power, the adult entertainment industry only represents 0.3% of the total market capitalization.

§5: Data and Research Design

I begin the collection of stocks with the Fama and French (1997) industry classification. This classification is based on an equity's SIC code and, as noted, divides stocks into 48 separate industry groups. Fama-French industry groups 4 and 5 (beer/alcohol and smoke/tobacco) are classified as sin stocks. The corresponding SIC codes are 2080-2085 for beer and alcohol and 2100-2199 for tobacco products. SIC code 2080 represents general beverage companies, 2082 represents malt beverage companies, 2083 represents malt businesses, 2084 represents wine businesses, and 2085 represents distilled and blended liquor businesses. All companies with a SIC code between 2100 and 2199 are classified as general tobacco product businesses. This Fama-French classification does not, however, distinguish gaming companies from hotel and other leisure and entertainment businesses. As Hong and Kacperczyk (2009) do, I instead use the NAICS codes 7132, 71312, 713210, 71329, 713290, 72112, and 721120 to identify gaming stocks for the constructed sin index. I then search CRSP for these SIC and NAICS codes to compile an initial list of sin stocks, counting all relevant businesses that have traded on the major U.S. public exchanges for at least one month, dating from 1965 until the end of 2021.[23]

Then to supplement this initial, broad screen for sin stocks, I use Compustat Segments data that has relevant information on the SIC and NAICS codes for the various segments of public companies. I conduct this supplementary screen to account for businesses that operate in sinful industries, even if only a proportion of the overall business. I then label a

[23] The CRSP database includes all stocks that have traded on the NYSE, NASDAQ, and AMEX exchanges.

company a sin stock and add this equity to the index if any of its segments fall into the above classifications across the Triumvirate of Sin.[24] This supplementary search in Compustat Segments is only effective dating back to 1976 for alcohol and tobacco companies, and 1985 for gaming companies. Given this limitation, I make a simplified assumption that any company identified as sinful through this procedure has been considered sinful over its entire history as a publicly traded company—this requires that I back-fill these alcohol and tobacco stocks prior to 1976, and the gaming stocks prior to 1985.

I cross-reference the results of this supplementary screen with available data on CRSP to retrieve the relevant returns, matching the GVKEY from Compustat Segments with the PERMNO from CRSP. Only a small subset of companies from my supplementary screen registers a PERMNO in CRSP, which suggests that only this small subset has traded publicly on major U.S. exchanges. Compustat data includes information on all U.S. (10-K filers) and Canadian firms that are listed on major U.S. or Canadian exchanges, listed on regional exchanges, traded OTC, or even those having a certain amount of public bonds. In other words, the universe of firms in Compustat is much more extensive than that of CRSP—for this reason, CRSP only populates return data from a small subset of companies included in the Compustat Segments supplementary screen. It is from this procedure that I compile my final list of sin stocks.[25]

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[24] This is also consistent with the procedure of Hong and Kacperczyk (2009).

[25] Table 1 below provides a summary count of sin stocks for each year of the period under study. Then Table 6 (appendix) provides a complete list of each individual index constituent, with the dates of each constituent's index inclusion and CRSP PERMNO.

Table 1: Sin Stock Summary

Distribution by Year				
Year	**Total**	**Tobacco**	**Alcohol**	**Gaming**
1965	17	10	7	0
1966	17	10	7	0
1967	18	10	8	0
1968	17	9	8	0
1969	18	8	9	1
1970	18	8	9	1
1971	18	8	9	1
1972	26	8	16	2
1973	29	8	18	3
1974	27	8	16	3
1975	27	8	16	3
1976	27	9	15	3
1977	25	8	14	3
1978	27	8	14	5
1979	30	8	13	9
1980	31	8	14	9
1981	31	7	14	10
1982	36	7	16	13
1983	38	6	16	16
1984	37	6	15	16
1985	40	6	17	17
1986	40	5	17	18
1987	39	5	16	18
1988	40	5	16	19
1989	40	5	14	21
1990	43	4	15	24
1991	43	4	15	24
1992	47	4	17	26
1993	66	4	18	44
1994	75	4	20	51
1995	82	5	24	53
1996	85	9	27	49
1997	90	11	30	49
1998	85	10	30	45
1999	79	9	29	41
2000	70	8	28	34
2001	63	7	26	30
2002	64	8	25	31
2003	62	8	24	30
2004	63	8	25	30
2005	61	7	24	30
2006	54	7	20	27
2007	51	7	18	26
2008	48	7	18	23
2009	43	4	16	23
2010	43	4	17	22
2011	42	4	17	21
2012	43	4	17	22
2013	44	4	18	22
2014	44	4	18	22
2015	44	4	17	23
2016	45	5	17	23
2017	46	5	18	23
2018	45	4	18	23
2019	44	4	16	24
2020	42	4	15	23
2021	46	4	18	24

This broad list of sin stocks includes 188 unique public equities, which is composed of 24 different tobacco stocks, 75 different alcohol stocks, and 89 different gaming stocks. Since the turn of the century, the number of publicly traded sin stocks has fallen considerably. The total count peaked in 1997 at 90 investable sin stocks, and then has since declined to just 46, as of the end of 2021. Much of this decline occurred between 1997 and the onset of the Global Financial Crisis—since 2009, the total count has remained more or less flat. Further, the mix between alcohol, tobacco, and gaming has been consistent, but upon closer examination, the mix *within* each category has varied considerably since the GFC. For instance, some online gaming businesses like DraftKings (NASDAQ: DKNG) have IPOed in recent years and shaken up the gaming industry's competitive landscape.

The relative industry representation in my sin index over the long-term has undergone material change. Not until the 1980s did the gaming industry contribute more than a small handful of stocks to the index. The great resurgence and deregulation of the gaming industry during this decade contributed to the growth in publicly traded businesses. Conversely, while tobacco businesses account for the majority of sin stocks in 1965, they only represent a small fraction of the sample in 2021, at the end of the period. Some might point to a decline in the smoking rate in the United States as an explanation for the drop in tobacco businesses during the period of study, but I want to be sure to call out the strong financial performance of these firms, despite the apparent secular headwinds.[26] Instead, I

[26] The number of cigarettes sold in the U.S. fell 37% from 2001 to 2016. Over this same period, however, Cigarette revenues grew 32%. This growth is due to a great increase in prices, which has in turn increased the profit margins by much more than 32%. For instance, an average pack of cigarettes in 2016 cost $6.42 compared to $3.73 in 2001. So, it turns out that the business has not been too bad, despite what headlines about

attribute much of the decline in the number of firms to a wave of industry consolidation, which has whittled the major American players in the tobacco market from seven down to just two, Altria and Newport.[27, 28]

Following the sin stock selection procedure, I turn to data collection on this group of equities. First, I retrieve monthly total returns from CRSP for each sin stock throughout the duration of its existence as a public company, dating back to 1965. I then also retrieve the monthly total returns for a group of comparable stocks over the period of interest. This group of comparable companies is made up of the Fama-French industry groups 2 (food products), 3 (candy & soda), 7 (fun), and 43 (meals and hotels).[29] This data can be downloaded from Ken French's website.

I define two dependent variables of interest. First, $EXSIN_t$, which is defined as the monthly return of an equal-weighted portfolio of sin stocks, net of the risk-free return for the month. Second, $EXCOMP_t$, defined as the monthly return of an equal-weighted portfolio of sin stocks, net of the monthly return of an equal-weighted portfolio of comparable companies. I consider the latter dependent variable, $EXCOMP_t$, in addition to the excess return of a sin portfolio over the risk-free return to account for potential industry factor

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declines in smoking might have you think. For this data, I turn to an article in *The Wall Street Journal*, <https://www.wsj.com/tobacco>.

[27] Again, <https://www.wsj.com/tobacco>.

[28] The industry makeup has changed some in very recent times, however. Consider Turning Point Brands (NYSE: TPB), which is included in the index beginning in May 2016 and remains there until the end of the period. Instead of traditional cigarettes, this firm focuses on the manufacture and sale of alternative smoking accessories,

[29] This is consistent with the comparable company set choice that Hong and Kacperczyk (2009) make in their study.

movements in the market.[30] That is, I include an additional dependent variable that nets the return of the sin portfolio against the return of the comparable companies to control for any potential industry alpha, to the upside or the downside. For this reason, I take the models in which I consider the return of $EXCOMP_t$ as more conservative.

