Financial Price of Sin Stocks across Religions

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ABSTRACT

This paper examines the pricing of sin stocks across religious contexts using monthly data for 833 publicly listed firms from 1990 to 2025. Sin stocks—defined as firms involved in alcohol, tobacco, gambling, or military industries—are matched with sector-specific non-sin counterparts to isolate abnormal returns. The analysis finds that sin stocks consistently earn significant excess returns relative to both industry comparables and the market. The sin premium is strongest in the gambling and military sectors and is notably higher in countries with substantial Abrahamic religious presence, where moral restrictions on vice-related activities are more stringent. In contrast, the premium is weaker or even negative in atheist and non-Abrahamic settings.

Fama–MacBeth cross-sectional regressions confirm that religious context significantly predicts sin stock return differentials, controlling for firm-level characteristics and broader cultural traits. These findings suggest that religion systematically shapes investor preferences and contributes to persistent mispricing. The study advances the literature on cultural finance, ethical investing, and the role of moral norms in asset pricing.

Keywords: Sin stocks; Religion; Investor sentiment; Social norms; Abnormal returns; Ethical investing.

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1. Introduction

Financial markets often misprice human sentiments, as investor decisions are shaped not only by risk and return but also by social norms, ethical beliefs, and cultural values. This study explores one such channel: religion-based moral aversion. In societies where specific religious traditions are widespread, local investors may exhibit taste-based preferences that lead them to avoid controversial ("sin") sectors such as alcohol, tobacco, gambling, and military-related industries. While these preferences deviate from traditional risk-return optimization, they are rational in a broader sense, reflecting non-pecuniary utility derived from moral or spiritual alignment.

Becker (1957) modeled such behavior in the context of taste-based discrimination, where economic agents are willing to forgo pecuniary gains to avoid association with disfavored entities. In financial markets, this manifests in norm-constrained investing, where investors deliberately avoid certain stocks despite potential profitability (Cummings, 2000; Geczy et al., 2021). Hong and Kacperczyk (2009) explicitly interpret such avoidance as the cost of discriminatory preferences à la Becker. We adopt this framework to theorize that investors in religious societies may avoid sin stocks due to moral aversion, thereby depressing prices and generating abnormal returns for those willing to hold them.

Importantly, we do not assume homogeneity in religious composition or moral attitudes. We identify all religions that hold a significant local presence, defined as 25% or more of the national population. This threshold reflects the notion that even without majority status, a religious group can exert sufficient normative influence to shape societal attitudes and investment behavior. As detailed in Section 3, we use this approach to categorize countries into five religious profiles: Christianity, Islam, Judaism, Atheism, and Other religions (e.g., Hinduism, Buddhism, tribal faiths). In contexts with multiple qualifying religions (e.g., Latvia, Bosnia), firms are assigned to all applicable religious portfolios, and robustness checks account for potential overlaps.

These behavioral models are extensively used in analyzing investor behavior in financial markets (Salaber, 2007; Hong & Kacperczyk, 2009; Liston & Soydemir, 2010; Durand et al., 2013; Fauver & McDonald, 2014; Han et al., 2022; Hamdan et al., 2023). Existing research demonstrates that social norms influence market behavior, contributing to the mispricing of socially stigmatized stocks. Hong and Kacperczyk (2009) find that sin stocks in the U.S., Canada, and Europe generate annual excess returns of 2.5–3.4% due to exclusion by institutional investors, consistent with costly taste-based screening. Niszczota et al. (2024) show that a significant portion of individuals prioritize morality over profit, even when unethical investments offer higher returns. Liston and Soydemir (2010) report that sin and faith-based portfolios behave inversely, with sin stocks exhibiting a beta of ~0.5, while faith-based stocks closely track the market.

Several studies also document supportive results (Chong et al., 2006; Fabozzi et al., 2008; Chang & Krueger, 2013). More recently, Hamdan et al. (2023) document significant positive alphas for sin stocks across one-, three-, and five-factor models in both South/East and North European portfolios, with monthly abnormal returns ranging from 0.97% to 1.55%. Han et al. (2022) also provide supporting evidence of persistent sin premiums. In contrast, Blitz and Fabozzi (2017) and Sagbakken and Zhang (2022) challenge the robustness of these findings, using value-weighted portfolios and measuring returns relative to the risk-free rate over mid-sized sin stock samples. Blitz and Fabozzi (2017) report weak and statistically insignificant alphas under the Fama–French five-factor model, while Sagbakken and Zhang (2022) find that sin premiums diminish under extended multifactor specifications, although these alphas re-emerge during the 2016–2020 subperiod, suggesting temporal variation.

Comparing to these studies, ours differs in several key respects. We use a much broader and longer panel and employ equal-weighted portfolios to better reflect average firm-level performance. We also construct returns net of sector-matched non-sin comparables, allowing for a more precise assessment of excess performance. Unlike these studies, we find consistently significant abnormal returns across all model specifications, including

FF5 and FF5+BAB. Furthermore, we extend the literature by examining how these returns vary systematically across industries and religious contexts—an overlooked dimension in previous research.

Fauver and McDonald (2014) and Durand et al. (2013) emphasize the cross-country variation in sin stock pricing, arguing that cultural or normative opposition plays a role. Durand et al. (2013) describe this phenomenon as a *"manifestation of groupthink,"* wherein collective beliefs shape market outcomes. This study extends their insight by shifting the analytical focus from broad cultural dimensions to religion specifically. While culture encompasses a broad set of shared practices, norms, and values, religion constitutes a more structured and codified system of moral guidance. Our approach builds on the idea that religion is both a stable identity marker and a source of enduring ethical principles, making it an appropriate and observable proxy for normative constraints. Its prescriptive nature and institutional authority distinguish religion from more diffuse cultural values, rendering it especially salient for understanding cross-national variation in investor behavior toward sin industries (Ferruz et al., 2012; Adhikari & Agrawal, 2016; Han et al., 2022; Hamdan et al., 2023).

Unlike Salaber (2007), who focused solely on Christianity within Europe, we adopt a global, cross-religious perspective. She found stronger sin aversion in Protestant-majority countries, where church attendance and religious commitment were higher. Our study broadens the scope to include all major world religions and compares sin stock returns across these religious environments.

We empirically examine 833 sin stocks from 80 countries between July 1990 and January 2025. Using returns net of sector-matched non-sin comparables, we confirm that sin stocks consistently outperform across various models, including the Fama–French five-factor and FF5+BAB extensions. The baseline sin-minus-comparable portfolio delivers a minimum monthly alpha of 72 basis points (8.99% annualized), significant at the 1% level. In industry-level analysis, we show that gambling and military stocks deliver the highest alphas, while alcohol and tobacco exhibit smaller, though still significant, premiums.

When grouped by religious affiliation, we find that sin stocks from countries with significant Abrahamic religious presence (Christianity, Islam, Judaism) earn monthly abnormal returns of 71-79 basis points, whereas those from secular or non-Abrahamic societies show significantly lower or negative alphas. These results are robust to multiple benchmark definitions, exclusion of large countries (e.g., U.S., China), and overlapping classifications.

Finally, using Fama–MacBeth cross-sectional regressions, we show that the religious profile of a firm's home country remains a statistically significant predictor of sin stock returns, even after controlling for firm-level characteristics and cultural traits. The findings suggest that religious norms, more than generic cultural factors, are a key source of investor aversion and pricing inefficiency in controversial industries.

2. Religion, Ethics, and Sin Stock Stigma

The term “sin stocks” refers to firms engaged in industries that are widely viewed as morally contentious, including alcohol, tobacco, gambling, and military production. These industries are often linked to addictive behavior, social harm, or violence, but perceptions of their ethical legitimacy vary considerably across societies. While some countries regulate these sectors lightly or treat them as morally neutral, others subject them to strict regulatory oversight, consumer stigma, or outright bans. This variation is deeply rooted in divergent religious and ethical frameworks that shape societal norms.

Religious belief systems play a foundational role in defining moral boundaries. Unlike broader cultural norms, which are diffuse and often implicit, religious teachings provide structured and prescriptive moral codes. These codes influence both individual ethics and collective regulatory frameworks, making religion a potent institutional force in shaping economic behavior. Clouser (2005) argues that religion does not merely coexist with culture but constitutes one of its most influential sources, especially with regard to normative judgments

and moral taboos. In this context, sin industries are not simply controversial, they are often proscribed in the theological doctrines of major world religions.

For instance, the Bible (Ephesians 5:18)[1] cautions believers against drunkenness and the use of intoxicants, while the Qur'an (Al-Maidah 5:90–91) categorically forbids both alcohol and gambling[2]. Torah (Genesis 9:20-38, Leviticus 10:2)[3] also condemn excessive drinking, though wine is an exception in ceremonial use (Shofetim/Judges 9:13). While tobacco is not explicitly mentioned in any of these scriptures due to its historical absence, modern interpretations—particularly within Islam and Judaism—often discourage or prohibit its use on health and ethical grounds. Military-related activities are not uniformly condemned but are often subject to moral scrutiny in pacifist traditions or doctrines emphasizing just war. These prohibitions are reinforced through religious institutions, public discourse, and political systems, particularly in countries where religious norms are embedded in legal or educational structures.

Consequently, we argue that religiously motivated moral aversion creates pricing frictions for sin stocks. Even if these firms generate strong fundamentals, they may be underweighted or avoided by local investors due to faith-based objections. This pattern is consistent with the "taste-based discrimination" framework originally proposed by Becker (1957), where agents willingly forgo pecuniary gain to avoid associations inconsistent with their preferences or identity. As applied to financial markets, Hong and Kacperczyk (2009) characterize such behavior as norm-constrained investing—investors voluntarily exclude certain stocks from their portfolios despite expected returns, incurring a utility cost that reflects their ethical preferences.

Importantly, we do not claim that these preferences are irrational. In line with contemporary behavioral economics, we recognize that individuals derive utility not only from financial returns but also from aligning

[1] Ephesians (5:18): "*And do not get drunk with wine, for that is debauchery, but be filled with the Spirit*".

[2] Catholics generally view gambling as a form of entertainment rather than inherently sinful, unless it interferes with personal responsibilities (Lee et al., 2023). In contrast, many Protestant denominations consider gambling sinful, often citing 1 Timothy 6:10: *"For the love of money is the root of all evil"* (Li, 2022).

[3] (Genesis 9:20-27): Noah's drunkenness brought shame to his family. (Genesis 19:30-38): Lot's drunkenness led him seduced by his two daughters. (Leviticus 10:2): the drunkenness of Aaron's two holy sons, Nadab and Abihu, brought their death by holy fire in Tabernacle.

investments with personal values. Investors may simply prefer not to own shares in firms whose activities violate their ethical or religious principles, even if this entails lower expected returns. This can produce systematic undervaluation of controversial firms in morally restrictive environments and excess returns for unconstrained investors.

Moreover, the influence of religion on investor behavior is not binary or uniform. Many countries exhibit religious heterogeneity, where multiple belief systems coexist. To capture this complexity, we classify a religion as "significant" if it accounts for at least 25% of the national population (explained in Section 3.1). This threshold is conceptually anchored in pluralism rather than dominance: a group need not constitute a numerical majority to exert normative influence. In political science and corporate governance, 25% is often treated as a "blocking minority," sufficient to veto decisions or shape institutional norms. As such, our approach reflects the idea that any religion with a substantial local following may contribute to the ethical climate surrounding investment decisions.

