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Will Good Deeds Redeem Your Sins?

A quantitative study of the effects of corporate charitable donations in a sin stock setting

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Abstract

Corporate social responsibility (CSR) has received increasing attention from the popular press in general, and academics and the investment community in particular, in the past decade. Corporations are increasingly integrating CSR as part of their business strategies. In sin stocks, CSR is particularly complex and although sin firms have been shown to engage more in CSR activities than non-sin firms there are still uncertainties to the actual effects of CSR in sin stocks. Some recent studies have suggested adverse effects of CSR in sin stocks. Nonetheless, these studies (and a majority of all studies on CSR in sin stocks) examines the effects of *overall* CSR performance, and we identify a lack of research on individual sub-categories of CSR. A major dimension of CSR is corporate philanthropy, with corporate donations being the most common form. In 2018, corporations in the US alone accounted for $20.05 billion in donations – a 5.4 percent increase from the previous year and an increase of over 40 percent compared to 2009. Despite the ample role of corporate donations in CSR, and a large body of literature related to CSR effects in sin stocks, there are to the best of our knowledge no studies on the effect of corporate donations in sin stocks. This study takes a quantitative approach to further the understanding of CSR in sin stocks, and specifically to shed light on the individual effects of the major CSR sub-category that is corporate donations. Using a sample of listed sin stocks from the North American and European markets, from the period 2009 to 2018, this study sets out to tests two main hypotheses: (1) Corporate donations are negatively related to abnormal returns in sin stocks, and (2) corporate donations decrease idiosyncratic risk in sin stocks. In line with our prediction, we find a clear negative relationship between donations and idiosyncratic risk in sin stocks, indicating that sin firm donations do in fact mitigate risk. We find no significant effects on abnormal returns from donations. The results imply that stakeholder perceptions of overall CSR performance differ from that of certain sub-activities in sin stocks, and thus future research could benefit from focusing on the effects of individual sub-activities rather than the effects of CSR performance as a composite. Further, the results imply that in order for donations to be value maximizing, they should be well grounded in- and aligned with stakeholder demands.

Keywords: Sin Stocks, CSR, Corporate Donations, Charity, Legitimacy, Stakeholder Sentiment

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1. INTRODUCTION

1.1. Background

In March of 2020, in the midst of the coronavirus crisis, the Bureau of Investigative Journalism (2020) reported how tobacco giant Philip Morris International donates fifty ventilators for use in intensive care units in Greek hospitals. The background was that there was a shortage of ventilators and the manufacturing facilities of this lifesaving breathing equipment was in a shutdown. So, the donation was very welcomed by Health Minister Vassilis Kikilias (ibid). However, after the donation the tobacco giant was slammed by campaigners for a “shameful publicity stunt” (Forbes, 2020). The reason for the harsh criticism was the double standards in Philip Morris International. The World Health Organization (WHO) had prior to the donation declared that smokers are more vulnerable to coronavirus because of their possibly already reduced lung capacity and increased contact between hands, lips, and mouth (Forbes, 2020). The question arose about how a company can pride itself on donating ventilators to charity while their core business is contributing to putting people in them? This is an example of how corporate social responsibility in general (and here charitable donations in particular) can be dualistic and complex for firms in industries that are considered morally or ethically questionable. This study takes a quantitative approach to further understand these complexities, and specifically investigates the effects of corporate charitable donations for sin firm risk and returns.

The public awareness of environmental, social and governance sustainability issues has increased substantially in the past decade. The number of participants in the public discourse surrounding the 17 sustainability goals set by the UN is growing. As such, more governments and companies have reacted to this change, resulting in more research that uses different theories trying to explain and predict the change in markets, such as legitimacy theory and institutional theory. Some argue that markets will eventually learn to develop business models that facilitate sustainability while at the same time increase profits for their shareholders (Porter and Kramer, 2011). Others voice their concerns that the private market will eventually crowd out social norms and values in civic life and move from a market economy to a market society and potentially hindering the set sustainability goals (Sandel, 2012). In any case, firms seem to be more engaged in sustainability in general than ever before. Corporate social responsibility (CSR) has received increasing attention from the popular press in general, and academics and the investment community in particular, and corporations are increasingly integrating CSR as part of their business strategies (Kim, Li and Liu, 2018).

A major dimension of CSR is corporate philanthropy. Peloza and Shang (2011) categorize CSR activities into three categories: philanthropy, business practices, or product related. Out of these three, they state philanthropy as the dominant category. Further, they conclude that the most common form of philanthropy is charitable donations that are tied to a commercial exchange (a.k.a. cause-related marketing). The next most common form is cash donations (different from the previous form since it is not tied to a sale). In 2018, corporate donations in the US alone composed $20.05 billion – a 5.4 percent increase from the previous year (Anon, 2019) and can be compared to $14.10 billion in 2009 (Giving USA Foundation, 2010).

The concept of “sin stocks” started becoming widespread in the 1980s, with the largest growth coming in the 21st century (Berry and Junkus, 2013). Sin stocks refers to companies that engage in activities that can be considered unethical or immoral due to their harm to society or the environment. There is no overall consensus or definition of what the activities that constitute a sin stock are. Investor sentiment can vary widely among different investor groups – what is considered a sin in one investor group can be considered a neutral or even a respected activity in the culture of another. For example, Fauver and McDonald (2013) find that there is a large disparity in valuation differences between sin- and non-sin stocks in G20 countries - implying that there is no universal homogeneity in what is considered a sin stock. A much-cited article by Hong and Kacperczyk (2009) calls the alcohol, tobacco, and gambling industries the “triumvirate of sin” since these industries are considered unethical or immoral in most social groups due to their addictive nature and undesirable social consequences of excessive consumption. Others include firearms and nuclear energy (e.g. Lam, Zhang and Jacob 2015; Grougiou, Dedoulis and Leventis 2016), adult entertainment, oil, or biotechnology (Cai, Jo and Pan 2012; Kim and Venkatachalam, 2011) to the list of sin stocks.

1.2. Problem

CSR in the context of sin firms can be complex. On the one hand, CSR could be expected to be of greater importance to sin firms than to non-controversial firms. This to rebalance the negative externalities from their businesses, and thereby improving the public perception of the firm, mitigating the consequences of negative investor screening. Research has also shown that sin firms are in fact more active in CSR disclosure than their non-sin counterparts (Grougiou, Dedoulis and Leventis, 2016). On the other hand, one might question if there are legitimacy effects of CSR in sin firms at all. Is it all possible to remedy the stigma of producing products or services that cause harm to the environment, society, or human beings? Vanhamme and Grobben (2009) find that firms routinely make CSR claims to counter negative publicity, and they argue that investors collectively know this. Therefore, CSR investments by sin stocks *could* be perceived as greenwashing or a sign of opportunistic behavior that is being covered. In this case, the cost of the CSR activities could outweigh the benefits, meaning that sin firms would have to sacrifice some profit for the social good.

Corporate donations are a major part of CSR (Peloza and Shang, 2011). Nonetheless, the effects of corporate donations are unexplored in a sin stock setting. There are several studies investigating the effects of CSR disclosures and CSR performance in sin stocks (see literature section below). However, these studies predominantly look at the *overall* CSR performance, usually in the form of a CSR score that takes into account the performance in each separate subcategory of CSR. There can, nonetheless, be an interest in breaking the CSR scores down into its constituents, investigating the effects of individual CSR activities. It is only reasonable to think that different forms of CSR sub-activities can carry more or less favorable perceptions. Donations to charity cannot necessarily be lumped together with other CSR activities, such as reducing CO2 emissions or improving labor policies. We identify a discrepancy between the major role of corporate donations in CSR and the lack of research focused to this activity in sin stocks, given the particular complexity of CSR in sin stocks.

To summarize: sin stocks engage more in CSR than their non-sin counterparts and charitable donations are a major dimension of CSR. Moreover, CSR in sin stocks is particularly complex and there are uncertainties even to whether CSR has a positive or negative effect for sin stocks (see the literature review for more on this). Notwithstanding, there are no (to the best of our knowledge) studies on the effect of charitable donations in sin stocks.

1.3. Purpose

To further the understanding of CSR effects in sin stocks, and more specifically the effects of charitable donations. To fulfil this purpose, we seek to answer the following research question:

- *In what ways do charitable donations impact financial performance in sin stocks?*

2. Literature Review and Hypotheses Development

This section will briefly summarize the theories and literature that constitute the foundation for this study. Based on the literature the hypotheses are developed and presented to answer our research question.

Legitimacy theory has been frequently used in the research field of accounting in the past decades, particularly in environmental- and social accounting research (Deegan, 2019). The central assumption of legitimacy theory is that organizations need to appear to be in conformance with community expectations (i.e be perceived as legitimate) in order to maintain success (ibid). The idea of a "social contract" between organizations and society is an integral part of which legitimacy theory has been developed (O'Donovan, 2002). Dowling and Pfeffer (1975) define legitimacy as "a condition or status which exists when an entity's value system is congruent with the value system of the larger social system of which the entity is a part".

Researchers applying legitimacy theory generally treat legitimacy as a dichotomous state – an organization can either be legitimate or illegitimate, and if deemed illegitimate the organization will have sanctions imposed upon it by society (Deegan, 2019). These sanctions can for example be difficulty securing resources, reduced demand for products and services, or restrictions on operations. This makes legitimacy and CSR in sin stocks particularly complex, since sin stocks are by the nature of their business deemed illegitimate. If legitimacy is in fact a dichotomous state, then sin stocks strive for legitimacy by engaging in CSR activities might be in vain. Even if the CSR performance in a sin stock is superior in all other areas than the core business, the firm might still be subject to sanctions by society. On the other hand, perhaps a sin stock could rebalance and over-compensate for their stigmatized business and reach a state of legitimacy in the public eye.

The legitimacy theory of CSR predicts that firms engage in CSR to communicate a positive image of the firm, in order to be subjected to lower social- and environmental risk and reduce the cost of capital. Being perceived as legitimate by the public will also broaden the investor base, reducing cost of capital further. There is a large body of literature showing how CSR performance, in general, can have favorable effects for different dimensions of firm performance, e.g. higher profitability (Flammer, 2015), higher firm valuations (Gyapong, Monem, and Hu, 2016), more earnings persistence (Gregory, Whitaker and Yan, 2016), higher credit ratings (Attig et al., 2013), better access to financial capital (Cheng et al., 2014) and better analyst forecast accuracy (Dhaliwa et al., 2012).

Sin stocks could be considered to have particularly great incentives for CSR disclosure, this to compensate for- and rebalance the harm to legitimacy already caused by the nature of their business. Research also confirms that sin stocks consistently have a higher cost of capital and are in fact more active in CSR disclosure than their non-sin counterparts (Grougiou, Dedoulis and Leventis, 2016; Sharma and Song, 2018). Furthermore, a large body of studies demonstrates how sin stocks have consistently outperformed markets in terms of abnormal returns (e.g. Lobe and Walkshäusl, 2016; Perez, Liston, and Soydemir; 2010; Lobe and Roithmeier, 2008; Hong and Kacperczyk, 2009). Nonetheless, there is no research supporting a relationship between the superior financial performance of sin stocks and the heightened CSR activity in these firms.

When it comes to the effect of CSR-activity on abnormal returns for firms in general, there is extensive research. There are findings suggesting positive effects (see Karim, Suh and Tang, 2016; Lipiec, 2016; Posnikoff, 1997; Yu, Du and Bhattacharya, 2013; Heal, 2005), negative effects (see Vance, 1975; Wright and Ferris, 1997) and findings suggesting that there are no effects at all (see Alexander and Buchholz, 1978; Teoh, Welsch and Wazzan, 1999; Margolis and Elfenbein, 2007; Reinhardt et al. 2008). McWilliams and Siegel (2000) suggest that these inconsistencies may be due to flawed empirical analysis. Bénabou and Tirole (2010) propose two different views of CSR. The first view considers CSR from a strategic "win-win" perspective where CSR is considered beneficial to society while at the same time promoting profits for the firm, by catering to the demands of investors, customers, employees etc. The other view considers CSR in terms of sacrificing some profits for the social good. The idea here is that when CSR is not grounded in stakeholders' demands or willingness to sacrifice profits for a higher cause, but instead motivated by board members' or management's desires for philanthropy, then value is typically not maximized. These two different views could also help understand the inconclusive results of previous studies. Regardless of inconsistencies in previous results, it is the viewpoint in this report that results for firms, in general, are not generalizable to a sin stock context. As mentioned previously in this report, CSR in a sin stock context is more complex than in non-sin stocks due to the stigmatized nature of the sin stocks core business, and therefore previous results are not considered transferable.

From a legitimacy perspective, enhanced CSR activity in sin firms can be explained as an economically rational means to rebalance and compensate for the harm to done to legitimacy by sin stocks core businesses. However, this phenomenon could also be understood from an institutional theory perspective. Institutional theory put more emphasis on the role of the overall organizational environment as the determinant of organizations and organizational practices, rather than solely on economic factors. DiMaggio and Powell (1983) describe three different mechanisms that lead to the isomorphic formation of organizational practices: coercive, mimetic, and normative isomorphism. They describe coercive isomorphism as formal types of pressures, such as compliance with laws, reporting standards, and governmental policies that are pressuring firms to homogenous practices. Normative isomorphism is described as a result of pressure to conform to industry practices, standards, norms and routines within a professional field. Mimetic isomorphism is a force driven by uncertainty and ambiguity. When there is significant uncertainty, organizations try to legitimize themselves by imitating or copying the practices of others. When it comes to CSR in sin stocks, there is a great ambiguity surrounding the area of legitimacy. This ambiguity could suggest that the CSR activities in sin stocks are in fact a result of mimetic isomorphism rather than a result of economically sound strategies and decisions.

There are previous studies looking specifically at CSR performance in sin stock settings (Ghouma and Hewitt 2019; Oh, Bae and Kim, 2017; Sharma and Song, 2018; Cai, Jo and Pan 2012; Lam, Zhang and Jacob, 2015). However, a majority of previous studies investigate the effects of overall CSR performance. To our best knowledge writing this report, there are very few studies breaking down the CSR score and investigating the effects of individual CSR activities, e.g. charitable donations, CO2 emission reductions, or labor policy improvements in a sin stock context. Charitable donations are a major dimension of CSR (Peloza and Shang 2011). There is some research on the impact of corporate donations on corporate financial performance for firms in general. Some suggest a slightly positive relationship (Orlitzky et al. 2003; Seifert et al. 2003; Peloza and Shang 2011) while others propose negative or no relationships at all (Friedman 1970; Galaskiewicz 1997; Seifert et al. 2004).

Ghouma and Hewitt (2019) studies the effects of CSR and the sub-activity of lobbying in sin stocks, being the sole study in our review looking at the effect of an individual sub-activity. In their study, they find indications of a negative relationship between CSR performance and abnormal returns for sin stocks. They speculate around the possibility that the market is aware of the damages caused to society by sin stocks, and that any CSR activity will not be able to repair it. On the contrary, Ghouma and Hewitt (2019) speculate that CSR investment of sin stocks could actually signal opportunistic activities that these firms are trying to camouflage, this resulting in an even more illegitimate public view of the firm and thus explaining the negative market effects of CSR. Vanhamme and Grobben's (2009) find that firms routinely make CSR claims to counter negative publicity, and they argue that investors know this. This, further supporting a hypothesis that CSR investments by sin stocks could actually be perceived as greenwashing or a sign of opportunistic behavior in sin firms. Ghouma and Hewitt (2019) call for further research into the relation between CSR and abnormal returns in sin stocks. To contribute to the previous research on the subject, this thesis breaks down the CSR score and investigates one of its major constituents individually – namely corporate donations. To test whether the adverse legitimacy effect suggested by Ghouma and Hewitt (2019) is present also for corporate donations, the following hypothesis is tested:

H1: Corporate donations are negatively related to abnormal returns in sin stocks.

Concerning the risk-mitigating effect of CSR in general, Godfrey (2005) suggest that good CSR engagements can provide a firm with an insurance-like protection to be less vulnerable to negative events. Godfrey et al. (2009) propose that certain types of CSR activities can generate a moral capital that in turn can help temper punitive sanctions from stakeholders due to negative publicity. It is, however, their notion that his moral capital has little to do with generating economic value. Instead, they argue that CSR activities can provide an insurance-like mechanism that *preserves* – rather than *generates* – financial performance. A large body of literature similarly finds support for risk mitigating effects of CSR in the stock market (see e.g. Lee and Faff, 2009; Mishra and Modi, 2013; Chen, Hung and Lee, 2018; Price and Sun, 2017). There is a greater consensus in the literature regarding risk effects than there is regarding effects for returns. A predominant part of the literature proposes risk mitigating effects of CSR, while (as mentioned above) the literature regarding returns is more inconclusive. Nonetheless, the literature mainly investigates the risk effects of overall CSR performance, and there are few studies looking specifically at the effects in sin stocks.

Some previous studies investigate CSR effects in sin stock settings. Oh, Bae and Kim (2017) test the effect of CSR advertising intensity on idiosyncratic risk for controversial firms. Their findings indicate that if a firm in a sinful industry increases the advertising intensity about their good CSR engagement, this firm will face a greater risk in the stock market. They make the conjecture that this adverse risk effect is due to an inverse legitimacy effect of CSR advertising. Jo and Na (2012) propose and test what they call a risk-reduction hypothesis for controversial industries. Interestingly, their findings support that CSR engagement reduces firm risk, and that this risk reduction effect is more significant for companies in controversial industries. Based on the conclusive prior results of risk mitigating effects of CSR for firms in general, and Jo and Na's (2012) results of particularly significant risk mitigating effects for controversial firms, it is the prediction of this study that this effect will be consistent also for the individual CSR subcategory of corporate donations. This, in spite of Oh, Bae and Kim's (2017) indication of an adverse effect of CSR advertising. To test this prediction the following hypothesis is formed:

H2: Corporate donations decrease idiosyncratic risk in sin stocks.

3. METHODOLOGY

This chapter will present and motivate the choices and assumptions related to the methodology of this study. The first part of the chapter presents the sample selection. The second part presents the choice and definitions of variables. The third part describes the data management process. The fourth part presents descriptive statistics. Section five presents the matching process, and the sixth and last section presents our main regression model.

3.1. Sample Selection

The sample is in the form of panel data, stemming from North American and European markets between year 2009 to 2018. We chose to exclude the previous years due to the financial crisis in 2008. Although the global market experienced to some degree abnormal volatility at the beginning of 2009, for the majority of 2009 the volatility levels had returned to what could be considered normal (Schwert, 2011). Therefore, 2009 is included in the sample although this might create noise to our results. In our robustness analysis we take this into consideration and drop the year 2009 to validate our results. The result is robust and can be seen in Appendix 1. The primary reason why this study includes both North America and Europe is due to data availability. Data availability for corporate donations is very limited (explained more in detail in the following section). Therefore, in order to expand our sample, we have included two different markets – North American and European. This may be problematic based on the results provided by Fauver and McDonald (2014). They highlight that the stigmatized association the market has with sin stocks is relative - implying that the degree of how ‘sinful’ an industry is varying across markets in different geographical regions due to disparity in social norms, values and governmental imposition. This disparity affects how sin stocks are valued on the market by investors. For example, the social norms of the U.S. speak more of disapproval towards tobacco companies than the social norms of China. Moreover, the U.S government allocate relatively more resources on restrictions and regulation on tobacco companies than the Chinese government. The Tobin’s Q of tobacco companies in the US is 8 percent lower than their control group, whereas in China, there is no statistical difference between tobacco companies and the control group (Fauver and McDonald, 2014).

