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MASTER'S THESIS

SIN STOCK RETURNS IN EMERGING MARKETS

Ljubljana, November 2022 MARK PETEJAN

AUTHORSHIP STATEMENT

The undersigned Mark Petejan, a student at the University of Ljubljana, School of Economics and Business, (hereafter: SEB LU), author of this written final work of studies with the title Sin Stock Returns in Emerging Markets, prepared under supervision of prof. dr. Aleš Ahčan.

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LIST OF ABBREVIATIONS

bps – Basis Points

CAPM – Capital Asset Pricing Model

CMA – Conservative Minus Aggressive

EM – Emerging Markets

ESG – Environmental, Social and Governance

EUR – Euro

FTSE – Financial Times Stock Exchange

HML – High Minus Low

ICB – Industry Classification Benchmark

MOM – Momentum

MSCI – Morgan Stanley Capital International

NASDAQ – National Association of Securities Dealers Automated Quotations

NYSE – New York Stock Exchange

RF – Risk-Free Rate

RMW – Robust Minus Weak

SMB – Small Minus Big

USD – United States Dollar

INTRODUCTION

According to the Cambridge dictionary (2021), sin is defined as "the offence of breaking, or the breaking of, a religious or moral law". In line with this, stocks of the companies that generate their revenue by taking advantage of human vulnerabilities are referred to as sin stocks or vice stocks. As the demand for their products or services stems from the human weaknesses, they are frequently considered as unethical and consequently, the public often disapproves of them.

One of the first industries, whose products or services have been branded as sinful, are alcohol and gambling industries. As medical research evolved and began acknowledging the negative effects of tobacco consumption, the stocks of the companies involved in the tobacco industries have also become recognised as sin stocks. Today alcohol and tobacco manufacturing and distribution industries together with gambling industry represent the three main activities in the world of sinful businesses. (Hong & Kacperczyk, 2009)

Even though the definition of sin stocks is straightforward, a robust classification has not yet been implemented. Consequently, stocks from other industries such as adult entertainment, weapons, nuclear energy, and marijuana industries might also be considered vice stocks (Blitz & Fabozzi, 2017). Although only marijuana industry also preys on the biopsychological vulnerability of addiction (Cox et al., 2020; Ferland & Hurd, 2020) for their profits, the other major industries can be considered sinful as well but for different reasons. Adult entertainment is considered sinful as their profits open a high risk for sexual exploitation (Dank et al., 2019) and human trafficking (Tocci, 2014), nuclear industry on the other hand can pose high risk for the environment and health issues especially via nuclear waste (Kaya, 2001; Kelly-Reif & Wing, 2016). Moreover, the conceptualisation of a sin product or service varies in different countries as the understanding of a sinful or vice activities are also influenced by different cultures, social norms, or religions (Blitz & Fabozzi, 2017).

In the world of finance, sin stocks are frequently wrongfully understood as a synonym for the unethical stocks. Although all sin stocks are considered unethical, not all unethical stocks are sin stocks. For example, the tobacco industry sustains their products' level of demand by the exploitation of the addictive potency of their product for the consumers, which is an evident exploitation of human biopsychological predispositions and thus, the stocks are sinful and unethical. On the other hand, the company that does not implement the necessary environmental safety policies and safeguards to reduce the pollution levels is considered to be unethical, but not sinful, as its manufacture or distribution of products is not relying upon the consumers' weaknesses.

With the growing importance of socially responsible investment (hereafter abbreviated as SRI), many investors have become conscious of the type of stocks they include in their portfolios. This kind of attentiveness is portrayed especially by the institutional investors,

for example pension funds, universities, religious organisations, banks, and insurance companies (Hong & Kacperczyk, 2009). It has been suggested that many individuals and institutions value the importance of not being affiliated with unethical activities and maintaining a good reputation over the importance of additional diversification, which might result in potential additional financial gain (Derwall, Koedijk, & Ter Horst, 2011).

The most socially responsible investors go even a step further, by not only excluding the most unethical stocks, but by only including the most ethical stocks in their portfolios. They do not exclude only stocks of companies producing products which are frowned upon by the public, but they, for example, also exclude stocks of companies with poor environmental track records. (Kreander, Gray, Power, & Sinclair, 2005) Companies are evaluated based on the environmental, social and governance (frequently abbreviated as ESG) criteria. The environmental criteria evaluate the impact of company towards the nature; the social criteria assess how a company treats its employees, partners, customers, and the general population; and finally, the governance criteria evaluate the company's leadership, transparency and the rights of equity holders (Lobe & Walkshäusl, 2016).

When investors are in search of companies with highly ethical policies, they conduct a positive screening, which is done using the ESG criteria. Furthermore, they also apply negative screening based on the industry the companies are involved in (Halbritter & Dorfleitner, 2015). Investors seeking to be socially responsible with their investments often avoid companies involved in industries, which are frowned upon, for example, companies which are involved in the alcohol, tobacco, gambling, marijuana, weapons, and adult entertainment business. Put in other words, investors looking for socially responsible investment tend to avoid the equity ownership of companies, which are active in industries that are believed to be disapproved by the general public. They do so despite the fact that these companies might be highly conscious about the environmental protection, put much effort in providing safe, stable and generally good working conditions for its employees, give back to the community and conduct their business as transparently as possible. However, they are excluded only due to the nature of their products. (Kim & Venkatachalam, 2011)

Much research on the topic of sin stock returns suggests (Salaber, 2007; Hong & Kacperczyk, 2009; Durand, Koh, & Limkriangkrai, 2013) that sin stocks offer higher returns compared to the general market. On the other hand, other studies suggest that the sin stock excess returns can be observed due to other reasons, such as the use of inadequate asset pricing models, which lack the explanatory power (Blitz & Fabozzi, 2017).

Despite the differences in the theoretical perspectives among researchers, they nonetheless share a mutual point. More specifically, most of the research on sin stock returns is based on stocks originating from developed markets, such as the USA, the most developed European countries, and the most developed Asian countries. At least to my knowledge, there is no

research focusing solely on sin stocks originating from emerging markets as an entity, but rather on individual emerging markets or small clusters of emerging markets.

Like certain investors tend to avoid the sin stocks due to risks associated with the investments (e.g. negative perception by the public), similarly stocks on the emerging markets are also associated with risks for which reason certain investors refrain from buying them. More specifically, emerging markets are often described as fast-growing markets, offering high stock returns at the cost of a high volatility, which may play as a deterring effect for more risk-averse investors. They are also known for higher transaction costs, which significantly impact the net gains of the investors (Kargin, 2002). Compared to the developed markets, they are in general smaller, offer lower liquidity and are less transparent (Bruner, Conroy, Li, O'Halloran, & Lleras, 2003). All the above has however not deterred away the investors seeking higher profits at the cost of higher risk. With the increasing liberalisation in the 90s, the developing countries opened their gates to the foreign capital and became a popular option for investors with higher risk tolerance (Bekaert & Harvey, 2003). This could, for example, clearly be seen after the 2008 financial crisis, when opportunity hungry private investors flooded the emerging economies with their capital, hoping to take advantage of the increased volatility in these markets at that time (Ahmed & Zlate, 2014).

Like sin stocks, no uniform classification standard for emerging markets has been accepted yet. Multiple financial institutions, such as the International Monetary Fund, Morgan Stanley Capital International (hereafter abbreviated as MSCI) and Russell Investments, developed own classification standards based on various economic indicators. However, when comparing the lists of the countries many differences can be noticed, suggesting the interpretation remains subjective at least to a certain degree.

Problem discussion

Much research on sin stock returns suggests the increasing importance of socially responsible investing, where investors' avoidance of the controversial stocks leads to market imperfections, such as the undervaluation of the sin stocks only due to the nature of their products or services. As a result of their avoidance and further undervaluation, these stocks therefore offer higher expected returns compared to the rest of the market, essentially representing an opportunity for an additional financial gain for investors who do not put much emphasis on the ethics of the stocks included in their portfolios.

According to the efficient market hypothesis in its strongest form, the equity prices should completely reflect the available information. This means that no investor should have the possibility to obtain additional information, which would give them an upper hand, since any major events concerning the company would immediately be followed by an according adjustment in its stock price. Thus, since stocks always trade at their fair price, there should be no possibility to consistently predict excess returns and the only way for an investor to increase his/her returns is to take additional risk.

Aim

Most of the existing research on the topic of sin stock returns and their anomalies is based on stocks originating from developed markets. In the present thesis it will be attempted to expand this research area and investigate whether operating under the emerging markets' conditions has any significant effect on the sin stock returns. More specifically, the present study was guided by the following research question: Can any significant excess returns be observed in the stocks from the alcohol, tobacco and gambling industries when comparing them to the returns of their neutral comparable industries in emerging markets?

Based on this research question the following hypotheses were formulated:

Hypothesis 1: The emerging markets sin portfolio will outperform its neutral counterpart.

Hypothesis 2: The emerging markets sin industries sub portfolios will outperform their corresponding neutral counterparts.

Hypothesis 3: Differences in the sin stock returns between the advanced and secondary emerging markets will be observed.

This will be examined by adopting multiple methodologies and various asset pricing models, which makes it possible to compare the findings to the findings of the research based on the stocks originating from the developed markets.

Although the present thesis only focuses on the existence of sin stocks excess returns, it offers a foundation for further research on how various factors, such as culture, dominant religion, political arrangement, taxation of sin products or services, governmental combat against the negative effects and addiction to sin products or services specific to individual emerging markets, affect the sin stock returns and the institutional ownership of sin stocks.

1 THE ESSENCE OF SIN INDUSTRIES

The human vulnerability exploited by three major sin industries – alcohol, tobacco and gambling industries, is the biopsychological predisposition for developing an addiction to their products. Consequently, their production, distribution and finally their profit depend upon people becoming addicted, regardless of the substantial socioeconomic costs it causes for the individuals and society as a whole. (Waxler, 2004)

Despite this, there has been an immense increase in the net of passive investors without any reservations for investing in sin stocks, which has directly resulted from an increase in the market share of passive investing (Blitz & Swinkels, 2021b). Moreover, a great majority of passive investors continues to purchase their stocks in accordance with the standard indices, such as MSCI World, which does not make stock exclusions based on ethical or moral questionability (Blitz & de Groot, 2019). On the other hand, the active investors in sin stocks

are motivated by their belief in high returns from these stocks. By holding an overweight position in certain stocks, they are actively betting against the investors who exclude the same stocks (Blitz & Swinkels, 2021a).

1.1 Alcohol

In many countries the production and consumption of alcoholic beverages represent an important part of culture. However, there is also a grimmer side to the alcoholic beverage industry. The consumption of the alcohol industry products can lead to alcohol abuse, which is associated with higher rates of aggression as well as violence, as it leads to a lowered impulse control and consequently to a higher likelihood for disinhibition leading to violent confrontations (e.g. family violence, intimate partner violence). The research shows that higher prevalence of alcohol abuse is associated with lower socio-economic status, lower education, unemployment, and financial insecurities. Alcohol abuse has also been considered as a risk factor for mental health difficulties – especially depression, psychotic disorders, and suicide. (American Psychiatric Association, 2013)

The great estimates of the societal costs were associated with the alcohol use, which are assessed by cost-by-illness studies. The results of a systematic review conducted by Manthey and colleagues (2021) showed that the alcohol use related costs (direct and indirect) amount up to 1306 Int$ or 2,6% of a country's GDP. Moreover, they found that only 38,8% of the entire alcohol-attributed costs are direct costs, whereas 61,2% are indirect costs resulting from the losses of productivity.

With globalisation, a concentration of ownership in the alcoholic beverage industry can be observed, with few large companies dominating the global market (Jernigan, 2009). A total net revenue of USD 155 billion in 2005 was produced only by the 26 largest alcoholic beverage companies (Impact Databank, 2007). Not only does the domination of a small number of companies enable them to obtain significant profits, but also enables the high marketing spending, making it highly difficult for new companies to enter the market (Jernigan & Ross, 2020). Moreover, a recent systematic review has found that alcohol industry actors have a profoundly strategic, well organised, and rhetorically sophisticated approach to influencing the national policymaking when perusing their commercial interests (McCambridge, Mialon, & Hawkins, 2018).

1.2 Tobacco

Smoking or the chewing of tobacco leaves was a part of many cultures throughout history. It was a part of religious rituals or just an everyday habit. Even though some research already correlated tobacco product consumption with various health risks, it was still widely advertised during a big part of the 20th century (Musk & De Klerk, 2003). During the world wars cigarettes were distributed to soldiers, sometimes they were even parts of the daily

rations, cigarette smoking was present in many children's cartoons, and it was in some cases even endorsed by doctors (Orleans, Slade, & Slade, 1993). Only in the late 20th century, some governments slowly begun implementing regulations limiting the sales and advertisement of tobacco products; however, even the countries which put great effort in decreasing the tobacco product consumption and have the strictest regulations concerning tobacco products still observe their wide use (Musk & De Klerk, 2003).

Like the alcoholic beverage industry, the tobacco industry is exploiting the high addiction potency of nicotine, even though due to tobacco use more than 8 million people die on a yearly basis worldwide, with most deaths occurring in the low- and middle-income countries, as they are especially targeted by the tobacco industry marketing (World Health Organization, 2021). People with lower education and low incomes are more likely to become nicotine users and less likely to cease the usage (American Psychiatric Association, 2013).

Only the healthcare costs of nicotine dependence per person were assessed to be 835 EUR in Denmark (Rasmussen & Sogaard, 2000) and 856 EUR in Germany (Ruff, Volmer, Nowak, & Meyer, 2000). In India researchers reported that in 2011 the total economic cost of nicotine use-related diseases for the middle-aged group amounted approximately to 22.4 billion US dollars (Shah, Dave, Shah, Mehta, & Dave, 2018).

Despite the detrimental effects of the tobacco smoking on one's health and consequential lawsuits that put billions at stake, the tobacco industry has won 75% of all of the lawsuits against them since 1996 up to 2004 in the USA. When the industry is not successful in the litigation process, the damages that the industry has to pay can be astronomical. For example, Philip Morris had to pay USD 100 billion to recoup the health costs associated with smoking in 1998. However, researchers are estimating that the risk associated with litigation has decreased over the years, but the new risk has arisen – an increase in taxes. The raise in the taxation of the tobacco products was primarily done in an attempt to reduce tobacco consumption. (Waxler, 2004)

Despite the World Health Organisation's (WHO) Framework Convention on Tobacco Control (FCTC) in 2003, the tobacco industry continues to obtain significant profits (Bialous & Peeters, 2012). This is largely contributed to the privatisation, mergers and acquisitions resulting in the strong consolidation of four transnational tobacco companies – Philip Morris International, British American Tobacco, Japan Tobacco and Imperial Tobacco, which challenge the implementation of the effectiveness of the WHO's FCTC (Bialous & Peeters, 2012; Gilmore, Fooks, & McKee, 2011).

1.3 Gambling

Gambling is nowadays portrayed as one of the leisure activities. Gambling includes a wide variety of activities, such as card games, roulettes, slot machines, or just betting on various

sport events. In many cities, such as Las Vegas, Monte Carlo and Macau, casinos represent some of the most important tourist attractions. The gambling industry is frequently also connected with other tourism-oriented businesses, such as restaurants, bars, hotels and other providers of tourism products or services. (Waxler, 2004)

Even though many people really see gambling only as an occasional fun activity, some people are more prone to developing a serious addiction, which can significantly impact individuals' life. Pathological gambling or gambling disorder (American Psychiatric Association, 2013), more commonly referred to as gambling addiction, is characterised as an uncontrollable urge to continue with gambling regardless of the consequences it has on one's life (Buth, Wurst, Thon, Lahusen, & Kalke, 2017). Research results indicate a high frequency of interpersonal relationship discordances, financial issues (e.g. bankruptcy, mortgage foreclosures), and legal problems that are especially linked to illegal gambling activities (Potenza et al., 2019). It is associated with at-risk alcohol use, lower socio-economic status, lower education, family history of gambling addictions, poor mental health, and younger age (Buth et al., 2017). Moreover, pathological gambling is highly comorbid with other psychiatric disorders, including alcohol and tobacco dependence, as well as suicide (Potenza et al., 2019).

In 2018, the Swedish societal costs of problematic gambling amounted to 0,30% of their GDP (Hofmarcher, Romild, Spångberg, Persson, & Håkansson, 2020). Moreover, in the USA a yearly cost of one additional person suffering from pathological gambling is estimated to 9393 US dollars (Grinols, 2011).

Despite the profound impact of the gambling on society, the gambling industry continues to grow and evolve with time, and has been considered as a highly stable industry (Waxler, 2004). Prior to the recession, in the USA commercial casino revenues reached an all time best in 2007 with USD 37.4 billion. Although during the recession the gambling industry had a drop in its revenues, they rebounded back to the pre-recession revenue levels in 2012 (Schwartz, 2016). Moreover, the annual gross gambling revenue has been growing for the past 20 years, exceeding the 400,000 million euros in 2019. Although there is sufficient evidence that public policies can reduce gambling-related harm, the revenue produced by the gambling industry is often a financial source supporting the public budgets, and welfare services and programmes, which is often considered to outweigh the negative consequences of gambling (Sulkunen et al., 2021).

1.4 Excluded Industries

Even though this thesis focuses only on three most frequently researched sin industries, there are multiple others, which might be just as sinful or are at least considered sinful by some. However, I decided to exclude them due to various reasons, such as the lack of publicly listed companies representing the industry, obscurity whether they are considered a sin

industry or not, tendency of companies being active in neutral industrial sectors together with a sin industrial sector.

