

Breaking Bad: an Investment in Cannabis[†]

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Abstract

This paper investigates the risk and return features of an investment in the cannabis industry. It further describes the current state of the market for cannabis and critically examines its potential future development. Findings show that a portfolio of cannabis stocks displays high volatilities and returns, but also low correlations and beta coefficients with regard to overall stock markets, other sin industries or cryptocurrencies. This makes it an interesting addition to financial portfolios.

Keywords: cannabis; CAPM; cryptocurrency; factor model; investment; return; risk

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1 Introduction

Over the past years two assets have made the headlines as the next big thing for investors wishing to enhance portfolio performance: cryptocurrencies and cannabis stocks. While literature on cryptocurrencies has gained momentum recently (Baek and Elbeck, 2015, Chowdhury, 2016, Aalborg et al., 2018, Baur et al., 2018, Smales, 2018), to the best of my knowledge, so far no study has analyzed the merits of an investment in the cannabis industry.¹ This paper thus aims at yielding insights into this industry and analyze the risk and return characteristics of an investment in cannabis stocks in Canada and the United States.

The cannabis industry can be related to the wider field of investments into sin stocks (normally composed of the trinity of gambling, tobacco and alcohol stocks and also known as vice stocks) according to Blitz and Fabozzi (2017). Literature on the performance and risk of sin stocks has documented a small but growing number of findings and generally suggests these to be associated to significantly positive abnormal returns (Fabozzi et al., 2008, Hong and Kacperczyk, 2009, Durand et al., 2013a). This is mainly linked to an undervaluation argument since investors oppose an investment in these fields or are norm-constrained on cultural or religious grounds (Hong and Kacperczyk, 2009, Perez Liston and Soydemir, 2010, Durand et al., 2013b, Salaber, 2013). Thus, a sin premium is offered to investors who are willing to invest in these types of stocks. Other arguments are linked to an increased litigation risk of these stocks or to quasi monopolistic returns (Derwall et al., 2011). This evidence is completed by studies comparing sin to socially responsible or ethical stocks (Perez Liston and Soydemir, 2010) and those who link sin stock performance to investor sentiments (Perez Liston, 2016). More recently, Blitz and Fabozzi (2017) find evidence that sin stocks do not display positive abnormal

¹ Two articles analyze the cannabis industry taking a financial angle. Guttery and Poe (2018) investigate the advantages and drawbacks of an exposure in the Marijuana industry through the channel of REITs. Parker et al. (2019) study the risks and challenges of the cannabis industry and the potential of futures to hedge price risk.

returns, once a Fama and French (2016) five-factor model is used. Lobe and Walkshäusl (2016) also refute the outperformance of sin stocks.

The cannabis industry, in many respects, ticks the boxes of other sin industries as investors may shun from an investment in it due to beliefs, norms or a legal grey-zone. It is also currently in the midst of a legal conundrum with Canada officially having legalized it for both medical and recreational use, while the situation in the United States remains uncertain at the federal level. However, due to its novel access to stock markets and legality the industry may display diverging characteristics with respect to classic sin stocks and thus constitute an interesting addition to an investor's portfolio. The finance industry has started to cater to increased investor demand for this industry by creating dedicated funds and ETF.

2 Legal environment

2.1 Canadian environment

Canada has started to open its cannabis market to medical use in 2001 after a ban under the Opium and Narcotic Control Act of 1923. Patients could then grow their own cannabis or get it from Health Canada or authorized sellers under the Marijuana for Medical Purposes Regulations. The Cannabis Act (Bill C-45) passed in 2017 paved the way for the legalization of cannabis not only for medical, but also for recreational use and effectively came into effect nationwide on October 17th, 2018. At the same time, Provinces were given the freedom to restrict the use of cannabis under specific conditions or the distribution channels according to provincial preferences.

2.2 U.S. environment

Under the Controlled Substances Act of 1970 the use, sale or possession of cannabis is illegal under federal law in the United States. The only exception is made for universities and

departments of agriculture of U.S. states which are allowed to work with cannabis for research only under the Agricultural Act of 2014.