Similar results are provided by Durand et al. (2013) who use a sample of stocks in the seven biggest markets in the pacific-basin. They conclude that investors in Australia and New Zealand are less likely to hold sin stocks. Conversely, investors in Japan and South Korea are more likely to hold sin stocks. Moreover, Hong and Kacperczyk (2009) initially focus on U.S firms but include European and Canadian firms in their robustness analysis. They argue that the sentiment of European and Canadian investors is similar to U.S investors towards sin stocks except when it comes to the defense industry. In order to minimize noise in our results due to sentiment differences between markets, our sample includes firms from these three markets which have shown to have similar sentiments. Further, as described in the definition of the variable Sin, this study focuses exclusively on those industries that are most widely accepted as sin stocks over different markets. This reducing the problem of different market sentiments further.

3.1.1. Screening Procedure of Sample Selection

Step 1. The initial screening is done in S&P capital IQ. This screening is done by looking at how many companies are or have been publicly traded in North America and Europe (for a complete list of stock exchanges included, see Appendix 2) in the period between 2009-2018 within the chosen industries (motivation of industry choices follows in variable definitions and matching process sections). Hence, we only look at the number of firms and not the number of years. This gives us a sample of 377 sin stocks and 1633 non-sin stocks.

Step 2. The secondary screening is applied in Thomson Reuters ASSET4 for data of donations and Bloomberg for financial information of all 377 sin stocks and 1633 non-sin stocks. This screening is done by looking at the reported variables of the existing firm years for all firms in our initial screening. All firms in our sample need to be reported in both Thomson Reuters ASSET4 and Bloomberg database. We find that 321 of the initially observed sin stocks and 1279 non-sin stocks is not reported within the ASSET4 database. This in effect decreases the number of observed sin stocks from 377 to 56 and non-sin stocks from 1633 to 354 due to missing information. We recognize the fact that this database was created in 2003 and later acquired by Thomson in 2009 (Thomson, 2018). The database reports information about 7000 companies as of 2018 (Thomson, 2018) and 6000 companies in 2017 (Thomson, 2017). We also discovered that firms with an all-time-high market capitalization below $1 billion in our sample were almost nonexistent in the ASSET4 database. Our number of firm observations can be compared to Ghouma and Hewitt (2019) who compile panel data based on the ASSET4 database. They sample firms within industries of tobacco, alcohol, and gambling between 2013-2015 where their variable of interest is the aggregate CSR score. Their final sample consists of 153 yearly observations over the period of 2013-2015, which implies approximately 51 sin stocks. By comparison, the substantial drop from 377 to 56 sin stocks in this study has also been experienced by similar prior studies using the same source of ESG data.

Step 3. In the last step we implement panel data restrictions that all firms in the sample need to have at least a 4-year observable period in all variables in our model within the period of 2009 to 2018.[1] Moreover, the period in each firm needs to be observable consecutively. This means that both delisted

[1] Usually, panel data require at least 3 observations per individual (Brooks, 2008). However, to be able the to lag the variable of interest by one year, and keep still keep three observations per individual, a minimum requirement of 4 firm-year observations per individual is set.

firms and new entrance firms can be represented in our sample. By cross-referencing ASSET4 and Bloomberg database, 53 sin stocks and 332 non-sin stocks are left in our sample which compiles of 1925 observed firm years in total. This gives us the opportunity to find 53 non-sin stocks that will act as our control group (i.e., peers) among the collected 332 non-sin stocks. Before we build our control group, we need to have a uniform currency for all variables that are obtained from financial statements. By taking the financial reported currency-to-USD exchange rate from Bloomberg for each fiscal year, we converted all financial variables to USD.

Table 3.1 Screening Procedure of Sample Selection

	GICS-Class	GICS-Code	no. Firms after Step 1	no. Firms after Step 2	no. Firms after Step 3
Weapons	Conventional weapons*	2010101050	7	7	7
	Light weapons and ammunition*	2010101060	9	2	2
	Industrial conglomorates	20105010	54	36	36
	Industrial Machinery	20106020	548	122	109
Gambling	Casinos & Gaming*	25301010	179	27	24
	Hotels, Resorts and Cruise Lines	25301020	242	49	42
	Leisure facilities	25301030	111	35	34
Tobacco	Tobacco*	30203010	53	6	6
	Agricultural products	30202010	131	20	20
	Packaged food	30202030	423	33	33
Alcohol	Beer, Ale and Malt beverages*	30201010	47	5	5
	Distillers and Vintners*	30201020	82	9	9
	Candy, Nut and Confectionary	3010103030	3	1	1
	Bottled Water	3020103010	46	14	14
	Juices	3020103040	23	4	4
	Manufactured ice	3020103050	1	0	0
	Non-Carbonated drinks	3020103060	25	20	19
	Soda and Other Carbonated drinks	3020103070	26	20	20
	Total Sin Stocks		377	56	53
	Total Non-sin Stocks		1633	354	332

This table shows the number of firms per GICS industry at each stage of the sample selection process. Sin stock industries are noted with (*).

3.2. Variable Selection and Definitions

Dependent variables: In order to test the hypotheses of this study, two outcome variables are defined. These variables are stated and defined as follows:

1. **Alpha (%)**: This variable is a proxy for market performance in terms of abnormal return. Following the example of Oh, Bae and Kim (2017), abnormal return is estimated from the Fama, French and Carhart (Carhart, 1997) four-factor model:

$$R_{i,t} - R_{f,t} = \alpha_{i,t} + \beta_1(R_{m,t} - R_{f,t}) + \beta_2 SMB_t + \beta_3 HML_t + \beta_4 MOM_t + \varepsilon_{i,t} \qquad \text{(Eq. 3.1)}$$

The Fama, French and Carhart (1997) four-factor model adds, above the market risk premium, factors for size, value, and momentum. Small minus big (SMB_t) is the size factor at time t, accounting for the spread in daily returns between small- and large-cap firms. High minus low (HML_t) is the value factor at time t, accounting for the spread in daily returns between high book-to-market (value) firms and low book-to-market (growth) firms. Momentum at time t (MOM_t) accounts for the tendency of share price to continue rising if it is going up and continue decreasing if it is going down. Further, $R_{i,t}$ is the stock return for firm i at time t, $R_{f,t}$ is the risk-free rate at time t, and $R_{m,t}$ is the market return at time t.

The model expands on the capital asset pricing model (CAPM). CAPM revolutionized the field of finance, but a number of empirical studies have revealed various drawbacks with the model (Sattar, 2017). The Fama and French three-factor model was developed as a response to the drawbacks in CAPM, and a paper by Sattar (2017) provides support for the Fama French theory suggesting more explanatory power of the three-factor model over the CAPM model as beta alone can not predict much of the variation in cross-section return. Carhart (1997) adds another factor on Fama and French's three-factor model, and a study by Evbayiro-Osagie and Osamwonyi (2017) supports the Carhart theory suggesting even more explanatory power in the four-factor than the three-factor model in explaining returns in the market.

For each firm, daily US and EU stock returns were retrieved from Bloomberg terminal. All other variables in our four-factor model were retrieved from Fama and French's data library.[2] It's important to note that the factors from North American markets and European markets are different. Hence, we only use European factors for European firms and North American factors for North American firms when we conduct our four-factor model to sample our Alpha. Each Alpha is estimated yearly based on daily returns. We bootstrap our regression for each year to later sample each alpha for each year per observed firm. The same methodology applies to our second dependent variable, idiosyncratic risk.

[2] The data base is accessible through the Tuck School of Business at Dartmouth: http://mba.tuck.dartmouth.edu/pages/faculty/ken.french/data_library.html#Research (Accessed June 3, 2020)

2. **IR**: This variable is a proxy for performance vulnerability in terms of idiosyncratic risk (IR). Oh, Bae and Kim (2016, p. 648) writes that idiosyncratic risk represents "[...] *the risk that is specific to an individual firm after accounting for risks that are due to the market, characteristics of stock, and momentum*". Following the example of Oh, Bae and Kim (2017) and Luo and Bhattacharya (2009), IR is mathematically defined as the variance of the residual term from the regression of Equation 3.1. The definition is as below, where $R^2_{i,t}$ is the explained variance from the four-factor model in Equation 3.1.[3]

$$IR_{i,t} = ln\left(\frac{1 - R^2_{i,t}}{R_{i,t}}\right) \quad \text{(Eq. 3.2)}$$

Explanatory variables:

1. **Donations/Rev (%):** The variable is defined as the donations-to-revenue ratio (expressed in percentage form). Donation data has been retrieved from Thomson Reuters database, where Thomson Reuters (2020) defines donations as *"the amount a firm has donated to charity, institutions, sponsorships and/or other non-political entities. This does not include lobbying expenses or any other political contributions"*. Donations are reported as the aggregated annual donations per fiscal year. Thomson Reuters gathers donation data through each firm's own channels, such as annual reports, sustainability reports, the firm's website, and other disclosures. In Thomson Reuters there are very few observations where the reported donations are zero. There is either a donated amount or there is no data regarding donations. For this study, the assumption is made that for those firm-year observations where Thomson Reuters reports that there is no data on donations, the annual donations are assumed to be zero for that firm and year. The reasoning behind this assumption is that firms do not generally express explicitly when they have not made any donations, whilst they are very prone to do so when they have. Revenue data has been retrieved from Bloomberg Terminal and is defined as the annual *"amount of sales generated by a company after the deduction of sales returns, allowances, discounts, and sales-based taxes"*.

2. **Sin:** This is a dummy variable stating whether the firm is a sin firm or not. There are multiple different views among researchers about what constitutes as a sin stock. There is, however, a consensus that tobacco, alcohol and gambling fit the definition of sin stock due their addictive nature and their destructive implications if used in excess (Hong and Kacperczyk, 2009; Kim and Venkatachalam, 2011; Fauver and McDonald, 2014; Sharma and Song, 2018). Recently, other industries have been included in the definition of a sin stock. These industries are for

[3] See Bali et al. (2005) for a more in-depth review of idiosyncratic risk measurements.

example defense, nuclear energy, gas and oil, due to SRI funds' active exclusion of these industries from their portfolio and due to their destructive implications on society and the environment in large (Lobe and Walkshäusl, 2016; Kim et al. 2017; Hmaittane et al. 2019). However, the public perception of these other industries is more unclear. For this reason, and following the reasoning of prior studies (see Gouma and Hewitt 2019; Hong and Kacperczyk 2009), this study categorize sin industries as alcohol, tobacco, and gambling due to the relative clarity on the widespread public perception of these industries as sinful.

In addition to these three, this report follows the reasoning of Grougiou, Dedoulis and Leventis (2016) and also includes firearms since *"firearm manufacturers and retailers are increasingly considered as the facilitators of tragedies relating to small firearms misuse"* (Grougiou et al. 2016, p.906). Many prior studies follow the Fama and French (1997) SIC code system to classify sin stocks. However, as Cai, Jo and Pan (2012) conclude, the Fama French classification scheme does not distinguish gambling stocks from hotels and other entertainment stocks. Therefore, this report instead uses the Global Industry Classification System (GICS) to identify sin stocks. If a firm is included in any of the following GICS categories it is defined as a sin stock: *Conventional weapons, Light weapons and ammunition, Casinos and gaming, Tobacco, Beer, ale, and malt beverages* or *Distillers and vintners* (0=non-sin, 1=sin). The sin variable is further broken down into industry dummies for each sin industry as follows:

2a. Alcohol: This is a dummy variable stating whether or not the firm is included in the GICS alcohol classifications, i.e Beer, ale and malt beverages or Distillers and vintners (0=no, 1=yes).

2b. Tobacco: This is a dummy variable stating whether or not the firm is included in the GICS Tobacco category (0=no, 1=yes).

2c. Gambling: This is a dummy variable stating whether or not the firm is included in the GICS Casinos and gaming category (0=no, 1=yes).

2d. Weapons: This is a dummy variable stating whether or not the firm is included in the GICS firearms categories, i.e Conventional weapons or Light weapons and ammunition (0=no, 1=yes).

3. **SINxDON:** This is the interaction between the variables *Sin* and *Donations/Rev.* The variable is defined as *Sin* multiplied with *Donations/Rev.* Consequently, there are interaction sub-variables as follows:

3a. ALCOxDON: Defined as *Alcohol* multiplied by *Donations/Rev.*

3b. TBCOxDON: Defined as *Tobacco* multiplied by *Donations/Rev.*

3c. GAMBxDON: Defined as *Gambling* multiplied by *Donations/Rev.*

3d. WPNSxDON: Defined as *Weapons* multiplied by *Donations/Rev.*

Control variables: Since we explore the effects that sin firm donations may have on idiosyncratic risk and risk-adjusted abnormal returns (alpha), we include control variables that are strong indicators of growth, profitability, size and risk (Ferreira and Faux, 2007; Luo and Bhattacharya, 2009; Sharma and Song, 2018; Ghouma and Hewitt, 2019):

1. **Growth (%):** Growth is calculated as the revenue compound annual growth rate (CAGR) over the previous five years (or most available for a small number of exceptions), following the example of Ghouma and Hewitt (2019). Revenue data is retrieved from Bloomberg Terminal and defined as "all sales generated by a company after the deduction of sales returns, allowances, discounts and sales-based taxes". The variable is expressed in percentage form.
2. **D/E:** This is the debt-to-equity ratio, defined as (short- and long-term debt / shareholder equity) * 100. Data is retrieved from Bloomberg Terminal. The variable is expressed as a fraction. This control variable is intended to capture the leverage (i.e. financial risk) that affects idiosyncratic risk. The proxy for leverage used by Luo and Bhattacharya (2009) and emphasized by Ferreira and Faux (2007) is slightly different, which is debt divided by total assets.
3. **ROA (%):** Return on assets is an indicator of how profitable a company is relative to its total assets (here expressed in percentage form). It is defined as (Trailing 12-month net income / Average total assets) * 100, where the average total assets are the average of the beginning balance and the ending balance. Data is retrieved from Bloomberg Terminal. This control variable is intended to capture the effect of profitability (Ferreira and Faux, 2007; Luo and Bhattacharya, 2009).
4. **Reinvestment:** This variable is defined as capital expenditures (capex) divided by total assets. Capex data is retrieved from WRDS COMPUSTAT where the definition is "the amount spent for the construction and/or acquisition of property, plant, and equipment". Total asset data is retrieved from Bloomberg Terminal where total assets are defined as "the total of all short and long-term assets as reported on the Balance Sheet". This control variable is intended to capture the degree of operational investments for future growth and is also used by Sharma and Song (2018) when investigating the effect of CSR performance by sin stocks on firm value.
5. **Operating_lev:** This variable represents operating leverage, expressed as gross profits divided by EBITDA. EBITDA is retrieved from WRDS COMPUSTAT and is defined as the "*sum* of net sales *minus* cost of goods sold *minus* selling, general & administrative expense." Gross profits are retrieved from WRDS COMPUSTAT and are defined as "net sales minus cost of goods sold. This variable is intended to expand the scope of financial risks (control variable 2) to capture the yield and operational risks related to fixed costs.

6. **Debt/ebitda:** This is the debt-to-EBITDA ratio. Debt data is retrieved from WRDS COMPUSTAT and defined as "interest-bearing obligations due after the current year [...] excluding accounts payable/creditors due after one-year, accrued interest on long-term debt, customers' deposits on bottles, cases, and kegs, and deferred compensation". For EBITDA, see number 5 above. This variable is intended to expand the scope of financial risk (variable 4) - to capture the risk involved by cash-on-hand in relation to interest bearing debt.
7. **Log_mktcap:** The logarithm of market capitalization, where market capitalization data is retrieved from Bloomberg Terminal and defined as "common shares outstanding multiplied by the month-end price that corresponds to the period end date". This variable is intended to capture the size of the firm (Ferreira and Faux, 2007; Luo and Bhattacharya, 2009; Edmans, 2011).

3.3. Data Management

Due to the nature of the sample selection, the dataset overall is very complete. As described above, one of the criteria for inclusion into the sample of this study is that the firm needs to have CSR-data available in the Thomson Reuters database. Generally, the firms assigned with a CSR-score in Thomson Reuters are well established, large, and listed firms. Consequently, data availabilty for these firms are good. However, there are a few minor exceptions. The variable *Growth* is missing 2 values, i.e. 0.3% of the values are missing. The variable *D/E* is missing 13 values, i.e. 1.7% of the values are missing. Since these are the only two variables missing data, the rows are still considered valuable to to study. Therefore, a "carry forward"-imputation is applied to the missing values, i.e. each missing value is replaced with the previous (or the succeeding if previous unavailable) year's value. A full table of missing values can be seen in Appendix 3. As a robustness check, the main regressions of this study are also run without imputation for missing values. The results can be found in Appendix 4 and they can be considered robust.

In order to adjust for erroneous or misleading observations, winsorizing has been applied to some variables. Winsorizing variables are considered favorable over dropping since the number of observations is already limited due to data availability (see previous section on sample selection). As shown in Table 3.2, the variable *Growth* has a maximum value of 589.8 percent while the 99^{th} percentile is 94.2 percent. As defined in the previous section, the *Growth* variable is calculated as the revenue CAGR of the previous 5 years. Thus, if the reported revenue for the first of these 5 years is close to zero or very low (which is sometimes the case for recently started firms), then the 5-year CAGR will be misleadingly high. After closer scrutiny of the top outlying values, it could be concluded that this was the case for the most extreme observations. Therefore, to adjust for these misleading growth rates, winsorizing at the 99^{th} percentile is applied, replacing all values above the 99^{th} percentile with the 99^{th} percentile value. Looking at the lower bound of *Growth* in Table 3.2, one might also suspect outliers

Table 3.2 Percentiles Before Outlier Management

VARIABLES	(1) Min	(2) P1	(3) P5	(4) P25	(5) P50	(6) P75	(7) P95	(8) P99	(9) Max
Alpha (%)	-0.397	-0.262	-0.137	-0.039	0.023	0.083	0.206	0.359	0.633
IR	-1.509	-0.846	-0.522	0.037	0.443	0.918	1.672	2.104	2.644
Donations/Rev (%)	0.000	0.000	0.000	0.000	0.000	0.089	0.336	0.936	7.676
Sin	0	0	0	0	1	1	1	1	1
Growth (%)	-100.000	-22.626	-8.820	0.338	4.031	8.391	31.595	94.237	589.808
D/E	0.000	0.000	0.011	0.488	0.965	1.833	10.519	53.248	2131.513
ROA (%)	-22.478	-11.453	-1.676	2.863	5.868	9.862	21.313	31.724	41.460
Reinvestment	0.000	0.000	0.006	0.018	0.032	0.049	0.130	0.501	11.841
Operating_lev	-10526.000	-6.002	1.354	2.021	2.661	3.598	7.168	16.880	187.896
Debt/ebitda	-6.625	0.000	0.002	1.238	2.239	3.241	6.696	11.686	15.355
Log_mktcap	1.905	2.383	2.857	3.361	3.840	4.309	5.094	5.340	5.427
Alcohol	0	0	0	0	0	0	1	1	1
Tobacco	0	0	0	0	0	0	1	1	1
Gambling	0	0	0	0	0	0	1	1	1
Weapons	0	0	0	0	0	0	1	1	1

This table shows the percentile ranks of collected data for each variable, where column (1) is the minimum value, column (2) is the first percentile, column (3) is the fifth percentile and so on until column (9) ends with the maximum value.

with a minimum value of -100 and a 1st percentile of -22.63. However, scrutiny of the lower bound found no signs of error with these values.