I then consider two separate models, the first of which is the traditional capital asset pricing model (CAPM). The one control variable in this model is $MKTPREM_t$, defined as the excess return of the market over the risk-free rate. More specifically, the market is defined as the value-weighted market index return, inclusive of dividends, of U.S. stocks that trade on the NYSE, NASDAQ, or AMEX exchanges. This model suggests that an asset's covariance with the investor's portfolio determines risk. Further, if all investors hold the same portfolio, then they will all agree on the asset's risk. If this portfolio that all investors hold is the market portfolio, it then must be the case that a stock's covariance with the market portfolio defines its risk, under the CAPM. Beta represents this risk—linearly related to the market return—which is the coefficient of $MKTPREM_t$.[31]

The second model is the Fama-French 4-factor model, in which I incorporate Fama-French factors SMB_t, HML_t, and MOM_t in addition to $MKTPREM_t$. This particular factor model is considered an ad-hoc factor model, which seeks to account for empirical phenomena in which particular factors have been found to contribute to alpha under the CAPM.[32] SMB_t

[30] These portfolios are equal- and not value-weighted so as to minimize an outsized effect of positive or negative performance from a small number of larger firms.
[31] If the CAPM is true, then for a given asset, alpha should equal zero, or at least not statistically deviate from zero. But my hypothesis is that I will detect positive Jensen's alpha. By extension, I also hypothesize that the CAPM should be rejected.
[32] Gibbons, Ross, and Shanken's 1989 paper should receive credit here, despite the fact that this trio did not create this particular factor model. In Gibbons et. al (1989), the authors detected weakness in the CAPM. In a

controls for empirical evidence in the literature that small stocks outperform large stocks over time. HML_t controls for further empirical evidence that value stocks tend to outperform growth stocks over time. Then, MOM_t controls for empirical evidence that stocks that have gained in recent periods tend to outperform stocks that have declined in recent periods, during the next period. The relevant factor values for each month can be downloaded from Ken French's website, along with the risk-free and market return.

Two dependent variables and two models then make for four distinct regressions, as follows:

$$EXSIN_t = \alpha_t + \beta MKTPREM_t + \varepsilon_t$$
$$EXCOMP_t = \alpha_t + \beta MKTPREM_t + \varepsilon_t$$

$$EXSIN_t = \alpha_t + \beta_1 MKTPREM_t + \beta_2 SMB_t + \beta_3 HML_t + \beta_4 MOM_t + \varepsilon_t$$
$$EXCOMP_t = \alpha_t + \beta_1 MKTPREM_t + \beta_2 SMB_t + \beta_3 HML_t + \beta_4 MOM_t + \varepsilon_t$$

Instead of running each regression over the entire 57-year period, I elect to cut up the data into 36-month subperiods. This then means that each coefficient is based on a three-year window of data. I opt for this procedure as an alternative to running each regression over the entire period to allow for variation in the factor coefficients over time—which allows for time-varying alpha, critical to testing the second plank of my hypothesis. Such a methodology seems to comport with reality more, as well.

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sample of return data from 1926-1982, they found that some industries outperform, and others underperform, relative to the CAPM. Even further, they found that in 57 successive Januarys an index of the smallest decile of firms outperforms the market by 612 bps per month—more evidence against the CAPM, that then led to the development of factor models, especially the size factor that Fama and French created.

Consider that the beta for one particular stock can vary over periods of time. Take Microsoft (NASDAQ: MSFT) as one notable example. Today, the stock's beta is 0.92.[33] But at the beginning of 2000, if you were to calculate Microsoft's beta using data from 1995-1999 over a comparable five-year period, the beta would have been 1.25—suggestive of much greater exposure to systematic risk.[34, 35] Now further consider the fact that the sin index I have constructed allows for monthly entry and exit of stocks. So not only does any given stock's beta tend to change over time, but the companies in the index, which already have different betas, change over time. For these reasons, it is critical to the study that I allow for such variation.

Last, to conclude the econometric work, I average the coefficient values and the alphas over all 19 periods and calculate t-statistics to gain an understanding of the alpha over time, as well as the statistical strength of the results.

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[33] Per S&P Capital IQ, 5Y beta.

[34] To calculate this beta, I downloaded total return data from CRSP and regressed the stock's return in excess of the risk-free rate on the market return in excess of the risk-free rate. Market return and risk-free data was downloaded from Ken French's website.

[35] Such an outcome should make intuitive sense given changes in the business fundamentals. While Microsoft today is still a high technology company, its growth has slowed and is one of the very largest companies in the entire world.

§6: Results

Tables 2 and 3 below summarize the regression results over the entire period of study, 1965-2021. The relevant figures represent the average factor coefficients over the 19 different 36-month periods. Under both the CAPM and the more conservative Fama-French 4-factor model, $EXSIN_t$, the return of my equal-weighted index of sin stocks, net of the risk-free return, outperforms, detectable through Jensen's alpha. Given the CAPM as the relevant benchmark, the monthly alpha is 0.42%. Given the Fama-French 4-factor model as the relevant benchmark instead, the monthly alpha falls to 0.27%. This lower monthly alpha given the additional factors suggests that some of the outperformance of the sin portfolio under the CAPM is picked up by size, value, and momentum factors.[36] Still, this alpha is material and highly significant, with t-statistics of 2.83 and 2.06. This corresponds to p-values of ~0.01 and ~0.05, implying significance at the 1% and 5% level. On an annualized basis, this is equivalent to alpha of 5.14% under the CAPM and 3.33% under the 4-factor model.

Of particular interest, the monthly alpha, while still positive, is much lower when I net the return of the sin portfolio against a portfolio of comparable companies. That is, when the dependent variable of interest is $EXCOMP_t$ instead of $EXSIN_t$, the alpha declines. This suggests that the portfolio of comparable companies has alpha over the period of study as well—which is borne out upon further econometric analysis. While the alpha under the

[36] It is worth noting that the inclusion of these factors in the benchmark assumes that the empirical phenomena in which small stocks, value stocks, and recent winners tend to outperform implies that these phenomena are not in fact market anomalies, but instead genuine risk factors. Only true risk factors should be included in the benchmark used to estimate Jensen's alpha, a market efficiency view is taken with respect to size, value, and momentum. Conversely, under the CAPM, such factors are not considered risk factors given the exclusion. But nobody knows whether or not these factors are genuine risk factors or just market anomalies, exposing market inefficiency. For this reason, I test for outperformance under both the CAPM and the 4-factor model.

CAPM is both immaterial and lacking in statistical significance (t-statistic of 0.75), the alpha under the 4-factor model is 0.19% per month, although the statistical significance is not quite as strong as that of the models given $EXSIN_t$ as the dependent variable, with a t-statistic of 1.52.[37] I take this to mean that the sin portfolio compared to the portfolio of comparable companies favors larger, growth stocks.[38] Treating these characteristics as risk factors, the alpha on the sin portfolio—even net of the return of comparable companies, stripping out industry-related alpha—is positive. On an annualized basis, this alpha is 2.35% per year, suggestive of a material "sin effect" over time.

[37] Perhaps this result is not significant at conventional statistical levels, but I subscribe to a Bayesian view here and reject the entirely arbitrary conception of a magical statistical cutoff.

[38] This aligns with the common interpretation of a negative sign on the relevant Fama-French factor coefficients. I do not discuss momentum given the much greater magnitude of SMB and HML.

Table 2: EXSIN Average Regression Coefficients[39]

	EXSIN				
Model	α	MKTPREM	SMB	HML	MOM
CAPM	0.0042	0.9783			
FF 4-Factor	0.0027	0.8339	0.6457	0.1092	(0.1850)
CAPM T-Stat	2.8309				
FF 4-Factor T-Stat	2.0579				
CAPM (Ann.)	0.0514				
FF 4-Factor (Ann.)	0.0333				

Table 3: EXCOMP Average Regression Coefficients

	EXCOMP				
Model	α	MKTPREM	SMB	HML	MOM
CAPM	0.0009	(0.0376)			
FF 4-Factor	0.0019	(0.0144)	(0.1522)	(0.0886)	(0.0407)
CAPM T-Stat	0.7492				
FF 4-Factor T-Stat	1.5216				
CAPM (Ann.)	0.0109				
FF 4-Factor (Ann.)	0.0235				

[39] Alpha values are monthly. I then annualize these alphas as well.

The summary tables above represent coefficient averages from all 36-month periods, 19 of which are included in my period of study. As noted, I break up the data into three-year subperiods to allow for variation in the coefficients over time. If the factor coefficients change over time, then this also must impact the alpha over time.

From 1965-2021, the market beta of the sin portfolio varies under both the CAPM and the Fama-French 4-factor model. Furthermore, the relevant alphas during each period vary, and in some instances to a great extent. For example, 1998-2006 was a great time for sin investors. Under the Fama-French 4-factor model, the monthly alpha from 1998-2000 was 1.11%, then from 2001-2003 this alpha was 1.32%, and then from 2004-2006, this alpha was 1.31%. This is to say that over a 108-month period, monthly alpha well exceeded 1%, and this outperformance appears statistically significant. The t-statistic in each respective period is 1.63, 2.65, and 2.97. This corresponds to p-values of ~0.08, ~0.01, and <0.01. These monthly alphas annualized are equivalent to 14.20%, 17.03%, and 16.95%.[40]

Sin stock performance is not always this strong. From 1971-1973, sin underperformed, detectable through negative alpha. Under the CAPM, however, there is reason to believe that this underperformance was a product of an industry downturn, and not poor performance strictly associated with sin. During this period, the sin portfolio net of the risk-free rate had negative alpha of 0.75% per month, but net of the comparable companies, this underperformance is eliminated, and even suggests some positive alpha.

[40] Note that given all four regressions—both the CAPM and the Fama-French 4-factor model, both with the sin portfolio return net of the risk-free return and the sin return net of the comparable companies return—sin experiences huge outperformance, both in absolute terms and relative to the average outperformance of sin over time during these subperiods.

