ERASMUS UNIVERSITY ROTTERDAM
ERASMUS SCHOOL OF ECONOMICS

MSc Economics & Business
Specialization Financial Economics

Stock Option Backdating: An Analysis Of Return Patterns Of Options Granted During The Covid-19 Stock Market Plunge

Author: Tommaso Lussetich
Student number: 617735
Thesis supervisor: Prof. Dr. Patrick Verwijmeren
Second reader: [tba]
Finish date: [month/2022]

Acknowledgments

Legum servi sumus ut liberi esse possimus

"We are slaves of laws so that we can all be free."

As this work aims to contribute to the field of forensic finance, I find this quote from Cicero to suit the purpose of introducing it. In the corporate finance system, each agent bears the burden of a complex set of rules whose aim is to maintain a balance among the rights of firms' stakeholders. The more powerful is the agent, the heavier such weight is. But whenever these individuals shirk from their duties, the freedom of all other stakeholders results compromised. This is the reason why the need for finance to put its instruments to the service of law enforcement bodies is real and urgent.

I would like to thank my fellow student Alessandro Terzoli and my dear friend Elisa Venturoli for the precious suggestions regarding the data processing of this work.

I am grateful for the support I received from my family and from all the people I encountered along this path.

Lastly, I thank Emilia, whose passion and strength motivated me to reach unimagined objectives.

Abstract

This study analyses the return patterns around the grant dates of stock options awarded to U.S. executives during the stock market plunge of March 2020. My aim is to collect evidence of whether an event of such unprecedented magnitude has given place to stock option manipulation. To do so, I compare the data relative to 2020 to the previous year. I find that there are no significant differences in the option grants distribution between 2019 and 2020. However, the two samples present differences in the return patterns, especially in the first trimester of the two years.

Keywords: Backdating, executives compensation, stock option awards, Covid-19

JEL Classification: M52, J33

Table of Contents

List of Tables

List of Figures

1. Introduction

The tool case that executives can employ to pursue self-serving objectives is large and well organized. This category of agents does not lack of the opportunities and skills to take advantage of the interactions between the performance of the firms they manage and the market fluctuations that involve the stock prices of the corporations they serve. The choice to give place to such opportunistic behaviors is up to their moral conduct and to the system of legal constraints in which they operate. This paper investigates a simple- yet effective- method of maximizing managers' personal wealth by falsifying the documentation relative to their performance-based equity awards: stock option backdating.

Stock option backdating is the illegal practice of manipulating option awards granted to executives by dating them retrospectively. Usually stock options are issued at-the-money, i.e., the exercise price equals the market price on the day of the award. By choosing a date in which the stock price was uncommonly low (preferably below the fundamental value), options holders immediately realize a profit by turning the option in-the-money.

From its first appearance in the scientific literature in the late 1990s, the topic of stock option backdating has intermittently undergone the scrutiny of financial research and newspapers. If the first articles did not draw much attention (as reported by Ritter, 2008), in few years, financial scandals started to shake the offices of some of the most renowned executives of the United States. This because even though the evidence reported by these works has always been purely inferential, as researchers and reporters did not possess private information about the alleged backdating companies, their findings resulted to be well-grounded. Indeed, the tension reached its climax in 2006, when the Securities and Exchange Commission (SEC) and the Department of Justice started to investigate on the companies that were singled out by the media. Along with several criminal charges, the results of such investigations were a new set of regulations about executives' compensation disclosure that outlawed stock option backdating. Since then, this phenomenon was thought to have disappeared by part of the literature (see for instance Huang and Lu, 2010 and Mohliver, 2019).

One of the main focal points of this study is to verify whether the dip in stock prices caused by the spread of the news about the Covid-19 pandemic has worked as a fertile ground for a new wave of options backdating. Indeed, it has been alleged that this kind of phenomena present the perfect chance to date option grants ex post facto. For example, the US press reported that after the terroristic attack of September 11 2001,

the evidence collected about the number of stock options granted to Wall Street executives suggested that the latter could have exploited this unpredictable event to date retrospectively their options (Maremount, Forelle and Bandler, 2007). This circumstance appears to be very similar to what could have happened with the effects that the news about the spread of Covid-19 had on the US stock market. Therefore, my research question is:

> *To what extent do the differences in the return patterns of the stock options granted in 2019 and those granted in 2020 suggest that part of the latter have been backdated?*

The need to conduct such study is twofold. In first instance, large part of the most recent financial literature about this phenomenon investigates samples relative to the period 2000-2010. Therefore, it is useful to provide an updated framework about the recent developments in the stock option grants assignments. Secondly, stock option backdating patterns exacerbates during periods of high volatility and decreasing stock prices. Hence, it is necessary to address whether the parameters and methodologies applied in previous studies are suitable to detect clues of backdating taking place during the Covid-19 stock crash.

The major academic outcome that this research provides deals with the evaluation of the methodology employed in previous studies. The main strand of literature that investigates backdating employs an event study approach that measures the cumulative abnormal returns around grant dates. This study allows to determine whether such model can efficiently identify backdating patterns also in the presence of unusual patterns caused by exogenous shocks. Moreover, on the practical side, the results of this study also aid to assess whether the current regulatory framework enacted by US law enforcement authorities is strong enough to contrast this outlawed practice in periods of unpredictable fluctuations such as those experienced in the first trimester of 2020.

Following a consolidated strand of literature (Aboody and Kasznik, 2000, Lie, 2005, Heron and Lie, 2007-2009), I conduct an event study in which I analyze the cumulative abnormal returns considering the grant date as the event date. I present results for a sample of 1,164 option grants relative to 580 firms of the S&P 1500 Composite Index in the years 2019 and 2020. The first evidence I collect regards the number of options issued in February and March 2020. If any backdating occurred in this period, the first logical proof of it would be to find that in this time frame an unusually high number of grants was issued. In particular, I distinguish

between scheduled and unscheduled grants, as the latter category is more liable to be manipulated retrospectively. I find that 46% of the options granted in 2020 are dated in February and March, the two months that were hit more heavily by the stock market crisis (see Figure 1). The share of unscheduled options is 70% and they exhibit the lowest CAR of the year. However, these results do not present significant differences with what is found for 2019. Therefore, the amount of total options and unscheduled options in these two periods does not allow to state that in February and March 2020 the firms that form the sample issued more unscheduled options by backdating them.

After controlling for the differences in the distribution of grants between the two years and throughout each year's months, I apply the parameter developed by Veld and Wu (2014) to estimate whether a given grant could have been backdated. As it is explained in further detailed in the methodology section, this measure assumes that options that present higher differences in abnormal returns before the grant date and after such date are more likely to be backdated, as they yield higher profits to the holder. The evidence I report is that, even though 2019 presented higher absolute number of options that can be classified as possibly backdated according to the above-mentioned parameter, the proportion among the two years holds, as approximately 10% of the options can be categorized as "backdated" both for the 2019 and the 2020 subsamples.

Moreover, I consider the patterns of the returns by plotting each of the two years' average returns in a (-30,+30) time window around the grant date (as can be found in Lie, 2005). I do so both for the actual returns and for the abnormal returns. The 2020 sample of actual returns exhibits many more similarities to previous studies on backdated options than the data relative to 2019. Indeed, it can be observed that after the grant date, the average actual returns decline steeply, but it seems that for the unscheduled sample the returns start rising again around ten days after such date. This evidence is in line with the assumption that it is more likely that the 2020 unscheduled stock options sample is more subjected to backdating.

Finally, I run five ordinary least squares (OLS) regressions on five measures of CARs using firms' and option grants' characteristics as independent variables. This analysis does not provide crucial evidence about firms' characteristics that increase the chances of options backdating. Nevertheless, by performing a chi-square test on the independent variables, I find that the explanatory variable that exhibits the highest statistical significance is the dummy February/March 2020, which is negatively correlated to all the CAR measures.

To my best knowledge, this is the first study that exploits the effects of the Covid-19 outbreak to investigate if this unpredictable crash influenced the stock options plans of US executives. Hence, this work contributes to the financial literature strands of corporate governance, as it addresses a phenomenon that can be incorporated in the framework of the Agency Theory, as well as the branch that has been described by Ritter (2008) as forensic finance.

The remainder of this paper is organized as follows: section two discusses the evidence brought up by previous studies, section three presents the hypotheses, in section four the data collection and the methodology implemented are described, section five illustrates the results, and finally section six concludes this work.

2. Theoretical Framework

2.1 Early Studies

Since the 1990s, stock options gained relevance as one of the main means to bound executives' personal wealth to firms' performances, as equity-based compensations are designed to align the interests of ownership and control (Jensen and Meckling, 1976). The exponential growth of this compensation mechanism occurred hand in hand with the emergence of misconducts of managers trying to pursue personal advantages by backdating their stock options (Bebchuk, 2009).

The analysis of such long-term incentive plans has brought previous researchers to elaborate two alternative hypotheses about their effects on corporate governance (see for example Larcker, 1983, and Defusco, Johnson, and Zorn, 1990). On the one hand, this kind of compensation plans could motivate managers to make better decisions. On the other hand, executives could try to use their inside knowledge to schedule positive announcements in accordance with their performance-based compensations, and vice versa.

The first study that tried to address this dilemma is Yermack (1997). Thanks to the executive compensation disclosure requirements introduced by the Securities and Exchange Commission (SEC from now on) in 1992, Yermack was able to analyze the stock price movements around the grant date of 620 stock options between 1992 and 1994. This allowed him to test whether executives influenced the decisions of their compensation committees to increase the value and reduce the risk of their compensations. The evidence presented in his study shows that the cumulative abnormal return in the 50 trading days after the CEO option awards is more than 2%. This suggests that managers could have manipulated the date of their stock options in order to benefit from the stock price increase related to the announcement of news concerning the operating improvements of the firm. This result has been only partially confirmed by subsequent studies (e.g., Aboody and Kazsnik, 2000, and Chauvin and Shenoy, 2001), since they either prove evidence of negative abnormal returns before the option award date or positive abnormal returns following that date.

This mixed evidence led Lie (2005) to formally hypothesize the possibility that the awards could be timed ex post, i.e., they could be backdated. By gathering a sample of 5,977 CEO stock option awards between 1992 and 2002 he finds strong patterns of abnormal returns surrounding the award date. The author gives particular relevance to the distinction between scheduled and unscheduled option awards, i.e., whether the stock option is granted every year around the same date. By running a logistic regression of the unscheduled,

scheduled, and unclassified awards he shows that unscheduled awards are more likely to occur after very low predicted returns and before high predicted returns. This pattern is particularly evident in the five-day window around the grant date (with p-values lower than 0.001), and it exacerbates throughout the sample period. The author explains these results by mentioning the ability of managers to refine this backdating method year on year. Similar results confirming the reversal pattern have also been found by Narayanan and Seyhun (2008).