The defence industry is a frequently present industry in the research focused on sin stocks; however, due to the methodology used in the present thesis, I decided to exclude it, since I could not find a relevant industry with a sample of stocks big enough to represent a neutral counterpart. Another reason for excluding it from this research is that many companies active in the defence industrial sector are not exclusively focused on the defence products. Shipyards, aerospace companies, software developers and various others might produce neutral products together with weapons, defence systems and military vehicles. It is therefore unclear whether all the companies producing defence products should be included, no matter what proportion of their revenue originates from these products, or should there be a revenue proportion threshold indicating whether a company should be included or not.

As already mentioned, marijuana industry could, similarly to the alcohol, tobacco and gambling industries, be related to the exploitation of the addictive potency of their products and it could arguably be labelled as a sin industry. On the other hand, marijuana is often used as an alternative to the mainstream medical products, making it difficult to distinguish companies producing products for medical use or for recreational use. It also has very few publicly listed representatives on emerging markets as well as in the world in general.

Adult entertainment industry products and services are strictly considered sinful by most religions and are frowned upon in many cultures. Additionally, it is often associated with human trafficking and the exploitation of sex-workers. Even though it can clearly be labelled as a sin industry, I had to exclude it from this research due to the lack of publicly listed companies.

Some research also labelled nuclear energy industry as sinful due to the nuclear waste produced in the energy production processes; however, I believe labelling it as unethical is more appropriate. It does not directly exploit human weaknesses, but rather has a negative impact on the environment while producing one of the main commodities. Under the same assumption we could then also include coal and hydroelectric powerplants, due to their impact on the environment, human health or both.

2 LITERATURE REVIEW

2.1 Sin Stocks

In their paper Chen and Bin (2001) focused on two aspects of the gambling industrial sector on the US market. The first topic of research was the response of the casino gaming stocks to changes in regulation and deregulation of gambling activities. They analysed the effects of news regarding the regulation or deregulation of the gambling industrial sector on stock

returns over a 4-and-a-half-year period between July 1993 and December 1997. They found the regulation/deregulation had different effects on gambling institutions and gambling equipment producers based on their size. Deregulation represented a minor; however, positive effect on large casinos, since it arose an opportunity to expand to other states. On the other hand, smaller casinos and gambling equipment producers appeared to be much more sensitive to the news. Deregulation news had a major negative impact on the small casinos, since it represented an expansion opportunity for large out-of-state casinos to another state and furthermore a decrease in traffic of smaller casinos. A deregulation meant positive news for the gambling equipment providers since it enlarged their potential sales market. The second topic Chen and Bin (2001) focused on was the long-term performance of gaming stocks. They compared the systematic risk and risk-adjusted excess returns of gabling stocks to the US stock market average and found the gambling stocks risk-adjusted excess returns varied across different market conditions. The gambling stocks on average offered negative excess-returns and an above-market average systematic risk. After accounting for the market conditions, however, the returns appeared relatively normal with an abnormal risk level compared to the market average.

Salaber (2007) explored the determinants of European sin stocks. More specifically, how the dominant religion in a country, excise taxation on sin products and the litigation risk of sin companies affect the returns of sin stocks. She begun by constructing a sin portfolio, a neutral portfolio, and a zero-investment (long sin stocks short neutral stocks) portfolio consisting of all stocks from respectable industries from all the countries included in her research. She then performed CAPM and Fama and French 3-factor model regression of their returns and found that both the sin portfolio and zero-investment portfolio exhibited positive statistically significant excess returns, while the neutral comparable portfolio exhibited negative statistically significant excess returns, indicating the sin stocks on average outperform the market. She also found that the sin portfolio exhibited a market beta lower than 1, the neutral portfolio exhibited a beta almost equal to 1 and the zero-investment portfolio beta was significantly negative. The 3-factor regression analyses on the sin and zero-investment portfolios both showed heavy loading on the HML factor. To analyse the religion, taxation, and litigation risk effects on the sin stock returns, she formed six portfolios for each determinant, a sin, neutral and zero-investment for Catholic countries and additional three for Protestant countries. Using the same pool of stocks, she also formed sub-portfolios for high excise taxation countries and low excise countries, high litigation rate countries and low litigation rate countries, and countries with a high number of lawyers per capita and a low number of lawyers per capita. All the sub-portfolios were analysed using the CAPM and Fama and French 3-factor model regression analyses. None of the Catholic country sub-portfolios exhibited statistically significant excess returns; however, she observed statistically significant positive excess returns when regressing the Protestant countries sin and zero-investment portfolios on the CAPM market risk factor and when regressing the Protestant countries zero-investment portfolio on the Fama and French 3-factor model factors. The Protestant countries neutral portfolio exhibited negative statistically significant

excess returns for both regressions. Furthermore, the regressions on all three low litigation risk sub-portfolios and three low number of lawyers sub-portfolios returned no significant excess returns, while the regressions on high litigation risk sub-portfolios and high number of lawyers sub-portfolios returned positive statistically significant single-factor model excess returns for both the sin and zero-investment portfolios, and positive statistically significant three-factor model excess returns for the zero-investment sub-portfolio. Both neutral sub-portfolios exhibited significant negative excess returns when regressing on single-factor model factor and three-factor model factors. Lastly, the only regression on low excise sub-portfolios to return statistically significant excess returns was the single-factor model regression on neutral low excise taxation sub-portfolio with negative excess returns. On the other hand, the single-factor model regression analyses on both sin and zero-investment sub-portfolios returns returned statistically significant excess returns, which became insignificant for the sin portfolio, when adding the additional size and value factors to regression. She concluded that the Protestant religion, high litigation risk and high excise taxation factors play a significant role in sin aversion, which results in sin stocks on average performing better than the rest of the stocks in these markets.

In a study conducted by Hong and Kacperczyk (2009) they explored the institutional ownership, analyst coverage and performance of the so-called triumvirate of sin, alcohol, tobacco and gambling stocks on the US market. To explore the institutional ownership of the sin stocks they performed a series of cross-section regressions where they compared the sin stocks to various neutral (non-sin) stocks. They found that approximately 28% of the neutral counterpart stocks are held by institutions, while the sin stocks have and approximately 18% lower institutional ownership ratio and approximately 23% of sin stocks are held by institutions. Based on the findings that institutions appear to be less interested in adding sin stocks to their portfolios, they hypothesised that the companies active in sin industries should also have lower coverage by the analysts producing financial reports and analyses. They performed similar cross-sectional regressions for the analyst coverage and found significant evidence that there is less analyst focus on the sin stocks compared to the rest of the stocks. They continued their research by performing time-series single, three and four factor model regression analyses on zero-investment (long sin stocks short comparable neutral stocks) portfolios. All asset pricing model regression analyses returned statistically significant positive excess returns for the zero-investment portfolio. With their research they provided evidence of social norms affecting the investors. The norm-constrained institutions, such as pension funds, banks, insurance companies and universities tend to avoid ownership of stocks, which are closely related to production, distribution or just general supply of sinful products or services. They also found that the sin stocks significantly outperformed the market in the period between 1965 and 2003.

In her paper Salaber (2009) challenged the theory that norm-based investing results in consistent excess returns of sin stocks compared to more neutral stocks. She formed four hypotheses. Firstly, she hypothesised that excess returns of sin stocks observed in some

previous studies disappear when accounting for various predetermined macroeconomic variables. Her second hypothesis was that sin stocks exhibit higher risk premiums during recessions. Thirdly, she hypothesised that their risk premiums vary more compared to other stocks. And her last hypothesis was that sin stocks earn higher excess returns due to higher earnings growth. Using different variants of the Carhart 4-factor model, she analysed monthly returns of alcohol, tobacco, gambling, and other more neutral non-financial stocks over the period between 1926 and 2005. Her empirical results confirm positive sin stock excess returns; however, she also attributes them to time-varying macroeconomic factors. The excess returns also disappear when comparing sin stock returns to the returns of a control group of industry-comparable stocks. She also confirmed that risk premiums of sin stocks are higher during recessions compared to the periods of economic growth, which she attributes to a steadier product demand compared to other products. She observed that sin stocks exhibit abnormal returns during recession periods; however, these abnormal returns are not present during the periods of economic growth. Lastly, she confirmed that sin stocks are more stable during economic cycles compared to the general market; however, they are not the only option for hedging against recession.

Liston and Soydemir (2010) investigated the performance of two diametrically opposing portfolios; a sin portfolio and a faith-based portfolio. Using CAPM, Fama and French 3-factor Model and Carhart 4-factor model, they analysed the daily returns of a sin stock-based portfolio and a faith conforming stock portfolio between July 2001 and December 2007. Their empirical results indicated a significant and positive alpha of the sin portfolio and a significant and negative alpha of the faith conforming portfolio. They also performed a rolling regression for portfolios' betas and found that sin stocks act more defensively compared to the market, while faith-based stocks closely mimic the general market. The two market betas also exhibited a statistically significant negative correlation.

Phillips (2011) investigated the prevalence of sin stocks in Australian self-managed superannuation funds and the risk-adjusted performance of these sin stocks. In the first section of his paper, he analysed a randomly selected sample of 140 self-managed superannuation funds' portfolios and found that only 8 out of his sample of 45 sin stocks were included. Since only larger well-known sin companies' stocks were included in the portfolios, he hypothesised that the small interest in sin stocks by the self-managed superannuation funds is more likely due to the avoidance of small, less known stocks, rather than due to the avoidance of the sin stocks. In the second part of his research, he focused on Australian sin stock returns and compared them to the Australian All Ordinaries market index. He found that sin stocks do not generate positive excess returns and an equally weighted portfolio of sin stocks is unlikely to outperform the market.

Kamil, Bacha and Masih (2012) explored whether investing according to Shari'ah deprives Islamic stock portfolios of diversification. They hypothesised that investors who follow the Shari'ah law also do not partake in investing in sinful stocks, which consequently deprives them of additional diversification. Using a Multivariate Generalised Autoregressive

Conditional Heteroscedastic model, they analysed the return volatility of selected sector-based Malaysian and US market indices and selected Malaysian stocks. Specifically, they analysed the correlation among the volatility of various Shari'ah compliant and non-compliant stocks and indices and came to a conclusion that excluding certain types of sin stocks or indices tracking sin stocks does deprive investors of some diversification.

In their paper Durand and colleagues (2013) extended the work of Hong and Kacperczyk (2009) by exploring the institutional ownership, analyst coverage and performance of sin stocks relative to their neutral comparable stocks and the stocks on the other site of the spectrum, saint stocks. The stocks included in the saint portfolio are stocks, which score high economic, social and governance scores and are therefore considered highly ethical stocks. Using similar methodology to Hong and Kacperczyk (2009), they also confirmed that sin stocks are less held by institutions compared to their neutral counterparts. They additionally found the institutions constrained by the social norms are more likely to hold saints, the highly ethical stocks. Furthermore, they also confirmed a lower analyst coverage of sin stocks due to a lower interest in them by institutions. In contrast, a higher demand of saint stocks also results in them being more frequently a subject to analyst coverage. Finally, they carried out a series of asset pricing model regressions to evaluate the performance of zero-investment portfolios, namely long sin stocks short neutral comparable stocks portfolio, long saint stocks short neutral comparable stocks portfolio and long sin stocks short saint stocks portfolio. They again confirmed the findings of Hong and Kacperczyk (2009) – a positive risk-adjusted performance of sin stocks. However, they found no negative risk-adjusted performance of saint stocks.

Fauver and McDonald (2014) hypothesised that sin stocks are valued differently in different markets due to a significant heterogeneity in social norms among them. They tested their hypothesis by analysing stock returns in the G20 nations. They began by developing a social norm ranking system, which determined whether a market is sinful or not (whether citizens consider alcohol, tobacco, and gambling stocks to be sinful or not) based on citizens' attitudes toward religion, environment, charity, etc. The rankings were then applied to various regression models testing the effect of social norms on stock valuation. They found that sin stocks are on average not undervalued in markets with lower social norms, and even found weak evidence that sin stocks might be slightly overvalued in these markets. On the other hand, as suggested by previous literature, sin stocks appear to be undervalued in markets with high social norms. With this paper they confirmed that sin stock valuation is significantly affected by the social norm aspect of a specific market, which contests the long-lasting belief that sin stocks are shunned equally all over the world.

Cheung and Lam (2015) focused specifically on the gaming stocks that have been cross listed on the US market (NYSE and NASDAQ) and Hong Kong market (Hong Kong stock exchange). They compared the gaming stocks returns to the returns of market indices of both markets. During the period of research, the observed gaming stocks on average yielded 0.2% daily returns on the US market, which was a 0.1 percentage points more than the US market

index (S&P500). In the same observation period, the cross-listed gaming stocks generated 0.2 percentage points more than the Hong Kong market index (Hang Seng Index), which on average daily yielded less than 0.1%. Furthermore, they conducted time-series regression analyses for the single factor model (CAPM) and the Carhart four-factor model. On both, the US market, and the Hong Kong market, they observed positive statistically significant alphas. More specifically, on the US market the gambling stocks had average excess returns of 0.184%, while on the Honk Kong market the average excess returns amounted to 2.57%, meaning that the observed gambling stocks significantly outperformed the benchmark market indices during the time of observation.

Liston (2016) examined the effect of investor sentiment on the valuation of sin stocks. He analysed sin stock portfolio returns in the period between January 1988 and June 2009 using a commonly utilised Capital Asset Pricing Model, Fama and French 3-factor model and Carhart 4-factor model regressions and sentiment-augmented versions of the same asset pricing models. The asset pricing models are augmented by adding two additional survey data-based risk factors – irrational individual sentiment and irrational institutional sentiment. The regression analyses on single- and four-factor model risk factors returned statistically significant positive excess returns. The betas for all three models were close to or lower than one. Three- and four-factor model regressions also showed significant positive loadings on size, value and momentum factors. Meanwhile, the sentiment-augmented asset pricing models regressions showed that both sentiment factors were statistically significant and had a positive effect on sin stock returns. When applied together, the alphas obtained by all three asset pricing model regressions became insignificant. Based on these findings, Liston (2016) additionally suggested that positive sin stock excess returns, reported in previous literature, appear due to insufficiently accurate asset pricing models.

Blitz and Fabozzi (2017) analysed returns of sin stocks originating from the US, European and Japanese markets. They performed time-series asset pricing model regression analyses of sin stock returns on Capital Asset Pricing Model market risk factor, Fama and French 3 Factor Model factors separately and with added momentum and low beta factors, and Fama and French 5 Factor asset pricing model factors. Their Capital Asset Pricing Model and Fama and French 3 Factor Model analyses results were consistent with the previous literature, yielding positive statistically significant alphas; however, when adding low beta and Fama and French 5 Factor Model profitability and investment factors they observed alphas becoming statistically insignificant. The authors argued that the results obtained when regressing on the additional low beta, profitability and investment factors explain what was previously believed to be the sin stock anomaly. They concluded the presence of statistically significant positive sin stock excess returns in previous literature was the result of the lack of explanatory power of the then available asset pricing models, thus, by applying the additional factors they could better explain the expected returns and challenge the existence of a sin premium.

In a more recent research, Blitz and Swinkels (2021b) studied the effects of exclusion of specific industries on the expected return, by examining the risk factor exposure of unethical stocks in the period between January 2011 and December 2020. They compared the factor exposure of the returns of 49 different industries, 11 out of which were frequently excluded due to their unethical nature. More specifically, these 11 industries were: alcohol, tobacco and weapons, which are some of the industries that are most commonly branded as sinful; coal, oil, utilities and transportation are frequently excluded due to their high carbon footprint; mining and gold are frequently excluded due to their negative impact on the environment; soda and food industries are frequently excluded due to their contribution to the growing problem of obesity and other health related problems; and finally the hotel industry is often excluded due to its close relation to the gambling industry. The returns of each of the industries were analysed by regression on the Fama and French 5 factor asset pricing model risk factors augmented with an additional low-risk factor. Except for the weapons industry, which has a negative combined exposure to the risk factors, all other show significant positive combined exposure to the risk factors. Based on these findings, Blitz and Swinkels (2021b) suggested that excluding stocks representing any of these 10 industries would have a negative impact on expected returns.

2.2 Emerging Markets

As already mentioned, most of the existing research on the topic of sin stocks is based on the sin stocks originating from developed markets, such as US, some European and some Asia-Pacific markets. When analysing the sin stock returns in emerging markets, it is important to acknowledge that compared to the developed markets, some emerging markets have a lower availability of information, lower liquidity, and higher transaction costs, which affect their efficiency, and consequently may also have an impact on the pricing of equity.

Kawakatsu and Morey (1999) examined the effects of market liberalisation on market efficiency in 9 emerging markets – Argentina, Brazil, Chile, Colombia, India, Korea, Mexico, Thailand and Venezuela. More specifically, they studied how openness to foreign investments affects the availability of information and efficiency of stock pricing. By applying a set of tests, they analysed and compared market returns pre- and post-liberalisation. They found no evidence that any of the markets included in the research became more efficient after the liberalisation dates. Most of their tests indicated that the markets were efficient already prior to the liberalisation date. They did however acknowledge that liberalisation was a lengthy process, usually announced well prior to the actual liberalisation date. This allows the investors to act and prepare before the market opens to new foreign investments, which essentially diminishes the effects at the exact time of liberalisation.

Hull and McGroarty (2014) studied market efficiency of emerging markets. They hypothesised that the development of the market significantly affects its efficiency. To test

their hypothesis, they analysed daily price data of 22 indices over a 16-year period, between 1995 and 2011. Using the Hurst-Mandelbrot-Wallis rescaled range statistic, they measured the long-memory price change and volatility persistence. Based on FTSE Russell market classification, they additionally divided the 22 indices (each representing one of the emerging markets) into two groups, representing the advanced emerging markets and secondary emerging markets. Based on the results obtained with the last method, they concluded that the advanced emerging markets show greater efficiency in returns and volatility.