At the state level the picture is, however, more nuanced and depends on the use of cannabis (medical vs. recreational). As early as 1973, Oregon decriminalized the medical use of cannabis and in 1996 California was the first to legalize its use for medical purposes. Today, a total of 33 states and DC have legalized cannabis for medical use and in 2012 Colorado and Washington State were the first to legalize it for recreational use. Thus far, 8 other states and DC have followed this example and have legalized the use and 7 states the commercial sale of cannabis. Another 13 states have decriminalized its use.

[Insert Figure 1]

Although, legal in many states the federal ban of cannabis still has strong repercussions on companies in this industry. In 2014, the federal administration allowed banks to do business with legal cannabis companies (e.g. helping with savings, payrolls, tax payments). However, these companies are still often refused access to banks and credit unions for financing purposes due to Federal Reserve regulations hindering their development and growth.

In 2013, the Justice Department adopted the Cole memo trying to enforce federal law in states in which recreational cannabis has been legalized. The policy details that distribution for commercial purposes of cannabis would be generally accepted if no illegal action was taken by its participants. This was appended by the Rohrabacher–Farr amendment of 2014, eliminating the Justice Department from funding interference with the application of medical marijuana laws at the state level (Houser and Robert, 2014). However, in 2018 the Cole memo was withdrawn by Attorney General Jeff Sessions, reestablishing the ability of U.S. Attorneys to

apply federal law in states that have legalized recreational cannabis. This has led to uncertainty in the industry on the future of cannabis in the United States.

3 Data and methodology

3.1 Sample

The dataset for the cannabis industry is constructed using the investment set put forth on the website www.marijuanaindex.com. The provider of the website only uses companies having a strategy related to the cannabis industry (direct or as ancillary) and with at least half of the operations deriving from this industry. In order to assure that companies show a minimum market liquidity the dataset is restraint following the approach described in Ang et al. (2013). I only use data if (i) the price of the stock is higher than 1 USD, (ii) the market capitalization of the company is higher than 1 million USD, (iii) the volume is larger than 0 and (iv) the stock trades at least once a week. I further discard first day returns as these are often far above 100% and thus biasing results. This gives me a final sample including 33 companies and 1'218 daily observations.² All price data for the period January 2014³ to October 2018 is downloaded from ThomsonReuters Datastream and converted in USD.

The data on other sin industries such as alcohol (beer), defense (guns) and tobacco (smoke) are for the U.S. only as no Canadian company meets the minimum standards to be included and is downloaded from Kenneth French's website. The different factors used in the empirical part are also downloaded from this website and are related to the North American market (Canada and United States). For comparison purposes the S&P1500 and TSX Composite are used in the descriptive statistics to relate the different industries to the two stock market benchmarks.

² See appendix 1 for a full list of cannabis-related companies included in this study.

³ The cannabis industry was in its infancy before 2014 and nearly all stocks OTC-traded and thus did not meet the minimal liquidity criteria.

3.2 Methodology

In order to evaluate the risk and return characteristics of a cannabis investment I first resort to the use of the Capital Asset Pricing Model. I estimate the model by regressing the excess returns of the respective indices representing sin investments on market excess returns. The regression equation for the market model is represented as

$$(R_{i,t} - R_{f,t}) = \alpha + \beta(R_{m,t} - R_{f,t}) + \varepsilon_t \quad [1]$$

where $R_{i,t}$ represents the return of an index i over day t ; $R_{f,t}$ the risk-free rate on day t and $R_{m,t}$ the market return on day t . In a second step, and following recent literature on sin stocks (Blitz and Fabozzi, 2017), we also make use of the three and five-factor Fama-French models which take the following form

$$(R_{i,t} - R_{f,t}) = \alpha + \beta_1(R_{m,t} - R_{f,t}) + \beta_2SMB_t + \beta_3HML_t + \varepsilon_t \quad [2]$$

$$(R_{i,t} - R_{f,t}) = \alpha + \beta_1(R_{m,t} - R_{f,t}) + \beta_2SMB_t + \beta_3HML_t + \beta_4RMW_t + \beta_5CMA_t + \varepsilon_t \quad [3]$$

where $R_{i,t}$, $R_{f,t}$ and $R_{m,t}$ follow the same definitions as above. SMB, HML, RMW and CMA represent the respective factors as defined in Fama and French (1993) and Fama and French (2016). For all specifications standard errors are Newey–West corrected with lags of order six to account for autocorrelation and heteroskedasticity in the data.