Many following studies focus on the effects of the change in the reporting regulations for stock option grants made by the SEC in compliance with the Sarbanes-Oxley Act. From August 29, 2002, stock option grant recipients must disclose them on Form 4 within two business days after receiving the award. This provision reduced considerably the time frame in which executives could backdate their options, since before the legislative change this disclosure was not due until 45 days after the end of the company's fiscal year.

Heron and Lie (2007, 2009) and Narayanan and Seyhun (2008) find evidence that the above-mentioned provision effectively aided to dampen backdating. Specifically, Heron and Lie (2007) show that after the implementation of the Sarbanes-Oxley Act, 80% of the observed abnormal returns disappear, suggesting that they were mostly attributable to backdating. Although the pattern shows to be significantly curtailed from this provision, it has not completely disappeared, as many firms still violate the two-day filing requirement. The authors attribute this circumstance to the fact that in some cases backdating benefits overcome the consequences of such violation. Indeed, further research (Heron and Lie, 2009) estimate that 16.1% of a sample of 4,098 firms engaged in option manipulation between August 29, 2002, and the end of 2005.

2.2 Backdating Drivers

Financial literature has also been able to identify some of the drivers of backdating, proving that some firms' characteristics make this phenomenon more likely to occur. As many other authors (e.g., Brenner, Sundaram and Yermack, 2000; Carter and Lynch, 2001; Chidambaran and Prabhala, 2003), Heron and Lie (2009) report that firms that are small and have been publicly owned for a shorter time present higher percentages of backdated stock options. The authors add to the previous literature that companies that operate in the tech sector and have high stock price volatility also exhibit higher chances to incur in backdating. These findings have been confirmed by Veld and Wu (2014), who analyze the stock options of 5,398 companies between 1999 and 2007. They point out size, stock volatility and firm age to be the main drivers of option

backdating firms. Besides, this study shows that companies in which executives' options are out-of-the-money are more likely to be involved in backdating.

2.3 Negative Effects of Backdating

Although backdating presents convenient opportunities for executives and firms, it does not come at no cost. From late 2005, financial newspapers have brought the attention of the public eye on this phenomenon, leading to regulatory investigations from the SEC and the Department of Justice, as well as class-action lawsuits. The climax of this major scandal occurred with the publication of the Wall Street Journal first-page article of March 18, 2006, by Forelle and Bandler (2006). The Pulitzer-awarded authors singled out companies that systematically dated executives' option grants on the day with the lowest stock price of the fiscal year. The effects have been of such magnitude that several corporate executives were criminally charged, leading to infamous cases such as the one of Comverse Technology CEO Kobi Alexander escaping to Namibia. Huang and Lu (2010) argue that this sort of media attention and the later compensation disclosure provisions enacted in 2006 brought to the obsolescence of opportunistic timing practices such as backdating.

In addition to criminal charges and personal liability claims, the consequences borne by executives who committed (or allegedly committed) backdating have also showcased implications at their reputational level. One of the first studies that empirically addressed the effects of backdating scandals on top managers turnover is Bernile and Jarrell 2009. The authors prove that for those firms that experienced worse stock performances after a backdating scandal, a higher rate of management turnover positively influence shareholders' wealth. Ertimur, Ferri and Maber (2012) extend this analysis to outside directors, confirming that director turnover increases after backdating announcements with special regard to members of the compensation committee. Furthermore, they illustrate that after such news are released, directors also incur in voting penalties whose degree of severity depends on the responsibilities they are held accountable of. Finally, Efendi, Files, Ouyang and Swanson (2013) analyzed 141 firms that reported backdating revelations in 2005 and 2006, estimating that 36.2% of the firms involved in option backdating exhibit forced turnover of top executives (namely, CEOs and CFOs), nearly 3.5 times higher than the control group. In their study, backdating executives forced turnover is milden under two conditions, i.e., higher stock returns and whether the accused executive is the founder of the firm.

Empirical research has also provided evidence on the effects of option backdating news on firms' performances. Veld and Wu (2014) conduct an extensive analysis, distinguishing between accounting and market performance. The evidence they gather does not show any significant effect of backdating on operating performance, meaning that the decision to backdate CEO options does not affect accounting revenues. Similarly, backdated firms do not show to have statistically significant different market performances than non-backdated firms, excluding the hypothesis that such manipulation can lead to incentivize executives to take better decisions. Nevertheless, in a previous study, Bernile and Jarrell (2009) take a closer look at investors' reaction to backdating news involving 129 firms between January 1, 2004 and March 31, 2007. Even though they find that such revelations do not considerably affect firms' cash flows, investors- especially institutional ones- do assign a substantial weight to executives' integrity, having a high propensity to liquidate their participations in firms accused of options backdating. This is linked to large, negative abnormal returns and steep decline in equity value.

2.4 How Backdating Spread

Previous studies attempted to assess the reasons behind the spread of backdating, spanning among numerous hypotheses. Collins, Gong and Li (2009) provide evidence in support of Bebchuk and Fried (2009) managerial power theory, establishing that, due to the lack of independence between executives and compensation committees, top managers are able to exercise their influence for rent-seeking and self-serving purposes. The authors prove that backdating firms are characterized by a higher incidence of outside directors employed by the allegedly backdating CEO and a higher percentage of CEOs who are also chairmen of the board, leading to less independent boards and weaker governance settings with respect to a control group. The agency hypothesis is also supported by Bizjak, Lemmon, and Whitby (2009) who investigate the role of board interlocks in the spread of the practice of backdating, finding out that a firm is more likely to begin backdating if it has a director who is a board member of another firm that backdated its stock option grants. Veld and Wu (2014) conducted an extensive study that does not confirm the previous results. Indeed, by comparing the retention, incentive and agency hypotheses, they conclude that the latter is the less likely to explain the observed phenomenon, as backdating firms actually show to protect minority shareholders more efficiently. Conversely, this research provides evidence about the high significance of proxies that imply the tendency of

backdating firms to retain talented executives, consistently with previous studies that confirmed the retention hypothesis (e.g., Fang, 2010, and Armstrong and Larcker, 2009).

Instead of focusing on the intestine dynamics that could have caused the implementation of backdating practices, another strand of literature investigates the role of external auditors and legal consultants in the spread of this phenomenon. Heron and Lie (2009) examine a sample consisting of 9,081 unscheduled at-the-money grants between 1997-2005 dividing it in six categories according to the supervising auditing firms. These six variables are the five major auditing companies, the so called big-five, and a group containing all the other minor auditors. By conducting a multivariate analysis, they find that non-big-five auditing firms display a higher incidence of late filings (i.e., filings of form 4 that violated the two-day requirement introduced by the Sarbanes-Oxley Act), which are positively correlated with option manipulation. This pattern is consistent with the rationale that big auditing firms suffer higher reputational losses when involved in accounting scandals (as in DeAngelo 1981), and therefore perform stricter scrutiny. Mohliver (2019) analyzes the role of external auditors during the legislative change that made backdating shift from being not clearly outlawed to become illegal. His sample consisted of approximately 100,000 stock options granted to executives in the period 1996-2010, reporting that the influence of local auditors over the spread of this practice inverted as the institutional settings changed. Indeed, this study established that since the enactment of the Sarbanes-Oxley Act in 2002, auditors shifted from suggesting their clients to perform option backdating (aiding its diffusion) to extinguishing this practice. This reversal pattern consolidated after the backdating scandals were diffused by the media in 2006.

2.5 The Current Legal Status of Backdating

As it may be clear by the evidence reported above, the regulatory interpretation of backdating has changed in the last three decades. From being a liminal practice suitable to pursue fraudulent behaviors by managers but not legally punishable, it was declared illegitimate by SEC after the scandals that took place in 2006 (McWilliams, 2007). In July 2006, the U.S.regulator issued new executives compensation disclosure rules, prescribing that the total compensation of the top five managers must be reported in the annual proxy statement. According to Wiersema and Zhang (2013), there are two cumulative conditions to be met for backdating to be legal. Firstly, the firm must consider the additional revenues realized by backdating as a

compensation expense. Secondly, the company must disclose this practice to the SEC and to shareholders swiftly. These requirements evidently disincentivize the usage of option backdating in that they render this practice no longer convenient for executives.

3. Hypotheses Development

Since nowadays option backdating is an outlawed practice, it is not possible to verify its existence by analyzing publicly disclosed information. The only means to infer whether clues of its presence persist among companies is by using an unpredictable event to conduct a natural experiment. For example, in a Wall Street Journal article, Maremount, Forelle and Bandler (2007) report that the frequency of option awards duplicated in late September 2001, providing possible evidence of the exploitation of the market crisis that followed September, 11 2001 terrorist attacks.

From February, 24 2020 to March, 24 of the same year, Baker et al. (2020) report that the U.S. stock market experienced an unprecedented period of volatility due to the outbreak of the COVID-19 pandemic. Specifically, this time frame was characterized by a steep decrease in the market volume that led to a plunge of the S&P 500 Index of 33%. The authors link this never-experienced period of uncertainty to the implementation of nonpharmaceutical policy interventions (NPIs) adopted by the U.S. Government in order to contain the spread of the pandemic disease. To be consistent with the sample I collected, I consider the movements relative to the S&P 1500 Composite Index, which value dropped by 31.42% from February, 24 2020 to March, 23 2020 (the day with the lowest market capitalization of the year).

Figure 1.
Daily values of the S&P 1500 Composite Index in 2020

Note: This graph plots the daily value of the S&P 1500 Composite Index throughout the year 2020. It is possible to see the steep decrease the stock market that occurred during February and March.

The unpredictability of the abnormally low stock prices of this period leads me to hypothesize that if any backdating occurred during 2020, it must have exploited the time window around the day that presented the lowest prices.

H1. The months in which the highest number of options are granted are those that show the lowest abnormal returns .

In order to be able to infer that backdating possibly happened, it is also necessary to prove that the timing of such grants is not random. This leads to the second hypothesis.

H2. The stock options that yield the lowest abnormal returns in 2020 are unscheduled.

4 Data and methodology

4.1 Data Collection

I obtain a sample of the grant dates relative to top executives' Standards&Poors 1500 stock options awards from the Execucomp database. I restrict my sample for those options that result to be exercised in the period 2018-2020, which is the last year for which this database provides such information. I filter the data by selecting only those awards for which the grant date, the price and the market price on the day of the award are available. I furtherly restrict the sample by only selecting options that are granted at the money, i.e., those stock options for which the exercise price and the market price equal (as in Lie, 2005, and Heron and Lie, 2007). Finally, the sample is controlled for missing data, duplicates and outliers. Three records with missing CUSIP codes are removed and no duplicate observations are found. Following scholars from the field, outliers are removed if above or below 1.5 times the inter-quartile range (Schwertman, Owen and Adnan, 2004). I retrieve the market value of each firm from the CRSP database as the product of the average of the absolute value of prices of December times the number of the outstanding shares. Following Veld and Wu (2014), I use as a proxy for the age of the firm at the moment of the grant date the difference between the year of the grant date and the first year in which the Compustat database has information about the firm. This results in a cutoff of this variable, as the Compustat database was funded in 1950, while some of the oldest firms in the sample date back to the late 1890s. To build the top executive dummy variable I used the Execucomp database to mark those options that were granted to CEOs and CFOs and grouped them in a single subsample.