The variable *Reinvestment* shows a maximum value of 11.841 while the 99th percentile value is 0.501. The top extreme values can be derived from one and the same firm, and scrutiny could confirm the falseness of these unreasonably high values. Therefore, winsorizing with replacement at the 99th percentile is applied. *Operating_lev* shows a minimum value of -10526 and a maximum of 187.896, with 1st percentile value of -6.002 and a 99th percentile value of 16.880. The underlying reason for these outlying values is gross profits close to zero. When calculating this variable, gross profits close to zero have large and misleading effects for the outcome of the value (see variable definitions for details). Thus, this variable is winsorized with replacement at the 1st and 99th percentiles. Table 3.2 further shows extraordinary maximum values for the variable *D/E*, with a maximum value of 2131. After scrutiny it can be concluded that the extreme upper values are erroneous, and winsorizing with replacement above the 99th percentile is applied.

Looking at the independent variable, *Donations/Rev*, the maximum value is 7.68 percent and the 99th percentile is 0.94 percent. All the extreme values in this variable are represented by one firm and there are no indications that they are erroneous in any way. On the contrary, these observations are considered interesting and important for this study. Therefore, no adjustments are made to this variable. As a robustness check, the main regressions of this study are also run without adjusting for outliers at all (see Appendix 5), as well as with trimming winsorizing, i.e. excluding the extreme values instead of replacing them at said percentiles (see Appendix 6). The results can be considered robust. The results in Appendix 6 shows somewhat weaker results. This, however, can be expected from exclusion of all observations above or below certain percentiles. A trimming method leads to exclusion not only of outliers, but also of non-erroneous and highly significant observations above or below certain percentiles. These observations can be particularly significant for the results, and for this reason it is the perception in this study that winsorizing with imputation gives the most true reflection of reality.

3.4. Descriptive Statistics

Panel A of Table 3.3 shows descriptive statistics for each variable after corrections for missing values and outliers. The variable *Donations/Rev* stands out due to its high skewness and kurtosis, with values of 12.43 and 178.62 respectively. The high skewness and kurtosis values can be derived from four remarkably high firm-year donation observations by the same firm. This firm's annual donations range from 4.7 to 7.6 percent of revenues, which can be compared to the mean of 0.103, the median of 0.000 percent, and the 99th percentile value of 0.936 percent. However, as concluded in the outlier section above there is nothing erroneous about these values. It is a firm distinguishing itself through substantial donations. Consequently, these observations are highly interesting for the purpose of this study and are therefore not excluded, resulting in the skewness to the right and the sharp peak (due to the increase in overall variable range) in the distribution curve. Exclusion of these extreme firm-year observations would largely remedy the skewness in the distribution, though leaving kurtosis in the variable still high (around 15 even with exclusion). This, indicating a sharp peak in the distribution curve and a generally high concentration around the median and mode (both equal to zero) in the variable data.

Panel A further shows high kurtosis for the variables *Growth* (17.328), *D/E* (29.800), Reinvestment (28.804), *Operational_lev* (15.172), and *Debt/ebitda* (9.175), indicating sharp peaks in the distribution curves and high concentrations in the data of these variables. The *D/E* variable includes ten all-equity firms constituting a total of all 31 firm-year observations. The *D/E* data has an overall range stretching from 0 to 50, but is highly concentrated between ratios of 0 to 3. Panel B of Table 3.3 shows a negative correlation of 0.442 between the control variable *Log_mktcap* and the dependent variable *IR*, indicating that firms with higher market capitalization tend to have lower idiosyncratic risk. *Log_mktcap* has a relatively high correlation to the dependent variable, though no significant correlation to the other predictors in the model. Hence, *Log_mktcap* is expected to increase the explanatory power of the model. Further, there are positive correlations between the variables *Sin* and *Alcohol* and between *Sin* and *Gambling* of 0.434 and 0.469 respectively. These correlations do not, however, pose any problems since none of these variables are included in the same regression models.

Although not presented in the tables (we choose to present the constituents of the interaction variables rather than presenting each interaction individually), there is a high correlation between *SINxDON* and *Donations/Rev*, equal to about 97%. Naturally, it is expected that the interaction variable is highly correlated with its source, but 97% is remarkably high. Intuitively, this may be perceived as an indication that the peers to the sin stocks donate little or not at all and that sin stocks represent almost all of the donations. However, this is not the case. The number of sin stocks that have donated an amount above zero is equal to 33 which is 31% of the total of 106 firms in the sample. The number of non-sin stocks that have carried out donations is equal to 27 which is 25% of the total sample of 106 firms. If we look at the number of observations (i.e., years), all sin stocks in our sample have donated 196 times combined which is 26% of the total 744 observations. And finally, non-sin stocks have donated 168 times combined which is 23% of the total 744 observations. Hence, donations carried out by sin stocks are not over-represented in our sample. But why the high correlation one might ask. We believe it stems from that corporations that do donate, sin stocks or not, donate similar amounts in relation to their revenue, and have relatively consistent donation policies.

Table 3.3 Descriptive Statistics and Correlation Matrix after Outlier Management

PANEL A: Descriptive Statistics	(1) N	(2) Mean	(3) Median	(4) SD	(7) Skewness	(8) Kurtosis
Alpha (%)	744	0.026	0.023	0.108	0.553	5.818
IR	744	0.498	0.443	0.661	0.279	2.943
Donations/Rev (%)	744	0.103	0.000	0.451	12.426	178.623
Sin	744	0.500	0.500	0.500	0.000	1.000
Growth (%)	744	6.637	4.031	17.120	1.394	17.328
D/E	744	2.820	0.965	7.212	5.044	29.800
ROA (%)	744	7.074	5.868	7.347	0.896	5.929
Reinvestment	744	0.047	0.032	0.064	4.660	28.804
Operating_lev	744	3.131	2.661	2.544	2.178	15.172
Debt/ebitda	744	2.556	2.239	2.208	1.814	9.175
Log_mktcap	744	3.862	3.840	0.664	0.140	2.620
Alcohol	744	0.159	0.000	0.366	1.869	4.494
Tobacco	744	0.073	0.000	0.260	3.295	11.856
Gambling	744	0.180	0.000	0.385	1.665	3.772
Weapons	744	0.089	0.000	0.285	2.893	9.370

PANEL B: Correlation Matrix	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)
(1) Alpha (%)	1.000														
(2) IR	0.116	1.000													
(3) Donations/Rev	-0.036	0.054	1.000												
(4) Sin	0.071	0.103	0.065	1.000											
(5) Growth (%)	0.144	0.179	-0.119	0.173	1.000										
(6) D/E	0.034	0.051	-0.034	0.064	-0.018	1.000									
(7) ROA (%)	0.003	-0.031	0.032	-0.061	-0.013	-0.003	1.000								
(8) Reinvestment	0.021	0.033	-0.038	-0.012	0.095	0.021	0.100	1.000							
(9) Operating_lev	0.046	0.108	-0.021	0.140	0.185	-0.020	-0.184	0.009	1.000						
(10) Debt/ebitda	0.056	0.001	-0.034	0.213	0.059	0.275	-0.396	0.053	0.160	1.000					
(11) Log_mktcap	-0.046	-0.442	0.036	0.029	-0.064	-0.063	0.227	-0.001	-0.149	-0.102	1.000				
(12) Alcohol	0.058	-0.041	-0.025	0.434	-0.051	-0.118	-0.070	-0.128	0.011	0.065	0.138	1.000			
(13) Tobacco	-0.017	-0.042	-0.003	0.280	-0.056	0.157	0.281	0.134	-0.132	-0.084	0.295	-0.121	1.000		
(14) Gambling	0.063	0.246	0.151	0.469	0.337	0.137	-0.092	0.108	0.173	0.328	-0.243	-0.203	-0.131	1.000	
(15) Weapons	-0.019	-0.060	-0.056	0.312	-0.034	-0.065	-0.149	-0.124	0.118	-0.075	-0.069	-0.135	-0.087	-0.146	1.000

Table 3.4 Panel Descriptives

Variable	Mean	Std.Dev.	Min	Max	Observations	Variable	Mean	Std.Dev.	Min	Max	Observations
Alpha(%)						**D/E**					
overall	0.026	0.108	-0.397	0.633	N = 744	overall	2.820	7.212	0	49.995	N = 744
between		0.050	-0.094	0.242	n = 106	between		7.345	0	49.995	n = 106
within		0.099	-0.386	0.522	T-bar = 7.019	within		3.543	-20.277	39.692	T-bar = 7.019
IR						**ROA** (%)					
overall	0.498	0.661	-1.509	2.644	N = 744	overall	7.074	7.347	-22.478	41.459	N = 744
between		0.510	-0.547	1.895	n = 106	between		5.799	-7.145	23.633	n = 106
within		0.445	-0.736	2.156	T-bar = 7.019	within		4.584	-12.827	43.472	T-bar = 7.019
Log_mkcap						**Reinvestment**					
overall	3.862	0.664	1.905	5.427	N = 744	overall	0.047	0.064	0	0.478	N = 744
between		0.617	2.432	5.345	n = 106	between		0.066	0.000	0.478	n = 106
within		0.158	3.168	4.451	T-bar = 7.019	within		0.027	-0.207	0.241	T-bar = 7.019
Donations/Rev (%)						**Operating_lev**					
overall	0.103	0.451	0	7.676	N = 744	overall	3.131	2.544	-5.723	16.866	N = 744
between		0.560	0	5.712	n = 106	between		2.346	-2.688	15.951	n = 106
within		0.138	-1.450	2.067	T-bar = 7.019	within		1.527	-7.510	15.079	T-bar = 7.019
Growth (%)						**Debt/ebitda**					
overall	6.637	17.120	-100	92.235	N = 744	overall	2.556	2.208	-6.625	15.355	N = 744
between		18.027	-21.824	88.025	n = 106	between		2.003	-0.417	9.371	n = 106
within		9.383	-75.864	78.178	T-bar = 7.019	within		1.210	-6.168	12.291	T-bar = 7.019

This table shows the mean, standard deviation, min and max values on the overall panel data, between firms and within firms. It also shows between and within standard deviation. Between standard deviation is a measure that shows how much variation in the data set is caused by the existence of different firms. First, the entity level average is estimated for the variable and then the standard deviation is calculated based on these means. Within standard deviation is used to display how much variation there is within each entity over time. First, the standard deviations within each entity are calculated for each entity, then these standard deviations are averaged to get the output shown as within standard deviation in. However, for comparability purposes, we add back the global mean when calculating the standard deviation within firms resulting in the standard deviation computation where is the global mean across all firms in each variable. N = number of observations, n = number of firms, and T-bar = the average number of years observed per firm.

Table 3.4 presents the total number of firms is equal to 106 and the total number of observations (i.e. firm-years) is equal to 744. In addition, the average number of firm years per firm in our sample is equal to 7. By looking at *Alpha*, we see that within variation is equal to 0.1 while the between variation is equal to 0.05. This indicates that most of the variation does not stem from the existence of different firms, but it rather stays within each entity. Conversely, in *Donations/Rev*, most of the variation stems from the existence of different firms since the between variation (0.56) is much higher than within variation (0.138). This is to be expected, since one firm's donation policies should approximately remain the same, and more stable than the difference between one firm's donation policy to another.

3.5. Matching Process

To find an appropriate control group is essential. In the election of peer groups, we follow the example of Ghouma and Hewitt (2019). However, Ghouma and Hewitt (2019) uses SIC codes in identifying peer groups, and as motivated in the definition of the *Sin* variable, this study instead uses GICS codes. Nevertheless, the two different classification systems have very similar structures and we have found very close corresponding GICS categories for the SIC categories used by Ghouma and Hewitt (2019). The control group must be similar in terms of underlying business characteristics, structure and risks. For example, the tobacco industry is matched with agricultural products and packaged food due to similarities in production, packaging, supply chain, weather risks, and commodity prices. We did not find any previous research explicitly stating which industrial control group was used as a benchmark for weapons and why. Following the rationale of similar underlying business characteristics, structure, and risks, we found industrial conglomerates and industrial machinery to be most appropriate match for weapons. To summarize, each of the four sin stock industries that are defined under variable definitions have two or more appointed peer-group industries. Weapon's peer group is industrial conglomerates and industrial machinery. Gambling's peer group is hotels, resorts and cruise lines, and leisure facilities. Tobacco's peer group is agricultural products and packaged food. Alcohol's peer group is candy, nut and confectionery, bottled water, juices, manufactured ice, non-carbonated drinks, and soda and other carbonated drinks. The sin- and respective peer groups are presented in Table 3.1.

A common problem associated with building a control group is dimensionality. One method to address this issue is to rely on propensity score matching (PSM). PSM is used to study the effect of an implemented treatment, policy, or another non-randomized intervention by accounting for a number of covariates. Instead of focusing on multiple characteristics that need to be similar between the focus group and the control group, PSM allows us to focus only on one specific variable - the propensity score, in order to find matching pairs. This does not only eliminate the problem with dimensionality, but also helps us hinder selection bias (Rosenbaum and Rubin, 1985; Titus, 2007; Smart, 2009).[4] In this

[4] PSM reduces the human element of picking out the control group manually.

study, we let the binary outcome variable to be whether a firm is a sin stock or not. Hence, sin stocks are treated, and non-sin stocks are untreated in PSM terms.

The chosen covariates are based upon Ghouma and Hewitt (2019) matching method which is market-to-book ratio and market capitalization. Market capitalization will take into account the size of the company, which is important in terms of comparing maturity, ability to scale and resources to name a few. Market-to-book ratio will take into account the level of disparity between market valuation and accounting valuation, which is also important in terms of comparing the market sentiment towards the premium paid on a company's net assets. We also want to avoid complicating our PSM model by introducing more covariates, making the matching process more dimensional and complex. After identifying the covariates and the outcome variable, we structure the total sample into four different groups based on matching the sin stocks with their respective peer group. These groups are formed to restrict that a sin-stock can only be matched with a non-sin stock in their appointed peer group (see Table 3.1 for all groups and their respective industries). Since our sample is panel data and one individual (firm) is observed at least over 4 years - we need to collapse the panel data by the mean of each observed covariate for each firm in order to conduct PSM. Instead of having panel data, we now have the average value of each covariate for each firm in their observed time period.

The used matching method is the nearest neighbor matching (i.e., the closest propensity score). This method takes the following steps, i) sin stocks and non-sin stocks fall into a random order, ii) the first sin stock will be matched with a non-sin stock having the closest propensity score, and they will both be removed from the list, iii) the process of ii) is repeated until all sin stocks have found a match. There are other matching methods such as kernel and local linear matching, however, the nearest neighbor gave the best results in terms of low difference in propensity scores between matched pairs. The propensity score difference (p_diff in Table 3.5) represents the absolute difference in percentage between a matched sin stock and a non-sin stocks propensity score. If this difference is high, it signals that the matched sin stock and non-sin stock do not have a similar market-to-book ratio and market capitalization on average over the observed period.

The base bandwidth for each match is set at 2.5%, which is usually considered an accepted limit (Smart, 2009). This means that a sin stock can only be matched with a non-sin stock that has a propensity score that deviates by a maximum of 2.5%. If a sin stock does not find a match within this bandwidth, it will be increased until every sin stock has been matched. In Table 3.5, there are five matches that have a propensity difference score that is outside the bandwidth of 2.5%. Two tobacco stocks and one weapon stock deviates significantly from their matched peer. When looking closer at these firms, we see that all three firms have conducted numerous aggressive share buy-backs over our observed period, especially one in tobacco stock.

Table 3.5 Propensity Score Differences

n	Gambling p_diff	Alcohol p_diff	Weapons p_diff	Tobacco p_diff
1	6.319%*	2.4421%	18.174%*	77.2938%*
2	2.691%*	1.8413%	0.6444%	35.0263%*
3	1.7262%	1.7735%	0.5443%	2.1097%
4	1.1482%	0.9877%	0.5405%	0.2610%
5	1.0702%	0.8938%	0.3417%	0.1441%
6	1.0465%	0.7250%	0.3093%	0.0463%
7	0.9175%	0.6866%	0.2815%	
8	0.7564%	0.5719%	0.1631%	
9	0.7084%	0.5251%	0.1548%	
10	0.6064%	0.2597%		
11	0.5560%	0.1233%		
12	0.4192%	0.0942%		
13	0.4075%	0.0824%		
14	0.3166%	0.0823%		
15	0.2805%			
16	0.2460%			
17	0.2450%			
18	0.1969%			
19	0.1082%			
20	0.0816%			
21	0.0721%			
22	0.0685%			
23	0.0322%			
24	0.0162%			

This table shows the difference in propensity scores (p_diff) between each sin stock and matched peer in respective sin industry group. Each n represents a matched sin/peer pair within each industry, presented in descending order based on the p_diff. When a p_diff exceeds the assigned 2.5% bandwidth, the p_diff is marked by (*).

This made the market-to-book ratio extremely volatile, since the book value of equity can be close to zero and/or negative. However, the strong majority of our matched firms do have a difference in propensity score within our bandwidth of 2.5%. Because we collapsed our panel data sample before initiating our PSM, there is a possibility that a sin stock can be matched with a non-sin stock and both firms do not have an equal amount of observed years. This issue is handled by dropping the years that are not among both matched firms. For example, if a sin stock has observed years between 2009-2018 and the matched peer have observed years between 2014-2018 - the years between 2009-2013 in the sin stock will be dropped in our final sample. This problem occurred for three times for our matching of gambling stocks. Six and three yearly observations were dropped in two gambling stocks and four yearly observations were dropped in one benchmark firm. The final sample after matching gives us 53 sin stocks and 53 non-sin stocks, adding up to 744 observable firm-years in total.

The matching quality of our control group per industry category is determined by an imbalance tests of covariates between the focus group and the control group which is presented in Table 3.6. It shows whether there are significant differences in covariates between the two groups before and after matching. The null hypothesis of the t-test is that the difference between the means in covariates for the treated and untreated is zero (Hagen, 2016). Hence, significant t-statistics would reject the null hypothesis, and that in turn implies that there are significant differences in the covariate between our focus and control group in the matched sample. If we look at industry-specific tests, we can see that the mean of market-to-book ratio in gambling stocks is equal to 1.9659 while matched peers (i.e., control group) have a mean equal to 6.07. However, t-test does not imply that the null hypothesis can be rejected. In gambling stocks, the mean of market capitalization is almost the same as for matched peers. Alcohol stocks and their matched peers show the more promising numbers and a better match overall compared to gambling. Weapon stocks and their matched peers also show a good match. However, the mean of market-to-book ratio in Tobacco stocks deviates quite strongly compared to matched peers mean. In spite of this, we cannot reject the null hypothesis. If we look at the total matched sample, the means of both market capitalization and market-to-book are more or less similar and deviates slightly.

Table 3.6 Covariate Imbalance Test

		Unmatched	**Mean**		**t-test**	
Group	**Variable**	**Matched**	**Treated**	**Control**	**t**	**p (t)**
Gambling	MarketCap	U	4996	10320	-1.39	0.168
		M	4996	4575.5	0.19	0.847
	Mtb	U	1.9659	0.42539	0.22	0.829
		M	1.9659	6.07	-0.84	0.408
Alcohol	MarketCap	U	27279	42459	-0.75	0.458
		M	27279	23881	0.2	0.84
	Mtb	U	3.3498	3.4812	-0.06	0.952
		M	3.3498	2.2269	0.51	0.615
Weapons	MarketCap	U	8525.3	24743	-1.24	0.22
		M	8525.3	10742	-0.46	0.654
	Mtb	U	4.2503	3.7051	0.62	0.542
		M	4.2503	4.3909	-0.09	0.928
Tobacco	MarketCap	U	59771	22779	1.97	0.056
		M	59771	51570	0.2	0.843
	Mtb	U	17.039	3.846	3.89	0
		M	17.039	7.8714	1.13	0.285
Total Sample	MarketCap	M	24108.91	21076.89	0.983	0.33
	Mtb	M	3.87	4.63	-0.26	0.7948

This table shows an imbalancing test of two covariates between the treated group (i.e., sin stocks) and the control group (market peers). The first covariate is MarketCap which is the market capitalization. The second covariate is Mtb, which is the market-to-book ratio. 'U' stands for unmatched sample and 'M' stands for matched sample. The total sample constitutes 744 firm-year observations, the gambling group 268, the alcohol group 236, the weapons group 132 and the tobacco group 108.