This particular case is another example of the size, value, and momentum factors included in the Fama-French 4-factor model making a material difference as compared to the CAPM. Under the factor model, even controlling for an industry downturn, sin underperforms. But it is also worth noting that both t-statistics are quite small (0.17 and -0.72), which suggests this difference is a product of noise in the return data, instead.[41]

The results since 2006 deserve further discussion in light of the second plank of my hypothesis, in which I suggest that with an increase in the proportion of ESG capital entails an increase in the sin premium. The empirical evidence contrasts with this hypothesis. Between 1965-2006, I observe 26 basis points of monthly alpha given $EXCOMP_t$ as the dependent variable of interest and the Fama-French model—which exactly aligns with the results of Hong and Kacperczyk (2009). But over the entire period through 2021, given the same dependent variable and model, I only observe 19 basis points of monthly alpha. A material deterioration rather than improvement in alpha explains this result. From 2007-2021, on average I observe zero basis points of alpha. Given the CAPM instead, average monthly alpha falls to three basis points. Then given $EXSIN_t$ under the CAPM, monthly alpha equals 15 basis points per month and under the Fama-French model, four basis points. The general result—alpha deterioration following 2006, from 2007-2021—holds under both models and given both dependent variables. Not only does the alpha deteriorate, but often this alpha is negative, particularly in the most recent subperiod from 2019-2021. This trend

[41] The associated p-values are quite large, and not significant at any conventional level.

across both variables and models is evident in the below figures and in Tables 4 and 5 in the appendix.

Figure 1: EXSIN Market Beta Over Time (CAPM)[42]

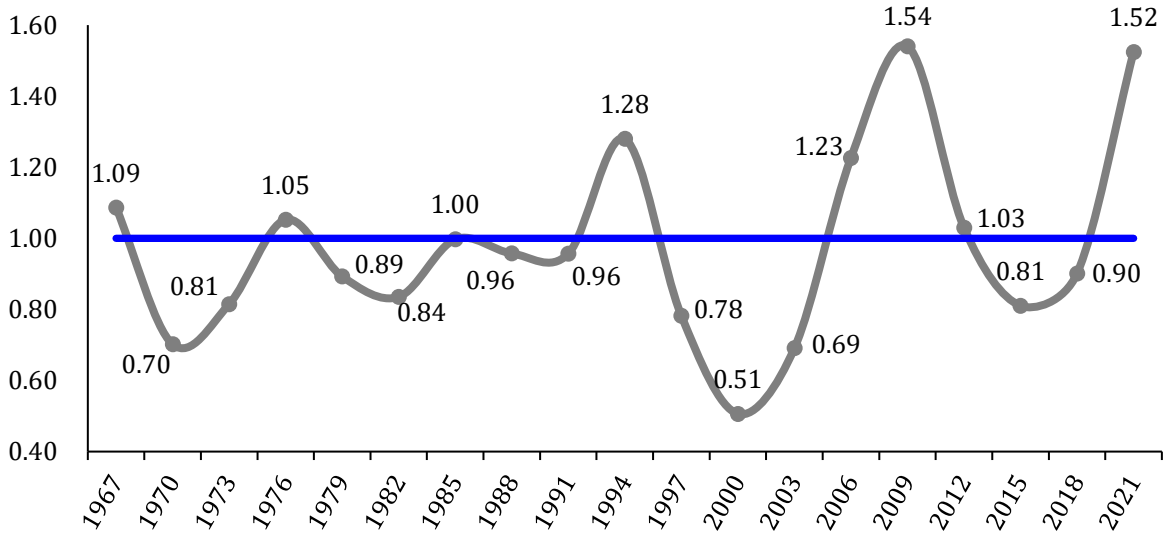
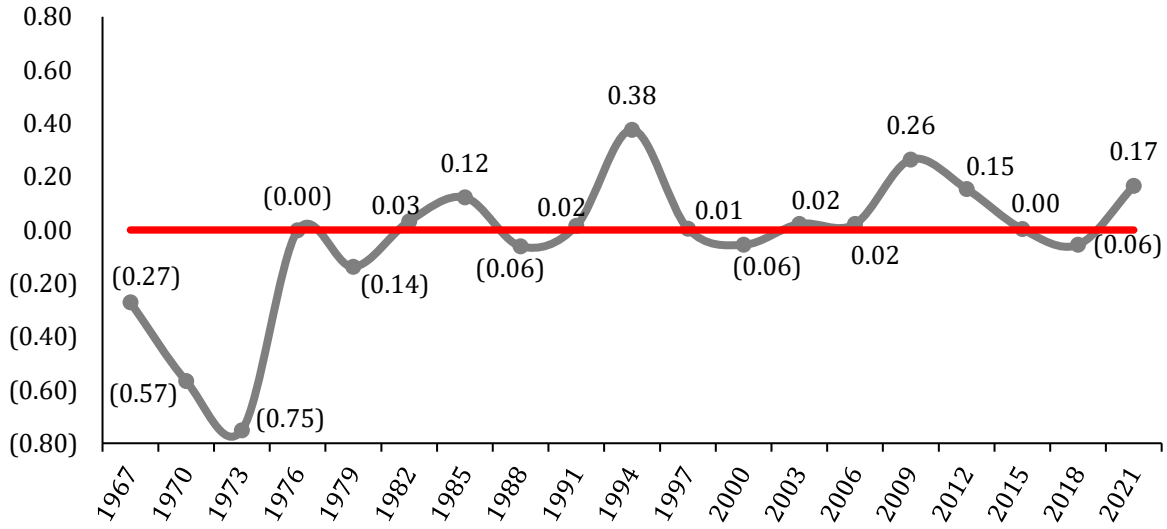


Figure 2: EXCOMP Market Beta Over Time (CAPM)[43]



[42] Blue line represents the beta of the entire market, which must equal 1.00.
[43] Red line represents the beta of a market neutral portfolio, in which the portfolio has no correlation with the excess return of the market.

Figure 3: EXSIN Monthly α Over Time (CAPM)[44]

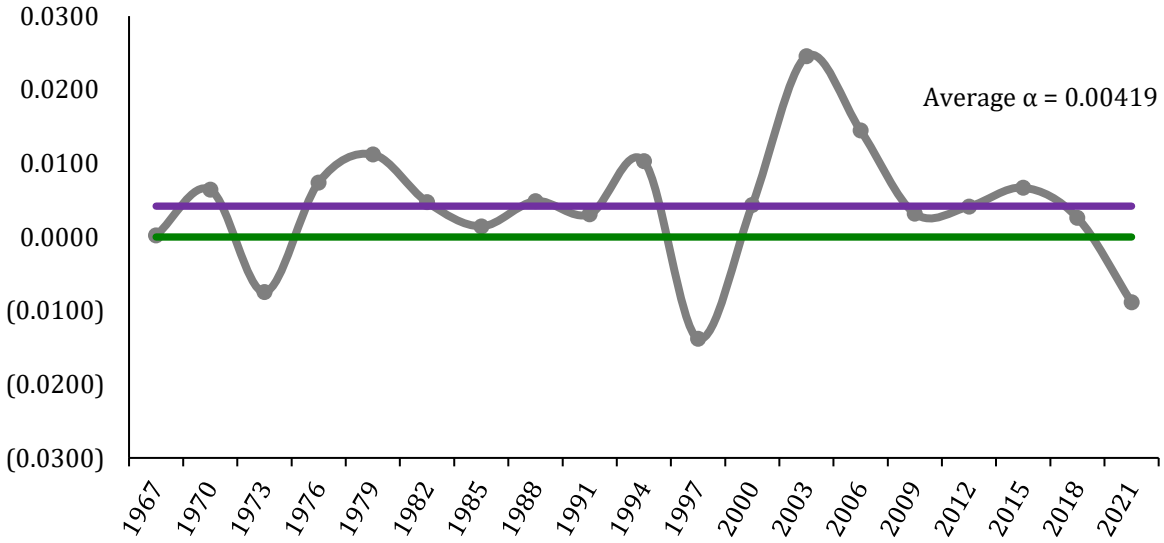
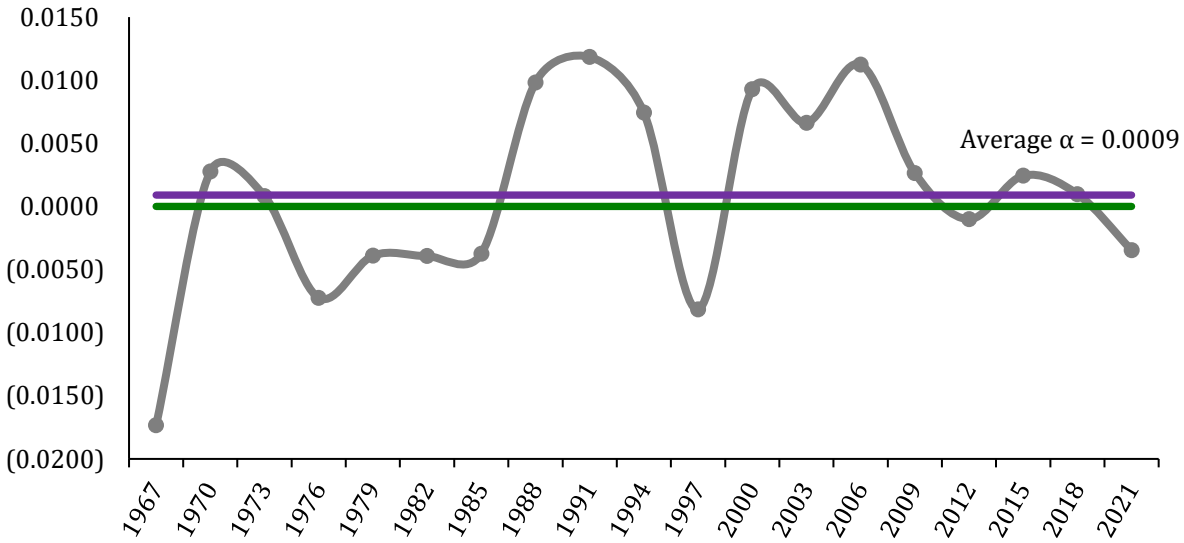


Figure 4: EXCOMP Monthly α Over Time (CAPM)



[44] Green lines represent no alpha and market efficiency. Purple lines represent the average alpha over all subperiods.