4.2 The Event Study Methodology

Following the main strand of literature about stock option backdating (see, among others, Lie, 2005, Heron and Lie, 2007-2009), I conduct an event study methodology, taking each grant date of the years 2019-2020 as an event date. I choose to stick to the traditional event study described in MacKinlay (1997). This method grounds on the Efficient Market Hypothesis (EMH) which assumes that stock prices efficiently incorporate all available public information (Fama, 1970). I examine several event windows, three of which centered around the event date and denoted as (-30,+30), (-20,+20), and (-5,+5), and other two that can also be found in Lie (2005) that consider the (-30,-10) and the (+10,+30) time frames. In all the descriptive statistics the event window considered is the (-20,20), as previous studies suggest that the majority of the effects

displayed by stock option backdating occur in the twenty days before and after the grant date. I consider an evaluation window of a total of 255 day that ends 46 days before the grant date, as in Veld and Wu (2014).

The expected returns are calculated using the Fama-French three-factor model:

$$E(R_{i,t}) = \alpha_i + r_f + \beta_1(r_m - r_f) + \beta_2(SMB) + \beta_3(HML) + \varepsilon \quad (1)$$

Where $E(R_{i,t})$ is the expected return for a security i at time t, α_I is the intercept, r_f is the risk-free rate, β_1 is the coefficient for r_m-r_f, which is the return on the market portfolio, β_2 is the coefficient for the small-minus-big factor (SMB), β_3 is the coefficient for the high-minus-low factor (HML) and ε is the error term. These factors are retrieved with a daily frequency by the Fama-French Portfolios WRDS database. I calculate the abnormal returns as the difference between the daily actual returns and the expected returns, as:

$$AR_{i,t} = R_{i,t} - E(R_{i,t}) \quad (2)$$

Where $AR_{i,t}$ is the abnormal return for a security i at time t, $R_{i,t}$ is the actual return for a security i at time t, and $E(R_{i,t})$ is the expected return for a security i at time t. Thereafter, the cumulative abnormal returns (CARs) are calculated by aggregating the daily abnormal returns over an event window:

$$CAR_i(T_1, T_2) = \sum_{t=T_1}^{T_2} AR_{i,t} \quad (3)$$

Where $CAR_i(T_1,T_2)$ is the cumulative abnormal return of a security i in the event window that starts T_1 days from the event and ends T_2 days after, and $AR_{i,t}$ is the abnormal return for a security i at time t.

4.3. Regression Analysis

To assess which firm characteristics affect backdating, an ordinary least square regression is performed for the whole sample. The (-30,+30), (-20,+20), (-5,+5), (-30,-10) and the (+10,+30) CAR estimates are used as the dependent variable in five separate regressions to assess whether the effects are more pronounced in certain event windows. The regression model used is:

$$\begin{aligned} CAR = \alpha &+ \beta_1 MarketValue + \beta_2 FirmAge + \beta_3 Agriculture + \beta_4 Construction \\ &+ \beta_5 FinancieInsuranceRealEstate + \beta_6 Manufacturing + \beta_7 Mining + \beta_8 Services \\ &+ \beta_9 TransportationCommunicationsCommodities + \beta_{10} WholesaleTrade \\ &+ \beta_{11} RetailTrade + \beta_{12} Scheduled + \beta_{13} Backdated + \beta_{14} TopExecutive + \beta_{15} 2019 \\ &+ \beta_{16} February/March\ 2020 + \varepsilon \end{aligned} \quad (4)$$

The explanatory variables relative to the industry are dummy variables and they are obtained by collecting each firm's Standard Industrial Classification (SIC) code from Compustat and aggregating them in the ten categories identified by the Department of Labor of the United States (see Appendix A for variables descriptions). Finally, a univariate test statistics is performed for each of the five regressions run in order to examine whether each predictor variable is independent of a response variable by using individual chi-square tests. The applied formula is:

$$Score_i = -\log(p - value_i) \quad (5)$$

Where i is each independent variable employed in the regression.

4.4 Options Classification

To classify the option grants as backdated, I implemented the parameter adopted by Veld and Wu (2014): if the difference between the AR after the event date and the AR before the event date, respectively the (+1,+20) and the (-20,-1) time frames, rank in the top 10% of the distribution the option is assumed to have higher chances of being backdated. Furthermore, in order to assess the likelihood of backdating I categorize the options following the strict criterion elaborated by Heron and Lie (2007), which establishes that an option can be classified as scheduled if its grant date falls in a (-1,+1) trading days time interval relatively to the previous year's grant date.

5. Empirical Results

5.1 Summary Statistics

Between the 2019 and 2020 the stock options issued decreased from 641 to 523. Table 1 exhibits the distribution of the observed option grants based on the dimension of the issuing firm. Being a sample retrieved from the 1500 S&P Composite Index, it is sensible that both for 2019 and 2020 the majority of the firms happen to have a market value larger than 10 billion US dollars. No significant difference can be observed in the size distribution between the two years taken into account.

Table 1
Size (Firm-wise)

Panel A: 2019		
Market Value (US$ million)	Number of Firms	Fraction (%)
<500	37	5.77
500-1,000	57	8.89
1,000-2,000	91	14.20
2,000-3,000	70	10.92
3,000-4,000	44	6.86
4,000-5,000	24	3.74
5,000-6,000	21	3.28
6,000-7,000	20	3.12
7,000-8,000	16	2.50
8,000-9,000	17	2.65
9,000-10,000	14	2.18
>10,000	230	35.88
Sample Size	641	100.00

Panel B: 2020		
Market Value	Number of Firms	Fraction (%)
<500	25	4.78
500-1,000	64	12.24
1,000-2,000	62	11.85
2,000-3,000	27	5.16
3,000-4,000	44	8.41
4,000-5,000	30	5.74
5,000-6,000	19	3.63
6,000-7,000	12	2.29
7,000-8,000	16	3.06
8,000-9,000	11	2.10
9,000-10,000	7	1.34
>10,000	206	39.39
Sample Size	523	100.00

Note: This table displays the firm size distribution, where the size is proxied as the mean market value of a firm during the last month of the relative year (i.e., December 2019 and 2020). The market value was obtained by multiplying the absolute value of a firm's stock for its outstanding shares. Panel A shows such distribution for the year 2019 and Panel B exhibits the results concerning the year 2020.

Table 2
Firms' Ages

Panel A: 2019

Years	Number of Firms	Fraction (%)
<10	69	10.76
10-20	198	30.89
20-30	302	47.11
30-40	8	1.25
40-50	19	2.96
50-60	30	4.68
>60	15	2.34
Sample Size	641	100.00

Panel B: 2019

Years	Number of Firms	Fraction (%)
<10	71	13.58
10-20	99	18.93
20-30	147	28.11
30-40	51	9.75
40-50	39	7.46
50-60	42	8.03
>60	74	14.15
Sample Size	523	100.00

Note: This table contains the distribution of the observed firms on the basis of the company's age. The age is proxied as the difference between the year of the grant relative to a certain firm and the first year in which information about the firm is available con Compustat. Panel A displays results for 2019, while Panel B presents the distribution for 2020.

From Table 2 it is possible to see that in 2020 a larger share of older firms granted options to their executives. This result may be controversial. Indeed, according to previous studies, the evidence indicates that younger firms are more prone to issue option grants in order to attract and retain more qualified executives, which indirectly leads to higher chances of committing option backdating. This would suggest a lower incidence of backdating in 2020. On the contrary, what I find is that the average age of allegedly backdating firms in 2019 is 21 years, while for 2020 it results to be 36 years.

Table 3 provides insights on the distribution of the option grants among ten industry classes. In both years the industry that issued the most stock options is manufacturing, which happens to be also the most likely to be affected by backdating, according to the Veld and Wu (2014) parameter. Indeed, in 2019 55.38% of the backdated options were linked to this industry. This share decreases considerably in the 2020 sample, but it still ranks first among all industries. This table also shows that both in 2019 and 2020 scheduled grants are less common than unscheduled ones, being them roughly 20% of the entire sample. This pattern- even if in different proportions- appears to be consistent among all the industry categories.

Table 3
Industries

Panel A: 2019

Industry	N Total Grants	Fraction (%)	N Sched. Grants	Fraction (%)	N Unsched. Grants	Fraction (%)	N BD Options	Fraction (%)	BD Options/ Total Options (%)
Agriculture Forestry and Fishing	0	0.00	0	0.00	0	0.00	0	0.00	0
Construction	5	0.78	1	0.63	4	0.83	1	1.54	20.00
Finance Insurance and Real Estate	66	10.30	13	8.23	53	10.97	2	3.08	3.03
Manufacturing	301	46.96	80	50.63	221	45.76	36	55.38	11.96
Mining	14	2.18	6	3.80	8	1.66	1	1.54	7.14
Not Classified	53	8.27	8	5.06	45	9.32	8	12.31	15.09
Retail Trade	48	7.49	11	6.96	37	7.66	4	6.15	8.33
Services	99	15.44	21	13.29	78	16.15	8	12.31	8.08
Transportation Communications and Commodities	36	5.62	11	6.96	25	5.18	2	3.08	5.56
Wholesale Trade	19	2.96	7	4.43	12	2.48	3	4.62	15.79
Sample Size	641	100.00	158	100.00	483	100.00	65	100.00	

Panel B: 2020

Industry	N Total Grants	Fraction (%)	N Sched. Grants	Fraction (%)	N Unsched. Grants	Fraction (%)	N BD Options	Fraction (%)	BD Options/ Total Options (%)
Agriculture Forestry and Fishing	1	0.00	0	0.00	1	0.24	0	0.00	0.00
Construction	4	0.01	1	0.92	3	0.72	0	0.00	0.00
Finance Insurance and Real Estate	55	0.11	12	11.01	43	10.39	3	5.77	5.45
Manufacturing	214	0.41	53	48.62	161	38.89	18	34.62	8.41
Mining	17	0.03	3	2.75	14	3.38	1	1.92	5.88
Not Classified	53	0.10	8	7.34	45	10.87	10	19.23	18.87
Retail Trade	45	0.09	6	5.50	39	9.42	10	19.23	22.22
Services	85	0.16	16	14.68	69	16.67	10	19.23	11.76

Table 3
Continued

Transportation Communications and Commodities	24	0.05	8	7.34	16	3.86	0	0.00	0.00
Wholesale Trade	25	4.78	2	1.83	23	5.56	0	0.00	0.00
Sample Size	523	100.00	109	100.00	414	100.00	52	100.00	

Note: This table provides the distribution of the sample among 10 categories of industries based on the aggregation of the Standard Industrial Classification (SIC) codes. Sched. is the abbreviation for scheduled, unsched. stands for unscheduled and BD means backdated. An option grant is classified as scheduled if its grant date falls in a (-1,1) interval of the previous year grant date. An option grant is classified as backdated if the difference between the abnormal return twenty days after the grant date and the abnormal return twenty days before the grant date ranks in the top 10% of the distribution. Panel A presents the results relative to 2019 and Panel B the ones of 2020.