Taken together, these considerations provide the conceptual foundation for our empirical analysis. If moral aversion is shaped by religious affiliation, and if this aversion affects investors' willingness to hold certain stocks, then we should observe persistent return differentials across sin stocks sorted by the religious composition of their home countries. The next section describes how we construct and test this hypothesis using firm-level data across 80 countries over the 1990–2025 period.

3. Data & Methodology

3.1. Sample and Data

This study examines the performance of sin stocks in religious environments using monthly firm-level data covering the period from July 1990 to January 2025 across eighty countries. Sin stocks are defined as publicly listed firms whose primary operations involve the production or sale of alcohol, tobacco, gambling, or military-

related goods and services. We identify these firms using the LSEG Refinitiv industry classification (INDUS module), extracting all companies classified under Brewers, Distillers, Wine, Smoke & Tobacco, Gambling & Lottery, and Military categories. This procedure yields a universe of 833 distinct sin firms, which constitute the analytical sample for our empirical investigation.

Although many of these firms operate globally, we assign religious affiliation based on the significant religion(s) of the country in which each firm is headquartered. A religion is considered significant if it accounts for at least 25% of the national population. Religious composition data are primarily sourced from the CIA World Factbook[4] and Pew Research Center (Hackett et al., 2025) to ensure coverage, consistency, and institutional grounding (see Appendix-B).

From a classification standpoint, our religious taxonomy includes five mutually exclusive groups: Christianity, Islam, Judaism, Atheism, and Other religions (e.g., Buddhism, Hinduism, tribal faiths). However, Judaism appears exclusively in Israel, and never overlaps with other classifications. This renders the effective religious competition a four-group system, where the theoretical equilibrium share—under perfect religious equality—is 25%. In this context, a 25% share becomes a natural and intuitive threshold to recognize plural religious significance in a society. Any group exceeding this level can be viewed as shaping societal norms, political structures, or financial attitudes to a degree consistent with broader cross-national governance principles.

This interpretation aligns with precedents in corporate governance and political science, where 25% is widely regarded as a blocking minority: a share sufficient to prevent structural changes, influence outcomes, or demand voice. For instance, under German GmbH law, a 25% holding is enough to block amendments (Noack, 2005); under the UK Companies Act (2006)[5], 25% qualifies as *"significant control"*; and in the European Union's qualified majority system, 25–26.4% of the population can constitute a veto coalition[6]. These examples

[4] https://www.cia.gov/the-world-factbook/field/religions
[5] https://www.gov.uk/guidance/people-with-significant-control-pscs
[6] https://www.cvce.eu/content/publication/2004/5/13/091ecbcb-7f7d-4772-ac95-9c51b041a7ff/publishable_en.pdf

illustrate that a 25% threshold, even without numerical majority, is often sufficient to constrain decisions, shape discourse, and influence outcomes—both in law and in practice.

Furthermore, our overlap analysis (Appendix C) reveals that when sin stocks are jointly classified under more than one religion, 91.69% of these overlaps involve atheism as one of the co-affiliations (e.g., atheist-Christian, atheist-Other). This suggests that religious heterogeneity in our sample is not random, but structured: atheism frequently coexists with religious minorities in secular or post-religious societies. Accordingly, applying a 25% threshold allows us to identify countries where two normative logics may plausibly compete, such as Latvia (43.8% Atheist, 55.8% Christian) or Bosnia (50.7% Muslim, 45.9% Christian)[7].

While cross-border investing is increasingly common, a firm's country of origin—defined by its headquarters—serves as a powerful heuristic in investment decisions. Investors, analysts, and data providers often use headquarter location as a proxy for the firm's regulatory, cultural, and ethical environment. Prior studies (e.g., Ullah, 2021; Cheng et al., 2023) show that investors often rely on country labels as shorthand for legal frameworks, disclosure standards, and cultural alignment. This is particularly relevant for religious or norm-constrained institutional investors who incorporate region-specific exclusionary screens or ethical guidelines.

Moreover, firms often emphasize their origin for reputational or strategic reasons (e.g., "Swiss pharmaceuticals" or "Japanese automakers"), and both analysts and commercial data vendors typically classify firms based on headquarter location rather than shareholder base. The cultural and regulatory context of the home country also influences corporate behavior, disclosure practices, and investor sentiment. Therefore, while we acknowledge the internal heterogeneity of national religious composition, the religion(s) with significant local presence in a firm's home country provide a relevant and observable proxy for the normative environment in which it is embedded and evaluated. Table 1 summarizes the annual distribution of sin stocks across these religious categories.

[7] See Appendix-A.

Table 1. Sin stocks distribution by year

	SS	IA	IT	IM	IG	RC	RJ	RI	RA	RO
1990	72	20	7	35	10	56	0	6	35	10
1991	75	21	7	35	12	58	0	6	36	11
1992	80	23	7	37	13	61	0	7	38	11
1993	94	29	7	39	19	73	0	7	42	12
1994	110	35	10	43	22	82	0	7	50	14
1995	131	43	12	50	26	96	4	7	58	15
1996	147	47	15	55	30	106	6	9	67	15
1997	173	61	19	63	30	117	8	12	81	17
1998	192	71	19	72	30	127	9	12	93	18
1999	208	79	22	77	30	141	9	12	101	19
2000	220	84	22	80	34	149	9	12	110	20
2001	236	91	24	84	37	163	9	12	121	20
2002	248	93	25	88	42	173	9	12	124	21
2003	266	100	25	97	44	185	9	12	137	22
2004	288	109	26	107	46	198	9	15	146	24
2005	304	113	26	112	53	213	9	15	153	25
2006	317	117	26	117	57	224	9	16	156	26
2007	328	119	27	121	61	232	9	17	160	28
2008	339	121	30	126	62	243	9	17	161	28
2009	360	128	32	132	68	262	9	17	168	28
2010	374	133	33	136	72	271	9	19	175	28
2011	392	140	35	141	76	285	9	19	185	29
2012	405	146	35	144	80	292	10	22	189	29
2013	419	151	36	151	81	303	10	23	191	31
2014	440	156	39	158	87	317	10	24	197	34
2015	453	161	39	162	91	328	10	24	203	34
2016	468	167	41	166	94	340	10	25	210	34
2017	484	169	43	174	98	351	10	26	217	34
2018	497	173	44	180	100	359	11	26	223	36
2019	516	175	49	189	103	376	11	29	231	37
2020	541	180	51	204	106	389	13	30	247	38
2021	577	187	53	225	112	416	13	32	267	39
2022	596	193	54	234	115	429	13	32	278	40
2023	645	207	55	258	125	464	14	35	314	43
2024	672	213	56	275	128	484	14	37	329	46

2025	676	213	56	278	129	487	14	37	331	47
TOTAL	**833**	**286**	**77**	**311**	**159**	**536**	**14**	**47**	**398**	**143**

Notes: IA indicates Alcohol sin stocks portfolio; IT indicates Tobacco sin stocks portfolio; IG indicates Gambling sin stocks portfolio; IM indicates Military sin stocks portfolio; RA indicates Atheistic stocks portfolio; RC indicates Christian stocks portfolio; RI indicates Islamic stocks portfolio; RJ indicates Jewish stocks portfolio; and RO indicates other religious stocks portfolio.

To evaluate performance, we construct industry-matched benchmark portfolios using data from Kenneth French's data library[8], restricted to developed markets. For each sin industry, a sectorally relevant non-sin counterpart is selected. Specifically, the food industry is used as the benchmark for tobacco stocks; the fun industry serves as the counterpart for gambling stocks; and alcohol stocks are compared to the average of the food and soda industries. Military-related stocks are evaluated against a composite benchmark, constructed as the average return of the construction, steel, machinery, and automobile industries. This industry-matched portfolio approach allows us to evaluate the relative performance of sin stocks against economically comparable but morally neutral sectors. Unlike Hong and Kacperczyk (2009), we explicitly classify military-related industries as part of the sin stock universe from a religious and ethical perspective.

Table 2 reports key descriptive statistics for the sin stock portfolios, including market capitalization, valuation metrics, risk measures, and religious classifications. The total market capitalization of sin stocks in our sample is approximately USD 3.92 trillion, with the gambling industry accounting for the smallest share and the military industry the largest. Financial characteristics such as price-to-earnings ratio (P/E), price-to-book ratio (P/B), price-to-cash flow ratio (P/CF), debt-to-equity ratio (D/E), and five-year beta are presented for each sin industry, alongside their corresponding industry benchmarks.

We acknowledge that some firms, particularly large conglomerates, operate across both controversial and neutral sectors. These so-called "grey stocks" pose classification challenges, as their exposure to sin-related activities may not be easily isolated. While our classification strategy follows widely used industry-based

[8] The data library is publicly accessible at http://mba.tuck.dartmouth.edu/pages/faculty/ken.french/data_library.html

definitions consistent with Hong and Kacperczyk (2009), it reflects the broader difficulties associated with delineating sin and non-sin sectors in the context of socially responsible investing.

Table 2. Sample Description

Portfolio	Code	MC	Av.MC	P/E	P/B	P/CF	D/E	Beta	Country	Stocks
PANEL A: *Across Sin Industries*										
Alcohol	IA	1,097.92	3.84	87.68	5.61	33.00	1.01	0.65	59	286
Tobacco	IT	624.56	8.56	47.20	4.92	17.91	0.63	0.73	26	77
Gambling	IG	338.00	2.17	108.89	3.73	15.97	2.29	1.01	42	159
Military	IM	1,854.77	6.29	107.22	5.52	70.91	0.61	1.09	31	311
Sin Stocks	SS	3,915.24	4.83	94.43	5.15	42.31	1.06	0.88	80	833
PANEL B: *Across Religions*										
Christianity	RC	2,792.10	5.75	61.21	5.71	24.99	1.44	0.89	58	508
Judaism	RJ	23.24	1.66	30.54	7.33	11.40	0.74	0.50	1	14
Islam	RI	37.67	0.80	24.05	1.53	9.17	0.37	0.73	11	47
Others	RO	1,548.34	4.39	122.67	4.32	52.41	0.68	0.89	19	235
Atheism	RA	1,005.78	4.30	164.52	4.76	79.28	0.65	0.97	13	355

PANEL C: *Industry and Religion Matrix*					
	Christianity	*Judaism*	*Islam*	*Others*	*Atheism*
Alcohol	172	1	15	86	134
Tobacco	51	1	10	13	13
Gambling	112	1	14	31	62
Military	173	11	8	105	146

Notes: Market Capitalization (MC) is presented in units of billion USD. Beta is 5-year average. P/E is time series average of Price to Earnings ratio, P/B is times series average of Price-to-Book Value per share, P/CF is time series average of Price-to-CashFlow per share derived from LSEG Refinitiv. Note that a firm may appear in multiple religious portfolios if more than one religion exceeds the 25% population threshold in a given country. Overlapping stocks detail are given at Appendix-C.