4 Empirical Results

For the overall sample period, cannabis stocks (average daily return of 0.17% and 0.20%) have, on average, outperformed not only their respective market benchmarks, but also the industry benchmarks related to the alcohol, defense and tobacco industry. This is true for both

the equally-weighted and value-weighted portfolios of stocks. The lower median performance, however, hints at skewness and kurtosis features in the data, especially for the value-weighted portfolio. The large range and a standard deviation three to four times higher for cannabis stocks further indicates that these display a higher risk as compared to the other industries and the overall market. More generally, all sin investments appear to have higher volatilities and rather higher returns than the overall Canadian and U.S. stock market.

[Insert Table 1]

The discussion on the diversification benefits of cannabis stocks in a financial portfolio begins with the correlation between the returns of cannabis, other sin industries and the overall stock market. It is apparent that all sin industries display medium correlations in the range of 0.5 to 0.6 with the overall market. Cannabis, on the other hand, exhibits the lowest correlations of all with correlations of around 0.15 with regard to both the U.S. and Canadian stock market. I also report correlations with the Bitcoin. Anecdotal evidence suggests that crypto-currencies may be used to finance illegal activities that are in relation with sin stocks (drugs and guns especially). These parallel markets may affect the returns of legitimate companies such as those examined in this study. As argued by Parker et al. (2019) cryptocurrencies may also be a solution to reduce funding risk for some cannabis companies. In both cases, this may induce a linkage between cryptocurrencies and the cannabis industry. However, I find correlations to be close to zero between Bitcoin and sin industry returns which dampens this concern.⁴ Overall, this suggests that cannabis stocks may lead to diversification benefits when added in a portfolio. To a certain extent it can be viewed as a hedge which is on the brink of a safe haven asset

⁴ I also run specification [1] but substitute the MKT factor by the excess returns of the Bitcoin. Again the Bitcoin does not appear related to sin industries with insignificant and/or beta coefficients very close to zero (see appendix 2).

according to Baur and Lucey (2010)⁵. The correlations between sin industries are also rather low indicating potential intra-sin segmentation.

[Insert Table 2]

Table 3 reports results expanding on the initial evidence from the correlations. To better understand the features of an investment in the cannabis industry we first run a market model (Panel A), then a Fama and French (1993) three-factor model (Panel B) and a Fama and French (2016) five-factor model (Panel C). We find evidence that the alpha is in all cases high but insignificant for the cannabis industry. Only the equally-weighted portfolios for alcohol and defense offer significantly positive risk-adjusted returns to investors. It therefore, overall, does not appear that sin stocks outperformed over the sample period. Turning to the market coefficient, results are in line for all sin industries. All display significantly positive beta coefficients, which are between 0.5 and 0.9, hinting at the more or less defensive nature of all these industries.⁶

[Insert Table 3]

5 Discussion and conclusion

Investing in cannabis has been popular over the past couple of years and the market has started to cater for investors who want to get a share of the pie. Today, investors can not only buy shares directly on Canadian and U.S. stock exchanges, but also face a small but growing

⁵ The safe-haven feature may not hold in times of market stress that I do not incur over the sample period. However, the weak correlation constitutes a good starting point as compared to other sin investments.