In a study, Cakici, Fabozzi and Tan (2013) analysed the returns of stocks from 18 emerging markets. In the first part of their study, they focused on value and momentum effects in three geographical regions – Asia, Latin America and Eastern Europe. They found strong evidence of a value effect in all three regions and evidence of momentum effect in Asia and Latin America. In the second part of their study, they attempted explaining the returns of 25 emerging market stock portfolios using CAPM, Fama and French 3 Factor Model and Carhart 4 Factor Model. They performed asset pricing model regressions using local, US and Global Developed markets factors, where local factors performed noticeably better than US or global developed markets factors, proposing an emerging market segmentation.

In a more recent study, Foye (2018) tested the performance of the Fama and French 5 Factor Model and compared it to the performance of one of its predecessors – Fama and French 3 Factor Model. The basis for his analysis was stock return data from 18 emerging markets, divided in three geographical regions – Asia, Latin America and Eastern Europe. He found that the five-factor model performs better than its three-factor predecessor on Eastern European and Latin American markets. Additionally, he found evidence of value premium in all three regions and profitability premium in Eastern Europe and Latin America.

Liu, Wei and Ye (2018) investigated the excess return and risk of individual stocks in the Chinese market in the period between April 2005 and December 2014. By applying the Capital Asset Pricing Model regression analysis, they analysed the returns of 1171 publicly listed Chinese companies. They found that 103 or approximately 9% of the stocks included in the sample exhibited significant excess returns. Out of all included industries, the stocks representing the financial industry have had the highest ratio of excess return, followed by the information transmission and software, and manufacturing industries. They also found hotel, food, beverage, transportation, warehousing and post service industry stocks exhibit significant excess returns in the month of January, which they hypothesise is most likely due to the Chinese New Year Festival.

3 METHODOLOGY

3.1 Data selection

To explore the returns of sin stocks on the emerging markets, the data was selected in following several steps. First, the MSCI market classification was used for identifying countries meeting the criteria to be classified as an emerging market followed by using the FTSE Russel market classification to distinguish between advanced and secondary emerging markets. After creating a timeline of selected countries that were allocated to the emerging markets groups, sin stocks of alcohol, tobacco and gambling were determined by using the FTSE Russell's Industry Classification Benchmark subsector classifications. The stocks were then extracted by using the Bloomberg terminal. The same procedure was adapted for identification of neutral comparable stocks as used by Hong and Kacperczyk (2009).

This was followed by specifying the risk-free rate. I use the US one-month Treasury bills rate to represent the proxy for the risk-free rate. Likewise, the risk factors were defined. I use MSCI Emerging Markets Index returns as a market benchmark. The additional risk factors used in Fama and French 3-Factor Model, Carhart 4-Factor Model and Fama and French 5-Factor Model are the emerging markets risk factors calculated by Kenneth R. French.

3.1.1 Emerging Markets

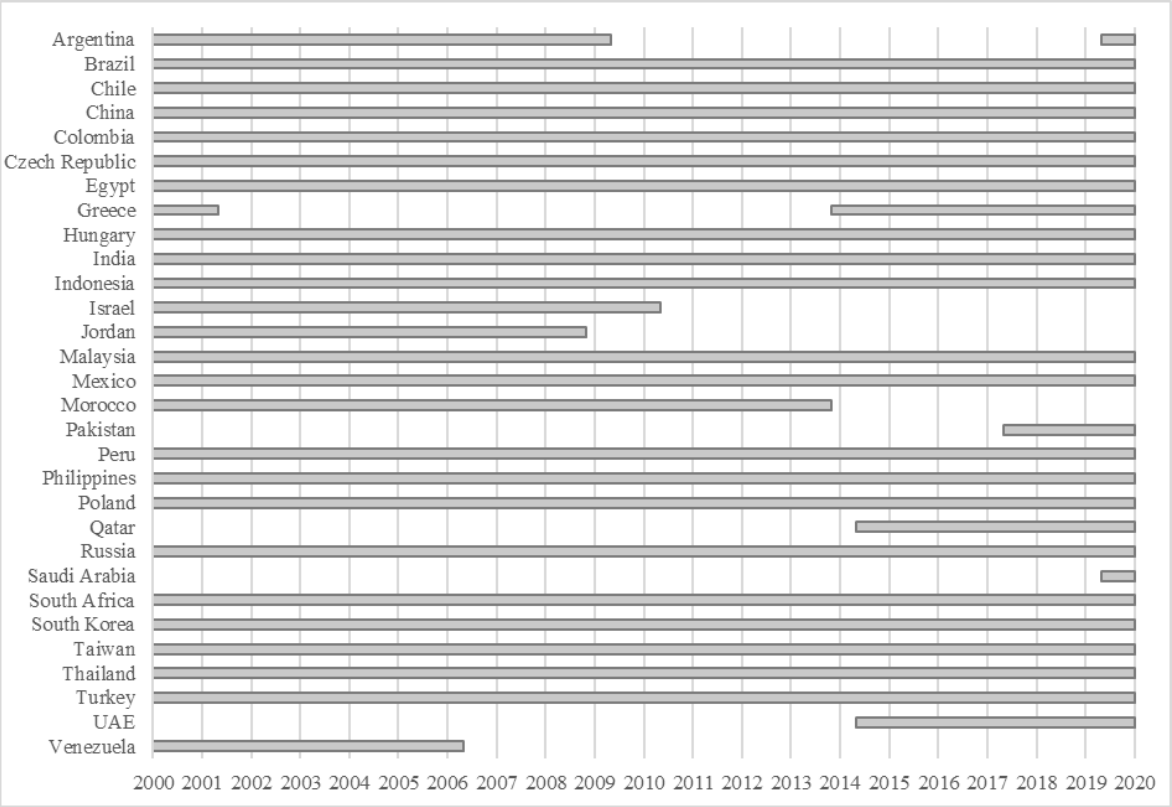
The emerging markets, later used for equity screening and other data acquisitions, were determined by using MSCI market classification. Based on the MSCI market classification framework markets are allocated to one of the four market groups – developed, emerging, frontier or standalone markets. To be allocated to one of the four groups, a country must meet certain economic development, size, liquidity, and market accessibility criteria.

To be allocated to the emerging markets group there are no minimum requirements in terms of the economic development of the market. However, the market must be a country of domicile of at least 3 companies with a full market capitalization higher than USD 1.83 billion, float market capitalization larger than USD 9.15 million and a liquidity of 15% of annualised traded value of a security. The market must also be significantly open to foreign ownership, allow capital inflows and outflows with significant ease, have a good and tested efficiency of operational framework, have high availability of investment instruments, and have a modestly stable institutional framework. (MSCI, 2020)

Using the current allocation of markets and the list of reclassifications between the beginning of 2000 and the end of 2019, both available on the MSCI official website, I was able to create a timeline, showing all the countries classified as emerging markets during the 20-year period of interest.

Figure 1 shows that there have been 30 countries all together classified as emerging markets during the period of observation, 20 of those for the entire 20-year period. The list contains markets from four different continents – Asia, Africa, Europe, and South Amerika.

Figure 1: Emerging markets timeline between 2000 and 2019 based on the MSCI market classification

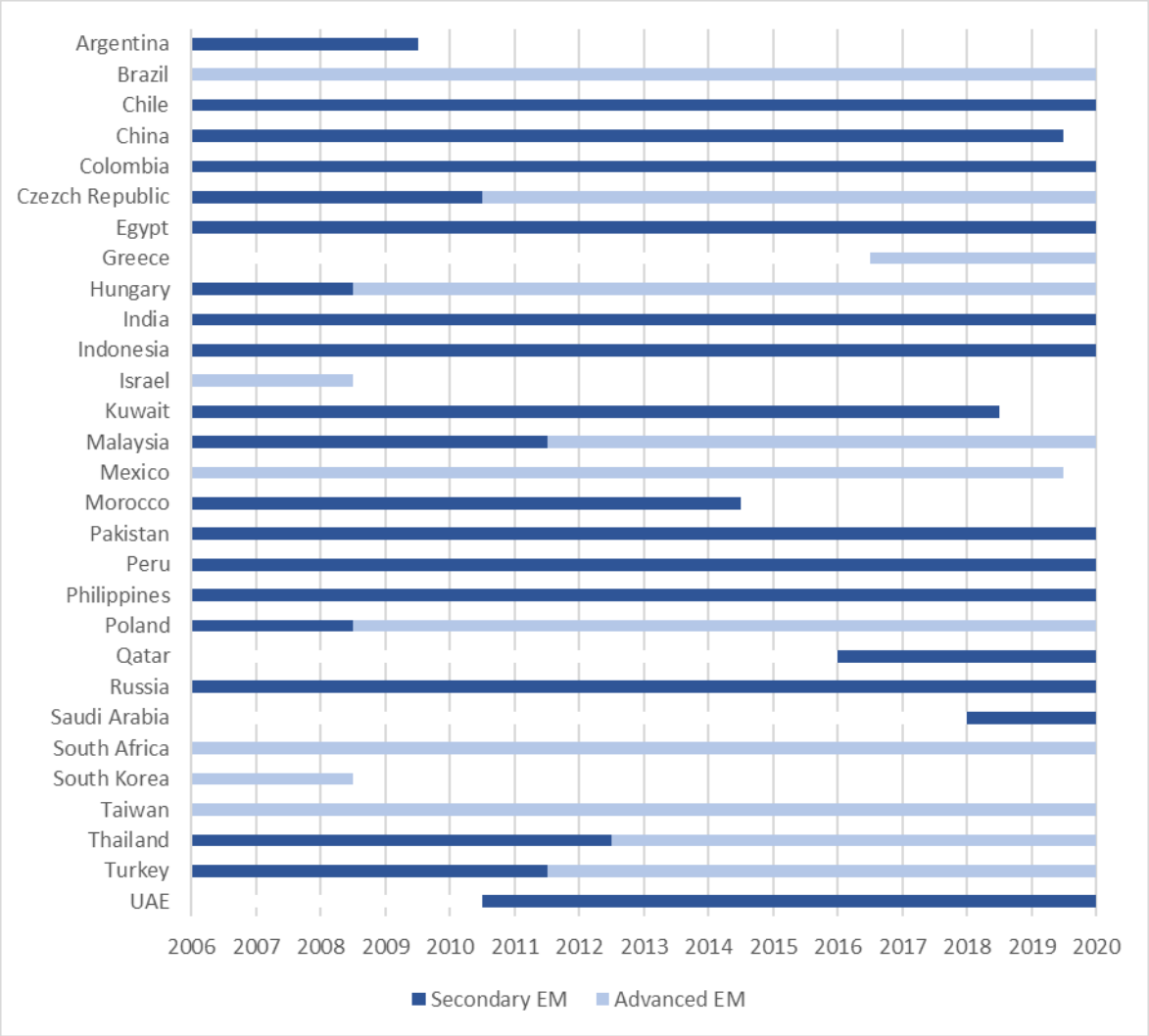


The grey bars represent the periods between January 2000 and December 2019 when the country was classified as an emerging market based on the MSCI classification framework.
Source: own work.

The additional market classification used in the last part of this thesis, the FTSE Russel market classification, additionally distinguishes between advanced and secondary emerging markets, the first being the more developed out of the two. Similarly to the MSCI market classification, the FTSE Russell market classification allocates the countries based on their development status. They are allocated to one of the five groups – developed, advanced emerging, secondary emerging, frontier and unclassified markets, based on market development indicators, such as investable market capitalization, gross national product, and the number of available stocks in the market meeting certain requirements.

I created a similar timeline to the timeline representing the emerging markets based on the MSCI market classification. However, as visible in Figure 2, it only covers the period between January 2006 and December 2019, since the available information on historical classifications, available on the FTSE Russell website, only dates back to 2006.

Figure 2: Advanced and secondary emerging markets timeline between 2006 and 2019 based on the FTSE Russell market classification



The dark blue bars represent the period between January 2006 and December 2019 when a country was classified as a secondary emerging market based on the FTSE Russell market classification. The light blue lines represent the periods when a country was classified as an advanced emerging market.

Source: own work.

3.1.2 Sin Stocks

The first step in determining sin stocks eligible for this research was creating a pool of all stocks which originate from the markets, which were classified as emerging markets for at least one period between the beginning of 2000 and the end of 2019.

In the second step of the equity screening, I used the FTSE Russell's Industry Classification Benchmark (hereafter abbreviated as ICB) subsector classifications to determine stocks representing sin industries. The list of alcoholic beverage producers was obtained by using the ICB "Brewers" subsector (ICB subsector code 45101010) and ICB "Distillers and

Vintners" subsector (ICB subsector code 45101015). The Brewers subsectors includes the manufacturers and shippers of cider or malt products such as beer, ale and stout. The Distillers and Vintners subsector includes the producers, distillers, vintners, blenders and shippers of wine and spirits. The list of companies active in tobacco industry was obtained by using the ICB "Tobacco" subsector (ICB subsector code 45103010). The list includes the manufacturers and distributors of cigarettes, cigars, and other tobacco products. It also includes tobacco plantations. Finally, the list of companies involved in any kind of gambling activities was obtained by using the ICB "Casino and Gambling" subsector (ICB subsector code 40501020). This subsector includes the providers of gambling and casino facilities, online casinos, racetracks, manufacturers of pachinko machines and the manufacturers of casino and lottery equipment. (Russell, 2021)

According to the emerging markets timeline, I removed the stock financial data for the periods when the market of origin was not classified as an emerging market.

Bloomberg terminal was used both for the screening process and to obtain the historical stock price and volume data. To avoid the survivability bias, I included all active, dead, and delisted companies. I was left with three portfolios representing each of the sin industries included in this research. As shown in Table 1, the number of companies within the portfolios ranges from 16 to 103 and changes over time due to the addition or removal of the stocks. The total number of sin stocks ranges from 103 to 166.

Table 1: Total number of sin companies and the number of companies representing individual sin industrial sectors in the period between 2000 and 2019, obtained via a two-step equity screening process, based country of origin and the industrial sector

	Alcohol	Tobacco	Gambling	Total
2000	67	16	20	103
2001	67	15	21	104
2002	69	16	21	106
2003	73	16	23	112
2004	74	16	24	114
2005	75	16	25	116
2006	76	16	25	117
2007	75	16	28	119
2008	77	16	28	121
2009	77	13	29	120
2010	81	13	33	128
2011	86	14	33	133
2012	91	15	33	139
2013	92	17	35	143
2014	93	17	38	149
2015	95	18	38	151
2016	100	18	40	158
2017	102	21	41	164
2018	103	22	40	165
2019	103	22	41	166

Source: own work.

3.1.3 Comparable stocks

As the neutral comparable industry representatives, I used the same industries as were used by Hong and Kacperczyk (2009). The soft drink industry was used as a neutral comparable industry to the alcoholic beverage industry, the food industry as a neutral counterpart to the tobacco industry, and the hotel industry to the gambling industry.

In the first step of the screening process, I followed the same procedure as when determining sin stocks. I used the same pool of companies, obtained through the screening based on the country of origin.

To obtain the stocks representing the soft drink industry, I used the ICB "Soft Drinks" subsector (code 45101020). This subsector includes the manufacturers, bottlers and distributors of non-alcoholic beverages, such as soda, fruit juices, tea, coffee and bottled water. The list of stocks representing food industry was obtained by using the ICB "Food Producers" sector (sector code 541020). This sector includes companies involved in farming, fisheries operation, livestock raising, food producers and other food related operations. It also excludes the production of any soft-beverages and tobacco related farming and production (Russell, 2021). Finally, to avoid including hotels, which are closely related to any kind of gambling activities, such as casino hotels, I decided to use the Bloomberg Industry Classification System Level 5 Segment "Hotel and Motel", which excludes casino hotels.

The financial data of comparable industry stocks was removed by using the same approach as used for removing the financial data of sin stocks. More specifically, the stock financial data was removed for the periods when the country did not meet the criteria for being classified as an emerging market. This was done in accordance with the emerging market timeline created as the first step in the present study.

The screening process was performed by using the Bloomberg terminal; however, due to data download limitations I had to obtain the stock price data by using Eikon DataStream terminal.

Table 2: Total number of the neutral comparable companies and the number of companies representing the individual neutral comparable industrial sectors in the period between 2000 and 2019, obtained via a two-step equity screening process, based on the country of origin and the industrial sector

	Soft Drinks	Food	Hotels	Total
2000	21	157	58	236
2001	22	165	58	245
2002	23	169	59	251
2003	24	177	65	266
2004	24	187	66	276
2005	25	202	69	295

Table continues

Table 2: Total number of the neutral comparable companies and the number of companies representing the individual neutral comparable industrial sectors in the period between 2000 and 2019, obtained via a two-step equity screening process, based on the country of origin and the industrial sector (continued)

	Soft Drinks	Food	Hotels	Total
2006	27	217	75	319
2007	28	228	79	334
2008	28	235	81	345
2009	28	235	81	344
2010	27	239	81	346
2011	27	248	83	358
2012	30	261	85	376
2013	31	271	86	387
2014	34	282	91	407
2015	39	295	95	428
2016	43	309	94	446
2017	45	336	96	478
2018	49	360	99	508
2019	50	384	109	543

Source: own work.

The same rules as for the formation of sin portfolios were applied for the formation of comparable industries portfolios. All active, dead, and delisted companies were included to avoid the survivability bias. As shown in Table 2, the number of stocks included in the portfolios ranges from 21 to 386. The total number of comparable industry stocks ranges from 236 to 543.

3.1.4 Risk Free Rate

The risk-free rate is defined as an option for investors to invest with taking virtually no risk; however, at the cost of low returns, and is used in the analysis of stock returns in order to determine whether the stock returns will be substantial enough to justify the accompanying risk when investing in the equity market. In the present thesis, the US one-month Treasury bills rate was used as a proxy for the risk-free rate. The data was downloaded from the Kenneth R. French data library (French, 2021).

