

FUNDAÇÃO GETULIO VARGAS
ESCOLA DE ECONOMIA DE SÃO PAULO

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**DO CANNABIS STOCKS PRESENT HIGH IDIOSYNCRATIC RISK
AND OTHER LOTTERY-STOCK CHARACTERISTICS??**

SÃO PAULO

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À minha família, e em especial aos meus pais, pelo apoio incondicional e pelos valores passados a mim ao longo da vida, dos quais tenho imenso orgulho e passarei adiante a todos aqueles que estiverem dispostos a compartilhá-los. À Renata pela paciência, amor e companheirismo de sempre, para sempre.

RESUMO

A Indústria de cannabis ainda é incipiente e subdesenvolvida. Com alta regulação e características de um setor insurgente, uma porção significativa do risco enfrentado por empresas de cannabis é específico à essa indústria e tem pouca relação com os demonstrativos financeiros dessas empresas ou com o risco sistemático de mercado. Assim, o objetivo desse estudo é investigar como o risco idiossincrático das ações de empresas de cannabis se compara com outras ações negociadas nas bolsas canadenses, e investigar também se as ações de cannabis são mais frequentemente classificadas como ações do tipo loteria do que outras ações, potencialmente refletindo que a animação e incertezas que rodeiam a indústria da cannabis podem estar refletidas em características de loteria que atraiam o desejo humano por apostas.

Palavras-chave: Indústria de Cannabis, Mercado de Ações, Ações de Loteria

ABSTRACT

The cannabis industry is still recent and undeveloped. As a highly regulated insurgent sector, a significant portion of the risk faced by cannabis companies is specific to the industry and has very few to do with the company's past performance and balance sheet or systematic risk. As such, the intent of this paper is to investigate how cannabis stocks' idiosyncratic risk compares to non-cannabis stocks traded in the Canadian stock exchanges and to investigate rather cannabis stocks are more likely to be considered lottery- stocks than non-cannabis stocks, potentially reflecting that the excitement and uncertainty surrounding this emerging industry may somewhat be reflected in observable lottery stock characteristic, potentially instigating the desire for gambling that, according to KUMAR, 2009 "is deeply rooted in the human psyche." .

Keywords: Cannabis industry, Stock Market, Lottery Stocks.

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1 INTRODUCTION

Medical and adult use cannabis sales have been legalized in several states in the US as well as federally in Canada. Nonetheless, cannabis continues to be considered a schedule one drug from the US Food and Drug Administration (FDA) perspective, thus federally illegal in the US despite being permitted for medical purposes in 34 states and for adult use purposes in 11 states with state law support. As the cannabis industry started to become mainstream in North America, many cannabis companies, from both the US and Canada, became publicly listed in Canada, where cannabis is federally legal for medicinal and adult use purposes, to access the Canadian capital markets and raise capital to fund their business plans. While there is a lot of positive sentiment for the industry global potential and the increasing demand for medicinal and adult-use cannabis products, the industry's regulatory framework is still in its early days and the extent to which the market, and cannabis companies, will growth and succeed is yet far away from visibility. The legal cannabis industry is still emerging, and its pace of development depends largely on future events that have almost no historical precedent, both from a demand and regulatory perspectives.

As such, cannabis stocks have presented a very high level of volatility over the past few years, and, most recently, strong devaluations. The main motivation of this study is to understand if cannabis companies have indeed presented a higher level of idiosyncratic volatility when compared to other sectors and as high idiosyncratic volatility is also consider to be a characteristic of lottery-type stocks, one other area of interest is to understand if cannabis stocks, as a group, have other lottery features such as positive skewness and low price that could make this stocks more attractive for retail investors, which typically hold a greater proportion of lottery-type stocks, KUMAR, 2009

Given that the idiosyncratic volatility is one of the characteristics of lottery type stocks, the paper will focus on assessing if cannabis stocks present lottery like characteristics, which will also allow me to observe the behavior of cannabis stocks idiosyncratic volatility. The rationale for the hypothesis that cannabis stocks present high idiosyncratic volatility resides on the difficulty faced by investors to quantify the growth potential and long-term profitability level of an emerging industry, in which companies are exposed to a unique set of risks associated with the nature of the nascent cannabis industry, such as: changing regulations, capital constrains, regulatory constrains to marketing and demand generation, political and social pressure, potential for increasing taxation on cannabis products, incipient competitive dynamics, lack of historical track-record to produce accurate forecasting, among others.

Secondly, as noted by KUMAR, 2009 retail investors may perceive high idiosyncratic volatility as a higher probability of experiencing past extreme returns, which is a characteristic of lottery-type stocks. Cannabis stocks have experienced tremendous returns between 2015 and early 2019 before there was a huge crash on the market in mid-2019. As such, I investigate rather cannabis stocks present lottery type characteristics such as high idiosyncratic volatility, stock idiosyncratic skewness, and low-price relative to other groups of stocks. The objective of this paper is to gather empirical evidence to verify if cannabis stocks indeed present lottery type characteristics when compared to non-cannabis stocks.

The methodology is based on KUMAR, 2009 I use the same criteria to classify companies from three Canadian Stock Markets as being lottery or non-lottery. Afterwards, I see the proportion of companies from the Cannabis Sector among these. This will allow me to test if there are idiosyncratic characteristics from the sector that enhances the propensity of the companies to be classified as lottery ones. In addition, I am also going to estimate a new market factor based on the companies that are classified as lottery and using the Fama-French Factors as inspiration in order to understand if the return of cannabis stocks is correlated with the return of lottery-stocks.

The results indicate that there is in fact a statistically significant proportion of cannabis companies among those classified as lottery companies. However, I did not find any lottery characteristic, such as high idiosyncratic volatility, that stood out among the selection criteria of lottery characteristic, meaning that no single lottery-characteristic seems to be more frequent among cannabis stocks. Furthermore, the behavior proved to be robust to several tests. Finally, while the pattern was not completely clear, I found that for those stock exchanges where the lottery factor is statistically significant to explain the return of cannabis companies, the signal was positive, thus cannabis stocks returns and lottery stock returns move in similar directions.

The paper is organized as follows. In section 2, I review the literature. Then in section 3, I describe the databases that will be used throughout the paper. Fourth, I present the empirical strategy. In section 5, I discuss the main results. In section 6, I go over some robustness exercises. Finally, I present the conclusions.

2 LITERATURE REVIEW

2.1 IDIOSYNCRATIC VOLATILITY

According to asset pricing theory, there should be no premium for specific risk that could be diversified through a portfolio of assets. The asset pricing theory states that only the systematic risk component of securities should be priced and, thus, rewarded. However, according to MERTON et al., 1987 investor recognition hypothesis, if investors only invest in securities with familiar risk-return characteristics and, consequently, hold undiversified portfolios, idiosyncratic risk should be priced in Equilibrium BHOOTRA; HUR, 2015 Nevertheless, Merton's (1987) assumption of a positive relationship between volatility and return in poorly diversified portfolios assumes the standard expected utility theory, in which individuals are equally risk averse in the domain of gains and losses. However, KAHNEMAN; TVERSKY, 1979 prospect theory (PT) model of decision making under uncertainty postulates an S-shaped utility function that is concave in the domain of gains, but convex in the domain of losses. The S-shaped utility function is consistent with risk-aversion over positive prospects, but risk-seeking behavior over negative prospects BHOOTRA; HUR, 2015

The prospect theory is a key link to understand the idiosyncratic volatility puzzle introduced by ANG et al., 2006 which consists in the contradictory evidence that high idiosyncratic volatility stocks are associated with low subsequent returns. The risk seeking behavior of investors in the domain of losses that was identified by the prospect theory suggests that investors may prefer high volatility stocks, in the sense that these stocks have a "greater chance" to return to historical levels of prices that could generate a positive return to investors.

2.2 LOTTERY-STOCKS

The desire to gamble is deep rooted in the human psyche. This fascination with games of chance can be traced back at least a few centuries. A complex set of biological, psychological, religious, and socioeconomic factors jointly determines an individual's propensity to gamble (e.g., FRANCE, 1902 BRENNER, 1983 WALKER, 1992" KUMAR, 2009 MARKOWITZ, 1952 provides insight as to investor's preference to take large chances of a small loss in exchange for a small chance of a large payoff. Barberis and Huang (2008) relate the evidence of investors preference for stocks with positive skewness to an overweighting of low probability events.

As evidenced by KUMAR, 2009 lottery-type stocks are preferred by individual investors, who tend to overweight these stocks in their portfolios, while institutional investors typically avoid lottery stocks. MARKOWITZ, 1952 provides insight as to investor's preference to take large chances of a small loss in exchange for a small chance of a large payoff. BARBER; ODEAN, 2008 relate the evidence of investors preference for stocks with positive skewness to an overweighting of low probability events. While there is extensive literature on retail investor preference for lottery stocks and what are the characteristics that define lottery stock features, I was not able to find any available literature that relates lottery type characteristics to a particular sector. As such, the objective of this stock is to gather empirical evidence to verify if cannabis stocks present higher idiosyncratic volatility than non-cannabis stocks, and if cannabis stocks somehow present aggregate (sector) characteristics of lottery type stocks.

“The finding that socioeconomic characteristics of individual investors influence their stock preferences is not entirely surprising because the psychological, social, economic, political, and religious identities of an individual supersede her identity as an investor. Portfolio choice models that recognize this potential link could better explain the portfolio decisions of individual investors. Further, if socioeconomic characteristics influence portfolio choice, those characteristics could also be reflected in stock prices. For instance, the return generating process of a stock with an older investor clientele might be influenced by the preferences and biases that are unique to older investors. In broader terms, the evidence in the stock suggests that the link between changes in socioeconomic environment and stock market behavior might be stronger than currently believed. For example, on the one hand, as the U.S. population becomes older, the aggregate level of gambling-motivated trading in financial markets could decline, which in turn could affect the equilibrium returns, volume, and volatility of lottery-type stocks.” KUMAR, 2009 The objective of this paper is to gather empirical evidence to verify if cannabis stocks present aggregate (sector) characteristics of lottery type stocks. While Kumar's definition of lottery type stocks is mainly based on statistics such as idiosyncratic volatility and skewness and nominal share price, which are by no means sector specific characteristics, the purpose of this paper is to investigate if the strong excitement with cannabis investment and the high proportion of retail investors investing in the industry is somewhat reflected in the stocks' characteristics.

