
# Is Alcohol still considered a Sin Stock? A Comparative Analysis with Sin Stocks and Shariah-Compliant stocks

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## Abstract

Socially responsible investing (SRI) often excludes sin industries such as Alcohol. However, trends such as ESG adoption and Alcohol-free products challenge this classification.

This thesis evaluates Alcohol's status as a sin stock by comparing its financial performance to other sin industries (Gambling and Tobacco) and the Shariah World Index, an SRI benchmark, using data from 2004–2023. Alcohol showed no significant link to Gambling stocks but displayed a negative correlation between its leverage and Tobacco returns, indicating shared financial risks. Periods of convergence between Alcohol and Shariah-compliant stock returns were also observed, particularly during phases of economic recovery and market volatility. Key factors influencing return differentials included Alcohol's Market Activity, Profitability, Leverage, and Firm Size.

Despite advancements in ESG, results show that Alcohol remains classified as a sin stock, reflecting persistent perceptions of its controversial nature. This underscores the nuanced relationship between evolving industry practices and ethical investment standards.

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**Keywords**: Social norms, Sin stocks, Stock returns, Alcohol, Shariah Compliant investments

## Resumo

O investimento socialmente responsável (ISR) exclui muitas vezes os sectores pecaminosos, como o do Álcool. No entanto, tendências como a adoção de ESG e de produtos sem álcool desafiam esta classificação.

Esta tese avalia o estatuto do Álcool como uma ação pecaminosa, comparando o seu desempenho financeiro com outras indústrias pecaminosas (Jogo e Tabaco) e com o Índice Shariah, uma referência ISR, entre 2004 e 2023. O Álcool não mostrou qualquer ligação significativa com as ações do Jogo, mas apresentou uma correlação negativa entre a dívida do Álcool e os retornos do Tabaco. Foram também observados períodos de convergência entre os retornos das ações do Álcool e das ações do Índice Shariah, particularmente durante as fases de recuperação económica e de volatilidade do mercado. Os principais fatores que influenciaram os diferenciais de retorno incluíram a atividade de mercado do Álcool, a rentabilidade, a dívida e a dimensão da empresa.

Apesar dos avanços em ESG, os resultados mostram que o Álcool continua a ser classificado como uma ação de pecado, refletindo perceções persistentes da sua natureza controversa.

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**Tópico**: Será o Álcool ainda considerado uma ação de pecado? Uma análise comparativa com ações de pecado e ações Shariah

**Palavras-chave**: Normas Sociais, Ações do Pecado, Retorno de Ações, Álcool, Investimentos Shariah

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## 1. Introduction

Socially responsible investing (SRI) has become a rapidly growing sector that incorporates firms' environmental, social, and governance (ESG) performance, alongside ethical and social responsibility considerations, into investment strategies. Within the realm of SRI, certain industries, particularly those engaged in activities considered to be "sinful" — such as Alcohol, Gambling, and Tobacco — have faced disapproval due to the social norms surrounding their practices. The exclusion of their stocks remains the most common SRI strategy today. Relative to fund size, Alcohol is the second most prominent *negative screen* (after Tobacco) employed by SRI investors (Trinks and Scholtens, 2015; de Bruin, 2013). Colonnello et al. (2019) highlight the significance of ethical preferences in shaping both investors' portfolio decisions and asset prices. Meanwhile, de Bruin (2013) argues that there is little rationale for negative screens used by many SRI investors, aside from the religious motivations embraced by, though not exclusively, Islamic investors.

Islamic investors tend to allocate their capital toward Shariah-compliant funds, which were driven mainly by individuals, who were attracted by the idea of faith-based investments aligned with Shariah (Islamic law). These funds exclude any companies involved in sectors such as Alcohol, Tobacco, entertainment, pork-related products, weapons, among others. In addition to adhering to Shariah principles, the FTSE Global Equity Shariah Index incorporates an asset-based debt screening process. As the sector has matured, its year-on-year (YoY) Total Returns have increasingly converged with those of the FTSE All-World, even outperforming it from 2020 to 2023. (LSEG, 2024; PricewaterhouseCoopers, 2009).

Social norms are constantly evolving alongside economic and cultural changes. Although Alcohol remains excluded from SRI investment strategies, the industry has adapted in an effort to better to respond to market shifts, even as demand trends have moved away from traditional Alcoholic beverages. For instance, during the Covid-19 pandemic, distilleries pivoted to produce hand sanitizers, showcasing their ability to quickly align with a changing economic framework. More recently, the demand for premiumization, the increasing interest in low and non-alcoholic beverages, the focus on sustainability, and the influence of local traditions and regulations have been shaping the Alcohol market landscape. (Fetzer, 2022; Statista, 2024).

The primary objective of this study is to investigate whether such innovations within the Alcohol sector have contributed to offsetting the investors' negative perception associated with Alcohol being a sin stock. To achieve this, I will examine the market performance of the

Alcohol industry, by analysing profitability and risk variables, through a series of regression analyses. First, I will investigate the key drivers of Alcohol stock performance and then compare it with other sin stocks, namely Gambling and Tobacco, and Shariah Global Index performances. Preliminary findings indicate that Alcohol continues to be classified as a sin stock within the stock market and therefore within the SRI framework. However, an interesting result emerged: Alcohol *Turnover* demonstrates a positive correlation with the outperformance of Shariah World Index when compared to the Alcohol industry itself. Furthermore, when I go on to analyse the differential return between Alcohol and Shariah in three different time frames, I find that *Turnover* shows explanatory power across all years, *Earnings-per-Share* and *Firm Size* contributed the most to decrease the gap in 2008-2011 and 2018-2023 respectively. This study contributes to the existing literature by reaffirming that investors adhering to SRI principles continue to exclude Alcohol from their portfolios, despite the absence of clearly justifiable reasoning. This underscores the complex interplay between ethical and religious preferences and financial performance in investment decision-making.

The following section provides additional insight into the context of this thesis, including a brief survey of the existing literature on sin stocks and socially responsible investing (SRI), along with an overview of recent developments in the Alcohol industry. The third section outlines the data and methodology employed in the study. In the fourth section, I present the regression results on Alcohol's stock performance, followed by a comparative analysis with Gambling and Tobacco. This section also includes a comparison of Alcohol returns with Shariah-compliant returns, along with an in-depth analysis across three time periods: 2008–2011, 2012–2017, and 2018–2023. Finally, the thesis concludes with a summary of key findings and discusses the limitations of the study.

## 2. Literature Review

### 2.1. Sin stocks, SRI and Investor sentiment

Sin stocks are shares of companies primarily engaged in activities such as Gambling, Tobacco, and Alcohol. Their unique risk-return profiles, coupled with the aversion some investors feel toward these industries, make sin stocks compelling subjects for academic research. Hong and Kacperczyk (2009) investigate the investment dynamics regarding institutional ownership and SRI behaviour that surrounds "sin" stocks, specifically focusing on publicly traded companies engaged in the production of Alcohol, Tobacco, and gaming products. In contrast, this thesis specifically focuses on Alcohol stocks, examining their return profiles in comparison to those

of Tobacco and gaming stocks. I focus on Alcohol stocks in my sample instead of the adoption of sin portfolios as a whole (Trinks and Scholtens, 2015), to better assess whether investor sentiment regarding Alcohol as a sin stock has shifted over time. Both Hong's study and this working paper employ cross-sectional regression models to control for firm-specific characteristics, utilizing a comparable set of variables.

Du and Sun (2023) also follow on Hong and Kacperczyk's (2009) definition of "sin" firms, categorizing Alcohol, Tobacco, and gaming companies as such. Their study finds that these firms exhibit strong ESG performance across multiple benchmarks, particularly excelling in social metrics like employee relations and community engagement. Importantly, they show that this high ESG performance is not driven by mechanisms of valuation and monitoring, instead their findings suggest that sin stock firms may actively use ESG strategies to offset negative perceptions and enhance their reputations despite social norms.