3.2. Model

We use two approaches to examine behavior of sin stocks in an international setting. First, we run time-series return regressions, using CAPM, Fama–French three-factor (Fama & French 1992, 1993), Carhart four-factor (Carhart 1997), Fama–French five-factor (Fama & French 2015), and betting against beta (BAB) extension (Frazzini & Pedersen, 2014) models.

$$CAPM \rightarrow \quad SINEX_{it} = \alpha + \beta_1 \cdot MKT_t + \varepsilon_{it}$$

$$FF3 \rightarrow \quad SINEX_{it} = \alpha + \beta_1 \cdot MKT_t + \beta_2 \cdot SMB_t + \beta_3 \cdot HML_t + \varepsilon_{it}$$

$$CH4 \rightarrow \quad SINEX_{it} = \alpha + \beta_1 \cdot MKT_t + \beta_2 \cdot SMB_t + \beta_3 \cdot HML_t + \beta_4 \cdot WML_t + \varepsilon_{it}$$

$$FF5 \rightarrow \quad SINEX_{it} = \alpha + \beta_1 \cdot MKT_t + \beta_2 \cdot SMB_t + \beta_3 \cdot HML_t + \beta_4 \cdot RMW_t + \beta_5 \cdot CMA_t + \varepsilon_{it}$$

$$BAB \rightarrow \quad SINEX_{it} = \alpha + \beta_1 \cdot MKT_t + \beta_2 \cdot SMB_t + \beta_3 \cdot HML_t + \beta_4 \cdot RMW_t + \beta_5 \cdot CMA_t + \beta_6 \cdot BAB_t + \varepsilon_{it}$$

The dependent variable, *SINEX*, denotes the monthly return of an equal-weighted sin stocks portfolio at month *t*, net of the monthly return of an equal-weighted non-sin comparable stocks portfolio. The benchmark market factor, **MKT**, represents the excess return of the global market portfolio over the risk-free rate. The model includes six additional global risk factors: **SMB**, **HML**, **WML**, **RMW**, **CMA**, and **BAB**, which account for key asset pricing anomalies related to firm characteristics and market frictions.

SMB (Small Minus Big) captures the size premium, defined as the return differential between small-cap and large-cap firms. **HML** (High Minus Low) reflects the value premium by measuring the return spread between high and low book-to-market firms. **WML** (Winners Minus Losers) captures the momentum effect, calculated as the return spread between prior-year return winners and losers. **RMW** (Robust Minus Weak) captures profitability by comparing firms with strong versus weak operating profitability. **CMA** (Conservative Minus Aggressive) reflects investment behavior, measuring the return difference between firms that invest conservatively and those that invest aggressively. Finally, **BAB** (Betting Against Beta) captures pricing anomalies associated with leverage constraints and the low-risk effect by contrasting a leveraged portfolio of low-beta stocks with a deleveraged portfolio of high-beta stocks.

The intercept term, α, represents abnormal returns unexplained by the included risk factors. Under market efficiency, α is expected to be zero. A significantly positive (negative) alpha indicates that the sin stock portfolio outperforms (underperforms) the benchmark on a risk-adjusted basis. All global risk factors are obtained from

French's online data library, and the analysis period begins in July 1990, consistent with the availability of these factor series.

For robustness, we estimate a Fama–MacBeth (1973) cross-sectional regression to examine whether the performance of sin stocks varies systematically across religious contexts. The specification is as follows

$$SinExReturn_{it} = \alpha + \sum_{r=1}^{4} \delta_r REL_{ri} + \theta' X_{it} + \varepsilon_{it}$$

where $SinExReturn_{it}$ denotes the monthly return of stock *i* in month *t*, minus the risk-free rate in that month. REL_{ri} is a set of binary variables indicating whether religion r (Christianity, Judaism, Islam, or others) has significant religious presence in the firm i's home country. The omitted category is atheist countries, making them the reference group. Control variables X_{it} include the natural logarithm of market capitalization (LnSIZE), book-to-market ratio (LnBM), leverage (LnLEV), firm age (LnAGE), turnover intensity (LnTI), past one-year return (AR), and market beta (BETA).

In this setup, the intercept (α) captures the average excess monthly return of sin stocks located in atheist countries, holding all control variables at zero. The coefficients δ_r measure the excess return differential for sin stocks operating in countries where religion r has a significant local presence, relative to sin stocks in atheist countries. A significantly positive (negative) δ_r indicates that sin stocks domiciled in such countries earn higher (lower) risk-adjusted returns compared to those from atheist countries, after accounting for firm-level characteristics.

3.2.1. Alternative Approaches to Evaluating Sin Stock Mispricing

An alternative approach for assessing sin stock mispricing involves analyzing the performance of sin-focused mutual funds relative to socially responsible investing (SRI) funds or broad market benchmarks. This

comparison provides indirect evidence of investor avoidance and potential pricing distortions. For instance, the Vice Fund, the only publicly known sin-focused mutual fund, has consistently outperformed its benchmarks. Chong et al. (2006) report superior returns for the Vice Fund over the S&P 500 between 2002 and 2005, while Chang and Krueger (2013) document similar outperformance through 2012.

However, mutual fund–level analysis has notable limitations. These funds typically hold diversified, actively managed portfolios, which can obscure the pricing dynamics of specific industries or cultural contexts. Moreover, fund returns are confounded by management effects, rebalancing, and fees. Crucially, they do not allow for direct attribution of returns to religious or ethical influences.

Our approach, in contrast, leverages firm-level data and constructs portfolios based on both industry classification and religion. This enables a more precise analysis of how religious norms shape investor behavior and asset pricing. While mutual fund studies offer valuable perspective on aggregate investor sentiment, they lack the granularity required to isolate religion-specific mispricing effects.

3.2.2. Other Explanatory Variables in Sin Stock Mispricing

Beyond ethical considerations, several alternative explanations for sin stock mispricing have been proposed, including liquidity, corporate governance, and institutional behavior. Liquidity-based theories suggest that investor avoidance may reduce trading activity, generating a liquidity premium. However, Hong and Kacperczyk (2009) find no systematic liquidity differences between sin and comparable non-sin firms, and Amihud's (2002) illiquidity measure does not consistently explain returns in this context.

Corporate governance concerns have also been explored. Contrary to the expectation that sin firms suffer from weak governance, Kim and Venkatachalam (2011) find that these firms exhibit stronger financial reporting

quality relative to peers, indicating that underpricing is unlikely to be driven by transparency or governance deficits.

Institutional investor behavior offers another potential explanation. Liston (2016) shows that institutional sentiment affects sin stock pricing in the U.S., but global evidence remains sparse and difficult to generalize due to differences in regulatory, cultural, and ownership structures. Existing studies (e.g., Hong and Kacperczyk, 2009; Han et al., 2022) suggest that institutional underinvestment in sin stocks is largely motivated by ethical screening rather than risk-based concerns.

Given these limitations, our analysis emphasizes religious and cultural norms as central drivers of sin stock mispricing. This framing is consistent with recent evidence and enables a more comprehensive assessment of return patterns across moral and social contexts.

4. Results

4.1. Sin stocks analysis

We begin by assessing the performance of sin stocks relative to both their non-sin counterparts and the broader market using a series of time-series return models. Table 3 presents the results from five specifications: CAPM, Fama–French three-factor (FF3), Carhart four-factor (CH4), Fama–French five-factor (FF5), and an extended model including the Betting Against Beta (BAB) factor. For each specification, we estimate returns for two long-short strategies: (i) a sin-minus-non-sin portfolio (Panel A), and (ii) a sin-minus-market portfolio (Panel B). All regressions use heteroskedasticity and autocorrelation consistent (HAC) standard errors with a Newey-West correction and a Bartlett kernel.

Across all model specifications, sin stocks exhibit economically meaningful and statistically significant positive alphas. In Panel A, which compares sin stocks to industry-matched non-sin portfolios, monthly alphas range from 72 bps to 85 bps, with all estimates significant at the 1% level. The CAPM model produces the highest

alpha (83 bps), while the CH4 model yields a slightly lower figure (72 bps) after adjusting for momentum (WML). The inclusion of additional factors in the FF5 and FF5+BAB models does little to attenuate the alpha, suggesting that sin stock outperformance is not fully explained by conventional risk factors.

Panel B compares the sin stock portfolio to the market. Here, alphas are even higher—ranging from 96 bps to 106 bps per month, all significant at the 1% level. These results underscore the robustness of the return premium, confirming that sin stocks outperform not only their ethically neutral industry peers but also the overall market on a risk-adjusted basis (Chong et al., 2006; Salaber, 2007; Hong & Kacperczyk, 2009; Liston & Soydemir, 2010; Durand et al., 2013; Hamdan et al., 2023).

Table 3. Time-series analysis of sin stocks, net of comparable counterparts

	CAPM	**FF3**	**CH4**	**FF5**	**FF5+BAB**
Panel A: Sin minus Non-Sin					
α	0.0083*** *(5.44)*	0.0085*** *(5.88)*	0.0072*** *(4.89)*	0.0085*** *(5.40)*	0.0081*** *(4.95)*
MKT	-0.4469*** *(-8.69)*	-0.4608*** *(-9.93)*	-0.4319*** *(-11.08)*	-0.4434*** *(-9.20)*	-0.4437*** *(-9.24)*
SMB		-0.4384*** *(-4.79)*	-0.4511 *** *(-5.69)*	-0.4338*** *(-5.18)*	-0.4345*** *(-5.23)*
HML		-0.1016 *(-1.41)*	-0.0124 *(-0.20)*	-0.2106* *(-1.79)*	-0.2108* *(-1.84)*
WML			0.1890*** *(4.89)*		
RMW				-0.0640 *(-0.52)*	-0.0652 *(-0.53)*
CMA				0.2035 *(1.25)*	0.1966 *(1.23)*
BAB					0.0593 *(1.07)*
Adj. R^2	0.3038	0.3664	0.4093	0.3685	0.3692
Obs.	414	414	410	414	414
DW	1.99	1.96	1.91	1.95	1.97
Panel B: Sin minus Market					
α	0.0100*** *(8.23)*	0.0098*** *(9.23)*	0.0106*** *(10.14)*	0.0098*** *(8.82)*	0.0096*** *(8.40)*
MKT	-0.4735* *(-14.43)*	-0.4629*** *(-15.09)*	-0.4880*** *(-16.55)*	-0.4803** *(-14.66)*	-0.4805 *** *(-14.57)*
SMB		0.4231*** *(9.31)*	0.4193*** *(9.16)*	0.4195*** *(9.10)*	0.4189*** *(9.05)*

HML		0.0623* *(1.78)*	0.0415 *(1.16)*	0.1721*** *(3.56)*	0.1721*** *(3.70)*
WML			-0.0354 *(-1.48)*		
RMW				0.0668 *(1.14)*	0.0659 *(1.12)*
CMA				-0.2044*** *(-2.91)*	-0.2092*** *(-3.07)*
BAB					0.0405 *(1.51)*
Adj. R^2	0.5337	0.6195	0.6374	0.6261	0.6267
Obs.	415	415	411	415	415
DW	1.60	1.72	1.80	1.76	1.76

Notes: Panel A is monthly return of long sin stocks portfolio and short non-sin counterpart portfolio. Panel B is monthly return of long sin stocks portfolio and short market portfolio. The time-series regression analysis uses HAC standard errors and covariance of Bartlett kernel with Newey-West fixed bandwidth of 6. The t-statistics are given in the parentheses Statistical significance levels: * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$. DW is Durbin-Watson statistics.

