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Changes in stock price behaviour around dividend announcement date during Covid-19 crisis

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ABSTRACT

This thesis investigates the change in the investor's behaviour related to the Covid-19 outbreak, that appears in the stock price change around the dividend announcement date. Past research has demonstrated that abnormal returns can be observed around dividend announcement dates. Regardless of previous research, the latest crisis related to Covid-19 remains unexplored. Thus, the aim of this thesis is to study if there was an observable change in the behaviour of investors related the Covid-19 outbreak, that appears in the stock price change around the dividend announcement date.

This study uses a daily closing stocks prices of companies listed on the New York Nasdaq, the S&P 500 index and data provided by the World Health Organisation on the daily new Covid-19 cases in the United States of America as a basis for conducting an event study into the abnormal returns that occurred around dividend announcement dates. The results gathered are compared against the two environments - Covid-19 environment and the "normal" environment – based on the t-statistics and confidence levels they provide.

The results of the event study confirm that the announcement date had a varied effect to the stock price during the Covid-19 outbreak, compared to the period preceding the Covid-19 outbreak.

Keywords: Covid-19, dividend announcement, event study, abnormal returns, dividend signalling, investor behaviour

LÜHIKOKKUVÕTE

Magistritöö eesmärgiks on analüüsida kas aktsiahinna muutus dividendimakse välja kuulutamise päeva ümber Covid-19 pandeemia ajal ning sellele eelneval perioodil. Vaatamata sellele, et varasemad uurimused on kinnitanud, et ootusi ületav tootlus esineb dividendimakse välja kuulutamise päeva ümber, siis puudub ülevaade dividendimakse välja kuulutamise mõjust Covid-19 pandeemia ajal. Sellest tulenevalt on töö eesmärk uurida, kas investorite käitumises toimus Covid-19 pandeemia ajal muutus, mis on vaadeldav aktsaihinna muutustest dividendimakse väljakuulutamise päeva ümber.

Uurimuse sooritamiseks kasutab magistritöö autor New York Nasdaq'il noteeritud ettevõtete aktsiahindasid, S&P 500 indeksi hindasid ning Maailma Tervishoiuorganisatsioon päevaste nakatumiste andmeid Ameerika Ühendriikides. Andmete analüüsimiseks kasutas autor sündmusuuringut, et tuvastada olukordasid, kus ootusi ületav tootlus on märkimisväärne. Saadud tulemusi võrdles autor kahe perioodi vahel – Covid-19 keskkond ning "tavaline" keskkond – kasutades analüüsiks t-statistikat.

Magistritöö tulemusena tuvastati, et aktsiahinna muutus dividendimakse väljakuulutamise päeva ümber Covid-19 pandeemia ajal ning sellele eelneval perioodil oli varieeruv.

Märksõnad: Covid-19, dividendimakse väljakuulutamise päev, sündmusuuring, ootusi ületav tootlus, dividendide signaliseerimisteooria, investori käitumine.

INTRODUCTION

The research at hand provides insights towards how investors reacted to the crisis related to Covid-19 pandemic. The author set out to find the change in the behaviour of investors related the Covid-19 outbreak, that appears in the stock price change around the dividend announcement date. The author based his research around two of the following questions:

1) Is the change in stock price around the dividend announcement date during the Covid-19 outbreak similar to period preceding the Covid-19 outbreak?
2) Was the reaction of investors to the dividend announcement date during the Covid-19 outbreak more positive or negative if compared to the period preceding the Covid-19 outbreak?

To answer these questions the thesis tested the following hypothesis:
H0: The dividend announcement date has the same effect to the stock price during the Covid-19 outbreak as in the period preceding the Covid-19 outbreak.
H1: The dividend announcement date has the varied effect to the stock price during the Covid-19 outbreak if compared to the period preceding the Covid-19 outbreak.

The method chosen by the author for investigating the research questions and testing the posed hypothesis is the event study. The event study is conducted in Stata statistical software using the historical market data available on the New York Nasdaq website. Additionally to the historic market data the author also incorporates the Covid-19 case data provide by the World Health Organisation on the United States of America into the research in order to distinguish the moments when the market might have been affected by the Covid-19 outbreak.

The importance of this research is related to the lack of understanding of investor behaviour around the dividend announcement date in changing market conditions. Although there is a considerable amount of empirical evidence to suggest that stock prices do react to the dividend announcement events by producing abnormal return there is little information on how the stock price reactions

vary in between stable market conditions and highly uncertain market conditions. Also, the recency of the Covid-19 outbreak has provided sample data for which the change in stock price around the dividend announcement date has not been yet been investigated to the knowledge of the author.

Chapter one covers the theory behind the relationship between dividend policy and stock prices, research on investor behaviour to new information and concludes with an overview of previous empirical studies that have been performed in this field. Within this overview the dividend signalling theory is covered in its various aspects as well as other theories that could potentially explain investor behaviour in market conditions where the outlook on the future is uncertain. Chapter two outlines the data and method used in the conducted research and provides an overview of the criticism the chosen research method is open to. The main body of this chapter covers the consideration for alternative methods that could have been used for the study, the details of the sample data and its restrictions as well as the details on how the event study was structured. The third chapter outlines the findings of the author and provides recommendations for future research into the subject.

I would like to thank my supervisor, lector Kaido Kepp for providing his insights on all matters related to the research and by being a proactive supervisor through constructive criticism and helpful comments. I would also like to also thank my fellow students – Elina Tasa, Karl Kristjan Soidla and Lauri Vunk for motivating me.

1. THE RELATIONSHIP BETWEEN DIVIDENDS AND STOCK PRICE

1.1. The effect of dividends on stock price

Dividends are payments that companies can make to their stockholders in order to distribute the profits of a company. As Friedman's (1970) Stockholder theory states the purpose of a company is to maximise the returns to its stockholders then dividends can be considered as a tool for distributing the returns generated (Friedman, 1970). However, the returns for stockholders are not measured only in returns distributed, but also in the value that the ownership in the company itself holds. This value is reflected in the stock price of the company which is a reflection of the returns that a company is able to generate for its stockholders through the company's lifetime or more accurately the markets perception of the returns that a company is able to generate. Therefore, the question becomes what the relationship between dividends and the measure of potential future returns is i.e., the stock price of a company. The following in this chapter will outline the main theories covering this matter and how the two, dividends and stock prices, are related to one another.

Miller and Modigliani (1961) proposed in their research on dividend policy, growth, and the valuation of stocks that the dividend policy of a company has no effect on the stock price of a company. The research was based on the understanding that there are no taxes or bankruptcy cost and that the markets are efficient. Meaning that all the information about a company is available to all market participants at the same time and the market participants make rational decisions based on this information. However, they did agree that dividends could have a signalling effect. (Miller & Modigliani, 1961)

Under the signalling hypothesis, dividends could have an effect on the stock price of a company as managers can use dividends to signal to the market their perception of things to come. The

premiss of the theory is based on the asymmetry of information that is created between the managers of a company and the less informed market participants. Meaning that as dividends increase the free cash flow available for the firm also becomes smaller. This places financial constraints on the resources of a company for future growth. Therefore, managers should only increase dividends in circumstances where they are confident in the sustainable growth of the company's future earnings. As a result, investors can consider increase in dividends as a sign of higher earnings in the future. Based on this there should be a positive relationship between dividend changes and the stock price reaction in the markets. (Bhattacharya, 1979)

In his research Lintner (1956) also found that managers tend to avoid making changes to the dividend rates if the rates might have to be reversed in the future. This due to the fact that managers are looking to minimize adverse stockholder reactions. As a result, managers will not consider increasing dividends unless the earnings of the company can sustain the increased pay-out. This means that companies are primarily concerned with the stability of dividends as managers find that the market places a premium on firms with that employ a stable dividend policy. Lintner also observed that earnings were the most important determinant for any change in dividends as management had to rationalise the motivation behind their actions to stockholders. From all the variables researched Lintner found that earnings were the most tangible (Lintner, 1956). However, Lintner did not establish a model for describing the relationship between the stock price and the dividend pay-out, but rather sought to establish and understanding on corporate dividend policy.

Since then, there have been multiple authors who have researched the signalling theory and how this translates to a change in the stock price. The best known are those of Bhattacharya (1979), Miller and Rock (1985), and John and Williams (1985). The foundation of these models is that companies will use dividends to signal their future outlook, where an increase in dividends is a signal for a better future outlook, and a decrease suggests *vice versa*.