3 DATA

This section aims to describe the main databases that will be used in this study. Note that my primary source is the Bloomberg data terminal. Since the main objective of this study is to, using the methodology addressed by KUMAR, 2009 determine whether companies in the cannabis sector present or not a lottery type characteristics, I have to use the closing price data of multiple companies.

Data from Canada's three main stock markets will be used. The first of these is the Canadian Securities Exchange (CSE). It should be noted that for this stock market and the others, the number of companies that will be used in the analysis will depend on the availability of company data. This is due to the fact that the classification of companies according to Kumar's methodology involves regressions that use samples of daily data, so there are companies whose history of closing prices does not provide enough observations.

I also use data from companies listed on the Toronto Stock Exchange (TSX), which is Canada's largest stock exchange, the second largest on the American continent, and the sixth largest in the world. The Toronto Stock Exchange handles more than \$ 1.62 trillion annually. Finally, I also use data from TSX Venture (TSXV), which focuses on emerging companies, mainly from the technology and natural resources sectors.

The stock prices refer to the price at the end of the previous two weeks. The intention was to use data from all Canadian stock exchanges that contain a relevant sample of cannabis stocks and non-cannabis stocks with at least two years of trading data. While this was challenging to achieve given that few cannabis stocks have been trading for longer periods than two years, I believe to be a preferred approach to analyze potential differences in results yielding from stock exchanges that may have different sets of characteristics such as company's size, stage of maturity, stock liquidity, etc. For example, we may observe different results when assessing lottery stocks in the TSX, which is the largest and most traditional stock exchange in Canada and the CSE, a Canadian venture stock exchange that majorly contains technology companies, junior miners, block chain companies, cannabis companies, and other relatively early-stage companies that may also have stock that exhibit lottery characteristics. If that is the case, it will be interesting to see if my hypothesis of cannabis stocks having lottery type characteristics is proven in a stock exchange that houses mostly companies from other sectors that have high idiosyncratic volatility and other early stage high risk characteristics that could also be perceived as lottery.

I emphasize that different time windows will be used, which means that the number of companies used for each of the exchanges varies according to the initial period used.

The base sample will start in 2017. As a robustness check I will also consider samples that start in 2018 and 2019. All of them will end on the last working day of the year 2020. For example, when I refer to the 2017 sample, I use data from companies starting on the first possible day of the year 2017 until the last day of the year 2020.

This classification is made only with works whose historical series have sufficient observations to make rolling regressions, which were proposed by KUMAR, 2009nd are described in the methodology section. In addition, I will present the samples used in each of the time windows in the results section. The base sample will consider a fixed number of companies. These companies are the ones that have enough data in the entire time window to run rolling regressions. As a robustness exercise, I will also do an exercise in which the sample size is variable, and companies are included as the data is available.

In addition to the price data, Fama and French market factors and share returns are used, as explained in the methodology section. The market factors used are those that are calculated and available on the French website ¹. . I will use the values calculated for the North American market, which involves the United States and Canada. The return on the stock is given by the difference of the natural price logarithm at times t and $t - 1$ ².

¹<http://mba.tuck.dartmouth.edu/pages/faculty/ken.french/index.html>

² $R_t = \log P_t - \log P_{t-1}$

4 METHODOLOGY

The main hypotheses of this study are that cannabis stocks present greater idiosyncratic volatility and lottery features than non-cannabis stocks. Given that idiosyncratic volatility is one of the characteristics of lottery-stocks, the focus of this section will be on defining the methodology to assess lottery-type stocks, which include an assessment of idiosyncratic volatility. Following the methodology proposed by KUMAR, 2009 I consider three characteristics to identify lottery stocks: (i) stock idiosyncratic volatility, (ii) idiosyncratic skewness, and (iii) stock price. Given that the stock market has been accessed very recently by cannabis companies, there is very few historical data available to be examined, thus I've shortened the length of the measure for idiosyncratic volatility and idiosyncratic skewness to weekly when compared to KUMAR, 2009 that opted for monthly measures. At the end of each week since the start of the sample, I measure both the idiosyncratic volatility and idiosyncratic skewness using the last three months ($t - 3$ to $t - 1$) of daily returns data. I use the standard deviation of the residuals of a three-factor model of FAMA; FRENCH, 1993 to assess the idiosyncratic volatility:

$$r_i = \alpha_i + \beta_i MKT + s_i SMB + h_i HML + \varepsilon_i \quad (4.1)$$

where r_i is the daily excess return of stock i , α_i is the Fama-French adjusted alpha, MKT is the excess return on the market portfolio, SMB (small minus big market capitalization) and HML (high minus low book-to-market) are return differences between the top 33.33% and bottom 33.33% ranked stocks in the stock exchange of interest. Similar to KUMAR, 2009 I define idiosyncratic skewness as a scaled measure of the third moment of the residual obtained from a two-factor model applied to daily stock returns (r_i), where the two factors are the excess market returns ($RMRF$) and the squared excess market returns ($RMRF^2$):

$$r_i = \alpha_i + \beta_i RMRF + \gamma_i RMRF^2 + \varepsilon_i \quad (4.2)$$

As in KUMAR, 2009 will assume that stocks in the lowest k^{th} stock price percentile, the highest k^{th} idiosyncratic volatility percentile, and the highest k^{th} idiosyncratic skewness percentile are likely to be perceived as lottery type stocks. All three sorts are carried out independently. I will choose $k = 50$ in order to have a considerable number of lottery-type stocks in the sample.

After understanding the number of lottery companies and the participation of companies in the lottery sector in these, I will also estimate a new market factor along the lines of what was done by FAMA; FRENCH, 1993 I am going to create a new market factor that gives us the part of the return that is given by the company's lottery factor. For this, I will also create the classification of non-lottery companies, using as inspiration

KUMAR, 2009 I will assume that stocks in the highest k^{th} stock price percentile, the lowest k^{th} idiosyncratic volatility percentile, and the lowest k^{th} idiosyncratic skewness percentile are likely to be perceived as non-lottery type stocks.

I then, create a new factor, that I will call Lottery Factor (LF). This factor for each instant t is given by return of a portfolio in which we are bought in companies classified as lottery and sold in those that are classified as non-lottery. The next step is to estimate a 3 factors inspired in FAMA; FRENCH, 2015nd the LF. We use the following model on the cannabis portfolio from the exchange stock:

$$r_i = \alpha_i + \beta_i MKT + s_i SMB + h_i HML + l_i LF + \varepsilon_i \quad (4.3)$$

The objective of this model is to investigate if part of the return of the cannabis portfolio can be explained by the return of lottery stocks. I will estimate this model for all stock exchanges and to different time samples. investigating which factors are relevant to explain the returns from the cannabis portfolio.

The construction of the cannabis portfolio was the following. Here we opted for the simplest strategy, which was to include companies that had data available to calculate the lottery characteristics at every moment of time. This means that the companies considered here are the same ones included in the sample of possible lottery-type actions. For our baseline sample this means that for CSE, TSX and TSXV the portfolio included, respectively, 82, 10 and 22 companies. Note that they all have the same weight in our portfolio.

Future extensions are possible. One is to make a portfolio in which stock positions can be either bought or sold. Another is to give different weights to company stocks according to characteristics such as size, market capitalization, etc. Here, however, I will keep a simpler approach.

5 RESULTS

5.1 LOTTERY STOCKS

Now I am going to present the results for a) the number of lottery companies and b) the participation of companies in the cannabis sector ³. Table 1 presents these statistics to the baseline sample, which starts in 2017. Note that I can see that for all exchanges and all times, the proportion of Cannabis companies in relation to companies that are lottery is slightly higher than the proportion of Cannabis in the total of companies.

The next step is to see if the proportion of cannabis stocks among those classified as a lottery is similar to the proportion of companies in that sector among the total stocks in each stock exchange. That is, I want to assess whether the probability of a cannabis company showing up as a lottery stock is similar to the proportion of cannabis companies among total stocks in each stock exchange, or if for some reason cannabis companies tend to be classified more often as lottery. According to the results of Table 2, only in the there is a statistically significant difference between the proportion of cannabis companies among lottery stocks and the proportion of cannabis stocks in the sample as a whole. As such, on the TSX, there is a greater likelihood that cannabis companies are considered lottery stocks compared to the likelihood that by randomly picking a stock from TSX we find a cannabis stock. On CSE and TSXV, there is no such difference.

Although divergent, the results seem to make sense: While the TSXV and CSE are considered venture stock exchanges, in the sense that most of the companies listed are early-stage small cap companies in insurgent industries such as cannabis, blockchain, biotechnology and others, the TSX is the sixth largest stock exchange in the world, where the largest and most traditional Canadian companies are listed. If we think about the concept of a lottery bet presented by Kumar, lottery stocks should typically have high volatility, big chances of a small loss and small chances of a huge gain (positive skewness), and a low “entry price” reflected in a low stock price. These characteristics should be more common among small cap high risk businesses than mature and relatively more predictable businesses. Thus, when thinking about cannabis companies in a mature stock exchange such as the TSX, these stocks should stand out in terms of lottery characteristics given their relatively high risk. Nonetheless, when comparing cannabis companies to other high-risk companies in sectors such as biotech, blockchain, and junior mining, that are present on the CSE and TSXV, there is no evidence that cannabis stocks are more frequent among lottery stocks than these other high risk companies.

³In the Appendix there is a list of all companies / stocks that are part of the Cannabis sector. This list is provided by the stock exchanges themselves.

In addition, I also evaluate how cannabis stocks behave in terms of the different characteristics evaluated under the classification proposed by KUMAR, 2009^o to classify lottery companies. As explained in the Methodology section, 3 criteria are used: volatility, skewness and price. One can think that the participation of cannabis companies in these 3 groups is varied. I have an initial suspicion that cannabis stocks would stand out among lottery stocks because of the high volatility of the stocks.

I carried out the investigation of this hypothesis and presented the results in Table ??⁴. The results indicate that there is no significant difference between the proportion of participation of cannabis companies among the different characteristics of cannabis companies. There is no proportion that differs greatly among the same stock exchanges. Finally, we note for the TSX, which is a more mature exchange compared to the others, cannabis companies present volatility as a characteristic that has a slight prominence in relation to the others.