Religious and social norms heavily influence certain institutional investment decisions, often leading to the exclusion of sin stocks from portfolios, as discussed by Hong and Kacperczyk (2009). This exclusion creates a premium on sin stocks, attracting investors unconstrained by ethical concerns, though more recent studies yield mixed results (Liston, 2016). Trinks and Scholtens (2015) conclude that effective portfolio management fundamentally depends on diversification. They find that investors, a diverse group with varying goals, increasingly seek to align their investments with their personal values and beliefs. Their results suggest a potential trade-off between adhering to these values and achieving financial returns. Additionally, Colonnello et al. (2019) argue that while investors prioritize financial gains, they adjust investments based on perceived ethical behaviour, with retail investors influencing more the sin premium due to less public scrutiny on their choices. Given that individual ethical preferences tend to outweigh public scrutiny in shaping investment behaviour, this thesis shifts from examining investor sentiment by type and instead focuses on the broader market's view of Alcohol as a sin stock.

Moreover, existing literature suggests that sin stocks often receive reduced analyst coverage relative to comparable firms (Liston, 2016; Hong and Kacperczyk, 2009). To better understand this, I will also analyse changes in analyst coverage over time for Alcohol stocks, employing similar methodologies for this analysis.

### 2.2. Shariah Investments

Shariah investments exclude firms operating in sin industries and those with capital structures marked by high debt and current assets[1] (Anwer et al., 2020; LSEG, 2024). Anwer et al.'s (2020) findings indicate that Shariah-compliant firms generally display lower governance quality compared to Shariah non-compliant firms, characterized by smaller size, lower profitability, higher dividend payouts, higher total risk, and lower free cash flow. Nonetheless, the Shariah-compliant funds sector has matured and demonstrated strong performance from 2019 to 2023. Because of this, Shariah stocks now appeal to investors beyond the global Muslim population, which accounts for roughly a quarter of the world's population (LSEG, 2024; PricewaterhouseCoopers, 2009). In this thesis, I will use the FTSE Global Equity Shariah Index Series as a benchmark for comparison with the Alcohol industry.

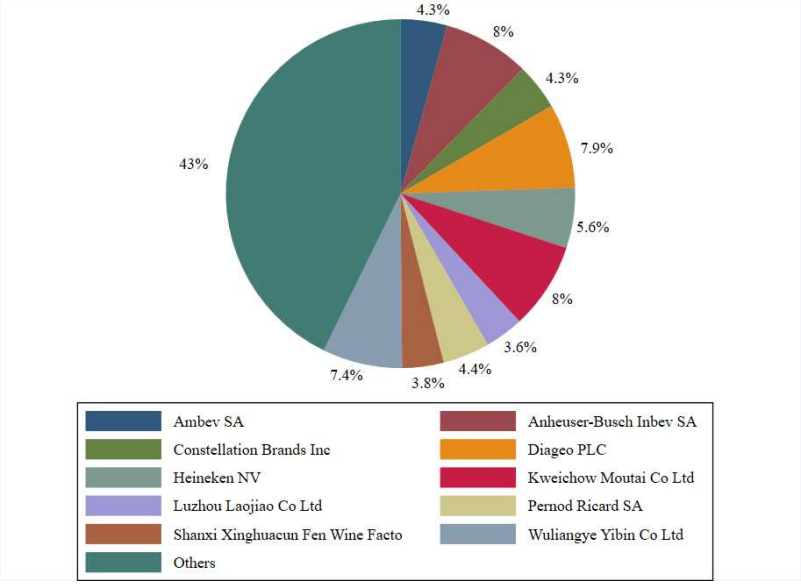
### 2.3. The Alcohol Industry

Despite a decline in overall Alcohol consumption, the industry has achieved moderate growth in both value and volume over recent years, a trend that is expected to continue due to factors such as premiumization, increased interest in low-Alcohol and non-alcoholic alternatives, and demand for sustainable, eco-friendly packaging solutions. Even though developments are influenced by cultural differences in consumption patterns across countries, the Alcohol business is no longer a production-driven business, instead it has become a marketing-driven business, reflecting the rise of e-commerce (Jernigan, 2009; MarketLine, 2024; Statista, 2024). Macroeconomic factors also shape the industry landscape significantly. In 2023, besides premiumization, rising GDP and inflation contributed to the market growth of 2.5% although this was partly offset by geopolitical tensions and a decline in Alcohol consumption.

This study's sample includes 294 global companies in the Alcoholic beverage sector, covering both manufacturers and wholesalers of beer, wine, and spirits. According to Figure 1, the top 10 companies represent 57% of the sample in terms of market capitalization, highlighting the high concentration seen in the industry. Despite growing consumer interest in local and premium brands, major corporations continue to dominate market influence, making them central to understanding shifts in public perception of Alcohol.

[1] See further in LSEG. (2024, September 30). *FTSE Global Equity Shariah Index Series*

***Figure 1*** *Leading global Alcohol firms based on Market Cap*




Source: Refinitiv Workspace (2024) – author's own computations

## 3. Data and Methodology

### 3.1. Data

All data for this analysis was sourced from Refinitiv Workspace (LSEG), with industry-specific stock selections based on LSEG's Industry Index constituents. The Alcohol industry sample combines constituents from the Distillers & Wineries (RIC Code: .TRXFLDGLPUBOOZ) and Brewers (RIC Code: .TRXFLDGLPUBREW) indices, totalling 294 firms. The Gambling industry includes 165 constituents from the Casinos & Gaming index (RIC Code: .TRXFLDGLPUGAMI), and the Tobacco industry comprises 85 constituents from the Tobacco index (RIC Code: .TRXFLDGLPUTOBC). For the regression analysis, variables were selected based on prior studies, focusing on firm-level variables and using the annual closing stock price to calculate returns for the Alcohol, Gambling, Tobacco, and Shariah global indices. The variables were chosen due to their relevance when evaluating firm profitability and financial risk, key factors in investor decision-making, which include *Beta*, *Earnings-per-Share* (*EPS*), *Turnover*, *Return-on-Equity* (*ROE*), *Debt-to-Equity* (*DE*) ratio, *Firm Size* (*LogSize*), and *Number of Analysts (LogNoA)*. All financial data was converted to a common currency, USD, to ensure consistency across companies. The global Shariah benchmark used for comparison is the *FTSE Global Equity Shariah Index* (RIC Code: .FTSWORLDS), with its annual closing prices extracted similarly.

This study spans the period from 2004 to 2023, though certain variables—such as *Beta*, *LogSize*, and the *FTSE Global Equity Shariah Index*—have data available only from later points within this range due to initial data limitations. For example, *Beta* and *LogSize* exhibit scattered values between 2004 and 2015, with consistent observations available only from 2015 onward. Similarly, between 2008 and 2011, the dataset lacked sufficient observations to perform regressions for that specific time window. As for the *FTSE Global Equity Shariah Index*, data availability begins in 2008, since the index's launch on 29th October 2007. (LSEG, 2024)

### 3.2. Methodology

For data preprocessing, I began by winsorizing all variables at 1% level to reduce the potential impact of outliers, which could distort the analysis. To ensure the robustness and validity of the model, a series of diagnostic tests were conducted. First, the *Hausman test* was performed to assess the appropriateness of using fixed effects at the company level, determining whether fixed or random effects were more suitable for the analysis. Next, the *Wooldridge test for autocorrelation in panel data* was applied to check for serial correlation in the error terms, which could compromise the model's reliability. Additionally, the *Breusch-Pagan test for heteroskedasticity* was conducted using the Lagrange Multiplier method to account for potential cross-sectional correlation within the fixed effects model (Breusch & Pagan, 1979). Furthermore, Year Fixed Effects were tested using the *i.Year* command in Stata, and it was confirmed that all years were statistically significant, ensuring that any unobserved heterogeneity associated with different time periods was properly accounted for.

Based on the outcomes of these robustness checks, the fixed effects model was applied in regressions where Alcohol's return and Shariah index's were the dependent variables, as indicated by the results of the *Hausman test*. For all other regressions, random effects with robust standard errors (using the *vce(robust)* command in Stata) were employed to account for potential heteroskedasticity and serial correlation, thereby enhancing the model's accuracy and ensuring more reliable estimation of the relationships between the variables.

