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DIVIDEND ANNOUNCEMENT IMPACT ON STOCK PRICES OF NASDAQ OMX BALTIC LISTED COMPANIES 2004-2019

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I hereby declare that I have compiled the thesis independently
and all works, important standpoints and data by other authors
have been properly referenced and the same paper
has not been previously presented for grading.
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TABLE OF CONTENTS

ABSTRACT

This thesis focuses on the impact of dividend announcement day on share prices and provides an overview of the movement of price around that specific date.

The research problem is the fluctuating impact of dividend announcement event on stock prices of the companies listed in NASDAQ OMX Baltic stock exchange. The aim of this paper is to analyse and evaluate the dividend announcement impact on stock prices of Baltic stock market listed companies during years 2004-2019.

The database for the thesis is compiled with the data collected from NASDAQ OMX Baltic webpage. The research methods used are event study methodology and regression analysis. The results show that all three countries have different level of market efficiency. There is a positive correlation between the changes in dividend payments and abnormal returns. The results show the highest cumulative abnormal returns for investors when buying the stock three days prior to the dividend announcement day and selling the stock three days after the dividend announcement day. The increase in dividend has no or very little impact on share prices, whereas a decrease in the dividend decreases the share price as well. The thesis shows evidence of weak market efficiency in NASDAQ OMX Baltic Stock market.

Keywords: share prices, dividend announcements, market efficiency, the Baltic States.

INTRODUCTION

NASDAQ OMX Baltic is part of American multinational financial services corporation Nasdaq, Inc. and was created to bring the investment barriers between Estonia, Latvia and Lithuania to minimum. Vilnius Stock Exchange was established in 1992, Riga Stock Exchange in 1993 and Tallinn Stock Exchange was opened for trading in 1996. Since then, the interest in investing, alongside with the interest in entrepreneurship has been steadily growing. People from Baltic countries are constantly trying to find out the reasons behind share price fluctuations and the impact of different events on stock. This thesis focuses on the impact of dividend announcement day on share prices and provides an overview of the movement of price around that specific date.

The research problem is the fluctuating impact of dividend announcement event on stock prices of the companies listed in NASDAQ OMX Baltic stock exchange. The aim of this paper is to analyse and evaluate the dividend announcement impact on stock prices of Baltic stock market listed companies during years 2004-2019.

The research questions are:

1. How dividend announcements impact share prices of NASDAQ OMX Baltic listed companies?
2. How efficient is NASDAQ OMX Baltic market?
3. What is the impact of the economic recession in 2009 on dividend payments?
4. Which variables could affect the abnormal returns in NASDAQ OMX Baltic market?

The database for the thesis is compiled with the data collected from NASDAQ OMX Baltic webpage. The database describes all the dividend payments from three countries (Estonia, Latvia, Lithuania) made by companies, that have been listed in Baltic main list between 2004 and 2019. In case of missing information about the amount of dividend per share, the annual reports are used.

The research is conducted in three stages. The first stage identifies all the dividend paying companies during years 2004-2019 that have been part of the NASDAQ OMX Baltic main list. In

the second stage, the dividend announcement event impact on stock prices is evaluated by employing market model event study methodology. The third stage of the research focuses on the regression analysis. The dependent variable for the regression analysis is abnormal return and the explanatory variable for the regression analysis is the change in dividend amount compared to previous year.

The thesis is divided into three parts. The first chapter focuses on the theoretical background of the paper and is divided into three subchapters. The first subchapter introduces the theory behind dividend announcement day. The second subchapter gives an overview of the NASDAQ OMX Baltic stock market. The third subchapter provides an overview of the recent studies published about NASDAQ OMX Baltic and dividend announcement day impact. The second chapter concentrates on the data and methodology used in this thesis. It is divided into three subchapters introducing data, market model event study methodology and regression analysis. The third chapter focuses on the analysis of dividend announcement day impact on share prices of NASDAQ OMX Baltic listed companies. There are two subchapters. The first subchapter is dedicated to market model event study analysis and the second subchapter focuses on the analysis and findings of the regression analysis.