⁶ Appendix 3 provides additional evidence on the relationship of cryptocurrencies with sin industries and reports results if a Bitcoin (BTC) factor is added to specifications [1], [2], and [3]. The Bitcoin factor is never significant for the cannabis industry and only sometimes for the gun and beer industry. In all cases, coefficients are very close to zero. Overall, cryptocurrencies do not appear to effect sin industry returns in an economically meaningful way.

choice of Exchange-Traded Funds (e.g. Horizons Marijuana Life Sciences Index) and mutual funds (e.g. Purpose Marijuana Opportunities Fund or Evolve Marijuana). It has even become possible to participate in private companies or crowdfunding campaigns for more risk-seeking investors. The legalization of cannabis in Canada and multiple U.S. States has further spurred investors and corporations from other industries (e.g. Constellation Brands) to get interested in this new business and to pour money into it. This study has shown that both risk and returns of cannabis stocks are large. This is, however, compensated by low correlations and beta coefficients which come at the cost of a positive, but non-significant risk-adjusted performance. Moreover, cannabis stock returns appear uncorrelated with cryptocurrencies. This indicates that both cannot be considered as interchangeable trend investments, but enhance diversification benefits in different ways and individually merit a deeper analysis. It also contradicts anecdotal evidence that cryptocurrencies may positively or negatively affect cannabis stock returns. So, overall, should an investor go for the cannabis industry?

It appears that while in the long run there is a definite potential for cannabis to establish itself as a mainstream business and industry, in the short- to mid-term prospects are more questionable. This is due to three major reasons. First, most companies active in this industry are small caps, with little information and research performed on them. This is accompanied by low trading volumes, especially on the U.S. market on which most cannabis stocks remain OTC-traded. Moreover, as for most new business segments the risk of a price bubble is all but non-existent. The very high multiples and stock price appreciation observable over the last years suggest that a price correction may occur (as witnessed for cryptocurrencies in 2018 or internet companies in 2000). However, once the market stabilizes, this disadvantage should be diminished or disappear entirely.

Second, risk remains high both in terms of how the market will consolidate in the future and how and how quickly the legalization process will evolve in the United States but also in other

countries. In order for the market to stabilize it needs clear rules. In Canada this has been achieved but much less so in the United States where regulatory risk remains an issue. Also the speed at which other markets will develop will have an impact on the emergence of new entrants, cannabis prices and the market in general.

Third, the industry is not yet uniform, but displays two distinctive businesses. Generally, it can be broken into two parts: medical use and recreational use. The first, today, appears more acceptable and successful, but comes with its lot of problems (especially political and regulatory). This sub-industry will be more focused on R&D, clinical trials and distribution like pharmaceutical companies nowadays. The second is more open to interpretation but should revolve around brands, marketing, and consumer segmentation similar to the tobacco or alcohol industries. It already has become of interest for both tobacco and beverage companies, which try to diversify and be the first to tap into this huge market by fortifying their products.

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Table 1
Summary Statistics

	Cannabis (EW)	Beer (EW)	Smoke (EW)	Guns (EW)	Cannabis (VW)	Beer (VW)	Smoke (VW)	Guns (VW)	TSX Composite	S&P 1500
Mean	0.17	0.08	0.10	0.05	0.20	0.05	0.05	0.07	-0.01	0.03
Median	0.03	0.07	0.09	0.06	0.02	0.06	0.05	0.09	-0.01	0.05
Minimum	-15.54	-3.33	-7.35	-5.20	-14.11	-4.28	-11.46	-5.66	-3.38	-4.05
Maximum	22.01	5.84	5.77	8.48	58.96	3.04	4.91	6.22	4.45	3.75
St. Dev.	3.54	1.04	1.10	1.22	3.87	0.81	1.04	1.01	0.92	0.80
Skewness	0.34	0.43	-0.31	0.50	3.17	-0.25	-1.21	-0.28	0.04	-0.58
Kurtosis	7.29	4.91	7.55	7.19	48.02	4.53	16.68	6.71	4.92	6.17
No. Obs.	1'218	1'218	1'218	1'218	1'218	1'218	1'218	1'218	1'218	1'218

Cannabis, Beer, Smoke and Guns display the different sin-industries. EW denotes equally-weighted and VW value-weighted stock portfolios. The TSX Composite is the benchmark stock index for the Canadian market and the S&P 1500 the U.S. stock market benchmark. The sample period is January 2014 to October 2018 and uses daily data.