5.2 LOTTERY FACTOR

The next result that will be presented is in relation to the creation of a new market factor, combining the ideas of FAMA; FRENCH, 1993 FAMA; FRENCH, 2015 KUMAR, 2009. The idea here is to explore whether the lottery component is responsible or not for explaining part of the return of cannabis stocks. The results of the estimation of the estimation of Equation 4.3 are presented in Tables 4.

The results point to a common trend. For CSE and TSX, I found a positive and significant coefficient. For TSXV, I found a positive sign associated with the coefficient, while this value was not significant. These results indicate that the return of cannabis stocks moves in the same direction as lottery stocks. A possible explanation for this is precisely the fact that there are companies in this sector among lottery companies.

Furthermore, I found for all exchanges that the *SMB* has a positive sign and the *HML* has a negative sign, which intuitively makes sense: Cannabis companies, with few exceptions, still have very limited size, thus a positive sign for *SMB* indicates that the return of cannabis companies moves in the same direction as the return of small companies. Conversely, cannabis stocks are considered to be growth stocks rather than value stocks, so the negative sign for *HML* also makes sense given that the return of cannabis stocks should move in the opposite direction of the return of value stocks.

⁴There is, for example, in some moment of time and some stock exchange a proportion of Cannabis companies among those with greater volatility, much higher than the other criteria.

Table 1: Lottery stocks and Participations of Cannabis Stocks

	Stock Exchange		
	CSE	TSX	TSXV
2017			
Total of Stocks	260	981	1313
Number of Cannabis Stocks	82	10	22
Percentage of Cannabis Stocks in Sample	31,54%	1,02%	1,68%
Average Number of lottery Stocks	43	225	247
Percentage of lottery that are Cannabis Stocks	38,00%	2,00%	2,00%

Notes: This table presents the stock classification data for different periods of time. The year indicates the beginning of the sample used. The final of the sample is always the last day from 2020. In addition, as we follow Kumar's methodology, we have a number of lottery companies for each day. Thus, we report in the table the average number of lottery companies and what percentage of these which are from the cannabis sector.

Table 2: Lottery stocks and Participations of Cannabis Stocks - t-statistics

	Stock Exchange		
	CSE	TSX	TSXV
2017			
Sample	136	136	136
Percentage of lottery that are Cannabis Stock	37,53%	1,70%	1,95%
Standard deviation	1,57%	0,42%	0,45%
t-statistic (1)	23,918	4,057	4,347
t-statistic (2)	0,778	2,513	0,300

Notes: This table presents the tests (1) of the cannabis companies' proportion among the stocks classified as lottery being different from zero (2) difference between cannabis proportion which are lottery and cannabis proportion stocks in the sample. The year indicates the beginning of the sample used. The final of the sample is always the last day from 2020

Table 4: Fama French Factor Model with Lottery Factor

	CSE	TSX	TSXV
Intercept	-0.00258 *** (0.00060)	-0,00176 (0.00109)	-0.00159 * (0.00069)
MKT_RF	0.52469 *** (0.03915)	0.88535 *** (0.07874)	0.58797 *** (0.05257)
SMB	0.29390 ** (0.09542)	0.69199 *** (0.19247)	0.34532 ** (0.12803)
HML	-0,01384 (0.06580)	-0,22654 (0.13196)	-0,13177 (0.08828)
LF	0.00040 *** (0.00010)	0.11531 ** (0.04161)	0,03055 (0.02947)
n	952	952	952
R^2	0,19586	0,16056	0,1367

Note: This table shows the results of estimating Equation 4.3 for the all Stock Market using the baseline sample. The Stock Market are indicated at the columns. Significance at the *10%, **5%, *** 1% level.

6 ROBUSTNESS

The next exercises will be of two natures. The first of them will still use a fixed sample of companies, but we will have different time samples. The second will vary both the time size of the sample and the companies that are there: companies will be added as the data is available.

6.1 FIXED SAMPLE AND VARYING TIME WINDOWS

A first point to be explored is: when temporal windows change, will the same companies in the Cannabis sector be classified as lottery? The answer, as observable in Tables 11, 12 and 13 ⁵ is no. Their is clear that for the 3 stock exchanges, not always the same companies that have the largest stakes of participation. There is a variation according to the time window that is analyzed. This makes sense according to the methodology proposed by KUMAR, 2009ince it uses classification criteria that varies according to the time.

The next analysis concerns the historical series of the number of lotteries and the number of companies in the Cannabis sector. The graphs for each stock exchange and for each sample are in the Appendix. Some points should be highlighted. The first is that there is no constancy in the series: both the number of lottery companies, and the participation of Cannabis companies among lottery stocks, have a great temporal variability. The second is the lack of association between the series of lottery stocks and those in the Cannabis sector: there is no joint movement between the two series, which means that the increase or decrease in the number of lottery stocks does not necessarily correlate with a similar variation in the participation of cannabis stocks.

Finally, I repeat the exercise proposed in equation 4.3 for different temporal samples. The results are presented in Tables 8, 9 e 10. Here, we see that the results found are maintained in terms of sign and significance for almost all exchanges and at all instants of time.

6.2 VARYING SAMPLE AND TIME WINDOWS

The last exercise is to see what happens if I allow the number of stocks on each of the exchanges to vary as data becomes available. That is, as long as there is a sufficient amount of information to be able to include the company using the classification method

⁵The tables are in the Appendix

proposed by KUMAR, 2009 Here, the main objective is to analyze whether the variable behavior of the proportion of Cannabis companies among lottery companies is maintained when we make the sample more flexible.

Figures for this result are found in the section D of the Appendix. The volatile behavior that was observed across all companies when using a fixed sample was also observed when using this time-varying sample. This tells us that the proportion of Cannabis companies among those classified as lottery is linked to factors other than sample size. It is important to emphasize that by making the sample more flexible, I increased both the number of stocks of companies in the cannabis sector, as well as the total number of companies.

7 CONCLUSION

As noted by KUMAR, 2009 retail investors may perceive high idiosyncratic volatility as a higher probability of experiencing past extreme returns, which is a characteristic of lottery-type stocks. The objective of this study, was to investigate if cannabis stocks present high idiosyncratic risk and other lottery like characteristics such as high idiosyncratic skewness, and low-price relative to other groups of stocks.

The methodology is based on KUMAR, 2009 I used the same criteria to classify companies from three Canadian Stock Markets as being lottery or non-lottery. The results indicate that there is in fact a statistically significant proportion of cannabis companies among those classified as lottery companies. I found that the proportion of cannabis stocks among lottery stocks is higher than the proportion of cannabis stocks in the TSX, suggesting that cannabis stocks are more likely to be perceived as lottery in this stock exchange, which was not the case for the CSE and TSXV stock exchanges that contain majorly stocks from early-stage companies and sectors with similar high-risk characteristics as the cannabis sector.

According to KUMAR, 2009 findings, lottery stocks have typically relatively low market capitalization, low institutional ownership and are younger. These characteristics are all present in cannabis stocks, but also in other early-stage companies and sectors that present high risk. As such, it makes sense that cannabis stocks do not stand out as lottery stocks when compared to other early stage high risk stocks from different sectors that are listed on the venture stock exchanges (CSE and TSX). I did not find any particular lottery characteristic that stood out among cannabis companies, even though high idiosyncratic volatility was slightly more frequent for cannabis companies in the TSX. In other words, within the three factors used as criteria for classifying stocks of shares as lottery or not, none of the attributes seemed to be significantly more frequent among cannabis companies than others. Furthermore, the behavior proved to be robust to several tests..

Finally, I conclude by creating a lottery factor that was added to the Fama French equation in order to see if cannabis stocks returns are somehow correlated with lottery stock returns. The results point to a common trend. For CSE and TSX, I found a positive and significant coefficient. For TSXV, I found a positive sign associated with the coefficient, while this value was not significant. These results indicate that the return of cannabis stocks moves in the same direction as lottery stocks. While a possible explanation is precisely the fact that there are companies in this sector among lottery companies, the result reinforces that cannabis stocks indeed have lottery like characteristics.

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APPENDIX

A) LIST OF CANNABIS COMPANIES OF EACH STOCK EXCHANGE

Table 5: TSXV - Cannabis Companies

Company Name	Symbol
48North Cannabis Corp.	NRTH
Auxly Cannabis Group Inc.	XLY
Calyx Ventures Inc.	CYX
CanadaBis Capital Inc.	CANB
Decibel Cannabis Company	DB
Eastwest Bioscience Inc.	EAST
Elixxer Ltd.	ELXR
Emerald Health Therapeutics, Inc.	EMH
Eve & Co Incorporated	EVE
Experion Holdings Ltd.	EXP
Flowr Corporation, The	FLWR
FluroTech Ltd.	TEST
Geyser Brands Inc.	GYSR
GTEC Holdings Ltd.	GTEC
Harvest One Cannabis Inc.	HVT
High Tide Inc.	HITI
Hill Street Beverage Company Inc.	BEER
INDIVA Limited	NDVA
Kalytera Therapeutics Inc.	KLY
Khiron Life Sciences Corp.	KHRN
Kiario Holdings Corp.	KO
Namaste Technologies Inc.	N
Naturally Splendid Enterprises Ltd.	NSP
PharmaCielo Ltd.	PCLO
Radiant Technologies Inc.	RTI
Rubicon Organics Inc.	ROMJ
Spyder Cannabis Inc.	SPDR
Sugarbud Craft Growers Corp.	SUGR
Target Capital Inc.	TCI
Terrace Global Inc.	TRCE
WeedMD Inc.	WMD
YSS Corp.	YSS

Table 6: TSX - Cannabis Companies

Company Name	Symbol
Aleafia Health Inc.	AH
Aphria Inc.	APHA
Aurora Cannabis Inc.	ACB
Avicanna Inc.	AVCN
Canopy Growth Corporation	WEED
Canopy Rivers Inc.	RIV
Cardiol Therapeutics Inc.	CRDL
Charlotte's Web Holdings, Inc.	CWEB
Cronos Group Inc.	CRON
Delta 9 Cannabis Inc.	DN
Fire & Flower Holdings Corp.	FAF
HEXO Corp.	HEXO
InMed Pharmaceuticals Inc.	IN
MediPharm Labs Corp.	LABS
Neptune Wellness Solutions Inc.	NEPT
Organigram Holdings Inc.	OGI
Tetra Bio-Pharma Inc.	TBP
The Green Organic Dutchman Holdings Ltd.	TGOD
The Supreme Cannabis Company, Inc.	FIRE
The Valens Company Inc.	VLNS
Village Farms International Inc.	VFF
VIVO Cannabis Inc.	VIVO
Willow Biosciences Inc.	WLLW
Zenabis Global Inc.	ZENA