3.1.5 Market Risk Rate

The MSCI Emerging Markets Index returns were used as a proxy for Emerging Markets Returns. The historical return data was downloaded from the Bloomberg Terminal.

3.1.6 Additional risk factors

The size, value, momentum, profitability, and investment risk factors were acquired from the Kenneth R. French Data Library.

3.2 Portfolio Formation

In the first step I form two equally weighted portfolios, the sin stock portfolio, and the comparable industry stock portfolio, the first representing sin industries and the second representing neutral comparable industries. Each of the two portfolios is then also broken down to three smaller equally weighted sub-portfolios, representing each of the industries separately – alcohol, tobacco, gambling, soft drinks, food and hotels. According to the difference in market efficiency among the advanced and secondary emerging markets, suggested by Hull and McGroarty (2014), I wish to also analyse how market efficiency reflects sin stock returns. Thus, I form additional four sub-portfolios, sin and neutral comparable advanced emerging markets sub-portfolios and sin and neutral comparable secondary emerging markets sub-portfolios.

3.3 Portfolio Evaluation

The portfolio evaluation was conducted in two steps. Firstly, the descriptive statistical analysis was conducted to get an insight into the general stock price movement. Secondly, the Time-Series Asset Price Model Regressions were applied for the portfolio excess returns analysis.

3.3.1 Descriptive statistics

I first compare the unadjusted average monthly returns of the sin portfolio and sin sub-portfolios to the unadjusted average monthly returns of their comparable industries portfolio and sub-portfolios and to the average monthly returns of the market index. I then look at the average returns adjusted for the compounding effect. As the last part in this section, I show what the value of a hypothetical US $1 investment in each portfolio, sub-portfolio and market index would amount to at the end of the period.

3.3.2 Time-Series Asset Pricing Model Regression Analyses

In the second part of the stock return analysis, I first perform time-series asset pricing model regression analyses of the returns of the sin and neutral comparable portfolios individually. I then calculate the spread in returns of the two portfolios, sin stocks taking the long position and neutral comparable stocks taking the short position. The spread is then regressed on the same risk factors.

All time-series regression analyses are corrected for heteroskedasticity and autocorrelation of error terms by applying the Newey-West Estimator.

To test the persistency of alphas of the long sin stock short neutral comparable stock portfolio I perform 36-month window rolling regressions for all four asset pricing models.

The same steps are taken to analyse individual sin industries and their neutral counterparts; and the sin and neutral comparable portfolios representing sin and neutral comparable industries in advanced and secondary emerging markets.

3.3.2.1 Capital Asset Pricing Model

The capital asset pricing model, or CAPM shortly (Equation 1), was introduced in the first half of the 1960s by multiple economists independently. The model describes the relationship between expected returns of a risky asset to the market risk, also called undiversifiable or systematic risk (Gibbons, Ross, & Shanken, 1989). Even though the model has been in existence for approximately 60 years and a multitude of its successors have been introduced, it is still commonly used by companies and individuals for risky asset pricing (Fama & French, 2004):

$$\mathbf{r_{i,t} - r_{f,t} = \alpha_i + \beta_{i,MKT}(r_{MKT,t} - r_f)} \quad (1)$$

In the first equation, where $r_{i,t} - r_{f,t}$ is the return of the stock or the portfolio in excess of the risk free rate at time t, α_i is the excess return of the stock or portfolio, $\beta_{i,MKT}$ is the market beta of the portfolio and $r_{MKT,t} - r_f$ is the market risk premium at time t.

Market risk premium represents the general price movement of the market. It is calculated as the expected returns of the market net of the risk-free rate. In asset pricing models, such as CAPM, market indices are frequently used as proxies for the market. These market indices are hypothetical portfolios of stocks, which track the price movement of stocks with specific characteristics. They can represent the returns of specific industries, countries or even a cluster of various countries with certain characteristics.

In practice, the market beta of a risky asset tells us how sensitive the returns of a risky asset are to the market risk or in other words how exposed is the risky asset to the systematic risk. The alpha on the other hand explains what portion of the expected returns of a risky asset remain unexplained by the market risk.

Market risk or systematic risk is defined as the risk that the investors are exposed to when the value of their investments decreases because of various financial market factors. There are four main risk factors that affect the market: equity price risk, foreign exchange risk, interest rate risk and commodity risk (Szylar, 2013).

3.3.2.2 Fama and French 3 Factor Asset Pricing Model

The Fama and French 3 Factor Asset Pricing Model (Equation 2) is essentially an upgrade to the CAPM. The model was introduced in 1992 by Eugene Fama and Kenneth R. French. Its foundation were Banz's (1981) findings that small market capitalization stocks yield significantly higher risk adjusted returns than large market capitalization stocks, De Bondt

and Thaler's (1985) findings that stocks with lower price-to-earnings ratio yield higher risk adjusted returns than high price-to-earnings ratio stocks. The driving force for the development of the model was the discovery that other financial variables, not included in the CAPM, also offer the explanatory power of stock returns. They found company size, leverage, price-to-earnings ratio, and book-to-market ratio alone or in combination decrease the explanatory power of the market risk factor. They also found that size and book-to-market ratio used in combination absorb the explanatory power of leverage and price-to-earnings ratio factors, making them redundant (Fama & French, 1993). By adding the additional two risk factors, the Fama and French 3 Factor Asset Pricing Model appears to capture a large proportion of the cross-sectional variation in average stock returns (Fama & French, 1996):

$$\mathbf{r_{i,t} - r_{f,t} = \alpha_i + \beta_{i,MKT}(r_{MKT,t} - r_{f,t}) + \beta_{i,SMB}SMB_t + \beta_{i,HML}HML_t} \quad (2)$$

In the second equation, where $r_{i,t} - r_{f,t}$ is the return of the stock or the portfolio in excess of the risk free rate at time t, α_i is the excess return of the stock or portfolio, $\beta_{i,MKT}$ is the market beta of the portfolio, $r_{MKT,t} - r_f$ is the return of the market index at time t, $\beta_{i,SMB}$ is the size beta of the stock or portfolio, SMB_t is the spread between the returns of a small market cap portfolio and large market cap portfolio at time t, $\beta_{i,HML}$ is the value beta of a stock or portfolio and HML_t is the spread between the returns of a high book to market ratio portfolio and low book to market ratio portfolio at time t.

The small minus big factor represents the small market value premium. Stocks are sorted in two groups, based on their market value – small market capitalization stocks and large market capitalization stocks. Small stocks represent the bottom 10% of the market capitalization, while the large stocks represent the top 90% of the market capitalization. The factor is calculated as a spread between the average returns of small market capitalization stocks and the average returns of large market capitalization stocks.

The high minus low factor represents the high book to market premium. Stocks are sorted in three groups – high, medium and low book-to market ratio groups. High book to market ratio stocks are represented by the top 30% of stocks based on the book to market ratio, low book to market ratio stocks are represented by the bottom 30% and mid are represented by the 40% of stocks in the middle of the two. The factor is calculated as a spread between the average returns of high book to market ratio stocks and the average returns of low book to market ratio stocks.

Statistically significant loadings on the SMB or HML factors indicate a correlation between the returns of the risky asset returns and the returns of the small value or high book-to-market ratio stocks respectively. Significant loadings on any of the two factors do not necessarily mean the asset is a small market capitalization or high book-to-market stock, but rather that the price of the asset has a similar price movement to the price movement of stocks with these specific attributes.

3.3.2.3 Carhart 4 Factor Asset Pricing Model

The Carhart 4 factor model (Equation 3) is an extension to the Fama and French 3 factor model. The idea for adding an additional fourth factor came from Jegadeesh and Titman's (1993) findings that stocks that have performed well in the past yield significantly higher returns in the next 3 to 12 months than stocks that performed poorly in the past. The additional momentum factor represents the spread in returns of stocks which have been performing well lately and stocks that were not performing well (Fama & French 2012):

$$\mathbf{r_{i,t} - r_{f,t} = \alpha_i + \beta_{i,MKT}(r_{MKT,t} - r_{f,t}) + \beta_{i,SMB}SMT_t + \beta_{i,HML}HML_t + \beta_{i,MOM}MOM_t} \quad (3)$$

Based on the third equation, where $r_{i,t} - r_{f,t}$ is the return of the stock or the portfolio in excess of the risk free rate at time t, α_i is the excess return of the stock or portfolio, $\beta_{i,MKT}$ is the market beta of the portfolio, $r_{MKT,t} - r_f$ is the return of the market index at time t, $\beta_{i,SMB}$ is size beta of the stock or portfolio, SMB_t is the spread between the returns of a small market cap portfolio and a large market cap portfolio at time t, $\beta_{i,HML}$ is the value beta of a stock or portfolio and HML_t is the spread between the returns of a high book to market ratio portfolio, low book to market ratio portfolio at time t, $\beta_{i,MOM}$ is the momentum beta of a stock or portfolio and MOM_t is the spread in returns of high momentum stock portfolio and low momentum stock portfolio at time t.

The momentum factor, also known as WML – winners minus losers or UMD – up minus down, represents the premium of high stock price growth. Stocks are sorted in three groups based on their stock price growth – winners, neutral and losers groups. High momentum stocks or winners are represented by the top 30% of the stocks based on price growth, while the low momentum stocks or losers are represented by the bottom 30%. Neutral group represents the 40% of stocks in between. The factor is calculated as a spread between the average returns of high stock price growth stocks and the average returns of low stock price growth stocks.

Statistically significant loading on the momentum factor does not indicate, that the asset did great price-wise in the past, but rather that the price movement in the period of observation is similar to the price movement of stocks which performed well in the past.

3.3.2.4 Fama and French 5 Factor Asset Pricing Model

The most recently developed asset pricing model applied in this thesis, the Fama and French 5 Factor Asset Pricing model (Equation 4), is also an extension to the previously described 3 factor model. It was argued that the three-factor model fails to explain a significant proportion of the return variation related to the profitability and investment factors. Thus, adding these two factors should increase the explanatory power of the model and allow to capture additional risks. (Fama & French, 2015)

$$r_{i,t} - r_{f,t} = \alpha_i + \beta_{i,MKT}(r_{MKT,t} - r_{f,t}) + \beta_{i,SMB}SMB_t + \beta_{i,HML}HML_t + \beta_{i,RMW}RMW_t + \beta_{i,CMA}CMA_t \quad (4)$$

In the fourth equation, where $r_{i,t} - r_{f,t}$ is the return of the stock or the portfolio in excess of the risk free rate at time t, α_i is the excess return of the stock or portfolio, $\beta_{i,MKT}$ is the market beta of the portfolio, $r_{MKT,t} - r_f$ is the return of the market index at time t, $\beta_{i,SMB}$ is size beta of the stock or portfolio, SMB_t is the spread between the returns of a small market cap portfolio and large market cap portfolio at time t, $\beta_{i,HML}$ is the value beta of a stock or portfolio and HML_t is the spread between the returns of a high book to market ratio portfolio and low book to market ratio portfolio at time t, $\beta_{i,RMW}$ is the profitability beta of a stock or portfolio, RMW_t is the spread in returns of a robust profitability stock portfolio and a weak profitability stock portfolio at time t, $\beta_{i,CMA}$ is the investment beta of a stock or portfolio and CMA_t is the spread in returns of a conservative investment stock portfolio and an aggressive investment stock portfolio at time t.

The robust minus weak factor represents the robust profitability premium. Stocks are sorted in three groups based on operating profitability – robust, neutral and weak profitability groups. High operating profitability or robust profitability stocks are represented by the top 30% of stocks based on their operating profitability, while the low operating profitability or weak profitability stocks are represented by the bottom 30%. The neutral profitability stocks represent the 40% of stocks in between. The factor is calculated as a spread between the average returns of stocks with high operating profitability and the average returns of stocks with low operating profitability.

Conservative minus aggressive factor represents the conservative investment premium. Stocks are sorted in three groups based on their investment to book value ratio – conservative, neutral and aggressive investment groups. Conservative investment stocks are represented by the bottom 30% of stocks based on their investment to book value ratio, while aggressive investment stocks are represented by the top 30%. The neutral investment stocks represent the 40% of stocks in between. The factor is calculated as a spread between the average returns of stocks with low investment to book value ratio and the average returns of stocks with high investment to book value ratio.

4 EMPIRICAL RESULTS

4.1 Descriptive Statistics

4.1.1 Sin Versus Comparable Industries

As seen in the Table 3, the sin portfolio outperformed both its neutral comparable industries portfolio and the market index in terms of unadjusted monthly returns in the period between the beginning of 2000 and the end of 2019. The alcohol 1.6% average unadjusted monthly

returns were approximately 0.2 percentage points higher than the returns of the comparable industry and over 1 percentage point higher than the returns of the market. Based on the standard deviation of the returns, the market index appears to be the most volatile out of the three.

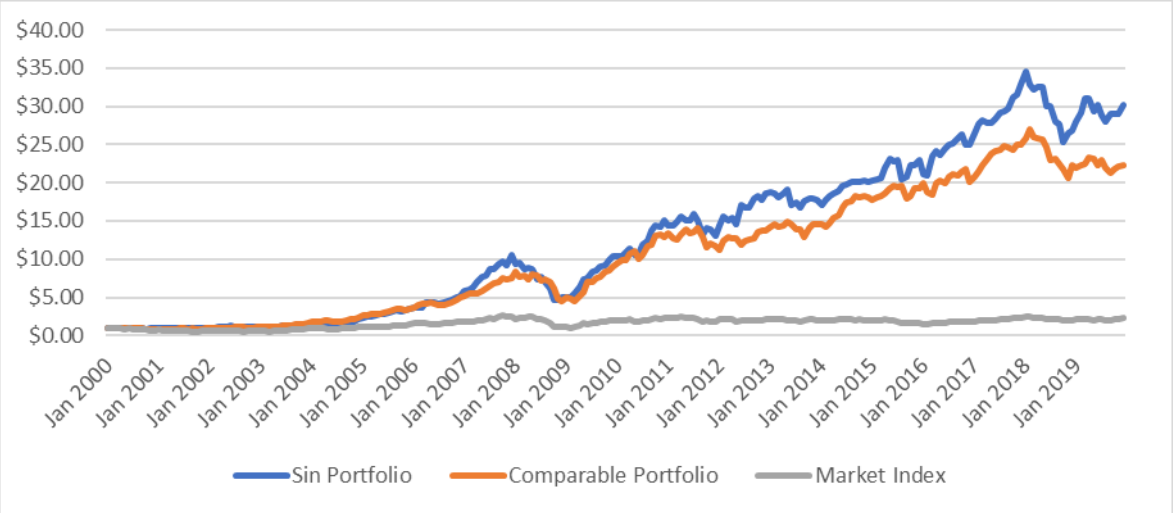
Table 3: Descriptive statistics for the sin portfolio, comparable industries portfolio and MSCI EM index monthly returns in the period between 2000 and 2019

	Mean	Median	Std. Dev.	Geometric Mean
Sindex	0.0159	0.0168	0.0550	0.0144
Compdex	0.0143	0.0151	0.0502	0.0131
Market Index	0.0054	0.0061	0.0617	0.0034

Source: own work.

Taking into consideration the compounding effect (calculated as a geometric mean instead of an arithmetic mean), the sin portfolio annually on average yielded 18.7%, followed by the comparable industries portfolio with its 16.9% average annual yield and finally the market index with a considerably lower average annual yield of 4.2%.

Figure 3: Monthly cumulative continuously compounded returns of the sin portfolio, comparable industries portfolio and MSCI EM index in the period between 2000 and 2019, represented by USD 1 investment in each



The blue, orange and grey lines represent the value of a hypothetical $1 investment at the beginning of 2000 in the sin portfolio, neutral comparable portfolio, and the market index respectively over a 20-year period.

Source: own work.

As seen in Figure 3, if exchange traded funds existed for each of the two portfolios and the market index and we invested USD 1 into each and left the investment untouched for the entire period of 20 years, the value invested in the sin index would amount to approximately

USD 30.15, the amount invested in the comparable industries index to approximately USD 22.34 and finally the amount invested in the market index to USD 2.27.

4.1.2 Alcohol Versus Soft Drinks

In terms of unadjusted returns, the alcohol portfolio was the second best performing out of all portfolios and indices observed in the present thesis. From Table 4 we can see the alcohol portfolio outperformed both, its comparable neutral industry and market benchmark. Monthly it yielded, on average, approximately 1.6%, approximately 0.5 percentage points more than the soft drinks industry portfolio and approximately 1.1 percentage points more than the market index. During the period of observation it was also the most volatile.

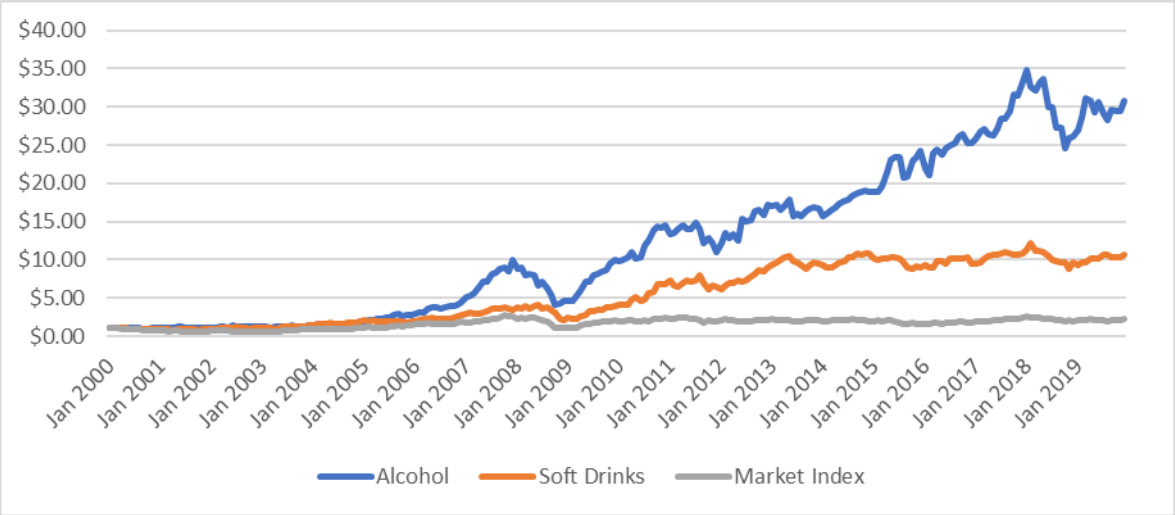
Table 4: Descriptive statistics for the alcohol portfolio, soft drinks portfolio and MSCI EM index monthly returns in the period between 2000 and 2019

	Mean	Median	Std. Dev.	Geometric Mean
Alcohol	0.0164	0.0184	0.0634	0.0145
Soft Drinks	0.0115	0.0114	0.0565	0.0099
Market Index	0.0054	0.0061	0.0617	0.0034

Source: own work.