The factor loadings offer further insight into the composition of the sin portfolio. In Panel A, the negative and statistically significant coefficients on SMB suggest that the portfolio is tilted toward large-cap firms, consistent with the global dominance of established players in tobacco, alcohol, and defense. The HML factor is marginally significant in the FF5 and FF5+BAB models, indicating partial exposure to value stocks. The inclusion of the WML factor in the CH4 specification yields a strongly positive and significant coefficient, suggesting that sin stocks benefit from persistent momentum. Other factors such as RMW and CMA are not statistically significant, and the BAB coefficient is positive but also insignificant, indicating limited explanatory power from profitability, investment aggressiveness, or beta-related anomalies.

Panel B factor loadings generally mirror those in Panel A but differ in sign and magnitude, reflecting the broader composition of the market. Notably, sin-minus-market portfolios exhibit a positive and significant loading on SMB and HML, contrasting with the negative SMB loading in Panel A. This suggests that when benchmarked against the aggregate market, sin stocks skew smaller and more value-oriented by comparison. The CMA factor is significantly negative, implying that sin firms tend to invest more aggressively than the average market firm.

Taken together, these results confirm that sin stocks deliver consistent and significant positive abnormal returns, even after controlling for size, value, momentum, profitability, investment, and beta anomalies. The persistence of alpha across models and benchmarks suggests that the pricing of sin stocks cannot be fully attributed to standard risk factors and likely reflects investor-driven preferences or market frictions related to ethical exclusion (Fabozzi et al., 2008; Hong & Kacperczyk, 2009; Fauver & McDonald, 2014; Han et al., 2022).

4.2. Sin stocks industry-based analysis

To examine the heterogeneity of sin stock performance across industries, we estimate separate time-series regressions for four industry-specific sin portfolios—alcohol, tobacco, gambling, and military—each benchmarked against a sectorally matched non-sin counterpart. Table 4, Panel A presents the results based on an extended factor model that includes the market factor, size, value, momentum, profitability, investment, and low-beta anomalies.

All four industry portfolios deliver positive and statistically significant alphas, suggesting that sin stock outperformance persists even after adjusting for conventional risk factors. The highest alpha is observed in the gambling sector, which yields an abnormal return of 0.97% per month (11.64% annualized), significant at the 1% level. This finding aligns with Fabozzi et al. (2008) and Hamdan et al. (2023), who also report elevated returns for gambling stocks, attributing this to persistent stigma and investor exclusion.

Gambling stocks are often viewed as inherently risky due to their exposure to regulatory uncertainty, high leverage, and earnings volatility. However, these financial characteristics alone cannot fully explain the persistent return premium. While moral attitudes toward gambling vary across religions, it is explicitly condemned in Islam—referred to as *"Satan's handiwork"*—and discouraged in many conservative Christian and Jewish traditions, where it is associated with vice and moral hazard. In highly religious societies, such moral

disapproval likely contributes to sustained underpricing, reinforcing our broader finding that religious norms play a critical role in the mispricing of sin stocks.

The military sector follows closely with an alpha of 0.93% per month (11.16% annualized), also significant at the 1% level. The return premium in this sector is robust to all included factors and likely reflects persistent ethical and political aversion among investors, consistent with prior literature on defense stocks (Han et al., 2022; Trinks & Scholtens, 2017). For instance, Chong et al. (2006) report that the Vice Fund—allocating nearly a quarter of its portfolio to defense—significantly outperformed the S&P 500, posting a daily Jensen's alpha of 0.0864 at the 5% level. Fabozzi et al. (2008) also find elevated abnormal returns for military stocks, while Martins (2024) highlights their return resilience during periods of armed conflict. Together, these findings suggest that underexposure to defense stocks for ethical reasons may lead to persistent mispricing and excess returns.

The tobacco and alcohol portfolios yield more moderate alphas of 0.64% and 0.58% per month, respectively, both statistically significant at the 5% level. These magnitudes are broadly consistent with prior studies. Fabozzi et al. (2008) and Hamdan et al. (2023) similarly document that tobacco and alcohol stocks tend to exhibit lower abnormal returns than other sin sectors, such as gambling or military.

Table 4. Industry-based sin stocks portfolios, net of comparable counterparts

	Alcohol	**Tobacco**	**Military**	**Gambling**
Panel A: Sin Industry minus Comparable Counterpart				
α	0.0058**	0.0064**	0.0093***	0.0097***
	(2.50)	(2.53)	(3.95)	(3.38)
MKT	-0.3630***	-0.3703***	-0.6782***	-0.3790***
	(-6.67)	(-6.71)	(-9.39)	(-4.48)
SMB	-0.1299	-0.2238**	-0.7467***	-0.5259***
	(-1.26)	(-2.1)	(-6.26)	(-3.04)
HML	-0.1670	-0.1526	-0.4839***	-0.2000
	(-1.19)	(-1.14)	(-3.5)	(-1.22)
RMW	-0.2840*	-0.1772	0.0339	0.2459
	(-1.67)	(-1.29)	(0.21)	(1.11)
CMA	0.1678	0.0585	0.2675	0.5922***
	(0.77)	(0.32)	(1.42)	(2.65)

BAB	0.0122 (0.16)	0.0681 (0.85)	0.0915 (1.33)	0.0106 (0.12)
Adj. R^2	0.1031	0.1042	0.4473	0.1906
Obs.	414	414	414	414
DW	1.88	1.91	2.08	2.01
Panel B: Sin Industry minus Market				
α	0.0076*** (5.13)	0.0075*** (3.53)	0.0117*** (7.81)	0.0106*** (4.33)
MKT	-0.605*** (-15.18)	-0.6802*** (-15.5)	-0.4296*** (-9.80)	-0.2258*** (-3.38)
SMB	0.3089*** (5.12)	0.3066*** (3.27)	0.3585*** (4.74)	0.8038*** (7.23)
HML	0.0515 (0.79)	0.0812 (0.85)	0.2910*** (3.46)	0.1196 (0.87)
RMW	0.1274 (1.42)	0.083 (0.69)	-0.0842 (-0.87)	0.2041 (1.18)
CMA	-0.0152 (-0.15)	-0.0199 (-0.15)	-0.4756*** (-4.23)	-0.0524 (-0.28)
BAB	0.086** (2.21)	0.0347 (0.58)	0.0177 (0.48)	-0.0318 (-0.45)
Adj. R^2	0.5337	0.3908	0.3528	0.1798
Obs.	415	415	415	415
DW	1.70	1.83	1.90	1.95

Notes: Panel A is monthly return of long related sin stocks portfolio and short comparable counterpart portfolio. Panel B is monthly return of long related sin stocks portfolio and short market portfolio. The time-series regression analysis uses HAC standard errors and covariance of Bartlett kernel with Newey-West fixed bandwidth of 6. The t-statistics are given in the parentheses. Statistical significance levels: * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$. DW is Durbin-Watson statistics.

Panel B, which benchmarks sin industries against the global market portfolio, generally confirms the magnitude and direction of alphas reported in Panel A. However, because it does not account for sector-specific fundamentals, we rely on Panel A as the more appropriate benchmark for identifying industry-level mispricing.

These findings are broadly consistent with existing literature (Chong et al., 2006; Salaber, 2007; Fabozzi et al., 2008; Hong & Kacperczyk, 2009; Liston & Soydemir, 2010; Durand et al., 2013; Fauver & McDonald, 2014; Han et al., 2022; Hamdan et al., 2023), which attributes the sin premium to investor aversion rooted in social and cultural norms. While most prior studies are confined to national markets, cross-country analyses such as Fauver and McDonald (2014) reveal that sin stock pricing varies systematically across institutional and cultural contexts. Durand et al. (2013) further argue that these differences are culturally embedded—an argument that

underlines the importance of religion as a foundational driver of societal values. These insights motivate our next analysis, which explores the role of religious affiliation more directly.

4.3. Sin stocks religion-based analysis

To assess whether the pricing of sin stocks varies across religious affiliations, we estimate time-series regressions for religion-specific sin stock portfolios. Each portfolio is benchmarked against three baselines: sin stocks from atheist countries (Panel A), the global market (Panel B), and a restricted atheist portfolio excluding Chinese firms (Panel C). Additionally, we construct non-overlapping religion-based portfolios to eliminate classification-induced inflation (Panel D) and overlapping-only portfolios to explore the implications of dual-religion contexts (Panel E).

As 22.21% of our total sample consists of U.S. firms, we also estimate a Christian portfolio excluding U.S. firms (Christian Ex-US) to mitigate potential dominance effects. Similarly, Chinese firms account for 13.33% of the atheist benchmark. To address this concentration, Panel C excludes Chinese sin stocks from the atheist portfolio. These multiple specifications help ensure that our findings are not driven by large-country effects but instead reflect systematic religion-based pricing differentials.

Portfolios are classified based on the significant religious composition of a firm's home country. The categories include Christianity, Judaism, Islam, Other religions (e.g., Hinduism, Buddhism, tribal faiths), and a pooled Abrahamic group. All regressions control for market, size, value, momentum, profitability, investment, and low-beta factors, using HAC-adjusted standard errors with a Bartlett kernel.

Panel A reveals clear and economically meaningful differences across religious contexts. Sin stocks originating from Abrahamic countries exhibit the highest abnormal return of 0.79% per month, statistically significant at the 1% level. Within this group, Christian, Islamic, and Jewish portfolios each yield significant positive alphas between 0.71% and 0.78%, supporting the notion that moral aversion leads to persistent underpricing. In

contrast, sin stocks from countries classified under Other religions yield a negative alpha of –0.43%, significant at the 10% level, suggesting weaker stigma or different normative attitudes toward vice-related industries. The Christian Ex-US portfolio, which excludes all U.S. firms, still delivers a statistically significant alpha of 0.43%, confirming that the observed sin premium is not solely driven by American firms.

Panel B benchmarks these religious portfolios against the global market. While alpha magnitudes are generally higher—ranging from 0.79% to 1.22% per month—the interpretive strength of this benchmark is more limited. Global market returns do not control for sin-sector comparability and may conflate industry- and region-specific effects. Nonetheless, the persistence of positive and significant alphas reinforces the robustness of religion-related pricing asymmetries.