Figure 5: EXSIN Monthly α Over Time (Fama-French 4-Factor)

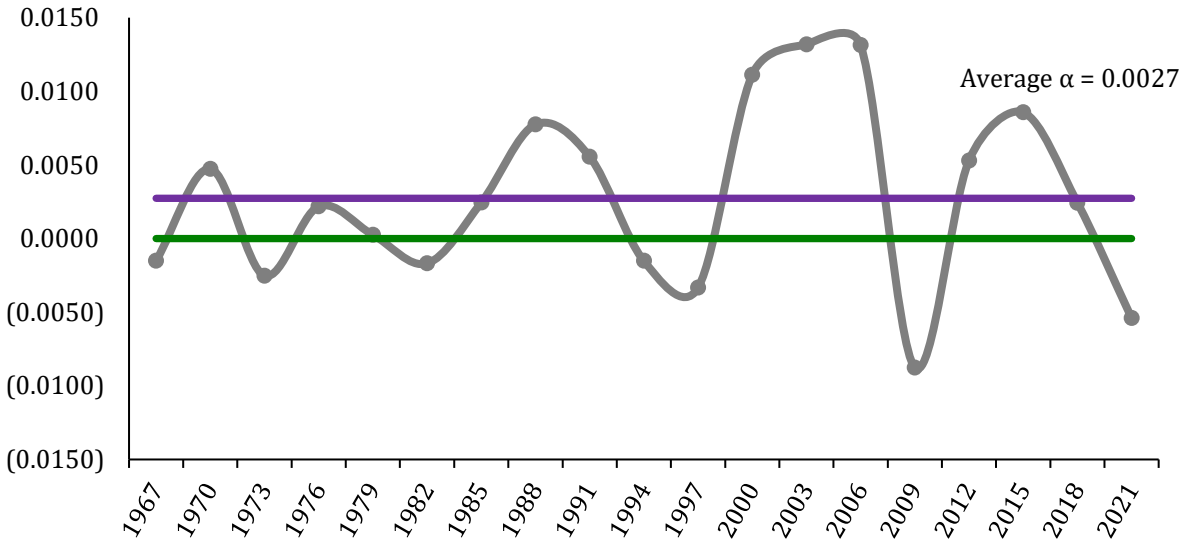
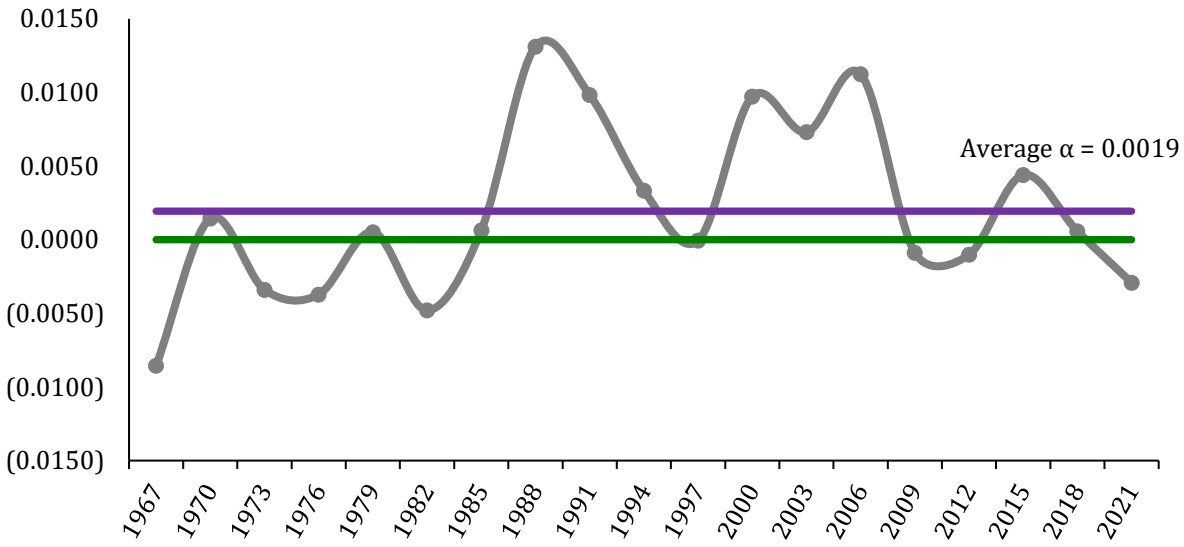


Figure 6: EXCOMP Monthly α Over Time (Fama-French 4-Factor)



§7: Discussion

I now want to link these results with the motivating theory (Heinkel et. al. 2001). The theory suggests that given a great enough presence of socially responsible capital in the market, a material price effect will be observed on sin stocks—the stocks that the socially responsible investors shun. This then results in outperformance, or realized alpha, for these very sin stocks. The analysis seems to bear out this result.

Also note, however, that the model behind the theory is static in the sense that the model does not account for changes in the proportion of socially responsible investors present in the market over a period of time. The authors do demonstrate that the proportion of socially responsible capital impacts the magnitude of the price effect, and thus alpha, as discussed. But what the theory does not account for is the alpha *amidst a period of an unexpected change in this proportion*.

But an unexpected change in the relative proportion of ESG capital, to the upside or the downside, has implications for the measured alpha of sin stocks during the period of change, which a static theory does not explain.[45] Let's return to my earlier example of a firm with a debt-free capital structure that produces cash flow per share of $1 every year, into perpetuity.[46] Now I will consider a one-year period, with the first trading day of the year marked as Day A and the final trading day of the year marked as Day B. The stock price on Day A is $10. This firm still generates $1 of free cash flow between A and B, which suggests

[45] My explanatory extension of the theory should not be considered in tension with the theory. Instead, it is as I describe it: a logical extension of the theory to a dynamic market environment.
[46] The capital structure is also free of preferred and other structured equity products, and no equity has liquidation preference or enhanced voting rights for insiders that might skew the share price.

a 10% return given no capital appreciation or depreciation. But say that a horde of ESG investors enter the market between A and B, or neutral investors instead become socially responsible and divest from sin stocks, which pushes the stock price of my stylized firm down to $8 per share by Day B. Any investor that holds this stock through the entire period realizes a total loss of 10% on her investment.[47]

The takeaway is that expected future return at time Y need not equate to or even relate to the return realized between time X and time Y, given X precedes Y. In a dynamic market environment in which there is an unexpected increase in the proportion of socially responsible investors, this should be expected. The expected future return on Day B is greater than that on Day A, but this requires investors that hold the asset between A and B bear the cost.[48] The other side of the coin is that if the proportion of socially responsible investors decreases during this time, then the investor instead benefits. Rather than a negative return as a result of the shift in ESG-oriented capital, the investor realizes capital appreciation, in addition to her cash flow distribution. This pushes the return above 10%.

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[47] The investor experiences capital depreciation of 20%, but is entitled to the cash, tax-free dividend of $1, which reduces the loss to 10% for the period on a total return basis. Technically, her loss exceeds 10%—the exact figure depends on the specific timing of the cash dividend. That is, in practice, corporate managers declare dividends following the end of a period and then pay out the dividends to shareholders several months following the declaration of the dividend. These dividends are often paid on a quarterly basis, so if we are to assume that this fictitious firm distributes the $1 in cash per year quarterly pro rata, then on Day B, the investor does not hold $0.25 of cash that she is entitled to receive. She will receive it, but the time value of money requires that the present value be less than this $0.25. This then means that the present value of the dividends for the year on Day B is less than $1. It is due to this fact that her loss in reality is greater than 10%. But this is nothing more than a stylized example, so 10% is close enough.

[48] Note that I also could have used the same figures from Section 3 (see page 8). In this case, the loss would be greater—a total negative return of 40%, if we assume that the capital depreciation occurs over a one-year period.