Table 7: CSE - Cannabis Companies

Company Name	Symbol
1933 Industries Inc.	TGIF
1933 Industries Inc. Wts.	TGIF.WT
1933 Industries Inc.10% 14SEP21	TGIF.DB
3 Sixty Risk Solutions Ltd.	SAFE
4Front Ventures Corp.	FFNT
4Front Ventures Corp. Wts	FFNT.WT
Abattis Bioceticals Corp.	ATT
Acreage Holdings, Inc. Fixed S.V.	ACRG.A.U
Acreage Holdings, Inc. Floating S.V.	ACRG.B.U
Adastra Labs Holdings Ltd.	XTRX
Affinor Growers Inc.	AFI
AgraFlora Organics International Inc	AGRA
Agrios Global Holdings Ltd.	AGRO
Aion Therapeutic Inc.	AION
Alliance Growers Corp.	ACG
Alternate Health Corp.	AHG
AMP German Cannabis Group Inc.	XCX
AREV NanoTec Brands Inc.	AREV
Asia Green Biotechnology Corp.	ASIA
Australis Capital Inc.	AUSA
Ayr Strategies Inc. Rts.	AYR.RT
Ayr Strategies Inc. S.V., RVS, L.V.	AYR.A
Ayr Strategies Inc. Wts.	AYR.WT
BC Craft Supply Co. Ltd.	CRFT
Beleave Inc.	BE
BellRock Brands Inc.	BRCK.U
Benchmark Botanics Inc.	BBT
Better Plant Sciences Inc.	PLNT
BevCanna Enterprises Inc.	BEV
Bhang Inc.	BHNG
BioHarvest Sciences Inc.	BHSC
Biome Grow Inc.	BIO
Blueberries Medical Corp.	BBM
Bluma Wellness Inc.	BWEL.U
Body and Mind Inc.	BAMM
Braingrid Limited	BGRD.X
C21 Investments Inc.	CXXI
Canada House Wellness Group Inc.	CHV
CanaFarma Hemp Products Corp.	CNFA
Canbud Distribution Corporation	CBDX
Cannabis Growth Opportunity Corporation	CGOC
Cannabix Technologies Inc.	BLO
CannAmerica Brands Corp.	CANA
CannaOne Technologies Inc	CNNA
Cannara Biotech Inc.	LOVE
Canntab Therapeutics Limited	PILL
Cansortium Inc.	TIUM.U
Cansortium Inc. Wts.	TIUM.WT.U

Table 7: CSE - Cannabis Companies (Continued)

Company Name	Symbol
Captiva Verde Land Corp.	PWR
Captor Capital Corp	CPTR
CBD Global Sciences Inc.	CBDN
Chemosis International Inc.	CSI.U
Choom Holdings Inc.	CHOO
Christina Lake Cannabis Corp	CLC
City View Green Holdings Inc.	CVGR
Clean Power Capital Corp.	MOVE
CLS Holdings USA, Inc.	CLSH
Columbia Care Inc.	CCHW
CordovaCann Corp.	CDVA
Cresco Labs Inc.	CL
Curaleaf Holdings, Inc.	CURA
Empower Clinics Inc	CBDT
Eviana Health Corporation	EHC
EXMceuticals Inc.	EXM
FinCanna Capital Corp.	CALI
Fiore Cannabis Ltd Warrants	FIOR.WT
Fiore Cannabis Ltd.	FIOR
Flower One Holdings Inc.	FONE
Flower One Holdings Inc. 18SEP2023	FONE.WT.B
Flower One Holdings Inc. 9.5% 15NOV22	FONE.DB.A
Flower One Holdings Inc. 9.5% 28MAR22	FONE.DB
Flower One Holdings Inc. A Wts.	FONE.WT.A
Flower One Holdings Inc.Wts.	FONE.WT
Future Farm Technologies Inc.	FFT
GABY Inc.	GABY
Gaia Grow Corp.	GAIA
Global Cannabis Applications Corp.	APP
Global Health Clinics Ltd.	MJRX
Global Hemp Group Inc.	GHG
Global Hemp Group Inc. Wts.	GHG.WT
Gnomestar Craft Inc	GNOM
Golden Leaf Holdings Ltd.	GLH
Green Growth Brands Inc.	GGB
Green Thumb Industries Inc.	GTII
Grown Rogue International Inc.	GRIN
Harborside Inc.	HBOR
Harvest Health & Recreation Inc.	HARV
HealthSpace Data Systems Ltd.	HS
Hemp for Health Inc.	HFH
Heritage Cannabis Holdings Corp.	CANN
Heritage Cannabis Holdings Corp. Wts.	CANN.WT
Hollister Biosciences Inc.	HOLL
iAnthus Capital Holdings Inc.	IAN
Icanic Brands Company Inc	ICAN
Ignite International Brands, Ltd.S.V.	BILZ
IM Cannabis Corp.	IMCC

Table 7: CSE - Cannabis Companies (Continued)

Company Name	Symbol
IM Cannabis Corp. Wts.	IMCC.WT
Indus Holdings, Inc.	INDS
INDVR Brands Inc.	IDVR
Inner Spirit Holdings Ltd.	ISH
Inner Spirit Holdings Ltd. 12% 30Jun2022	ISH.DB
InnoCan Pharma Corporation	INNO
Ionic Brands Corp.	IONC
Isodiol International Inc.	ISOL
Isracann Biosciences Inc.	IPOT
Jushi Holdings Inc. Class B Subordinate Voting Shares	JUSH
Juva Life Inc.	JUVA
Leviathan Natural Products Inc.	EPIC
Lexaria Bioscience Corp.	LXX
Liberty Health Sciences Inc.	LHS
Lobe Sciences Ltd.	LOBE
Lotus Ventures Inc.	J
Luff Enterprises Ltd.	LUFF
ManifestSeven Holdings Corporation	MSVN
Matica Enterprises Inc.	MMJ
MedMen Enterprises Inc. Class B Subordinate Voting Shares	MMEN
MedMen Enterprises Inc. Wts.	MMEN.WT
MedXtractor Corp.	MXT
Micron Waste Technologies Inc	MWM
MJardin Group, Inc.	MJAR
Mojave Jane Brands Inc.	JANE
Molecule Holdings Inc.	MLCL
MPX International Corporation	MPXI
MustGrow Biologics Corp.	MGRO
Mydecine Innovations Group Inc.	MYCO
MYM Nutraceuticals Inc.	MYM
Nabis Holdings Inc.	NAB
Nabis Holdings Inc. 8% 26MAR22	NAB.DB
Nabis Holdings Inc. Wts.	NAB.WT
NanoSphere Health Sciences Inc.	NSHS
Nass Valley Gateway Ltd.	NVG
New Leaf Ventures Inc.	NLV
Next Green Wave Holdings Inc.	NGW
Nextleaf Solutions Ltd.	OILS
North Bud Farms Inc.	NBUD
Nova Mentis Life Sciences Corp.	NOVA
Nutritional High International Inc.	EAT
Orchid Ventures Inc.	ORCD
Orion Nutraceuticals Inc.	ORI
Ovation Science Inc	OVAT
Pac Roots Cannabis Corp.	PACR
Pharmadrug Inc.	BUZZ
Planet 13 Holdings Inc.	PLTH

Table 7: CSE - Cannabis Companies (Continued)

Company Name	Symbol
Planet 13 Holdings Inc. B Wts. 10SEP22	PLTH.WT.B
Planet 13 Holdings Inc. Wts	PLTH.WT
Plus Products Inc	PLUS
Plus Products Inc. - 8% 28FEB21	PLUS.DB
Plus Products Inc. - Warrants	PLUS.WT
POSaBIT Systems Corporation	PBIT
Predictmedix Inc.	PMED
Primo Nutraceuticals Inc	PRMO
Pure Extracts Technologies Corp	PULL
Quinsam Capital Corporation	QCA
Radiko Holdings Corp.	RDKO
Rapid Dose Therapeutics Corp.	DOSE
Ravenquest BioMed Inc.	RQB
Red White & Bloom Brands Inc.	RWB
Red White & Bloom Brands Inc. Wts. 24SEP22	RWB.WT
Redfund Capital Corp.	LOAN
Revive Therapeutics Ltd.	RVV
RISE Life Science Corp.	RLSC
RMMI Corp.	RMMI
Rockshield Capital Corp.	RKS
Sativa Wellness Group Inc.	SWEL
Sire Bioscience Inc.	SIRE
Skylight Health Group Inc.	SHG
SLANG Worldwide Inc.	SLNG
SOL Global Investments Corp.	SOL
SpeakEasy Cannabis Club Ltd.	EASY
Sproutly Canada Inc.	SPR
Stem Holdings Inc.	STEM
Sunniva Inc.	SNN
Sweet Earth Holdings Corporation	SE
TAAT Lifestyle & Wellness Ltd.	TAAT
Terranueva Corporation	TEQ
TerrAscend Corp.	TER
THC Biomed Intl Ltd	THC
The Tinley Beverage Company Inc.	TNY
Thoughtful Brands Inc.	TBI
TILT Holdings Inc.	TILT
Top Strike Resources Corp.	VENI
Transcanna Holdings Inc.	TCAN
Transcanna Holdings Inc. Wts.	TCAN.WT
Tree of Knowledge International Corp.	TOKI
Trichome Financial Corp.	TFC
True Leaf Brands Inc.	MJ
Trulieve Cannabis Corp.	TRUL
Trulieve Cannabis Corp. 9.75% 18JUN24	TRUL.DB.U
TruTrace Technologies Inc.	TTT
Veritas Pharma Inc.	VRT
Vert Infrastructure Ltd.	VVV

Table 7: CSE - Cannabis Companies (Continued)

Company Name	Symbol
Vext Science, Inc.	VEXT
Vibe Growth Corporation	VIBE
Vinergy Cannabis Capital Inc.	VIN
Vireo Health International Inc. S.V.	VREO
Weekend Unlimited Industries Inc.	POT
Wikileaf Technologies Inc.	WIKI
Wildflower Brands Inc.	SUN
World Class Extractions Inc.	PUMP
XPhyto Therapeutics Corp.	XPHY
XS Financial Inc.	XSF

B) FIXED SAMPLE AND VARYING TIME WINDOWS

Table 8: CSE - Fama French Factor Model with Lottery Factor

	2018	2019
Intercept	-0.00277 *** (0.00056)	-0.00359 *** (0.00072)
MKT_RF	0.52991 *** (0.03814)	0.56568 *** (0.04194)
SMB	0.37589 *** (0.09520)	0.09021 (0.11790)
HML	-0.06356 (0.06440)	0.10109 (0.12139)
LF	0.00033 (0.00031)	0.00234 (0.01316)
n	692	431
R ²	0,26423	0,35817

Note: This table shows the results of estimating Equation 4.3 for the CSE Stock Market using the different samples. The year which we begin the sample are indicated at the columns. Significance at the *10%, **5%, *** 1% level.