Almost half of the grants that constitute the sample are destined to CEOs and CFOs, as can be seen in Table 4. In 2020 this ratio is even higher, with 286 out of 523 stock options granted to top executives. Consistently to the assumptions of this study, the average actual return of the backdated options granted to CEOs and CFOs is lower than the actual return of non-backdated options. Finally, in both years the month in which the most options are granted to top executives is February.

Table 4
Top Executive Option Grants

Year	Number of TEG	Fraction (%)	Average Actual Return TEG	SD	Number of Backdated TEG	Fraction (%)	Average Actual Return Backdated TEG	SD	Month with the most TEG
2019	269	48.47	0.002	0.027	24	45.28	0.001	0.034	February
2020	286	51.53	0.020	0.062	29	54.72	0.004	0.152	February
Sample Size	555	100.00			53	100.00			

Note: This table presents information about the options granted to top executives (TEG), namely Chief Executive Officers and Chief Financial Officers.

5.2 Testing the hypotheses

Figure 2 allows to compare the distribution of the option grants throughout the two analyzed years and to test the first hypothesis. Indeed, in 2020 the months characterized by a larger number of stock options issued are February and March, with 159 and 82 grants respectively. These two months are also the ones that exhibit the lowest average cumulative abnormal returns.

This suggests that the option grants of this year could have been dated retrospectively to February and March to make them become immediately in-the-money in order to realize a profit for the executives to which they were granted.

However, this result is milden by the outcomes brought up by previous literature about the tendency of corporations to assign stock options in the first quarter of each year. This pattern is confirmed by the results relative to 2019, in which the months with the highest number of option grants issued are, again, February and March. Regarding the returns relative to these months, it can be seen that this period exhibits way higher average cumulative abnormal returns compared to February and March 2020 (9.2% and 4.2% respectively). Nevertheless, this feature is probably influenced by the fact that there is a significant difference between the price movements in the beginning of the two years, as the abnormally low prices of February and March 2020 would have led to lower abnormal returns regardless the occurrence of backdating.

This mixed evidence might suggest that the high number of stock options issued in correspondence of a period of extremely low returns in 2020 could be merely accidental. To assess this, it can be useful to consider whether the grants of interest are scheduled or not.

Figure 2.
Monthly number of stock options granted and average CAR

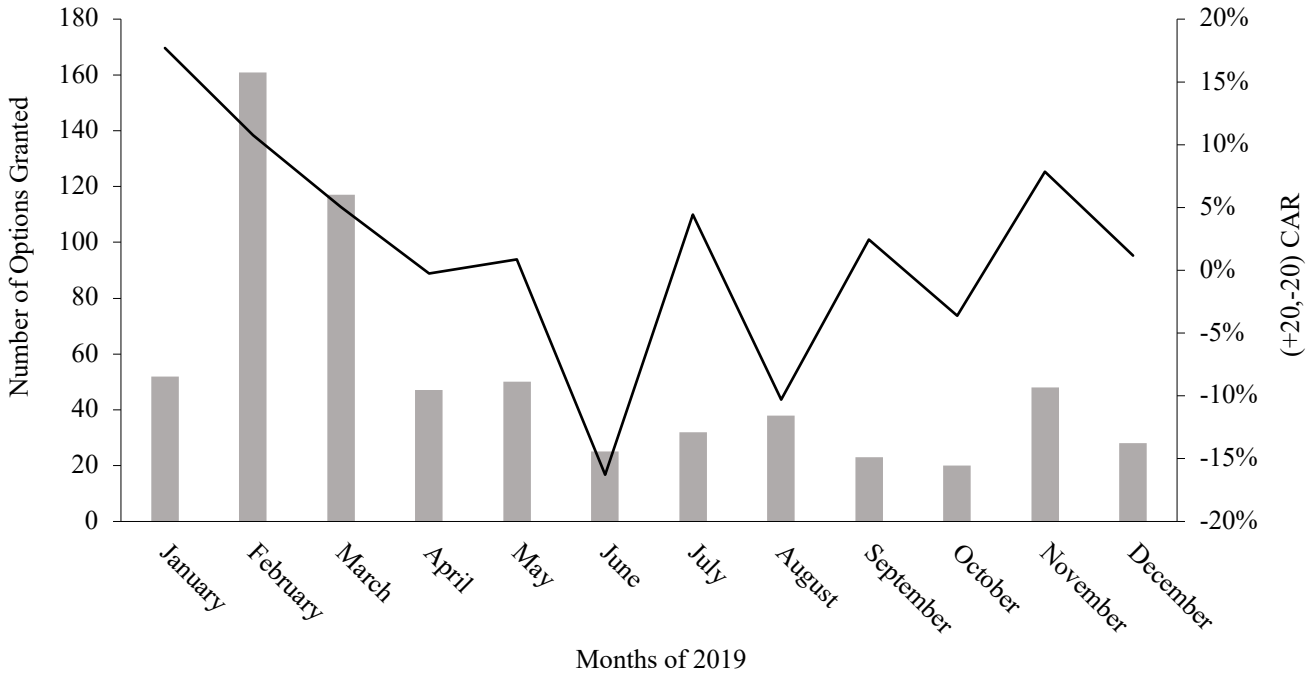
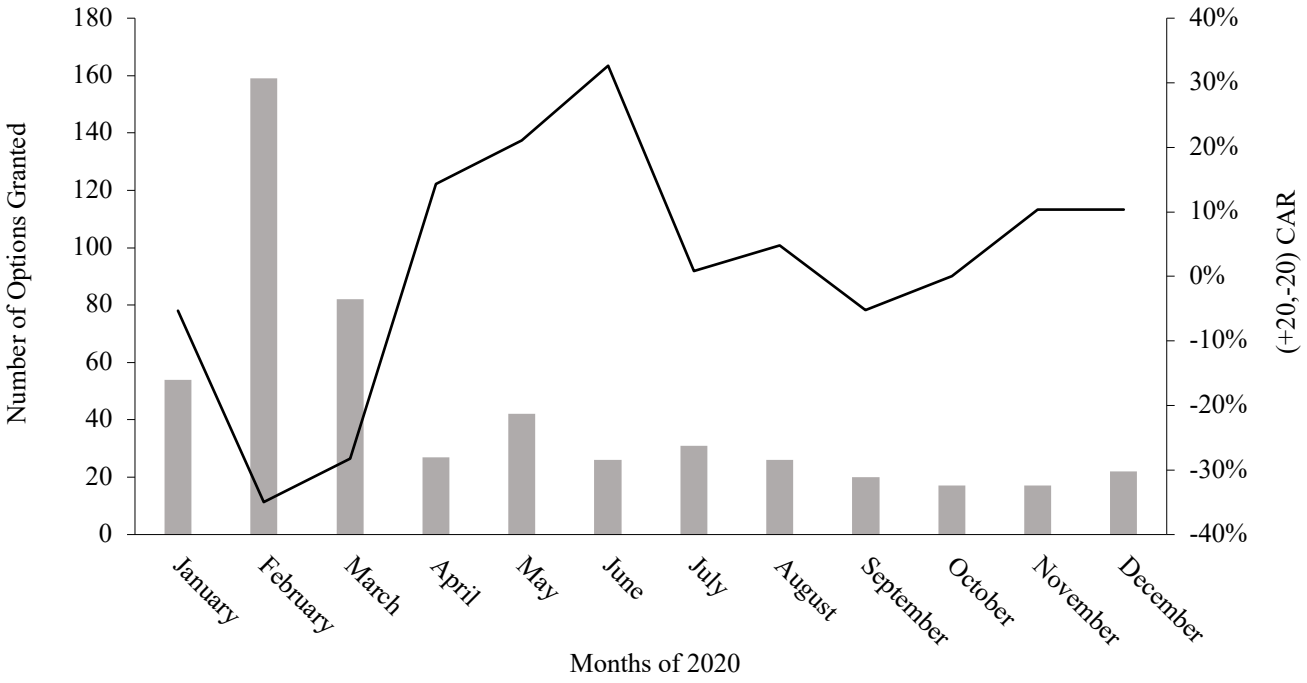


Figure 2.
Continued



Note: This figure displays the monthly number of stock options granted (the bars) and the monthly average (+20,-20) CAR (the lines) for the years 2019 (above) and 2020 (below). The left-hand ordinate axis tracks the number of grants and the right-hand ordinate axis indicates the level of the CARs in percentage.

Table 5 classifies the total sample of the option grants in scheduled and unscheduled options. As unscheduled grants are easier to be dated retrospectively, these results allow to infer the existence of a remarkable difference in the chances of committing backdating between the sample of 2019 and that of 2020. The assumptions of this paper predict that in the months of the stock market plunge, namely February and March 2020, a higher share of unscheduled options should be recorded. Instead, when comparing the percentages of unscheduled options of February and March 2020, respectively 67.92% and 74.39% of the two subsamples, no significant variation can be observed in comparison to the previous year. As a matter of fact, the unscheduled options registered in February and March 2019 correspond to 65.50% and 70.17%. In conclusion, this evidence seems to go against the idea that firms tried to exploit the stock market crash of 2020 to backdate stock options.

Moreover, the results in this table allow to verify the second hypothesis of this study, namely that the stock options that yield the lowest abnormal returns in 2020 are unscheduled. This hypothesis is not rejected by the data, as by comparing columns seven and nine of Panel B of Table 5 it is possible to observe that the lowest average cumulative abnormal returns are yield by the unscheduled stock options granted during

February and March 2020. As it is demonstrated in the last section of this chapter, by constructing a dummy variable that indicates if a grant is issued in these two months, it is possible to see that the influence of such variable is quite strong (ranges between -0.066 and -0.415 depending on the event window that is chosen) and it is statistically significant at conventional levels. The fact that these unscheduled grants could have been dated in any part of the year, but indeed happen to be concentrated in the period in which the holders of these options benefit of the highest possible returns may rise concerns about the possibility that these incentive-based awards were manipulated ex post facto.