Table 1 displays descriptive statistics for the dataset after winsorizing. The average *Beta* for Alcohol firms is 0.71, indicating a positive sensitivity to market fluctuations, which means that companies in the Alcohol industry, on average, tend to move in line with broader market trends. However, there is considerable variation in this relationship, as evidenced by the standard deviation (SD = 0.50), highlighting that some Alcohol firms are more responsive to market

changes than others. The *Earnings-per-Share* (*EPS*) variable has a mean of 0.70, suggesting moderate profitability on average. However, there is significant variability across firms, as reflected in the SD of 7.66, implying that earnings performance is highly inconsistent within the industry. *Return-on-Equity* (*ROE*) shows a relatively low mean of 0.15, indicating modest profitability relative to shareholders' equity. The data for *ROE* is also highly right-skewed (Skewness = 1.52; Kurtosis = 10.88), suggesting that a small number of firms within the sample achieve exceptionally high returns. This may affect the distribution disproportionately. Similarly, *Turnover* exhibits a heavy-tailed distribution, consistent with the market concentration observed in the Alcohol sector, where a few dominant companies capture a large share of total revenue. The *Debt-to-Equity* (*DE*) ratio, with a mean of 0.60 and SD of 0.77, suggests that most Alcohol firms maintain balanced leverage. However, the high skewness (2.80) and kurtosis (13.10) indicate that some firms have significantly higher levels of debt relative to equity. Analyst coverage, as measured by *LogNoA*, has a mean of 0.0027 and a SD of 0.0797, but it is extremely skewed (Skewness = 32.56; Kurtosis = 1137.23), pointing to the fact that most firms receive very little or no analyst attention, while a small number receive substantial coverage. In summary, despite winsorizing, the data distribution remains highly skewed across several key variables, with notable outliers and heavy tails that indicate the presence of extreme values in the sample.

***Table 1*** *Descriptive Statistics*

| *Variables* | *Obs* | *Mean* | *Std. Dev.* | *Min* | *Max* | *Skew.* | *Kurt.* |
|---|---|---|---|---|---|---|---|
| *Beta* | 1924 | .709 | .497 | -.493 | 2.116 | .189 | 3.143 |
| *EPS* | 4063 | .699 | 7.661 | -49.294 | 43.988 | -.743 | 31.716 |
| *ROE* | 1529 | .147 | .181 | -.463 | 1.025 | 1.522 | 10.803 |
| *Turnover* | 3664 | 8490000 | 26100000 | .417 | 1.840e+08 | 4.886 | 29.436 |
| *DE* | 3587 | .599 | .77 | 0 | 4.688 | 2.803 | 13.101 |
| *LogSize* | 2401 | 4.916 | 3.09 | -3.358 | 11.328 | -.243 | 2.884 |
| *LogNoA* | 1048575 | .003 | .08 | 0 | 3.526 | 32.564 | 1137.225 |
| *Alcohol*[2] | 5860 | -.005 | .675 | -15.933 | 15.933 | -1.061 | 232.769 |
| *Gambling*[3] | 3300 | -.074 | 3.281 | -13.817 | 14.163 | .076 | 6.717 |
| *Tobacco*[4] | 5819 | 7.164 | 51.12 | -.308 | 742.141 | 11.483 | 147.514 |
| *Shariah*[5] | 5860 | .044 | .676 | -15.933 | 15.933 | 1.011 | 232.033 |

Source: Refinitiv Workspace – author's own computations

[2] Alcohol Returns
[3] Differential in returns between Gambling and Alcohol
[4] Differential in returns between Tobacco and Alcohol
[5] Differential in returns between Shariah and Alcohol

### 3.3. Time-series regressions

To explore the determinants of Alcohol stock price performance and to compare it with other "sin" industries, as well as with the Shariah Index, I conduct a series of cross-sectional regressions based on three main research questions of the thesis.

*Research question 1: What drives Alcohol's stock price performance?*

$$(1)\ \ Alcohol_{i,t} = \beta_0 + \sum \beta_k Alcohol\ Controls_{i,t} + FE + \ \varepsilon_{i,t}$$

where the dependent variable is the average yearly return on stock *i*, calculated as the natural logarithm of the ratio of average stock return for firm *i* for year *t* to average stock return for firm *i* for year *t−1*:

$$(2)\ \ Alcohol_{i,t} = \ln\left(\frac{Alcohol\ Price\ Close_t}{Alcohol\ Price\ Close_{t-1}}\right)$$

*Research question 2: How does Alcohol perform in comparison to other "sin" industries?*

$$(3)\ \ Gambling_{i,t} = \beta_0 + \sum \beta_k Alcohol\ Controls_{i,t} + RE + \ \varepsilon_{i,t}$$

$$(4)\ \ Tobacco_{i,t} = \beta_0 + \sum \beta_k Alcohol\ Controls_{i,t} + RE + \ \varepsilon_{i,t}$$

where the dependent variable represents the difference in annual return between Gambling or Tobacco stocks and Alcohol stocks:

$$(5)\ \ Gambling_{i,t} = \ln\left(\frac{Gambling\ Price\ Close_t}{Gambling\ Price\ Close_{t-1}}\right) - \text{Average Yearly } Alcohol_{i,t}$$

$$(6)\ \ Tobacco_{i,t} = \ln\left(\frac{Tobacco\ Price\ Close_t}{Tobacco\ Price\ Close_{t-1}}\right) - \text{Average Yearly } Alcohol_{i,t}$$

By framing the dependent variable as the return differential, this approach directly examines the relative performance of these industries compared to Alcohol. The equations (3) and (4) use random effects (RE) to allow for time-invariant differences across individual stocks within these sectors.

*Research question 3: How does Alcohol perform in comparison with the Shariah Index?*

$$(7)\ Shariah_{i,t} = \beta_0 + \sum \beta_k Alcohol\ Controls_{i,t} + FE + \ \varepsilon_{i,t}$$

where the dependent variable is the difference in return between *FTSE Global Equity Shariah Index* yearly with Alcohol's average yearly return:

$$(8)\ Shariah_{i,t} = \text{Shariah Index Price Close}_t - \text{Average Yearly } Alcohol_{i,t}$$

The independent variables (Alcohol controls) for each regression are defined using firm-specific data from companies operating within the Alcohol industry[6]. The first variable is the *Beta* of firm i at the end of year t, which measures the firm's Market Volatility. This metric captures the sensitivity of the firm's returns to fluctuations in the broader market, providing insight into how susceptible the firm is to overall market risk and volatility. Profitability is assessed using two metrics: *Earnings-per-Share* (*EPS*), which is calculated as firm i's basic EPS excluding extraordinary items at the end of year t, and *Return-on-Equity (ROE)*, which is the ratio of net income to shareholders' equity. These two indicators reflect the firm's ability to generate profits and deliver returns to its equity holders. Liquidity is measured by the firm's year-end unscaled trading *Turnover*, representing the level of trading activity and potential ease of buying or selling shares. Financial Risk is evaluated using the *Debt-to-Equity (DE)* ratio, which is calculated by dividing total debt by total shareholders' equity. This ratio indicates the firm's leverage and its reliance on debt financing, offering insight into its financial stability. *Firm Size (LogSize)* is included as a control variable and is represented by the natural logarithm of firm i's market capitalization (price multiplied by shares outstanding) at the end of year t. This variable captures the scale of the firm and helps control for size-related factors that could influence performance, following approaches used in prior studies. Finally, Analyst Coverage *(LogNoA)* is measured by the natural logarithm of one plus the number of analysts covering firm i at the end of year t. This variable reflects the attention and scrutiny the firm receives from financial analysts, which can influence investor perceptions and stock performance. These variables are consistent with the definitions used in prior literature and serve as key explanatory factors in the regression analysis.

## 4. Results

### 4.1. Alcohol's Performance Drivers

The analysis presented in Table 2 examines the influence of market and firm-specific variables on variations in Alcohol industry stock returns. The regression results indicate that different variables exhibit varying degrees of explanatory power depending on whether they are

[6] Further variable descriptions and computations are presented in the Appendix

evaluated in isolation or within the full model framework. Columns (1) through (7) report the effects of individual variables, while column (8) provides the results from the full model incorporating all variables simultaneously.

The market sensitivity variable, *Beta*, demonstrates a notable shift in explanatory power between models. When considered individually in column (1), *Beta*'s coefficient is negative but statistically insignificant, indicating that market sensitivity does not fully explain stock returns when studied in isolation. However, in the full model (column 8), *Beta* becomes statistically significant at the 1% level, with a coefficient of -0.261. This finding suggests that *Beta*'s influence is conditional on the presence of other variables, and higher market volatility is negatively associated with Alcohol stock returns. This relationship implies that Alcohol stocks underperform during periods of heightened market volatility, possibly due to the industry's perceived risk profile.