The above just might explain the empirical results in the most recent 36-month period of study, in which all four regressions pick up negative alpha, indicative of sin stock underperformance. Preliminary datapoints suggest that ESG investing popularity has exploded in the past couple years. A J.P. Morgan report claims that more than $500 billion flowed into ESG-oriented funds in 2021, representing 55% growth in the asset class over the prior year, well exceeding the growth of neutral institutional capital.[49] Of note, this represents an acceleration in the growth rate of ESG institutional capital. The Social Investment Forum reports that the asset class grew 42% from 2018-2020, which corresponds to a 19% CAGR.[50] This acceleration in growth that broke from the linear trend very well could have been a surprise to neutral investors. Likewise, the growth rate in ESG capital accelerated in 2012, another subperiod in which I find negative alpha for the sin portfolio net of the return of comparable companies.[51] Amidst such a period of change, prices fall, and short-run returns are impaired, resulting in negative alpha. This explanation certainly aligns with observed results.[52]

I want to point out that the past several years is not the only period in which evidence exists for the underperformance of sin, despite the clarity of the long-term trend. It follows

[49] Please see <https://am.jpmorgan.com/future-of-esg-investing> for more.
[50] Per The Forum for Sustainable and Responsible Investment biennial 2020 report.
[51] The Social Investment Forum reported a 22% increase over the prior 24 months following several years of much slower growth during the Great Financial Crisis.
[52] While data on the percentage of investors in the market with an aversion to sin stocks back in the 1960s is lacking, a similar theory for the largely negative alpha relative to comparable companies from 1965-1967 seems plausible. Given the legislation regulating the labels on cigarette packages passed in 1965, it seems reasonable to suggest that some socially responsible investors, now made explicitly aware of costs to health, divested from tobacco stocks, leading to negative alpha. Another potential theory is that neutral investors, seeking to maximize total returns, divested from tobacco products given concern of further regulation, which could lead to secular decline for the cigarette industry.

then that if an investor seeks to take advantage of the price effect on sin stocks, patience might prove fruitful. The empirical evidence suggests that such an investment will lead to alpha over time, but not necessarily in every short-term period.[53] This is perhaps thanks in part to unexpected changes in the proportion of ESG capital in the market.

Further, there is no clear trend in the directional change in alpha since 1965. In other words, the monthly alpha does not appear to have trended up or down under any model or given either dependent variable since the beginning of the study. I take this to mean nothing more than that the alpha is lumpy over time—but in the long-run, sin investors are well rewarded for their investment.

[53] Refer to 1965-1967, 1971-1973, and 1995-1997 in Figures 3-6 for a handful of examples.

§8: Conclusion

This paper contributes to the broad literature studying the market effects of ESG investors. The results that suggest a broad portfolio of sin stocks generates alpha over time supports the inference that the presence of ESG investors changes the risk-reward dynamic for particular categories of public securities. The presence of ESG capital then leads to an evident price effect as these sin stocks plot off of the security market line. The control for industry alpha—that is, the inclusion of comparable companies—perhaps made the greatest impact on my results of any control, hence the large difference in the average alphas given $EXSIN_t$ or $EXCOMP_t$ as my dependent variable of interest. Even when controlling for industry alpha, under the Fama-French 4-Factor model, my analysis provides evidence for anti-ESG alpha, which I attribute to the presence of socially responsible investors exerting market influence.

The recent proliferation of ESG investing products, both in public equity markets and the alternative investment universe, serves as critical motivation for this study. While I have now conducted a study on the costs of ESG investing, the sustainable alpha of sin stocks does not represent a direct cost to these investors, but rather an opportunity cost. But an opportunity cost is still a cost to these ESG investors, in economic terms.

There perhaps exist other sources of alpha in the public equity markets, within a socially responsible framework. For instance, the portfolio of comparable companies had

alpha during the period of study.[54, 55] Even under the assumption that alternative sources of alpha exist in the market, it is undeniable that ESG assets are invested under certain constraints. Basic financial theory says that a constrained portfolio can never have a greater expected risk-adjusted return than an optimized unconstrained portfolio. ESG investors must accept this reality.

Astute readers might have caught the irony in the above. What if ESG investors decided to instead become neutral investors, shun the limitations of social responsibility in the consideration of investment opportunities, and take advantage of the alpha that a portfolio of sin stocks offers? In such a scenario, *the sin stock alpha discussed would be arbitraged away*. This is because the alpha relies on these very investors shunning particular public equities in the first place.

Further, the alpha remains reliant on public perceptions. As noted throughout this paper, public perceptions shift over time. What counts as a sin stock then might change over time. I take this to mean that if an investor wants to take advantage of the price effect on sin

[54] There is certainly the question of whether this is a strange statistical anomaly, or instead representative of market inefficiency, and an opportunity for investors over time. I will not pretend as if I have a compelling theory to explain the alpha, which contrasts with a clear theory to explain the alpha of the sin portfolio.

[55] Further, these ESG investors might not even invest in the portfolio of comparable companies, depending on their interpretation of socially responsible investing. If an ESG investor conducts a positive screen for socially responsible stocks, in which the manager only buys stock in companies that are "good" instead of using a negative screen to only avoid companies that are "bad," then a realization of this industry alpha might have been off of the table in 1965. Taking the theory of Heinkel et. al. (2001) as given, these "good" companies should plot below the security market line, representative of negative alpha. If this is true, then it seems the best strategy to generate alpha is through stock selection in which the manager goes long some "good" companies and then short some other "good" companies with the most negative alpha. But this strategy certainly does not align with the ethos of this sort of socially responsible investment—particularly the shorting of "good" companies—which might be why I am not aware of any prominent managers using such an investment strategy in practice.

stocks, she need not limit herself to tobacco, alcohol, and gaming businesses. Today, in addition to oil and gas companies that often draw the ire of environmental activists, I might also add industrial businesses that are heavy polluters (e.g., cement producers), various pharmaceutical businesses, and some cybersecurity software businesses that contract with governments.

This could be one particular area for further study in the future. That is, a comparable study to this one that adds to the vast and growing literature on sin stocks and socially responsible investing but updated for more modern interpretations of ESG. Moreover, an identical procedure might be run for ESG stocks, or virtue stocks—but the hypothesis, based on the results of this paper and the corresponding theory espoused—should be inverted, with an expectation of underperformance (read: negative alpha for the proverbial good firms).

§9: References

Ahmed, D., Demers, E., Hendrikse, J., Joos, P., Lev, B., 2022. Are ESG Ratings Informative About Companies' Socially Responsible Behaviors Abroad? Evidence from the Russian Invasion of Ukraine. Unpublished working paper. University of Waterloo.

Amel-Zadeh, A., Serafeim, G., 2018. Why and How Investors Use ESG Information: Evidence from a Global Survey. Financial Analysts Journal 75, 87-103.

Di Giuli, A., Kostovetsky, L., 2013. Are red or blue companies more likely to go green? Politics and corporate social responsibility. Journal of Financial Economics 111, 158-180.

Fama, E, French, K., 1997. Industry costs of equity. Journal of Financial Economics 43, 153-193.

Fenich, G., 1996. A Chronology of (Legal) Gaming in the US. UNLV Gaming Research & Review Journal 3, 65-77.

Geczy, C., Stambaugh, R., Levin, D., 2003. Investing in Socially Responsible Mutual Funds. Unpublished working paper. The Wharton School, University of Pennsylvania.

Gibbons, M., Ross, S., Shanken, J., 1989. A Test of the Efficiency of a Given Portfolio. Econometrica 57, 1121-1152.

Heinkel, R., Kraus, A., Zechner, J., 2001. The Effect of Green Investment on Corporate Behavior. The Journal of Financial and Quantitative Analysis 35, 431-449.

Hong, H., Kacperczyk, M., 2009. The price of sin: The effects of social norms on markets. Journal of Financial Economics 93, 15-36.

Lobe, S., Walkshäusl, C., 2011. Vice vs. Virtue Investing Around the World. Unpublished working paper. University of Regensburg, Center of Finance.

Merton, R., 1987. A Simple Model of Capital Market Equilibrium with Incomplete Information. The Journal of Finance 42, 483-510.

Statman, M., 2000. Socially Responsible Mutual Funds. Financial Analysts Journal 56, 30-39.

Vacek, H., 2011. The History of Gambling. Center for Christian Ethics at Baylor University.