The first model put forth by Bhattacharaya (1979) used a two-period model in which managers try to maximise the returns to their stockholders as they are appointed by the stockholders. At time zero managers make investment decision towards projects with an expected profitability. Also, at time zero managers signal to the market on the future outlook by locking in a dividend pay-out. At time one the investments are realised and from the proceeds the company performs dividend pay-outs to the stockholders. Managers avoid setting the signal too high due to the fact that if the

company is unable to meet its dividend commitment to stockholders, they must resort to outside financing to uphold their obligations. This obligation is costly, and managers strive to avoid it. This also presents itself as a barrier for false signals as the signal would prove too costly for weak performing companies to imitate on a regular basis. At the same time managers strive to set the dividend policy as high as possible in order to maximise the returns to stockholders in the form of an increase in the stock price. (Bhattacharya, 1979)

The main criticism of this models provided by Michaely and Allen (2001) is related to the cost of dividends as a signal. Namely as companies have the option to use less expensive signals in terms of taxes such as the stock buyback then why would companies choose the use dividends as a method for providing signals to the market (Allen & Michaely, 2001). Also, in this case managers would reset the dividend pay-out level for each consecutive period and as such the dividend pay-outs would not remain stable throughout time.

The model developed by Miller and Rock (1985) was also a two-period one. At time zero managers make investment decision towards projects with an expected profitability. However, at this time stockholders do not receive information on the profitability. At time one investments are realised and from the proceeds the investment is used to pay out dividends as well as to finance future investments. Both levels are unknown to the stockholders. The model assumes that this cycle continues, and the returns of each period's investments are correlated to one another. A poorly performing company might be able to imitate a strong company by slashing investments and propping up dividend payments. However, this remains unsustainable in the long run for the poor performers since lower investments would result in lower absolute returns. Due to this the strong performers should set a dividend level high enough where poor performers are unable to provide false signals. (Miller & Rock, 1985)

Although the model was an improvement over the model put forth by Bhattacharaya (1979) as the model addresses toa degree the question of why managers trying to keep the dividend pay-outs stable the core criticism remains. Why would companies choose the use dividends as a method for providing signals when stock buybacks would result in lower personal taxes to investors?

The importance for the consideration of taxes in dividends was brought out by Brennan (1970) as he explained that discounted after-tax cash flows can be used to determine the value of a company

and hence the stock price. Due to this the higher taxes on dividends compared to capital gains should concern investors in their preference (or lack of preference) towards receiving dividends over capital gains via stock repurchases (Brennan, 1970). Nevertheless, research conducted by Blume (1980) showed that individuals prefer increased dividends with a corresponding reduction of retained earnings when tax considerations might suggest the opposite showing that the question of dividends and stock price reaction is not captured solely through tax considerations (Blume, 1980).

The later model presented by John and Williams (1985) took into consideration the effect taxes could play. More precisely the model addressed the main criticism of models presented by Bhattacharaya (1979) and Miller and Rock (1985) as the model does not ignore the fact that stock buybacks could prove more attractive to investors if taxes are taken into consideration. The foundation of the model is based around the liquidity needs that companies have and stock issuing's as a potential avenue to meet these liquidity needs. Meaning that if a company needs to raise capital and chooses to do so by way of selling stocks it is in the best interest of the company to sell as little of their holdings as possible. The only means of doing so is through achieving a higher stock price at the time of the sale. As managers know the true value of the company opposed to investors due to information asymmetry then dividends prove a valuable tool in providing an indication when a company is undervalued. As a result of issuing dividends that are taxed the market will distinguish this as a signal of strength and the stock price will rise. In turn the company has to issue less stocks to meet its liquidity requirements. (John & Williams, 1985)

In this situation the taxes are an important part as poorly performing companies would not aim to imitate strong performers as there is little to gain due to the fact that holding more of an overvalued stock is less desirable to holding more of an undervalued stock. Also issuing dividends remains more costly and poor performers would benefit rather from stock buybacks then dividends due to the cost on taxes. (John & Williams, 1985)

Albite the issue of taxes is addressed with this model it still remains open to criticism. In an environment of negative interest rates why would companies choose to meet their liquidity needs through the issuance of stock. Also, the longevity of the model remains under question (Allen & Michaely, 2001). As Linters research showed companies strive to sustain a dividend level rather

than signal according to the requirements of the company then the question becomes why aren't dividend amounts constantly changing?

Aside to the formerly mentioned three most commonly known dividend signalling models there have been numerous more recent additional models developed where a large part of them remain open to the criticism brough out earlier. However, Allen *et al* (2000) in their research put forth a model that directly tackled the criticism of taxes and companies desire to sustain stable dividend payments. In their work they proposed that investors can be clustered into two distinct categories, "untaxed institutions" and "taxed individuals". The idea they put fourth is that there is a considerable number of investors (public and corporate pension funds, colleges and universities, labour unions, foundations, etc.) who are exempt from taxes. The underlying characteristic for these, aside to tax exemptions, is that due to their scale they are incentivised to perform due diligence to find out whether a particular firm is well run or poorly managed, this compared to the average taxed individual. As a result, management employee's dividends to signal to the untaxed institutions of their quality. Poor performing company are not attracted to imitate this method as it would increase the likelihood of their true value being revealed since the untaxed institutions are more prudent in performing *due diligence*. As for dividend smoothing, they argue that the untaxed institutions are the type of clientele to panelise companies for not sustaining a stable dividend policy (Allen, Bernardo, & Welch, 2000). The main criticism for this model is the fact that it does not follow the efficient market hypothesis and finds that certain market participants are not taking account all the available public information when making their decisions.

All of the four forementioned models have focused on the relationship brought out by Lintner where the decision of changes in dividends is directly linked to the future earnings of a company. However, Grullon *et al* (2002) presented a risk related explanation in the form of "maturity hypothesis." In it they argue that as companies mature their investment opportunities shrink and their established earning streams become more stable. This translates into a decline in systematic risk. This dynamic creates a situation where less resources are required for investments into growth leaving the company with more free cash flow. As a result, companies increase dividends partly to avoid agency conflicts and also to provide an indication to the market that the company has matured. In this model the increase in dividends translates to positive news for investors in situations where the decline in risk outweighs the message of lower investment opportunities. (Grullon, Michaely, & Swaminathan, 2002)

The source of the agency conflict mentioned by Grullon *et al* is from the research of Jensen and Meckling (1976) who proposed that dividends could be used as a mechanism to reduce costs resulting from the principal-agent relationship. The premiss of the theory suggest that investors (principals) should prefer dividends over retained earnings as excessive cash might tempt managers (agents) to take upon the company negative net present value projects. Therefore, the earnings would be better serviced in the hands of the investors as they would be able to find more profitable uses for the returns generated by the company. Hence dividends can not only be considered as tools for signalling, but also as practical means to better align the interest of the owners and managers responsible for maximizing the investment of the owners (Jensen & Meckling, 1976). This theory suggests a significant departure from the original Miller and Modigliani assumption in that pay-out policy and investment policy are interrelated. Paying out cash would increase firm value by reducing potential overinvestments (Allen & Michaely, 2001).

This theory also remains open to criticism on the question of taxes. Namely, why would stockholders prefer to implement higher taxed dividends as a control mechanism rather than issuing stock buybacks? Another criticism put forth by Jensen (1986) is a question of debt creation. As managers have a harder time going back on debt obligations then lowering dividends it would seem prudent to apply debt as a control mechanism over dividends (Jensen M. C., 1986). Thirdly, the agency conflict does not address the reaction to decrease in dividends. Could dividend cuts not be a sign of profitable investment opportunities and therefore interpreted as a positive sign of potential growth (Allen & Michaely, 2001)?

The theory discussed earlier by Allen *et al* (2000) provides a model that addresses the criticism on the question of why dividends and not stock repurchases and why not debt. The main argument being that dividends attract large institutional investors who are considered good shepherds when it comes to management control (Allen, Bernardo, & Welch, 2000).

From the recent decade new proposed models on the theoretical explanations on the relationship between dividend policy and market price have not been established to the extent that the author would be aware of their prevalence. The more recent trend during the latest decade has been geared towards empirical studies on the existing theories and the introduction of behavioural theories to

better explain the abnormal returns observed within the empirical studies. The details on this are covered in the subsequent chapters.

Regardless, as can be seen from the multitude of proposed models from earlier works the relationship between dividends and stock price has room for criticism and remains an area that can be and is developed further. Nevertheless, based on the evidence provided by former research it can be deducted that it is in the interest of companies to keep their dividend policy stable during turbulent times in the economy if management is confident in the long running performance of the company and only reduce dividends in situations where there is no attractive alternative available.