Table 2
Correlations of Returns

	Cannabis (EW)	Beer (EW)	Smoke (EW)	Guns (EW)	Cannabis (VW)	Beer (VW)	Smoke (VW)	Guns (VW)	Bitcoin	TSX Composite	S&P 1500
Cannabis (EW)	1.00										
Beer (EW)	0.09	1.00									
Smoke (EW)	0.03	0.33*	1.00								
Guns (EW)	0.09*	0.34*	0.29*	1.00							
Cannabis (VW)	0.70*	0.08	0.02	0.12*	1.00						
Beer (VW)	0.04	0.54*	0.53*	0.32*	0.02	1.00					
Smoke (VW)	0.00	0.35*	0.80*	0.24*	0.00	0.61*	1.00				
Guns (VW)	0.06	0.32*	0.30*	0.55*	0.09	0.38*	0.26*	1.00			
Bitcoin	0.02	0.01	0.01	0.06	0.00	-0.02	0.01	0.03	1.00		
TSX Composite	0.15*	0.34*	0.29*	0.37*	0.16*	0.36*	0.27*	0.29*	0.04	1.00	
S&P 1500	0.14*	0.50*	0.44*	0.57*	0.18*	0.60*	0.44*	0.59*	0.02	0.63*	1.00

Cannabis, Beer, Smoke and Guns display the different sin-industries. EW denotes equally-weighted and VW value-weighted stock portfolios. The Bitcoin is the benchmark for cryptocurrencies, the TSX Composite is the benchmark stock index for the Canadian market and the S&P 1500 the U.S. stock market benchmark. The sample period is January 2014 to October 2018 and uses daily data.

* shows significance at the 5% level.

Table 3
Market and Fama-French Model

Panel A: Market model								
	Cannabis (EW)	Beer (EW)	Smoke (EW)	Guns (EW)	Cannabis (VW)	Beer (VW)	Smoke (VW)	Guns (VW)
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Intercept	0.148 (1.416)	0.055** (2.397)	0.081*** (2.986)	0.023 (0.781)	0.170 (1.502)	0.025 (1.338)	0.030 (1.021)	0.043* (1.728)
MKT	0.687*** (5.686)	0.646*** (18.673)	0.587*** (15.192)	0.880*** (19.939)	0.961*** (8.428)	0.583*** (17.986)	0.541*** (12.019)	0.732*** (20.630)
Observations	1,218	1,218	1,218	1,218	1,218	1,218	1,218	1,218