Table 9: TSX - Fama French Factor Model with Lottery Factor

	2018	2019
Intercept	-0.00284 * (0.00120)	-0.00481 *** (0.00136)
MKT_RF	0.88211 *** (0.07998)	0.88602 *** (0.07780)
SMB	0.94095 *** (0.20010)	0.77957 *** (0.21118)
HML	-0.31939 * (0.13457)	-0.25479 (0.14403)
LF	0.09499 * (0.04128)	0.08017 * (0.03767)
n	692	431
R ²	0,21608	0,30011

Note: This table shows the results of estimating Equation 4.3 for the TSX Stock Market using the different samples. The year which we begin the sample are indicated at the columns. Significance at the *10%, **5%, *** 1% level.

Table 10: TSXV - Fama French Factor Model with Lottery Factor

	2018	2019
Intercept	-0.00272 *** (0.00082)	-0.00422 *** (0.00103)
MKT_RF	0.61043 *** (0.05594)	0.65456 *** (0.06384)
SMB	0.43576 ** (0.13951)	0.06988 (0.17984)
HML	-0.17981 (0.09439)	0.04085 (0.18515)
LF	0.02884 (0.03020)	0.02157 (0.03659)
n	692	431
R^2	0.17933	0.23305

Note: This table shows the results of estimating Equation 4.3 for the TSXV Stock Market using the different samples. The year which we begin the sample are indicated at the columns. Significance at the *10%, **5%, *** 1% level.

Table 11: Cannabis Companies Partition - TSXV

2017		2018		2019	
% of Appearance	Stock	% of Appearance	Stock	% of Appearance	Stock
64,18%	CYX CV Equity	56,21%	EVE CV Equity	37,82%	BEER CV Equity
58,72%	EAST CV Equity	55,20%	NRTH CV Equity	35,73%	XLY CV Equity
52,21%	NRTH CV Equity	45,66%	EMH CV Equity	32,95%	CYX CV Equity
48,74%	GYSR CV Equity	39,45%	CYX CV Equity	27,84%	HVT CV Equity
46,85%	KHRN CV Equity	37,43%	GTEC CV Equity	25,06%	CANB CV Equity
40,97%	FLWR CV Equity	34,97%	EXP CV Equity	19,26%	KHRN CV Equity
38,97%	EVE CV Equity	34,83%	NDVA CV Equity	16,47%	EVE CV Equity
38,45%	CANB CV Equity	31,36%	PCLO CV Equity	16,47%	FLWR CV Equity
25,11%	XLY CV Equity	30,35%	NSP CV Equity	15,55%	HITI CV Equity
19,22%	BEER CV Equity	12,86%	ELXR CV Equity	13,46%	SPDR CV Equity

Notes: This table presents the participation of Cannabis companies listed among the lottery companies on the TSXV Stock Exchange. The year indicates the beginning of the sample used (2017, 2018 or 2019). The final of the sample is always the last day from 2020. The sample size is 952, 692 and 431 respectively.

Table 12: Cannabis Companies Partition - TSX

2017			2018			2019		
% of Appearance	Stock	% of Appearance	% of Appearance	Stock	% of Appearance	% of Appearance	Stock	% of Appearance
71,85%	APHA CT Equity	67,92%	67,92%	CRDL CT Equity	78,89%	78,89%	CWEB CT Equity	78,89%
69,43%	HEXO CT Equity	62,14%	62,14%	APHA CT Equity	72,85%	72,85%	HEXO CT Equity	72,85%
67,33%	CRDL CT Equity	60,69%	60,69%	AH CT Equity	69,14%	69,14%	RIV CT Equity	69,14%
66,39%	AH CT Equity	43,35%	43,35%	CRON CT Equity	65,89%	65,89%	LABS CT Equity	65,89%
64,60%	WEED CT Equity	10,55%	10,55%	DN CT Equity	61,72%	61,72%	WEED CT Equity	61,72%
42,33%	CRON CT Equity	9,39%	9,39%	ACB CT Equity	58,70%	58,70%	CRDL CT Equity	58,70%
		3,32%	3,32%	IN CT Equity	47,10%	47,10%	APHA CT Equity	47,10%
					44,55%	44,55%	DN CT Equity	44,55%
					37,35%	37,35%	FAF CT Equity	37,35%
					15,31%	15,31%	ACB CT Equity	15,31%

Notes: This table presents the participation of Cannabis companies listed among the lottery companies on the TSX Stock Exchange. The year indicates the beginning of the sample used (2017, 2018 or 2019). The final of the sample is always the last day from 2020. The sample size is 952, 692 and 431 respectively.

Table 13: Cannabis Companies Partition - CSE

2017			2018			2019		
% of Appearance	Stock	% of Appearance	% of Appearance	Stock	% of Appearance	% of Appearance	Stock	Stock
38,87%	FONE.CF.Equity	49,86%	GAIA.CF.Equity	93,04%	HFH.CF.Equity			
38,76%	GABY.CF.Equity	47,83%	GNOM.CF.Equity	85,61%	FFNT.WT.CF.Equity			
33,82%	BLO.CF.Equity	44,08%	GTIL.CF.Equity	69,61%	CPTR.CF.Equity			
31,93%	BWEL.U.CF.Equity	37,14%	CRFT.CF.Equity	68,91%	TIUM.WT.U.CF.Equity			
30,36%	AUSA.CF.Equity	27,75%	AHG.CF.Equity	61,48%	BEV.CF.Equity			
29,73%	GNOM.CF.Equity	27,02%	ATT.CF.Equity	61,25%	BAMM.CF.Equity			
29,41%	CSI.U.CF.Equity	26,73%	PWR.CF.Equity	60,56%	CCHW.CF.Equity			
28,89%	CNFA.CF.Equity	26,16%	BLO.CF.Equity	58,47%	GHG.WT.CF.Equity			
26,37%	AGRA.CF.Equity	25,87%	CPTR.CF.Equity	56,61%	FFT.CF.Equity			
25,63%	CNNA.CF.Equity	24,28%	AUSA.CF.Equity	56,38%	CANA.CF.Equity			

Notes: This table presents the participation of Cannabis companies listed among the lottery companies on the CSE Stock Exchange. The year indicates the beginning of the sample used (2017, 2018 or 2019). The final of the sample is always the last day from 2020. The sample size is 952, 692 and 431 respectively.