From this the author has arrived at two fundamental understandings when it comes to the relationship that dividends and stock prices have. First, that managers use dividends to provide signals to the market and that the market reads into these signals by interpreting growth in dividends as a signal of strength and a decline as a weakness. This even though from the tax perspective there are cheaper alternatives for signalling. Second, that managers aim to sustain dividend pay-out levels and only make changes to dividend pay-outs in cases where they are confident that either the current dividend pay-out level is unsustainable due to weakening future outlook or that an increased dividend pay-out level can be sustained in the long run. Based on these two understandings the author finds that in the context of the hypothesis raised there should be a positive correlation between the change in dividends and the corresponding change in stock price.

However, a question remains on the topic of trust from the perspective of the market. Meaning that in an uncertain market environment such as the Covid-19 crisis does the market interpret the signals provided by the management on future outlook to a similar degree as it interprets these signals in a more stable market environment. In order to answer this question, the author looked towards the efficient market hypothesis and the theories developed under behavioural finance.

1.2. Efficient markets and investor behaviour

In 1970 Fama published an article on the efficient markets that distinguishes three forms of efficiency – weak, semi-strong and strong. The efficient market was defined as “a market with great number of rational, profit-maximisers actively competing, with each trying to predict future

market values of individual securities, and where current important information is almost freely available to all participants". As described in the research by Fama the weak-form efficiency is where the historical data does not provide any indications for the future and hence long-term abnormal returns cannot be achieved through technical analysis. However fundamental analysis could provide opportunities for long-term abnormal returns. In semi-strong-form stock prices react to publicly available information the moment it becomes available and in turn there is no way to generate abnormal returns from this information. In strong-form efficiency, stock prices cover all information, public and private, and abnormal returns cannot be generated by anyone in the long-term (Fama E. F., 1970). Efficient markets hypothesis is simple in theory but has proven difficult to test. Therefore, the fact remains that there is no consensus among economists regarding any of the three forms of efficient markets hypothesis (Titan, 2015).

Another interpretation of this is an understanding that not all market participants are making their decisions in an absolutely rational manner. Behavioural finance offers an alternative paradigm to the efficient market theory, one in which individuals make systematic mistakes in the way they process information. The psychology literature describes a myriad of behavioural biases that can potentially explain almost any observed deviations from the efficient market hypothesis. (Daniel & Titman, 1999)

Although many economists are sympathetic with the view that behavioural biases play a role in economic decisions, they generally believe that irrational investors have only minor effects on prices. The standard argument is that in competing to take advantage of the profit opportunities created by the trades of irrational investors, rational arbitrageurs will push prices to a level where the profit opportunities virtually disappear. Thus, in the end, prices will be determined in the market "as if" all investors were rational. (Daniel & Titman, 1999)

Daniel and Titman explain that in reality it is quite difficult for rational investors to exploit profit opportunities provided by irrational investors as the exploitation of these profit opportunities requires a level of knowledge about the tastes, strategies, and cognitive limitations of other investors. Arbitrageurs can learn only imperfectly about behavioural biases from past patterns and thus are likely to eliminate the biases with a lag. To account for this Daniel and Titman presented a somewhat weaker concept of market efficiency called "adaptive efficiency". In a market that is

adaptive efficient, pricing anomalies may be observed in historical data, but these anomalies will not persist for too long. (Daniel & Titman, 1999)

A few other theories put forth to explain the investor biases that result in irrational behaviour are Bird-in-Hand theory that was first introduced by Gordon (1959) where it is explained that investors need to realise wealth in order to consume and therefore prefer cash dividends for capital gains that are just earnings on paper (Gordon, 1959). A later theory for Self-Control was introduced by Thaler and Shefrin (1981) can be considered an extension of the Bird-in-Hand theory. Self-Control theory finds that investors use dividends as a control mechanism for their own consumption. Meaning that dividend allow them to transfer the decision of how much of their gains should be realised to the management of the company. This way investors avoid making the decision themselves and are not tempted to realise more of their gains then necessary (Thaler & Shefrin, 1981). A third explanation was provided by Shefrin and Statman (1984). They proposed the mental accounting theory where large returns that are divided into increments of smaller returns provide more pleasure to investors. Therefore, investors prefer dividends over capital gains (Shefrin & Statman, 1984).

The importance of these behavioural finance theory's is also supported in part by the growing trend over the last decade where scientist have started to question if signalling theory and efficient market hypothesis remain relevant in relation to corporate dividend policies and their impact of stock prices and if other theories such as agency and behavioural theories may be the better theoretical frameworks to explain the movements of stock prices. (Legenzova, Jurakovaitė, & Galinskaitė, 2017)

The most prevalent of these studies is a research conducted by Breuer *et al* (2014) where dividend pay-out policy to behavioural issues was studied based on the ideas of mental accounting. With a panel analysis across 29 countries and over 43,000 firm-years they demonstrated that the relation between dividends and patience, loss aversion, and ambiguity aversion could be verified empirically. Their study showed analytically and empirically that loss aversion and ambiguity aversion are positively related to dividend pay-outs, while more patient investors prefer lower dividend ratios. This supports the boundedly rational investor story, as for rational investors, behavioural parameters should be completely irrelevant for dividend demand. (Breuer, Rieger, & Soypak, 2014)

However, as the theory of efficient markets, or inefficient markets, does not seem to have a consensus amongst economist it would be hard pressed to derive at a singular theory that would explain the rationality or irrationality of investor behaviour during times of market stability and times of uncertainty within the markets. Therefore, the author recognises that boundedly rational investor story should play a role in the change in investor behaviour but finds that due to the lack of consensus in the underlying theory the conclusions made will be subjective to the authors opinion rather than empirical evidence.

At the same time the differences in the interpretation of signals over time periods could also be related to changes in investor risk perceptions due to changing market dynamics. Financial risk tolerance as defined by Grable (2000) is the maximum amount of uncertainty that someone is willing to accept when making a financial decision (Grable, 2000). This view is also supported by empirical studies by Monat et al (1972) and Bankhart and Elliot (1974) where subjects experienced anxiety towards the possibility of being penalised altogether and the probability of the penalisation itself did not play a role in their action. In other words, if their findings would be extended towards the financial markets then asset prices could tend to "overreact" to small probability events in cases where investors feel anxiety due to high levels of uncertainty (Caplin & Leachy, 2001). This is more commonly known as the “overreaction hypothesis” that in essence markets overreact to unanticipated news, resulting in exaggerated movements in stock prices as proposed originally by De Bondt and Thaler (De Bondt & Thaler, 1985).

This theory falls in line with later empirical research conducted by Hoffmann et al (2013) where they observed that investor’s risk tolerance is time varying. In their research they found that investor perceptions exhibit significant fluctuation over the course of a crisis, with risk tolerance and risk perceptions being less volatile than return expectations. In the worst months of the crisis, investors’ return expectations and risk tolerance decreased, while their risk perceptions increased. Towards the end of the crisis, return expectations, risk tolerance, and risk perceptions recovered (Hoffmann, Post, & Pennings , 2013). Such a reaction in the investor’s reaction could also be in part explained through the Grullon et al (2002) dividend signalling model that proposed that a part of the dividend signal could be related to signals on systematic risk. However, their study was focused on the life cycle of a company rather than the economic environment itself.

Regardless there remains a possibility that during times of turbulence in the economy dividend signals are interpreted differently by investors related to the time of the signal and the overall economic outlook at that time. As a result of this the author finds that there is sufficient evidence to suggest that during a *force majeure* event that brings with it a considerable uncertainty to the market, such as the Covid-19 crisis, the reaction of the market to changes in dividends should follow the overreaction hypothesis. Therefore, the expectation of the author is that in the Covid-19 environment the stock price changes around the dividend announcement date are more pronounced than they are during the period preceding the Covid-19 outbreak.

1.3. Previous empirical studies

The two main views of why dividends are paid that were introduced were related to the signalling of good (bad) news by the management on earnings and/or risks and the second is that dividends are a form of good news that stockholders are placing rains on their managers. Regardless of the criticism brought out in the earlier chapters on the various proposed models there are numerous empirical research that validate the signalling theory and the idea that markets follow the overreaction hypothesis in situations of high uncertanty.