§10: Appendix

Table 4: EXSIN Subperiod Results

Period	Start	End	Model	α	α S.E.	α T-Stat	MKTPREM	SMB	HML	MOM
1	Jan-65	Dec-67	CAPM	0.0002	0.0037	0.0590	1.0868			
			FF 4-Factor	(0.0015)	0.0036	(0.4220)	0.8897	0.4481	0.1801	(0.3793)
2	Jan-68	Dec-70	CAPM	0.0064	0.0041	1.5690	0.7022			
			FF 4-Factor	0.0047	0.0035	1.3563	0.5433	0.5455	0.2264	0.1519
3	Jan-71	Dec-73	CAPM	(0.0075)	0.0047	(1.5892)	0.8149			
			FF 4-Factor	(0.0025)	0.0047	(0.5375)	0.4889	0.5027	0.1069	(0.0763)
4	Jan-74	Dec-76	CAPM	0.0074	0.0072	1.0321	1.0526			
			FF 4-Factor	0.0022	0.0040	0.5501	0.8498	0.5305	0.2295	(0.6357)
5	Jan-77	Dec-79	CAPM	0.0112	0.0049	2.2885	0.8928			
			FF 4-Factor	0.0003	0.0047	0.0540	0.6094	1.0350	0.0219	(0.2885)
6	Jan-80	Dec-82	CAPM	0.0047	0.0060	0.7915	0.8354			
			FF 4-Factor	(0.0017)	0.0048	(0.3528)	0.9694	0.7505	0.6215	(0.0380)
7	Jan-83	Dec-85	CAPM	0.0015	0.0062	0.2362	0.9973			
			FF 4-Factor	0.0024	0.0069	0.3556	0.8422	0.8151	(0.0501)	(0.0394)
8	Jan-86	Dec-88	CAPM	0.0049	0.0055	0.8852	0.9575			
			FF 4-Factor	0.0077	0.0039	1.9818	0.9115	1.0262	0.2230	(0.0124)
9	Jan-89	Dec-91	CAPM	0.0031	0.0066	0.4674	0.9567			
			FF 4-Factor	0.0056	0.0071	0.7880	0.8495	0.8598	(0.1255)	0.0482
10	Jan-92	Dec-94	CAPM	0.0103	0.0092	1.1146	1.2797			
			FF 4-Factor	(0.0015)	0.0091	(0.1664)	1.2395	1.0748	0.6820	0.2146
11	Jan-95	Dec-97	CAPM	(0.0138)	0.0074	(1.8565)	0.7821			
			FF 4-Factor	(0.0033)	0.0080	(0.4167)	0.6587	0.3391	(0.4202)	(0.4667)
12	Jan-98	Dec-00	CAPM	0.0043	0.0071	0.6123	0.5062			
			FF 4-Factor	0.0111	0.0068	1.6341	0.6985	0.3485	0.3031	(0.3810)
13	Jan-01	Dec-03	CAPM	0.0245	0.0059	4.1739	0.6911			
			FF 4-Factor	0.0132	0.0050	2.6501	0.7816	0.5386	0.6093	(0.0021)
14	Jan-04	Dec-06	CAPM	0.0145	0.0040	3.6212	1.2261			
			FF 4-Factor	0.0131	0.0044	2.9696	0.8358	0.6968	0.4839	(0.1206)
15	Jan-07	Dec-09	CAPM	0.0032	0.0121	0.2627	1.5401			
			FF 4-Factor	(0.0088)	0.0080	(1.1010)	0.8977	1.0098	(0.4728)	(0.8154)
16	Jan-10	Dec-12	CAPM	0.0041	0.0047	0.8763	1.0296			
			FF 4-Factor	0.0053	0.0043	1.2436	0.8097	0.8734	0.0159	(0.2032)
17	Jan-13	Dec-15	CAPM	0.0067	0.0042	1.5830	0.8103			
			FF 4-Factor	0.0086	0.0044	1.9472	0.7524	0.1694	(0.4298)	(0.2771)
18	Jan-16	Dec-18	CAPM	0.0026	0.0043	0.6043	0.9013			
			FF 4-Factor	0.0024	0.0044	0.5543	0.8682	0.0125	(0.3012)	(0.1588)
19	Jan-19	Dec-21	CAPM	(0.0089)	0.0082	(1.0867)	1.5246			
			FF 4-Factor	(0.0054)	0.0077	(0.6973)	1.3474	0.6925	0.1707	(0.0348)

Table 5: EXCOMP Subperiod Results

Period	Start	End	Model	α	α S.E.	α T-Stat	MKTPREM	SMB	HML	MOM
1	Jan-65	Dec-67	CAPM	(0.0173)	0.0045	(3.8176)	(0.2711)			
			FF 4-Factor	(0.0086)	0.0042	(2.0426)	(0.0061)	(0.5664)	0.1958	(0.0856)
2	Jan-68	Dec-70	CAPM	0.0028	0.0047	0.5863	(0.5664)			
			FF 4-Factor	0.0014	0.0035	0.4099	(0.2979)	(0.6054)	0.1669	0.1210
3	Jan-71	Dec-73	CAPM	0.0008	0.0047	0.1744	(0.7510)			
			FF 4-Factor	(0.0034)	0.0043	(0.7882)	(0.4145)	(0.7164)	(0.0052)	(0.1275)
4	Jan-74	Dec-76	CAPM	(0.0072)	0.0047	(1.5339)	(0.0012)			
			FF 4-Factor	(0.0037)	0.0047	(0.7977)	(0.0178)	(0.3422)	(0.1141)	(0.2607)
5	Jan-77	Dec-79	CAPM	(0.0039)	0.0045	(0.8702)	(0.1385)			
			FF 4-Factor	0.0005	0.0057	0.0903	(0.0676)	(0.1967)	(0.1777)	(0.0959)
6	Jan-80	Dec-82	CAPM	(0.0039)	0.0044	(0.8963)	0.0330			
			FF 4-Factor	(0.0048)	0.0046	(1.0489)	0.2060	(0.1843)	0.3645	(0.0077)
7	Jan-83	Dec-85	CAPM	(0.0037)	0.0049	(0.7650)	0.1223			
			FF 4-Factor	0.0006	0.0059	0.1087	0.0008	(0.2050)	(0.2563)	(0.2251)
8	Jan-86	Dec-88	CAPM	0.0098	0.0041	2.3922	(0.0610)			
			FF 4-Factor	0.0131	0.0037	3.5502	(0.1459)	0.4525	(0.2424)	(0.0566)
9	Jan-89	Dec-91	CAPM	0.0118	0.0056	2.1237	0.0159			
			FF 4-Factor	0.0098	0.0066	1.4916	(0.1021)	(0.0330)	(0.6072)	(0.1045)
10	Jan-92	Dec-94	CAPM	0.0074	0.0069	1.0739	0.3764			
			FF 4-Factor	0.0033	0.0078	0.4237	0.2445	0.0499	0.0772	0.4694
11	Jan-95	Dec-97	CAPM	(0.0082)	0.0052	(1.5717)	0.0052			
			FF 4-Factor	(0.0001)	0.0063	(0.0105)	(0.1979)	(0.1283)	(0.6486)	0.0584
12	Jan-98	Dec-00	CAPM	0.0093	0.0055	1.6801	(0.0556)			
			FF 4-Factor	0.0097	0.0063	1.5512	0.0220	(0.0203)	0.1035	(0.0546)
13	Jan-01	Dec-03	CAPM	0.0066	0.0050	1.3225	0.0229			
			FF 4-Factor	0.0073	0.0052	1.3922	0.2665	(0.1161)	0.1347	0.1707
14	Jan-04	Dec-06	CAPM	0.0112	0.0035	3.1863	0.0223			
			FF 4-Factor	0.0113	0.0044	2.5368	(0.0533)	0.0399	0.0155	0.1537
15	Jan-07	Dec-09	CAPM	0.0027	0.0079	0.3382	0.2645			
			FF 4-Factor	(0.0009)	0.0076	(0.1149)	0.0159	0.1784	(0.0447)	(0.3038)
16	Jan-10	Dec-12	CAPM	(0.0010)	0.0045	(0.2238)	0.1542			
			FF 4-Factor	(0.0010)	0.0045	(0.2247)	0.1824	0.0982	(0.3389)	(0.1990)
17	Jan-13	Dec-15	CAPM	0.0024	0.0038	0.6429	0.0031			
			FF 4-Factor	0.0044	0.0039	1.1314	(0.0274)	(0.0994)	(0.1382)	(0.2737)
18	Jan-16	Dec-18	CAPM	0.0010	0.0066	0.1481	(0.0554)			
			FF 4-Factor	0.0006	0.0068	0.0851	0.0365	(0.2209)	0.0100	0.2272
19	Jan-19	Dec-21	CAPM	(0.0035)	0.0064	(0.5399)	0.1654			
			FF 4-Factor	(0.0029)	0.0065	(0.4481)	0.0827	(0.2768)	(0.1783)	(0.1783)