Profitability measures, including *EPS* and *ROE*, provide additional insights. *EPS*, in column (2), is statistically significant with a positive coefficient (0.005, $p < 0.05$). However, the magnitude of the coefficient is very small, suggesting that *EPS* has limited practical influence on Alcohol stock returns. In contrast, *ROE*, reported in column (3), exhibits a larger and more impactful coefficient (0.605, $p < 0.01$), indicating that profitability as measured by *ROE* has greater explanatory power when considered independently. Nevertheless, both *EPS* and *ROE* lose their statistical significance in the full model, as seen in column (8). This shift suggests that other variables, particularly those capturing firm size and market engagement, may subsume their explanatory power when all factors are considered simultaneously. Liquidity, as measured by *Turnover*, demonstrates robust significance across models. In column (4), *Turnover* reports a positive and statistically significant coefficient at the 1% level. The coefficient remains small in magnitude, which is consistent with expectations given that *Turnover* is an unscaled variable. These results suggest that increased trading activity reflects positively on Alcohol stock returns, potentially signalling greater market confidence and investor engagement with these stocks.

The *Debt-to-Equity* (*DE*) ratio, a measure of financial risk, exhibits a negative and statistically significant coefficient (-0.108, $p < 0.05$) in column (5), indicating that higher leverage negatively affects Alcohol stock returns when considered independently. However, in the full model, *DE* loses its significance, indicating that financial structure variables have limited standalone influence on stock performance once other firm characteristics, such as *size*, are

taken into account. This finding suggests that investors may prioritize firm-specific traits over leverage when evaluating Alcohol stocks.

*Firm size*, as measured by the natural logarithm of market capitalization (*LogSize*), emerges as a critical explanatory variable. *LogSize* is statistically significant in both the individual regression in column (6) and the full model in column (8), where its coefficient increases from 0.162 to 0.262 ($p < 0.01$). Interestingly, once *LogSize* was added to the model, Return-on-Equity became statistically insignificant, showcasing that Market Capitalization has more explanatory power over variations in Alcohol's return than ROE. This result highlights the importance of *Firm Size* as a determinant of stock performance, likely due to larger firms being perceived as more stable and reliable by investors.

***Table 2*** *Alcohol Performance Drivers*

| *Variables* | *(1) Alcohol* | *(2) Alcohol* | *(3) Alcohol* | *(4) Alcohol* | *(5) Alcohol* | *(7) Alcohol* | *(8) Alcohol* |
|---|---|---|---|---|---|---|---|
| Beta | -.043 | -.055* | -.18*** | -.283*** | -.293*** | -.315*** | -.261*** |
| | (.034) | (.033) | (.05) | (.051) | (.05) | (.05) | (.048) |
| EPS | | .005** | .003 | -.004 | -.008 | -.011 | -.01 |
| | | .002 | (.013) | (.013) | (.013) | (.013) | (.012) |
| ROE | | | .605*** | .357** | .273* | .017 | .117 |
| | | | (.154) | (.153) | (.152) | (.161) | (.153) |
| Turnover | | | | 0*** | 0*** | 0*** | 0*** |
| | | | | (0) | (0) | (0) | (0) |
| DE | | | | | -.108** | -.082* | -.053 |
| | | | | | (.043) | (.042) | (.04) |
| LogSize | | | | | | .162*** | .262*** |
| | | | | | | (.037) | (.037) |
| LogNoA | | | | | | | -.318*** |
| | | | | | | | (.037) |
| Constant | .023 | .032 | | .098* | .176*** | -.953*** | -1.191*** |
| | (.026) | (.025) | | (.051) | (.056) | (.262) | (.25) |
| Observations | 1924 | 1884 | 811 | 805 | 785 | 785 | 785 |
| Pseudo $R^2$ | .001 | .004 | .045 | .114 | .129 | .155 | .240 |
| Adj $R^2$ | -.148 | -.146 | -.162 | -.076 | -.060 | -.031 | .072 |

This table contains the results of regressions of Alcohol's stock return with the control variables (*Beta, Earnings-per-share, Return-on-Equity, Turnover, Debt-to-Equity ratio, Firm Size and Analyst Coverage*). Fixed effects were applied. The sample period for the variables is from 2004 to 2023. The robust standard errors are shown in parentheses. * , **, and *** denote statistical significance at 10%, 5% and 1% levels, respectively.

Finally, the number of analysts covering a firm (*LogNoA*) reveals a negative relationship with stock returns. In column (8), the coefficient is -0.318 ($p < 0.01$), revealing that an increase in

analyst coverage reflects negatively on Alcohol's stock performance. This result showcases that analysts' opinion may have more influence over investors' decision than other financial metrics for firms in the Alcohol industry since the *Debt-to-Equity* ratio lost statistical significance in the full regression model.

The results suggest that market sensitivity and firm-specific characteristics, such as size and trading activity, are the most robust predictors of stock performance. While profitability and financial risk factors exhibit significance in isolated cases, their explanatory power diminishes when considered alongside other variables.

### 4.2. Alcohol's Performance Comparison

#### 4.2.1. Gambling and Tobacco

In this section I test how the Alcohol industry may influence other sin industries, namely Gambling and Tobacco. Table 3 presents the regression results, with the dependent variables being the difference in returns between each of the other sin industries and Alcohol, while maintaining the same independent variables (firm specific controls of firms in the Alcohol industry) used in earlier models.

For Gambling, none of the coefficients are statistically significant, suggesting that the Alcohol industry's controls do not directly influence Gambling stock performance. This lack of relationship indicates that the stock returns of Alcohol and Gambling operate independently during the observed period. This finding aligns with the notion that both industries retain distinct market dynamics despite being classified as "sin stocks." It reinforces the idea that investors may treat these industries as separate entities, with no significant spillover or shared drivers of stock performance.

In contrast, Tobacco demonstrates a significant relationship with one of the Alcohol control variables. In column 2, the *Debt-to-Equity (DE)* ratio is significant at the 5% level, with a coefficient of -6.374. This negative relationship suggests that higher leverage within the Alcohol industry is associated with comparatively poorer returns for Tobacco stocks. This could imply a competitive dynamic between the two industries or a reflection of investor sentiment, where increased financial risk in one sin sector (Alcohol) negatively impacts perceptions of another (Tobacco). This finding suggests that Tobacco stocks may be more responsive to leverage-related market signals originating from similar industries compared to Gambling stocks.

***Table 3*** *Regression Results for Alcohol, Gambling, Tobacco and Shariah*

| *Variables* | *(1) Alcohol* | *(2) Gambling* | *(3) Tobacco* | *(4) Shariah* |
|---|---|---|---|---|
| Beta | -.261*** | .058 | 8.197 | .239*** |
| | (.048) | (.284) | (11.387) | (.047) |
| EPS | -.01 | .037 | 2.029 | .011 |
| | (.012) | (.063) | (1.775) | (.012) |
| ROE | .117 | .504 | 8.818 | -.276* |
| | (.153) | (.557) | (17.037) | (.149) |
| Turnover | 0*** | 0 | 0 | 0*** |
| | (0) | (0) | (0) | (0) |
| DE | -.053 | .057 | -6.374** | .05 |
| | (.04) | (.172) | (3.157) | (.039) |
| LogSize | .262*** | -.062 | -.198 | -.215*** |
| | (.037) | (.085) | (2.131) | (.036) |
| LogNoA | -.318*** | .139 | -1.571 | .279*** |
| | (.037) | (.168) | (5.751) | .037 |
| Constant | -1.191*** | -.068 | 17.483 | 1.006*** |
| | (.25) | (.469) | (14.155) | (.245) |
| Observations | 785 | 785 | 770 | 785 |
| Pseudo $R^2$ | .240 | .005 | .003 | .202 |
| Adj $R^2$ | .072 | -.004 | -.006 | .026 |

This table contains the results of regressions of Alcohol's stock return (1) with the control variables (*Beta, Earnings-per-share, Return-on-Equity, Turnover, Debt-to-Equity ratio, Firm Size and Analyst Coverage*) with fixed effects. The dependent variable in the Gambling, Tobacco and Shariah models is the difference in returns between the respective industry and Alcohol. For Gambling and Tobacco, random effects and robust standard errors (*vce(robust)*) were applied. Similarly to Alcohol, fixed effects were applied in Shariah regressions. The sample period for the variables is from 2004 to 2023 with the exception of Shariah, where data is only available between 2008 and 2023. The robust standard errors are shown in parentheses. * , **, and *** denote statistical significance at 10%, 5% and 1% levels, respectively.