One of the earliest empirical works on signalling conducted by Pettit (1972) supported the proposition that the market makes use of announcements of changes in dividend payments in assessing the value of a security. He also concluded that most of the information implicit in the announcement is reflected in the securities' prices around the dividend announcement date (Pettit, 1972). A similar conclusion was made by Aharony and Swary (1980) that dividend announcements strongly support the hypothesis that changes in dividends provide useful information. In addition, their findings also supported the semi-strong form of the efficient capital market hypothesis. Meaning that the stock market adjusts in an efficient manner to new quarterly dividend information (Aharony & Swary, 1980). However, Watts (1973) argued that the information content of dividends is trivial since the average absolute size of the future earnings changes which might be conveyed by unexpected dividend changes rather small and do not exceed transaction costs (Watts, 1973).

The findings on dividends providing signals are also supported by recent research on the 2008 financial crisis by Bozos *et al* (2011) on the United Kingdom stock markets. Where it was shown

that changes in dividends are treated as signals by the investors on the potential future outlook for the earnings of a company. The research found that the changes in stock price can be explained through changes in dividend pay-out amounts. Meaning that there was a negative effect to the stock price in situations where the dividends were cut and the opposite effect when dividends were increased. (Bozos, Nikolopoulos, & Ramghandi, 2011)

Other research by Michaely *et al* (1995) found that there was an immediate and long-term effect from dividend changes by the markets in cases where the dividend policy changes were extreme. In case of short-term abnormal returns, they found that dividend increases produced around 1% abnormal returns while dividend decreases produced negative 3,5% abnormal returns. As for long term effects they observed a 7,5% positive abnormal return for dividend increases and negative 11% abnormal returns for dividend decreases in the 254 days following the event date. An important note in their research is in regard to the long-term effects of the announcement. The first important finding was related to the fact that there were observations of predictable abnormal returns which are in contradiction with the efficient market hypothesis. This is noteworthy as the observation pattern for abnormal returns is consistent throughout time in both cases where dividends where increased and decreased. The second important finding in their research is that the reaction to the dividend decreases were greater in absolute value then increases. Their explanation for the short-term asymmetric reaction was related to the magnitude of the yield change between two events but agreed that this only covers the short-term reaction and does not explain the long-term findings (Michaely, Thaler, & Womack, 1995). This also follows the earlier research conducted by Charest (1978) where it was found that the post-dividend-change performance yielded 4% positive abnormal return in the two years after dividend increase announcements and a negative 8% for dividend-decreasing firms (Charest, 1978). Additionally, a similar finding was been made in the later research by Grullon *et al* (2002) who observed an 8,6% positive abnormal return over the short-term and close to 12,6% positive abnormal return over the three years following a dividend increase. In case of dividend decreases the findings were found to be insignificant (Grullon, Michaely, & Swaminathan, 2002).

The findings on asymmetric reactions could explain why managers are unwilling to change their dividend policies, but at the same time the long-term abnormal returns observed cannot be explained away just by the overreaction hypothesis that would cover any abnormal returns over the short-term. Other important consideration of the fact that abnormal returns are consistent over

time is the fact that if the dividend changes are translated as a signal then the market seems to not understand the signal to its full effect. The problem that this presents is the fact that the models brought out in earlier chapters of this work follow the rational logic that markets are efficient and react in a rational manner. The long-term drift found in previous empirical studies does not support this understanding (Allen & Michaely, 2001).

From the risk perspective Grullon *et al* (2002) also found in their research that that firms that increase dividends experience a significant decline in their systematic risk while firms that decrease dividends experience a significant increase in systematic risk. The changes in systematic risk translate to a decline in risk premium of 1% a year for dividend-increasing firms and an increase in risk premium of 2% a year for dividend-decreasing firms (Grullon, Michaely, & Swaminathan, 2002). The proposed explanation for their findings is also outlined in the earlier chapters.

More recently various empirical studies that have been conducted over the last decade with various samples from various markets to explain the relationship between dividend policy and market price have also found that there exists an abnormal effect in the market price. An empirical study conducted on the Indian market by Goel (2015) found that the abnormal effect is temporary and fades out in the long run as the market returns to efficacy (Goel, 2017). The results of this study could be related to the overreaction hypothesis put forth by Caplin and Leachy (2001) or the adaptive efficiency theory put forth by Daniel and Titman (1999) introduced in earlier chapters. Both of these theories are considered to be in the field on behavioural finance and have been found to be better theoretical frameworks for explaining the relationship between dividend policy and market price over the last decade as mentioned in earlier chapters. However, the authors themselves have not gone so far as to explain their findings through these theories in their works. Other empirical studies that have arrived at similar findings have been a study conducted on the Australian market by Aamir and Shah (2011) where again abnormal effects were found around the dividend announcement date, but the price returned to efficient market levels only seven days after the initial announcement (Aamir & Shah, 2011) and a similar study with similar finding made by Bogołębska (2019) that was conducted on the Warsaw stock exchange (Bogołębska, 2019). However, these empirical studies have not gone any further then to explain that an abnormality exists around the dividend announcement date.

Regardless of the various findings from the previous empirical works, the author has concluded that the forementioned understandings are prevailing in previous empirical studies:

1) Dividend changes do carry signals to the market which markets accept, and the reaction can be witnessed in the movement of stock prices that follow the direction of the dividend changes.
2) The reaction size in stock prices varies between dividend increases and dividend decreases and tends to be exaggerated giving proof that the efficient market hypothesis does not hold true in the short-term and in certain cases even in the long-term.

As a final remark on the theories discussed the author would like to point out that the literature on the dividend policy is extensive and there does not seem to be a consensus amongst researchers with regard to the various theories. Therefore, the Covid-19 crisis allows for an assessment of dividend theories and market responses in an environment where investors should be more concerned with the signals provided by managers due to the high uncertainty within the markets. However, the author agrees with criticism that in situations of high uncertainty signals could be disregarded by investors completely due to changes in investor risk perceptions, the irrational nature of investors in the short run related to the "adaptive efficiency" theory and also the fact that markets seem to be reacting to dividend changes if not irrationally then at least not to the degree that they should if one would follow just the models put forth in various theories.

Nevertheless, the authors expectations derived from previous empirical studies are that the reaction of the market to the changes in dividends is in a positive correlation with the changes in dividends and that the reactions are more pronounced in the Covid-19 environment. Hence the authors expectations are that the null hypothesis will be rejected, and that the alternative hypothesis will be accepted.

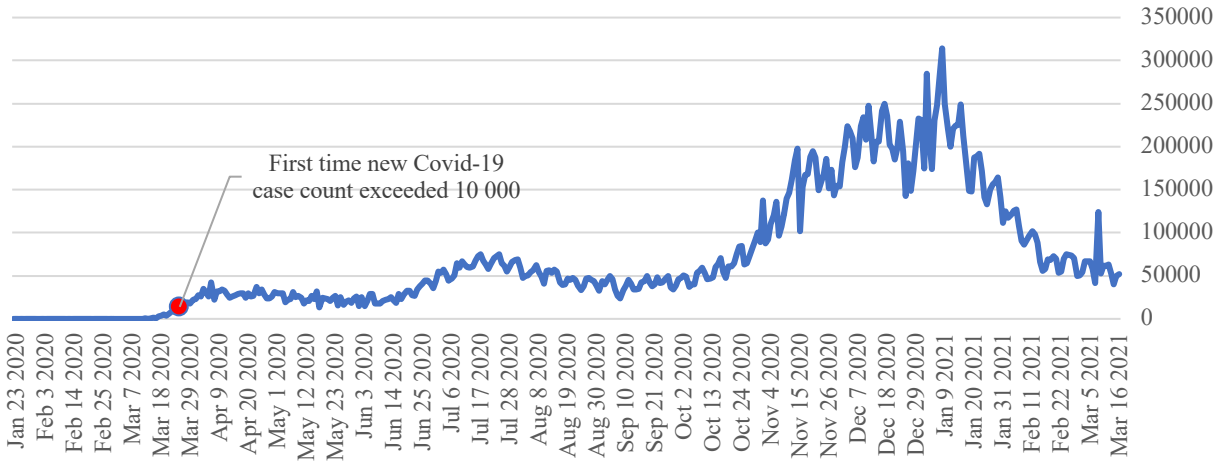
2. DATA AND METHODOLOGY

2.1. Data

In order to conduct the research into the stock price change around the dividend announcement date the author has chosen to focus on a sample of stocks from the New York Nasdaq. The sample consist of 587 companies and their daily closing stock prices that are adjusted for stock splits and dividend payments. The sample was derived at through the use of certain conditions that the companies had to meet.

Firstly, the author arrived at a date that represented the start of the Covid-19 outbreak in the United States of America. The author considers the 23rd of March 2020 as the official start date of the Covid-19 pandemic within the United States of America as this is the first date on which the number of daily new Covid-19 cases exceeded the ten thousand people threshold based on the data provided by the World Health Organisation. The development of the Covid-19 new cases in the United States of America is illustrated in Figure 1.