I would like to thank my supervisor, associate professor Karin Jõeveer for advising and motivating me, as well as for the constructive and helpful comments. I would also like to thank my family and friends. Thank you Helina Meier, Markus Nurmsaar and Martin Nurmsaar for always motivating and supporting me.

1 THEORETICAL BACKGROUND

The first chapter focuses on the theoretical background of the paper and is divided into three subchapters. The first subchapter introduces the theory behind dividend announcement day. The second subchapter gives an overview of the NASDAQ OMX Baltic stock market. The third subchapter provides an overview of the recent studies published about NASDAQ OMX Baltic and dividend announcement day impact.

1.1 Dividend Announcement

The dividend announcement date, also known as the declaration date "… is the date on which the board of directors of a company announces the next dividend payment. This statement includes the dividend's size, ex-dividend date, and payment date." (Chen, 2018) The dividend announcement date is usually considered the least important date next to ex-dividend date, date of record and date of payment. Still, many researches have shown that the impact of dividend announcement date on share price is quite important and visible. Dividend announcement dates have always been under the control of companies' management and are never known to investors beforehand. In Baltic market, the difference between dividend announcement dates each year might even be a month. However, some companies prefer to announce the dividends on the same date every year.

Many researchers have investigated the stock price reaction to public and private information. However, the father of the efficient-market hypothesis is an American economist Eugene F. Fama, who published his doctoral thesis in 1965 analyzing the behaviour of stock market prices. It was followed by an article in 1970, where Fama proposed two concepts for efficient markets that are still used today. According to Fama, "… the ideal is a market in which prices provide accurate signals for resource allocation: that is, a market in which firms can make production-investment decisions, and investors can choose among the securities that represent ownership of firms' activities under the assumption that security prices at any time "fully reflect" all available information." (Fama, 1970) Still, it happens that share prices have the tendency to strive over time in the same direction as the events occurred. Analysing the impact of dividend announcement date on share prices is a great method for evaluating the efficieny of the market. Fama (Fama, 1970)

divided the market efficieny into three distinguishable forms – the weak, the semi-strong and the strong. The weak form indicates that stock prices should mirror only historical value-changing information. The semi-strong form of efficiency maintains that all publicly available value-changing information should be reflected in share prices. The strong form states that stock prices reflect all value-changing information. In his paper, Fama also introduced the "fair game" model, which considers the implication of the following assumptions:

- The conditions of market equilibrium can be stated in terms of expected returns;
- The information is fully utilized by the market in forming equilibrium expected returns and thus current prices.

Weak form tests showed consistent evidence of positive dependence in day-to-day price changes and returns on common stock. Semi-strong and strong form tests also supported the efficient market hypothesis. Overall, Fama found that the evidence in support of the efficient market model is widespread, whereas the evidence at odds is sparse. (Fama, 1970)

Over the years there have been comparatively many publications investigating the dividend announcement impact on stock prices all over the world (Seyedimany, 2019; Kaluarachchi, 2019; Ozo & Arun, 2019; Frensidy, Josephine, & Setyawan, 2019; Naik, Parab, & Reddy, 2018; Chaabouni, 2017; Truong, Huong, & van Anh, 2017; Kumar, 2017), but most of these focus on American or Asian markets. The Eastern Europe has not yet been broadly investigated.

1.2 NASDAQ OMX Baltic

NASDAQ OMX Baltic stock market is part of the world's biggest exchange group Nasdaq, Inc., which makes it a trustworthy platform for the investors. The market infrastructure is in accordance with the international industry standards and the world's fastest trading platform makes it comfortable for the investors to settle financial products between three countries. (Nasdaq Baltic - About Us) NASDAQ OMX Baltic consists of three stock exchanges - Vilnius Stock Exchange was established in 1992, Riga Stock Exchange in 1993 and Tallinn Stock Exchange was opened for trading in 1996 (Nasdaq OMX Nordic - About Us). In order to keep the financial sectors of the Baltic countries secure, all the securities markets are supervised by local financial supervisory authorities. In Estonia there is the Financial Supervision and Resolution Authority, in Latvia there is the Financial and Capital Market Commission and in Lithuania there is the Bank of Lithuania for supervising the stock exchanges. (Market Surveillance)