### 4.2.2. Shariah Index

#### 4.2.2.1. Full time window analysis

In column 3, the results indicate a nuanced relationship between the Alcohol industry and Shariah-compliant stocks, with Alcohol's market variables showing varying levels of influence on the return differences between these two categories. The positive and significant *Beta* (0.179) indicates that when Alcohol's market volatility increases, Shariah-compliant stocks tend to outperform Alcohol stocks during the same period. Additionally, *LogNoA*, representing analyst coverage, is also significant at the 1% level, with a positive coefficient (0.283). This suggests that greater analyst attention to the Alcohol industry enhances the return differential between Alcohol and Shariah-compliant stocks. This could be attributed to the possibility that

analyst reviews in the Alcohol sector do not sufficiently appeal to the broad investor base. Alternatively, the increase in analyst coverage may also reflect heightened scrutiny or perceived risk in the Alcohol industry, which could divert investors' interest toward less controversial assets like Shariah-compliant stocks. The *Debt-to-Equity* (*DE*) ratio exhibits a positive coefficient (0.131, significant at the 10% level), suggesting that higher leverage in firms in the Alcohol industry is associated with improved relative returns for Shariah-compliant stocks. This finding may reflect investor preferences for lower-risk profiles, as increased leverage in Alcohol firms could be perceived as a sign of financial fragility, thereby enhancing the relative attractiveness of Shariah-compliant investments. *Turnover*, on the other hand, is negatively significant at the 5% level (-1.63e-09), indicating that increased market activity within Alcohol firms narrows the performance gap between Alcohol and Shariah-compliant stocks. This may suggest that heightened trading activity reflects temporary positive sentiment or short-term market corrections that improve Alcohol stock returns relative to Shariah-compliant stocks. Finally, firm size (*LogSize*) is significant and negative (-0.205, $p < 0.01$), indicating that larger firms in the Alcohol industry are associated with reduced return differences relative to Shariah-compliant stocks. This could be due to the relatively stable performance of larger, more established firms, which may mitigate volatility or performance gaps compared to smaller firms within the Alcohol sector. Taken together, these findings highlight a more complex and nuanced relationship between Alcohol and Shariah-compliant stocks compared to Alcohol and other sin stocks. This complexity likely arises from the ethical and religious constraints guiding Shariah-compliant investments, which sets them apart from traditional sin industries like Gambling and Tobacco. The interplay of market volatility, leverage, analyst coverage, and firm size underscores the importance of both financial and ethical considerations in shaping the relative performance of these two categories.

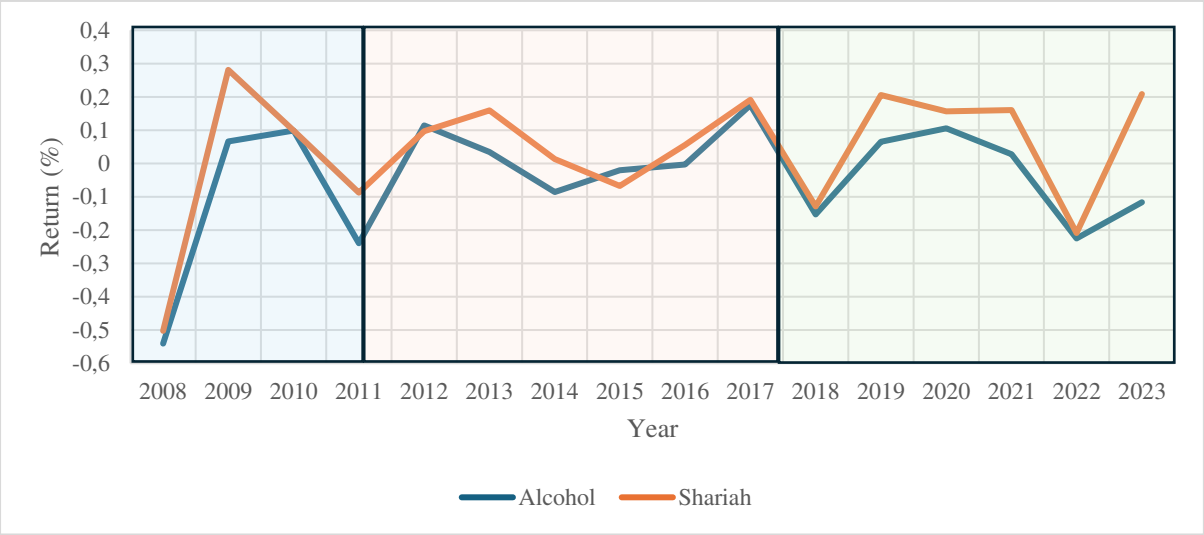
#### 4.2.2.2. Time Window Analysis

To further explore the stock performance differences between Alcohol and Shariah-compliant stocks, I conducted an analysis using the same regression framework, segmented into three distinct time periods within the broader timeline of the study.

Figure 3 illustrates the comparative stock performance of Alcohol and the *FTSE Global Equity Shariah Index* from 2008 to 2023. While the broader analysis spans multiple decades, data limitations prevented the inclusion of the 2004–2007 period in this segment. The graph provides a visual representation of the return trends for both categories, offering context for the

three-period time-split regression results. Shariah-compliant stock data was sourced from Refinitiv Workspace, using the closing stock price for each year. For Alcohol, I calculated a yearly average return based on the sample of Alcohol companies included in this study. This approach ensured that both data sets were standardized, enabling direct comparison on the same scale and unit of measurement. Figure 3 thus serves as a foundation for understanding the dynamic interplay between these two categories of investments over the studied period.

***Figure 2*** *Average yearly return of Alcohol and Shariah-compliant stocks*




Source: Refinitiv Workspace (2024) – author's own computations

Over the analysed period, Shariah-compliant stocks generally delivered higher average yearly returns compared to Alcohol stocks, particularly during the post-crisis recovery years (2012–2017) and the pandemic-affected period (2018–2023). However, Alcohol stocks outperformed in specific years, notably in 2012 and 2015, demonstrating that while Shariah-compliant investments often benefit from their ethical and financial resilience, the Alcohol sector still has periods of competitive strength. During the 2008–2009 global financial crisis, both sectors experienced declines, with Alcohol stocks suffering a steeper initial drop. From 2010 to 2013, Shariah-compliant stocks outpaced Alcohol stocks. This outperformance can be attributed to a stronger global economic recovery and an increased appeal of ethical investments in the aftermath of the crisis. Shariah-compliant sectors such as healthcare and technology benefitted from robust growth and reduced volatility compared to Alcohol, whose performance remained subdued by market scepticism and slower consumer spending recovery in discretionary areas like premium spirits. In 2015, Alcohol stocks saw a marked surge despite a slight decline in the Shariah Index. This divergence was likely driven by increased consumer spending, reflected in

stronger sales for distilleries and spirit beverages, and positive market sentiment toward the Alcohol industry. In contrast, Shariah sectors may have faced headwinds, including shifts in market sentiment or slower growth in industries like industrial goods and services. The 2018–2020 period was characterized by the consistent outperformance of Shariah-compliant stocks. This was driven by rising demand for ethical investments and the relative stability of Shariah-compliant sectors during the uncertainty of the COVID-19 pandemic. In contrast, the Alcohol industry struggled with pandemic restrictions, which disrupted sales in bars and restaurants and led to shifting consumer preferences toward home consumption or non-Alcoholic alternatives. From 2021 to 2023, the Alcohol sector entered a recovery phase as pandemic restrictions eased, and global markets stabilized. Increased consumer spending and the resilience of larger Alcohol companies helped boost returns. However, Shariah-compliant stocks continued to perform strongly, reflecting their sustained appeal to investors prioritizing stability and ethical investment criteria. Interestingly, in 2018 and 2022, both sectors saw declines, but Shariah-compliant stocks experienced a steeper downward trajectory, leading to a convergence with Alcohol returns. This can be partly explained by macroeconomic factors such as trade tensions and supply chain disruptions in 2018, which significantly impacted the industrial goods, technology, and healthcare sectors—three dominant industries in the Shariah Index. In 2022, the healthcare sector, a traditional pillar of stability for Shariah-compliant stocks, faced challenges post-pandemic as demand for COVID-19-related products waned, and rising inflation pressured margins across industries.