Figure 1. Daily new Covid-19 cases in the United States of America

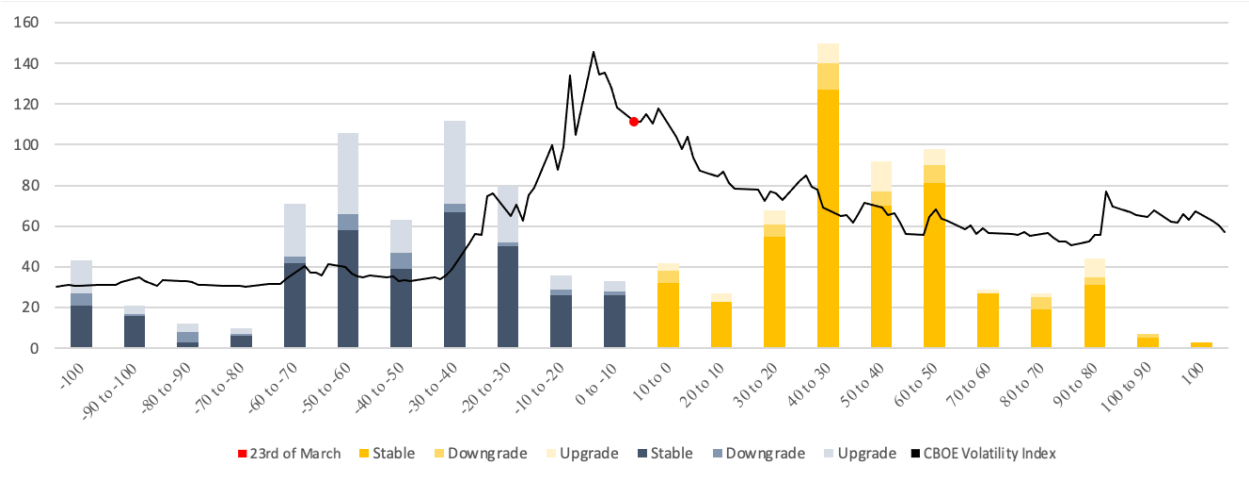


Source: World Health Organisation (WHO, 2021)

The author recognises that the companies listed in the New York Nasdaq have a global presence. This means that their performance is not only exposed to the United States of America. However, it was considered that the Covid-19 outbreak had reached the United States of America after it had already spread to the two other largest economies - Asia end the European Union - meaning that by the time Covid-19 reached United States of America the pandemic had already achieved a global reach in light of the operations of the companies within the sample. Therefore, the sample does remain open to a degree of criticism in relation to the companies within the sample who were exposed to other markets to a larger degree then the United States of America. Meaning that the effect of the Covid-19 pandemic could have already been affecting the prices of these stock prior to the date chosen by the author. However, the author finds this timing related effect to be relatively immaterial and also partly addresses this issue by selecting an estimation window that precedes the outbreak of the pandemic in all major markets.

As for the conditions themselves the first condition set by the author on the sample was that the companies within the sample must have announced dividends after or on the 23rd of March 2020. The second condition set out by the author found that the companies within the sample had to have also announced dividends in two prior instances proceeding the 23rd of March 2020. Based on these criteria's the author was able to distinguish two separate concurrent environments – Covid-19 environment and the "normal" environment – and observe the reactions to the dividend announcements in two clusters.

Figure 2. Distribution of events around the Covid-19 start date in the United States of America and the CBOE Volatility Index development.



Source: WHO (2021) and Yahoo Finance (2021)

As can be seen from Figure 2 most of the observations within the sample fell in the distance of 20 to 50 days following the Covid-19 start date in the United States of America and 30 to 70 days preceding the Covid-19 start date. Compared to the CBOE volatility index that measures the volatility of the stock price changes the chosen start date by the author for the Covid-19 effects deviates 7 days from the peak of the index. As a result, the author finds that the effects of the chosen start date could be shifted to an earlier date, but this would likely have little material effect to the results as the main body of observations within the sample are located 20 to 70 days from the 23rd of March as mentioned earlier.

The sample also includes the dividend pay-out amounts for each individual observation of a dividend announcement between the 1st of January 2018 and the 31st of December 2020. The dividend pay-out amounts are used by the author to distinguish between changes in dividend pay-outs between concurrent dividend announcement dates. This data is used by the author to cluster the observations into three pools. Firstly, companies who kept their dividend pay-outs stable. Secondly companies who decreased their dividend pay-outs and thirdly companies who decreased their dividend pay-outs.

Table 1. Summary statistics

Environment	**Increase in dividend pay-out**	**Decrease in dividend pay-out**	**Stable dividend pay-out**
"Normal"	190	43	354
Covid-19	61	53	473

Source: author's elaborations

Table 1 presents a summary of statistics where from the 587 companies there were 43 observations of companies decreasing their dividend pay-out amounts (7,3% of all the observations) and 190 observations of companies increasing their dividend pay-outs (32,4% of all observations) in the "normal" environment just prior to the Covid-19 crisis. The remaining 354 observations (60,3% of all observations) were cases of dividend pay-out amounts remaining stable. In the environment of Covid-19 there were 53 observations of companies decreasing their dividend pay-out amounts (9% of all observations) and 61 observations of companies increasing their dividends (10,4% of all observations) compared to the period just preceding the Covid-19 environment. The remaining

473 observations (80,6% of all observations) were cases of dividend pay-out amounts remaining stable.

The author did not introduce into the sample companies who have decided to withhold dividend pay-outs altogether. The reason being that the exact date when the market gained public information on when the decision was made not to pay out dividends is not as clear as it is for dividend announcement dates. As a result, the introduction of these observations into the pool of observations could skew the findings as data on a clear event does not exist in a reliable and accessible manner.

Finally, to find abnormal risk adjusted returns on the market the author has chosen the S&P 500 index to represent the market. The basis for choosing the S&P 500 index is derived from the fact mentioned earlier that the companies within the sample have a global operational exposure within the markets and the S&P 500 index is a commonly accepted and easily accessible indexes to reflect the global market development that is updated on a quarterly basis. The author did also consider using alternative indexes for evaluation that would better capture the movement of dividend stocks but decided in favour of the S&P 500 index as it encapsulates the general sentiment within the market. However, the research could be expanded upon by running the study using alternative indexes.

Based on the gathered data the author has conducted an event study towards the stock price reactions on the dividend announcement dates. The method used for this study is outlined in the following chapter.

2.2. Methodology

For conducting the research into to the changes that stock prices have around the dividend announcement date author considered two alternative approaches that could have been used: the difference-in-difference model and the event study method.

The difference-in-difference model is used in situations where a treatment group is compared against a control group. In a classical use of the model neither of the two groups are exposed to a

treatment at first. This is referred to as period one. Following period one, one of the groups becomes exposed to the treatment while the other does not. This is referred to as period two. After this the two groups can be compared against one another in order to estimate the effect of the treatment (Angrist & Krueger, 1999). In finance and economics, the model is found to be appropriate for systematic events that affect the whole market. Examples include the introduction of new laws, government policies and regulation, etc. (Fredriksson & Oliveira, 2019). Regardless of the wide use of the model the author finds the model to be unattractive for two reason. Firstly, due to the fact that the research conducted by the author is looking to analyse the changes that specific events have for individual companies in two different environments then the difference-in-difference model is found to be too broad in its approach. This is related to the size of the event window that the author is looking to observe. Secondly, the author does not have the opportunity to observe the results of the control group after the treatment group is exposed to the treatment since Covid-19 crisis affected the market as a whole.

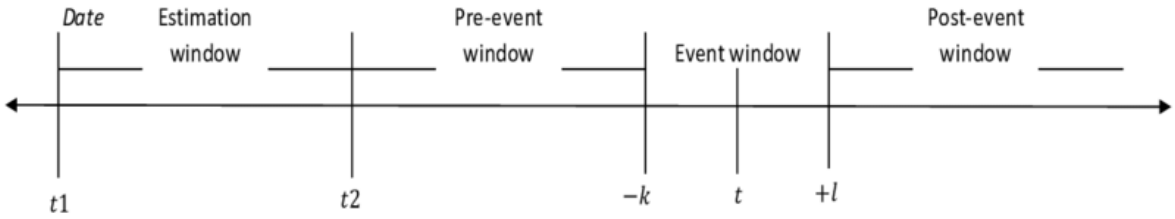
Compared to the difference-in-difference model the event study methodology is designed to analyse the effects of specific events on individual companies then the author chose the event study as the method used for conducting the research.