The primary market on the NASDAQ OMX Baltic exchanges is the Baltic Regulated Market, which is regulated under European Union directives and consists of four different lists – Baltic Main List, Baltic Secondary List, Baltic Bond List and Baltic Fund List. For this paper, the companies for analysis were taken from the Baltic Main List during the years of 2004 and 2019. The Baltic Main List comprises the most respected companies on the Nasdaq Tallinn, Nasdaq Riga and Nasdaq Vilnius. The conditions for a company to be eligible for the main list are the following (List of Markets):

- a history of at least 3 years of operations;
- a sound financial position;
- market capitalization of at least EUR 4 million;
- reporting according to International Financial Reporting Standards;
- a sufficient free float.

In 2020 there are 34 companies in NASDAQ OMX Baltic Main List and 28 companies in the Secondary List. During the studied period 2004-2019 altogether 58 companies were part of the Baltic Main List and 438 dividend announcements were made.

The trading day in NASDAQ OMX Baltic Stock exchange includes seven different events. From 9am to ~10am there is the period before the opening call auction, also known as pre-open period. This is the time for placing, modifying and cancelling orders before the trading starts. Between 10:00:00 and 10:00:05 there is the opening call auction, meaning that the order books move to continuous trading. From ~10am to 15:55 is the continuos trading period that is followed by pre-close period. Pre-close period is the last time to place, modify or cancel transaction orders. At ~4pm there is the closing call auction, meaning that the orders are matched in the order book based on the equilibrium price. During post-trading session from ~4pm to 16:30 there is a possibility for the investors to report manual trades and cancel submitted orders. From 16:30 until 9am the market is closed and no trading can be done. (Trading Day Structure)

On NASDAQ OMX Baltic Stock Exchange there are also many trading holidays that had to be taken into account when looking at the share prices before and after the announcement dates. Most of the trading holidays are different for all three countries, but for example Christmas is a common

holiday for Estonia, Latvia and Lithuania. During 2004-2019 there were altogether 628 trading holidays in the Baltic states - 177 in Estonia, 215 in Latvia and 236 in Lithuania.

Similarly to other stock markets, NASDAQ Baltic Stock Exchange uses indexes in order to help the investors to follow market movements and minimize their costs in constructing portfolios. Both share prices and indexes change continually during trading hours. One of the indexes used in NASDAQ Baltic Stock Market is the OMX Baltic Benchmark index. It tracks the largest and most actively traded shares on the market and it is reviewed twice a year. For this index, the basis used for weighing each stock is the free-float capitalization. Another index that NASDAQ Baltic uses is the OMX Baltic 10 index. It is most suitable for derivative financial intruments, since it considers the 10 most traded stocks on the market. Similarly to the OMX Baltic Benchmark index, it is reviewed twice a year and weighted based on free-float capitalization. Third general index used in NASDAQ Baltic Stock Exchange is the OMX Baltic All-Share index. This index shows the movement of stocks as a whole and includes almost all the stocks included on both the Main and Secondary lists. In addition to these general indexes, NASDAQ Baltic Stock Exchange also uses the local all-share indexes in order to provide information about the current status and stock movements on Tallinn, Riga and Vilnius markets separately. (NASDAQ Baltic)

1.3 Overview of the Recent Studies

Previous studies have analyzed dividend policy's impact on stock prices taking into account different aspects and focusing on only one country or many countries. This subchapter consists of three paragraphs introducing the results of the researches conducted in Asia, Europe and Baltics.

The two recent studies in the Baltic countries were conducted in 2017 and 2018 and investigated both the dividend announcement impact on stock prices and the semi-strong form efficiency in the Baltic stock market. For both of the researches, the event study methodology was used. The first paper investigated the period of 2010-2015 calculating the AARs. The second paper investigated the period of 2000-2016 calculating AARs as well. The results showed that NASDAQ OMX Baltic stock market has weak efficieny. (Legenzova, Jurakovaitė, & Galinskaitė, 2017; Alekneviciene, Kviedaraitiene, & Alekneviciute, 2018)