#### 4.2.2.2.1. Time Window I: 2008-2011 Analysis

The regression results in Table 4 examine how variables related to the Alcohol industry influence its own stock returns (column 1) and the return differential between Shariah-compliant stocks and Alcohol stocks (column 2), during the 2008–2011 period. For this time frame, data was unavailable for the variables *Beta* and *LogSize.*

Firstly, *Earnings-per-Share* (*EPS*) does not significantly influence Alcohol's stock returns during this period (0.0220). However, it has a significant and negative association with the return differential between Shariah-compliant stocks and Alcohol stocks (-0.0199, $p < 0.01$). This implies that stronger earnings in the Alcohol industry narrow the performance gap, with Shariah-compliant stocks outperforming Alcohol when Alcohol's earnings weaken.

*Return-on-Equity* (*ROE*) shows no significant relationship with Alcohol stock returns (0.925), but it is marginally significant and negatively associated with the return differential in column

2 (-0.401, $p < 0.10$). This weak significance could imply that higher profitability in the Alcohol industry slightly diminishes its relative underperformance against Shariah-compliant stocks.

. ***Table 4*** *Regression Results for Alcohol and Shariah: 2008-2011*

| *Variables* | *(1) Alcohol* | *(2) Shariah* |
|---|---|---|
| EPS | .022 | -.02*** |
| | (.018) | (.005) |
| ROE | .925 | -.401* |
| | (.640) | (.242) |
| Turnover | 0*** | 0*** |
| | (0) | (0) |
| DE | -.230** | .102** |
| | (.100) | (.044) |
| LogNoA | -.408*** | .03 |
| | (.141) | (.029) |
| Constant | 0.540* | .015 |
| | (.275) | (.08) |
| Observations | 223 | 223 |
| Pseudo $R^2$ | .187 | .115 |
| Adj $R^2$ | -.219 | .095 |

This table contains the results of regressions of Alcohol's stock return (1) with the control variables (*Earnings-per-share, Return-on-Equity, Turnover, Debt-to-Equity ratio and Analyst Coverage*) with fixed effects. The dependent variable in the Shariah model is the difference in returns between the index and Alcohol. Similarly to Alcohol, fixed effects were applied in Shariah regressions. The sample period for the variables is from 2008 to 2011. The robust standard errors are shown in parentheses. * , **, and *** denote statistical significance at 10%, 5% and 1% levels, respectively.

Turning to *Turnover*, this variable is significant in both columns at 1% level, having a positive correlation with Alcohol's return and a negative correlation with Shariah. This means that a higher market activity from Alcohol companies contribute to a higher industry return, consequently decreasing the gap of return performance between Alcohol and Shariah.

The *Debt-to-Equity* (*DE*) ratio shows contrasting effects across the two columns. In column 1, *DE* has a significant negative effect on Alcohol stock returns (-0.230, $p < 0.05$), highlighting that higher leverage in the Alcohol industry is associated with weaker returns during the crisis period. However, in column 2, *DE* has a positive and significant relationship with the return differential between Shariah-compliant and Alcohol stocks (0.102, $p < 0.05$). This finding aligns with earlier regression results, emphasizing the greater market volatility of the Alcohol industry relative to Shariah-compliant stocks, which are selected based on strict financial and activity-based criteria that ensure financial stability. The positive *DE* coefficient in column 2

may also reflect investor perceptions that the Alcohol industry's returns are more susceptible to economic fluctuations, particularly during the volatile post-crisis period of 2008–2011.

Additionally, *LogNoA* has a significant and negative impact in Alcohol's return in the 2008-2011 period (-0.408, $p<0.01$) which could reflect Alcohol's weak financial performance in the analyst reviews. This suggests that increased analyst attention correlates with weaker returns for Alcohol stocks. However, *LogNoA* does not significantly influence the return differential with Shariah-compliant stocks (0.0296, $t = 1.02$). This implies that analyst scrutiny primarily impacts the Alcohol industry, potentially reflecting negative market sentiment or a heightened perception of risk within the Alcohol sector during this period.

#### 4.2.2.2.2. Time Window II: 2012-2017 Analysis

For the 2012–2017 period, the regression analysis highlights notable shifts, in comparison with the 2008-2011 window. The *Beta* coefficient in column 1 appears to have no relationship with Alcohol's return, indicating that market volatility played a less direct role in shaping Alcohol stock performance. On the other hand, the positive coefficient of *Beta* in column 2 (0.109, $p<0.10$), shows a weaker but still significant relationship compared to the results from the full model in section 4.2.2.1 (0.179, $p < 0.01$). This diminished significance implies that while post-crisis Alcohol stocks were still more volatile than their Shariah-compliant counterparts. Other variables, such as *Turnover* and *Debt-to-Equity* (*DE*) ratio, appear to have greater explanatory power in accounting for the return differential between Alcohol and Shariah-compliant stocks.

*Turnover's* significance declined in column 1 compared to the 2008–2011 period, reflecting its reduced explanatory power for Alcohol's returns in the 2012–2017 window. However, in column 2, *Turnover* maintains a similar relationship as observed in the previous time frame, indicating that increased market activity within the Alcohol industry continued to narrow the return gap with Shariah-compliant stocks during this second time-window.

The *Debt-to-Equity* (*DE*) ratio remains significant at the 5% level in both columns, though the coefficients are smaller than in the earlier period. This suggests that while higher leverage continued to negatively impact Alcohol's returns, its influence was less pronounced in the post-crisis recovery period. The relationship in column 2 is consistent with earlier findings, where higher leverage in the Alcohol industry correlates with a positive return differential relative to Shariah-compliant stocks. This may reflect investor perceptions that the Alcohol sector's returns are more vulnerable to economic fluctuations, whereas Shariah-compliant stocks are seen as more stable and resilient investment options.

***Table 5*** *Regression Results for Alcohol and Shariah: 2012-2017*

| *Variables* | *(1) Alcohol* | *(2) Shariah* |
|---|---|---|
| Beta | -.079 | .109* |
| | (.136) | (.06) |
| EPS | .006 | -.004 |
| | (.020) | (.006) |
| ROE | .500 | -.271 |
| | (.339) | (.192) |
| Turnover | 0* | 0*** |
| | (0) | (0) |
| DE | -.254** | .077** |
| | (.106) | (.03) |
| LogSize | .595*** | .007 |
| | (.077) | (.019) |
| LogNoA | -.060 | -.015 |
| | (.073) | (.036) |
| Constant | -4.199*** | -.071 |
| | (.575) | (.073) |
| Observations | 223 | 223 |
| Pseudo $R^2$ | .534 | .215 |
| Adj $R^2$ | .185 | .189 |

This table contains the results of regressions of Alcohol's stock return (1) with the control variables (*Beta*, *Earnings-per-share, Return-on-Equity, Turnover, Debt-to-Equity ratio, Firm Size and Analyst Coverage)* with fixed effects. The dependent variable in the Shariah model is the difference in returns between the index and Alcohol. Similarly to Alcohol, fixed effects were applied in Shariah regressions. The sample period for the variables is from 2012 to 2017. The robust standard errors are shown in parentheses. * , **, and *** denote statistical significance at 10%, 5% and 1% levels, respectively.

In column 1, *LogSize* emerges as the most significant variable (0.595, $p < 0.01$) underscoring the role of larger Alcohol companies in driving industry returns during this time. This finding suggests that market concentration within the Alcohol sector became more pronounced between 2012 and 2017, likely because smaller companies struggled to survive the economic challenges of the preceding crisis.

Other variables, including *Earnings-per-share* (*EPS*), *Return-On-Equity* (*ROE*) and *Analyst coverage* (*LogNoA*) were found not to be significant during the 2012-2017 period.