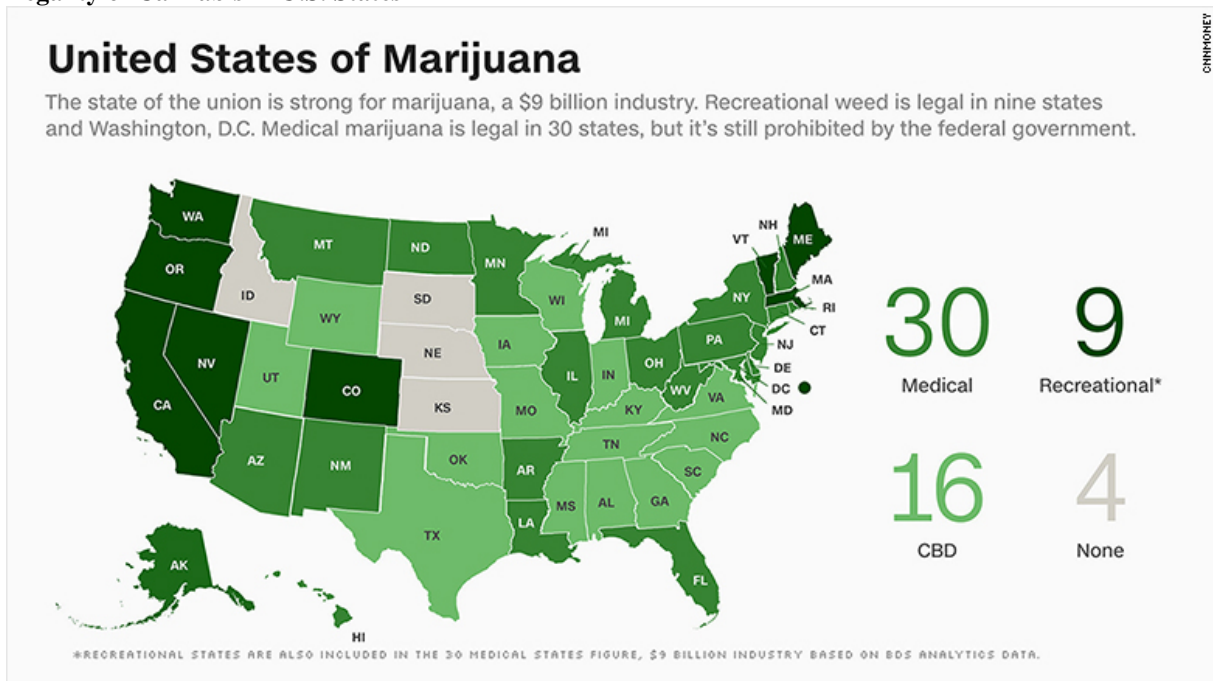
Panel B: Fama-French 3-factor model								
	Cannabis (EW)	Beer (EW)	Smoke (EW)	Guns (EW)	Cannabis (VW)	Beer (VW)	Smoke (VW)	Guns (VW)
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Intercept	0.150 (1.449)	0.057** (2.518)	0.077*** (2.848)	0.031 (1.099)	0.170 (1.555)	0.016 (0.899)	0.022 (0.769)	0.037 (1.493)
MKT	0.614*** (4.978)	0.621*** (17.396)	0.604*** (15.997)	0.821*** (18.235)	0.783*** (6.613)	0.618*** (22.223)	0.583*** (14.423)	0.734*** (21.206)
SMB	0.491** (2.095)	0.231*** (3.654)	-0.236*** (-3.953)	0.607*** (9.663)	1.042*** (4.752)	-0.485*** (-9.674)	-0.502*** (-7.673)	-0.191*** (-2.589)
HML	-0.378* (-1.751)	-0.078 (-1.457)	-0.027 (-0.386)	-0.111** (-2.058)	-1.067*** (-4.080)	-0.046 (-0.933)	0.021 (0.266)	-0.155*** (-2.685)
Observations	1,218	1,218	1,218	1,218	1,218	1,218	1,218	1,218

Panel C: Fama-French 5-factor model								
	Cannabis (EW)	Beer (EW)	Smoke (EW)	Guns (EW)	Cannabis (VW)	Beer (VW)	Smoke (VW)	Guns (VW)
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Intercept	0.153 (1.494)	0.057** (2.507)	0.076*** (2.953)	0.030 (1.079)	0.174 (1.625)	0.015 (0.914)	0.020 (0.764)	0.037 (1.506)
MKT	0.484*** (3.805)	0.668*** (18.488)	0.718*** (21.654)	0.861*** (19.576)	0.556*** (4.447)	0.711*** (27.274)	0.719*** (19.280)	0.798*** (25.352)
SMB	0.247 (1.070)	0.274*** (4.043)	-0.121** (-2.041)	0.681*** (10.340)	0.681*** (2.979)	-0.389*** (-8.184)	-0.361*** (-5.602)	-0.150** (-2.119)
HML	-0.344 (-1.047)	-0.211*** (-2.837)	-0.324*** (-3.820)	-0.123 (-1.359)	-0.832** (-2.109)	-0.277*** (-4.841)	-0.319*** (-3.805)	-0.385*** (-5.133)
RMW	-1.268*** (-3.168)	0.234** (2.284)	0.623*** (5.875)	0.389*** (3.521)	-1.893*** (-4.628)	0.517*** (6.824)	0.764*** (6.299)	0.233*** (2.702)
CMA	-0.490 (-1.014)	0.382*** (2.938)	0.882*** (6.460)	0.154 (1.169)	-1.153** (-2.367)	0.698*** (6.710)	1.025*** (8.025)	0.603*** (5.203)
Observations	1,218	1,218	1,218	1,218	1,218	1,218	1,218	1,218

Panel A, B and C show specifications over the period January 2014 to October 2018 for the market model and the Fama and French three- and five-factor models respectively. Columns [1] to [4] are run on equally-weighted portfolios invested in the cannabis, beer, tobacco and gun industry respectively, while columns [5] to [8] do the same for value-weighted portfolios. The different factors show the market (MKT), size (SMB), value (HML), profitability (RMW) and investment (CMA) exposure.