The two recent studies in the European countries were conducted in 2009 and 2017. Both of the researches investigated market reaction to events, one in Greek stock market and the other in Warsaw Stock Exchange. The methods used were event study methodology and cross-sectional regression analysis. For the Polish stock market, the results showed positive and immediate market reaction for dividend announcements. For the Greek stock market, the results showed statistically significant market reaction on the dividend announcement date and that the market reacts to dividend news efficiently. (Dasilas & Leventis, 2011; Mrzyglod & Nowak, 2017)

The three recent studies in the Asian countries were conducted in 2010, 2012 and 2016. In 2010 the stock price reactions in Bangladesh were investigated by employing the event study methodology. In 2012 the impact of dividend announcement was examined in Thailand Stock Exchange using the event study methodology. In 2016 the dividend announcement and ex-dividend dates in Vietnam stock market were taken under investigation in order to find out their effect on stock returns. Similarily to the previous researches, event study methodology was used. Based on Vietnam and Thailand, it was clearly seen that the dividend announcement effect on the stock return is positive. However, the study conducted in Bangladesh, resulted that due to strong influence of insider trading and other factors in the capital market, the dividend announcement does not communicate any information. (Ngoc & Cuong, 2016; Suwanna, 2012; Ali & Chowdhury, 2010)

These recent researches can also be grouped by market efficiency instead of region. According to Fama, there are three different forms of market efficiency: strong, semi-strong and weak. (Fama, 1970) Out of these seven investigated researches, evidence of weak market efficiency was found in the Baltic market and in Bangladesh Stock Exchange. (Legenzova, Jurakovaitė, & Galinskaitė, 2017; Ali & Chowdhury, 2010) Evidence of semi-strong efficiency was found in Thailand Stock Exchange and in Vietnam Stock Market. (Ngoc & Cuong, 2016; Suwanna, 2012) Researches conducted in Polish and Greek Stock Markets found statistically significant evidence of strong market efficiency. (Dasilas & Leventis, 2011; Mrzyglod & Nowak, 2017)

2 DATA AND METHODOLOGY

The second chapter concentrates on the data and methodology used in this thesis. The research was conducted in three stages. The first stage was to identify the dividend paying companies in NASDAQ OMX Baltic Main List during 2004-2019. In the second stage, the dividend announcement event impact on stock prices was evaluated by employing market model event study methodology. The third stage of the research focused on the regression analysis. The first subchapter provides information about the data used in this thesis. Second subchapter gives an overview of the market model event study methodology and third subchapter introduces regression analysis.

2.1 Data

The data for this thesis was collected from NASDAQ OMX Baltic webpage. The dividend announcement dates for all the three countries were identified and found by browsing through companies' market announcements. The amounts of dividend payment were mostly included in the dividend announcements, but for some cases it was necessary to look for the dividend per share in the annual reports. In order to automatically get the necessary dates before and after the announcement date, the author created a new function in Excel. This was necessary, since the existing daycounting functions are not able to take into account the holidays. The function was built not to count in the weekends and trading holidays, when calculating the new date because there is no trading on those days. The function was built to identify the home market of each company in order to choose the correct holidays to account for for each company. The list of trading holidays was acquired from NASDAQ OMX Baltic website and converted into the Excel file. The function created by the author is the following:

$$workday\ Local(start\_date\ As\ Date, days, holidaysRIG\ As\ Range, holidaysTLN\ As\ Range, holidaysVLN\ As\ Range, region)$$

where

$start\_date\ As\ Date$	–	the dividend announcement date,
$days$	–	the number of days before (-) or after (+) the dividend announcement date,
$holidaysRIG\ As\ Range$	–	list of all the trading holidays in 2004-2019 in Riga Stock Exchange,
$holidaysTLN\ As\ Range$	–	list of all the trading holidays in 2004-2019 in Tallinn Stock Exchange,
$holidaysVLN\ As\ Range$	–	list of all the trading holidays in 2004-2019 in Vilnius Stock Exchange,
$region$	–	home market of the company (TLN, RIG or VLN).

The share prices to match the dates were taken from the NASDAQ OMX Baltic webpage where every company was investigated separately. In addition to the share prices, the OMX Baltic Benchmark GI index values were also matched to each date. After the initial data was collected, the data was sorted in order to provide the best possible quality.