Event studies were first applied in the two papers by Ball and Brown (1968) and Fama *et al* (1969). The study conducted by Ball and Brown looked to describe the usefulness of information by looking at the annual earnings announcements given by companies (Ball & Brown, 1968). The research by Fama, *et al* was geared more towards explaining the timing of the market reaction to stock split announcements which was to test the efficient market hypothesis (Fama, Fisher, Jensen, & Roll, 1969). Both of these studies followed the event study process that has since become classic. The steps are described by Henderson (1990) as follows:

1. Define the date upon which the market would have received the news – the event window.
2. Characterize the returns of the individual stocks in the absence of this news – the estimation window.
3. Measure the difference between observed returns and "no-news" returns for each firm-the abnormal returns.
4. Aggregate the abnormal returns across firms and across time.
5. Statistically test the aggregated returns to determine whether the abnormal returns are significant and, if so, for how long.

The method developed by Fama *et al* and Ball and Brown have been advanced further over the years, but the core elements of the studies have remained the same (Corrado, 2011). The timeline of steps one and two are also illustrated under Figure 3.

Figure 3. Event study timeline



Source: (Keles & Ülengin, 2019)

The usefulness of the Event Study comes from the fact that, given rationality in the marketplace, the effects of an event will be reflected immediately in security prices. This according to the efficient market hypothesis. Thus, a measure of the event's impact can be constructed using security prices observed over a relatively short time period. (MacKinlay, 1997).

As noted earlier the first step of conducting an event study is to define the event of interest and identify the period over which the security prices of the firms involved in this event will be examined - the event window (MacKinlay, 1997). The event window is also illustrated under Figure 3. The event of interest that the author is investigating was presented in the preceding chapter. The event date T_0 is defined as the day of the dividend announcement and the chosen observable event window set by the author is defined as T_0 +/- 5 days. The event window is chosen under the assumption that the effect related to the dividend announcement might not take place on the announcement date. This due to the fact that the reaction to the news might not be immediate just following the announcement if the announcement was made after trading hours and the reaction.

In order to characterise the returns of the individual stocks in the absence of the dividend announcement described in the second step of the study theory provides multiple alternatives. The first of which is by looking at the mean returns of the stock that it has generated over the estimation period – the estimation window. However, as this approach is very simplified considering the fact that it does not take into account the correlation between the observable stock and the market.

Therefore, the author has chosen not to use this approach in their research. An alternative for estimating the returns of stocks is the market-adjusted model as this uses a regression model to predict expected returns for the firm by considering the correlation between the market and the individual sock. Abnormal returns, prediction errors, or residuals are defined to be the difference between the returns observed and those predicted by the regression model (Henderson, 1990).

Another model is a procedure where abnormal returns are calculated by taking the difference between the actual return and a portfolio of firms of similar size, where size is measured by market value of equity. This procedure implicitly assumes that expected return is directly related to market value of equity (MacKinlay, 1997).

Generally, the benefit from employing such a model for event studies is limited. The reason for the limited benefit is the empirical fact that the marginal explanatory power of additional factors the market factor is small, and hence, there is little reduction in the variance of the abnormal returns. The variance reduction will typically be greatest in cases where the sample firms have a common characteristic, for example they are all members of one industry, or they are all firms concentrated in one market capitalization group. In these cases, the use of a multifactor model warrants consideration (MacKinlay, 1997). However, as the Covid-19 crisis affected the whole global market and the research conducted by the author is geared towards describing the overall market reaction then the consideration of industry-based split was made but not implemented. This does leave the research open to criticism related to the unequal exposure of various industries, but as the sample chosen by the author remains consistent throughout the changing environment then the effects of not implementing the multifactor model should prove relatively small. Regardless, this criticism can be considered as a suggestion towards future research on the topic of stock price reactions to the Covid-19 crisis.

Another alternative would be the use of the capital asset pricing model (CAPM). However, it has been argued that the results of the studies may be sensitive to the specific CAPM restrictions (MacKinlay, 1997) and that calculating abnormal returns using the ordinary least squares market model and using standard parametric statistical tests appears to be a well-specified procedure (Strong, 1992). Due to this the CAPM model was not chosen by the author.

For the purpose of finding the abnormal returns for the described six data clusters the author has chosen the market-adjusted model to find the expected market return in a situation where the events did not take place. The method chosen is based on the review of literature provided in earlier paragraphs. The model is described by the following formula (MacKinlay, 1997):

$$R_{it} = \alpha_i + \beta_i R_{mt} + \varepsilon_{it} \quad (1.1)$$

where,
R_{it} – is the actual stock return,
R_{mt} – is the actual market return (S&P 500),
β_i – is historical measure of volatility between the market return and stock return (correlation),
α_i – is historical measure of stock return compared to the risk adjusted expected return (intercept),
ε_{it} – is the zero mean disturbance term.

Based on this formula the author was able to generate the returns for each stock within the sample to represent how the stock price of the individual company should have developed if dividends would not have been announced. The estimation period chosen by the author is 120 trading days five days before the announcement window (from T_0 - 130 to T_0 - 10) in the "normal" environment, where stock returns are regressed against the corresponding market returns R_{mt} as described in the risk adjusted return model above. By substituting ε_{it} with AR_{it}, where AR_{it} represents the abnormal returns for the stock and rearranging formula 1.1 the author arrived at formula 1.2 that is used for the calculation of the abnormal returns during the event period (T_0 - 5, T_0 + 5).

$$AR_{it} = R_{it} - (\alpha_i + \beta_i R_{mt}) \quad (1.2)$$

where,
R_{it} – is the actual stock return,
R_{mt} – is the actual market return (S&P 500),
β_i – is historical measure of volatility between the market return and stock return (correlation),
α_i – is historical measure of stock return compared to the risk adjusted expected return (intercept),
AR_{it} – is the abnormal return.

The abnormal returns were averaged out for each cluster using formula 1.3 so the stock price behaviour on the event day for each cluster could be analysed (MacKinlay, 1997).

$$AAR_t = \frac{1}{N} \sum_{1=i}^{N} AR_{i,t} \quad (1.4)$$

where,
AR_{it} – is the abnormal return,
N – is the number of observations.

In order to derive at a single figure for each observation the author has calculated the cumulative abnormal return (CAR) for each of the 587 individual dividend announcement event windows in both the Covid-19 environment and the "normal" environment. This was done with the use of the formula 1.4 (MacKinlay, 1997).

$$CAR_i(t_1, t_2) = \sum_{t=t_1}^{t_2} AR_{i,t} \quad (1.4)$$

where,
$CAR_i(t_1,t_2)$ – is the cumulative abnormal return for the stock return in the event window,
AR_{it} – is the abnormal return for each day within the event window.

As both the Covid-19 environment and the "normal" environment hold multiple observations of similar event windows the author has calculated using formula 1.5 the cumulative average abnormal return (CAAR) for each observation cluster (companies who kept their dividend pay-outs stable, companies who decreased their dividend pay-outs and companies who decreased their dividend pay-outs) to arrive at a mean value for each observed data cluster.

$$\text{CAAR} = \frac{1}{n} \sum_{i=1}^{n} CAR_i(t_1, t_2) \quad (1.5)$$

where,
$CAR_i(t_1,t_2)$ – is the cumulative abnormal return for the stock return in the event window,
CAAR – is the cumulative average for each day within the event window.

The outlined methodology will be used to test the hypothesis presented in the following chapter.

2.3. Hypotheses

The subsequent sub-chapter provides the hypotheses, which has been formulated taking into account previous studies. The formulated hypothesis describes the expectations of the results anticipated in the empirical section of this thesis. The following hypotheses has been set by the author:

H0: The dividend announcement date has the same effect to the stock price during the Covid-19 pandemic as in the period preceding the Covid-19 pandemic.
H1: The dividend announcement date has a varied effect to the stock price during the Covid-19 pandemic if compared to the period preceding the Covid-19 pandemic.

3. RESULTS

3.1. Results of the event study

The author reached the results on the dividend announcement event effect on the stock prices by employing a market model event study methodology using Stata 14 statistical software. For determining market reaction to dividend announcements, first the abnormal returns (ARs) were calculated for each observation, this was followed by the calculation of average abnormal returns (AARs), cumulative abnormal returns (CARs) and then the cumulative average abnormal return (CAARs). This was done for the three groups of companies (companies who kept their dividend pay-outs stable, companies who decreased their dividend pay-outs and companies who decreased their dividend pay-outs) in two different environments (market prior to Covid-19 outbreak and the market preceding the Covid-19 outbreak). Table 2 presents the average abnormal returns (AARs) and cumulative average abnormal returns (CAARs) of the sample companies listed on the New York Nasdaq during the observed periods together with their statistical significance.