Table 5
CARs of the total sample, of the scheduled stock options, and of the unscheduled stock options

Panel A: Total option grants issued in 2019

	Total option grants (N=641)			Scheduled option grants (N=158)			Unscheduled option grants (N=483)		
	N	Average CAR	SD CAR	N	Average CAR	SD CAR	N	Average CAR	SD CAR
January	50	0.139	0.144	22	0.167	0.147	28	0.117	0.140
February	160	0.092	0.153	52	0.083	0.122	108	0.097	0.166
March	114	0.042	0.126	34	0.053	0.108	80	0.044	0.149
April	45	-0.002	0.148	9	0.074	0.099	36	-0.021	0.153
May	48	-0.033	0.144	10	0.001	0.079	38	-0.042	0.156
June	29	-0.036	0.166	5	0.048	0.087	24	-0.048	0.172
July	35	0.044	0.165	7	0.013	0.122	28	0.053	0.176
August	37	-0.030	0.130	5	-0.122	0.092	32	-0.016	0.130
September	26	0.024	0.122	6	0.057	0.108	20	0.013	0.127
October	19	0.064	0.123	2	0.215	0.054	17	0.046	0.117
November	49	0.054	0.109	4	0.124	0.104	45	0.047	0.108
December	29	0.012	0.151	2	-0.081	0.198	27	0.019	0.150

Panel B: Total option grants issued in 2020

	Total option grants (N=523)			Scheduled option grants (N=109)			Unscheduled option grants (N=414)		
	N	Average CAR	SD CAR	N	Average CAR	SD CAR	N	Average CAR	SD CAR
January	54	-0.053	0.164	22	-0.053	0.164	32	-0.053	0.167
February	159	-0.350	0.272	51	-0.313	0.179	108	-0.367	0.306
March	82	-0.283	0.283	21	-0.272	0.196	61	-0.286	0.309
April	27	0.144	0.257	4	-0.030	0.017	23	0.174	0.268
May	42	0.210	0.257	7	0.121	0.338	35	0.228	0.239
June	26	0.326	0.491	0			26	0.326	0.491
July	31	0.009	0.184	1			30	0.005	0.186
August	26	0.048	0.223	1			25	0.046	0.227
September	20	-0.052	0.177	0			20	-0.052	0.177
October	17	0.000	0.173	0			17	0.000	0.173

Table 5 Continued							
November	17	0.103	0.236	1	16	0.086	0.232
December	22	0.104	0.194	1	21	0.102	0.199

Note: This table divides the total sample in scheduled and unscheduled option grants. An option grant is classified as scheduled if its grant date falls in a (-1,1) interval of the previous year grant date. The cumulative abnormal returns (CARs) reported are those relative to the (-20, 20) time window around the grant date. Panel A contains the data relative to 2019 and Panel B contains information regarding 2020.

5.3 Evidence on backdated grants

Following Veld and Wu (2014), I classify the option grants as backdated if the difference between the abnormal return after the event date and the abnormal return before the event date, respectively the (+1,+20) and the (-20,-1) time frames, belong to the highest decile of the distribution. In producing such subsample, I decided not to exclude scheduled grants for comparison purposes, even if for their nature this kind of grants are highly unlikely to be retrospectively dated. It results that roughly 10% of the total sample presents allegedly backdated stock options. This is a result consistent with what is found by previous literature. For example, Veld and Wu (2014) estimate that for a sample comparable to the one presented in this study relative to the period 1999-2007, the portion of possibly backdated grants is 17.16%. Heron and Lie (2009) distinguish between the pre-Sarbens-Oaxley Act in 2002 and the years following its ratification. They estimate that in the period 1999-2002, 23% of the options granted to top executives were manipulated. Instead, after the enactment of the above-mentioned regulation, i.e., in the 2002-2007 period, the percentage of backdated awards sensibly decreases to 10%.

Figure 3.
Monthly number of backdated stock option grants divided in scheduled and unscheduled

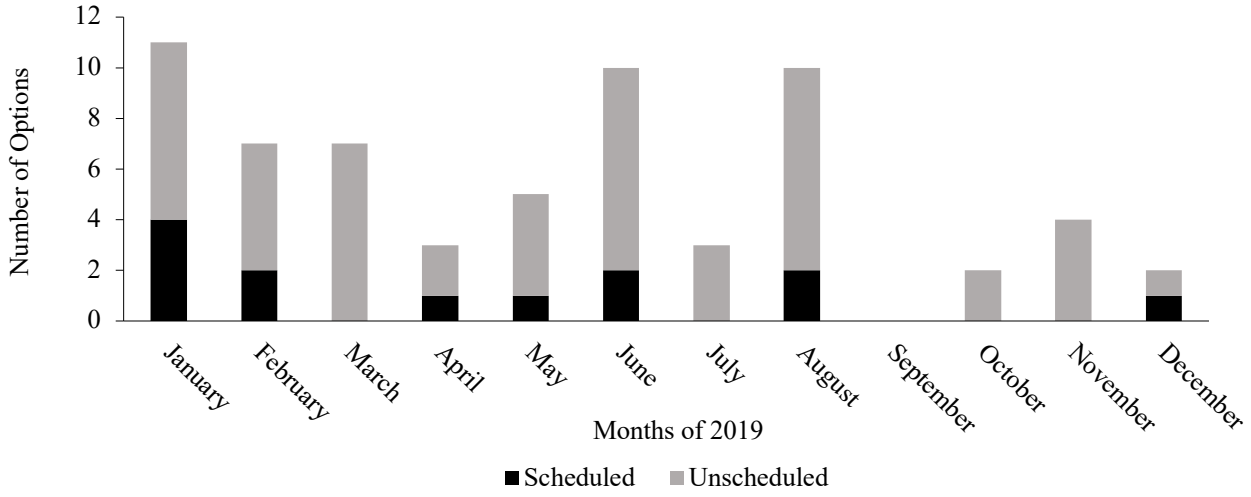
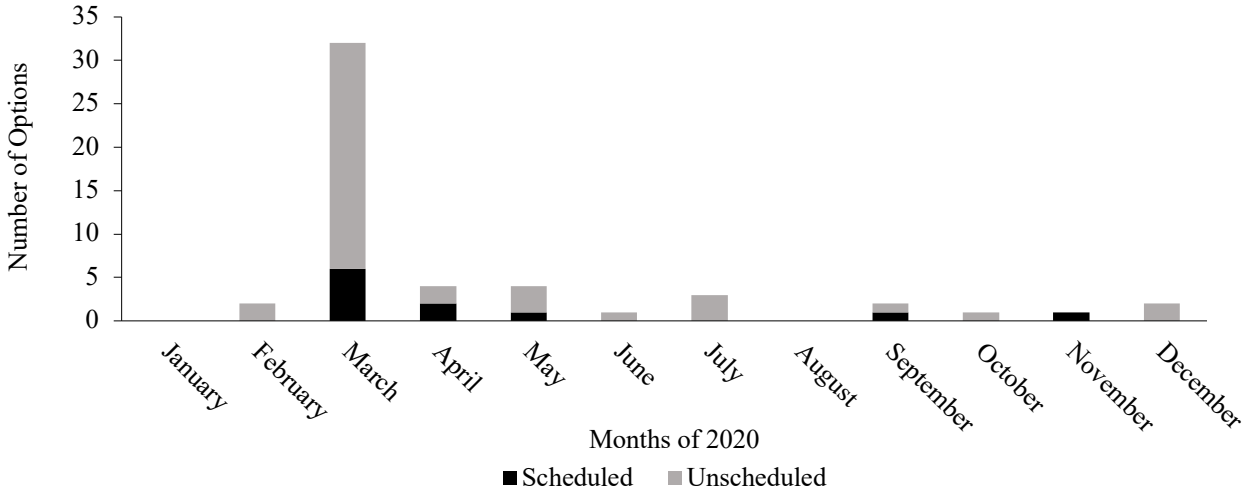


Figure 3.
Continued



Note: This figure shows the distribution of backdated stock option grants across the year 2019 (above) and 2020 (below). The black area of the bars refers to scheduled grants, while the grey area represents the unscheduled grants.

Figure 3 shows the monthly distribution of backdated options for the years 2019 and 2020. With the exception of November 2020, in each month the backdated options are mostly unscheduled.

One interesting insight provided by this elaboration is that, while in 2019 the backdated stock options are quite evenly spread, in 2020 61.54% of the grants classified as backdated were assigned in March. Again, it is important to remark that such result is highly influenced by the abnormally low stock prices recorded at the beginning of 2020, and that the parameter proposed by Veld and Wu (2014) could not incorporate the effects of such volatility.

Table 6
Backdated options

Panel A: Backdated Option grants in 2019

	Total option grants (N=64)			Scheduled option grants (N=13)			Unscheduled option grants (N=51)		
	N	Average CAR	SD CAR	N	Average CAR	SD CAR	N	Average CAR	SD CAR
January	11	0.288	0.479	4	0.233	0.277	7	0.320	0.584
February	7	0.363	1.039	2	-0.151	0.189	5	0.569	1.194
March	7	-0.084	0.163	0			7	-0.084	0.163
April	3	-0.089	0.218	1			2	-0.089	0.218
May	5	-0.744	1.429	1			4	-0.946	1.566
June	10	-0.438	0.994	2			8	-0.438	0.994
July	3	0.176	0.316	0			3	0.176	0.316

Table 6 Continued									
August	10	-0.317	0.881	2	-0.207	0.238	8	-0.329	0.933
September	0			0			0		
October	2	-1.063	1.228	0			2	-1.063	1.228
November	4	-0.062	0.076	0			4	-0.062	0.076
December	2	0.147	0.521	1			1		

Panel B: Backdated Option grants in 2019

	Total option grants (N=52)			Scheduled option grants (N=11)			Unscheduled option grants (N=41)		
	N	Average CAR	SD CAR	N	Average CAR	SD CAR	N	Average CAR	SD CAR
January	0			0			0		
February	2	0.604	0.453	0			2	0.604	0.453
March	32	-0.303	0.264	6	-0.281	0.210	26	-0.308	0.278
April	4	0.004	0.129	2	-0.029	0.025	2	0.037	0.212
May	4	0.179	0.235	1			3	0.095	0.199
June	1			0			1		
July	3	-0.246	0.481	0			3	-0.246	0.481
August	0			0			0		
September	2	0.054	0.404	1			1		
October	1			0			1		
November	1			1			0		
December	2	-0.146	0.147	0			2	-0.146	0.147

Note: Note: This table divides the subsample of backdated stock options in scheduled and unscheduled option grants. An option grant is classified as scheduled if its grant date falls in a (-1,1) interval of the previous year grant date. An option grant is classified as scheduled if its grant date falls in a (-1,1) interval of the previous year grant date. The cumulative abnormal returns (CARs) reported are those relative to the (-20, 20) time window around the grant date. Panel A contains the data relative to 2019 and Panel B contains information regarding 2020.