C) TIME SERIES- TOTAL NUMBER OF LOTTERY STOCKS AND CANNABIS LOTTERY STOCKS

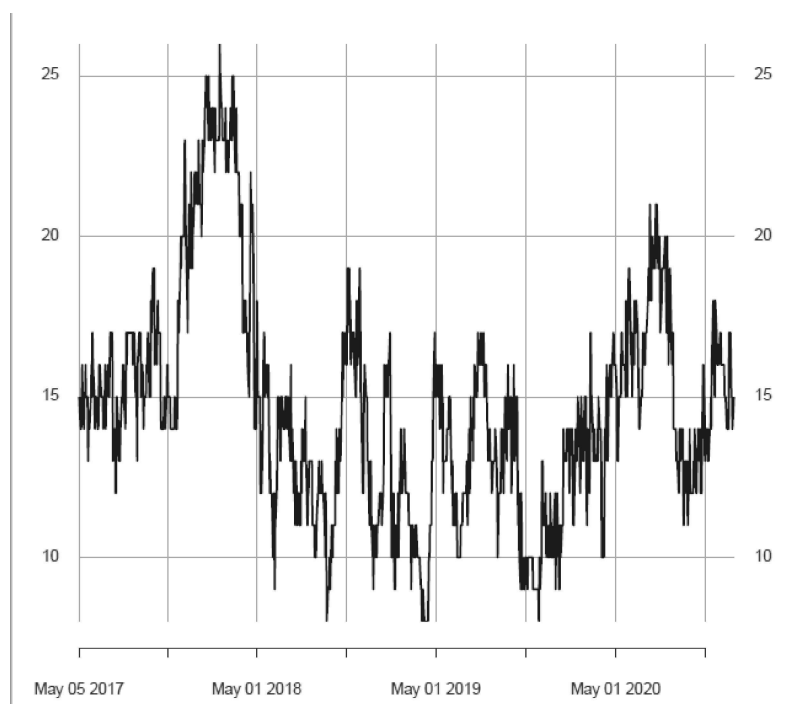


Figure 1: CSE - Number of Cannabis Lottery Stocks: 2017-2020

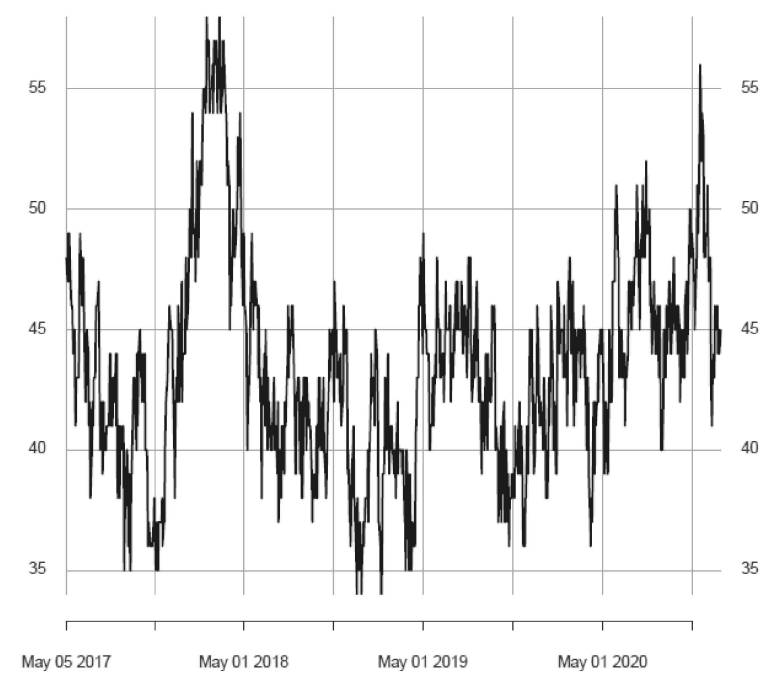


Figure 2: CSE - Number of Lottery Stocks: 2017-2020

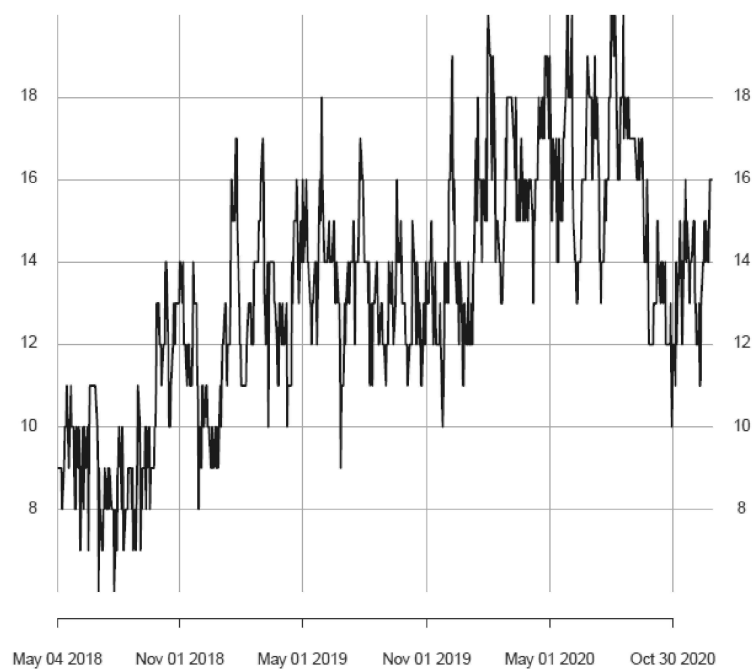


Figure 3: CSE - Number of Cannabis Lottery papers: 2018-2020

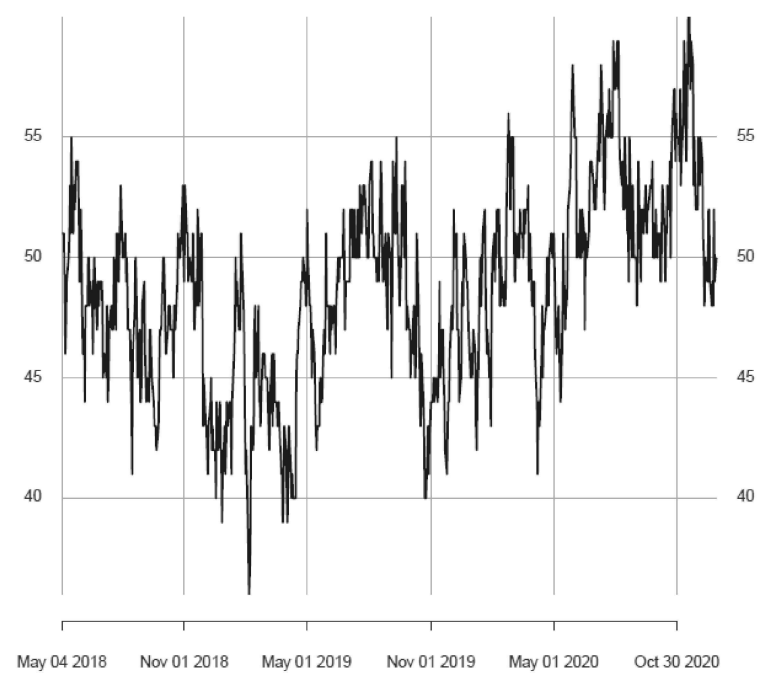


Figure 4: CSE - Number of Lottery Stocks: 2018-2020

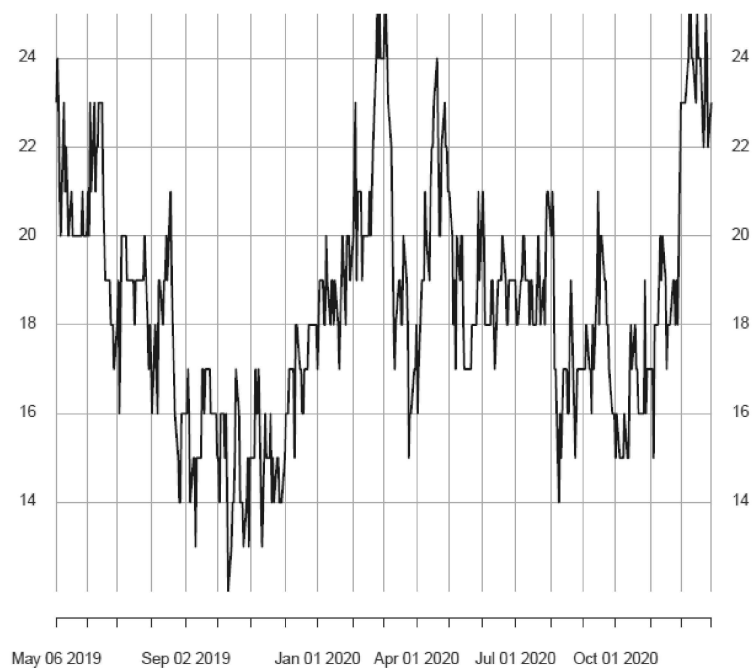


Figure 5: CSE - Number of Cannabis Lottery papers: 2019-2020



Figure 6: CSE - Number of Lottery Stocks: 2019-2020

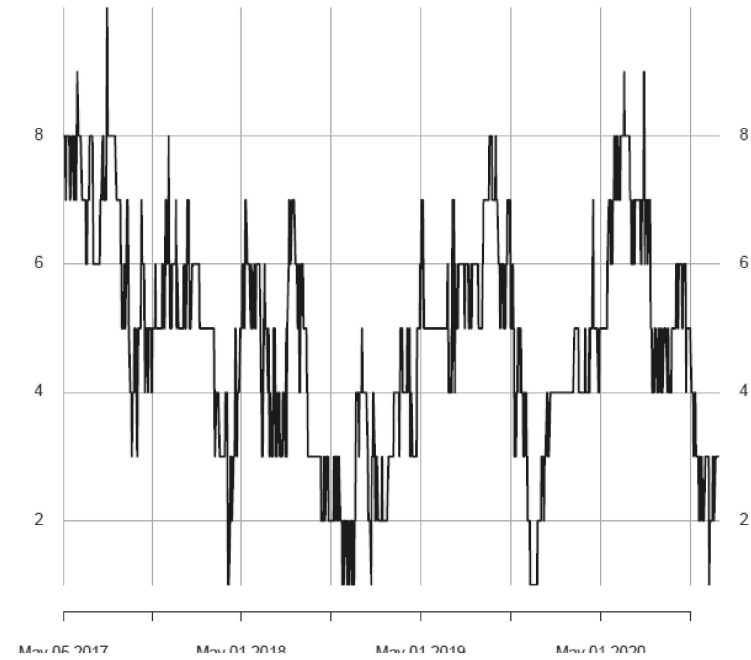


Figure 7: TSXV - Number of Cannabis Lottery Stocks: 2017-2020

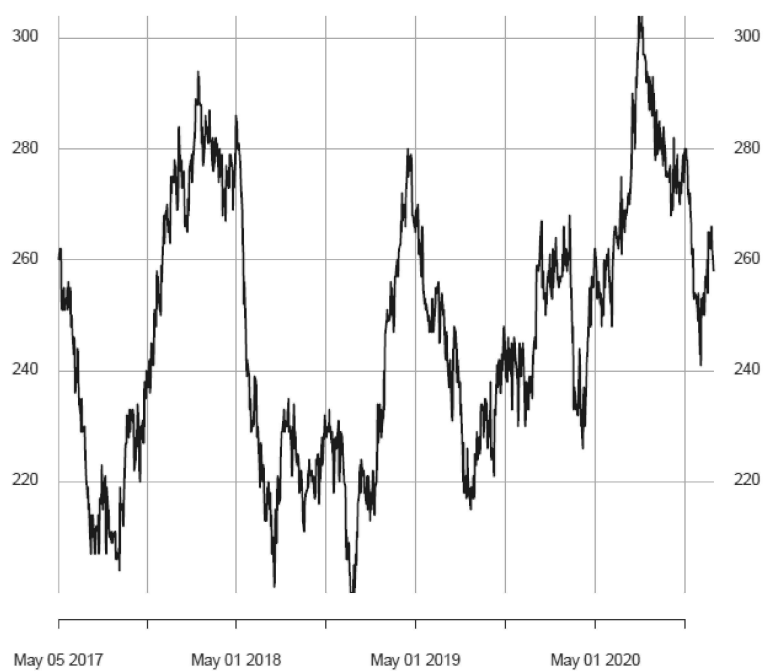


Figure 8: TSXV - Number of Lottery Stocks: 2017-2020

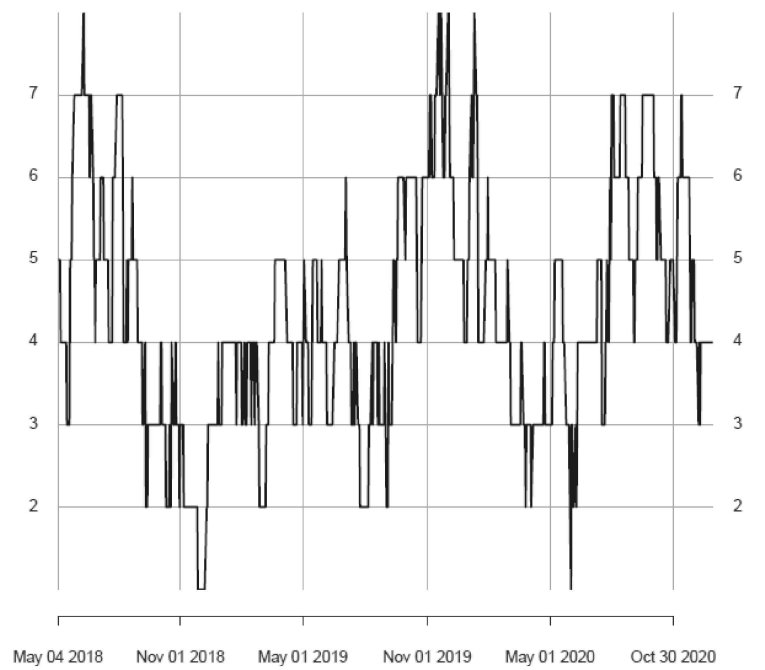