Table 3.7 shows comparative statistics between sin stocks and respective peer groups in terms of the variables on which they were matched – namely market-to-book and market capitalization. The table shows that Tobacco has larger differences between sin and peer groups for both variables, with market-to-book of 4.00 compared to 8.68 and market capitalization of 66 263 compared to 53 203. The reason is that the tobacco industry has two firms (constituting 10 yearly observations each) with certain circumstances, e.g. substantial share buybacks, making it particularly challenging to find good market-to-book matches. In addition, the tobacco industry is highly concentrated with few firms controlling most of the market, often being the most concentrated sector in an economy (Hawkins et al., 2018).

In 2013, for example, the Herfindahl-Hirschman Indices (HHI) for the tobacco industry were 2750 and 3100 for the European and the US markets respectively, indicating very high concentration ratios (ibid). Consequently, the tobacco industry constitutes the smallest share (with 54 firm-year observations) of the total sample and this makes the impact of the two extreme tobacco firms even greater on the means. The average market capitalization for tobacco firms are also higher than for their peer firms as a consequence of high concentration, resulting in fewer good matches to choose from. However, these two firms are still considered interesting and important observations for the study. Therefore, we have chosen the best matches available, and made exceptions to the rule of a maximum propensity score difference of 2.5 percentage points between sin and peer firm for these two firms. This resulting in a higher diff in means between sin and peer group for this category and ultimately a poorer match for the overall sample.

Table 3.7 Comparative Statistics between Sins and Peers

Sin Industry	# of firm-year obs	% of firm-year obs	Mean Market-to-Book (sin industry)	Mean Market-to-Book (peer group)	Mean Market Cap in MUSD (sin industry)	Mean Market Cap in MUSD (peer group)
Alcohol	118	32%	3.30	4.61	31 864	27 692
Tobacco	54	15%	4.00	8.68	66 263	53 203
Gambling	134	36%	2.41	1.60	6 803	5 275
Weapons	66	17%	3.43	4.15	10 856	13 474
Total	372	100%	3.10	4.04	24 109	21 077

This table shows the number of firm year observations per sin stock industry group. It also shows comparative statistics on the chosen covariates in the matching process with PSM between market peers and sin stocks.

3.6. Main Regression Model

To test the hypotheses of this study, we use the following panel regression base model:

$$Y_{i,t} = \beta_0 + \beta_1 SINxDON_{i,t} + \beta_2 Donations/Rev_{i,t} + \beta_3 Sin_i + \sum_{i}^{j} \beta_i \, Controls_{i,t} + \varepsilon_{i,t} \qquad \text{(Eq. 3.3)}$$

where *Y* represents the dependent variable (*IR* or *Alpha*) for firm *i* at time *t*. *Donations/Rev* is the donations-to-revenue ratio (expressed in percentage form) for firm *i* at time *t*, *Sin* is the dummy variable indicating if firm *i* is a sin stock or not, *SINxDON* is the interaction between *Sin* and *Donations/Rev* for firm *i* at time *t*, and *Controls* represents the control variables for firm *i* at time *t*. The model is alternated to also test for one year lagged effects of donations and industry specific effects of donations. To test the lagged effects, the base model is run with one year lagged variables for donations, i.e. the alternation from the base model is that $Donations/Rev_{i,t-1}$ and $SINxDON_{i,t-1}$. To test the industry specific effects of donations, the *Sin* variable is exchanged for the sin industry subcategory and respective interaction variable. For example, to test the effects of donations in the gambling industry, *Sin* is exchanged for *Gambling* and *SINxDON* is exchanged *GAMBxDON.*

3.5.1. Fixed or Random Effects

To determine if fixed or random effects are appropriate, we conduct a hypothesis test that there is no correlation between the unique residuals from our model to our independent variable. There would be such correlation if we suspect that some omitted variable in our model correlates with our independent variable. In our Hausman test, the null hypothesis stipulates that there is no such correlation. If the null hypothesis is rejected, a presence of an endogenous independent variables in the model (i.e. a correlation between the error term and independent variable) must be assumed. If this is the case, a fixed model is more appropriate. This is because a fixed-effect model controls for omitted variables that are time-invariant (i.e. constant over time) that may induce the observed correlation in the Hausman test. In our case, this could be for example that sin stocks have the possibility to deduct a part of their tax because they donate funds. Another example is that sin stocks may donate funds to non-profit organizations that are being governed by politicians (i.e., indirect lobbying expenses). Notwithstanding, fixed effects does not control for the correlation between these time-invariant effects - it only controls for correlation between the variables in the model and the omitted time-invariant variables. The chi-square statistic Hausman test is equal to 117 with 9 degrees of freedom with *Alpha* as the dependent variable, which makes the p-value equal to zero. The chi-square statistic Hausman test is equal to 18 with 9 degrees of freedom with *IR* as the dependent variable, which makes the p-value equal to 0.03. As the basis of these results, we rejected the null hypothesis and therefore decide that fixed effects should be used.

3.5.2. Endogeneity Concerns

While fixed effects will control for omitted time-invariant effects, there are additional endogeneity concerns to address. A large concern is that there may be reverse causality between our dependent variables and the independent variable of interest. An argument can be made that firms financial performance, both in terms of idiosyncratic risk and abnormal returns, will affect their decision making in their donating policy. That is, a firm decides to increase their donations if their financial performance is stronger. However, sin stocks may decide to donate in the belief to accumulate goodwill for stakeholders and customers that will increase their financial performance as a result in the long term. In any case, financial performance ought to have an impact on a firm's donating policy, the question is how much and in what time frame.

Suppose that a firm's current annual financial performance or the previous year's financial performance have an impact on their donating policy. This would impose an endogeneity problem in the nature of reverse causality, otherwise known as simultaneous equation bias. Consider the following relationship:

$$IR_{i,t} = \beta_0 + \beta_1 SINxDON_{i,t} + \beta_2 Donations/Rev_{i,t} + \beta_3 Sin_i + \delta_n Control_{i,t} + \varepsilon_{1\ i,t} \qquad \text{(Eq. 3.4)}$$

$$SINxDON_{i,t} = \gamma_0 + \gamma_1 IR_{i,t} + \delta_n Control_{i,t} + \varepsilon_{2\ i,t} \qquad \text{(Eq. 3.5)}$$

where equation 3.4 is the base model that tests our main hypothesis and equation 3.5 is stipulating that donations in sin stocks (SINxDON) are contingent on a firm's idiosyncratic risk (IR) and additional control variables. One can see the coupling effect since *IR* is contingent on *SINxDON* in equation 3.4 and *SINxDON* is contingent on *IR* in equation 3.5. An endogeneity problem would exist if the independent variable correlates with the error-term. The endogeneity problem, in this case, reveals itself by combining equation 3.4 and 3.5. Hence,

$$SINxDON = \gamma_0 + \gamma_1\left(\beta_0 + \beta_1 SINxDON_{i,t} + \beta_2 Donations/Rev_{i,t} + \beta_3 Sin_i + \delta_n Control_{i,t} + \varepsilon_{1\ i,t}\right) + \delta_n Control_{i,t} + \varepsilon_{2\ i,t} \qquad \text{(Eq. 3.6)}$$

Here we can see that *SINxDON* is correlated with ε_1 as shown in equation 3.6. This means that our model will not on average show the true intercept nor the true coefficient for *SINxDON* and over- or underestimate the vector. This would also be true for when abnormal returns (Alpha) is the dependent variable, if we conjecture that *Alpha* does indeed have an impact on a firm's donating policy. By all means, it seems rational by a firm to consider their financial position before ramping up their philanthropic activities. A key variable to consider is also the timeline of the financial performance. For example, the financial performance both in terms of *IR* and *Alpha* in the current year and the previous year could have an impact on a firm's donating policy. Suppose at time t, a sin stock donates *X*. The donated amount *X* could be contingent on both *Alpha* and *IR* at year t and t-1.

Similar discussions about simultaneous equation bias have occurred in previous research that focused on overall CSR-performance and its impact on financial performance (Hmaittane et al. 2019; Liang and Renneboog, 2016; Goss and Roberts, 2010). Namely that CSR-performance may be contingent on a firm's financial performance and not the other way around. In addition to this, omitted variable bias also seem to be a concern and that is arguably more difficult to control for and validate (Goss and Roberts, 2010). Are there any variables that determine *IR* or *Alpha* that also determines donations? If so, it would cause additional endogeneity bias to our model. The most common method that has been used for scrutinizing these endogeneity concerns are two-stage least squares (2SLS) regressions. We see, however, an absence of discussion in previous research similar to ours (Kim et al. 2016; Sharma and Zong, 2018; Ghouma and Hewitt, 2019) about these endogenous concerns. In addition, there also seem to be a total absence of discussion on why 2SLS is preferred over generalized method of moments (GMM). Wooldridge (2001) explains that GMM should be used instead of linear regression if the sample variance is heteroskedastic and in unknown form. This is explained by Cragg (1983), that the GMM estimator (i.e., a weighting matrix) gives moment conditions with high variance relatively lower weight in the estimation and moment conditions with low variance relatively higher weight in the estimation. This is because large variances contain relatively less information about the population compared to low variances. If this is not the case, then 2SLS might be better (Wooldridge, 2001). To see whether our data suffers from heteroscedasticity, we will look at the residuals of each model against the fitted values of the same regression to see whether there are any patterns or indications of clustering of variances. Furthermore, we will also conduct a Breusch-Pagan test, which is a hypothesis test where the null hypothesis states that there is constant variance in the population. This will underpin our decision whether to rely on GMM or 2SLS when scrutinizing our endogeneity concerns.

To initially scrape the surface of our concerns, we create a simultaneous equation both for when *IR* and *Alpha* are the dependent variable following equation 3.6. Before any further tests are being administered, we also conduct an augmented regression (Durbin-Wu-Hausman test) on each model to determine whether it might be relevant to treat the variable *SINxDON* as endogenous. Our first method that is deemed appropriate to rely on is 2SLS, because that is the most widely used method in comparative research. Although, there might be issues with heteroscedasticity, so it is also concluded that GMM will be used in order to validate our results from the 2SLS regression. The chosen type of GMM estimator is two-step GMM system-estimators, since we have a relatively small sample size, and the number of firms (i.e., 106 in total) is relatively large compared to observed years (7 years on average per firm) in our panel data. In addition, a two-step system GMM is more robust when controlling for heteroscedasticity (Roodman, 2009), especially when having a relatively small sample. Nevertheless, we will conduct both one-step and two-step system-GMM to compare the standard deviations and statistical significance between the two methods and see if there are any palpable differences.

Since we suspect that *SINxDON* may be endogenous, *Donations/Rev* is also by definition endogenous. Since *SINxDON* is the interaction variable between *Donations/Rev* and *Sin*, we only need one instrument variable for both *SINxDON* and *Donations*/*Rev*. Hmaittane et al. (2019) who look if CSR performance impacts the implied cost of equity using the CSR-score industry average per year as an instrument variable. Liang and Renneboog (2016) that investigates if corporate donations in general impacts shareholder value use peer industry average CSR score as instrument variable. Therefore, we utilize the same instrument variable for both *SINxDON* and *Donations/Rev*. The computation of the instrument variable will be based on GICS codes that define the industry for each firm in our sample. This means that the instrument variable for *Donations/Rev* is the 'Donations/rev-industry-average-per-year', which we are calling *DON_AVG*. And the instrumented variable for *SINxDON* is the interaction variable between *Sin* (i.e., whether the firm is a sin stock or not) and the instrumented *Donations/Rev*.

4. RESULTS

This chapter presents the empirical findings of this study. The first section presents the main results, from the regressions for the overall dataset. The second section presents the lagged effects of donations. The third section presents the individual results for each sin industry, and the fourth and final section presents the results of the endogeneity analysis.

4.1. Main Results

Table 4.1 shows the results on *IR* and *Alpha* of the main regression model (Eq. 3.3). The dependent variable *IR* is only a proxy for idiosyncratic risk (see variable definitions) and is not expressed in the same unit as the other variables, making it difficult to interpret the coefficients in terms of percentage units. Therefore, in model (1), (2) and (3) the results are interpreted in terms of standard deviations, and all coefficients, except for the dummy variable *Sin*, are presented in standardized form for these three models. Standardized coefficients are calculated as:

$$standardized\ (\beta_x) = \beta_x\ \frac{\sigma_x}{\sigma_y} \qquad \text{(Eq. 4.1)}$$

where β_x is the non-standardized coefficient, σ_x is the standard deviation for the independent variable and σ_y is the standard deviation for the dependent variable. In all models with dependent variable *IR*, coefficients are standardized this way. Standardized coefficients are of limited use for dummy variables, since dummy variables cannot increase or decrease by a standard deviation. Therefore, the coefficients for the dummy variable *Sin* are presented in non-standardized form over all models. Model (1) is a simple OLS regression with robust standard errors clustered by firm. Model (1) shows a standardized coefficient of -0.332 for the interaction variable *SINxDON*, indicating that an increase of one standard deviation in *SINxDON* leads to a decrease of 0.332 standard deviations in *IR*. The estimated coefficient is significant at a 5 percent level. *Donations/Rev* has an estimated standardized coefficient of 0.397, indicating that an increase of one standard deviation in *Donations/Rev* leads to an increase in idiosyncratic risk of 0.397 standard deviations. The coefficient is significant at a 1 percent level. The standardized coefficients of the control variables *Growth* and *Log_mktcap* are both statistically significant at a 1 percent level, indicating that an increase of one standard deviation in *Growth* leads to an increase in idiosyncratic risk of 0.130 standard deviations. An increase of one standard deviation in *Log_mktcap* leads to an decrease in idiosyncratic risk of 0.465 standard deviations. Model (1) has an R-squared of 0.247.

When we control for fixed effects on firms and use robust standard errors clustered by firms in model (2) the coefficients of *SINxDON* and *Donations/Rev* are non-significant. The coefficient of *Sin* in Model (2) remains significant at 1 percent level and consistently indicate that sin stocks have higher *IR* than their peers. The control variables *D/E, Reinvestment* and *Log_mktcap* are statistically significant at 5, 1 and 1 percent respectively. The results indicate that an increase of one standard deviation in *D/E* leads to an increase in idiosyncratic risk of 0.892 standard deviations, an increase of one standard deviation in *Reinvestment* leads to a decrease in idiosyncratic risk of 0.208 standard deviations, and a increase of one standard deviation in *Log_mktcap* leads to an increase in idiosyncratic risk of 0.496 standard deviations. The indicated relationship between *Log_mktcap* and *IR* changes from negative to positive between model (1) and (2), indicating that this relationship is affected by some omitted variable that is variant between firms. To conclude, model (2) has an R-squared of 0.561.

Model (3) is a regression model that control for both firm- and yearly fixed effects with robust standard errors clustered by firm. The model shows that both standardized coefficients for *SINxDON* and *Donations/Rev* are non statistically significant. Furthermore, the (non-standardized) coefficients of *Sin* shows a strong statistical significance and a consistently positive impact on *IR*. This indicates that identification as a sin stock inflates the idiosyncratic risk of a firm compared to our control group of market peers. The control variable *Reinvestment* is statistically significant at a 1 percent level, indicating that an increase of one standard deviation in *Reinvestment* leads to a decrease in idiosyncratic risk of 0.159 standard deviations.

Models (4), (5) and (6) of Table 4.1 show the results of the regressions on *Alpha*. Model (4) is a simple OLS regression with robust standard errors clustered by firm, model (5) is an OLS regression that controls for firm fixed effects and uses robust standard errors clustered by firm, model (6) is the same as model (5), except it controls for time fixed effects as well. The coefficients of *SINxDON* in models (4) and (5) are non-significant. However, in model (6) when we control for firm and time fixed effects, the coefficient of *SINxDON* indicate a negative relationship between donations and abnormal returns and is significant at a 10 percent level. The results on *Donations/Rev* are consistently non-significant in model (4) to (6). When we control for both time and firm fixed effects, *Sin* has an estimated coefficient of 0.223 significant at a 5 percent level. This implying that sin firms have an estimated 0.223 percentage points higher annual abnormal return than non-sin firms. Model (4) indicates that an increase of one percentage point in the control variable *Growth* leads to an increase in of 0.000808 percentage points in *Alpha*. Model (6) indicates that an increase of one percentage point in the control variable *Log_mktcap* leads to an increase in of 0.165 percentage points in *Alpha*.

Table 4.1 Main Results

MODEL	(1)	(2)	(3)	(4)	(5)	(6)
VARIABLES	IR	IR	IR	Alpha (%)	Alpha (%)	Alpha (%)
SINxDON	-0.332**	-0.513	-0.265	0.0185	-0.0193	-0.126*
				(0.0354)	(0.0707)	(0.0644)
Donations/Rev (%)	0.397***	0.500	0.328	-0.0224	0.00809	0.0982
				(0.0353)	(0.0675)	(0.0630)
Sin (non standard.)	0.198***	2.228***	1.404***	0.00762	0.124	0.223**
	(0.0740)	(0.285)	(0.301)	(0.00760)	(0.114)	(0.0970)
Growth (%)	0.130***	-0.0416	0.0531	0.000808**	0.000217	-0.000690
				(0.000396)	(0.000512)	(0.000496)
D/E	0.0313	0.892**	0.0699	0.000292	0.000561	0.00107
				(0.000532)	(0.000626)	(0.00147)
ROA (%)	0.0441	-0.0373	0.00187	0.000507	0.000842	0.000678
				(0.000769)	(0.00107)	(0.00109)
Reinvestment	0.0129	-0.208***	-0.159***	0.00519	-0.102	-0.106
				(0.0523)	(0.236)	(0.189)
Operating_lev	0.0159	-0.0413	-0.0124	0.000457	0.00141	-0.00212
				(0.00182)	(0.00417)	(0.00430)
Debt/ebitda	-0.0591	0.0985*	0.0585	0.00197	0.00822	0.00871*
				(0.00294)	(0.00517)	(0.00467)
Log_mktcap	-0.465***	0.496***	-0.329*	-0.00578	0.0602	0.165***
				(0.00628)	(0.0371)	(0.0440)
Constant	2.131***	-1.310***	1.358***	0.0287	-0.249**	-0.515***
	(0.139)	(0.440)	(0.453)	(0.0256)	(0.0985)	(0.108)
Year fixed/Firm fixed	No/No	No/Yes	Yes/Yes	No/No	No/Yes	Yes/Yes
Observations	744	744	744	744	744	744
R-squared	0.247	0.561	0.674	0.028	0.171	0.300
Prob > F	0.000	0.000	0.000	0.0264	0.1662	0.000

Robust standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

The table shows the regression results from 6 different models. Model 1 to 3 contains only standardized coefficients except for the variable Sin which is a dummy-variable, and model 4 to 6 do not contain standardized coefficients. In model 1 and 4 we use OLS regression. In model 2 and 5 we control for fixed effects on firms. In model 3 and 6 we control for fixed effects on both firms and years. In model 1 to 3, the dependent variable is idiosyncratic risk (*IR*). In model 4 to 6, the dependent variable is *alpha* (%). *Donations/Rev* (%) is the percentage of revenue donated by a firm. *Sin* is the dummy variable that equals 1 if it is a sin stock, zero otherwise. *SINxDON* is the interaction variable between *Donations/Rev* (%) and *Sin*. For definitions of all other variables, see section "Variable definitions" at the beginning of the method chapter.