The dividend payments were presented in Estonian kroons (EEK), Latvian lats (LVL), Lithuanian litas (LTL) and in euros (EUR). Estonia joined the Euro area in 2011, prior to that all the dividend payments were presented in EEK and had to be converted into euros. For conversion, the fixed exchange rate of European Central Bank (1€ = 15.6466EEK) was used. Latvia joined the Euro area in 2014, prior to that all the dividend payments were presented in LVL and had to be converted into euros. For conversion, the fixed exchange rate of European Central Bank (€1 = LVL 0.702804) was used. Lithuania joined the Euro area in 2015, prior to that all the dividend payments were presented in LTL and had to be converted into euros. For conversion, the fixed exchange rate of European Central Bank (€1= LTL 3.45280) was used. (Alekneviciene, Kviedaraitiene, & Alekneviciute, 2018)

2.2 Market Model Event Study

The market model event study is based on analyzing the pre-announcement, announcement and post-announcement periods in order to identify the stock price behaviour (Legenzova, Jurakovaitė, & Galinskaitė, 2017). The execution of event study compared to other evaluation methods is fairly easy. It comprises the identification of an event (in this case, the dividend announcement event)

that is the reason behind the change in investors' expectations about the value of a company. This method compares the stock price movement to the expected stock price movement and consists of three steps. In the first step the event window is identified, in the second step abnormal returns are calculated and the third step is for testing the statistical significance of the abnormal share price performance. (Mitchell & Netter, 1994) In the first stage of the analysis, the author identified all the dividend paying companies in NASDAQ OMX Baltic Main List between 2004-2019 who had publicly disclosed such information. All the companies who had been part of the Main List at some point during the studied period were taken into account.

In the second stage of the research the dividend announcement event impact on stock prices was evaluated by employing market model event study methodology. This methodology has also been used in previous researches, when evaluating the event impact on share prices (Chavali & Nusratunnisa, 2013; Legenzova, Jurakovaitė, & Galinskaitė, 2017; Mallikarjunappa & Manjunatha, 2009; MacKinlay, 1997; Fama, 1970). For all the dividend announcements, the change in dividend was calculated by using the simple percentage change formula:

$$\Delta Div_1 = \frac{Div_1 - Div_0}{Div_0} \cdot 100\% \quad (1)$$

where
Div_1 – the amount of dividend in year 1,
Div_0 – the amount of dividend in year 0.

Due to two limitations, for some of the dividend payments it was not possible to calculate the change. The first limitation was the situation where the company decided to pay dividend for the first time during studied period. The second limitation was the situation where because of unknown factors the company was not able to pay dividends every year, so when initiating the dividend again, it was not possible to calculate the accurate change. The dividend announcements where then sorted from smallest to largest by taking into account the calculated change in dividend and dividend into four groups (I Group, II Group, III group and IV Group). The first group includes the dividend announcements for which the change in the announced dividend was from -100% to -33% compared to previous year. The second group involves the dividend announcements for which the change in the announced dividend was from -33% to 0% compared to previous year. The third group incorporates the dividend announcements for which the change in the announced dividend was from 0% to 33% compared to previous year. The fourth group involves the dividend announcements for which the change in the announced dividend was from 35% to 24900% compared to previous year. The change in dividend was chosen for grouping the companies,

because of the following assumption made by the author: the companies with similar changes in dividend payments offer similar abnormal returns for the investors. For example, when the change in dividend is negative, the abnormal returns will most likely be negative as well.

In order to simplify the research, it was conjectured that the investors follow a specific investment strategy. It was assumed that since investors are looking for abnormal returns, they have three different dates for buying the stock and three different date options for selling the stock. The dividend announcement date, or the event day is marked as t. The nine different holding periods for the stock were:

- $(t - 3, t + 1)$ – the stock is bought three days before the announcement date and sold one day after the announcement date;
- $(t - 3, t + 3)$ – the stock is bought three days before the announcement date and sold three days after the announcement date;
- $(t - 3, t + 7)$ – the stock is bought three days before the announcement date and sold seven days after the announcement date;
- $(t - 1, t + 1)$ – the stock is bought one day before the announcement date and sold one day after the announcement date;
- $(t - 1, t + 3)$ – the stock is bought one day before the announcement date and sold three days after the announcement date;
- $(t - 1, t + 7)$ – the stock is bought one day before the announcement date and sold seven days after the announcement date;
- $(t, t + 1)$ – the stock is bought on the announcement date and sold one day after the announcement date;
- $(t, t + 3)$ – the stock is bought on the announcement date and sold three days after the announcement date;
- $(t, t + 7)$ – the stock is bought on the announcement date and sold seven days after the announcement date.