Table 5. Time-series analysis of religion-based sin stocks portfolios, net of comparable counterparts

	Christian	**Jewish**	**Islamic**	**Abrahamic**	**Other**	**Christian Ex-US**
Panel A: Sin Religious stocks minus Sin Atheist stocks						
α	0.0078***	0.0071*	0.0073**	0.0079***	-0.0043*	0.0043***
	(5.35)	(1.65)	(2.09)	(5.56)	(-1.85)	(3.51)
MKT	0.0155	-0.1737	-0.0266	0.0048	0.1478*	-0.0469
	(0.40)	(-1.49)	(-0.35)	(0.13)	(1.65)	(-1.57)
SMB	0.0015	0.1334	0.1018	0.0243	0.1621	-0.0112
	(0.02)	(0.79)	(0.62)	(0.38)	(1.35)	(-0.21)
HML	0.2357***	-0.2466	-0.0470	0.1901**	-0.4196***	0.1372**
	(2.78)	(-1.33)	(-0.30)	(2.26)	(-2.98)	(2.32)
RMW	-0.1030	-0.3806*	-0.1064	-0.1256	-0.2043	-0.0339
	(-1.07)	(-1.79)	(-0.53)	(-1.34)	(-1.25)	(-0.41)
CMA	-0.3678***	-0.2284	-0.1031	-0.3466***	0.8952***	-0.2564***
	(-2.93)	(-0.70)	(-0.38)	(-2.79)	(4.07)	(-3.07)
BAB	0.0045	-0.0548	-0.0418	0.0036	0.0447	-0.0135
	(0.10)	(-0.42)	(-0.41)	(0.08)	(0.72)	(-0.46)
Obs.	415	356	415	415	415	415
DW	1.88	2.04	1.85	1.89	1.93	1.78
Panel B: Sin Religious stocks minus Market						
α	0.0114***	0.0122***	0.0109***	0.0115***	-0.0007	0.0079***
	(10.03)	(2.76)	(3.20)	(10.22)	(-0.25)	(6.91)
MKT	-0.4727***	-0.7235***	-0.5149***	-0.4834***	-0.3404***	-0.5352***
	(-15.65)	(-5.91)	(-6.70)	(-15.88)	(-3.12)	(-14.76)
SMB	0.4022***	0.5359***	0.5026***	0.4250***	0.5629***	0.3896***
	(7.08)	(3.11)	(3.36)	(7.68)	(4.85)	(5.87)
HML	0.2960***	-0.1284	0.0134	0.2505***	-0.3593**	0.1975***
	(4.65)	(-0.68)	(0.10)	(4.18)	(-2.23)	(3.54)

RMW	0.0500 (0.69)	-0.1937 (-0.93)	0.0475 (0.25)	0.0282 (0.41)	-0.0504 (-0.28)	0.1199 (1.47)
CMA	-0.3654*** (-4.11)	-0.3573 (-1.05)	-0.100 (-0.43)	-0.3442*** (-4.02)	0.8976*** (3.46)	-0.2540*** (-2.99)
BAB	0.0293 (0.96)	-0.0362 (-0.27)	-0.0169 (-0.17)	0.0284 (0.92)	0.0695 (1.06)	0.0113 (0.32)
Obs.	415	356	415	415	415	415
DW	1.81	1.67	1.91	1.85	1.95	1.98
Panel C: Sin Religious stocks minus Non-Chinese Sin Atheist Stocks						
FF5 (α)	0.0085*** (6.45)	0.0080* (1.87)	0.0080** (2.35)	0.0086*** (6.82)	-0.0036* (-1.72)	0.0050*** (5.07)
Panel D: Sin Religious stocks minus Sin Atheist Stocks (Non-overlapping)						
FF5 (α)	0.0094*** (3.59)	0.0078* (1.64)	0.0079** (2.05)	0.0094*** (3.74)	0.0067 (1.23)	0.0056** (2.22)
Panel E: Sin Religious stocks minus Sin Atheist Stocks (Only overlapping)						
FF5 (α)	0.0017 (1.55)	NA	0.0022 (0.29)	0.0019* (1.74)	-0.0085*** (-3.25)	0.0017 (1.55)

Notes: Panel A reports the monthly returns of religion-based sin stock portfolios net of sin stocks from atheist countries. Panel B reports the same portfolios relative to the global market. Panel C presents an additional robustness test in which the atheist benchmark excludes Chinese sin stocks to mitigate country concentration effects. Panel D further refines the analysis by constructing non-overlapping religion portfolios, excluding sin stocks that are jointly assigned to multiple religious groups due to cross-threshold classification. Panel E focuses exclusively on overlapping portfolios—i.e., sin stocks from countries with multiple religions exceeding the 25% threshold—allowing for assessment of sin pricing under conditions of significant religious heterogeneity. Christian Ex-US portfolios are also included across all panels to isolate the impact of U.S. firms, which constitute 22.21% of the total sample. The time-series regressions control for market, size, value, momentum, profitability, investment, and betting-against-beta factors. HAC standard errors are used with a Bartlett kernel and Newey–West fixed bandwidth of 6. t-statistics are reported in parentheses. Statistical significance: * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$. DW denotes the Durbin–Watson statistic.

Panel C strengthens these findings by addressing the potential overrepresentation of China in the Atheist group. When Chinese firms are excluded from the atheist benchmark, the estimated alphas increase slightly across most religious categories. The Christian portfolio yields an alpha of 0.85%, Islamic and Jewish portfolios both rise to 0.80%, and the Abrahamic portfolio reaches 0.86%—all statistically significant at conventional levels. These results reinforce the robustness of our central finding: religious norms are associated with meaningful return differentials for sin stocks, independent of single-country effects.

Panel D introduces an additional robustness check by constructing non-overlapping religion portfolios. Specifically, we exclude sin stocks that are classified under more than one religion due to shared significant religious presence in the firm's home country. For example, 19.21% of sin stocks are shared between Atheist

and Other categories, 16.57% between Christian and Atheist, and 2.64% between Christian and Islamic groups. Removing these overlapping firms stocks ensures that the detected return premia are not artifacts of double-counting, but instead reflect genuine differences in investor behavior and ethical aversion. The results remain fully consistent with our main findings: Christian, Islamic, Jewish, and Abrahamic portfolios yield statistically significant alphas ranging from 0.78% to 0.94% per month. Importantly, these results reflect genuine religion-based pricing differences and not artifacts of portfolio construction. The Christian Ex-US portfolio also remains statistically significant (0.56%), further validating the robustness of the religion-specific sin premium.

Panel E offers additional conceptual validation by focusing exclusively on sin stocks originating from countries where more than one religion exceeds the 25% population threshold—i.e., religiously plural settings such as Latvia (55.8% Christian, 43.8% Atheist) or Bosnia (50.7% Muslim, 45.9% Christian). This approach directly addresses concerns about whether significant religious heterogeneity weakens the pricing influence of any single group. Notably, 91.69% of these overlapping classifications involve Atheism on one side (e.g., Christian–Atheist, Other–Atheist), suggesting a tension between secular and religious moral frames within these countries. The resulting alphas are considerably smaller than those in Panels A–D, with most coefficients statistically insignificant. In contrast, the "Other" religion portfolio continues to exhibit a significantly negative alpha, indicating an absence of sin premium where moral disapproval may be more diffuse. These findings suggest that in contexts lacking a clear normative majority, the behavioral pricing effect induced by religious aversion is diluted—providing empirical support for the notion that cohesive moral consensus enhances the financial consequences of religiously driven investor behavior.

In line with Salaber (2007), our results support the hypothesis that religious beliefs and ethical prohibitions materially influence investment behavior and asset pricing. The consistent pattern of higher alphas in Abrahamic contexts—where sin-related activities are often explicitly condemned—suggests that investor aversion translates into persistent return premiums. These findings reinforce the broader argument that moral

norms are transmitted through religious institutions and shape capital allocation decisions in global financial markets.

In sum, the results reported in Table 5 provide strong empirical support for the argument that religious context plays a central role in shaping the financial pricing of controversial industries. The sin premium is not uniform but is amplified in societies where religiously rooted moral disapproval is strongest, consistent with the broader literature on cultural finance and ethical investing.

4.4. Industry-specific Sin Stocks across Religions

Table 6 reports monthly Fama–French five-factor (FF5) alphas for sin stock portfolios, disaggregated by sin industries and the significant religious affiliation of the firm's home country. Each alpha is measured relative to the corresponding industry portfolio of sin stocks from atheist countries. This specification enables a direct comparison of sin premia across religious contexts within each industry, thereby isolating the influence of religious affiliation on asset pricing.

The results reveal substantial cross-religion heterogeneity consistent with the hypothesis that stronger religious disapproval of sin-related activity results in higher expected returns. For alcohol stocks, alphas are substantially higher in Jewish (2.48%) and Islamic (1.14%) portfolios than in Christian (0.45%) or Other religion (0.13%) portfolios. These differences may reflect variation in religious attitudes toward alcohol consumption, as Islamic and Jewish traditions tend to impose stricter behavioral norms or ritual constraints, whereas Christian contexts often adopt a more tolerant or culturally embedded stance. The higher abnormal returns observed in more restrictive environments suggest a pricing discount consistent with investor avoidance due to ethical or religious concerns.

Table 6. Monthly Alphas for Industry-specific Sin Stocks across Religious Contexts

	Christian	**Jewish**	**Islamic**	**Abrahamic**	**Other Religions**
Alcohol	0.0045***	0.0248***	0.0114**	0.0046***	0.0013
	(2.61)	(2.63)	(1.97)	(2.69)	(0.49)
Tobacco	0.0021	0.0099*	0.0079*	0.0029*	-0.0063**
	(0.97)	(1.64)	(1.65)	(1.69)	(-1.98)
Military	0.0103***	0.0065	0.0190**	0.0102***	-0.0144**
	(4.50)	(1.35)	(2.03)	(4.57)	(-3.66)
Gambling	0.0137***	0.0064	0.0138***	0.0133***	-0.0040
	(3.74)	(0.65)	(2.53)	(3.65)	(-1.18)

Note: Monthly FF5 alphas for industry-specific sin stock portfolios by religion, measured relative to corresponding atheist sin portfolios. T-statistics (in parentheses) are based on HAC standard errors. ***, **, and * denote significance at the 1%, 5%, and 10% levels.

Tobacco stocks show a similar gradient, though with smaller magnitudes. Alphas are positive and weakly significant in Jewish (0.99%) and Islamic (0.79%) portfolios, but not in Christian contexts (0.21%). The Other religion portfolio shows a significant negative alpha (-0.63%), indicating that tobacco stocks from these regions underperform their atheist counterparts. For military stocks, the Islamic portfolio yields the highest alpha (1.90%), followed by Christian (1.03%). The Jewish alpha (0.65%) is not statistically significant, while the Other religion portfolio exhibits a strong and significant negative alpha (-1.44%). These findings suggest that in religious environments where military investment is morally or politically contentious, sin stocks in this category are discounted more heavily, creating relative return premia. Conversely, in settings with weaker moral aversion or pacifist leanings, such stocks may be overpriced relative to their counterparts in atheist regions.

For gambling stocks, Islamic (1.38%) and Christian (1.37%) portfolios again yield the largest positive and significant alphas, reflecting well-known religious prohibitions against gambling. The Jewish portfolio (0.64%) shows a smaller and statistically insignificant premium, while the Other religion portfolio (–0.40%) underperforms. These results reinforce the interpretation that moral aversion leads to underpricing in contexts where gambling is strongly condemned.

The results in Table 6 demonstrate that the pricing of sin stocks varies not only across industries but also across religious environments, with higher alphas in religions that attach greater moral disapproval to the underlying

activity. Because each religion–industry alpha reflects a differential return relative to atheist counterparts, the findings directly capture how religion-specific ethical norms contribute to pricing distortions in financial markets.