***, **, * show significance at the 1%, 5% and 10% respectively.

Figure 1
Legality of Cannabis in U.S. States



The map shows the legality of cannabis in different U.S. States. The darkest shade is for states in which cannabis is legal, this is followed by states in which it is legal for medical use, legal for medical use (CBD) and prohibited for any use. Source: <https://money.cnn.com/2018/01/31/news/marijuana-state-of-the-union>.

Appendix 1
List of companies in the sample

Company	Country
Aphria	Canada
Aurora Cannabis	Canada
Auxly Cannabis Group	Canada
Cannaroyalty	United States
Cannex Capital Hdg.	United States
Cantrust Holdings	Canada
Canopy Growth	Canada
Charlottes Web Hldgs	United States
Cronos Group	Canada
CV Sciences	United States
Emerald Health Therp.	Canada
Golden Leaf Holdings	United States
Green Organic Dutchman Holdings	Canada
Green Thumb Industries	United States
Growgeneration	United States
GW Pharmaceuticals	United States
Hexo	Canada
Ianthus Capital Hdg.	United States
Innovative Indl.Props.	United States
Isodiol International	Canada
Kushco Holdings	United States
Liberty Health Sciences	United States
Maricann Group	Canada
Marimed	United States
Medmen Enterprises	United States
Namaste Techs.	Canada
Newstrike Brands	Canada
Organigram Holdings	Canada
Sunniva	Canada
Supreme Cannabis	Canada
Terra Tech	United States
Tilray	Canada
Vivo Cannabis	Canada

Appendix 2
Bitcoin and its effect on sin industries

	Cannabis (EW)	Beer (EW)	Smoke (EW)	Guns (EW)	Cannabis (VW)	Beer (VW)	Smoke (VW)	Guns (VW)
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Intercept	0.144 (1.370)	0.055** (2.389)	0.081*** (2.987)	0.019 (0.662)	0.170 (1.486)	0.026 (1.417)	0.030 (1.034)	0.042* (1.684)
BTC	0.016 (0.740)	-0.000 (-0.027)	0.001 (0.083)	0.014** (2.449)	-0.001 (-0.065)	-0.006* (-1.721)	-0.001 (-0.139)	0.004 (0.785)
Observations	1,218	1,218	1,218	1,218	1,218	1,218	1,218	1,218

The table shows OLS regressions of Bitcoin excess returns on sin industry excess returns over the period January 2014 to October 2018. BTC denotes the Bitcoin. Columns [1] to [4] are run on equally-weighted portfolios invested in the cannabis, beer, tobacco and gun industry respectively, while columns [5] to [8] do the same for value-weighted portfolios.

***, **, * show significance at the 1%, 5% and 10% respectively.

Appendix 3

Market and Fama-French Model enhanced by cryptocurrency returns

Panel A: Market model								
	Cannabis (EW)	Beer (EW)	Smoke (EW)	Guns (EW)	Cannabis (VW)	Beer (VW)	Smoke (VW)	Guns (VW)
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Intercept	0.144 (1.370)	0.055** (2.389)	0.081*** (2.987)	0.019 (0.662)	0.170 (1.486)	0.026 (1.417)	0.030 (1.034)	0.042* (1.684)
MKT	0.685*** (5.689)	0.646*** (18.695)	0.587*** (15.199)	0.879*** (19.833)	0.961*** (8.419)	0.584*** (17.901)	0.541*** (12.035)	0.731*** (20.688)
BTC	0.016 (0.740)	-0.000 (-0.027)	0.001 (0.083)	0.014** (2.449)	-0.001 (-0.065)	-0.006* (-1.721)	-0.001 (-0.139)	0.004 (0.785)
Observations	1,218	1,218	1,218	1,218	1,218	1,218	1,218	1,218