Adjusted for the compounding effect, the alcohol portfolio on average yielded 18.8% annually. Its neutral industry comparable, i.e. soft drinks producers, portfolio yielded, on average, 12.6% annually, followed by the market index, with a 4.2% average annual yield.

Figure 4: Monthly cumulative continuously compounded returns of the alcohol portfolio, soft drinks portfolio and MSCI EM index in the period between 2000 and 2019, represented by USD 1 investment in each



The blue, orange and grey lines represent the value of a hypothetical $1 investment at the beginning of 2000 in the alcohol portfolio, soft drinks portfolio, and the market index respectively over a 20-year period.

Source: own work.

As represented in Figure 4, if exchange traded funds, which followed the movement of the two portfolios and the market index existed and we invested USD 1 in each and left the investment untouched for the entire period of 20 years, the value invested in the alcohol portfolio would amount to approximately USD 30.85, the value invested in the soft drinks' portfolio to USD 10.61 and finally the value invested in the market index to USD 2.27.

4.1.3 Tobacco Versus Food

The tobacco portfolio was the best performing overall in terms of unadjusted returns; however, it was also the most volatile. As seen in Table 5, its monthly returns during the period of observation were on average 1.8%, approximately 0.3 percentage points higher than the average monthly returns of the food portfolio and approximately 1.3 percentage points higher than the average monthly return of the market index.

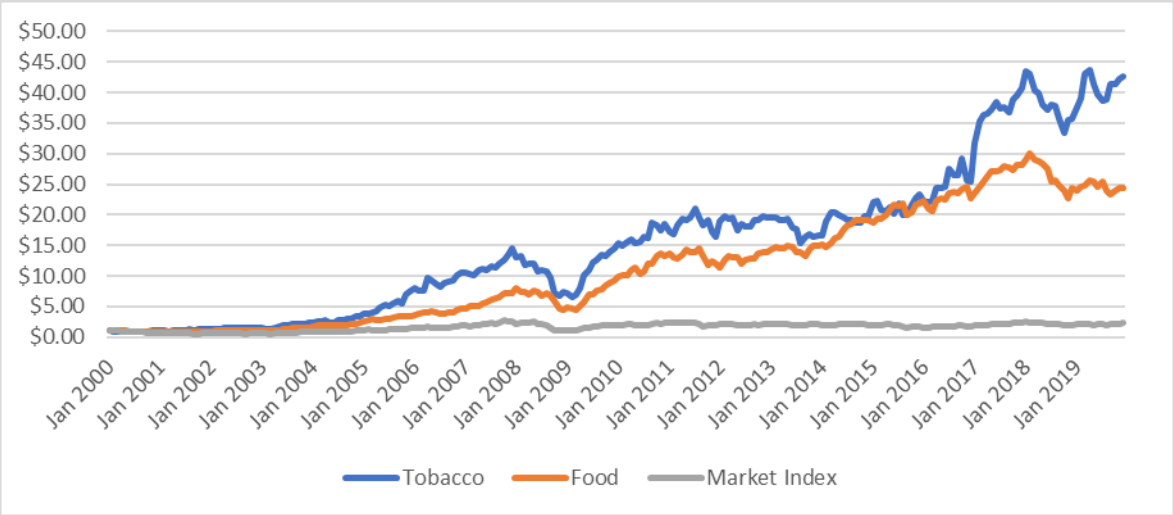
Table 5: Descriptive statistics for the tobacco portfolio, food portfolio and MSCI EM index monthly returns in the period between 2000 and 2019

	Mean	Median	Std. Dev.	Geometric Mean
Tobacco	0.0182	0.0100	0.0700	0.0158
Food	0.0147	0.0152	0.0509	0.0135
Market Index	0.0054	0.0061	0.0617	0.0034

Source: own work.

When accounting for the compounding effect, the average annual returns of the tobacco portfolio were approximately 20.7%. The food industry portfolio was the best performing portfolio out of all three comparable industries portfolios and on average it annually yielded 17.4%. When not accounting for the risks, both did much better than the market, which on average yielded 4.2% annually.

Figure 5: Monthly cumulative continuously compounded returns of the tobacco portfolio, food portfolio and MSCI EM index in the period between 2000 and 2019, represented by USD 1 investment in each



The blue, orange and grey lines represent the value of a hypothetical $1 investment at the beginning of 2000 in the tobacco portfolio, food portfolio, and the market index respectively over a 20-year period.

Source: own work.

Seen in Figure 5, if we invested USD 1 in exchange traded funds following the price movement of the two portfolios and the market index and left the investment untouched for the entire period of 20 years, the value invested in the tobacco portfolio would amount to approximately USD 42.55, the investment in the food portfolio would amount to approximately USD 24.39 and finally the investment in the market index to USD 2.27.

4.1.4 Gambling Versus Hotels

The gambling portfolio was the worst performing among all portfolios. Seen in Table 6, its average monthly yield was approximately 1%, approximately 0.4 percentage points lower than its comparable industry, and approximately 0.5 percentage points higher than the market index. The gambling portfolio also resulted to be more volatile than its comparable industry portfolio, however less volatile than the market.

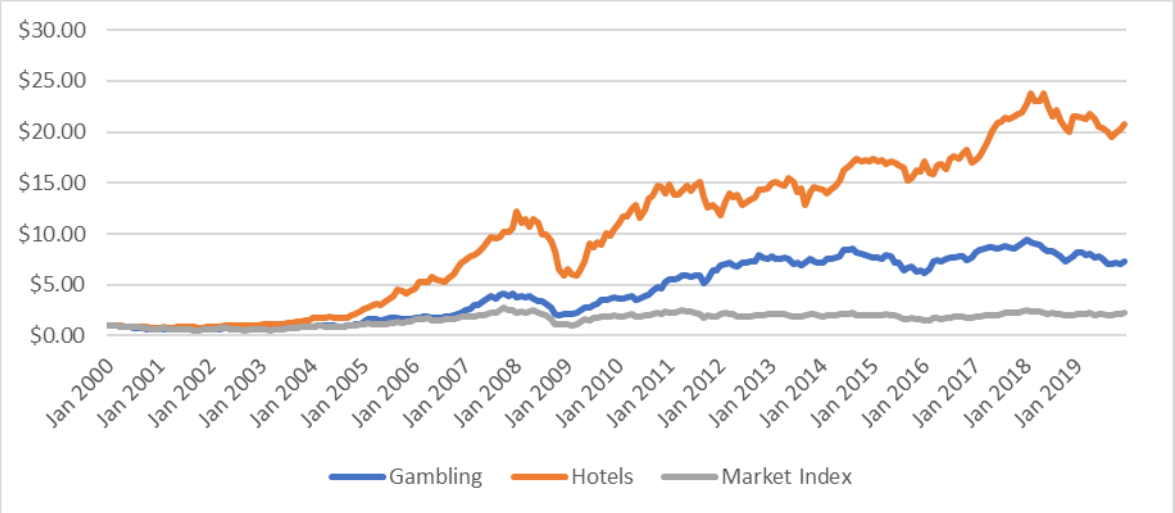
Table 6: Descriptive statistics for the gambling portfolio, hotels portfolio and MSCI EM index monthly returns in the period between 2000 and 2019

	Mean	Median	Std. Dev.	Geometric Mean
Gambling	0.0101	0.0120	0.0594	0.0084
Hotels	0.0143	0.0144	0.0550	0.0128
Market Index	0.0054	0.0061	0.0617	0.0034

Source: own work.

Adjusted for the compounding effect, the gambling portfolio on average yielded approximately 10.5% annually. It got outperformed by its comparable industry hotel stocks portfolio with an average yearly yield of 16.4%; however, it outperformed the market with its average yearly yield of 4.2%.

Figure 6: Monthly cumulative continuously compounded returns of the gambling portfolio, hotel portfolio and MSCI EM index in the period between 2000 and 2019, represented by USD 1 investment in each



The blue, orange and grey lines represent the value of a hypothetical $1 investment at the beginning of 2000 in the gambling portfolio, hotel drinks portfolio, and the market index respectively over a 20-year period.

Source: own work.

Seen in Figure 6, USD 1 investment in an exchange traded fund tracking the price movement of the gambling portfolio would after 20 years be worth approximately USD 7.33. The value of an investment of the same amount in the hotel portfolio would rise to approximately USD 20.73, and finally an investment in the market index to USD 2.27.

4.1.5 Advanced Emerging Markets Sin Versus Comparable Industries

As seen in Table 7, in terms of unadjusted monthly returns, the Advanced Emerging markets Sin portfolio got outperformed by both its neutral comparable industries portfolio and the market index. Its average monthly returns were approximately 0.3 percentage points lower than the market average monthly returns and over 0.6 percentage points lower than the average returns of the comparable industries portfolio. Based on the standard deviation it also appeared the most volatile.

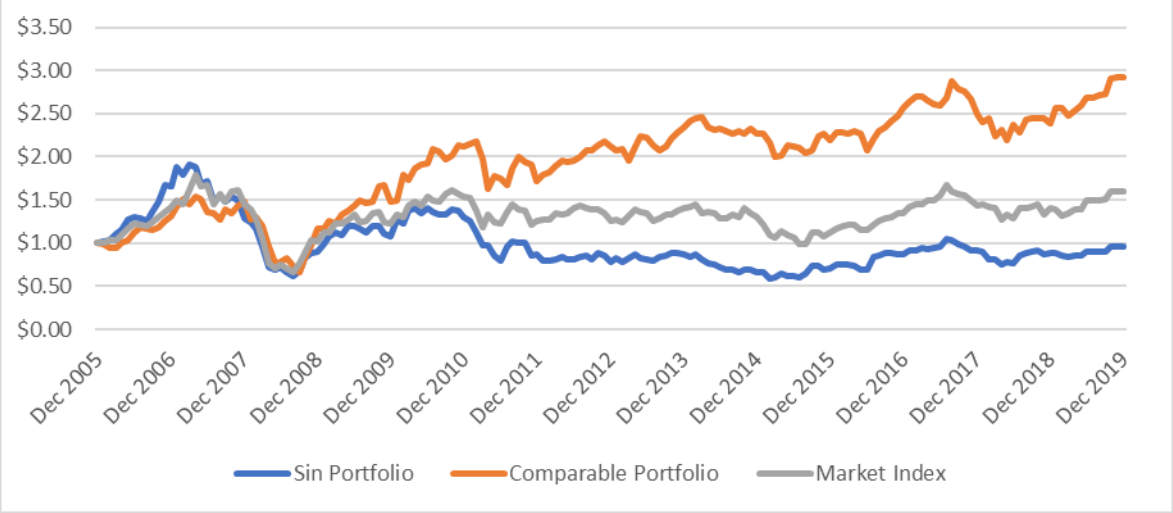
Table 7: Descriptive statistics for the Advanced Emerging Markets Sin portfolio, comparable industries portfolio and MSCI EM index monthly returns in the period between 2006 and 2019

	Mean	Median	St. Dev	Geometric Mean
Adv. Sin	0.0016	-0.0020	0.0685	-0.0007
Adv. Comparable	0.0081	0.0088	0.0627	0.0061
Market Index	0.0044	0.0042	0.0617	0.0025

Source: own work.

Adjusted for the compounding effect, the sin portfolio annually yielded on average a 0.8% loss, while the comparable industries portfolio and market index annually, on average, yielded 7.6% and 3% respectively.

Figure 7: Monthly cumulative continuously compounded returns of the advanced emerging markets sin portfolio, comparable industries portfolio and MSCI EM index in the period between 2006 and 2019, represented by USD 1 investment in each



The blue, orange and grey lines represent the value of a hypothetical $1 investment at the beginning of 2000 in the advanced emerging markets sin portfolio, advanced emerging markets neutral comparable portfolio, and the market index respectively over a 20-year period.

Source: own work.

Seen in Figure 7, USD 1 investment in an exchange traded fund tracking the price movement of the advanced emerging markets sin portfolio would after 14 years be worth approximately

USD 0.95. The value of an investment of the same amount in the comparable industries portfolio would rise to approximately USD 2.92, and finally an investment in the market index to USD 1.6.

4.1.6 Secondary Emerging Markets Sin Versus Comparable Industries

Reported in Table 8, in terms of unadjusted monthly returns, the secondary emerging markets sin portfolio outperformed both its neutral comparable portfolio and the market index. Its unadjusted monthly returns were on average approximately 0.3 percentage points higher than those of the comparable industries portfolio and approximately 1.2 percentage points higher than the average unadjusted returns of the market index. Based on the standard deviation, it does however appear the most volatile.

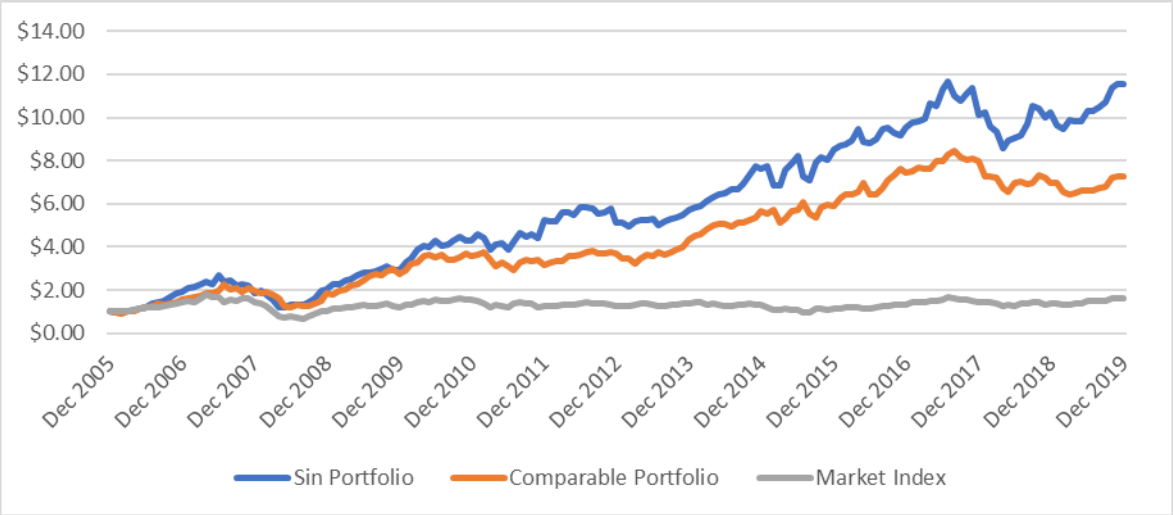
Table 8: Descriptive statistics for the Secondary Emerging Markets Sin portfolio, comparable industries portfolio and MSCI EM index monthly returns in the period between 2006 and 2019

	Mean	Median	St. Dev	Geometric Mean
Sec. Sin	0.0165	0.0220	0.0632	0.0145
Sec. Comparable	0.0133	0.0172	0.0561	0.0117
Market Index	0.0044	0.0042	0.0617	0.0025

Source: own work.

If accounting for the compounding effect, the Secondary emerging markets sin portfolio annually, on average, yielded 18.9%, the comparable industries portfolio 15%, and lastly, the market index annually, on average, yielded 3%.

Figure 8: Monthly cumulative continuously compounded returns of the secondary emerging markets sin portfolio, comparable industries portfolio and MSCI EM index in the period between 2006 and 2019, represented by USD 1 investment in each



The blue, orange and grey lines represent the value of a hypothetical $1 investment at the beginning of 2000 in the secondary emerging markets sin portfolio, secondary emerging markets neutral comparable portfolio, and the market index respectively over a 20-year period.
Source: own work.

As represented in Figure 8, if exchange traded funds which followed the movement of the two portfolios and the market index existed, and we invested 1 USD in each and left the investment untouched for the entire period of 14 years, the value invested in the secondary emerging markets sin portfolio would amount to approximately 11.55 USD, the value invested in the comparable industries portfolio to 7.29 USD and finally the value invested in the market index to USD 1.6.

4.2 Regression Results

4.2.1 Sin Versus Comparable Industries

As seen in Table 9, the single-factor and multi-factor model regression analyses yield positive significant alphas for both long sin stocks and long comparable industries stocks portfolio returns minus risk-free rate. We can also notice that by adding the risk factors the alphas for both portfolios are gradually decreased. The regressions on the comparable industries portfolio monthly returns yield higher monthly excess returns, ranging from 119 bps to 126 bps, compared to the sin portfolio monthly excess returns, which range from 95 bps to 119 bps.