4.5. Sin stocks cross-sectional analysis

To reinforce the findings from our time-series and industry-based analyses, we conduct a cross-sectional robustness check using the Fama–MacBeth (1973) two-pass regression procedure. While prior sections establish that sin stocks generate abnormal returns relative to their non-sin counterparts, and that this outperformance varies across industries and religious portfolios, this section investigates whether such differences persist after controlling for firm-level characteristics and broader cultural traits. By focusing exclusively on sin stocks, we isolate the influence of religious context on return behavior, independent of cross-industry variation.

Table 7 presents the results of monthly cross-sectional regressions, averaged across the sample period. The dependent variable is the monthly excess return of individual sin stocks (i.e., stock return minus the risk-free rate). The core specification includes religion dummies for firms headquartered in countries with a significant Christian, Jewish, Islamic, or Other religious affiliation, using atheist countries as the reference group. Firm-level controls include market beta, firm size (LnSIZE), book-to-market ratio (LnBM), leverage (LnLEV), firm age (LnAGE), total income (LnTI), and past return momentum (AR).

Panel A reports the baseline regression with religion and firm-level variables. The coefficients on the religion dummies are consistently positive and statistically significant for Christian, Jewish, and Islamic countries. This reinforces the argument that sin stocks headquartered in religiously affiliated contexts, particularly those associated with Abrahamic faiths, earn systematically higher excess returns than those in secular environments. This result aligns with earlier findings in Sections 4.3 and 4.4, providing additional robustness.

Table 7. Cross-sectional regression

	Christian	Jewish	Islamic	Other	Atheist
PANEL A: Sin Stock Excess Returns with Religion Dummies					
Intercept	0.0079***	0.0062***	0.0063***	0.0071***	0.0082***
	(4.40)	(4.52)	(4.45)	(4.30)	(4.25)
REL	0.0036**	0.0041**	0.0035**	0.0018	–
	(2.04)	(2.07)	(1.99)	(1.12)	
BETA	0.6035***	0.6281***	0.6108***	0.5909***	0.6046***
	(3.15)	(3.27)	(2.86)	(2.37)	(2.75)
LnSIZE	-0.1702***	-0.1725***	-0.1684***	-0.1650***	-0.1602***
	(2.60)	(2.63)	(2.55)	(2.51)	(2.48)
LnBM	0.1795**	0.1872**	0.1824**	0.1751**	0.1708**
	(2.01)	(1.97)	(1.99)	(1.97)	(2.03)
AR	1.2170***	1.2835***	1.2488***	1.2316***	1.2505***
	(4.02)	(4.24)	(4.10)	(3.82)	(3.95)
LnLEV	-0.0509*	-0.0572*	-0.0535*	-0.0490*	-0.0451*
	(1.90)	(1.67)	(1.68)	(1.65)	(1.85)
LnTI	0.0171*	0.0244*	0.0183	0.0160	0.0148*
	(1.63)	(1.78)	(1.49)	(1.41)	(1.66)
LnAGE	-0.0607	-0.0648	-0.0615	-0.0672	-0.0715
	(1.32)	(1.61)	(1.45)	(1.37)	(1.52)
PANEL B: Sin Stock Excess Returns with Religion Dummies + Average Cultural Controls (Six Dimensions)					
Intercept	0.0102***	0.0109***	0.0103***	0.0114***	0.0135***
	(3.25)	(3.44)	(3.08)	(3.71)	(3.62)
REL	0.0044**	0.0034**	0.0047**	0.0029	–
	(2.31)	(2.17)	(2.02)	(1.03)	
CUL6	-0.0004	-0.0003	-0.0003**	-0.0002**	-0.0004***
	(1.23)	(1.38)	(2.10)	(2.01)	(2.65)
PANEL C: Sin Stock Excess Returns with Religion Dummies + Individualism + Uncertainty Avoidance					
Intercept	0.0096***	0.0088***	0.0091***	0.0091***	0.0131***
	(3.51)	(3.12)	(2.83)	(2.83)	(3.80)
REL	0.0049**	0.0037**	0.0054**	0.0031	–
	(2.35)	(2.01)	(2.14)	(0.98)	
IDV	0.0002**	0.0001**	0.0001**	0.0001***	0.0001***
	(1.97)	(2.08)	(3.41)	(2.94)	(3.39)
UAI	-0.0004*	-0.0001	-0.0001	-0.0001	-0.0001
	(-1.78)	(-1.29)	(-0.65)	(-1.09)	(-0.74)

Notes: The dependent variable is the monthly excess return (stock return minus risk-free rate). Religion dummies indicate the significant religious affiliation of the firm's home country; atheist countries serve as the reference group. All panels control for firm-level characteristics. Panel A includes only religion dummies. Panel B adds the average of Hofstede's six

cultural dimensions as a composite control. Panel C includes two specific Hofstede dimensions: Individualism (IDV) and Uncertainty Avoidance (UAI). Coefficients are time-series averages from Fama–MacBeth regressions; t-statistics (in parentheses) are Newey–West adjusted. Panels B and C are estimated on a reduced sample of 657 sin stocks due to data availability for Hofstede indices. Statistical significance: * p<0.10, ** p<0.05, *** p<0.01.

To assess whether these religion-based return premia are simply capturing broader sociocultural traits, Panels B and C introduce country-level cultural controls from Hofstede's framework[9]. Panel B incorporates the average of all six Hofstede dimensions (Power Distance, Individualism, Masculinity, Uncertainty Avoidance, Long-Term Orientation, Indulgence) as a single composite measure, while Panel C introduces two specific dimensions theoretically most relevant to sin stock aversion: Individualism (IDV) and Uncertainty Avoidance (UAI).

Hofstede's dimensions capture fundamental cross-country differences in values and behavior, but not all are expected to influence investment decisions in controversial industries (Nadler & Breuer, 2019; Hofstede, 2011). Consistent with Nadler and Breuer's (2019) systematic review—which identifies Hofstede's model as the most widely applied framework in cultural finance—we focus on Individualism and Uncertainty Avoidance, as they are most conceptually linked to moral judgment and behavioral conformity. Prior literature (e.g., Durand et al., 2013) also highlights their role in shaping investor psychology, particularly through mechanisms such as cognitive dissonance, ethical compliance, and herding behavior.

Individualism reflects the degree to which individuals prioritize autonomy over group norms. In more individualistic societies, investors may experience greater cognitive dissonance when holding controversial stocks, leading to heightened aversion to sin stocks. In contrast, collectivist cultures emphasize social conformity, which may reduce the perceived stigma of investing in morally contentious assets. Groupthink and herding behavior in such contexts can further diminish investor resistance (Durand et al., 2013).

[9] Hofstede's framework is the most widely used cultural model in empirical finance and economics. Among 101 reviewed studies analyzing cultural effects, 83% relied on cultural dimensions rather than indirect proxies (e.g., religion, language, or trust), with 81% of those adopting Hofstede's approach specifically (Nadler & Breuer, 2019).

Uncertainty Avoidance captures a society's discomfort with ambiguity and deviation from social norms. Although distinct from risk aversion, high-UAI cultures tend to enforce stricter behavioral codes and disapprove of deviant actions (Hofstede, 2011). As a result, investors in these environments may be more reluctant to hold sin stocks, which are often viewed as morally ambiguous or socially inappropriate.

The results in Panels B and C show that, even after controlling for cultural factors, religion dummies remain positive and statistically significant in most cases. Notably, Individualism exhibits a positive and significant association with sin stock returns in Panel C, consistent with the idea that social disapproval is stronger in individualistic cultures. Uncertainty Avoidance is negatively associated with returns, but its effect is weaker and less consistent across specifications.

Overall, the Fama–MacBeth regressions confirm that the higher returns observed in religious contexts are not simply attributable to general cultural traits. The persistence of religion-based premia after controlling for Hofstede dimensions supports the interpretation that religion functions as a distinct normative force shaping investor behavior. These results align with earlier findings (Durand et al., 2013; Clouser, 2005) and reinforce the robustness of the sin premium across varying cultural and empirical conditions.

5. Conclusion

This study investigates the pricing of sin stocks across religious contexts using a comprehensive cross-country sample from 1990 to 2025. By integrating time-series asset pricing models with religion-based portfolio construction and Fama–MacBeth cross-sectional analysis, we provide robust evidence that both industry type and religious environment significantly influence the financial performance of controversial stocks.

Our findings confirm that sin stocks consistently earn positive abnormal returns, even after controlling for conventional risk factors. This return premium is especially pronounced in industries such as gambling and military, where moral opposition is typicaly strongest. More importantly, we document that the sin premium is

not uniformly distributed across cultural contexts: sin stocks from countries with substantial Abrahamic religious presence—Christianity, Islam, and Judaism—exhibit significantly higher alphas than those from atheist or non-Abrahamic settings. These results remain robust after adjusting for firm-level fundamentals and cultural traits, suggesting that religious norms influence investor preferences and contribute to systematic pricing distortions.

The evidence supports the view that religion serves as a key transmission channel through which moral values are embedded in financial markets (Durand et al., 2013; Yates & Oliveira, 2016; Wang et al., 2016). In environments where sin-related industries are subject to stronger normative disapproval, investor avoidance leads to underpricing, which is subsequently capitalized by higher realized returns. These insights enrich the broader literature on ethical investing, cultural finance, and the role of non-economic factors in asset pricing.

This study is not without limitations. First, the use of country-level religious composition may mask within-country heterogeneity in moral preferences and investment behaviors. Second, while we attribute observed pricing differences to moral aversion, other unobserved institutional or legal factors correlated with religion may also play a role. Third, although we address multi-religion country overlaps through robustness checks, more granular approaches (e.g., investor-level data or surveys) could improve classification precision. Fourth, our classification treats major religions as homogeneous blocs; yet denominational differences—such as between Protestant and Catholic views on gambling—may further shape sin stock aversion. Fifth, while we include Judaism as one of the five religious categories, Jewish-affiliated sin stocks in our sample are almost exclusively Israeli military firms. This narrow representation may conflate religion-based effects with country-specific or industry-specific drivers. We address this concern through pooled Abrahamic groupings and interpret the Jewish results with caution, but future research with broader geographic representation of Jewish-affiliated firms is warranted. Future studies could refine these dimensions by leveraging micro-level or text-based data to assess doctrinal variation and its impact on ethical investing.

Reference

Adhikari, B.K., and Agrawal, A. (2016). Religion, gambling attitudes and corporate innovation. Journal of Corporate Finance, 37, pp. 229–248. https://doi.org/10.1016/j.jcorpfin.2015.12.017

Amihud, Y. (2002). Illiquidity and stock returns: cross-section and time-series effects. Journal of Financial Markets, 5(1), 31-56. https://doi.org/10.1016/S1386-4181(01)00024-6

Becker, G. (1957). The Economics of Discrimination. University of Chicago Press, Chicago.