Figure 7: EXSIN Fama-French Coefficients Over Time

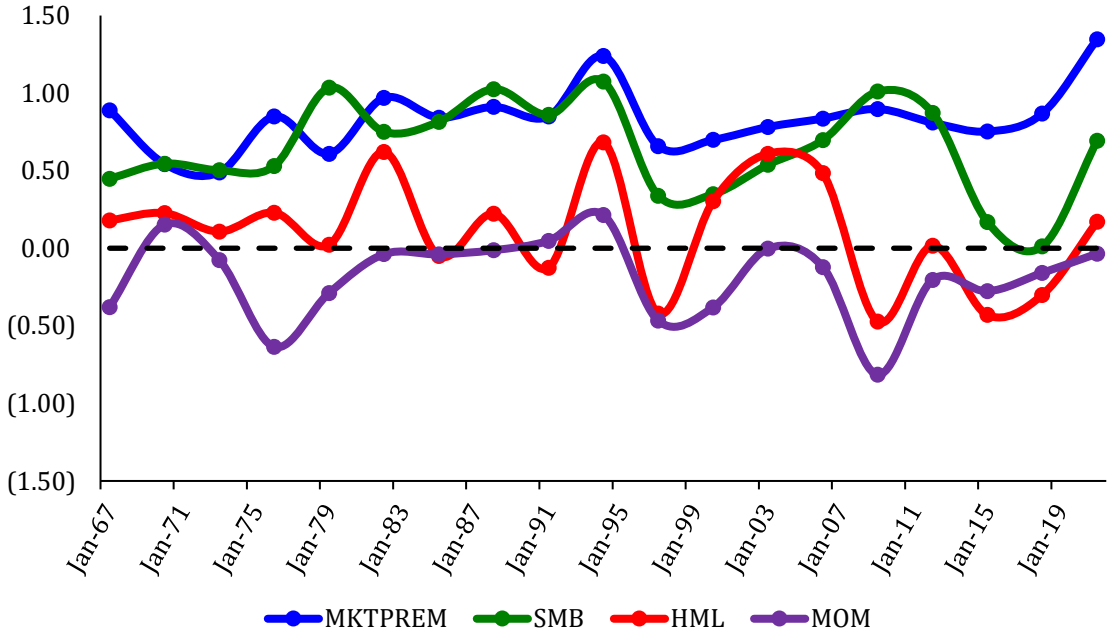

Figure 8: EXCOMP Fama-French Coefficients Over Time

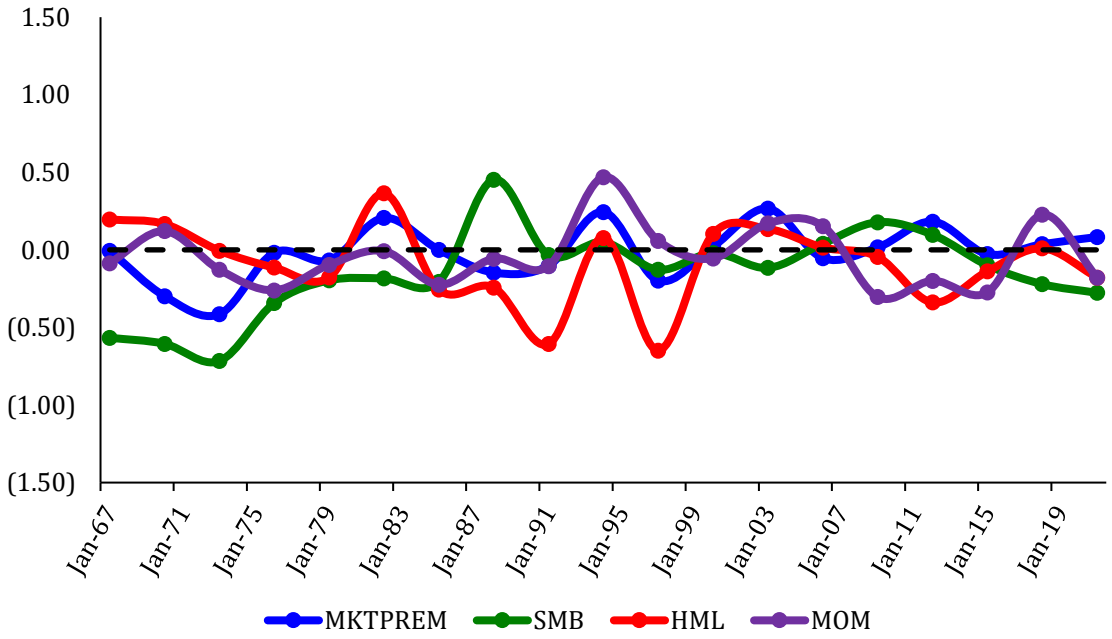

Table 6: Sin Stock List

Company Name	Industry	PERMNO	Begin	End
A & W Brands Inc	Alcohol	11307	May-87	Oct-93
Allied Domecq PLC (New)	Alcohol	89457	Aug-02	Jul-05
Almaden Vineyards Inc	Alcohol	84284	Dec-72	Aug-73
Altria Group Inc	Tobacco	13901	Jan-65	Dec-21
Ambev SA	Alcohol	85254	Jun-97	Dec-21
American Wagering Inc	Gaming	83479	May-96	Aug-00
Ameristar Casinos Inc	Gaming	79795	Nov-93	Aug-13
Anchor Gaming	Gaming	80153	Jan-94	Dec-01
Anheuser-Busch Companies Inc	Alcohol	59184	Dec-72	Nov-08
Anheuser-Busch InBev SA/NV	Alcohol	93013	Sep-09	Dec-21
Archon Corp	Gaming	68567	Jun-83	Apr-99
Argosy Gaming Co	Gaming	78867	Feb-93	Oct-05
Australian Corporate Holdings	Alcohol	78617	Jan-87	Apr-88
Aztar Corp	Gaming	75900	Dec-89	Jan-07
Bacardi Corp	Alcohol	16353	Jan-83	Dec-86
Ballys Corp	Gaming	18425	Apr-19	Dec-21
Bally's Grand Inc	Gaming	80801	Aug-94	Mar-98
Bally's Park Place Inc	Gaming	64872	Jul-79	Jun-86
Bardstown Partners Ltd	Alcohol	16943	Dec-72	Nov-82
Bayuk Cigars Inc	Tobacco	10727	Jan-65	Jun-82
Beam Inc	Alcohol	10225	Jan-65	Apr-14
Beringer Wine Estates Holdings Inc	Alcohol	85456	Oct-97	Oct-00
Big Rock Brewery Inc	Alcohol	78769	Jul-92	Jan-03
Black Hawk Gaming & Development Co Inc	Gaming	79153	May-93	Feb-02
Boardwalk Casino Inc	Gaming	80225	Feb-94	Jun-98
Boomtown Inc	Gaming	78021	Oct-92	Jun-97
Boston Beer Co Inc. (The)	Alcohol	82634	Nov-95	Dec-21
Boulder Brewing Co	Alcohol	18893	Sep-83	Dec-83
Bouncebacktechnologies.com	Gaming	79578	Sep-93	May-99
Boyd Gaming Corp	Gaming	79758	Oct-93	Dec-21
British American Tobacco Ltd	Tobacco	29874	Jan-65	Aug-76
British American Tobacco PLC	Tobacco	59504	Dec-96	Dec-21
Brown-Forman Corp	Alcohol	29938	Jan-65	Dec-21
CA Blockers Inc	Tobacco	11766	Oct-87	Jun-89
Caesars Entertainment Corp	Gaming	13267	Feb-12	Jul-20
Caesars Entertainment Inc	Gaming	14882	Sep-14	Dec-21
Caesars Entertainment Inc -OLD	Gaming	86447	Jan-99	Jun-05
Caesars New Jersey Inc	Gaming	62818	Nov-78	Nov-90
Caesars World	Gaming	49402	Oct-69	Mar-95
Canterbury Park Holding Corp	Gaming	81182	Dec-94	Dec-21
Capital Gaming International Inc	Gaming	76546	Nov-90	Jul-95
Caribbean Cigar Co	Tobacco	83851	Aug-96	Nov-98
Carling O'Keefe Ltd	Alcohol	23106	Jan-65	Jun-87

Casino Magic Corp	Gaming	78023	Oct-92	Oct-98
Castle Brands Inc	Alcohol	91192	Apr-06	Oct-19
Century Casinos Inc	Gaming	79791	Nov-93	Dec-21
Chalone Wine Group Ltd (The)	Alcohol	22569	May-84	Feb-05
China New Borun Corp	Alcohol	93406	Jun-10	Jun-19
Churchill Downs Inc	Gaming	79026	Mar-93	Dec-21
Codere Online Luxembourg S.A	Gaming	22536	Dec-21	Dec-21
Colorado Casino Resorts Inc	Gaming	81478	Apr-95	May-99
Compania Cervecerias Unidas SA	Alcohol	77928	Sep-92	Dec-21
Consolidated Cigar Corp	Tobacco	11391	Jan-65	Jan-68
Consolidated Cigar Holdings Inc	Tobacco	83819	Aug-96	Jan-99
Constellation Brands Inc	Alcohol	69796	Jul-86	Dec-21
Conwood Corp	Tobacco	11498	Jan-65	Sep-85
Craft Brew Alliance Inc	Alcohol	82176	Aug-95	Sep-20
Cruzan International Inc	Alcohol	77984	Oct-92	Mar-06
Culbro Corp	Tobacco	12044	Jan-65	Aug-97
Diageo PLC	Alcohol	76592	Mar-91	Dec-21
Diamondhead Casino Corp	Gaming	75781	Jun-89	Nov-98
Dover Downs Gaming & Entertainment Inc.	Gaming	89332	Apr-02	Mar-19
Dr Pepper/Seven Up	Alcohol	78864	Jan-93	Jun-95
DraftKings Inc	Gaming	18835	Jul-19	Dec-21
Eastside Distilling Inc	Alcohol	16887	Aug-17	Dec-21
Ebet Inc	Gaming	21036	Apr-21	Dec-21
Elsinore Corp	Gaming	60927	Mar-79	Oct-95
Empire Resorts Inc	Gaming	79790	Nov-93	Nov-19
Eskimo Pie Corp	Alcohol	77446	Apr-92	Oct-00
Falstaff Brewing Corp	Alcohol	23683	Jan-65	May-89
Frederick Brewing Co	Alcohol	83240	Mar-96	Apr-99
Fresh Vine Wine Inc	Alcohol	22465	Dec-21	Dec-21
Full House Resorts Inc	Gaming	79490	Aug-93	Dec-21
Gallaher Group PLC, London	Tobacco	84775	Jun-97	Apr-07
Gaming & Technology-Old	Gaming	38149	Nov-78	Nov-14
Gaming Corp of America	Gaming	78887	Feb-93	Nov-95
GB Holdings Inc	Gaming	88925	Mar-01	Sep-04
Geminex Industries Inc	Gaming	76486	Apr-90	May-91
General Cigar Holdings	Tobacco	84580	Mar-97	May-00
Glenmore Distilleries	Alcohol	32256	Jan-65	Aug-91
Golden Entertainment Inc	Gaming	86578	Jan-99	Dec-21
Golden Nugget Online Gaming Inc	Gaming	18778	Jun-19	Dec-21
Golden State Vintners Inc	Alcohol	86301	Jul-98	Jul-04
Grand Casinos Inc	Gaming	77028	Oct-91	Dec-98
Grand Gaming Corp	Gaming	80551	May-94	Nov-95
Griffin Gaming & Entertainment	Gaming	76482	Oct-90	Dec-96
Harbor Brewing Co Inc	Alcohol	76433	Jan-90	Jun-94
Harveys Casino Resorts	Gaming	80199	Feb-94	Feb-99
Heileman (G) Brewing-Old	Alcohol	56864	May-73	Mar-88
Heublein Inc	Alcohol	38324	Jan-65	Oct-82
Holly Holdings Inc	Gaming	79980	Dec-93	Jul-97
Hollywood Casino Corp	Gaming	79171	Jun-93	Mar-03