Table 9: Results of the asset pricing models regressions of sin portfolio returns net of the risk-free rate, comparable industries portfolio returns net of the risk-free rate and zero investment (long sin short comparable industries) portfolio returns

	ALPHA	MKTPREM	SMB	HML	MOM	RMW	CMA
SIN - RF	0.0119***	0.653***					
	(4.33)	(12.71)					
SIN - RF	0.0116***	0.734***	0.956***	0.294**			
	(4.91)	(17.08)	(7.75)	(3.06)			
SIN - RF	0.0111***	0.742***	0.958***	0.304**	0.0581		
	(4.80)	(17.27)	(7.77)	(3.08)	(0.75)		
SIN - RF	0.0095***	0.778***	1.045***	0.206		0.229	0.143
	(3.63)	(13.56)	(7.29)	(1.36)		(1.07)	(0.71)
	ALPHA	MKTPREM	SMB	HML	MOM	RMW	CMA
COMPARABLE - RF	0.0126***	0.106					
	(3.43)	(1.56)					
COMPARABLE - RF	0.0125***	0.185**	0.915***	0.248*			
	(4.09)	(2.75)	(3.59)	(2.48)			
COMPARABLE - RF	0.0122**	0.190**	0.916***	0.255*	0.0404		
	(3.23)	(2.68)	(3.59)	(2.55)	(0.24)		
COMPARABLE - RF	0.0119**	0.131*	0.920***	0.302		0.103	-0.436
	(3.10)	(2.25)	(3.46)	(1.69)		(0.33)	(-1.35)
	ALPHA	MKTPREM	SMB	HML	MOM	RMW	CMA
SIN - COMP	-0.0007	0.547***					
	(-0.19)	(8.78)					
SIN - COMP	-0.0009	0.549***	0.0412	0.0454			
	(-0.28)	(7.29)	(0.16)	(0.34)			
SIN - COMP	-0.0011	0.551***	0.0418	0.0484	0.0177		
	(-0.28)	(6.89)	(0.16)	(0.36)	(0.12)		
SIN - COMP	-0.0024	0.647***	0.125	-0.0958		0.126	0.579
	(-0.59)	(7.88)	(0.43)	(-0.38)		(0.30)	(1.44)

*t statistics in brackets, * p < 0.05, ** p < 0.01, *** p < 0.001.*

Source: own work.

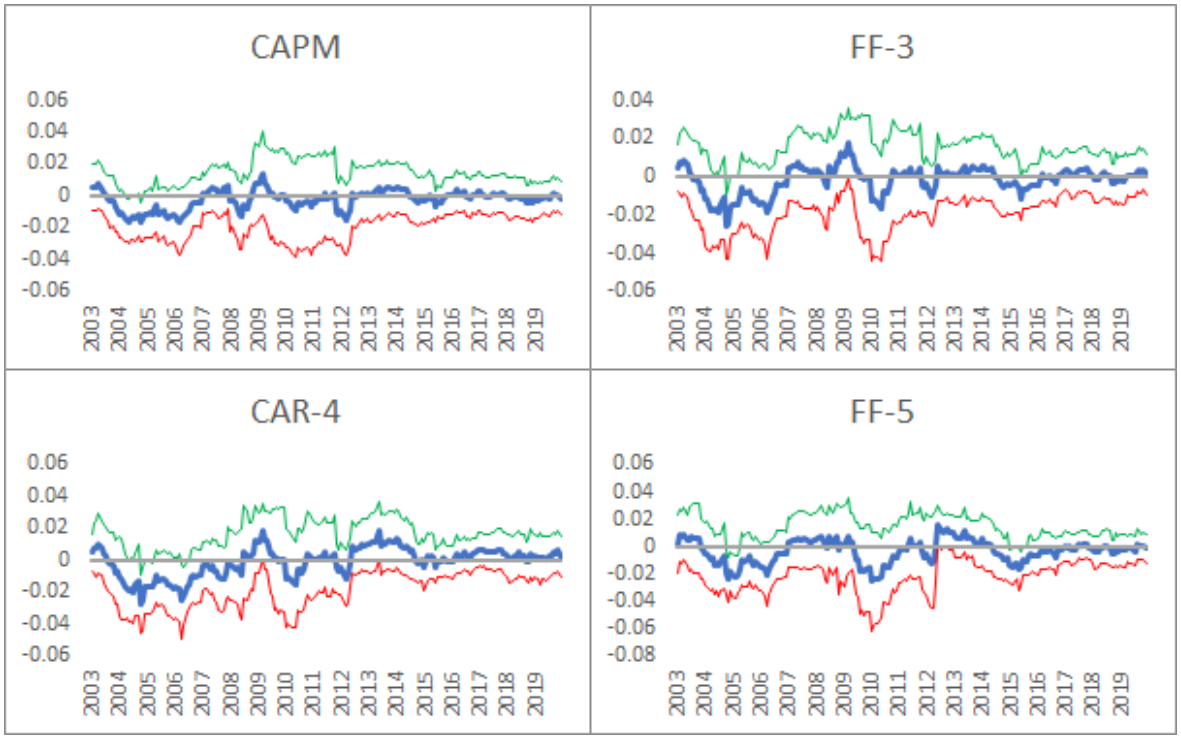
All regression analyses, with the exception of the single model regression of long comparable industries portfolio returns minus risk-free rate, yield statistically significant market betas. The comparable industries portfolio returns, with average betas ranging from 0.13 to 0.19, depending on the model, appear to be much less exposed to the systematic risk than the long sin portfolio returns minus risk-free rate, with average betas ranging from 0.65 to 0.78.

Three-, four- and five-factor asset pricing model regressions return high statistically significant SMB risk factor loadings for both portfolios. The SMB factor loadings slightly below or slightly above 1 indicate that both portfolios price movement was very similar to the price movement of small market cap Fama and French portfolios. We can also notice statistically significant positive HML risk factor loadings, when regressing the returns for the three- and four- factor models; however, the loadings become statistically insignificant when adding additional RMW and CMA factors.

The single- and multi- factor regression results on long sin stocks short comparable industries stocks portfolio return statistically significant betas, lower to those of the sin portfolio returns minus risk-free rate; however, they return no alphas statistically different from zero. We also notice no statistically significant loading on the rest of the risk factors, indicating that "betting" on sin stocks and against their neutral comparable stocks eliminates the exposure to the size, value, momentum, profitability and investment risk factors.

As visible in Figure 9, even after breaking down the entire 20-year period between January 2000 and December 2019 to 36-month moving segments and for each regressing the portfolio returns for all asset pricing models risk factors, there is no significant excess returns indicating that the sin portfolio outperforms its neutral counterpart.

Figure 9: Long sin stock short neutral industry stock portfolio excess returns persistency test - 36-month window rolling regression on single-, 3-, 4- and 5-factor asset pricing model risk factors alpha



Blue line represents the rolling regression alpha, green line represents the 95% confidence upper bound, red line represents the 95% confidence lower bound.

Source: own work.

4.2.2 Alcohol Versus Soft Drinks

As seen from Table 10, apart from the five-factor asset pricing model regression of the long soft drinks stocks portfolio returns minus risk free rate, all other regressions returned positive statistically significant alphas for long alcohol stocks and long soft drinks stocks portfolio returns. Comparing alphas of each asset pricing model regression separately, we notice that the alcohol portfolio on average offered higher excess returns than its neutral counterpart.

Depending on the asset pricing model, the alcohol portfolio yielded excess returns between 96 and 125 bps, while the soft drinks portfolio yielded between 80 and 113 bps excess returns.

Table 10: Results of the asset pricing models regressions of alcohol portfolio returns net of the risk-free rate, soft drinks portfolio returns net of the risk-free rate and zero investment (long alcohol short soft drinks) portfolio returns

	ALPHA	MKTPREM	SMB	HML	MOM	RMW	CMA
ALC - RF	0.0125***	0.639***					
	(3.76)	(9.42)					
ALC - RF	0.0123***	0.725***	1.003***	0.296*			
	(4.17)	(11.88)	(6.11)	(2.12)			
ALC - RF	0.0119***	0.731***	1.005***	0.304*	0.0498		
	(3.98)	(12.24)	(6.14)	(2.08)	(0.49)		
ALC - RF	0.0096**	0.768***	1.117***	0.271		0.369	0.0721
	(2.80)	(9.40)	(5.79)	(1.24)		(1.23)	(0.25)
	ALPHA	MKTPREM	SMB	HML	MOM	RMW	CMA
COMPALC - RF	0.00985*	0.0842					
	(2.47)	(1.10)					
COMPALC - RF	0.0113**	0.191**	1.128***	0.0856			
	(2.97)	(2.61)	(4.65)	(0.45)			
COMPALC - RF	0.0107*	0.201*	1.131***	0.0981	0.0727		
	(2.47)	(2.58)	(4.61)	(0.52)	(0.43)		
COMPALC - RF	0.00798	0.236**	1.235***	0.0802		0.455	0.0551
	(1.80)	(3.06)	(4.62)	(0.31)		(1.13)	(0.13)
	ALPHA	MKTPREM	SMB	HML	MOM	RMW	CMA
ALC - COMP	0.0027	0.555***					
	(0.60)	(7.13)					
ALC - COMP	0.0011	0.534***	-0.125	0.210			
	(0.24)	(5.73)	(-0.41)	(0.93)			
ALC - COMP	0.0012	0.531***	-0.126	0.206	-0.0229		
	(0.27)	(5.46)	(-0.41)	(0.89)	(-0.13)		
ALC - COMP	0.0016	0.532***	-0.118	0.191		-0.0857	0.0170
	(0.29)	(4.63)	(-0.33)	(0.52)		(-0.15)	(0.03)

*t statistics in brackets, * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$.*

Source: own work.

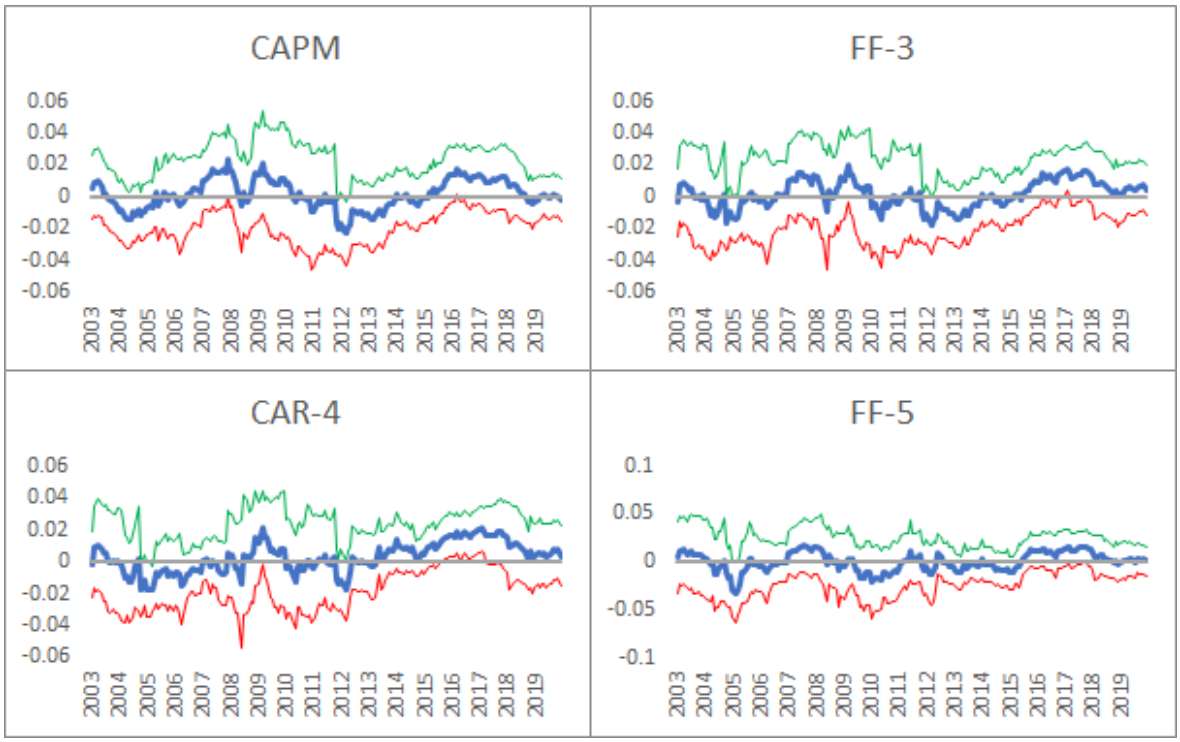
The regression results also show positive statistically significant market betas for both portfolios, except for the market beta obtained when regressing soft drinks portfolio returns for the single factor model. We can see the neutral counterpart portfolio returns minus risk-free rate were much less sensitive to market price movement than the alcohol portfolio.

Statistically significant and high, above 1, SMB factor loadings indicate both portfolios share price movement characteristics with the small market value stocks. Three- and four-factor regressions returned statistically significant and positive HML factor loadings for the alcohol portfolio indicating it shares some characteristics with the high book-to-market ratio stocks. The HML factor loading becomes insignificant when adding the additional two five-factor model factors. Neither of the portfolios show any statistically significant correlation to the momentum, profitability, and investment factors.

The last set of regressions on long alcohol and short soft drinks portfolio returns yielded no alphas statistically different from zero, indicating the alcohol stocks do not offer higher risk adjusted expected returns than its soft drinks neutral counterpart. The market betas observed with all regressions appear to be statistically significant and lower than market betas observed when regressing alcohol portfolio returns minus risk-free rate, indicating a lower exposure to the systematic risk compared to the alcohol portfolio. We can also observe there are no statistically significant loadings on any of the risk factors other than the market risk factor, which indicates that putting the returns of the alcohol portfolio against its neutral comparable industry portfolio returns eliminates the exposure to all risk factors other than the market risk factor.

Visible in Figure 10, even though on some rare occasions, the alphas obtained by the single-, three- and four-factor asset pricing model rolling regressions appear to be positive and statistically significant, the trend indicates the excess returns are during the majority of the observation period not statistically different than zero.

Figure 10: Long alcohol industry stock short soft drinks industry stock portfolio excess returns persistency test - 36-month window rolling regression on single-, 3-, 4- and 5-factor asset pricing model risk factors alpha



Blue line represents the rolling regression alpha, green line represents the 95% confidence upper bound, red line represents the 95% confidence lower bound.

Source: own work.

4.2.3 Tobacco Versus Food

Table 11 reports the regressions of the long tobacco stocks portfolio returns minus risk-free rate and its neutral comparable, long food stocks portfolio returns minus risk-free rate yielded positive and statistically significant alphas for all the asset pricing models. Depending on the model, the monthly excess returns of the tobacco portfolio range between 123 and 142 bps, the lowest observed when regressing on the three-factor model factors, while the monthly excess returns of the food portfolio range between 128 and 130 bps.

Table 11: Results of the asset pricing models regressions of tobacco portfolio returns net of the risk-free rate, food portfolio returns net of the risk-free rate and zero investment (long tobacco short food) portfolio returns

	ALPHA	MKTPREM	SMB	HML	MOM	RMW	CMA
TOB - RF	0.0142***	0.659***					
	(4.28)	(9.19)					
TOB - RF	0.0123***	0.690***	0.505*	0.422			
	(3.48)	(10.09)	(2.55)	(1.82)			
TOB - RF	0.0128***	0.681***	0.502*	0.411	-0.0626		
	(3.48)	(9.83)	(2.58)	(1.79)	(-0.36)		
TOB - RF	0.0128**	0.664***	0.489*	0.349		-0.145	-0.133
	(3.18)	(7.66)	(2.49)	(1.34)		(-0.42)	(-0.38)
	ALPHA	MKTPREM	SMB	HML	MOM	RMW	CMA
COMPTOB - RF	0.0130***	0.105					
	(3.52)	(1.55)					
COMPTOB - RF	0.0132***	0.185**	0.908***	0.208*			
	(4.27)	(2.76)	(3.38)	(2.07)			
COMPTOB - RF	0.0131***	0.186**	0.908***	0.209*	0.00956		
	(3.43)	(2.71)	(3.38)	(2.11)	(0.06)		
COMPTOB - RF	0.0128**	0.116*	0.900**	0.286		0.0894	-0.531
	(3.32)	(2.02)	(3.24)	(1.65)		(0.29)	(-1.65)
	ALPHA	MKTPREM	SMB	HML	MOM	RMW	CMA
TOB - COMP	0.0012	0.553***					
	(0.29)	(7.56)					
TOB - COMP	-0.0009	0.504***	-0.403	0.214			
	(-0.22)	(6.82)	(-1.34)	(0.89)			
TOB - COMP	-0.0003	0.495***	-0.406	0.202	-0.0721		
	(-0.08)	(5.90)	(-1.34)	(0.84)	(-0.42)		
TOB - COMP	0.0000	0.548***	-0.411	0.0630		-0.234	0.398
	(0.01)	(5.28)	(-1.26)	(0.20)		(-0.50)	(0.94)

*t statistics in brackets, * p < 0.05, ** p < 0.01, *** p < 0.001.*

Source: own work.

All regressions of both long portfolios returns minus risk-free rate yielded statistically significant market betas, except the CAPM regression on food portfolio returns. The market beta of the tobacco portfolio returns indicates that they are significantly sensitive to market price movements, while the market beta of the food portfolio returns indicates they are barely affected by the market price movement.