Blitz, D. & Fabozzi, F.J. (2017). Sin Stocks Revisited: Resolving the Sin Stock Anomaly. The Journal of Portfolio Management, 44(1), 105-111. https://doi.org/10.3905/jpm.2017.44.1.105

Carhart, M.M. (1997). On Persistence in Mutual Fund Performance. Journal of Finance, 52(1), 57–82. https://doi.org/10.1111/j.1540-6261.1997.tb03808.x

Chang, C.E. & Krueger, T.M. (2013). The VICEX Fund: Recent Shortcomings of a Long-Run Success Story. Journal of Management and Sustainability, 3, 131–141. https://doi.org/10.5539/jms.v3n3p131

Cheng, C., Li, W. R., Liu, G.C., & Liu, Y.Y. (2023). Origin matters: Institutional imprinting and family firm innovation in China. Emerging Markets Review, 55, 100990. https://doi.org/10.1016/j.ememar.2022.100990

Chong, J., Her, M. & Phillips, G.M. (2006). To sin or not to sin? Now that's the question. Journal of Asset Management, 6(6), 406–417. https://doi.org/10.1057/palgrave.jam.2240191

Clouser, R.A. (2005). The myth of religious neutrality: An essay on the hidden role of religious beliefs in theories, (revised edition). University of Notre Dame Press, ISBN-13: 978-0-268-02366-9.

Cummings, L.S. (2000). The Financial Performance of Ethical Investment Trusts: An Australian Perspective. Journal of Business Ethics, 25, 79-92. https://doi.org/10.1023/A:1006102802904

Durand, R.B., Koh, S.K., and Tan, P.L. (2013). The Price of Sin in the Pacific-Basin. Pacific-Basin Finance Journal, 21(1), 899-913. https://doi.org/10.1016/j.pacfin.2012.06.005

Fabozzi, F.J., Ma, K.C. & Oliphant, B.J. (2008). Sin Stock Returns. The Journal of Portfolio Management, 35(1), 82-94. https://doi.org/10.3905/JPM.2008.35.1.82

Fama, E.F, and MacBeth, J. (1973). Risk, return, and equilibrium: empirical test. Journal of Political Economy, 81, 607–636. https://www.jstor.org/stable/1831028

Fama, E.F., & French, K.R. (1992). The Cross-Section of Expected Stock Returns. The Journal of Finance, 47(2), 427–465. https://doi.org/10.1111/j.1540-6261.1992.tb04398.x

Fama, E.F., & French, K.R. (1993). Common risk factors in the returns on stocks and bonds. Journal of Financial Economics, 33, 3-56. https://doi.org/10.1016/0304-405X(93)90023-5

Fama, E.F., & French, K.R. (2015). A Five-Factor Asset Pricing Model. Journal of Financial Economics, 116(1), 1–22. https://doi.org/10.1016/j.jfineco.2014.10.010

Fauver, L., and McDonald, M.B. (2014). International variation in sin stocks and its effects on equity valuation. Journal of Corporate Finance, 25, 173-187. https://doi.org/10.1016/j.jcorpfin.2013.11.017

Ferruz, L., Munoz, F., and Vargas, M. (2012). Managerial Abilities: Evidence from Religious Mutual Fund Managers. Journal of Business Ethics, 105, 503-517. https://doi.org/10.1007/s10551-011-0982-y

Frazzini, A., & Pedersen, L. H. (2014). Betting against beta. Journal of Financial Economics, 111(1), 1–25. https://doi.org/10.1016/j.jfineco.2013.10.005

Geczy, C., Stambaugh, R., & Levin, D. (2021). Investing in Socially Responsible Mutual Funds. The Review of Asset Pricing Studies, 11(2), pp. 309–351, https://doi.org/10.1093/rapstu/raab004

Hackett, C., Stonawski, M., Tong, Y., Kramer, S., Shi, A. F., & Zanetti, N. (2025). Religious composition by country, 2010–2020. Pew Research Center. https://doi.org/10.58094/5shf-2d69

Hamdan, M., Calavia, P.F. & Aminu, N. (2023). Sin stocks in European countries: The influence of wealth and familiarity bias on investment choices. Investment Management and Financial Innovations, 20(2), 256-266. https://doi.org/10.21511/imfi.20(2).2023.22

Han, X., Li, Y., & Onishchenko, O. (2022). Shunned stocks and market states. The European Journal of Finance, 28(7), 705–717. https://doi.org/10.1080/1351847X.2021.2015699

Hofstede, G. (2011). Dimensionalizing Cultures: The Hofstede Model in Context. Online Readings in Psychology and Culture, 2(1). https://doi.org/10.9707/2307-0919.1014

Hong, H., & Kacperczyk, M. (2009). The Price of Sin: The Effects of Social Norms on Markets. Journal of Financial Economics, 93(1), 15-36. https://doi.org/10.1016/j.jfineco.2008.09.001

Kim, I., & Venkatachalam, M. (2011). Are Sin Stocks Paying the Price for Accounting Sins? Journal of Accounting, Auditing & Finance, 26(2), 415-442. https://doi.org/10.1177/0148558X11401222

Lee, J., Lee, K. & Oh, F.D. (2023). Religion and Derivative Use: Evidence from the Hedge Fund Industry. Journal for the Scientific Study of Religion, 62(2), 451-475. https://doi.org/10.1111/jssr.12837

Li, J. (2022). Financial risk-taking, religiosity and denomination heterogeneity. Journal of Empirical Finance, 66(C), 74–98. https://doi.org/10.1016/j.jempfin.2021.12.005

Liston, D.P. (2016). Sin stock returns and investor sentiment. The Quarterly Review of Economics and Finance, 59, 63-70. https://doi.org/10.1016/j.qref.2015.08.004

Liston, D.P., and Soydemir, G. (2010). Faith-based and Sin Portfolio: An Empirical Inquiry into Norm-Neglect and Norm-Conforming Investor Behavior. Managerial Finance, 36(10), 876-885. https://doi.org/10.1108/03074351011070242

Martins, A.M. (2024). Stock Market Effects of Military Conflicts on Defence Industry. International Journal of Islamic and Middle Eastern Finance and Management, 17(5). https://doi.org/10.1108/IMEFM-01-2024-0019

Nadler, S., & Breuer, W. (2019). Culture and finance: A systematic literature review of cultural finance. Journal of Business Economics, 89, 191–220. https://doi.org/10.1007/s11573-017-0888-y

Niszczota, P., Conway, P., & Bialek, M. (2024). Moral decay in investment. Journal of Experimental Social Psychology, 115, 104664. https://doi.org/10.1016/j.jesp.2024.104664

Noack, U. (2005). Corporate governance reform in Germany: The second decade. *European Business Law Review, 16*(5), 1033–1064. https://doi.org/10.54648/eulr2005049

Sagbakken, S.T., & Zhang, D. (2022). European sin stocks. Journal of Asset Management, 23, 1–18. https://doi.org/10.1057/s41260-021-00247-9

Salaber, J. (2007). The Determinants of Sin Stock Returns: Evidence on the European Market. Working Paper, Paris-Dauphine University. https://shs.hal.science/halshs-00170219v1

Trinks, P.J., Scholtens, B. (2017). The Opportunity Cost of Negative Screening in Socially Responsible Investing. Journal of Business Ethics, 140, 193–208. https://doi.org/10.1007/s10551-015-2684-3

Ullah, B. (2021). The differential effect of corruption on growth: Does firm origin matter? Emerging Markets Finance and Trade, 57(14), 4036–4053. https://doi.org/10.1080/1540496X.2020.1785861

Wang, M., Rieger, M.O., and Hens, T. (2016). The Impact of Culture on Loss Aversion. Journal of Behavioral Decision Making, 30(2), pp. 270-281. https://doi.org/10.1002/bdm.1941

Yates, J.F., and Oliveira, S. (2016). Culture and decision making. Organizational Behavior and Human Decision Processes. 136, pp. 106-118. https://doi.org/10.1016/j.obhdp.2016.05.003

Appendix-A

	# of Sin Stocks
United States	185
China	111
India	49
United Kingdom	41
South Korea	32
Canada	31
Japan	30
France	25
Vietnam	23
Australia	20
Sweden	16
Germany	15
Hong Kong	14
Israel	14
Bosnia & Herzegovina	12
Belgium	11
Philippines	10
Chile	9
Malaysia	9
Netherlands	9
Romania	9
Thailand	9
Bulgaria	8
Denmark	8
Italy	7
North Macedonia	7
Russia	7
Taiwan	6
Greece	5
Turkey	5
Indonesia	4
Luxembourg	4
Macau	4
Malta	4
Mauritius	4
Montenegro	4
Serbia	4
Switzerland	4
Zimbabwe	4
British Virgin Islands	3

	# of Sin Stocks
Jordan	3
New Zealand	3
Poland	3
South Africa	3
Sri Lanka	3
Brazil	2
Croatia	2
Finland	2
Isle of Man	2
Mongolia	2
Nigeria	2
Pakistan	2
Austria	1
Benin	1
Bolivia	1
Botswana	1
Cambodia	1
Cayman Islands	1
Costa Rica	1
Cyprus	1
Czech Republic	1
Egypt	1
Estonia	1
Gibraltar	1
Guernsey	1
Hungary	1
Iceland	1
Ireland	1
Jamaica	1
Latvia	1
Mexico	1
Monaco	1
Norway	1
Palestinian Territories	1
Portugal	1
Puerto Rico	1
Singapore	1
Spain	1
Trinidad and Tobago	1
Venezuela	1
TOTAL	**833**