4.2. Lagged Effects

This section will present the lagged effects of corporate donations on *IR* and *Alpha*, specifically investigating the effects of donations on *IR* and *Alpha* in the subsequent year. All models in Table 4.2 are the same as in Table 4.1, except for the difference that *SINxDON* and *Donations/Rev* are lagged one year. The one-year lagged variables are denoted *SINxDON.1* and *Donations/Rev.1*. When the variables are lagged one year in the panel data, it generates missing values as a result. Due to this method, 106 missing values were generated and is thus lost, which leaves 638 firm-year observations left in our panel data.[5] The results of *SINxDON.1* and *Donations/Rev.1* show similar results to the non-lagged equivalent variables, however the lagged variables show significance also when fixing firm effects. The lagged results indicate negative relationships between sin firms' donations and idiosyncratic risk for the subsequent year, as shown in Model (1) and (2).

Model (1) of Table 4.2 is still an OLS regression and shows a coefficient of -0.377 for the interaction variable *SINxDON.1*, indicating that an increase of one standard deviation in sin firm donations leads to a decrease of 0.377 standard deviations in *IR* in the subsequent year. This estimated coefficient is significant at a 5 percent level. *Donations/Rev.1* has an estimated standardized coefficient of 0.434, indicating that an increase of one standard deviation in *Donations/Rev*, leads to an increase in *IR* of 0.434 standard deviations in the subsequent year for firms in general. The coefficient is significant at a 1 percent level. The model also has an R-squared of 0.244. Model (2) of Table 4.2 controls for firm fixed effects and shows a coefficient of -0.715 for the interaction variable *SINxDON.1*, indicating that an increase of one standard deviation in sin-firm donations leads to a decrease of 0.715 standard deviations in *IR* in the subsequent year. The estimated coefficient is significant at a 5 percent level. *Donations/Rev.1* has an estimated standardized coefficient of 0.543, indicating that an increase of one standard deviation in *Donations/Rev* (for firms in general) leads to an increase in *IR* of 0.5453 standard deviations in the subsequent year. The coefficient is significant at a 10 percent level. The model, however, has a lower R-squared equal to 0.074. Finally, the results on the variables of interest when we control for both yearly- and firm fixed effects in model (3) are non-significant.

Model (4) of Table 4.2 is a simple OLS regression and shows an estimated coefficient of 0.0601 for the interaction variable *SINxDON.1*, indicating that if a sin stock would increase their donations by one percentage unit of their revenue, they would increase their *Alpha* by 0.0601 percentage units in the subsequent year. The coefficient is significant at a 5 percent level. Further, model (4) shows a coefficient of -0.0574 for *Donations/Rev.1*, indicating that an increase of one percentage point in *Donations/Rev* leads to a decrease in *Alpha* of 0.0574 percentage points in the subsequent year. The coefficient is significant at a 5 percent level. Nevertheless, we do not see consistent results when we control for firm fixed effects in Model (5) and yearly- and firm fixed effects in Model (6).

[5] Note that only the first yearly observations per firm are dropped due to lagging the variable. Since all firms in the sample have at least four firm-year observations, no firms were dropped entirely.

Table 4.2 Lagged Effects

MODEL VARIABLES	(1) IR	(2) IR	(3) IR	(4) Alpha (%)	(5) Alpha (%)	(6) Alpha (%)
SINxDON.1	-0.377**	-0.715**	-0.117	0.0601**	-0.00923	-0.0620
				(0.0247)	(0.121)	(0.104)
Donations/rev.1 (%)	0.434***	0.543*	0.0281	-0.0574**	0.0162	0.0528
				(0.0242)	(0.105)	(0.0908)
Sin (non standard.)	0.156*	2.044***	0.789**	0.000270	0.132	0.233**
	(0.0796)	(0.386)	(0.323)	(0.00734)	(0.151)	(0.110)
Growth (%)	0.115***	-0.0392	0.0688	0.000657	-0.000103	-0.000851
				(0.000473)	(0.000551)	(0.000531)
D/E	0.0328	0.0671*	0.0327	0.000416	0.000595	0.000812
				(0.000609)	(0.00101)	(0.00181)
ROA (%)	0.0486	-0.0314	0.0134	0.000845	0.000728	0.000433
				(0.000758)	(0.00112)	(0.00112)
Reinvestment	0.0187	-0.119*	-0.0388	0.0182	-0.0184	-0.0414
				(0.0490)	(0.325)	(0.225)
Operating_lev	0.0101	-0.0281	-0.00418	0.000727	-0.000963	-0.00474
				(0.00214)	(0.00506)	(0.00547)
Debt/ebitda	-0.0306	0.127	0.118	0.00350	0.00602	0.00763
				(0.00284)	(0.00562)	(0.00499)
Log_mktcap	-0.479***	0.712***	-0.372*	-0.000220	0.124***	0.202***
				(0.00516)	(0.0401)	(0.0494)
Constant	2.197***	-2.280***	1.140	-0.000965	-0.452***	-0.666***
	(0.200)	(0.611)	(0.730)	(0.0241)	(0.145)	(0.168)
Year fixed/Firm fixed	No/No	No/Yes	Yes/Yes	No/No	No/Yes	Yes/Yes
Observations	638	638	638	638	638	638
R-squared	0.243	0.074	0.702	0.027	0.215	0.348
Number of company_id		106	106		106	106
Prob > F	0.000	0.000	0.000	0.0836	0.213	0.0932

Robust standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

The table shows the regression results from 6 different models. Model 1 to 3 contains only standardized coefficients except for the variable *Sin* which is a dummy-variable, and model 4 to 6 do not contain standardized coefficients. In model 1 and 4 we use OLS regression. In model 2 and 5 we control for fixed effects on firms. In model 3 and 6 we control for fixed effects on both firms and years. In model 1 to 3, the dependent variable is idiosyncratic risk (*IR*). In model 4 to 6, the dependent variable is *alpha* (%). *Donations/rev.1* (%) is the percentage of revenue donated by a firm the *previous year*. *Sin* is the dummy variable that equals 1 if it is a sin stock, zero otherwise. *SINxDON.1* is the interaction variable between *Donations/rev.1* (%) and *Sin*. For definitions of all other variables, see section "Variable definitions" at the beginning of the method chapter.

4.3. Industry Specific Effects

The following section shows the specific results for each sin industry. The sin stock group is divided into sub-industries, and each industry is treated separately, and an interaction model is created for each industry. We follow equation 3.3, except the dummy variable *Sin* is swapped for the sin subcategory dummies as presented in the variable definitions. For example, Alcohol equals 1 if the sin stock is an alcohol firm. The same method applies to gambling, weapons and tobacco. Since we get new industry-specific dummy variables, we will also get new industry-specific interaction variables for donations.

Hence, the industry-specific effects of donations on *IR* and *Alpha* can be observed. Table 4.3 shows the results of the interaction effect (*ALCOxDON*) between the dummy variable *Alcohol* and the explanatory variable *Donations/Rev*, i.e. the effect of donations in alcohol-stocks. Model (2) shows a standardized coefficient of -0.111 on *IR*, indicating that an increase of one standard deviation in alcohol firm donations leads to a decrease of 0.111 standard deviations in *IR*. The coefficient is statistically significant at a 5 percent level.

Table 4.3 Alcohol Industry Results

MODEL VARIABLES	(1) IR	(2) IR	(3) IR	(4) Alpha (%)	(5) Alpha (%)	(6) Alpha (%)
ALCOxDON	-0.0451	-0.111**	-0.0803	-0.118**	-0.0739	-0.180*
				(0.0564)	(0.106)	(0.0999)
Donations/Rev (%)	0.0929***	0.0671	0.109	-0.00227	-0.00696	-0.00715
				(0.00388)	(0.0214)	(0.0170)
Alcohol (non standrad.)	0.105	-0.401	-0.238	0.0316***	-0.0963	-0.108
	(0.104)	(0.296)	(0.305)	(0.0106)	(0.118)	(0.0966)
Growth (%)	0.152***	-0.0478	0.0498	0.000870**	0.000207	-0.000706
				(0.000396)	(0.000516)	(0.000503)
D/E	0.0403	0.0895**	0.0694	0.000457	0.000565	0.00105
				(0.000536)	(0.000622)	(0.00142)
ROA (%)	0.0514	-0.0337	0.00468	0.000640	0.000858	0.000732
				(0.000765)	(0.00107)	(0.00108)
Reinvestment	0.0149	-0.210***	-0.161***	0.0155	-0.102	-0.111
				(0.0542)	(0.237)	(0.192)
Operating_lev	0.0310	-0.0433	-0.0133	0.000537	0.00139	-0.00216
				(0.00180)	(0.00417)	(0.00429)
Debt/ebitda	-0.0395	0.0983	0.0588	0.00210	0.00821	0.00876*
				(0.00289)	(0.00518)	(0.00466)
Log_mktcap	-0.442***	0.489***	-0.336*	-0.00690	0.0599	0.162***
				(0.00616)	(0.0370)	(0.0436)
Constant	2.104***	-1.292**	1.639***	0.0295	-0.234*	-0.519***
	(0.199)	(0.539)	(0.617)	(0.0289)	(0.130)	(0.148)
Year fixed/Firm fixed	No/No	No/Yes	Yes/Yes	No/No	No/Yes	Yes/Yes
Observations	744	744	744	744	744	744
R-squared	0.231	0.062	0.306	0.034	0.023	0.172
Number of company_id		106	106		106	106
Prob > F	0.000	0.000	0.000	0.0109	0.221	0.000

Robust standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

The table shows regression results from 6 different models. Model 1 to 3 contains only standardized coefficients except for the variable Alcohol which is a dummy-variable, and model 4 to 6 do not contain standardized coefficients. In model 1 and 4 we use OLS regression. In model 2 and 5 we control for fixed effects on firms. In model 3 and 6 we control for fixed effects on both firms and years. In model 1 to 3, the dependent variable is idiosyncratic risk (*IR*). In model 4 to 6, the dependent variable is *alpha* (%). *Donations/rev* (%) is the percentage of revenue donated by a firm the current year. *Alcohol* is the dummy variable that equals 1 if it is a sin stock in the alcohol industry, zero otherwise. *ALCOxDON* is the interaction variable between *Donations/rev* (%) and *Alcohol*. For definitions of all other variables, see section "Variable definitions" at the beginning of the method chapter.

The standardized coefficient for *Donations/Rev* is 0.0929 and significant at a 1 percent level in Model (1), indicating that an increase of one standard deviation in *Donations/Rev* leads to an increase in *IR* of 0.0929 standard deviations. Model (4) shows a coefficient -0.118 for *ALCOxDON* on *Alpha*, indicating that a 1 percentage unit increase of donations in alcohol stocks leads to a decrease of 0.118 percentage units in abnormal returns. The coefficient is significant at a 5 percent level. Model (6) shows a coefficient of -0.180 for *ALCOxDON*, indicating that a 1 percentage unit increase of donations in alcohol stocks leads to a decrease of 0.180 percentage units in abnormal returns. This coefficient, although, is statistically significant only at a 10 percent level.

Table 4.4 Gambling Industry Results

MODEL VARIABLES	(1) IR	(2) IR	(3) IR	(4) Alpha (%)	(5) Alpha (%)	(6) Alpha (%)
GAMBxDON	-0.293**	-0.480	-0.357	0.0330	-0.000220	-0.0539
				(0.0294)	(0.0567)	(0.0583)
Donations/Rev (%)	0.348***	0.452	0.396	-0.0344	-0.00858	0.0332
				(0.0295)	(0.0522)	(0.0572)
Gambling (non standard.)	0.197*	2.224***	1.394***	-0.00484	0.124	0.220**
	(0.106)	(0.285)	(0.302)	(0.0114)	(0.114)	(0.0977)
Growth (%)	0.121**	-0.0401	0.0548	0.000867**	0.000216	-0.000673
				(0.000397)	(0.000512)	(0.000496)
D/E	0.0291	0.0881**	0.0697	0.000314	0.000558	0.00104
				(0.000527)	(0.000619)	(0.00142)
ROA (%)	0.0345	-0.0387	0.000671	0.000568	0.000843	0.000681
				(0.000790)	(0.00107)	(0.00108)
Reinvestment	0.00307	-0.208***	-0.158**	0.00408	-0.102	-0.107
				(0.0545)	(0.237)	(0.191)
Operating_lev	0.0233	-0.0410	-0.0117	0.000662	0.00140	-0.00210
				(0.00180)	(0.00416)	(0.00428)
Debt/ebitda	-0.0654	0.102	0.0603	0.00254	0.00824	0.00881*
				(0.00293)	(0.00518)	(0.0464)
Log_mktcap	-0.443***	0.494***	-0.331*	-0.00457	0.0600	0.161***
				(0.00680)	(0.0371)	(0.0437)
Constant	2.118***	-1.308**	1.363**	0.0268	-0.248*	-0.505***
	(0.203)	(0.537)	(0.614)	(0.0302)	(0.130)	(0.145)
Year fixed/Firm fixed	No/No	No/Yes	Yes/Yes	No/No	No/Yes	Yes/Yes
Observations	744	744	744	744	744	744
R-squared	0.240	0.561	0.675	0.0270	0.171	0.0474
Number of company_id		106	106		106	106
Prob > F	0.000	0.000	0.000	0.0636	0.233	0.000

Robust standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

The table shows the regression results from 6 different models. Model 1 to 3 contains only standardized coefficients except for the variable Gambling which is a dummy-variable, and model 4 to 6 do not contain standardized coefficients. In model 1 and 4 we use OLS regression. In model 2 and 5 we control for fixed effects on firms. In model 3 and 6 we control for fixed effects on both firms and years. In model 1 to 3, the dependent variable is idiosyncratic risk (*IR*). In model 4 to 6, the dependent variable is *alpha* (%). *Donations/rev* (%) is the percentage of revenue donated by a firm the current year. *Gambling* is the dummy variable that equals 1 if it is a sin stock in the gambling industry, zero otherwise. *GAMBxDON* is the interaction variable between *Donations/rev* (%) and *Gambling*. For definitions of all other variables, see section "Variable definitions" at the beginning of the method chapter.

Looking at the gambling industry, the coefficient of *GAMBxDON* in Table 4.4 is only statistically significant in Model (1). This coefficient also shows a negative relationship between gambling firm donations and their *IR*. Further, *Donations/Rev* has a standardized coefficient of 0.348, indicating that an increase of one standard deviation in donations (for firms in general) leads to an increase in *IR* of 0.348 standard deviations.

Table 4.5 Tobacco Industry Results

MODEL VARIABLES	(1) IR	(2) IR	(3) IR	(4) Alpha (%)	(5) Alpha (%)	(6) Alpha (%)
TBCOxDON	0.00207	-0.0276	0.0265	0.00720	-0.0779	-0.217
				(0.0390)	(0.576)	(0.342)
Donations/Rev (%)	0.0895***	0.0437	0.0913	-0.00402	-0.00870	-0.0114
				(0.00468)	(0.0214)	(0.0163)
Tobacco (non standard.)	0.221***	-1.517***	-1.048***	-0.00383	-0.0517	-0.0933
	(0.0801)	(0.302)	(0.306)	(0.00951)	(0.122)	(0.101)
Growth (%)	0.154***	-0.0433	0.0545	0.000848**	0.000215	-0.000678
				(0.000397)	(0.000512)	(0.000497)
D/E	0.0202	0.0877**	0.0689	0.000320	0.000553	0.00102
				(0.000549)	(0.000620)	(0.00139)
ROA (%)	0.0292	-0.0371	0.00282	0.000546	0.000840	0.000691
				(0.000794)	(0.00107)	(0.00108)
Reinvestment	0.00141	-0.211***	-0.160**	0.00286	-0.104	-0.114
				(0.0567)	(0.241)	(0.195)
Operating_lev	0.0355	-0.0431	-0.0127	0.000570	0.00140	-0.00212
				(0.00179)	(0.00417)	(0.00428)
Debt/ebitda	-0.0348	0.100	0.594	0.00241	0.00823	0.00877*
				(0.00287)	(0.00518)	(0.00464)
Log_mktcap	-0.463***	0.492***	-0.343*	-0.00564	0.0600	0.161***
				(0.00639)	(0.0371)	(0.0437)
Constant	2.199***	0.942*	2.792***	0.0295	-0.124	-0.279**
	(0.208)	(0.518)	(0.576)	(0.0295)	(0.149)	(0.140)
Fixed year /Fixed firm	No/No	No/Yes	Yes/Yes	No/No	No/Yes	Yes/Yes
Observations	744	744	744	744	744	744
R-squared	0.235	0.558	0.673	0.026	0.171	0.297
Number of company_id		106	106		106	106
Prob > f	0.000	0.000	0.000	0.000	0.000	0.000

Robust standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

The table shows the regression results from 6 different models. Model 1 to 3 contains only standardized coefficients except for the variable Tobacco which is a dummy-variable, and model 4 to 6 do not contain standardized coefficients. In model 1 and 4 we use OLS regression. In model 2 and 5 we control for fixed effects on firms. In model 3 and 6 we control for fixed effects on both firms and years. In model 1 to 3, the dependent variable is idiosyncratic risk (*IR*). In model 4 to 6, the dependent variable is *alpha* (%). *Donations/rev* (%) is the percentage of revenue donated by a firm the current year. *Tobacco* is the dummy variable that equals 1 if it is a sin stock in the Tobacco industry, zero otherwise. *TBCOxDON* is the interaction variable between *Donations/rev* (%) and Tobacco. For definitions of all other variables, see section "Variable definitions" at the beginning of the method chapter.

The third industry is the tobacco industry and the results are presented in Table 4.5. The results show that the coefficients of *TBCOxDON* cannot be determined statistically significant in any one of the models. The tobacco sample is also the smallest of this study, consisting of only 6 firms and a total of 54 firm-year observations (as shown in tables 3.1 and 3.7). This, making it harder to reach statistical significance and to draw sound conclusions based only from these 6 firms. The coefficients of *Tobacco* are, nonetheless, consistently significant at a 1 percent level in model 1 to 3. When controlling for firm fixed effects in model 2 and yearly and firm fixed effects in model 3, the results indicate that tobacco companies in fact have lower idiosyncratic risk than the control group. Although, when not controlling for fixed effects in model (1), tobacco companies are indicated to have higher idiosyncratic risk than the control group.