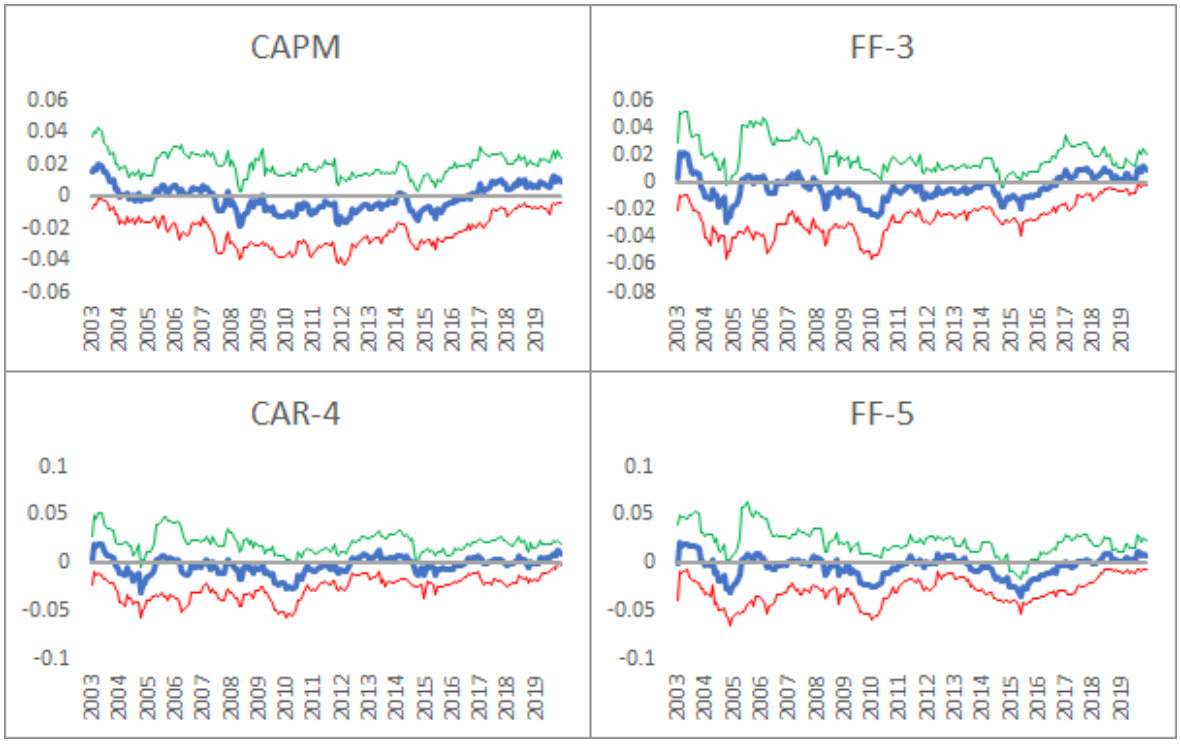
Three- to five-factor model regressions yield positive and statistically significant SMB factor loadings for both portfolios, approximately 0.5 for the tobacco portfolio returns, which indicates it shares returns characteristics with small market cap stock returns at least to some

degree, and almost 1 for the food portfolio, which indicates very similar price return characteristics to the return characteristics of small market cap stocks. As also reported in Table 11, there is a statistically significant positive correlation between food portfolio returns and the HML risk factor when regressing for the three- and four-factor model; however, there is no statistically significant correlation observed when regressing for the five-factor model. No statistically significant MOM, RMW and CMA factor loadings are observed through all the regressions.

When looking at the regression results for the long tobacco and short food portfolio, we observe statistically significant market betas lower than 1 for all four regressions, which indicates the long-short portfolio returns are less exposed to the systematic risk than the tobacco portfolio. Since there are no statistically significant positive alphas observed, we can assume, that the tobacco portfolio risk-adjusted expected returns did not exceed the risk-adjusted expected returns of its neutral counterpart portfolio.

The asset pricing models rolling regression results, shown in figure 11, confirm the tobacco portfolio does not outperform its neutral industry counterpart – the food stock portfolio. During some shorter periods, the rolling regression alphas even suggest the food portfolio outperformed the tobacco portfolio; however, it can be clearly seen that the trend suggests that neither of the portfolios significantly outperforms the other.

Figure 11: Long tobacco industry stock short food industry stock portfolio excess returns persistency test - 36-month window rolling regression on single-, 3-, 4- and 5-factor asset pricing model risk factors alpha



Blue line represents the rolling regression alpha, green line represents the 95% confidence upper bound, red line represents the 95% confidence lower bound.

Source: own work.

4.2.4 Gambling Versus Hotels

Shown in Table 12, the single-, three- and four-factor model regressions returned positive statistically significant alphas for both the long gambling stocks portfolio returns minus risk-free rate and its neutral counterpart. The five-factor model regression yielded statistically significant alpha only for hotel portfolio returns. The hotel portfolio yielded excess returns between 102 and 124 bps, which is overall significantly higher than the excess returns of gambling portfolio returns ranging between 58 and 66 bps.

Table 12: Results of the asset pricing models regressions of gambling portfolio returns net of the risk-free rate, hotel portfolio returns net of the risk-free rate and zero investment (long gambling short hotels) portfolio returns

	ALPHA	MKTPREM	SMB	HML	MOM	RMW	CMA
GAM - RF	0.0060*	0.688***					
	(2.00)	(16.77)					
GAM - RF	0.0066*	0.778***	0.986***	0.170			
	(2.33)	(15.39)	(5.37)	(1.55)			
GAM - RF	0.0058*	0.790***	0.989***	0.186	0.0927		
	(2.10)	(16.66)	(5.35)	(1.70)	(1.08)		
GAM - RF	0.0047	0.852***	1.060***	-0.0388		0.116	0.400*
	(1.53)	(15.99)	(5.70)	(-0.26)		(0.53)	(2.35)
	ALPHA	MKTPREM	SMB	HML	MOM	RMW	CMA
COMPGAM - RF	0.0124**	0.118					
	(3.06)	(1.60)					
COMPGAM - RF	0.0112**	0.183*	0.857***	0.418**			
	(3.22)	(2.49)	(3.38)	(3.14)			
COMPGAM - RF	0.0102*	0.199*	0.861***	0.438**	0.119		
	(2.49)	(2.39)	(3.34)	(3.20)	(0.69)		
COMPGAM - RF	0.0109*	0.137*	0.862**	0.427*		0.0215	-0.360
	(2.53)	(2.00)	(3.20)	(2.17)		(0.06)	(-1.05)
	ALPHA	MKTPREM	SMB	HML	MOM	RMW	CMA
GAM - COMP	-0.0064	0.571***					
	(-1.59)	(8.15)					
GAM - COMP	-0.0046	0.594***	0.129	-0.247			
	(-1.14)	(7.14)	(0.47)	(-1.55)			
GAM - COMP	-0.0043	0.591***	0.128	-0.252	-0.0261		
	(-0.91)	(6.41)	(0.47)	(-1.58)	(-0.14)		
GAM - COMP	-0.0062	0.716***	0.198	-0.466*		0.0946	0.760*
	(-1.23)	(8.69)	(0.66)	(-2.08)		(0.22)	(2.08)

*t statistics in brackets, * p < 0.05, ** p < 0.01, *** p < 0.001.*

Source: own work.

The majority of regressions of both portfolio returns yielded statistically significant market betas, which indicates that the gambling portfolio returns are much more exposed to the systematic risk than its neutral counterpart.

Three- to five-factor model regressions of both portfolios' returns show a heavy SMB factor loading, close to 1, indicating they both share returns characteristics with small market value stock returns. It also shows that hotel portfolio returns exhibited statistically significant loadings on the HML factor, indicating it shares some return characteristics with high book-to-market stocks.

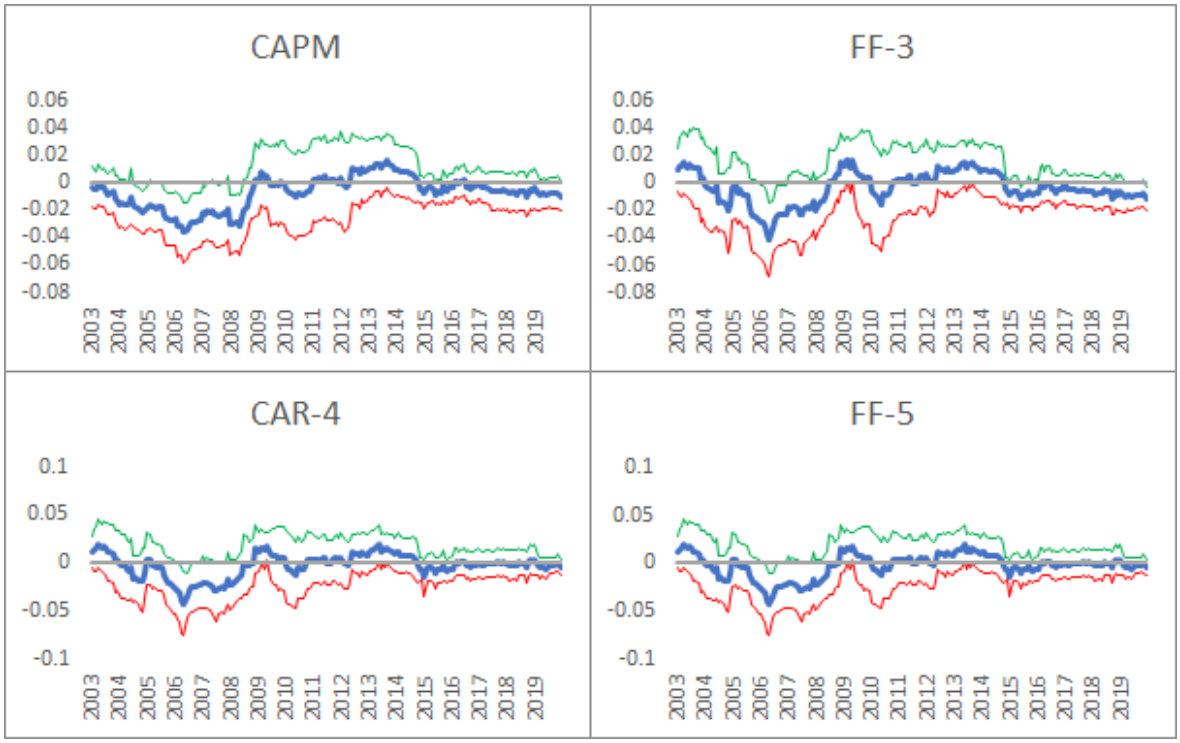
Five-factor model regressions of gambling portfolio returns minus risk-free rate and long gambling short hotel portfolio returns are the only overall, which exhibited statistically significant CMA factor loadings, indicating there is some significant correlation between gambling portfolio returns and the returns of equities with conservative investment policies.

Similar to the regressions of long-short portfolio returns, the regressions of long gambling short hotel portfolio returns yield statistically significant market betas, which are lower than one; however, we again cannot observe any statistically significant alphas, which indicates that the adjusted expected returns of the gambling portfolio are not bigger than the adjusted expected returns of the hotel portfolio.

Since putting one's returns against the others in a long-short portfolio negates the statistical significance of the alphas, we again assume the risk factors included in the regressions fail to explain a risk specific to the two industries, gambling, and the hotel industry.

Visible in Figure 12, the asset pricing model rolling regression alphas suggest that the gambling portfolio does not outperform its neutral counterpart during the 20-year period between January 2000 and December 2019. We can also notice a significant drop in excess returns during the 2007/2008 financial crisis, where the excess returns appear to be significantly lower than zero, which indicates that the hotels industry outperformed the gambling industry in that period.

Figure 12: Long gambling industry stock short hotels industry stock portfolio excess returns persistency test - 36-month window rolling regression on single-, 3-, 4- and 5-factor asset pricing model risk factors alpha



Blue line represents the rolling regression alpha, green line represents the 95% confidence upper bound, red line represents the 95% confidence lower bound.

Source: own work.

4.2.5 Advanced Emerging Markets Sin Versus Comparable Industries

As reported in Table 13, the regression analyses on sin and comparable portfolio returns yielded no significant alphas. Significant market betas close to 1 indicate the sin portfolio is highly exposed to the market risk, while low market betas of the comparable industries portfolio indicate a very low exposure to the systematic risk. The regression analyses results also show a heavy loading on the size factor for both portfolios, which indicates they are both highly exposed to the size risk factor. There are no other significant loadings on any other risk factors for the two portfolios.

Table 13: Results of the asset pricing models regressions of advanced emerging markets sin portfolio returns net of the risk-free rate, comparable industries portfolio returns net of the risk free rate and zero investment (long sin short comparable industries) portfolio returns

	ALPHA	MKTPREM	SMB	HML	MOM	RMW	CMA
SIN - RF	-0.0024	0.899***					
	(-0.78)	(18.95)					
SIN - RF	-0.0026	0.936***	0.832***	0.273			
	(-1.00)	(19.55)	(4.40)	(1.65)			
SIN - RF	-0.0027	0.937***	0.832***	0.276	0.00703		
	(-1.04)	(17.87)	(4.35)	(1.49)	(0.05)		
SIN - RF	-0.0047	1.039***	0.932***	0.0687		0.183	0.468
	(-1.52)	(11.66)	(4.28)	(0.34)		(0.73)	(1.29)
	ALPHA	MKTPREM	SMB	HML	MOM	RMW	CMA
COMPARABLE - RF	0.0064	0.223					
	(1.38)	(1.70)					
COMPARABLE - RF	0.0066	0.280*	0.969*	0.177			
	(1.59)	(2.03)	(2.34)	(0.66)			
COMPARABLE - RF	0.0081	0.255*	0.960*	0.106	-0.189		
	(1.40)	(2.09)	(2.38)	(0.36)	(-0.56)		
COMPARABLE - RF	0.0074	0.0825	0.844*	0.568		0.116	-1.063
	(1.33)	(0.74)	(2.27)	(1.46)		(0.19)	(-1.54)
	ALPHA	MKTPREM	SMB	HML	MOM	RMW	CMA
SIN - COMP	-0.0088	0.676***					
	(-1.83)	(4.81)					
SIN - COMP	-0.0093*	0.657***	-0.138	0.0960			
	(-2.00)	(4.09)	(-0.28)	(0.30)			
SIN - COMP	-0.0108	0.683***	-0.128	0.170	0.196		
	(-1.70)	(4.70)	(-0.26)	(0.50)	(0.49)		
SIN - COMP	-0.0120*	0.957***	0.0882	-0.499		0.0674	1.532*
	(-1.99)	(6.93)	(0.18)	(-1.15)		(0.10)	(2.17)

*t statistics in brackets, * p < 0.05, ** p < 0.01, *** p < 0.001.*

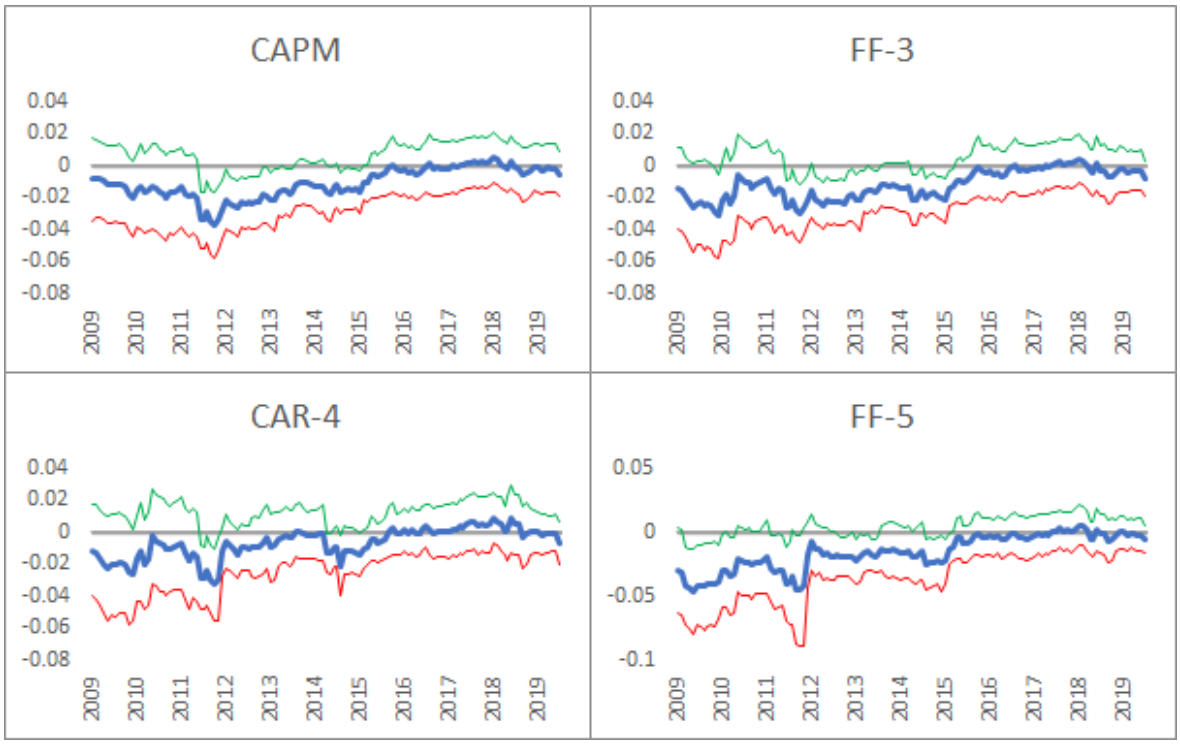
Source: own work.

The most interesting are however the regression results of the long sin short neutral portfolio. For the first time in the present thesis, we can observe statistically significant alphas for zero investment portfolio returns, which are however negative. This indicates that the advanced

emerging markets comparable industries on average outperformed the sin portfolio in the period between 2006 and 2019. We can also observe significant market betas ranging between 0.65 and 0.7 for the single-, three- and four-factor asset pricing models regression analyses, indicating a moderate exposure to the systematic risk, while the market beta obtained with the five-factor regression analysis is close to 1 and indicates a high exposure to the systematic risk. We can also see high loading on the investment risk factor.

The rolling regression alphas for all four asset pricing models, shown in Figure 13, clearly show the trend that zero-investment portfolio alphas are statistically non distinguishable from zero or significantly lower than zero, which indicates that the advanced emerging markets sin portfolio did not outperform its neutral counterpart during the period of 2006 and 2019.

Figure 13: Advanced Emerging Markets Long sin industries short comparable industries stock portfolio excess returns persistency test - 36-month window rolling regression on single-, 3-, 4- and 5-factor asset pricing model risk factors alpha



Blue line represents the rolling regression alpha, green line represents the 95% confidence upper bound, red line represents the 95% confidence lower bound.