Figure 9: TSXV - Number of Cannabis Lottery Stocks: 2018-2020



Figure 10: TSXV - Number of Lottery Stocks: 2018-2020

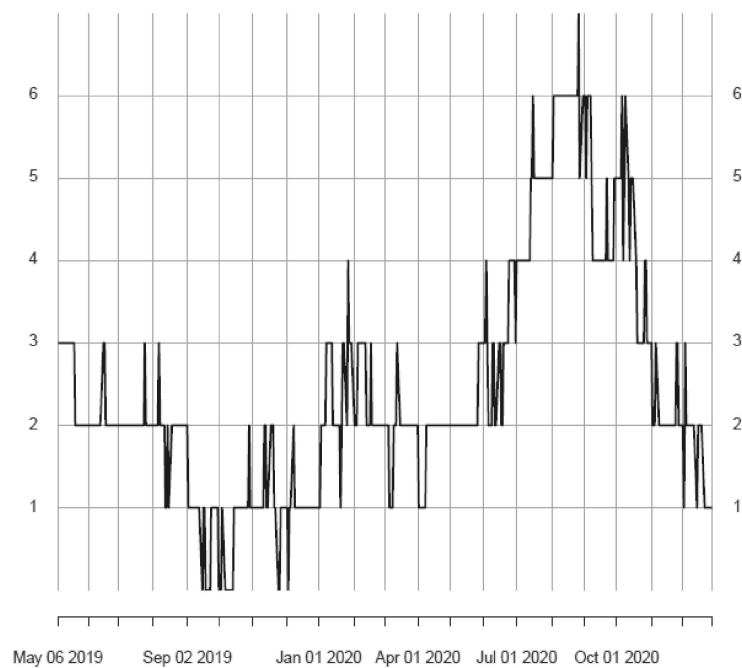


Figure 11: TSXV - Number of Cannabis Lottery Stocks: 2019-2020



Figure 12: TSXV - Number of Lottery Stocks: 2019-2020

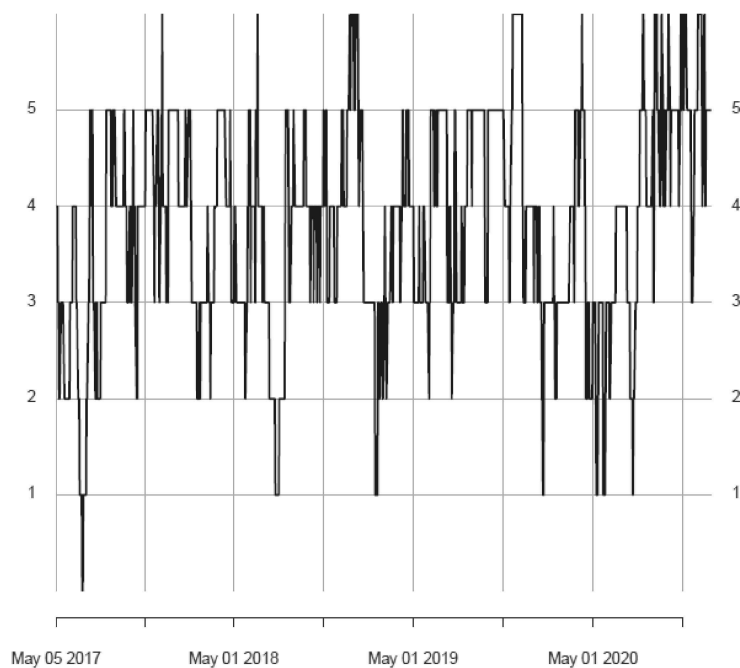


Figure 13: TSX - Number of Cannabis Lottery Stocks: 2017-2020

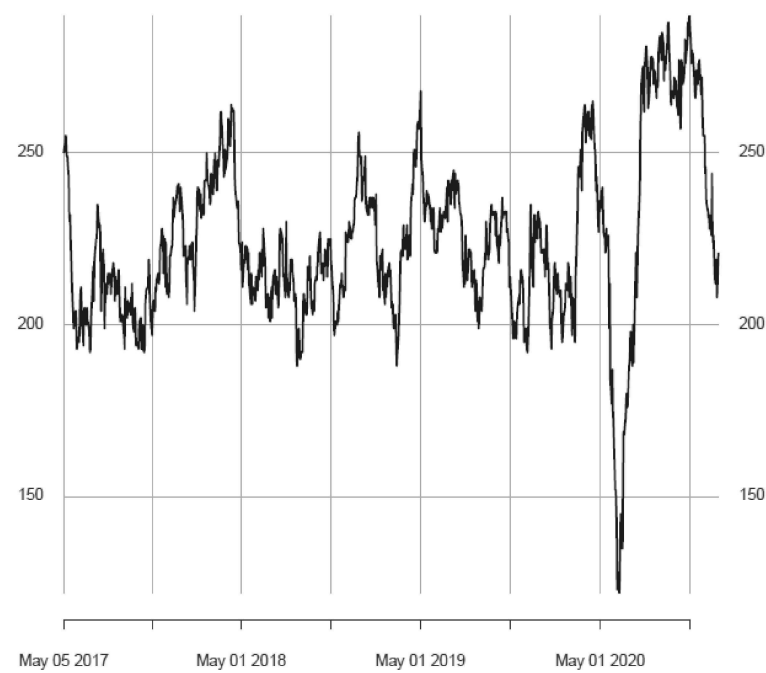


Figure 14: TSX - Number of Lottery Stocks: 2017-2020

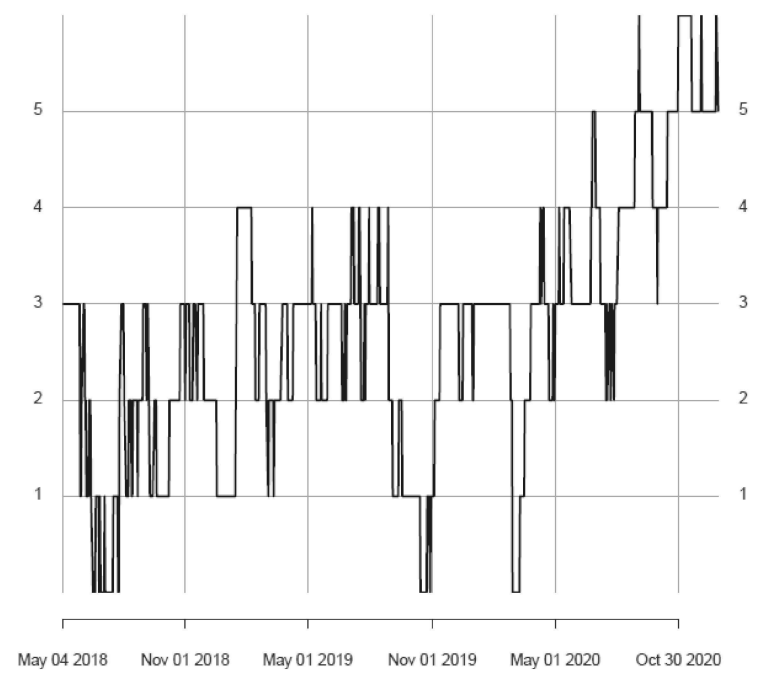


Figure 15: TSX - Number of Cannabis Lottery Stocks: 2018-2020

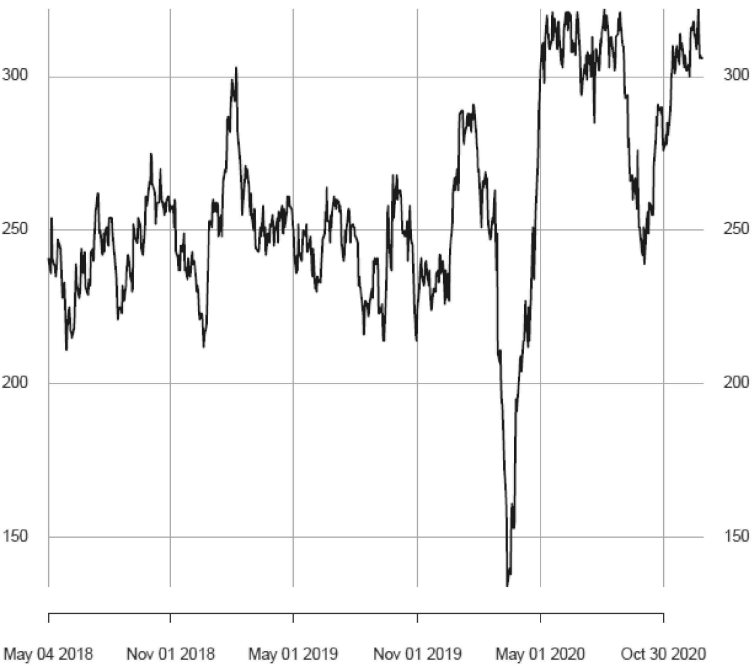


Figure 16: TSX - Number of Lottery Stocks: 2018-2020

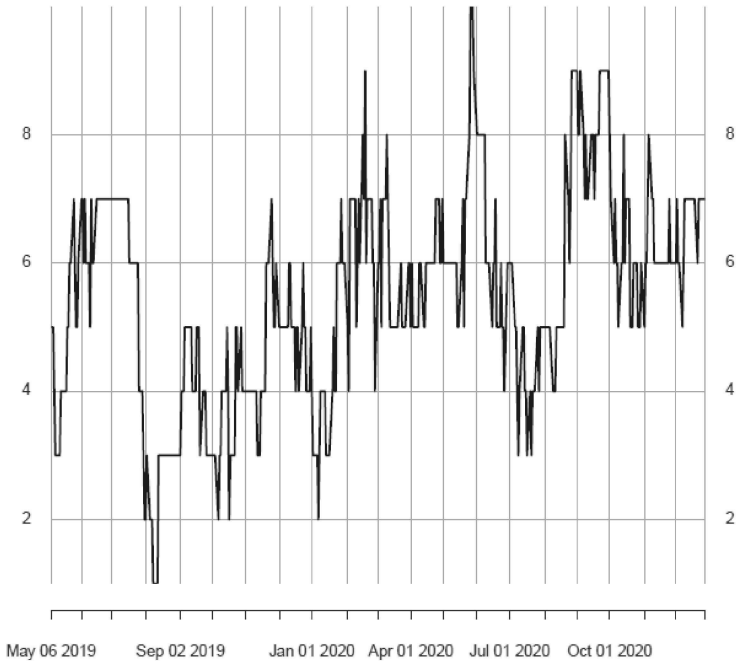


Figure 17: TSX - Number of Cannabis Lottery Stocks: 2019-2020



Figure 18: TSX - Number of Lottery Stocks: 2019-2020

D) VARYING SAMPLE AND TIME WINDOWS