Appendix-B

#	Country	Christian	Muslim	Jewish	Atheist	Others	Dominant	Secondary
1	Algeria	0.20%	97.90%	0.00%	1.80%	0.10%	ISLAM	
2	Argentina	78.50%	1.00%	0.50%	18.90%	1.10%	CHRISTIANITY	
3	Australia	46.70%	3.20%	0.50%	42.40%	7.20%	CHRISTIANITY	ATHEIST
4	Austria	63.80%	8.30%	0.10%	22.40%	5.40%	CHRISTIANITY	
5	Azerbaijan	2.60%	97.30%	0.00%	0.10%	0.00%	ISLAM	
6	Bahamas	96.00%	0.10%	0.00%	3.10%	0.80%	CHRISTIANITY	
7	Bahrain	14.50%	70.30%	0.60%	1.90%	12.70%	ISLAM	
8	Bangladesh	0.20%	91.00%	0.00%	0.10%	8.70%	ISLAM	
9	Barbados	95.00%	1.00%	0.00%	2.00%	2.00%	CHRISTIANITY	
10	Belgium	64.20%	5.90%	0.30%	29.00%	0.60%	CHRISTIANITY	ATHEIST
11	Bermuda	90.00%	1.00%	0.00%	7.00%	2.00%	CHRISTIANITY	
12	Bolivia	93.90%	0.00%	0.00%	4.10%	2.00%	CHRISTIANITY	
13	Bosnia	45.90%	50.70%	0.30%	1.90%	1.20%	CHRISTIANITY	ISLAM
14	Botswana	79.10%	0.40%	0.00%	15.50%	5.00%	CHRISTIANITY	
15	Brazil	81.30%	0.80%	0.06%	14.20%	3.64%	CHRISTIANITY	
16	Bulgaria	70.00%	13.10%	3.33%	10.24%	3.33%	CHRISTIANITY	
17	Cambodia	0.40%	2.00%	0.00%	0.20%	97.40%	OTHERS	
18	Cameroon	66.30%	22.30%	0.00%	5.30%	6.10%	CHRISTIANITY	
19	Canada	53.30%	5.00%	0.90%	34.60%	6.20%	CHRISTIANITY	ATHEIST
20	Cayman Islands	75.30%	0.40%	1.00%	16.70%	6.60%	CHRISTIANITY	
21	Chile	79.40%	0.00%	0.10%	18.60%	1.90%	CHRISTIANITY	
22	China	5.10%	1.80%	0.00%	52.20%	40.90%	ATHEIST	OTHER
23	Colombia	81.50%	0.02%	0.20%	16.28%	2.00%	CHRISTIANITY	
24	Costa Rica	73.70%	0.00%	0.00%	23.20%	3.10%	CHRISTIANITY	
25	Croatia	89.40%	1.50%	0.30%	7.40%	1.40%	CHRISTIANITY	
26	Cyprus	95.00%	1.80%	0.00%	1.20%	2.00%	CHRISTIANITY	
27	Czech Republic	19.70%	0.00%	0.00%	76.70%	3.60%	ATHEIST	
28	Denmark	83.50%	4.10%	0.00%	11.80%	0.60%	CHRISTIANITY	
29	Ecuador	88.90%	0.10%	0.10%	8.60%	2.30%	CHRISTIANITY	
30	Egypt	10.00%	90.00%	0.00%	0.00%	0.00%	ISLAM	
31	Estonia	39.90%	0.20%	0.10%	59.60%	0.20%	ATHEIST	CHRISTIANITY
32	Faroe Islands	87.00%	0.10%	0.00%	3.70%	9.20%	CHRISTIANITY	
33	Fiji	64.40%	6.30%	0.00%	0.80%	28.50%	CHRISTIANITY	OTHER
34	Finland	67.70%	0.80%	0.00%	23.60%	7.90%	CHRISTIANITY	
35	France	54.00%	8.50%	2.50%	33.00%	2.00%	CHRISTIANITY	ATHEIST
36	Germany	47.40%	3.70%	0.00%	43.80%	5.10%	CHRISTIANITY	ATHEIST
37	Ghana	71.30%	19.90%	0.00%	1.10%	7.70%	CHRISTIANITY	
38	Gibraltar	83.60%	3.60%	2.40%	7.20%	3.20%	CHRISTIANITY	
39	Greece	81.90%	2.00%	2.00%	11.10%	3.00%	CHRISTIANITY	
40	Guemsey	95.00%	0.00%	1.00%	4.00%	0.00%	CHRISTIANITY	
41	Hong Kong	12.00%	4.20%	0.00%	54.30%	29.50%	ATHEIST	OTHERS
42	Hungary	81.00%	0.00%	0.10%	18.60%	0.30%	CHRISTIANITY	

43	Iceland	72.00%	0.40%	1.00%	24.20%	2.40%	CHRISTIANITY	
44	India	2.30%	14.20%	0.00%	0.05%	83.45%	OTHERS	
45	Indonesia	10.60%	87.40%	0.00%	0.00%	2.00%	ISLAM	
46	Iran	0.70%	98.50%	0.00%	0.30%	0.50%	ISLAM	
47	Iraq	1.00%	98.00%	0.00%	0.00%	1.00%	ISLAM	
48	Ireland	80.80%	1.60%	1.50%	14.60%	1.50%	CHRISTIANITY	
49	Isle of Man	71.00%	0.50%	0.20%	23.80%	4.50%	CHRISTIANITY	
50	Israel	1.90%	18.10%	75.10%	0.00%	4.90%	JUDAISM	
51	Italy	80.80%	4.90%	0.08%	13.40%	0.82%	CHRISTIANITY	
52	Ivory Coast	33.90%	42.90%	0.00%	19.10%	4.10%	ISLAM	CHRISTIANITY
53	Jamaica	72.20%	0.00%	0.00%	21.30%	6.50%	CHRISTIANITY	
54	Japan	1.10%	0.20%	0.00%	48.30%	50.40%	OTHERS	ATHEIST
55	Jersey	85.20%	0.10%	0.10%	14.20%	0.40%	CHRISTIANITY	
56	Jordan	2.10%	97.10%	0.10%	0.10%	0.60%	ISLAM	
57	Kazakhstan	18.50%	73.50%	2.20%	5.20%	0.60%	ISLAM	
58	Kenya	85.50%	10.90%	0.00%	1.60%	2.00%	CHRISTIANITY	
59	Kuwait	18.20%	74.60%	0.00%	0.00%	7.20%	ISLAM	
60	Latvia	55.80%	0.10%	0.00%	43.80%	0.30%	CHRISTIANITY	ATHEIST
61	Lithuania	89.80%	0.00%	0.00%	10.00%	0.20%	CHRISTIANITY	
62	Luxembourg	70.60%	2.30%	0.00%	26.70%	0.40%	CHRISTIANITY	ATHEIST
63	Macao	7.20%	0.20%	0.00%	15.40%	77.20%	OTHERS	
64	Macedonia	59.30%	39.30%	0.00%	1.40%	0.00%	CHRISTIANITY	ISLAM
65	Malawi	77.40%	13.80%	0.00%	2.10%	6.70%	CHRISTIANITY	
66	Malaysia	9.40%	66.70%	0.00%	0.70%	23.20%	ISLAM	
67	Malta	97.00%	0.20%	0.00%	2.50%	0.30%	CHRISTIANITY	
68	Mauritius	32.70%	17.30%	0.00%	0.60%	49.40%	OTHERS	CHRISTIANITY
69	Mexico	89.20%	0.00%	0.06%	10.60%	0.14%	CHRISTIANITY	
70	Moldova	92.70%	0.50%	0.50%	6.20%	0.10%	CHRISTIANITY	
71	Monaco	90.00%	0.40%	1.70%	7.70%	0.20%	CHRISTIANITY	
72	Mongolia	1.30%	3.20%	0.00%	40.60%	54.90%	OTHERS	ATHEIST
73	Montenegro	75.50%	19.10%	0.00%	3.90%	1.50%	CHRISTIANITY	
74	Morocco	0.06%	99.90%	0.00%	0.00%	0.04%	ISLAM	
75	Namibia	97.50%	0.30%	0.00%	1.90%	0.30%	CHRISTIANITY	
76	Netherlands	34.90%	5.00%	0.20%	54.10%	5.90%	ATHEIST	CHRISTIANITY
77	New Zealand	40.30%	1.30%	1.00%	50.40%	7.00%	ATHEIST	CHRISTIANITY
78	Nigeria	45.90%	53.50%	0.00%	0.00%	0.60%	ISLAM	CHRISTIANITY
79	Norway	74.40%	3.10%	0.00%	19.90%	2.60%	CHRISTIANITY	
80	Oman	6.40%	85.90%	0.00%	0.00%	7.70%	ISLAM	
81	Pakistan	1.00%	96.50%	0.00%	0.00%	2.50%	ISLAM	
82	Palestine	2.40%	97.60%	0.00%	0.00%	0.00%	ISLAM	
83	Panama	88.40%	0.00%	0.00%	10.10%	1.50%	CHRISTIANITY	
84	Paraguay	87.40%	0.00%	0.00%	6.30%	6.30%	CHRISTIANITY	
85	Peru	90.20%	0.00%	0.00%	6.80%	3.00%	CHRISTIANITY	
86	Philippines	85.30%	6.40%	0.00%	4.30%	4.00%	CHRISTIANITY	
87	Poland	86.30%	0.00%	0.00%	13.00%	0.70%	CHRISTIANITY	

88	Portugal	84.40%	0.50%	0.00%	14.50%	0.60%	CHRISTIANITY	
89	Puerto Rico	90.00%	0.00%	0.00%	8.00%	2.00%	CHRISTIANITY	
90	Qatar	13.70%	65.20%	0.40%	1.00%	19.70%	ISLAM	
91	Romania	95.30%	0.30%	0.00%	1.40%	3.00%	CHRISTIANITY	
92	Russia	73.30%	10.00%	2.20%	14.20%	0.30%	CHRISTIANITY	
93	Rwanda	95.90%	2.10%	0.00%	1.10%	0.90%	CHRISTIANITY	
94	Saudi Arabia	4.40%	93.70%	0.00%	0.00%	1.90%	ISLAM	
95	Senegal	2.70%	97.20%	0.00%	0.00%	0.10%	ISLAM	
96	Serbia	91.10%	3.10%	0.00%	5.80%	0.00%	CHRISTIANITY	
97	Singapore	18.90%	15.60%	0.00%	20.00%	45.50%	OTHERS	
98	Slovakia	69.00%	1.00%	0.00%	27.50%	2.50%	CHRISTIANITY	ATHEIST
99	Slovenia	75.00%	3.00%	0.00%	18.00%	4.00%	CHRISTIANITY	
100	South Africa	86.00%	1.90%	0.10%	6.60%	5.40%	CHRISTIANITY	
101	South Korea	24.25%	0.05%	0.00%	60.00%	15.70%	ATHEIST	
102	Spain	64.70%	2.40%	0.20%	23.80%	8.90%	CHRISTIANITY	
103	Sri Lanka	7.40%	9.70%	0.00%	0.10%	82.80%	OTHERS	
104	Sweden	59.00%	2.60%	0.10%	37.20%	1.10%	CHRISTIANITY	ATHEIST
105	Switzerland	67.30%	5.40%	1.30%	23.90%	2.10%	CHRISTIANITY	
106	Taiwan	4.20%	0.00%	0.00%	19.80%	76.00%	OTHERS	
107	Tanzania	63.10%	34.10%	0.10%	1.00%	1.70%	CHRISTIANITY	ISLAM
108	Thailand	1.20%	5.40%	0.00%	0.40%	93.00%	OTHERS	
109	Trinidad&Tobago	56.10%	5.00%	0.00%	8.20%	30.70%	CHRISTIANITY	OTHERS
110	Tunisia	1.00%	98.00%	0.00%	0.00%	1.00%	ISLAM	
111	Turkey	0.40%	98.00%	0.03%	1.20%	0.37%	ISLAM	
112	Uganda	84.50%	13.70%	0.00%	0.20%	1.60%	CHRISTIANITY	
113	Ukraine	83.80%	1.20%	0.10%	14.70%	0.20%	CHRISTIANITY	
114	UAE	12.90%	74.50%	1.00%	1.30%	10.30%	ISLAM	
115	United Kingdom	64.10%	4.40%	3.50%	24.20%	3.80%	CHRISTIANITY	
116	United States	71.30%	0.90%	2.10%	22.00%	3.70%	CHRISTIANITY	
117	Uruguay	57.00%	0.00%	0.00%	37.00%	6.00%	CHRISTIANITY	ATHEIST
118	Venezuela	84.20%	0.00%	0.00%	14.10%	1.70%	CHRISTIANITY	
119	Vietnam	7.10%	0.20%	0.00%	86.30%	6.40%	ATHEIST	
120	Zambia	95.50%	1.00%	0.00%	1.80%	1.70%	CHRISTIANITY	
121	Zimbabwe	85.30%	0.80%	0.00%	8.30%	5.60%	CHRISTIANITY	

Appendix-C

Overlapping Stocks	**Stock Number**	**Share in Sample**
Atheist & “Other Religions” stocks	160	19.21%
Christian & Atheist stocks	138	16.57%
Christian & Islamic stocks	22	2.64%

Christian & “Other Religions” stocks	5	0.60%
Total Sampled Sin Stocks	833	100%