Icee USA Corp	Alcohol	67977	Jan-85	May-88
Imperial Brands PLC	Tobacco	86404	Nov-98	Sep-08
Imperial Group PLC	Tobacco	33080	Jan-65	Nov-86
Independence Brewing Co	Alcohol	84539	Feb-97	Apr-99
International Game Technology	Gaming	45277	Oct-81	Apr-15
International Game Technology PLC	Gaming	15331	Apr-15	Dec-21
International Gaming Management Inc	Gaming	78893	Feb-93	Sep-94
International Thoroughbred Breeders Inc	Gaming	67619	Mar-81	Oct-97
Isle of Capri Casinos Inc	Gaming	77897	Sep-92	May-17
Jacquin (Charles) Et Cie	Alcohol	46253	Dec-72	Feb-74
JCC Holding Co	Gaming	86446	Dec-98	Nov-00
Kerzner International Ltd	Gaming	80573	Jul-94	Sep-06
Kirin Holdings Co Ltd	Alcohol	47897	Feb-73	Jun-06
Lady Luck Gaming Corp	Gaming	79606	Sep-93	Mar-00
Las Vegas Sands Corp	Gaming	90505	Dec-04	Dec-21
Liggett Group Inc-Old	Tobacco	12837	Jan-65	Aug-80
LiNiu Technology Group	Gaming	12018	Jul-10	May-18
Lion Brewery Inc	Alcohol	83525	May-96	Jan-99
Lone Star Brewing Co	Alcohol	50068	Dec-72	Jan-77
Lorillard Corp	Tobacco	12896	Jan-65	Nov-68
Lorillard Inc	Tobacco	89303	Feb-02	Jun-08
Lottery & Wagering Solutions Inc	Gaming	85037	Jun-97	Nov-99
Lottery com Inc	Gaming	17901	Jun-18	Dec-21
Mafco Consolidated Group Inc	Tobacco	81667	Jun-95	Jul-97
Mandalay Resort Group	Gaming	65533	Oct-83	Apr-05
Mbc Holding Co	Alcohol	79715	Oct-93	Jan-02
Melco Resorts & Entertainment Ltd	Gaming	91673	Dec-06	Dec-21
MGM Resorts International	Gaming	11891	May-88	Dec-21
MGP Ingredients Inc	Alcohol	12226	Oct-88	Dec-21
Mirage Resorts Inc	Gaming	60441	Aug-78	May-00
Molson Coors Beverage Company	Alcohol	90562	Feb-05	Dec-21
Monarch Casino & Resort Inc	Gaming	79507	Aug-93	Dec-21
Mountaintop Corp	Alcohol	76395	Jul-90	May-92
MTR Gaming Group Inc	Gaming	78147	Dec-92	Sep-14
Nevada Gold & Casinos Inc.	Gaming	60709	Mar-79	Jun-19
Nor'Wester Brewing Company	Alcohol	82808	Jan-96	Sep-97
Olympia Brewing	Alcohol	59468	Dec-72	Mar-83
Pabst Brewing Co	Alcohol	59416	Dec-72	May-85
Pavichevich Brewing	Alcohol	75682	Jan-89	Nov-92
PENN Entertainment Inc	Gaming	80563	May-94	Dec-21
PepsiCo Inc	Alcohol	13856	Jan-65	Dec-21
Petes Brewing Co	Alcohol	82627	Nov-95	Jul-98
Philip Morris International Inc	Tobacco	92602	Apr-08	Dec-21
Pinnacle Entertainment Inc.	Gaming	42140	Dec-72	Apr-16
Pittsburgh Brewing Co	Alcohol	63184	Oct-83	Apr-86
Players International Inc	Gaming	10857	Nov-86	Mar-00
Powerhouse Technologies Inc	Gaming	76746	Jul-91	Jun-99
Primadonna Resorts Inc	Gaming	79297	Jun-93	Feb-99
Pure World Inc	Alcohol	25786	Jan-82	Jul-05

Pyramid Breweries Inc	Alcohol	82710	Dec-95	Aug-08
Quilmes Industrial SA	Alcohol	90328	Jun-01	Feb-08
Rainier Cos Inc	Alcohol	65577	Dec-72	Aug-78
Rank Group PLC	Gaming	65702	Dec-72	Aug-05
Ravenswood Winery Inc	Alcohol	86843	Apr-99	Jul-01
Red Rock Resorts Inc	Gaming	16019	Apr-16	Dec-21
Reynolds American Inc	Tobacco	86946	Jun-99	Jul-17
RH Phillips Inc	Alcohol	82517	Oct-95	Oct-00
Rheingold Corp	Alcohol	42323	Aug-65	Jan-74
Rio Hotel & Casino Inc	Gaming	12395	Jun-84	Dec-98
Riviera Holdings Corp	Gaming	83458	May-96	Jun-09
Robert Mondavi Corp (The)	Alcohol	79289	Jun-93	Dec-04
Rush Street Interactive Inc	Gaming	19333	Apr-20	Dec-21
Sahara Casino Partners LP	Gaming	75184	Jul-87	Sep-93
Saint James Co (The)	Alcohol	91353	Jun-85	Apr-91
Sands Regent (The)	Gaming	91687	Feb-85	Jan-07
Schaefer (F&M) Corp	Alcohol	47562	Jan-69	May-81
Schenley Industries Inc	Alcohol	19385	Jan-65	Jun-71
Schlitz (Jos.) Brewing Co	Alcohol	45081	Sep-67	Jun-82
Senomyx Inc	Alcohol	90238	Jun-04	Nov-18
Showboat Inc	Gaming	56434	Feb-73	Jun-98
Sport of Kings Inc	Gaming	32249	Aug-83	Jun-93
Sportech PLC	Gaming	67484	Sep-82	Jun-91
Stars Group Inc	Gaming	15411	Jun-15	May-20
Station Casinos Inc.	Gaming	79192	May-93	Nov-07
Stearns & Lehman Inc	Alcohol	84334	Dec-96	Mar-02
Stratosphere Corp	Gaming	80282	Feb-94	Apr-97
Studio City International Holdings Ltd	Gaming	18185	Oct-18	Dec-21
Swedish Match AB	Tobacco	83563	May-95	Oct-04
Swisher International Group Inc	Tobacco	84374	Dec-96	Jun-99
Taylor Wine Inc	Alcohol	74772	Dec-72	Jan-77
Technology Flavors & Fragrances Inc.	Alcohol	87828	Mar-00	Jun-05
The Duckhorn Portfolio Inc	Alcohol	20654	Mar-21	Dec-21
TPG Pace Holdings Corp	Gaming	16874	Aug-17	Dec-21
Trans World Corp/NV	Gaming	81158	Dec-94	Jun-97
Truett-Hurst Inc	Alcohol	13970	Jun-13	Mar-19
Trump Entertainment Resorts Inc	Gaming	90911	Sep-05	Feb-09
Turning Point Brands Inc	Tobacco	16083	May-16	Dec-21
UST Inc.	Tobacco	15077	Jan-65	Jan-09
Vina De Concha Y Toro Sa Conchatoro	Alcohol	81049	Oct-94	Jul-18
Vintage Wine Estates Inc	Alcohol	20580	Feb-21	Dec-21
Walker (Hiram) Resources Ltd	Alcohol	61890	Apr-80	Oct-86
Willamette Valley Vineyards Inc	Alcohol	80955	Sep-94	Dec-21
Winc Inc	Alcohol	22417	Nov-21	Dec-21
WinWin Gaming Inc	Gaming	79281	Jun-93	Aug-95
Wynn Resorts Ltd	Gaming	89533	Oct-02	Dec-21
Youbet.com Inc	Gaming	87005	Jun-99	Jun-10