Table 4.6 Weapons Industry Results

MODEL VARIABLES	(1) IR	(2) IR	(3) IR	(4) Alpha (%)	(5) Alpha (%)	(6) Alpha (%)
WPNSxDON	0.114***	0.0991***	0.107***	-0.0357	-0.0146	-0.0941
				(0.0794)	(0.0916)	(0.119)
Donations/Rev (%)	0.0830***	0.00750	0.0533	-0.00404	-0.00850	-0.00991
				(0.00468)	(0.0217)	(0.0168)
Weapons (non standard.)	-0.115	-2.308***	-1.038***	-0.00279	-0.134	-0.277**
	(0.0975)	(0.337)	(0.361)	(0.0124)	(0.128)	(0.115)
Growth (%)	0.151***	-0.0466	0.0516	0.000846**	0.000216	-0.000672
				(0.000394)	(0.000511)	(0.000496)
D/E	0.0351	0.0846**	0.0648	0.000295	0.000560	0.00105
				(0.000529)	(0.000619)	(0.00140)
ROA (%)	0.0467	-0.0375	0.00204	0.000499	0.000844	0.000701
				(0.000785)	(0.00107)	(0.00108)
Reinvestment	0.00987	-0.211***	-0.1609**	-0.000344	-0.102	-0.110
				(0.0551)	(0.237)	(0.192)
Operating_lev	0.0283	-0.0412	-0.100	0.000645	0.00139	-0.00215
				(0.00182)	(0.00416)	(0.00427)
Debt/ebitda	-0.0375	0.109	0.0691	0.00235	0.00822	0.00870*
				(0.00289)	(0.00518)	(0.00464)
Log_mktcap	-0.449***	0.479***	-0.360**	-0.00588	0.0601	0.161***
				(0.00612)	(0.0372)	(0.0436)
Constant	2.152***	0.964*	2.827***	0.0311	-0.124	-0.282**
	(0.205)	(0.520)	(0.584)	(0.0284)	(0.147)	(0.139)
Year fixed/Firm fixed	No/No	No/Yes	Yes/Yes	No/No	No/Yes	Yes/Yes
Observations	744	744	744	744	744	744
R-squared	0.240	0.564	0.681	0.026	0.171	0.297
Number of company_id		106	106		106	106
Prob > F	0.000	0.000	0.000	0.239	0.230	0.000

Robust standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

The table shows the regression results from 6 different models. Model 1 to 3 contains only standardized coefficients except for the variable Weapons which is a dummy-variable, and model 4 to 6 do not contain standardized coefficients. In model 1 and 4 we use OLS regression. In model 2 and 5 we control for fixed effects on firms. In model 3 and 6 we control for fixed effects on both firms and years. In model 1 to 3, the dependent variable is idiosyncratic risk (*IR*). In model 4 to 6, the dependent variable is *alpha* (%). *Donations/rev* (%) is the percentage of revenue donated by a firm the current year. *Weapons* is the dummy variable that equals 1 if it is a sin stock in the weapons industry, zero otherwise. *WPNSxDON* is the interaction variable between *Donations/rev* (%) and *Weapons*. For definitions of all other variables, see section "Variable definitions" at the beginning of the method chapter.

The final industry in this section is weapons. The results in Table 4.6 deviates significantly from the main results, lagged results, and industry-specific results for gambling and alcohol. The coefficients of *WPNSxDON* in model (1) to (3) indicates that donations conducted by weapon firms increases *IR*. Moreover, all coefficients are significant at a 1 percent level. The coefficients of *WPNSxDON* are 0.114, 0.0991 and 0.107 for Models (1), (2) and (3) respectively, suggesting that an increase of one standard deviation in weapon firms' donations would lead to increases in *IR* of 0.114, 0.0991 and 0.107 standard deviations respectively. Finally, Model (4) to (6) indicate that donations do not seem to influence weapon firms' *Alpha* at all.

To summarize, our main results and lagged results show fairly consistent and homogenous results – which is indications of a risk mitigating effect of donations by sin stocks. Similar results are also provided looking at the gambling and alcohol industries. Contrary to this, the weapons industry shows indications of opposite effects from donations. To explore the effect of the deviating industry (weapons) to our overall results, we run our results again only including the 'triumvirate of sin', i.e. alcohol, tobacco, and gambling. A new dummy variable is created that is equal to 1 if the firm is either a gambling, tobacco or alcohol firm, and zero otherwise. This variable is named *Tri* (short for triumvirate), and as a result a new interaction variable is created which is named *TRIxDON*.

Table 4.7 shows that, when excluding the weapons industry, there are stronger indications of a negative relation between corporate donations and *IR* in the 'triumvirate of sin' than in our main results, indicating the weapon industry is the driver of lost statistical significance in the year fixed effect model (model 2) of Table 4.1. The standardized coefficients of *TRIxDON* on *IR* are significant in model (1) at 1 percent level and in model (2) at 5 percent level. Both coefficients indicate that donations conducted by triumvirate of sin firms will decrease the *IR*. For example, in model (2) when we control for firm fixed effects, the standardized coefficient of *TRIxDON* equals -0.736 which indicates that an increase of one standard deviation of *TRIxDON* will decrease *IR* by 0.736 standard deviations. However, the coefficient of *TRIxDON* remains non-significant when controlling for both firm and yearly fixed effects in model (3).

Table 4.7 Triumvirate of Sin Results

MODEL VARIABLES	(1) IR	(2) IR	(3) IR	(4) Alpha (%)	(5) Alpha (%)	(6) Alpha (%)
TRIxDON	-0.414***	-0.736**	-0.540	0.0182	-0.0151	-0.0981
				(0.0338)	(0.0636)	(0.0605)
Donations/Rev (%)	0.469***	0.686*	0.563	-0.0227	0.00418	0.0724
				(0.0337)	(0.0596)	(0.0589)
Tri (non standard.)	0.228***	2.225***	1.407***	0.00989	0.124	0.222**
	(0.0722)	(0.286)	(0.301)	(0.00770)	(0.114)	(0.0972)
Growth (%)	0.123**	-0.0422	0.0512	0.000789**	0.000216	-0.000690
				(0.000396)	(0.000512)	(0.000496)
D/E	0.0282	0.0884**	0.0703	0.000279	0.000559	0.00106
				(0.000528)	(0.000624)	(0.00145)
ROA (%)	0.0288	-0.0377	0.000956	0.000434	0.000842	0.000681
				(0.000771)	(0.00107)	(0.00109)
Reinvestment	0.00370	-0.208***	-0.158**	0.00141	-0.102	-0.107
				(0.0522)	(0.236)	(0.190)
Operating_lev	0.0230	-0.0397	-0.0116	0.000554	0.00141	-0.00210
				(0.00182)	(0.00417)	(0.00430)
Debt/ebitda	-0.0751	0.101*	0.602	0.00166	0.00824	0.00882*
				(0.00299)	(0.00518)	(0.00466)
Log_mktcap	-0.474***	0.493***	-0.319*	-0.00599	0.0601	0.163***
				(0.00618)	(0.0371)	(0.0439)
Constant	2.190***	-1.305***	1.327***	0.0307	-0.248*	-0.510***
	(0.139)	(0.439)	(0.450)	(0.0287)	(0.129)	(0.146)
Year fixed/Firm fixed	No/No	No/Yes	Yes/Yes	No/No	No/Yes	Yes/Yes
Observations	744	744	744	744	744	744
R-squared	0.253	0.564	0.677	0.029	0.171	0.299
Number of company_id		106	106		106	106
Prob > F	0.000	0.000	0.000	0.0986	0.232	0.000

Robust standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

The table shows the regression results from 6 different models. Model 1 to 3 contains only standardized coefficients except for the variable Sin which is a dummy-variable, and model 4 to 6 do not contain standardized coefficients. In model 1 and 4 we use OLS regression. In model 2 and 5 we control for fixed effects on firms. In model 3 and 6 we control for fixed effects on both firms and years. In model 1 to 3, the dependent variable is idiosyncratic risk (*IR*). In model 4 to 6, the dependent variable is *alpha* (%). *Donations/rev* (%) is the percentage of revenue donated by a firm the current year. *Tri* is the dummy variable that equals 1 if it is a sin stock in the alcohol, gambling or tobacco industry, zero otherwise. *TRIxDON* is the interaction variable between *Donations/rev* (%) and *Tri*. For definitions of all other variables, see section "Variable definitions" at the beginning of the method chapter.

The coefficient of *Donations/Rev* is also statistically significant at 1 percent level in model (1) in Table 4.7, indicating positive relationships between donations and *IR*. The coefficient of *Donations/Rev* in model (1) indicate that an increase of one standard deviation of *Donations/Rev* will increase *IR* by 0.469 standard deviations. The coefficients of *Donations/rev* remain positive in model (2) and (3) but is statistically significant at a 10 percent level in model (2) and non-significant in model (3). The (non-standardized) coefficients of *Tri* are statistically significant at 1 percent and positive in Models (1) to (3). This would further suggest that both alcohol, gambling, and tobacco firms generally have a higher *IR*.

What is most worth highlighting here is that the lack of statistical significance of *SINxDON* in the firm fixed effect model of our main results (model 2 of Table 4.1) is due to the opposite donation effects by weapon firm donations. Donations in the 'Triumvirate of sin' firms seem to reduce *IR*, while in weapon firms they seem to increase it.

4.4. Endogeneity Analysis

The first step of the endogeneity control is to see whether there is any simultaneous bias between our dependent variables (*Alpha* and *IR*) and our variable of interest, *SINxDON*. In Appendix 7 and 8, the results are shown for both 1 year lagged- and non-lagged *Alpha* and *IR* are the independent variables and *SINxDON* is the dependent variable. There is no statistical significance on any of the coefficients which initially leans towards drawing the conclusion that there is no simultaneous bias or reverse causality in our model. The second step is to see whether there are any indications of endogeneity with a Durbin-Wu-Hausmann test for each respective model. When *Alpha* is the dependent variable, the p-value is equal to 0.89, hence the null hypothesis cannot be rejected. This also indicates that we are 89% certain that *SINxDON* in this model does not impose an endogeneity problem.

When conducting the same test when *IR* is the dependent variable, the p-value is equal to zero. Therefore, the null hypothesis is rejected, and we consider that *SINxDON* does indeed impose an endogeneity problem in this model. These results suggest that it is appropriate to treat *SINxDON* as endogenous when *IR* is the dependent variable. The final step before conducting 2SLS and GM is testing our base model for heteroscedasticity with a Breusch-Pagan test and also look at the residuals in comparison to the fitted values to explore if there is heteroscedasticity. The p-value of all Breusch-Pagan tests are below 0.05, which implies that there is heteroscedasticity when both *Alpha* and *IR* is the dependent variable. This heteroscedasticity is illustrated in Appendix 9, with six different residuals versus fitted values plots. What we are looking for is unequal variances, which shows if there are uneven spreads in the scatterplot. Probably, the most severe heteroscedasticity is when *Alpha* is the dependent variable, where each scatterplot shows a clustering in the middle. When *IR* is the dependent variable, there are more even spreads in each scatterplot, although still uneven and there are some clusters.

To summarize, there are no alarming indications that there is endogeneity when *Alpha* is the dependent variable. There are, though, strong indications for endogeneity when *IR* is the dependent variable. The results on heteroscedasticity implies that it is more appropriate to conduct a GMM compared to a 2SLS to explore our endogeneity concerns. Hence, the following results will present both a 2-step GMM and 2SLS when *IR* is the dependent variable. Table 4.8 shows the results for the first-stage linear regression when *Donations/Rev* is the dependent variable and *DON_AVG* is the instrument variable. The coefficient is both statistically significant and positive on all three models. For example, an increase of one standard deviation in *DON_AVG* will increase *Donations/Rev* by 0.1533 standard deviations when controlling for both yearly and firm fixed effects. On the other hand, R-squared is equal to 0.110 in Model (1) while being above 0.9 in both Model (2) and (3). Finally, the p-value of the f-statistic is equal to zero in all three models in Table 4.8. This suggests that *DON_AVG* is an appropriate instrument variable for *Donations/Rev* when we control for fixed effects.

Table 4.8 First-Stage 2SLS Results

MODEL VARIABLES	(1) Donations/Rev (%)	(2) Donations/Rev (%)	(3) Donations/Rev (%)
DON_AVG	0.309***	0.150***	0.1533***
Sin (non standard)	0.0343	-0.135	-0.107
	(0.0335)	(0.133)	(0.137)
Growth (%)	-0.186***	-0.0298	-0.0359
D/E	-0.0411	-0.0581**	-0.0567**
ROA (%)	0.00444	-0.0241	-0.0257
Reinvestment	-0.0435	-0.00417	-0.00644
Operating_lev	-0.0217	-0.00817	-0.0105
Debt/ebitda	-0.0586	-0.00678	-0.00418
Log_mktcap	0.00629	0.0230	0.0658
Constant	0.0416	-0.0486	-0.139
	(0.102)	(0.135)	(0.160)
Year fixed/Firm fixed	No/No	No/Yes	Yes/Yes
Observations	744	744	744
R-squared	0.110	0.912	0.912
Number of company_id		106	106
Prob > F	0.000	0.000	0.000

Robust standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

The table shows the regression results from 3 different models from the first-stage of the 2SLS regression. Model 1 to 3 contains only standardized coefficients except for the variable Sin which is a dummy-variable. In model 1 we use OLS regression. In model 2 we control for fixed effects on firms. In model 3 we control for fixed effects on both firms and years. In model 1 to 3, the dependent variable is *Donations/rev* (%) which is the percentage of revenue donated by a firm at the current year. DON_AVG is the industry average based on GICS codes of *Donations/rev* (%). *Sin* is the dummy variable that equals 1 if it is a sin stock, zero otherwise. For definitions of all other variables, see section "Variable definitions" in the beginning of method.

Table 4.9 shows the second stage of the linear regression, where *IV.Donations/Rev* is the predicted values of *Donations/Rev* of each respective model in the first stage shown in Table 4.8. *IV.SINxDON* is the interaction variable of *IV.Donations/Rev* and *Sin*. Hence, we are treating both *SINxDON* and

Donations/Rev as endogenous. In Model (1) to (3), the coefficients of *IV.SINxDON* are not statistically significant different from zero. Thus, we cannot conclude if *SINxDON* influence *IR* with help of 2SLS. The Hansen-J test gives us a p-value slightly above 0.5 in all three models in Table 4.9. This is not enough to reject the null hypothesis which states that the overidentified restrictions of our model are valid. In other words, the used instrument variables do not cause endogeneity (i.e., correlate with the error term).

Table 4.9 Second Stage 2SLS Results

MODEL VARIABLES	(1) IR	(2) IR	(3) IR
IV.SINxDON	0.0683	0.232	1.128
IV.Donations/Rev (%)	0.108*	0.494	-0.0462
Sin (non standard.)	0.0717	2.180***	1.333***
	(0.0835)	(0.285)	(0.299)
Growth (%)	0.189***	-0.0186	0.0795
D/E	0.0459	0.132***	0.111*
ROA (%)	0.0332	-0.0173	0.0268
Reinvestment	0.0249	-0.208***	-0.155***
Operating_lev	0.0210	-0.0435	-0.0147
Debt/ebitda	-0.0520	0.111	0.0748
Log_mktcap	-0.447***	0.457***	-0.378**
Constant	2.052***	-1.204***	1.487**
	(0.191)	(0.444)	(0.620)
Year fixed/Firm fixed	No/No	No/Yes	Yes/Yes
Observations	744	744	744
R-squared	0.254	0.246	0.677
Number of company_id		106	106
Prob > F	0.000	0.000	0.000
Hansen j > P	0.505	0.504	0.504

Robust standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

The table shows the regression results from 3 different models that is the second stage of the 2SLS regression. Model 1 to 3 contains only standardized coefficients except for the variable Sin which is a dummy-variable, and model 4 to 6 do not contain standardized coefficients. Model 1 is OLS regression. In model 2 we control for fixed effects on firms. In model 3 we control for fixed effects on both firms and years. In model 1 to 3, the dependent variable is the idiosyncratic risk (*IR). IV.Donations/Rev* (%) is the instrumented *Donations/rev (%)* which is the predicted output of *Donations/rev (%)* in the first stage regression. *Sin* is the dummy variable that equals 1 if it is a sin stock, zero otherwise. *IV.SINxDON* is the interaction variable between *IV.Donations/Rev* (%) and *Sin*. For definitions of all other variables, see section "Variable definitions" in the beginning of method.

The industry-specific results in the previous section showed indications that donations conducted in "triumvirate of sin" firms will decrease *IR*, and that the results for the triumvirate of sin are stronger than the main results (including the weapon industry). We also wish to explore if these results hold when controlling for endogeneity in our GMM models. In Table 4.10, the results from both one- and two-step system GMM are presented. By looking initially at *SINxDON*, we see that its coefficient is significant at a 5 percent level and negative in both one- and two-step GMM. For example, in Model (1), an increase in one standard deviation in *SINxDON* will decrease the *IR* by 0.3785 standard deviations. The dummy variable *Sin* is positive and significant at 1 percent level, further implying that sin stocks tend to have higher idiosyncratic risk than their peers, which is consistent with previous results. The Hansen J test gives us a p-value equal to 0.112 in both Model (1) and (2). This is not enough to reject the null hypothesis that our instrument variables do not cause endogeneity. There are, although, robust indications that there is autocorrelation of the first order (i.e., the residual of the previous year correlate with the residual of the present year) since the Arellano-Bond (1) test show us a p-value equal to zero in both Model (1) and (2). This means that we reject the null hypothesis that states there is no presence of autocorrelation of the first order.

In the same test but in the second-order (2), the p-value is slightly above 0.05 (0.063 in Model 1 and 0.065 in Model 2), which is not enough to reject the null hypothesis, but the level is still quite alarming. Moving on to model (3) and (4), we see that *TRIxDON* is still negative and statistically significant at 1 percent level in both models, consistent with previous results.

Table 4.10 GMM Results

Number of Steps	2-step	1-step	2-step	1-step
MODEL	(1)	(2)	(3)	(4)
VARIABLES	IR	IR	IR	IR
Growth (%)	0.1427***	0.1349***	0.1217***	1.2014***
DE	0.0312	0.0205	0.0186	0.0165
ROA (%)	0.0394	0.0539	0.0233	0.0327
Reinvestment	0.0016	0.0047	-0.0066	-0.0051
Operating_lev	-0.0017	-0.0013	0.0058	0.0062
Debt/ebitda	-0.0945**	-0.0785*	-0.1131***	-0.1071***
Log_mktcap	-0.4773***	-0.4683***	-0.4863***	-0.4783***
Donations/rev (%)	0.4318***	0.4195***	0.4475***	0.4359***
SINxDON	-0.3785**	-0.3631**		
Sin (non standard.)	0.243***	0.218***		
	(0.0747)	(0.0712)		
TRIxDON			-0.4060***	-0.3926***
Tri (non standard.)			0.311***	0.292***
			(0.0740)	(0.0423)
Constant	2.091***	2.055***	2.148***	2.117***
	(0.213)	(0.191)	(0.185)	(0.107)
Observations	744	744	744	744
Number of company_id	106	106	106	106
Hansen j > P	0.112	0.112	0.681	0.353
Arellano-Bond (1st)/(2nd) > P	0.000/0.063	0.000/0.065	0.000/0.064	0.000/0.154

Robust standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

The table shows the GMM-results from four different models. All GMM models use system estimators and shows standardized coefficients. Model (1) and (3) estimates each coefficient based on two-step GMM. Model (2) and (4) estimates each coefficient based on one-step GMM. Idiosyncratic risk (*IR*) is the dependent variable in each model. *Donations/rev* (%) is the percentage of revenue donated by a firm the current year. *Tri* is the dummy variable that equals 1 if it is a sin stock in the alcohol, gambling or tobacco industry, zero otherwise. *TRIxDON* is the interaction variable between *Donations/rev* (%) and *Tri*. For definitions of all other variables, see section "Variable definitions" at the beginning of the method chapter.

The coefficients of *TRIxDON* in model (3) and (4) show that an increase in one standard deviation in *TRIxDON* will decrease the *IR* by 0.4060 and 0.3926 standard deviations respectively. The test for overidentification is less alarming in model (3) and (4) compared to model (1) and (2). However, there is still a problem with autocorrelation of the first order by looking at the p-values of the Arellano-Bond test. In the second order, the p-value of model (3) is equal to 0.064, which is slightly above the rejection level of 0.05, and in model (4), the p-value is above 0.1 significance level. When comparing the standard deviations of each coefficient in one- and two-step GMM in Appendix 10, we see that they are similar. For example, the standard deviation of the coefficient of *TRIxDON* in one-step is equal to 0.158 while in two-step its equal to 0.216.

4.5. Result Summary

The results regarding the relationship between donations and abnormal returns are weak and inconclusive, thus providing no reliable support of hypothesis 1. However, our findings together provide a clear picture of a negative relationship between idiosyncratic risk and sin firm donations. Drawing from the firm fixed effect models of this study, more specifically Model (2) from tables 4.2 and 4.7, and further strongly supported by the one- and two step GMM models of Table 4.10, we find substantial support of hypothesis 2.