#### 4.2.2.2.3. Time Window III: 2018-2023 Analysis

The regression analysis for the 2018–2023 period reveals significant shifts in how Alcohol industry variables influenced stock performance, especially in the context of market volatility and the pandemic crisis.

***Table 6*** *Regression Results for Alcohol and Shariah: 2018-2023*

| *Variables* | *(1) Alcohol* | *(2) Shariah* |
|---|---|---|
| Beta | -.243*** | .134** |
| | (.066) | (.064) |
| EPS | -.002 | .002 |
| | (.011) | (.011) |
| ROE | -.134 | -.165 |
| | (.183) | (.192) |
| Turnover | 0* | 0* |
| | (0) | (0) |
| DE | -.080 | .155* |
| | (.089) | (.094) |
| LogSize | .428*** | -.258*** |
| | (.065) | (.069) |
| LogNoA | -.460*** | .394*** |
| | (.074) | (.075) |
| Constant | -2.175*** | 1.168*** |
| | (.334) | (.073) |
| Observations | 562 | 562 |
| Pseudo $R^2$ | .346 | .198 |
| Adj $R^2$ | .133 | .188 |

This table contains the results of regressions of Alcohol's stock return (1) with the control variables (*Beta*, *Earnings-per-share, Return-on-Equity, Turnover, Debt-to-Equity ratio, Firm Size* and *Analyst Coverage*) with fixed effects. The dependent variable in the Shariah model is the difference in returns between the index and Alcohol. Similarly to Alcohol, fixed effects were applied in Shariah regressions. The sample period for the variables is from 2018 to 2023. The robust standard errors are shown in parentheses. * , **, and *** denote statistical significance at 10%, 5% and 1% levels, respectively.

The *Beta* coefficient in column 1 is significant and negative (-0.243, $p < 0.01$), indicating that market volatility had a strongly adverse effect on Alcohol's returns during this period. This suggests that the Alcohol industry became particularly vulnerable to broader market fluctuations, likely exacerbated by the economic uncertainty and disruptions caused by the pandemic. In column 2, the *Beta* coefficient is positive but less significant (0.134, $p < 0.05$), highlighting that while Alcohol stocks remained sensitive to market volatility, this sensitivity contributed to a widening return gap with Shariah-compliant stocks. This gap reflects Alcohol's weaker performance relative to the more stable returns of Shariah-compliant investments.

Consistent with previous observations, *Earnings-Per-Share* (*EPS*) and *Return-On-Equity* (*ROE*) remained insignificant, reinforcing their limited role in explaining stock performance differences during this time frame.

For *Turnover*, its explaining power on Alcohol increases slightly compared to earlier periods, with a positive coefficient (2.26e-09, $p < 0.01$) in column 1. This suggests that market activity

played a crucial role in driving Alcohol's performance during the pandemic. Investor sentiment may have been influenced by the Alcohol industry's ability to sustain operations and adapt during the crisis, such as repurposing production to create disinfectants. In column 2, *Turnover*'s coefficient remains negative (-1.57e-09, $p < 0.10$), though its significance decreased compared to prior periods. This indicates that while market activity continued to narrow the return differential between Alcohol and Shariah-compliant stocks, its impact was relatively less pronounced.

For *Debt-to-Equity* (*DE*) ratio, the variable was not significant for Alcohol's returns in column 1, reflecting a diminished influence of leverage on the industry's stock performance during this period. In column 2, *DE*'s explanatory power decreased, though its positive coefficient (0.155, $p < 0.10$) suggests that higher leverage in Alcohol stocks was associated with a slightly wider return gap relative to Shariah-compliant stocks. This positive relationship indicates that despite Alcohol's efforts to meet market demands for essential goods like disinfectants, Shariah-compliant stocks, with their strict investment criteria, remained more attractive to risk-averse investors during a time of heightened economic uncertainty.

The variable for *Firm Size* (*LogSize*) shows a significant influence on Alcohol's returns and the return differential with Shariah-compliant stocks. In column 1, the positive and highly significant coefficient (0.428, $p < 0.01$) indicates that larger firms in the Alcohol industry contributed more strongly to the sector's overall returns during the 2018–2023 period. This highlights the role of well-established firms with greater market capitalization in sustaining performance, likely due to their ability to weather the challenges posed by the pandemic, such as supply chain disruptions and shifts in consumer demand. Additionally, in column 2, *LogSize* has a significant negative coefficient (-0.258, $p < 0.01$), suggesting that as the size of Alcohol firms increased, the return differential with Shariah-compliant stocks narrowed. This finding implies that larger Alcohol firms may have been better equipped to stabilize their performance, thus reducing the performance gap with the more stable Shariah-compliant stocks.

The regression results for *Analyst Coverage* (*LogNoA*) also exhibit contrasting effects in comparison with previous periods. In column 1, the significant negative coefficient (-0.460, $p < 0.01$) suggests that increased analyst coverage coincided with weaker returns for Alcohol stocks during this period. This trend may reflect heightened scrutiny of the Alcohol industry, possibly tied to concerns about its resilience amid pandemic-related challenges or ethical considerations influencing investor sentiment. In column 2, the positive and significant

coefficient (0.349, $p < 0.01$) suggests that greater analyst attention to Alcohol stocks corresponded with a widening return gap relative to Shariah-compliant stocks. This may indicate that increased coverage amplified awareness of Alcohol's market volatility or perceived risk, which contrasted with the perceived stability and resilience of Shariah-compliant investments, ultimately reinforcing the return differential in more recent years.

This disaggregated analysis covering three separate time windows—2008–2011, 2012–2017, and 2018–2023—highlights even further the evolving dynamics of the Alcohol industry's stock performance relative to Shariah-compliant stocks. Although the main explanatory variables changed over time, across all time frames, Shariah-compliant stocks consistently displayed stability and resilience, underscoring the relative advantages of stringent financial criteria in shielding these investments from market volatility. In contrast, the Alcohol industry's returns were more sensitive to financial and market variables, as well as broader economic conditions, which influenced both investor behaviour and stock performance.

## 5. Limitations and Further Research

This study has several limitations that should be considered when interpreting the results and could guide future research.

One key limitation is data availability for certain variables, such as *Beta*, *Number of Analysts* (*LogNoA*), *Firm Size* (*LogSize*) and the Shariah Index. These variables were either missing or incomplete for specific time periods, particularly during the earlier years of the analysis, which constrained the comprehensiveness of the statistical models. The lack of consistent data may have influenced the precision of the regression results and limited the ability to fully explore the dynamics of these variables over time.

Efforts to address heteroskedasticity in the dataset through traditional tests in Stata were not successful. Consequently, the Breusch & Pagan test was applied as an alternative (detailed in the Appendix).

The dataset also exhibited significant skewness, particularly within the Alcohol industry sample. This skewness likely stems from the wide variability in *Firm Size* and financial performance, which may have amplified the influence of larger firms or outliers. Although data transformations and scaling were used to mitigate this issue, future studies might consider employing quantile regression techniques or nonparametric approaches to better account for

the effects of skewed distributions and provide a more granular understanding of the relationships under study.

Furthermore, the scope of this study was limited to the specific variables and sectors analysed. Additional firm-level controls, such as operating margins, market-to-book ratios, and cash flow variables, as well as macroeconomic factors like inflation, interest rates, or geopolitical risks, could be incorporated in future research. Besides controls, expanding the comparative analysis beyond the Shariah Index to include other benchmarks, such as environmental, social, and governance (ESG) indices or other ethical investment frameworks, could provide a more holistic perspective on the dynamics of ethical versus controversial investments.

## 6. Conclusion

This thesis provides a comprehensive analysis of the Alcohol industry's stock performance with the intent to respond to the three research questions: (1) What drives Alcohol's stock performance; (2) How firms in the Alcohol industry perform relative to other sin industries – Gambling and Tobacco; (3) How Alcohol's performance compares with the Shariah index and how the explanatory variables influenced the return gap through the time period in analysis.