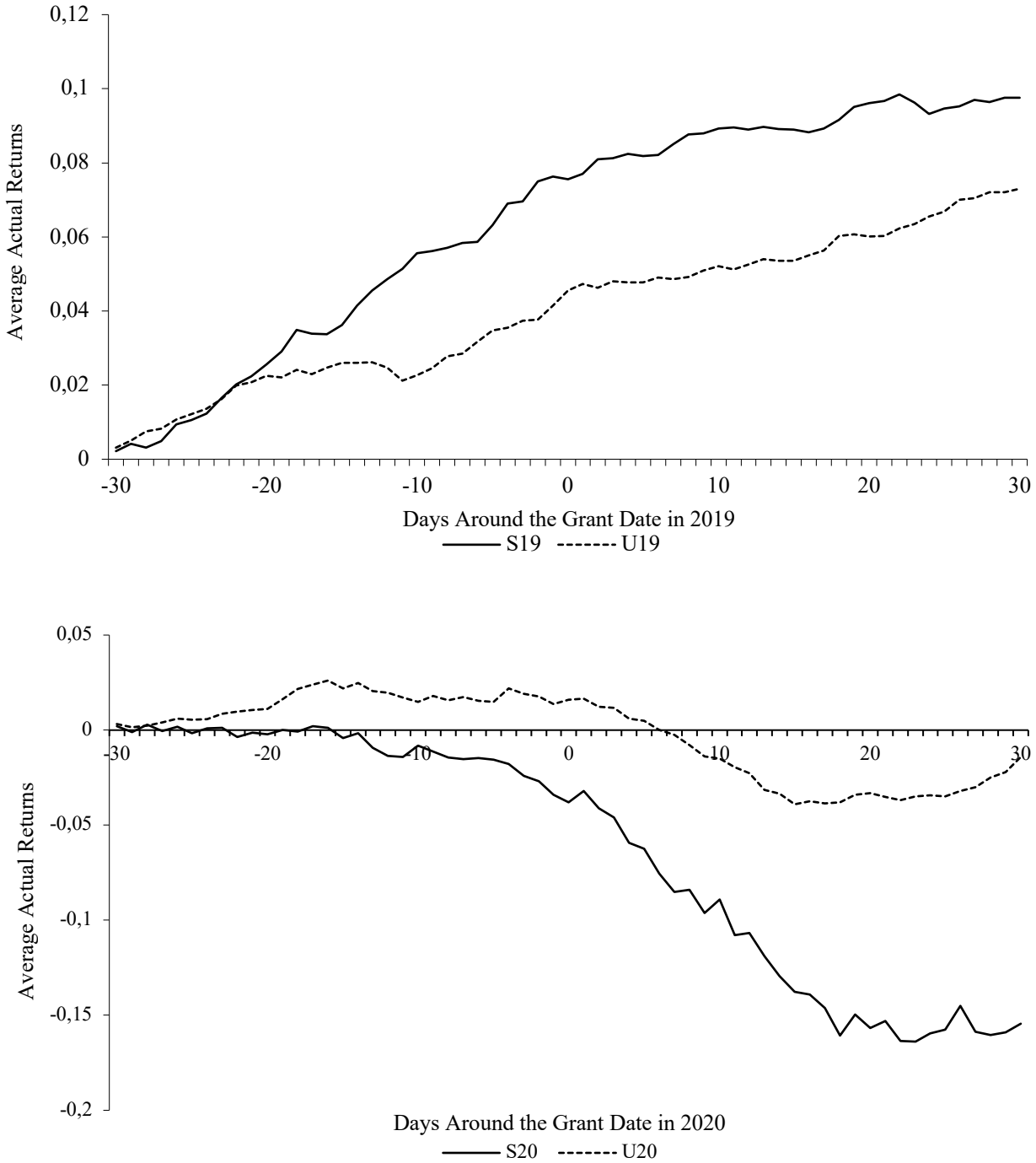
Table 6 presents the monthly averages of cumulative abnormal returns for the subsample of stock options classified as backdated. As can be seen in column nine of the Panel B of this table, the unscheduled backdated grants of March 2020 have the lowest average cumulative abnormal returns. This evidence is in line with the assumption of backdating taking place in the month of the stock market crash caused by the pandemic spread. Nevertheless, this result must be interpreted carefully, taking into account the high volatility and decreasing prices that characterize this month.

5.4 Patterns around the grant date

In this section, I replicate the results obtained by Lie (2005), investigating the return movements around the grant date. In presence of backdating, we should witness a plunge of the returns in correspondence

of the event date, i.e., the day 0, followed by steep increase in the days immediately after. This effect should be more pronounced for unscheduled grants.

Figure 4.
Daily averages of the actual returns around the stock options grant dates

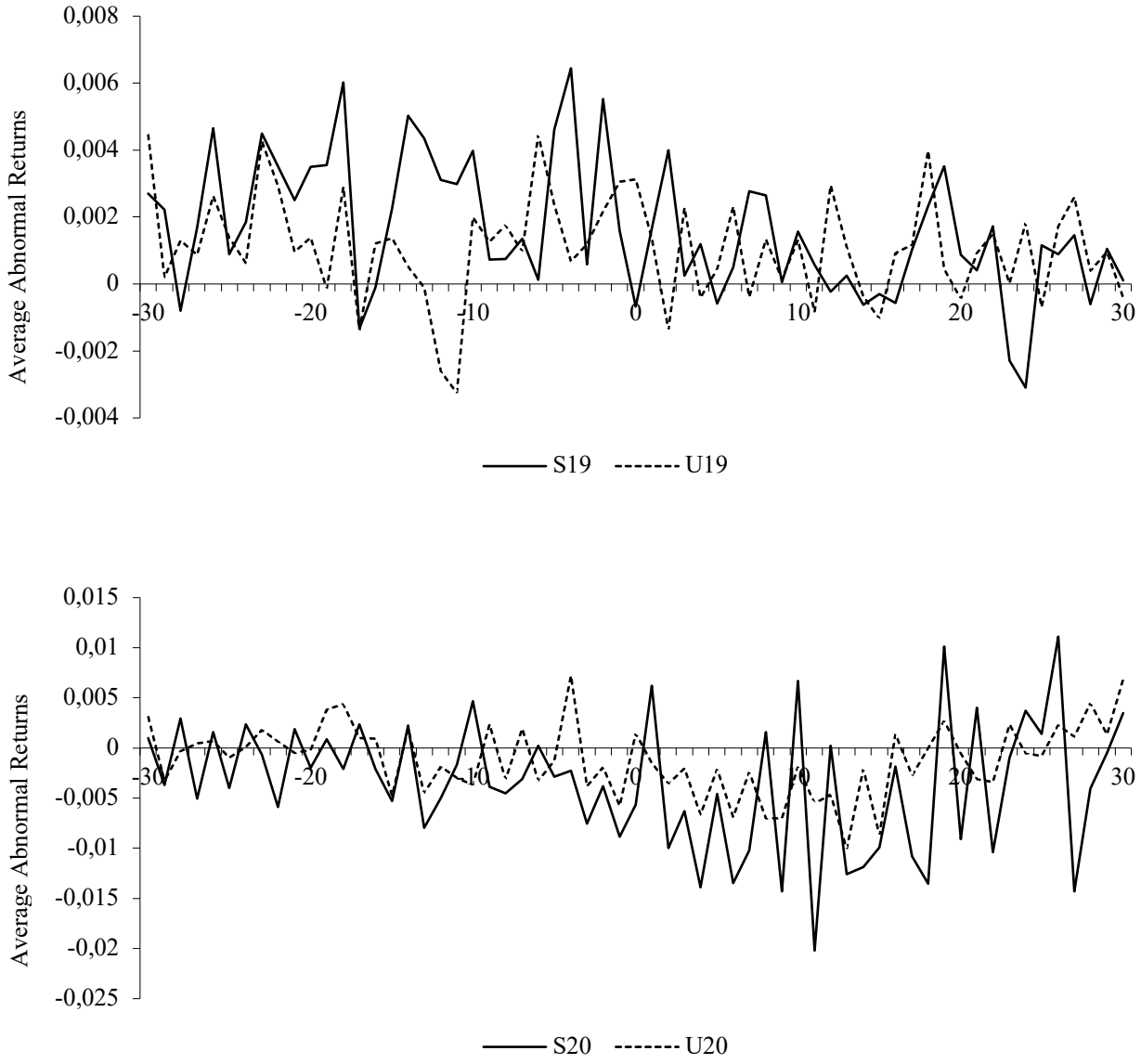


Note: This figure displays the averages of the actual returns 30 days before to 30 days after the observed grant dates for the year 2019 (above) and 2020 (below). The continuous line represents the scheduled grants, while the dotted line plots the unscheduled grants.

Figure 4 plots the averages of the actual returns and it is possible to see that the pattern descripted above is not as striking as in the mentioned study. What is worth to underline is that it seems that in the two years considered the pattern reverses. While in 2019 the returns steadily increase after the grant date, in 2020 they keep declining.

Actually, what can be observed in 2020 is similar to what found in Lie (2005), with the remarkable difference that the uplift movement seems to occur less swiftly and to be delayed of several days. What is in neat contrast with the previous literature is that in both years the pattern exacerbates for scheduled grants.

Figure 5.
Daily averages of the abnormal returns around the stock options grant dates



Note: This figure displays the averages of the abnormal returns 30 days before to 30 days after the observed grant dates for the year 2019 (above) and 2020 (below). The abnormal returns are calculated as the difference between the actual returns and the predicted returns obtained implementing the Fama-French three-factor model. The continuous line represents the scheduled grants, while the dotted line plots the unscheduled grants.

Figure 5 exhibits the same results for what concerns the averages of the abnormal returns. In this sample the movements appear to be rather unclear, exhibiting a larger volatility attributable to the predicted returns. As such fluctuations do not give place to any specific pattern, this evidence goes against the idea that any backdating has taken place during the two analyzed years.

5.5 OLS Regression

To assess which firm characteristics have the most influence on the likelihood of backdating, I run an ordinary least squares regression which results are reported in Table 7. As described in the methodology section, the dependent variables of this regression are five different estimates of the cumulative abnormal returns around the grant date. I assume that an explanatory variable positively influences the likelihood of backdating if it is negatively correlated to the CAR, as low returns are a key element to infer the occurrence of backdating.

As can be seen, Market Value does not exhibit any significant effect on CARs in any of the event windows considered. This result is not in line with the evidence found by Veld and Wu (2014), whose study addresses a firm's market value as a determinant feature to predict backdating. Furthermore, also Scheduled, Backdated, and Top Executive dummy variables show not to be correlated with the dependent variables. This outcome indicates how the parameter backdated could result not to be representative of the analyzed sample.

On the other hand, the industry variable Construction shows to be significantly negatively correlated to all the measures of CARs, being statistically significant at conventional levels in four out of five regressions. This result may suggest that industries that operate in the constructions industry are more likely to commit backdating. At the same time, it is important to remark that this evidence can be subject to the influence of the subsample of 2020, as this industry can be regarded as one of the most hit by the Covid-19 pandemic economic effects.

The independent variable that seems to have the strongest effect on all the measures of CARs presented in the regression is the dummy variable February/March 2020. According to the reported evidence, this variable shows to have very high explanatory power, being consistently negatively correlated to CARs in all the regressions and exhibiting low p-values.

Again, when looking at these results it is important to underline the influence that a period of high volatility and decreasing prices such that experienced in February and March 2020 inevitably leads to low CARs.