Table 2. AARs and CAARs on and around the dividend announcement date (***, **, * represent statistical significance at the level of 1%, 5% and 10% respectively)

Observation type	No of observations	AAR	AAR t-statistics	CAAR	CAAR t-statistics
Normal - stable	354	-0,20%	-0,911	-3.26%*	-1.804
Normal - decrease	43	-1,64%**	-2,423	-3.21%	-0.357
Normal - increase	190	0,09%	0,605	-1.65%	-0.909
Covid-19 - stable	473	0,22%	1,309	3.43%**	2.173
Covid-19 - decrease	53	0,01%	0,009	4.47%	1.023
Covid-19 - increase	61	1,14%	1,515	4.45%	0.641

Source: author's calculations

As the significance of abnormal returns can be observed by stock prices that are both higher and lower than the market model would suggest then a two-tailed hypothesis test was implemented to obtain a two-sided confidence interval. The confidence level chosen by the author for all

observations is set at 95%. The critical value for every observation type is found by following the degrees of freedom in each sample. For the statistical significance of the computed AAR and CAAR their t-statistics value must exceed the critical value. The modelled results are summarised in table 2.

The fist data cluster analysed by the author is related to companies who kept their dividend pay-outs stable prior to the Covid-19 start date in the United States of America. As can be seen from t-statistics presented in table 2 the observed abnormal returns around and on the dividend announcement date were insignificant. This follows the expectations of the author and previous empirical studies where in a "normal" market environment stable dividend does not convey information that would create a reaction in the market that would result in abnormal returns. Similar findings were observed in the recent empirical study by Bozos *et al* (2011) on the United Kingdom stock markets during the last financial crisis of 2008. This is likely due to the fact that companies strive to sustain a dividend level and markets are expecting companies to do so.

In the environment after the Covid-19 outbreak in the United States of America abnormal returns on the announcement date were also found to be insignificant. However, the abnormal returns in the event window were significant. The reason for insignificant observation on the event date can be explained through points made in an earlier chapter where it was pointed out that the reaction to the news might not immediately follow the announcement if the announcement was made after trading hours. The reaction could also precede the announcement in cases where the information has leaked to the markets. Regardless of the insignificance on the average abnormal returns the cumulative average abnormal return indicated that dividend announcements where the dividend amount remained the same produced a 3,4% cumulative average abnormal return in the event window.

The presence of abnormal returns around the announcement of stable dividends after the Covid-19 outbreak in the United States of America is an expected observation by the author. Classical theory around dividend announcements would suggest that abnormal returns should not be observed around events where dividends remain unchanged as this is the underlying intent of companies based on the dividend smoothing theory. Essentially markets should expect companies to keep their dividends stable. However, as pointed out in chapter 1.2 of this research previous study by Hoffmann et al (2013) showed that investor risk tolerance is time varying, and Grable

(2000) suggested that financial risk tolerance is the maximum amount of uncertainty that someone is willing to accept when making a financial decision. If these views are expanded upon the boundedly rational investor story then it can be deducted that in the presence of high uncertainty, that the Covid-19 outbreak brough, investors were looking for signs of stability within the market that the stable dividend announcement could have brought. This in turn resulted in a situation where investors were willing to pay a premium for stocks that signalled stability withing a highly uncertain market.

The second data cluster analysed by the author was related to companies who decreased their dividend pay-out amount. Prior to the Covid-19 start date in the United States of America the abnormal returns on the announcement date were found to be significant. However, the abnormal returns in the event window were insignificant. The significant abnormal returns observed on the event date of negative 1,6% are expected as theory would suggest that the decrease in dividends is interpreted by the market as a signal of lower future earnings which in turn translates to lower stock price. This is also supported by previous empirical studies where negative abnormal returns of 1,7% to 3,4% have been observed in cases where dividend pay-out amount is decreased. This regardless of the criticism that decrease in dividends could also be interpreted as new opportunities to invest in future growth.

Unexpected findings were related to observations made for companies who decreased their dividend pay-out amount after the Covid-19 start date in the United States of America. The observed abnormal returns on the announcement date and around the announcement date were both found to be insignificant. A partial explanation for the lack of abnormal returns in the event window can be drawn from the narrative of the Covid-19 related crisis a whole. Meaning that as the overall impact on the market became apparent with the unfolding of the Covid-19 crisis the market prices of companies that were most exposed saw a decrease in their stock price prior to any announcement dates. Therefore, in the event window observed by the author the price of the stocks in the sample had already been adjusted for a risk of lower future earnings and the decrease in dividends did not convey any new information to the market. A rational for this can also be drawn from the observed positive abnormal returns for companies who kept their dividend pay-outs stable in the post Covid-19 outbreak environment. Meaning that as markets prices decreased with the Covid-19 outbreak the stable dividend signal was translated as a signal of strength and prices adjusted upwards as a result.

The third and final data cluster analysed by the author was related to companies who increased their dividend pay-out amount. The observed abnormal returns on the announcement date and around the announcement date were both found to be insignificant. This was the case in both the preceding period of the Covid-19 outbreak as well as the period following the outbreak. The insignificance of this signal was found to be unexpected by the author as theory and previous empirical studies would suggest that abnormal returns should be present around the announcement of an increase in dividend pay-out amount. Previous empirical studies have found that in cases of dividend increases observable positive abnormal returns should be around 1%. For the period following the Covid-19 outbreak an explanation can be drawn from the rational that due to high uncertainty in the markets the signal of increased earnings in the future did not offset the inherent risk on future earnings that the market perceived for the overall market. However, in the case of the period preceding the Covid-19 outbreak previous studies provide little to explain the observation made. A partial reasoning for the observation could be related to the sample. As most of the observations for dividend pay-out increases fall in the region of -70 to -30 days from the Covid-19 outbreak it could be argued that the markets were already pricing in uncertainties about the future. This due to the fact that within the -70 to -30 day timeframe falls the event where the WHO emergency committee reached consensus and advised that the outbreak constituted a Public Health Emergency of International Concern (30th of January 2020 which is -53 days from T_0). However, the WHO characterisation of the Covid-19 as a pandemic does not fit into the timeframe (13th of March 2020 which is -10 days from T_0) (WHO official statement, 2020). Therefore, the author view this as a partial explanation to the lack of abnormal returns.

The author also tested event windows covering T_0 +/- 3 days and T_0 +/- 7 days and found that the statistical significance of the results within the event window of T_0 +/- 5 produced the highest t-statistics if compared to event windows of T_0 +/- 3 days and T_0 +/- 7 days. However, the t-statistics between the three event windows did not vary to a degree where the significance of results would have been materially different.

Based on the analysis, the following can be stated about the that the dividend announcement date effect on the stock price during the Covid-19 pandemic and the period preceding the Covid-19 pandemic:

- In the case of companies who kept their dividend pay-out amounts stable the author rejects the null hypothesis and accepts the alternative hypothesis.
- In the case of companies who decreased their dividend pay-out amounts the author rejects the null hypothesis and accepts the alternative hypothesis.
- In the case of companies who increased their dividend pay-out amounts the author is unable to reject the null hypothesis

In general, it can be stated that the dividend announcement date has a varied effect to the stock price during the Covid-19 pandemic if compared to the period preceding the Covid-19 pandemic. The reasoning provided by the author in the preceding chapter provides some insight towards the observations made. At the same time the research does raise numerous new questions and remains open to criticism which the following chapter will address.

3.2. Main conclusions and suggestions

The author was able to show that there was a varied response by the market to the dividend announcements during the Covid-19 outbreak if compared to the period preceding the Covid-19 outbreak. These findings indirectly support conclusions made by previous studies on the boundedly rational investor story and that investor risk tolerance is time varying. This since the signals provided by the companies did not seem to translate into market responses as the classical dividend signalling theory would suggest. Rather what was observed was that keeping dividend pay-out amount stable after the Covid-19 outbreak did produce positive abnormal returns compared to abnormal returns not being present in the period preceding Covid-19 outbreak. Additionally, dividend pay-out amount decreases did not produce abnormal returns in the period following the Covid-19 outbreak. This was a varied result if compared to the period preceding Covid-19 where negative abnormal returns were witnessed. In cases of dividend pay-out amount increases the author did not observe any abnormal returns being present in either of the periods under investigation.