Source: own work.

4.2.6 Secondary Emerging Markets Sin Versus Comparable Industries

As Table 14 reports, the asset pricing models regression analyses of secondary emerging markets sin and comparable industries portfolios returns yield statistically significant positive alphas, which range between 106 and 138 bps for the sin portfolio and between 115 and 123 bps for the comparable industries portfolio. Significant market betas close to 1 for

the sin portfolio indicate a high exposure to the systematic risk, while based on the results, the comparable industries portfolio does not seem to be exposed to the systematic risk at all. The results show significant loading on the size risk factor for both portfolios, which is however much higher for the sin portfolio. No exposure to other risk factors can be observed.

Table 14: Results of the asset pricing models regressions of secondary emerging markets sin portfolio returns net of the risk-free rate, comparable industries portfolio returns net of the risk-free rate and zero investment (long sin short comparable industries) portfolio returns

	ALPHA	MKTPREM	SMB	HML	MOM	RMW	CMA
SIN - RF	0.0130***	0.759***					
	(3.73)	(16.45)					
SIN - RF	0.0136***	0.837***	1.133***	0.0714			
	(4.12)	(18.56)	(6.28)	(0.40)			
SIN - RF	0.0138***	0.834***	1.132***	0.0640	-0.0197		
	(4.23)	(17.82)	(6.20)	(0.35)	(-0.23)		
SIN - RF	0.0106***	0.966***	1.303***	-0.135		0.343	0.541
	(3.38)	(13.31)	(7.28)	(-0.52)		(1.05)	(1.64)
	ALPHA	MKTPREM	SMB	HML	MOM	RMW	CMA
COMPARABLE - RF	0.0121*	0.0919					
	(2.44)	(0.98)					
COMPARABLE - RF	0.0123**	0.138	0.759*	0.118			
	(2.93)	(1.30)	(2.01)	(0.41)			
COMPARABLE - RF	0.0121*	0.141	0.761*	0.129	0.0279		
	(2.40)	(1.21)	(2.01)	(0.48)	(0.13)		
COMPARABLE - RF	0.0115*	0.0319	0.739*	0.449		0.373	-0.665
	(2.35)	(0.26)	(2.02)	(1.44)		(0.82)	(-1.19)
	ALPHA	MKTPREM	SMB	HML	MOM	RMW	CMA
SIN - COMP	0.0008	0.667***					
	(0.18)	(7.46)					
SIN - COMP	0.0013	0.699***	0.374	-0.0466			
	(0.28)	(5.58)	(0.90)	(-0.14)			
SIN - COMP	0.0017	0.693***	0.371	-0.0646	-0.0476		
	(0.31)	(5.06)	(0.89)	(-0.20)	(-0.23)		
SIN - COMP	-0.0009	0.934***	0.565	-0.584		-0.0308	1.206
	(-0.17)	(6.54)	(1.37)	(-1.48)		(-0.05)	(1.69)

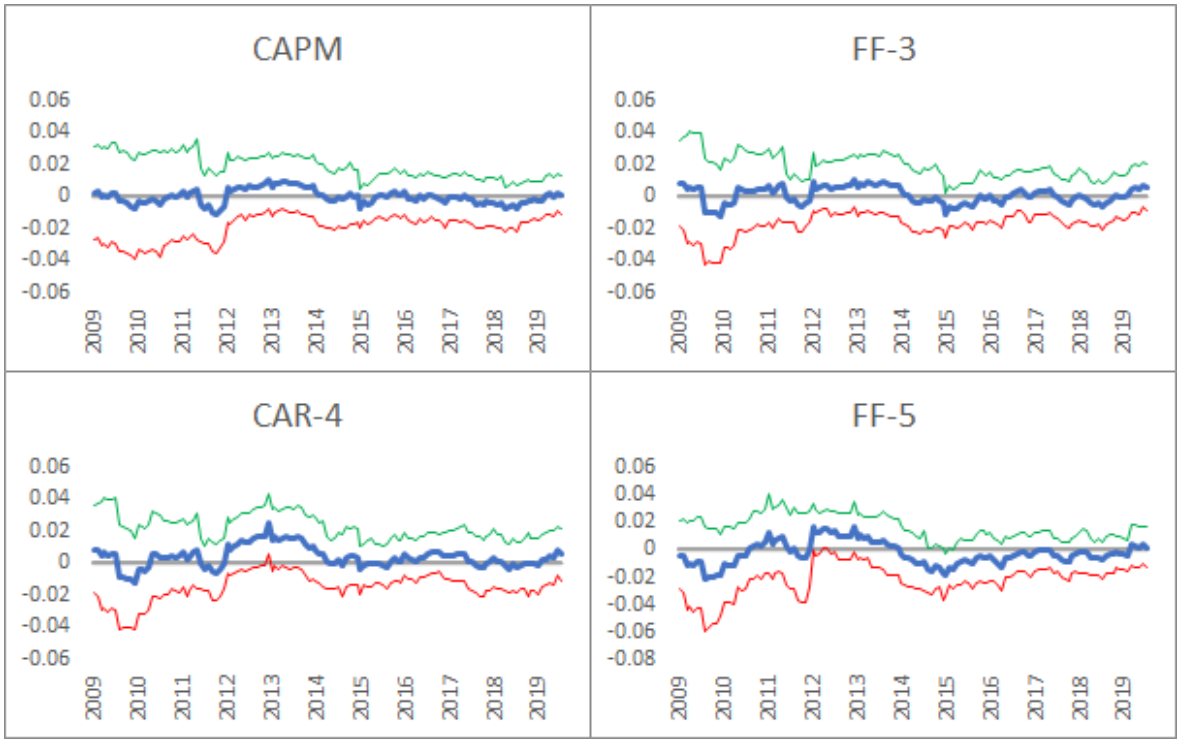
*t statistics in brackets, * p < 0.05, ** p < 0.01, *** p < 0.001.*

Source: own work.

The regression results for zero-investment portfolio returns show no significant alphas, which indicates that the secondary emerging markets sin portfolio did not outperform its neutral comparable portfolio during the period between 2006 and 2019. Significant market betas indicate a moderate to a high exposure to the systematic risk. Besides the exposure to the market risk, the zero-investment portfolio does not appear to be exposed to any other risk.

The graphs representing the trend in alphas obtained with the 36-month window rolling regressions, shown in Figure 14, show some occasional spikes, which indicate positive or negative alphas during some short periods; however, the overall trend clearly indicates the alphas are mostly non-distinguishable from zero. We can therefore conclude that the secondary emerging markets sin portfolio does not outperform its neutral counterpart during the period between 2006 and 2019.

Figure 14: Secondary Emerging Markets Long sin industries short comparable industries stock portfolio excess returns persistency test - 36-month window rolling regression on single-, 3-, 4- and 5-factor asset pricing model risk factors alpha



Blue line represents the rolling regression alpha, green line represents the 95% confidence upper bound, red line represents the 95% confidence lower bound.

Source: own work.

DISCUSSION

The aim of the present thesis was to explore the returns of sin stocks in emerging markets. The data used in the study are the monthly returns of sin stocks between January 2000 and December 2019. Furthermore, additional data was used in order to obtain a more in-depth understanding of sin stock returns in emerging markets. More specifically, the monthly returns of neutral comparable industry stock returns, the return of the MSCI Emerging Markets Index and the returns of 5 additional portfolios, which represent 5 common risks – size, value, momentum, profitability and investment.

The first hypothesis was explored by using the CAPM, Fama and French 3-factor, Charhart 4-factor and, Fama and French 5-factor models on returns of the sin stock portfolio. The

results of the four aforementioned asset pricing models regression analyses indicated that sin stocks offer excess returns regardless of how many additional risk factors were included into the analyses.

These results are in line with the results of previous studies in this field, which suggested that in some developed markets the investors' practices of excluding the sin stocks, especially by the institutional investors, result in an abnormal behaviour of sin stock returns, which is also known as the sin stock anomaly (Salaber, 2007; Hong & Kacperczyk, 2009; Durand et al., 2013). The assumption is that many significant investors do not wish to be associated with this type of stocks and they consequently exclude them from their portfolios only due to their nature, essentially ignoring the financial data that would otherwise indicate how well these stocks are performing (Hong & Kacperczyk, 2009; Durand et al., 2013).

However, despite of the first analysis in the present thesis and previous research results, all of which appeared to endorse the first hypothesis, the results from an additional more comprehensive analysis refutes it. More specifically, by regressing zero-investment portfolio returns, the results of all four asset pricing models showed no statistically significant positive excess returns. The four additional 36-month window rolling regressions on zero-investment portfolio returns confirmed that excess returns are consistently statistically equal to zero throughout the entire period of observation. Contrary to the results found by researchers exploring sin stock returns in developed markets (e.g., Salaber, 2007; Hong & Kacperczyk, 2009; Durand et al., 2013), this indicates that the sin stock portfolio does not outperform its neutral counterpart portfolio in emerging markets and therefore rejects the first hypothesis.

The additional information obtained when performing the asset pricing models regressions on sin and neutral portfolios are not relevant for answering the core questions of the present thesis but are nonetheless interesting. More specifically, the low betas of both portfolios indicate that they are both less volatile than the market; however, they both appear significantly exposed to size and value risk factors.

The analyses performed on individual industries' sin sub-portfolios were intended to give further, a more detailed, insight in returns of individual sin industries and their neutral counterparts included in the present thesis. Unexpectedly, even when testing the alcohol-soft drinks, tobacco-food, and gambling-hotels zero investment sub-portfolios, none of the sin industries outperformed their neutral counterparts. The regression results for all four asset pricing models showed that excess returns of all zero-investment portfolios were statistically equal to zero. Therefore, the results did not confirm the second hypothesis, which postulated that the returns of the individual sin industry will outperform their individual neutral counterparts. This was also confirmed with the 36-month window rolling regressions, which showed that alphas remain statistically equal to zero throughout the entire period of observation.

To the best of my knowledge, no other researcher has explored sin stock returns for various individual sin industries by comparing them to their neutral counterparta, but rather grouped them either by the country's characteristics, such as religion, legal system (e.g., Salaber, 2007), or look at sin stock portfolios as a whole – i.e., exploring the returns of various sin industries at the same time (e.g., Hong & Kacperczyk, 2009; Durand et al., 2013; Blitz & Fabozzi, 2017). Therefore, the comparison of the present results to the results of the previous research cannot be made.

The last two sets of regression analyses give insight into the differences between the more developed, advanced emerging markets and the less developed, secondary emerging markets. The asset pricing model regression analyses on the returns of the advanced emerging markets sin stock portfolio and their neutral counterpart portfolio showed surprising results as no excess returns significantly different than zero could be observed. On the other hand, the same regression analyses on the secondary emerging markets sin stock portfolio and neutral counterpart portfolios returned statistically significant positive excess returns for both portfolios. Therefore, the third hypothesis, which stated that differences in returns between advanced and secondary emerging markets sin stocks will be observed, is supported by the present results.

This is also in line with the findings of Hull and McGroarty (2014), who suggested that more developed emerging markets show greater efficiency in risky assets' returns and volatility. Therefore, the present results indicate that the lower level of development of secondary emerging markets affects their efficiency, which in turn could lead to market imperfections. Consequently, excess returns can be observed when valuating assets originating from secondary emerging markets.

Furthermore, regression analyses on zero-investment portfolios show that sin industries did not outperform their neutral counterparts in secondary emerging markets. On the other hand, two asset pricing model regression analyses' results suggest that the sin industries got outperformed by their neutral counterparts in advanced emerging markets, where the excess returns of the zero-investment portfolio were statistically significant and negative. This can also be seen with the 36-month window rolling regression results, where the 95% confidence level upper bound stays bellow the zero-line for longer periods.

To the best of my knowledge, no previous research has observed sin stocks being outperformed by neutral, non-sin industries. The results might have been affected by other factors, which have not been accounted for by any of the asset pricing models used in the thesis. Although an instinctive reasoning for the present results could be sought in the introduction of new legislations creating a higher risk for litigation or higher tax policies for sin industry products, Salaber (2007) reported that exactly those conditions lead to higher sin stock excess returns. Nevertheless, Salaber (2007) used data from the European market rather than emerging market when exploring the sin stocks and given the cultural differences between various emerging market countries and Europe this might not be the case at present.

However, these factors have not been explored in the present study and thus limit the possible interpretation of the results. Furthermore, as already presented in the introduction, the differences in classifications for both the stocks and emerging markets might present an additional limitation to the present research, as it can affect the comparison of one's results to the results of other researchers. Additionally, another potential limitation could be that there is a great heterogeneity amongst emerging markets as the classification of what is sinful is also linked to culture and religion. For example, the culture in Qatar is vastly different to the Brazilian culture, which could lead to Brazilian investors not perceiving some industries as sinful while the Qatar investors would, and the other way around. Therefore, by not taking into account the heterogeneity of the emerging markets when forming the present sin industries portfolios, this might have led to skewed results. Additionally, the absence of a further differentiation of sin stock portfolios by, for example cultural similarities, limits the comparison of the present results to studies that have explored only sin stocks in emerging markets with a specific cultural context (e.g., Salaber, 2009). Thus, the results do therefore not reflect the view on sin stocks in individual countries, but rather give a possibility to compare the findings on emerging markets sin stock returns with the findings based on developed markets data. Lastly, in the present thesis the focus on emerging markets was mostly determined by the MSCI market classification framework. However, other financial institutions of good renown, such as the International Monetary Fund, have also developed own market classification frameworks. Some might argue that the results might vary if a different framework was used to determine eligible markets.

To conclude, the empirical results in the present thesis show no solid evidence, which would confirm the findings of some previous research that sin stocks generally outperform their neutral counterparts. Neither is there any evidence that individual sin industry portfolios outperform their neutral counterparts. The positive alphas obtained when regressing the returns of the sin portfolio and sin sub-portfolios can more likely be attributed to market imperfections present in certain emerging markets rather than to sin industry stocks outperforming other stocks in the market. This can be seen when differentiating between advanced emerging markets and secondary, less developed emerging markets. Future research should explore how specific market characteristics of emerging markets, such as dominant religion or regulation on sin industries, affect the sin stock returns in these markets. Additional interesting topics for future research would be the levels analyst coverage of sin stocks and the percentages of sin stocks equity held by reputable institutions in individual emerging markets.

Emerging markets have been subject to a large liberalization and opened their gates to foreign capital inflow, which consequently also put them under scrutiny and increased transparency in the markets. However, they have not yet got completely rid of market imperfections. Based on the present empirical results conducted on sin stocks, the included emerging markets, especially secondary emerging markets, might in general be a good option for diversification for risk tolerant investors. However, no evidence which would with

certainty confirm that investing in sin stocks in emerging markets would yield high returns without taking additional risk has been found.

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APPENDIX

Appendix 1: Povzetek v slovenskem jeziku

Grešne delnice so delnice tistih podjetij oz. industrij, ki izkoriščajo človekovo šibkost za ustvarjanje prihodkov. Zaradi nemoralnega načina poslovanja se jim nekateri vlagatelji zato pogosto izogibajo, ne glede na njihovo uspešnost oziroma dobičkonosnost. Nekatere raziskave kažejo, da to finančno neracionalno vedenje etičnih investitorjev vodi v podcenjenost grešnih delnic in tako investitorjem, ki se pri svojem oblikovanju delniškega portfelja ne ozirajo na moralne ali etične vidike delnic, predstavljajo dobro finančno priložnost. Ker se večina raziskav osredotoča na donos grešnih delnic na razvitih trgih, je namen trenutne magistrske naloge raziskati donosnost grešnih delnic na razvijajočih se trgih s sledečim raziskovalnim vprašanjem: Ali je na razvijajočih se trgih moč zaznati presežni dobiček grešnih delnic iz tobačne, alkoholne in igralniške industrije v primerjavi z njihovimi primerljivimi nevtralnimi industrijami?

Na podlagi MSCI klasifikacije trgov so bili identificirani razvijajoči se trgi, medtem ko je bila za identifikacijo sekundarnih in naprednih razvijajočih se trgov uporabljena klasifikacija FTSE Russell, saj prva ne razlikuje med le-temi. Sledilo je oblikovanje portfeljev grešnih in primerljivih nevtralnih delnic, za kar sta bili uporabljeni FTSE Russellova in Bloombergova klasifikaciji industrij. Za vse delnice, umeščene v posamičen portfelj, so bili pridobljeni mesečni podatki o donosu za obdobje od 2000 do 2019 s pomočjo Bloomberg in Eikon Datastream podatkovnih baz. Za vsak portfelj je bil nato izračunan povprečen mesečni donos.

Z uporabo regresijskih modelov ocenjevanja vrednosti dolgoročnih sredstev – CAPM, Fama in French 3-faktorskega modela, Carhart 4-faktorskega modela, in Fama in French 5-faktorskega modela, so bili analizirani povprečni mesečni donosi portfeljev grešnih in primerljivih nevtralnih delnic na razvijajočih se trgih. Rezultati so pokazali, da donosnost grešnih delnic v obdobju med 2000 in 2019 ni vodila v presežni dobiček v primerjavi z nevtralnimi delnicami. Analize prav tako niso pokazale razlik med donosnostjo portfeljev individualnih grešnih in primerljivih individualnih nevtralnih industrij. Zadnji analizi, osredotočeni na razlike med naprednimi in sekundarnimi razvijajočimi se trgi, sta prav tako pokazali, da donosnost grešnih delnic ni statistično višja od nevtralnih primerljivih delnic. Dva izmed štirih modelov ocenjevanja vrednosti dolgoročnih sredstev sta celo pokazala, da so na naprednih razvijajočih se trgih nevtralne delnice presegle grešne delnice.