Table 7
OLS Regression

	(1)	(2)	(3)	(4)	(5)
Constant	0.1222*	0.093*	0.042*	0.041	0.050*
	(0.050)	(0.039)	(0.019)	(0.023)	(0.023)
Market Value	0.000	0.000	0.000	0.000	0.000
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Firm Age	-0.001	-0.001	0.000	-0.000	-0.001
	(0.001)	(0.001)	(0.000)	(0.000)	(0.000)
Agriculture	0.266	0.233	0.088	0.158	0.046
	(0.432)	(0.336)	(0.168)	(0.202)	(0.199)
Construction	-0.585***	-0.338**	-0.057	-0.165*	-0.298***
	(0.149)	(0.112)	(0.058)	(0.070)	(0.069)
Finance Insurance and Real Estate	-0.012	-0.004	0.003	0.019	-0.062*
	(0.058)	(0.045)	(0.018)	(0.027)	(0.027)
Manufacturing	0.037	0.026	0.002	0.029	-0,020
	(0.047)	(0.036)	(0.018)	(0.021)	(0.022)
Mining	0.036	0.019	0.004	0.050	-0.063
	(0.088)	(0.069)	(0.034)	(0.041)	(0.041)
Services	-0.004	0.000	0.013	0.008	-0.037
	(0.053)	(0.041)	(0.021)	(0.025)	(0.025)
Transportation Communications and Commodities	-0.036	0.011	0.025	0.027	-0.101**
	(0.070)	(0.054)	(0.027)	(0.033)	(0.032)
Wholesale Trade	-0.024	0.005	0.001	0.038	-0.087*
	(0.078)	(0.061)	(0.031)	(0.037)	(0.036)
Retail Trade	-0.091	-0.022	0.021	-0.043	-0.070*
	(0.062)	(0.048)	(0.024)	(0.029)	(0.029)
Scheduled	0.000	0.000	0.000	0.000	0.000
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Backdated	0.000	0.000	0.000	0.000	0.000
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Top Executive	0.000	0.000	0.000	0.000	0.000
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
2019	-0.026	-0.038	-0.018	-0.017	0.013
	(0.031)	(0.024)	(0.012)	(0.015)	(0.014)
February/March 2020	-0.415***	-0.405***	-0.132***	-0.114***	-0.066***
	(0.038)	(0.029)	(0.015)	(0.018)	(0.017)
Number of Observations	1164	1164	1164	1164	1164
Adjusted R-squared	0.138	0.181	0.077	0.051	0.049

Note: This table shows the results of multiple ordinary least squares (OLS) regressions on five estimations of CARs with different event windows. Column (1) presents the results for the (-30,+30) CAR, column (2) refers to the (-10,+10) CAR, column (3) displays the results for the (-5,+5) CAR, column (4) contains the results relative to the (-30,-10) CAR, and column (5) exhibits the coefficients for the (+10,+30) CAR.

Figure 6 allows to dive further into the results reported above by displaying the rankings of each independent variable employed in the OLS regression based on its statistical significance. The scores assigned are the negative logarithm of the variables' p-value, therefore a score of seven (or above) stands for a high significance at conventional levels, as it corresponds to a p-value lower than 0.001. As mentioned earlier, the two variables that show to be more significant are February/March 2020 and Construction.

Figure 6.
Scores of the significance of the explanatory variables of the OLS regression.

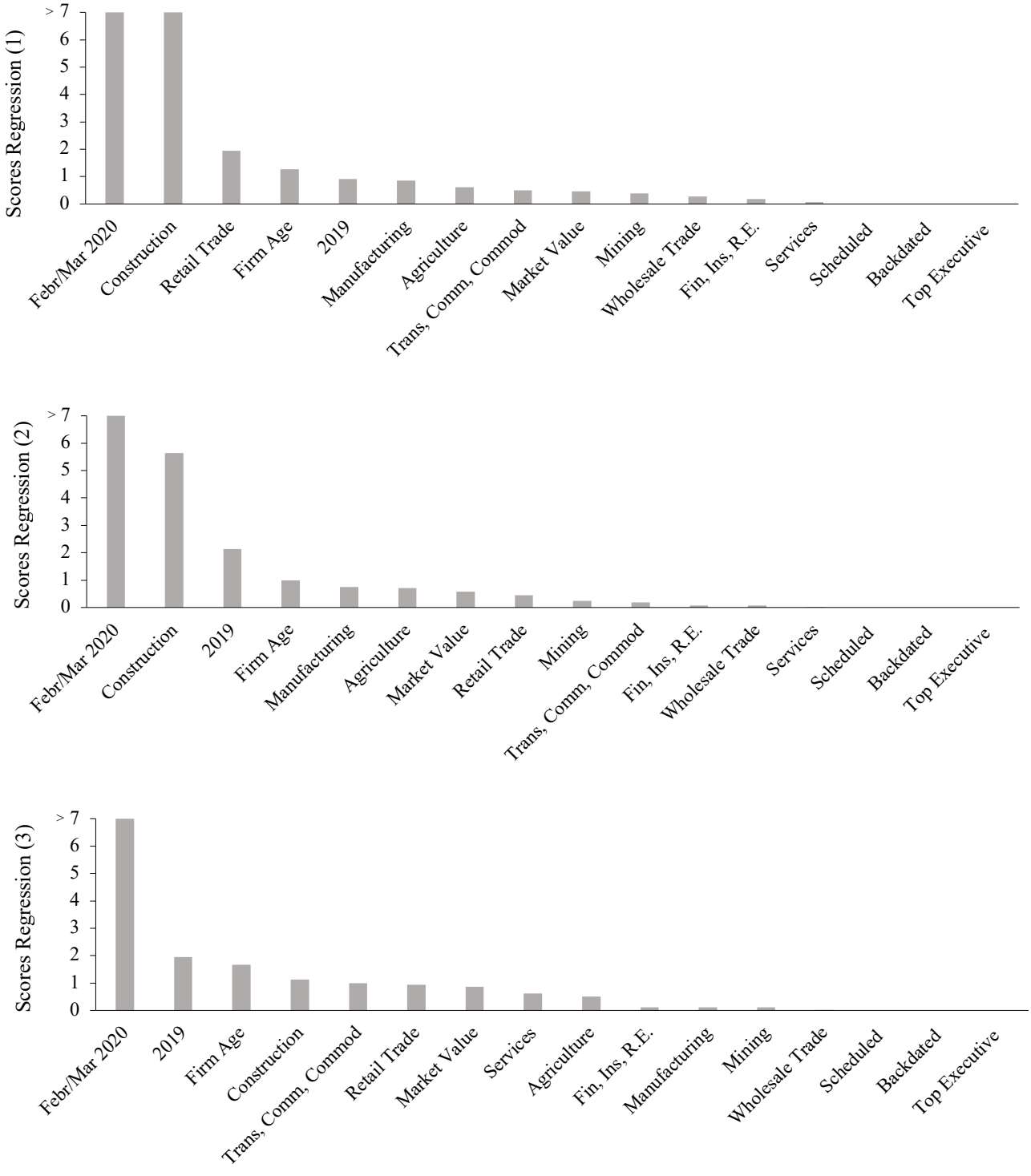
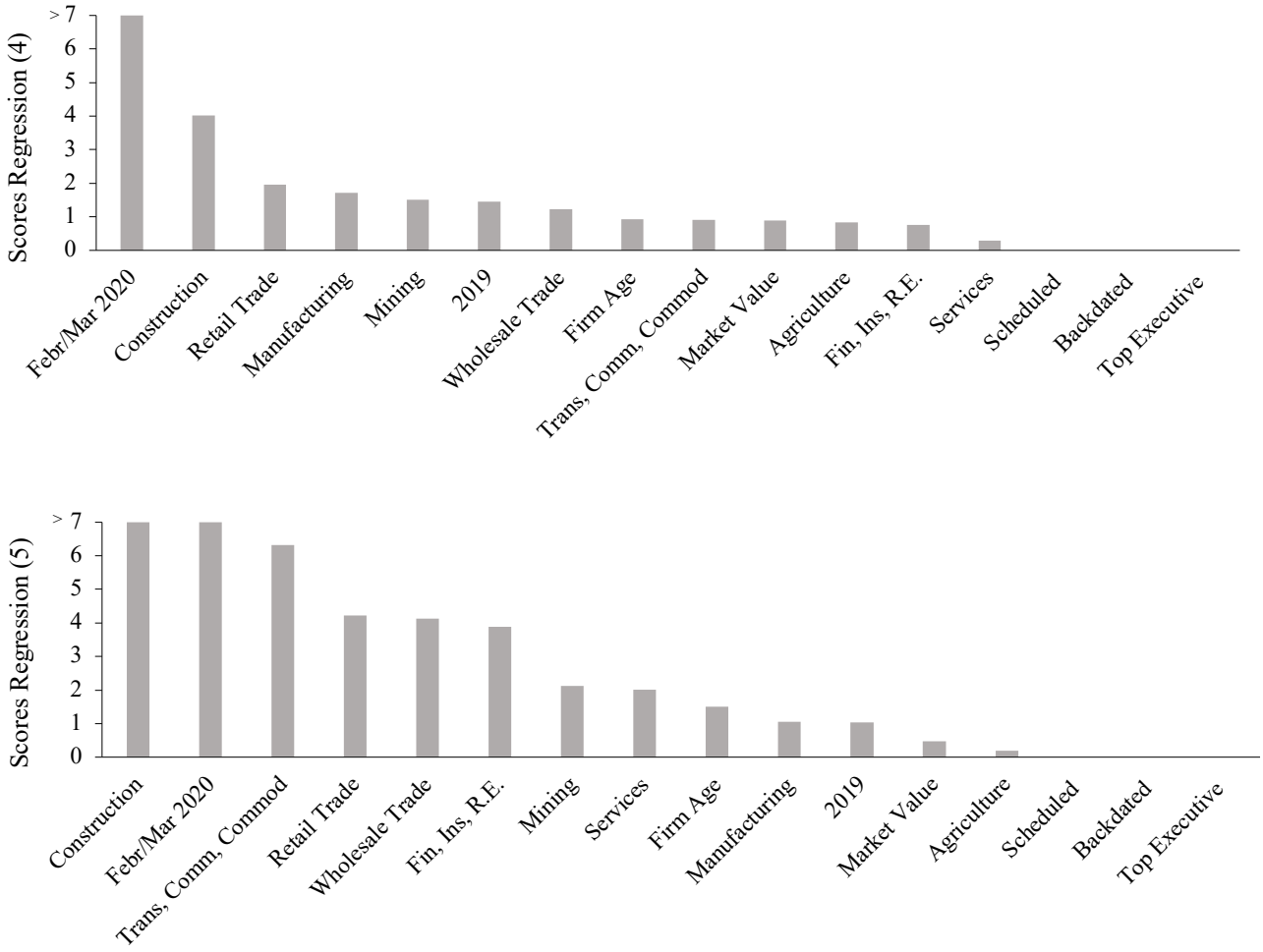


Figure 6.
Continued



Note: This graph illustrates the scores assigned to each independent variable in order to assess its independence to a response variable by using individual chi-square tests. The score equals the negative logarithm of the p-value of each variable.

6. Conclusion

This study examines the stock options granted to US executives during the period 2019-2020. By analyzing the characteristics of the awards and the return patterns around the grant dates, I collect evidence about the possible manipulation that involves the options granted during the first year of the outbreak of the Covid-19 pandemic. Specifically, through the comparison of the cumulative abnormal returns, the actual returns and the abnormal returns of 2019 and 2020, I aim to assess to what extent the options granted in 2020 are affected by a retrospective dating to the months of February and March 2020.