5. ANALYSIS AND DISCUSSION

5.1. Idiosyncratic Risk

The results of this study indicate negative relationships between corporate donations in sin-firms and idiosyncratic risk. These results are in line with the prediction of this study and supports that the risk mitigating effect of overall CSR in controversial firms (found by Jo and Na, 2012) is present also from the sub-activity of corporate donations. Jo and Na (2012) further found that the risk mitigation of CSR was greater in controversial firms, however still risk reducing for non-sin firms. Interestingly, our results show that while there are strong indications of a risk-mitigating effect of donations in sin firms, there are indications of the opposite for firms in general. Previous literature have predominantly suggested risk mitigating effects of overall CSR for firms in general. This makes the results of this study especially interesting. What makes the risk effects of corporate donations differ from those of overall CSR performance for non-sin firms?

Previous studies have suggested legitimacy effects to be the main reason for the risk reducing effects of CSR performance. The idea is that high CSR performance can cushion the stock price effects of negative publicity, reducing risk and keeping stock prices more stable. Our results, however, strongly contradicts the existence of any such effect from corporate donations in non-sin stocks. The results are thereby providing support that effects of overall CSR performance and effects of corporate donations differ significantly, suggesting that it is of interest to investigate different CSR activities individually. CSR as a composition have shown clear indications of negative relationships between risk and CSR performance, while certain activities (such as corporate donations) individually can have positive relationships.

Our results can be interpreted as that the “cushioning” effect of corporate donations is present in sin stocks, while donations seem to enhance volatility for non-sin firms. So, how come the results are opposing? The results could be better understood from the two different views on CSR presented by Bénabou and Tirole (2010). The risk-mitigating effect in sin stocks can be seen from the “win-win” view of CSR. With donations contributing to cushion stock price effects of negative publicity in sin stocks, stakeholders seem to appreciate the donations as somewhat rebalancing for other harmful activities. The essence of the “win-win” view is that CSR can be value maximizing *if* the activities are in line with the demands of investors, customers, employees, or other stakeholders. For sin-firms, one could expect the stakeholder demands on donations to be greater in order to compensate for their harm to society. So, if the stakeholder demands are greater, then the activity will also have a greater positive effect.

The risk-increasing effect of corporate donations in non-sin firms could be better understood from the second view of CSR presented by Bénabou and Tirole (2010), i.e. the view of CSR as sacrificing profits for a good cause. The essence of this view is that when CSR is not grounded in stakeholders' demands and desires, CSR will not be value-maximizing. As indicated by the results of this study, corporate donations for firms, in general, would increase volatility. This could be interpreted as that non-sin firms are not subject to the same level of stakeholder demands as sin firms. Their core businesses are not as harmful nor carry the same stigma, and hence there are not the same demands to compensate or rebalance through corporate donations. From this view, donations in non-sin firms are rather initiated by board members or management without foundation in stakeholder demands, and are consequently not value-maximizing. From these two perspectives the opposing risk effects in sin versus non-sin firms can be better understood.

The difference in donation effects between sin firms and non-sin firms can be understood from the preceding logic above, but how about the contradiction between prior studies' results of risk-mitigating effects of *overall* CSR in non-sins, and the risk increasing effects of non-sin donations indicated in this study? Also here Bénabou and Tirole's views on stakeholder demands could help in the interpretation. The interpretation would then be that stakeholders to non-sin firms have significant demands for overall CSR performance but not for charitable donations alone, perceiving CSR activities related to environmental issues and/or governance (and perhaps also other social activities apart from donations) as more legitimizing than charitable donations alone. One understanding of this could be that increased media attention paid to environmental issues in general, and climate change in particular, in the past decade have raised awareness and consequently stakeholder demands on these issues. Overall CSR performance is from this perspective more grounded in stakeholder expectations, explaining the greater risk mitigating effects of overall CSR. Corporate donations alone (and perhaps social engagements overall) are not expected for non-sin firms in the way they seem to be for sin firms, which can be understood from the preceding logic of lower stakeholder demands to compensate for harm caused to society. Demands of compensation for environmental externalities, nonetheless, might be expected also for firms in general since most or all businesses have an environmental footprint to some extent.

When including time fixed effects the results are not significant, indicating that the relationship between sin donations and IR is affected by some unobserved factors that are constant among firms but variant over time. This is somewhat unexpected, since the dependent variable here is idiosyncratic risk (which by definition is firm specific and should not be systematically related to cycles over time), and remembering from the panel descriptive data of table 3.4, the *Donations/Rev* variation *between* firms were significantly larger than that *within* firms over time. However, there is still some variation within firms over time, and we speculate that an unobserved factor might be mimetic isomorphism. Say for example that a successful, market leading sin firm donates 0.07 percent of revenue to charity in one year. From a perspective of mimetic isomorphism, other sin firms might adopt the same donation policy, also choosing a donation policy close to that level. If the market leading firm raises the donation policy in a following year, other sin firms might keep mimicking in fear of being perceived as illegitimate by comparison or simply trying to adopt what they think is best practice.. This could be a possible explanation for correlation between the donation variable and year, that would also be consistent among firms.

5.2. Abnormal Returns

The results of this study are not conclusive in regards to the relationship between sin firm donations and abnormal returns. There are only two coefficients throughout the result indicating statistically significant relationships, namely the one year lagged variable of Model (4) in Table 4.2 and the coefficient for *ALCOxDON* in Model (4) of Table 4.3. The two coefficients indicate opposite relationships, and are not considered reliable since the result does not display robustness to firm- nor time fixed effects. The results stand in contrast to the predictions of this study and provide no support that the adverse effect on abnormal returns (suggested by Ghouma and Hewitt) is applicable also for corporate donations. On the other hand, our results show no support for a positive effect either. From a legitimacy perspective, CSR could be expected to be even more beneficial to sin firms than for non-sin firms by rebalancing negative publicity from the sin-firms' core activities. However, the results indicate no differences in the effects of donations between sin and non-sin stocks. There are no significant indications of any relationship for either category.

Prior studies have shown varying results on the effects of CSR on abnormal returns for firms in general, where a majority seem to find no or slightly positive relationships. Our results could be considered support for the Godfrey et al. (2009) notion that CSR does not generate financial performance, but merely preserve it. Thus, adding to those finding no relationship between CSR and abnormal returns (e.g. Alexander and Buchholz, 1978; Teoh, Welsch and Wazzan, 1999; Margolis and Elfenbein, 2007; Reinhardt et al. 2008), though adding a new dimension by breaking down CSR and finding support that corporate donations as a sub-category of CSR are consistent with these findings. Other studies have looked specifically at the effects of corporate donations on returns for firms in general and the results have been inconclusive. Some have suggested there is no relationship (Friedman 1970; Galaskiewicz 1997; Seifert et al. 2004) and our results can be considered in line with these findings, indicating consistency of these previous results also in a sin stock setting.

Although this study finds no significant support of positive effects from corporate donations on corporate returns, the results show strong indications of the risk-mitigating effects of corporate donations in sin stocks. This would imply that there are in fact economically sound rationales to engage in corporate donations, contrary to the reasoning when deriving Hypothesis 1 of this study, reasoning around the possibility that (as seen from a perspective of institutional theory) sin firm donations may be an influence by mimetic isomorphism which in reality may have few economically sound benefits.

5.3. Industry Specific Effects

Looking at the industry-specific results, what is most apparent is that the weapons industry is deviating. This industry is indicating positive relationships between donations and risk, with high statistical significance in all three models. This stands in direct contrast to the otherwise unanimous results showing negative relationships. Seeing these results, it seems plausible that corporate donations for firms in the weapons industry are increasing share price drops following negative publicity instead of (as for the other industries and overall sample) "cushioning" price drops. This would imply that the public perception of weapon firm donations is different from that of other industries of this study. Our main results indicate a mitigating effect of donations on risk and no significant effect on returns. As to why the effect would be adverse in the weapons industry we can only speculate. The "triumvirate of sin" (i.e alcohol, tobacco and gambling) are the industries most widely considered to be sinful, while the public perception of the weapons industry has been considered to be more unclear in previous studies. Grougiou et al. (2016), however, argues that small firearm manufacturers are increasingly considered as the facilitators of firearm misuse.

Our result could be interpreted as that the weapons industry is even more stigmatized than the "triumvirate of sin" and the public perceives donations from these firms as cover for other opportunistic activities. This again emphasizes the complexity of legitimacy and CSR related to sin stocks. Two industries (consider alcohol and weapons in this case) can both be considered "sinful" industries (as motivated in the variable definition). Yet, the indicated effects of the same activity are opposite in these two industries. This would speak against Deegan's (2019) notion that legitimacy is a dichotomous state. The recent studies by Ghouma and Hewitt (2019) and Oh, Bae and Kim (2017) suggest adverse effects of overall CSR performance and CSR advertising, both for returns and risk in sin firms, implying an illegitimate view of sin firms. Our results, however, indicate that donations are perceived as legitimate in the same type of sin firms. Nevertheless, also for donations there are differences between industries. This could be interpreted as that there are in fact different levels of legitimacy, rather than a dichotomous state. Sin firms overall are not "legitimate enough" for the public to receive overall CSR performance or CSR advertising positively. However, sin firms overall are "legitimate enough" for the public to receive certain CSR activities, such as charitable donations, positively. While certain sin industries, such as the weapons industry, are not "legitimate enough" even for the public to perceive charitable donations as positive.

A different interpretation of the deviating results for the weapons industry could be that stakeholder sentiments do in fact differ significantly from those towards the triumvirate of sin. The inclusion or exclusion of firearm manufacturers in the definition of sin stocks have been widely discussed in previous research. Our decision to include the weapon industry was based on the reasoning of Grougiou et al. (2016, p.906): *"firearm manufacturers and retailers are increasingly considered as the facilitators of tragedies relating to small firearms misuse".* However, looking at the results it is evident that the results of the weapons industry are much more similar to those of donations in non-sin firms. This could plausibly be interpreted as that the risk increases for the same reason as suggested when interpreting the results for non-sin firms, i.e. there are no stakeholder demands for donations because the industry is not stigmatized, and firms have nothing to compensate for in the public eye. And donations initiated without foundation in stakeholder demands are not value-maximizing. From this perspective, the weapons industry should not be included in the definition of sin. Therefore, we have also run our results exclusively for the triumvirate of sin, and consequently obtained a much stronger result.

5.4. Effects on Future Performance

The results on the effects of sin donations on *IR* and *Alpha* in the subsequent year are similar to those in the same year, i.e. there are indications of mitigating effects on *IR* and no coherent effects on *Alpha* also for the year following corporate donations. This could be expected for two reasons. One is that investors and stakeholders might require some time to absorb and interpret corporate donations, and relate them to the view of the sin firm and the pre-existing idea about the legitimacy of the firm. Since the data in this study is yearly, donations could have been made late in the year and might not be effective until the following year. Another interpretation could be that legitimacy effects tend to be sticky. If a sin firm donates in one year and investors and stakeholders respond positively to this, then it would seem that this perception of legitimacy sticks also for the following year and perhaps longer than that. This study has only investigated the effects donations have in the subsequent year. Future studies will have to determine if there can be effects in the even longer term.

6. Conclusion

Corporate social responsibility (CSR) has received increasing attention from the popular press in general, and academics, and the investment community in particular in the past decade. Corporations are increasingly integrating CSR as part of their business strategies. CSR is a particularly complex subject in sin stock settings, and although sin firms have been shown to engage more in CSR than non-sin firms there are still uncertainties to the actual effects of CSR in sin stocks. Some recent studies have suggested adverse effects of CSR in sin stocks. Although, these studies (and a majority of all studies on CSR in sin stocks) examines the effects of overall CSR performance, and we identify a lack of research on individual sub-categories of CSR. A major dimension of CSR is corporate philanthropy, with corporate donations being the most common form. In 2018, corporations in the US alone accounted for $20.05 billion in donations – a 5.4 percent increase from the previous year and an increase of over 40 percent compared to 2009. Despite the ample role of corporate donations in CSR, and a large body of literature related to CSR effects in sin stocks, there are to the best of our knowledge no studies on the effect of corporate donations in sin stocks. This study takes a quantitative approach to further the understanding of CSR in sin stocks, and specifically to shed light on the individual effects of the major CSR sub-category that is corporate donations. Using a sample of listed sin stocks from the North American and European markets, from the period 2009 to 2018, this study sets out to tests two main hypotheses: (1) Corporate donations are negatively related to abnormal returns in sin stocks, and (2) corporate donations decrease idiosyncratic risk in sin stocks.

Our results indicate that there is no relationship between corporate donations and abnormal returns. However, we find a strong negative relationship between donations and idiosyncratic risk in sin stocks, indicating (consistent with the prediction of this study) that sin firm donations do in fact mitigate idiosyncratic risk. We argue that this is due to a positive legitimacy effect of donations, “cushioning” the share price effects of negative publicity. Interestingly, our results show an opposite effect for non-sin firms, with significant increases in risk following donations. We make the conjecture that it is differences in stakeholder demands between sin firms and non-sin firms that is the reason for these opposing results. We argue that sin firms have higher demands to rebalance and compensate for harmful activities, while donations in non-sins are not grounded in stakeholder demands and are therefore not a value-maximizing activity (in line with the notions of Bénabou and Tirole). Additionally, our results suggest that donation effects for the ‘triumvirate of sin’-industries are unanimously decreasing risk, while the weapons industry shows opposite results. We see two possible interpretations of this. One is that the weapons industry is perceived as so illegitimate that donations are publicly perceived as signals of covering other opportunistic activities. The other interpretation is that the weapons industry is in fact not publicly perceived as sinful at all, and the risk increase can be understood from a perspective of low stakeholder demands of compensating. However, the latter interpretation is considered less plausible.

Lastly, our results suggest that corporate donations in one year have similar effects also for the subsequent year.

Our findings contribute to existing literature on CSR in sin stocks by adding a new dimension, investigating a major subcategory of CSR that is previously unexplored in sin stock settings – namely corporate donations. Our result show indications that the sub-activity of donations is negatively perceived by stakeholders to non-sin firms, while previous studies have predominantly suggested positive stakeholder perceptions of *overall* CSR performance. We make the conjecture that different sub-activities can carry significantly different (even opposite) legitimacy properties compared to aggregate CSR, and on the basis of this insight, we suggest for future research to investigate the individual effects of specific CSR sub-activities, rather than overall CSR performance which has been the prevalent approach. We speculate that the opposing results between donations and overall CSR might be related to higher media attention of environmental issues, and consequently higher stakeholder awareness and demands. Further studies on these conjectures could be interesting, comparing differences in sin stock stakeholder perceptions between environmental sub-activities of CSR to, for example, social sub-activities. Our findings further contribute to prior research by adding to literature on the general effects of corporate donations, supporting a risk increasing effect from donations in non-sin firms. These findings should not be taken as an indication for non-sin firms to refrain from charitable donations. However, in order to achieve a win-win relation from donations, rather than sacrificing profits for the social good, firms could benefit from ensuring that donation engagements are well aligned with their stakeholders' desires and demands.

While our findings appear clear and robust, there may be some limitations to the generalizability and transferability of the results. Our sample selection has been influenced by the limited availability of data on corporate donations, resulting in a sin firm sample with market capitalizations higher than what can be considered a fair representation of the overall sin firm population. Further, our sample is on North American and European listed firms. Stakeholder sentiments towards what is considered 'sinful' may differ in other regions.

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Appendix 1 – Main regressions with exclusion of observations from 2009.

MODEL	(1)	(2)	(3)	(4)	(5)	(6)
VARIABLES	IR	IR	IR	Alpha (%)	Alpha (%)	Alpha (%)
SINxDON	-0.500**	-0.843	-0.444	0.0248	-0.0329	-0.129**
	(0.206)	(0.530)	(0.481)	(0.0352)	(0.0674)	(0.0649)
Donations/rev (%)	0.589***	0.811	0.535	-0.0273	0.0209	0.102
	(0.204)	(0.518)	(0.472)	(0.0351)	(0.0640)	(0.0633)
Sin	0.163**	2.133***	1.156***	0.00523	0.177	0.266**
	(0.0742)	(0.326)	(0.356)	(0.00743)	(0.155)	(0.117)
Growth (%)	0.00564***	-0.00177	0.00317	0.000822*	-0.000107	-0.000929*
	(0.00168)	(0.00253)	(0.00207)	(0.000421)	(0.000617)	(0.000558)
D/E	0.00188	0.00821*	0.00475	0.000357	0.000755	0.00116
	(0.00392)	(0.00419)	(0.00502)	(0.000544)	(0.000935)	(0.00180)
ROA (%)	0.00426	-0.00300	0.000991	0.000661	0.000812	0.000478
	(0.00447)	(0.00529)	(0.00423)	(0.000758)	(0.00113)	(0.00114)
Reinvestment	0.168	-1.849***	-1.294*	0.00518	-0.140	-0.150
	(0.342)	(0.646)	(0.717)	(0.0539)	(0.341)	(0.245)
Operating_lev	0.00373	-0.00964	0.000446	0.000689	0.000646	-0.00261
	(0.0108)	(0.0117)	(0.0111)	(0.00178)	(0.00431)	(0.00441)
Debt/ebitda	-0.00978	0.0354	0.0289	0.00224	0.00447	0.00617
	(0.0156)	(0.0268)	(0.0254)	(0.00283)	(0.00532)	(0.00470)
Log_mktcap	-0.471***	0.556***	-0.416**	-0.00431	0.104***	0.190***
	(0.0468)	(0.176)	(0.198)	(0.00553)	(0.0397)	(0.0506)
Constant	2.167***	-1.574**	1.455**	0.0181	-0.381***	-0.625***
	(0.192)	(0.601)	(0.676)	(0.0251)	(0.141)	(0.170)
Observations	694	694	694	694	694	694
R-squared	0.262	0.559	0.682	0.033	0.190	0.303
Number of company_id		106	106		106	106
Prob > f	0.000	0.000	0.000	0.000	0.000	0.000
Fixed year /Fixed firm	**No/No**	**No/Yes**	**Yes/Yes**	**No/No**	**No/Yes**	**Yes/Yes**

Robust standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

Appendix 2 – List of North American and European stock exchanges included in the initial screening.

AIM	LJSE
AMEX	LSE
ASX	MISX
ATSE	MTSE
BDL	MUN
BDM	NasdaqCM
BELEX	NasdaqGM
BIT	NasdaqGS
BME	NGM
BSSE	NSEL
BST	NYSE
BUL	OB
BUSE	OFEX
BVB	OM
Catalist	OTCNO
CNSX	OTCPK
CPSE	RISE
CSE	SEHK
DB	SEP
DUSE	SWX
ENXTAM	TLSE
ENXTBR	TSX
ENXTLS	TSXV
ENXTPA	UKR
HLSE	WBAG
HMSE	WSE
ICSE	XTRA
ISE	ZGSE

Appendix 3 – Table of missing values.

VARIABLES	(1) Valid	(2) Missing	(3) Percentage Missing
Alpha (%)	744	0	0
IR	744	0	0
Donations/Rev (%)	744	0	0
Sin	744	0	0
Growth (%)	742	2	0.3%
D/E	731	13	1.7%
ROA (%)	744	0	0
Reinvestment	744	0	0
Operating_lev	744	0	0
Debt/ebitda	744	0	0
Log_mktcap	744	0	0
Alcohol	744	0	0
Tobacco	744	0	0
Gambling	744	0	0
Weapons	744	0	0

Appendix 4 –Main regressions without imputation for missing values.