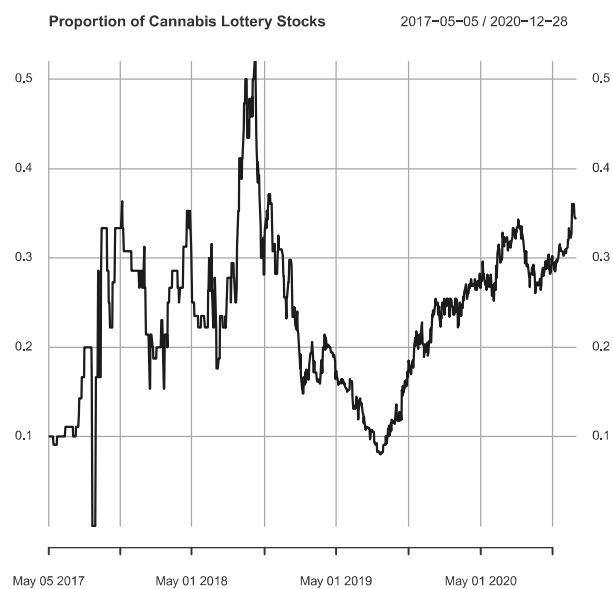


Figure 19: CSE - Proportion of Cannabis Lottery Stocks: 2017-2020



Figure 20: CSE - Proportion of Cannabis Lottery Stocks: 2018-2020



Figure 21: CSE - Proportion of Cannabis Lottery Stocks: 2019-2020

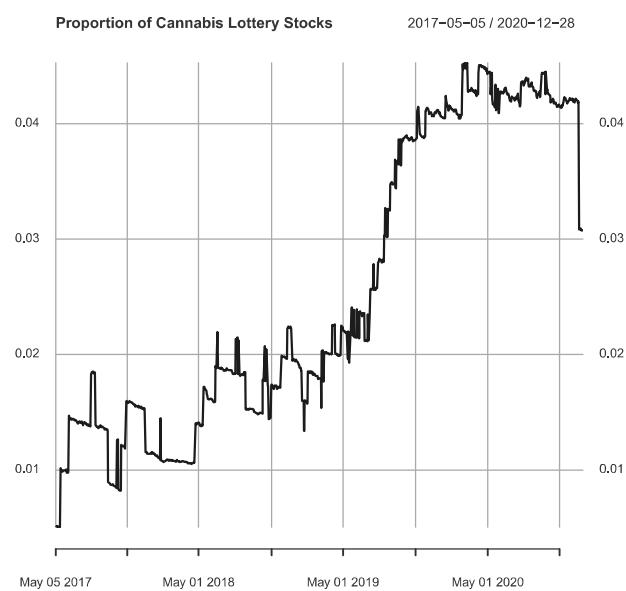


Figure 22: TSX - Proportion of Cannabis Lottery Stocks: 2017-2020

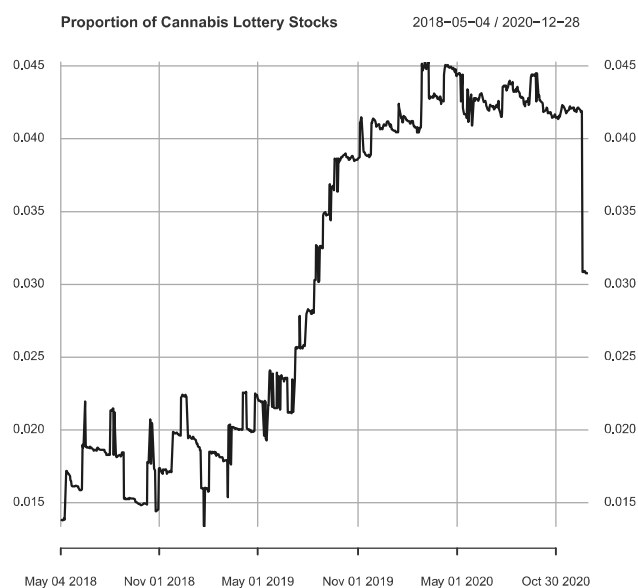


Figure 23: TSX - Proportion Cannabis Lottery Stocks: 2018-2020

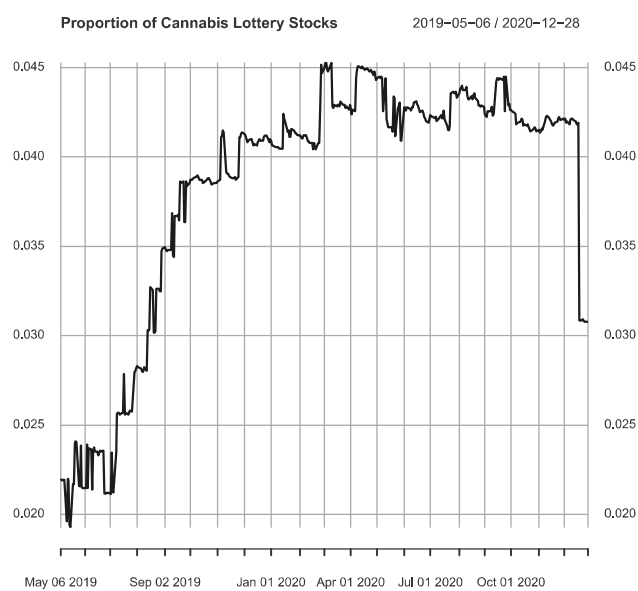


Figure 24: TSX - Proportion of Cannabis Lottery Stocks: 2019-2020

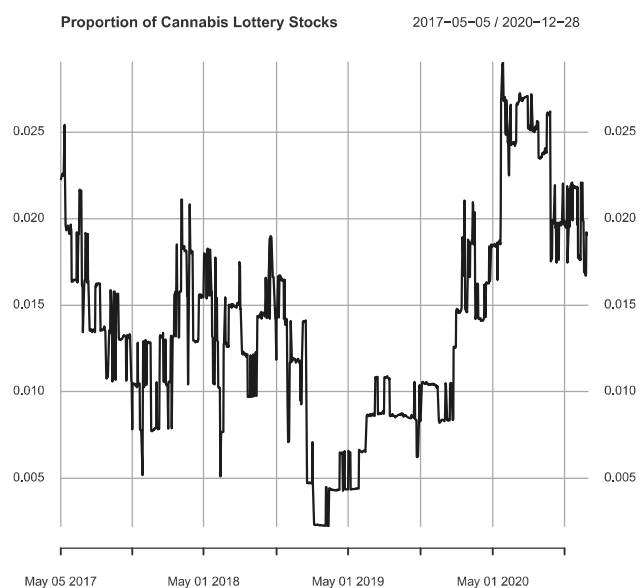


Figure 25: TSXV - Proportion of Cannabis Lottery Stocks: 2017-2020

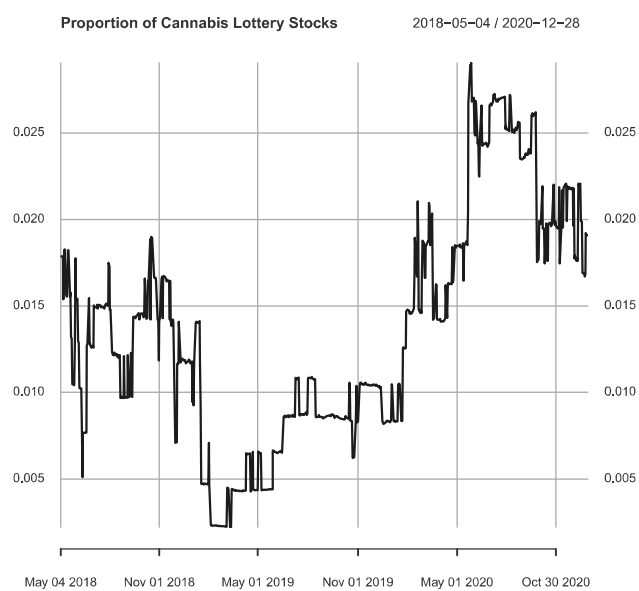


Figure 26: TSXV - Proportion of Cannabis Lottery Stocks: 2018-2020

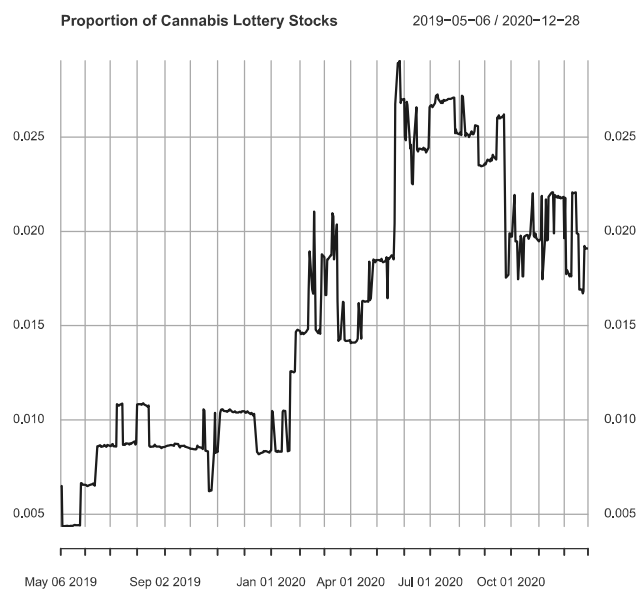


Figure 27: TSXV - Proportion of Cannabis Lottery Stocks: 2019-2020