However, the research remains open to criticism. Firstly, the sample size used by the author for analysing the effects around instances where dividend pay-outs were either increased or decreased was small. Therefore, a suggestion can be made for further analysis to include previous crisis into the sample to increase the sample size. Also, if the sample would be expanded upon by including

previous crisis then the findings warrant the use of additional factors for sample clustering, such as industry. This due to the fact that historical crisis have not affected the market to a similar extent in all industries. Therefore, the addition of industries would help to further explain the how the dividend announcement data affects the market price of stocks in relation to the dividend signalling theory.

Another criticism that could be brought out in regard to the sample is the fact that it remains open to survivorship bias where the companies who decided not to pay out dividends at all are excluded. The author considered adding these observations to the sample but decided against it due to data availability. The reason being that exact dates when companies decided and communicated that they will stop paying out dividends is not readily available. This caused concerns on the accuracy of the dates that could be gathered by the author.

Secondly, the research does not include company level information, such as profitability or earnings, when explaining the presence of abnormal returns. Information on price reaction towards earnings and profitability reports could provide additional context towards the price reaction on the dividend announcement date. Also, company level characteristics could prove useful in identifying the type of companies that were affected by the crisis but were able to sustain their dividend levels regardless of this fact. These identifiers could prove useful in practice for investors who are looking to capture highest abnormal returns in periods closely following an outbreak of a crisis. However, the inclusion of such details fell outside the original scope of the research and therefore these variables were not included in the analysis.

Thirdly, the date for Covid-19 outbreak in the United States of America could distort the findings if the market reaction to the pandemic was already priced into the stock prices. An example of this would be the 13th of March when WHO characterised the Covid-19 as a pandemic. However, the author is of the opinion that the effects of shifting the date is relatively immaterial if the observation scattering brought out in figure 2 is taken into account. Meaning that shifting the environment breaking point ten to twenty days earlier would not have a large effect on the characterisation of the sample data.

In conclusion it can be stated that the dividend announcement date has a varied effect on the stock prices during the Covid-19 outbreak if compared to the period preceding the Covid-19 outbreak.

Additionally, to this the findings of this research warrant additional investigation into the topic by applying the suggestions from the criticism that the author has brought out in relation the findings.

CONCLUSION

The aim of this research was to analyse and evaluate the change in the behaviour of investors related the Covid-19 outbreak, that appears in the stock price change around the dividend announcement date.

There were two research question posed. First, if the change in stock price around the dividend announcement date during the Covid-19 outbreak is similar to period preceding the Covid-19 outbreak? Second, was the reaction of investors to the dividend announcement date during the Covid-19 outbreak more positive or negative if compared to the period preceding the Covid-19 outbreak?

To answer these questions the thesis tested the following hypothesis:
H0: The dividend announcement date has the same effect to the stock price during the Covid-19 outbreak as in the period preceding the Covid-19 outbreak.
H1: The dividend announcement date has the varied effect to the stock price during the Covid-19 outbreak if compared to the period preceding the Covid-19 outbreak.

The analysis showed that the stock prices produced positive abnormal returns in situations where companies kept their dividend pay-out amount stable after the Covid-19 outbreak and did not produce abnormal returns when dividend pay-out amount was kept stable in the period preceding Covid-19 outbreak. Additionally, dividend pay-out amount decreases did not produce abnormal returns in the period following the Covid-19 outbreak, but negative abnormal returns were witnessed in similar situations in the period preceding Covid-19 outbreak. In cases of dividend pay-out amount increases the author did not observe any abnormal returns being present in either of the periods under investigation.

The analysis answered the first research question by showing that the change in stock price was not similar during the Covid-19 outbreak if compared to the period preceding the Covid-19 outbreak.

As for the second research question the author was able to show that the market interpreted the signal of unchanged dividends in the Covid-19 outbreak environment as a signal of strength by providing positive cumulative average abnormal returns of 3,4%. An explanation for this observation by the author is that in the presence of high uncertainty, that the Covid-19 outbreak brough, investors were looking for signs of stability within the market that the stable dividend announcement brought. This in turn resulted in a situation where investors were willing to pay a premium for stocks that signalled stability withing a highly uncertain market.

Secondly, prior to the Covid-19 start date in the United States of America the author observed negative average abnormal returns of 1,6%. However, in the period preceding the Covid-19 outbreak in the United States of America abnormal returns were not found to be significant. A partial explanation for the lack of abnormal returns by the author is related to the narrative of the Covid-19 crisis. Meaning that as the overall impact on the market and different sectors became apparent with the unfolding of the Covid-19 crisis the market prices of companies that were most exposed saw a decrease in their stock price prior to any announcements made. Therefore, in the event window observed by the author the price of stocks in the sample had already been adjusted for the risk of lower future earnings and the decrease in dividends did not convey any new information to the market. A rational for this can also be drawn from the observed positive cumulative average abnormal returns for companies who kept their dividend pay-outs stable in the post Covid-19 outbreak environment. Meaning that as markets prices decreased with the Cov-19 outbreak the stable dividend signal was translated as a signal of strength and prices adjusted upwards as a result.

In these two instances the author did observe varied responses by the investors to dividend announcements if the announcements in the period preceding to the Covid-19 were compared to the period following the Covid-19 outbreak. In the third instance where dividend pay-out amounts were increased the author did not observe any abnormal returns being present in either of the periods under investigation.

As a result, the author made the following conclusions on the hypothesis set:

- In the case of companies who kept their dividend pay-out amounts stable the author rejects the null hypothesis and accepts the alternative hypothesis.
- In the case of companies who decreased their dividend pay-out amounts the author rejects the null hypothesis and accepts the alternative hypothesis.
- In the case of companies who increased their dividend pay-out amounts the author is unable to reject the null hypothesis.

Overall, based on market model event study it can be concluded that when investing in an environment closely following an outbreak of a crisis, the highest abnormal returns are achieved when buying stocks that are affected by the crisis, but are able to sustain their dividend levels. However, this research did not go into details on how to identify this type of companies. Rather this could be treated as a subject for further investigation.

During the event study multiple factors were considered, but not taken into the scope of the research. As mentioned earlier the company level characteristics were not used nor were economic factors other than the outbreak of Covid-19 taken into account. Also, the research does not cover tax aspects brought out in the first chapter of the research or cluster the samples based on industry that the companies operate in. The author recognises that that stock prices are affected by a multitude of factors that the research does not cover. These shortcomings provide ample opportunity to expand upon this research. However, the research did address the questions that were posed and provide the authors interpretation for the findings in the modelled results.

The general topic of investor behaviour in varying market environments remains an important matter that is not covered in extensive details nor does the topic have a prevalent agreed upon theoretical basis to explain the varying observations made in numerous empirical studies. This research paper provides a small piece to the puzzle that is the dividend policy and its implication on the stock price of a company. The author proposes to further investigate the matter by following the criticism that is brought out in this paper.

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APPENDICES

Appendix 1. Event Study model summary statistics from Stata

	Normal stable	Normal decrease	Normal increase	Covid-19 stable	Covid-19 decrease	Covid-19 increase
No of observations	354	43	190	473	53	61
AAR	-0.20%	-1.64%**	0.09%	0.22%	0.01%	1.14%
AAR standard deviation	0.042	0.044	0.021	0.037	0.041	0.059
AAR t-statistics	-0.911	-2.423	0.605	1.309	0.009	1.515
CAAR (+/- 5)	-3.26%*	-3.21%	-1.65%	3.43%**	4.47%	4.45%
CAAR (+/- 5) standard deviation	0.340	0.589	0.250	0.343	0.318	0.542
CAAR (+/- 5) t-statistics	-1.804	-0.357	-0.909	2.173	1.023	0.641
CAAR (+/- 3)	-2.38%*	-2.85%	-0.40%	2.69%**	2.92%	3.60%
CAAR(+/- 3) standard deviation	0.266	0.441	0.151	0.232	0.220	0.349
CAAR (+/- 3) t-statistics	-1.684	-0.423	-0.366	2.521	0.968	0.805
CAAR (+/- 7)	-5.07%*	-4.80%	-2.95%	4.06%**	4.12%	5.26%
CAAR(+/- 7) standard deviation	0.514	0.896	0.433	0.443	0.477	0.695
CAAR (+/- 7) t-statistics	-1.855	-0.351	-0.940	1.995	0.629	0.591
Critical value (99%)	2.590	2.695	2.602	2.586	2.672	2.659
Critical value (95%)	1.967	2.017	1.973	1.965	2.006	1.000
Critical value (90%)	1.649	1.681	1.653	1.648	1.674	1.670

Source: author's calculations

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