Panel B: Fama-French 3-factor model								
	Cannabis (EW)	Beer (EW)	Smoke (EW)	Guns (EW)	Cannabis (VW)	Beer (VW)	Smoke (VW)	Guns (VW)
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Intercept	0.146 (1.400)	0.057** (2.510)	0.077*** (2.848)	0.028 (0.977)	0.170 (1.535)	0.017 (0.984)	0.022 (0.780)	0.037 (1.448)
MKT	0.612*** (4.992)	0.621*** (17.423)	0.604*** (15.985)	0.819*** (18.299)	0.783*** (6.613)	0.619*** (22.166)	0.583*** (14.428)	0.733*** (21.258)
SMB	0.491** (2.095)	0.231*** (3.653)	-0.236*** (-3.953)	0.606*** (9.647)	1.042*** (4.749)	-0.484*** (-9.693)	-0.502*** (-7.668)	-0.191*** (-2.589)
HML	-0.379* (-1.758)	-0.078 (-1.457)	-0.027 (-0.387)	-0.112** (-2.065)	-1.067*** (-4.078)	-0.046 (-0.926)	0.021 (0.267)	-0.155*** (-2.686)
BTC	0.017 (0.747)	-0.000 (-0.021)	0.001 (0.091)	0.014*** (2.603)	-0.001 (-0.032)	-0.006* (-1.683)	-0.001 (-0.137)	0.004 (0.844)
Observations	1,218	1,218	1,218	1,218	1,218	1,218	1,218	1,218

Panel C: Fama-French 5-factor model								
	Cannabis (EW)	Beer (EW)	Smoke (EW)	Guns (EW)	Cannabis (VW)	Beer (VW)	Smoke (VW)	Guns (VW)
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Intercept	0.149 (1.452)	0.057** (2.490)	0.075*** (2.934)	0.027 (0.946)	0.176 (1.614)	0.016 (0.987)	0.020 (0.759)	0.036 (1.453)
MKT	0.483*** (3.821)		0.718*** (21.641)	0.860*** (19.640)	0.556*** (4.447)	0.711*** (27.236)	0.719*** (19.279)	0.798*** (25.407)
SMB	0.249 (1.081)	0.274*** (4.041)	-0.121** (-2.030)	0.683*** (10.304)	0.680*** (2.974)	-0.390*** (-8.215)	-0.361*** (-5.597)	-0.150** (-2.109)
HML	-0.342 (-1.043)	-0.211*** (-2.833)	-0.324*** (-3.813)	-0.121 (-1.338)	-0.833** (-2.109)	-0.278*** (-4.874)	-0.319*** (-3.797)	-0.385*** (-5.130)
RMW	-1.259*** (-3.128)	0.234** (2.290)	0.624*** (5.867)	0.399*** (3.634)	-1.897*** (-4.603)	0.513*** (6.777)	0.765*** (6.307)	0.236*** (2.745)
CMA	-0.493 (-1.022)	0.381*** (2.935)	0.882*** (6.450)	0.151 (1.144)	-1.152** (-2.362)	0.699*** (6.740)	1.025*** (8.018)	0.602*** (5.198)
BTC	0.014 (0.608)	0.000 (0.083)	0.002 (0.284)	0.014*** (2.757)	-0.005 (-0.210)	-0.005 (-1.492)	0.001 (0.157)	0.004 (0.972)
Observations	1,218	1,218	1,218	1,218	1,218	1,218	1,218	1,218

Panel A, B and C show specifications over the period January 2014 to October 2018 for the market model and the Fama and French three- and five-factor models respectively. Columns [1] to [4] are run on equally-weighted portfolios invested in the cannabis, beer, tobacco and gun industry respectively, while columns [5] to [8] do the same for value-weighted portfolios. The different factors show the market (MKT), size (SMB), value (HML), profitability (RMW), investment (CMA) and cryptocurrency (BTC) exposure.

***, **, * show significance at the 1%, 5% and 10% respectively.