This research grounds on a sound strand of literature that examines the phenomenon of stock option backdating during the period of stock options manipulation scandals of the early 2000s. The contribution I attempt to give to such stream of research is to adapt these well-founded methodologies to more recent data. To do so I use the unpredictable stock market crash of 2020 to build a sort of natural experiment. What I find is that the distributions of the awards assigned during 2020 do not present significant differences from the ones relative to the previous year. Even though the distribution of the options granted in 2020 is highly concentrated in the months in which the Covid-19 outbreak displayed the strongest effects, i.e. February and March 2020, the same applies for the 2019 sample, in which these two months exhibit comparable amounts of option grants. In both years the option awards are in large part unscheduled, which means that it is not customary for these firms to assign them in that part of the year. The absence of a remarkable difference in the distribution of option grants between 2019 and 2020 rejects the hypothesis that the stock market crash of 2020 has been exploited to backdate executives' option grants.

Moving to the analysis of the cumulative abnormal returns of the grants issued in 2020, I find that the ones relative to February and March exhibit much lower CARs than those of any other period in the time frame taken into account. This means that the executives which awards were granted in that period benefit of very high profits. When looking at unscheduled awards, I demonstrate that this class of stock options systematically yield the lowest returns, consistently with the results provided by previous studies. In particular, the lowest cumulative abnormal returns are those of the unscheduled grants of February and March 2020 (respectively -36.7% and -28.6%). These findings do not reject the second hypothesis. The analysis conducted about the actual returns around the grant date shows that the pattern reverses from 2019 to 2020. The latter looks more compatible with the backdating assumption, as it resembles the results obtained by previous studies.

Finally, the results obtained by performing an OLS regression on difference measures of cumulative abnormal returns does not point out any significant difference between the time windows chosen for the estimation of the CARs. Moreover, this analysis shows that the two most statistically significant independent variables, namely February/March 2020 and Construction, are negatively correlated with returns.

This research is not immune from caveats. First of all, the fact that the outbreak of the pandemic coincides with the months in which typically the largest number of options are issued, i.e., February and March compromises the significancy of the results and creates endogeneity problems. Secondly, the OLS regression shows how the backdating parameter developed by Veld and Wu (2014) does not fit the sample. Actually, this parameter does not even incorporate the distinction between scheduled and unscheduled awards, leading to the very unlikely result that some scheduled option grants could be backdated. Lastly, the major shortfall of this work is that the investigation of backdating patterns through the analysis of CARs seems to be unsuitable to periods of high volatility and decreasing prices.

These limitations leave wide leeway for future research to develop new parameters that better fit the more recent data about option backdating. Moreover, when the relative financial data will be available, a similar study can be carried out by analyzing the return patterns that took place during the stock market dip that occurred in response to the Russian invasion of Ukraine. However, such study could suffer the same endogeneity issue that affects the present research. Indeed, the financial effects caused by the above-mentioned political crisis have, again, occurred during the months of February and March 2022.

In conclusion, this paper proves that the empirical evidence about the latest stock options grants suggests that some clues in the option grant distribution that have been identified by previous research as indicators of stock options backdating do not persist in the two years taken into account. Nevertheless, many differences in the return patterns go in the direction of possible backdating taking place in 2020.

Even though a lot has been done by the SEC and the US Department of Justice to contrast this unlawful practice, the last provisions that have been taken date back to 2006. This research suggests that the legal supervision of this phenomenon should be reassessed, with a special emphasis to the new options that financial shocks provide to executives to pursue self-serving behaviors.

References

Aboody, D. and Kasznik, R. (2000). CEO stock option awards and the timing of corporate voluntary disclosures. *Journal of Accounting Economics*, 29, 73–100.

Armstrong, S. and Larcker, D. (2009), Discussion of "The Impact of the Options Backdating Scandal on Shareholders and Taxes and the Backdating of Stock Option Exercise Dates". *Journal of Accounting and Economics*, 47(1-2), 50–8.

Baker, S. R., Bloom, N., Davis, S.J., Kost, K.J., Sammon, M.C. and Viratyosin, T. (2020). The unpredicted stock market impact of COVID-19. NBER Working Paper No. 26945.

Bebchuk, L.A. (2009). Pay without Performance: The Unfulfilled Promise of Executive Compensation. Cambridge, MA: Harvard University Press.

Bernile, G. and Jarrell, G.A. (2009). The impact of the option backdating scandal on shareholder. *Journal of Accounting and Economics*, 47, 2–26.

Bizjak, J., Lemmon, M. and Whitby, R. (2009). Option backdating and board interlocks. *Review of Financial Studies*, 22, 4821–47.

Brenner, M., Sundaram, R. and Yermack, D. (2000). Altering the Terms of Executive Stock Options, *Journal of Financial Economics*, 57(1), 103–28.

Carter, M. and Lynch, L. (2001). An Examination of Executive Stock Option Repricing, *Journal of Financial Economics*, 61(2), 207–25.

Chauvin, K. W. and Shenoy, C. (2001). Stock price decreases prior to executive stock option grants. *Journal of Corporate Finance*, 7, 53–76.

Chidambaran, N. and Prabhala, N. (2003). Executive Stock Option Repricing, Internal Governance Mechanisms, and Management Turnover. *Journal of Financial Economics*, 69(1), 153–89.

Collins, D.W., Gong, G. and Li, H. (2009), Corporate Governance and Backdating of Executive Stock Options. *Contemporary Accounting Research*, 26(2), 403-45.

DeAngelo, L. (1981). Auditor size and audit quality. *Journal of Accounting Economics*, 3, 183–200.

DeFusco, R.A., Johnson, R.R. and Zorn, T.S. (1990). The effect of executive stock option plans on stockholders and bond holders. *Journal of Finance*, 45, 617-27.

Efendi, J., Files, R., Ouyang, B. and Swanson, E.P. (2013). Executive Turnover Following Option Backdating Allegations. *The Accounting Review*, 8, 75-105.

Ertimur, Y., Ferri, F., and Maber, D. (2012). Reputational penalties for poor monitoring of executive pay: Evidence from option backdating. *Journal of Financial Economics*, 104, 118–44.

Fama, E. F. (1970). Efficient capital markets: A review of theory and empirical work. *The Journal of Finance*, 25(2), 383-417.

Fang, H. (2010), The Economic Rationale for Option Backdating: Incentive-based Explanations, Doctoral Thesis (Washington State University).

Forelle, C., and Bandler, J. (2006, March 18). The perfect payday. *Wall Street Journal*.

Heron, R. and Lie, E. (2007). Does Backdating Explain the Stock Price Pattern Around Executive Stock Option Grants? *Journal of Financial Economics*, 83(2), 271–95.

Heron, R. and Lie, E. (2009). What Fraction of Stock Option Grants to Top Executives Have Been Backdated or Manipulated? *Management Science*, 55(4), 513–25.

Huang, W. and Lu, H. (2010). Timing of CEO Stock Option Grants and Corporate Disclosures: New Evidence from the Post-SOX and Post-backdating-scandal Era. Working Paper (Canada: University of Toronto).

Jensen, C. and Meckling, H. (1976), Theory of the Firm: Managerial Behavior, Agency Costs, and Ownership Structure, *Journal of Financial Economics*, 3(4), 305–60.

Larcker,D. F. (1983). The association between performance plan adoption and corporate capital investment, *Journal of Accounting and Economics*, 5, 3-30.

Lie, E. (2005). On the timing of CEO stock option awards. *Management Science*, 51, 802–812.

MacKinlay, A. C. (1997). Event studies in economics and finance. *Journal of Economic Literature*, 35(1), 13-39.

Maremount, M., Forelle, C. and Bandler, J. (2007, March 7). Companies Say Backdating Used in Days After 9/11, *Wall Street Journal*.

McWilliams, J. N. (2007). Shock options: The stock options backdating scandal of 2006 and the SEC's response. SSRN working paper, accessed at http://dx.doi.org/10.2139/ssrn.1012082.

Mohliver, A. (2019). How Misconduct Spreads: Auditors' Role in the Diffusion of Stock-option Backdating. *Administrative Science Quarterly*, 64(2), 310–36.

Narayanan, M. and Seyhun, H. (2008). The Dating Game: Do Managers Designate Option Grant Dates to Increase Their Compensation? *Review of Financial Studies*, 21(5), 1,907–45.

Ritter, J. R. (2008). Forensic Finance. *Journal of Economic Perspectives*, 22, 127-147.

Schwertman, N. C., Owens, M. A., & Adnan, R. (2004). A Simple More General Boxplot Method for Identifying Outliers. *Computational Statistics & Data Analysis*, 47(1), 165-174.

Veld, C., Wu, B.H.T. (2014). What Drives Executive Stock Option Backdating? *Journal of Business Finance & Accounting*, 41(7), 1043-70.

Wiersema, M. F. and Zhang, Y. (2013). Executive turnover in the stock option backdating wave: The impact of social context. *Strategic Management Journal*, 34, 590–609.

Yermack, D. (1997). Good timing: CEO stock option awards and company news announcements, *Journal of Finance*, 52, 449–76.

Appendix A

Description of the variables employed in the regression analysis

- Market Value: this variable is obtained by multiplying the average of the absolute value of the stock prices of the last month of the relative year of a certain firm times the average of its outstanding shares in the same period. Both data are retrieved from the WRDS Compustat database.
- Firm Age: This is the difference between the year of the option grant relative to a certain firm and the first year in which the data about the firm is available on the WRDS Compustat database is available.
- Agriculture: This industry dummy variable expresses whether a certain grant is issued by a firm that operates in the agriculture industry. Such categorization is obtained by grouping the Standard Industrial Classification (SIC) codes according to what prescribed by the United States Department of Labor. All the following industry variable are built in the same way. This industry gathers the SIC codes from 01-09.
- Construction: This industry dummy variable groups the SIC codes from 15-17.
- Finance, Insurance, and Real Estate: This industry dummy variable groups the SIC codes from 60-67.
- Manufacturing: This industry dummy variable incorporates the SIC codes from 20-39.
- Mining: This industry dummy variable gathers the SIC codes from 10-14.
- Services: This industry dummy variable groups the SIC codes from 70-89.
- Transportation, Communications and Commodities: This industry dummy variable groups the SIC codes from 40-49.
- Wholesale Trade: This industry dummy variable clusters the SIC codes from 50-51.
- Retail Trade: This industry dummy variable units the SIC codes from 52-59.
- Scheduled: This dummy variable represents whether a grant can be classified as scheduled according to Heron and Lie (2009).
- Backdated: This dummy variable represents whether a grant can be classified as backdated according to the parameter developed by Veld and Wu (2014).
- Top Executives: This dummy variable expresses whether a grant is assigned to a CEO of a CFO.
- 2019: This dummy variable indicates whether a grant is issued in 2019.

- February/March 2020: This dummy variable informs whether a grant results to be issued in February or March 2020.