	(1)	(2)	(3)	(4)	(5)	(6)
VARIABLES	IR	IR	IR	Alpha	Alpha	Alpha
SINxDON	-0.500**	-0.837*	-0.472	0.0151	-0.0187	-0.125*
	(0.212)	(0.500)	(0.454)	(0.0359)	(0.0708)	(0.0649)
Donations/Rev (%)	0.590***	0.735	0.492	-0.0196	0.00616	0.0969
	(0.210)	(0.490)	(0.444)	(0.0357)	(0.0673)	(0.0635)
Sin	0.169**	2.245***	1.390***	0.00968	0.122	0.225**
	(0.0778)	(0.288)	(0.306)	(0.00780)	(0.113)	(0.0960)
Growth (%)	0.00569***	-0.00223	0.00177	0.000773*	0.000126	-0.000779
	(0.00197)	(0.00263)	(0.00240)	(0.000415)	(0.000580)	(0.000565)
D/E	0.00371	0.00781*	0.00604	0.000171	0.000569	0.00111
	(0.00380)	(0.00405)	(0.00548)	(0.000605)	(0.000629)	(0.00147)
ROA (%)	0.00365	-0.00340	0.000588	0.000206	0.000528	0.000353
	(0.00475)	(0.00531)	(0.00448)	(0.000756)	(0.00107)	(0.00110)
Reinvestment	0.217	-2.072***	-1.575**	0.00905	-0.0932	-0.0976
	(0.382)	(0.567)	(0.635)	(0.0513)	(0.231)	(0.183)
Operating_lev	0.00216	-0.00997	-0.00131	-0.000197	0.000521	-0.00309
	(0.0103)	(0.0115)	(0.0102)	(0.00167)	(0.00401)	(0.00413)
Debt/ebitda	-0.0219	0.0285	0.0170	0.000982	0.00656	0.00717
	(0.0150)	(0.0230)	(0.0222)	(0.00288)	(0.00529)	(0.00474)
Log_mktcap	-0.461***	0.554***	-0.301*	-0.00755	0.0546	0.164***
	(0.0491)	(0.149)	(0.177)	(0.00633)	(0.0377)	(0.0452)
Constant	2.127***	-1.519***	1.269**	0.0415	-0.217	-0.500***
	(0.201)	(0.536)	(0.623)	(0.0283)	(0.132)	(0.150)
Observations	729	729	729	729	729	729
R-squared	0.246	0.580	0.699	0.025	0.172	0.301
Fixed year /Fixed firm	**No/No**	**No/Yes**	**Yes/Yes**	**No/No**	**No/Yes**	**Yes/Yes**

Robust standard errors in parentheses

*** p<0.01, ** p<0.05, * p<0.1

Appendix 5 – Main regressions without corrections to outliers.

	(1)	(2)	(3)	(4)	(5)	(6)
VARIABLES	IR	IR	IR	Alpha	Alpha	Alpha
SINxDON	-0.526**	-0.855*	-0.474	0.0172	-0.0174	-0.122*
	(0.213)	(0.501)	(0.454)	(0.0375)	(0.0721)	(0.0663)
Donations/Rev (%)	0.595***	0.745	0.475	-0.0243	0.00198	0.0921
	(0.211)	(0.489)	(0.441)	(0.0372)	(0.0674)	(0.0639)
Sin	0.197**	0.343	0.0175	0.0107	0.173**	0.0748
	(0.0761)	(0.936)	(0.679)	(0.00781)	(0.0663)	(0.0653)
Growth (%)	0.00144	-0.000978**	-0.000365	0.000165	-0.000130	-0.000371***
	(0.00214)	(0.000423)	(0.000795)	(0.000280)	(0.000124)	(9.87e-05)
D/E	-5.08e-05	0.000927	0.000793	4.16e-05***	-0.000367**	-0.000341
	(5.22e-05)	(0.000583)	(0.000562)	(1.02e-05)	(0.000141)	(0.000218)
ROA (%)	0.00478	-0.00424	-0.000358	0.000596	0.000828	0.000638
	(0.00490)	(0.00531)	(0.00421)	(0.000792)	(0.00108)	(0.00111)
Reinvestment	0.0536***	0.110	0.0831	0.00183	-0.0109	0.00951
	(0.0121)	(0.110)	(0.0779)	(0.00207)	(0.00714)	(0.00712)
Operating_lev	-0.000120***	-5.01e-05***	-2.45e-05***	1.44e-05***	2.15e-05***	1.07e-05***
	(5.88e-06)	(5.34e-06)	(7.74e-06)	(8.55e-07)	(1.40e-06)	(1.81e-06)
Debt/ebitda	-0.0169	0.0268	0.0150	0.00181	0.00985*	0.00933**
	(0.0153)	(0.0203)	(0.0194)	(0.00310)	(0.00505)	(0.00440)
Log_mktcap	-0.471***	0.518***	-0.290*	-0.00683	0.0565	0.149***
	(0.0466)	(0.151)	(0.174)	(0.00654)	(0.0369)	(0.0452)
		(0.949)	(0.724)		(0.0767)	(0.0843)
Constant	2.183***	-1.480***	1.191*	0.0372	-0.244*	-0.473***
	(0.177)	(0.533)	(0.609)	(0.0275)	(0.130)	(0.151)
Observations	744	744	744	744	744	744
R-squared	0.238	0.571	0.692	0.020	0.177	0.301
Fixed year /Fixed firm	**No/No**	**No/Yes**	**Yes/Yes**	**No/No**	**No/Yes**	**Yes/Yes**

Robust standard errors in parentheses

*** p<0.01, ** p<0.05, * p<0.1

Appendix 6 – Main regressions with trimming winsorizing of outliers.

VARIABLES	(1) IR	(2) IR	(3) IR	(4) Alpha	(5) Alpha	(6) Alpha
SINxDON	-0.484**	-0.830	-0.433	0.0197	-0.0229	-0.138**
	(0.211)	(0.506)	(0.462)	(0.0353)	(0.0698)	(0.0642)
Donations/Rev (%)	0.581***	0.750	0.467	-0.0236	0.0127	0.111*
	(0.209)	(0.495)	(0.448)	(0.0352)	(0.0672)	(0.0632)
Sin (non standard.)	0.154*	-0.124	-0.0858	0.00800	-0.0344	-0.00950
	(0.0784)	(0.130)	(0.169)	(0.00794)	(0.0223)	(0.0278)
Growth (%)	0.00591***	-0.000327	0.00355*	0.000675**	0.000113	-0.000759
	(0.00191)	(0.00235)	(0.00197)	(0.000334)	(0.000563)	(0.000507)
D/E	0.00879*	0.00607	0.00373	0.000115	0.000846	0.00102
	(0.00468)	(0.00598)	(0.00843)	(0.000378)	(0.000673)	(0.00116)
ROA (%)	0.00348	-0.00313	0.000601	0.000889	0.00154	0.00159
	(0.00496)	(0.00552)	(0.00460)	(0.000721)	(0.000980)	(0.000979)
Reinvestment	-0.374	-2.555***	-1.987**	0.0189	-0.175	-0.194
	(0.550)	(0.816)	(0.806)	(0.0988)	(0.299)	(0.237)
Operating_lev	0.0134	-0.0115	-0.0130	0.000207	0.00315	0.00212
	(0.0133)	(0.0154)	(0.0137)	(0.00244)	(0.00450)	(0.00434)
Debt/ebitda	-0.0255	0.0402	0.0328	0.00176	0.00675	0.00647
	(0.0171)	(0.0273)	(0.0251)	(0.00302)	(0.00613)	(0.00555)
Log_mktcap	-0.453***	0.540***	-0.305	-0.00454	0.0425	0.144***
	(0.0491)	(0.158)	(0.191)	(0.00658)	(0.0363)	(0.0431)
Constant	2.095***	-2.033***	1.250	0.0216	-0.162	-0.495***
	(0.203)	(0.632)	(0.754)	(0.0305)	(0.143)	(0.164)
Observations	710	710	710	710	710	710
R-squared	0.242	0.569	0.694	0.019	0.152	0.290
Fixed year /Fixed firm	**No/No**	**No/Yes**	**Yes/Yes**	**No/No**	**No/Yes**	**Yes/Yes**

Robust standard errors in parentheses

*** p<0.01, ** p<0.05, * p<0.1

Appendix 7 – Simultaneous bias test

MODEL VARIABLES	(1) SINxDON	(2) SINxDON	(3) SINxDON	(4) SINxDON	(5) SINxDON	(6) SINxDON
IR	0.0668	-0.00295	0.00972			
	(0.0572)	(0.0108)	(0.0137)			
Alpha (%)				-0.0368	-0.0194	-0.0553
				(0.0394)	(0.0354)	(0.0361)
Growth (%)	-0.00303	-0.000811	-0.00103	-0.00264	-0.000801	-0.00104
	(0.00252)	(0.000618)	(0.000708)	(0.00224)	(0.000607)	(0.000722)
D/E	-0.00236	-0.00369	-0.00361	-0.00215	-0.00370	-0.00349
	(0.00155)	(0.00341)	(0.00332)	(0.00136)	(0.00346)	(0.00331)
ROA (%)	0.00159	-0.00162	-0.00174	0.00190	-0.00159	-0.00170
	(0.00188)	(0.00260)	(0.00267)	(0.00210)	(0.00255)	(0.00265)
Reinvestment	-0.290	-0.000148	0.0110	-0.284	0.00424	-0.0111
	(0.222)	(0.0825)	(0.0860)	(0.219)	(0.0700)	(0.0861)
Operating_lev	0.000268	0.000439	-0.000270	0.000851	0.000499	-0.000421
	(0.00365)	(0.00180)	(0.00186)	(0.00347)	(0.00181)	(0.00186)
Debt/ebitda	0.00473	-0.00321	-0.00306	0.00406	-0.00314	-0.00240
	(0.00915)	(0.00425)	(0.00374)	(0.00985)	(0.00435)	(0.00368)
Log_mktcap	0.0154	0.0395	0.0720*	-0.0140	0.0392	0.0776
	(0.0185)	(0.0429)	(0.0427)	(0.0396)	(0.0413)	(0.0474)
Constant	-0.0106	-0.0632	-0.159*	0.132	-0.0683	-0.147
	(0.106)	(0.0953)	(0.0888)	(0.218)	(0.103)	(0.102)
Observations	744	744	744	744	744	744
R-squared	0.022	0.916	0.916	0.014	0.916	0.916
Fixed year /Fixed firm	**No/No**	**No/Yes**	**Yes/Yes**	**No/No**	**No/Yes**	**Yes/Yes**

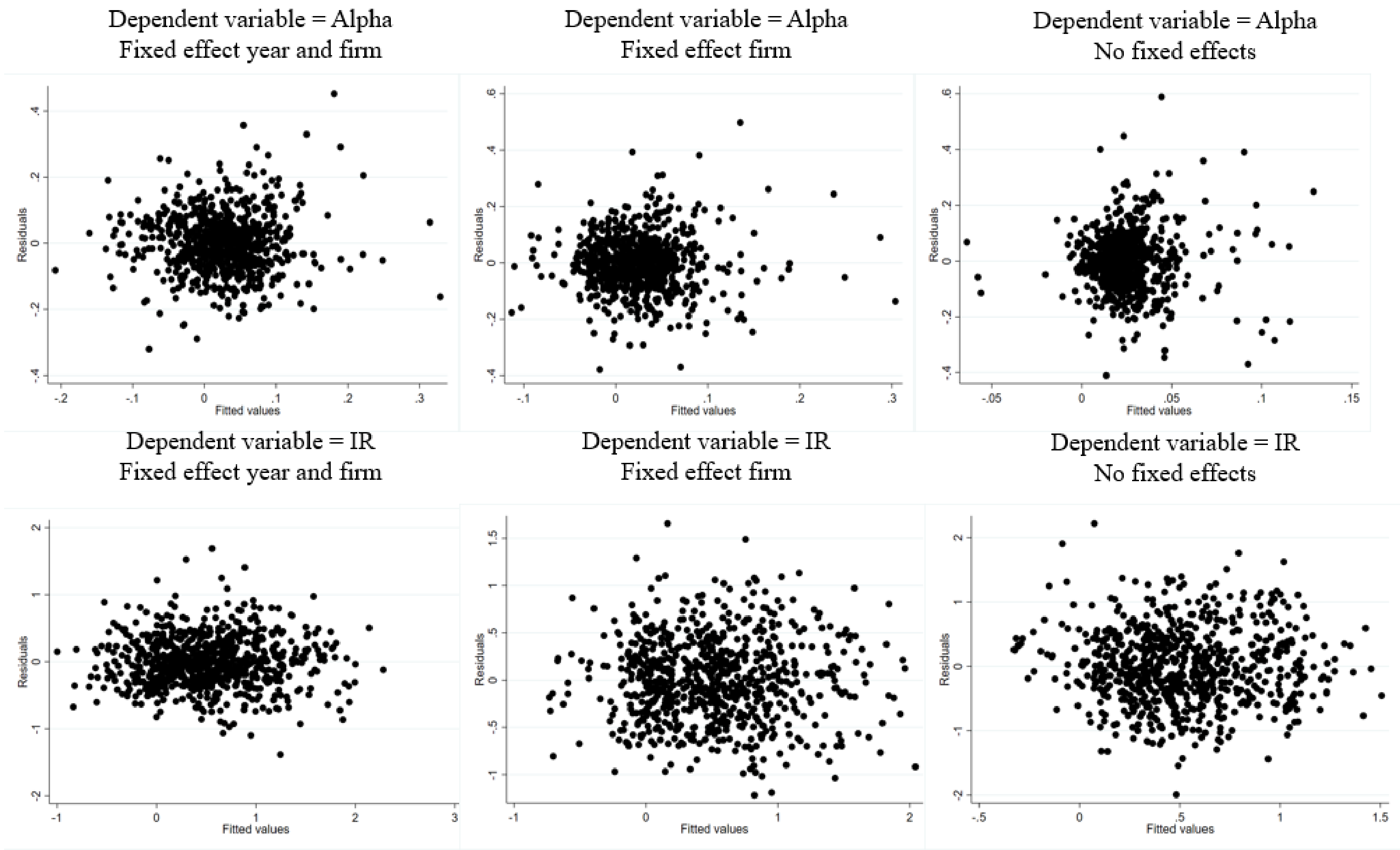
Robust standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

Appendix 8 – Simultaneous bias test (lagged variables)

MODEL VARIABLES	(1) SINxDON	(2) SINxDON	(3) SINxDON	(4) SINxDON	(5) SINxDON	(6) SINxDON
IR.1	0.0720	-0.00459	0.00480			
	(0.0574)	(0.00817)	(0.00529)			
Alpha.1				0.0658	-0.0640	-0.0785
				(0.0562)	(0.0527)	(0.0617)
Growth (%)	-0.00256	-0.000671	-0.000828	-0.00219	-0.000655	-0.000843
	(0.00208)	(0.000497)	(0.000550)	(0.00181)	(0.000480)	(0.000559)
DE	-0.00199*	-0.00359	-0.00339	-0.00202*	-0.00366	-0.00342
	(0.00109)	(0.00335)	(0.00319)	(0.00107)	(0.00333)	(0.00313)
ROA (%)	0.000729	-0.00202	-0.00213	0.00107	-0.00196	-0.00212
	(0.00151)	(0.00279)	(0.00281)	(0.00166)	(0.00282)	(0.00286)
Reinvestment	-0.252	-0.000754	0.0149	-0.243	0.00855	0.0205
	(0.203)	(0.0966)	(0.102)	(0.200)	(0.0970)	(0.110)
Operating_lev	0.00139	-0.000708	-0.00132	0.00217	-0.000495	-0.00106
	(0.00343)	(0.00138)	(0.00155)	(0.00336)	(0.00140)	(0.00153)
Debt/ebitda	0.00947	0.00130	0.00105	0.00909	0.000874	0.000702
	(0.00956)	(0.00530)	(0.00475)	(0.0101)	(0.00515)	(0.00465)
Log_mktcap	0.0283*	0.0137	0.0343	-0.00379	0.0164	0.0425
	(0.0146)	(0.0262)	(0.0315)	(0.0303)	(0.0273)	(0.0369)
Constant	-0.0833	-0.00648	-0.0684	0.0674	-0.0188	-0.0767
	(0.0709)	(0.0598)	(0.0682)	(0.166)	(0.0577)	(0.0774)
Observations	638	638	638	638	638	638
R-squared	0.025	0.925	0.926	0.013	0.925	0.926
Fixed year /Fixed firm	**No/No**	**No/Yes**	**Yes/Yes**	**No/No**	**No/Yes**	**Yes/Yes**

Robust standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

Appendix 9 – Plots of predicted residuals in relation to the fitted values.



Appendix 10 – GMM results with non-standardized coefficients and standard deviations.

Number of Steps	2-step	1-step	2-step	1-step
MODEL	(1)	(2)	(3)	(4)
VARIABLES	IR	IR	IR	IR
Growth (%)	0.00551***	0.00521***	0.00470***	0.00464***
	(0.00203)	(0.00162)	(0.00162)	(0.000963)
DE	0.00286	0.00188	0.00171	0.00151
	(0.00370)	(0.00366)	(0.00386)	(0.00227)
ROA (%)	0.00355	0.00485	0.00210	0.00294
	(0.00441)	(0.00428)	(0.00414)	(0.00243)
Reinvestment	0.0167	0.0481	-0.0681	-0.0527
	(0.353)	(0.312)	(0.319)	(0.246)
Operating_lev	-0.000438	-0.000326	0.00152	0.00162
	(0.0134)	(0.0108)	(0.0111)	(0.00642)
Debt/ebitda	-0.0284**	-0.0236*	-0.0340***	-0.0322***
	(0.0137)	(0.0128)	(0.0126)	(0.00856)
Log_mktcap	-0.476***	-0.467***	-0.485***	-0.477***
	(0.0513)	(0.0463)	(0.0451)	(0.0253)
Donations/rev (%)	0.633***	0.615***	0.656***	0.639***
	(0.214)	(0.211)	(0.213)	(0.153)
SINxDON	-0.565**	-0.542**		
	(0.217)	(0.213)		
Sin	0.243***	0.218***		
	(0.0747)	(0.0712)		
TRIxDON			-0.606***	-0.586***
			(0.216)	(0.158)
Tri			0.311***	0.292***
			(0.0740)	(0.0423)
y_2009	-0.0727	-0.0810	-0.0695	-0.0751
	(0.0889)	(0.0874)	(0.0818)	(0.0729)
y_2010	-0.200**	-0.209**	-0.198**	-0.204***
	(0.0863)	(0.0826)	(0.0816)	(0.0732)
y_2011	-0.428***	-0.419***	-0.421***	-0.417***
	(0.0870)	(0.0829)	(0.0799)	(0.0722)
y_2012	0.0476	0.0476	0.0553	0.0518
	(0.0718)	(0.0684)	(0.0676)	(0.0712)
y_2013	0.229***	0.213***	0.223***	0.213***
	(0.0805)	(0.0779)	(0.0761)	(0.0697)
y_2014	0.231***	0.216***	0.223***	0.214***
	(0.0698)	(0.0671)	(0.0654)	(0.0688)
y_2016	-0.0819	-0.0852	-0.0817	-0.0814
	(0.0539)	(0.0520)	(0.0508)	(0.0581)
y_2017	0.659***	0.647***	0.655***	0.653***
	(0.0619)	(0.0606)	(0.0590)	(0.0585)
y_2018	0.315***	0.306***	0.310***	0.311***
	(0.0753)	(0.0735)	(0.0714)	(0.0584)
Constant	2.091***	2.055***	2.148***	2.117***
	(0.213)	(0.191)	(0.185)	(0.107)
Observations	744	744	744	744
Number of company_id	106	106	106	106
Hansen j > P	0.112	0.112	0.681	0.353
Arellano-Bond Auto-corr (1)/(2)	0.000/0.063	0.000/0.065	0.000/0.064	0.000/0.154

Robust standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1