For the first research question, the analysis revealed that market volatility (*Beta*), market activity (*Turnover*), firm size (*LogSize*) and analyst coverage (*LogNoA*) were the main drivers of Alcohol's stock performance in the period of 2004-2023. Market volatility and analyst coverage exhibited a negative relationship with Alcohol's return, while market activity and firm size have a positive correlation, albeit with a small magnitude. Secondly, Alcohol's stock performance had no impact on the Gambling industry, highlighting the singular market behaviour each sin industry has. Interestingly, Alcohol's leverage was found to influence on Tobacco's return. This result may suggest that ethical concerns or the risk profile associated with Alcohol might shape investors' perceptions of Tobacco. In addition, Alcohol stocks demonstrated contrasting behaviour compared to Shariah-compliant stocks over time. In the full model, Alcohol's market activity (*Turnover*) and firms with bigger size (*LogSize*) may have contributed in time frames where both stock performances converged. In the immediate aftermath of the global financial crisis (2008–2011), profitability (*EPS*), market activity (*Turnover*) and leverage (*DE*) played significant roles in pushing Alcohol's returns closer to Shariah's stock performance, reflecting heightened sensitivity to financial risk and investor behaviour during economic uncertainty. The post-crisis recovery period (2012–2017) marked a shift, with firm size (*LogSize*) emerging as the most influential factor, suggesting that larger

Alcohol companies withstood the downturn more effectively, while smaller firms faced challenges in maintaining performance. In the most recent period (2018–2023), during which the pandemic introduced unprecedented market disruptions, market volatility (*Beta*), firm size, and analyst coverage (*LogNoA*) were pivotal. Larger firms again demonstrated resilience, contributing positively to industry returns, but heightened scrutiny by analysts correlated with weaker performance and amplified the return gap with Shariah-compliant stocks.

Overall, Alcohol continues to be perceived as a sin stock by investors. With Beta identified as one of the main performance drivers, the industry's risk profile—combined with public scrutiny and ethical judgment—may limit its appeal to a broader investor base, particularly when compared to Shariah-compliant investments. In more recent years, market variables such as *Beta*, *Firm Size*, and *Analyst Coverage* have played a more significant role in Alcohol's returns than traditional financial metrics, reflecting a shift in investor priorities.

The results of this thesis emphasize the significance of SRI and ethical investment criteria in maintaining stability and provide insights into the broader implications of market volatility, firm characteristics, and investor perceptions on sin stock performance. The findings contribute to a deeper understanding of the complex interplay between financial health, market activity, investment sentiment and religious preferences in shaping the trajectory of the Alcohol business as a sin industry, subject to differing levels of social and financial scrutiny.

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# Appendix

## 1. Table of variables

| Name | Definition | Source |
|---|---|---|
| **Dependent variables** | | |
| *Price Close* | The latest available closing price. Refinitiv Workspace Excel Function: "=TR("MSFT.O", "TR.PriceClose") | Refinitiv Workspace |
| *Alcoho* | $\ln\left(\frac{Alcohol\ Price\ Close_t}{Alcohol\ Price\ Close_{t-1}}\right)$ | Hong, H., & Kacperczyk, M. (2009) |
| *Gambling* | $\ln\left(\frac{Gambling\ Price\ Close_t}{Gambling\ Price\ Close_{t-1}}\right) - \ln\left(\frac{Alcohol\ Price\ Close_t}{Alcohol\ Price\ Close_{t-1}}\right)$ | |
| *Tobacco* | $\ln\left(\frac{Tobacco\ Price\ Close_t}{Tobacco\ Price\ Close_{t-1}}\right) - \ln\left(\frac{Alcohol\ Price\ Close_t}{Alcohol\ Price\ Close_{t-1}}\right)$ | |
| *Shariah* | Shariah Index Price Close$_t$ − Average Yearly $Alcohol_{i,t}$ The FTSE Global Equity Shariah Index Series covers all regions across both developed and emerging markets, to create a comprehensive Shariah indexing solution. RIC Code: .FTSWORLDS | Refinitiv Workspace |
| **Independent variables** | | |
| *Beta* | CAPM Beta. A measure of how much the stock moves for a given move in the market. Refinitiv Workspace Excel Function:=TR("MSFT.O", "TR.WACCBeta") | Refinitiv Workspace |

| | | |
|---|---|---|
| *EPS* | Earnings Per Share - Basic - excluding Extraordinary Items - Normalized - Total [SBESC] represents the value of Normalized Net Income - Bottom Line [SIBL] divided by the Number of basic weighted average shares used to calculate earnings and other per share item on company level (Shares used to calculate Basic EPS - Total [SBASC]). | Refinitiv Workspace |
| *ROE* | The company's actual value normalized to reflect the I/B/E/S default currency and corporate actions (e.g. stock splits). Return On Equity is a profitability ratio calculated by dividing a company's net income by total equity of common shares. | Refinitiv Workspace |
| *Turnover* | The unscaled turnover value (summation of the value of all trades during the market day) for a particular instrument. Value in percentage. | Refinitiv Workspace |
| *Debt-to-Equity Ratio (DE)* | Total Debt Percentage of Total Equity [RTDTE] represents the ratio of Debt - Total [TR.F.DebtTot] divided by the value of Total Shareholders' Equity - including Minority Interest & Hybrid Debt [TR.F.TotShHoldEq], multiplied by 100. | Refinitiv Workspace |
| *Market Capitalization* | The Company Market Capitalization represents the sum of market value for all relevant issue level share types. The issue level market value is calculated by multiplying the requested shares type by latest close price. This item supports | Refinitiv Workspace |

| | | |
|---|---|---|
| | Default, Free Float and Outstanding shares types. The default shares type is the most widely reported outstanding shares for a market and it is most commonly Issued, Outstanding, or Listed shares. | |
| *Firm Size (LogSize)* | Ln (winsorized market cap) | Refinitiv Workspace |
| *Number of Analysts (NoA)* | Number of sell-side analysts covering the security. | Refinitiv Workspace |
| *Analyst Coverage (LogNoA)* | Ln (1+NoA) | Refinitiv Workspace |

## 2. Hausman Test

| **Variable** | **Chi-square test value** | **Prob > Chi-square** |
|---|---|---|
| *Alcohol* | 24.81 | 0.0004 |
| *Gambling* | 4.75 | 0.5759 |
| *Tobacco* | 2.59 | 0.8585 |
| *Shariah* | 25.14 | 0.003 |

## 3. Wooldridge Serial Correlation Test

According to Stata, xtserial implements a test for serial correlation in the idiosyncratic errors of a linear panel-data model discussed by Wooldridge (2002). Drukker (2003) presents simulation evidence that this test has good size and power properties in reasonable sample sizes. Under the null of no serial the residuals from the regression of the first-differenced variables should have an autocorrelation of -.5. This implies that the coefficient on the lagged residuals in a regression of the lagged residuals on the current residuals should be -.5. xtserial performs a Wald test of this hypothesis. See Drukker (2003) and Wooldridge (2002) for further details.

| **Variable** | **F-value** | **Prob > F** |
|---|---|---|
| *Alcohol* | 102.951 | 0 |

| | | |
|---|---|---|
| *Gambling* | 0.246 | 0.6213 |
| *Tobacco* | 0.796 | 0.3747 |
| *Shariah* | 61.058 | 0 |

## 4. Heteroskedasticity Test

For the Heteroskedasticity test, I followed the formula with the Lagrange Multiplier from Breush & Pagan (1979).

$$LM = \frac{1}{2} \times \left[\frac{N}{n(N-n)}\right] \times \left[\sum_{t}^{n} \left(\frac{\hat{u}_t^2}{\sigma^2}\right) - n\right]^2$$

Due to data structure, I computed:

$$LM = \frac{nT}{2} \times \frac{\sigma_u^2}{\sigma_e^2}$$

Where:

- N is the number of panels.
- T is the number of time periods.
- $\sigma_u^2$ is the panel-level variance.
- $\sigma_e^2$ is the residual variance.

| **Variable** | **Chi-square tail (1, LM)** |
|---|---|
| *Alcohol* | 0 |
| *Gambling* | 1 |
| *Tobacco* | 1.34e-178 |
| *Shariah* | 0 |

## 5. Adjusted $R^2$

The Adjusted $R^2$ was mainly computed in Stata. For the regressions which Stata did not display the Adjusted $R^2$, I computed with the following expression:

$$Adjusted\ R^2 = 1 - \left(\frac{(1 - R^2)(N - 1)}{N - k - 1}\right)$$

Where:

- N is the number of observations.
- k is the number of independent variables.
- $R^2$ is the overall $R^2$ of the model.