The dividend announcement date t was determined using the market announcements from NASDAQ OMX Baltic webpage. When choosing the strategy of selling one day after the dividend announcement date, the investor is sure that the stock price drops right after the dividend announcement. This means that in the opinion of the investor, the NASDAQ OMX Baltic Stock Exchange is an efficient market and every piece of new information impacts the prices

immediately. When choosing the strategy of selling three or seven days after the dividend announcement date, the investor assumes some kind of inefficiency in the market and expects the prices not to drop shortly after the event date. (Fama, 1970; Legenzova, Jurakovaitė, & Galinskaitė, 2017)

In order to calculate abnormal returns (ARs) and cumulative abnormal returns (CARs) first the following general formula is used to calculate the simple percentage change in price during all the nine holding periods (MacKinlay, 1997):

$$R_i = \frac{P_{i1} - Pi_0}{P_{i0}} \quad (2)$$

where

R_i – the holding period return on stock *i,*
P_{i1} – closing price of stock *i* on the day of sale*,*
P_{i0} – closing price of stock *i* on the day of purchase.

For calculating the abnormal returns, the change in OMX Baltic Benchmark GI index is also necessary. This is calculated using the same formula (2). The market index is important for reflecting the market situation, since it contains the 20 companies who have highest capitalization and liquidity. The returns of market index are calculated for the same nine holding periods that are used for stock returns and that take into account all different strategies. For calculating the abnormal returns (ARs), the following formula is used (MacKinlay, 1997):

$$AR_{it} = R_i - M_t \quad (3)$$

where

AR_{it} – the abnormal return on a stock *i* during the holding period,
M_t – the market index return during the holding period.

In order to calculate the cumulative abnormal returns (CARs), the abnormal returns for each stock and for each of the nine strategies were summarized:

$$CAR_{it} = \sum_{i=1}^{n} AR_{it} \quad (4)$$

where

CAR_{it} – the cumulative abnormal returns during the holding period.

For assessing the results, the test of significance is also conducted. The deviation from 0 is evaluated by *t-test* and a level of significance of 5 percent was chosen. The following formula for *t-statistics* calculation is used:

$$\frac{AAR_t}{S \cdot \sqrt{n}} \sim t \tag{5}$$

where

AAR_t – the average abnormal returns during the holding period,
S – the standard deviation,
n - the number of observations.

It is a two-tailed *t-statistics* test and the hypotheses set are the following:

$H0: CAR = 0$

$H1: CAR \neq 0$

The abnormal returns (ARs) were calculated for each dividend announcement for all nine holding periods, but the cumulative abnormal returns (CARs) and average abnormal returns (AARs) were calculated for each group (I Group, II Group, III Group and IV Group) for all the nine holding periods.

2.3 Regression Analysis

The term "regression" was first used in the 19th century by an English anthropologist Francis Galton, who noticed that children's height heads towards the average height. He called it the regression toward the mean. (Sauga, 2020) Since then, many other models and methods have been developed and regression analysis is widely used for estimating the relationship between one dependent and one or multiple independent variables.

The third stage of the research, the regression analysis, has one dependent variable and five explanatory variables. The dependent variable is the abnormal return and altogether 9 regressions were made, one for each holding period.

The regression model for this analysis is:

$$AR_{i,t} = \propto + \beta_1 largedrop + \beta_2 largeinc + \varepsilon_{i,t} \quad (6)$$

where

$\propto$	–	constant,
largedrop	–	dummy variable for extreme decrease in dividend,
largeinc	–	dummy variable for extreme increase in dividend,
$\varepsilon_{i,t}$	–	error term for a stock i during the holding period.

The first explanatory variable *largedrop* is a dummy for measuring the effect of extreme decrease in dividend on abnormal returns. The dummy variable *largedrop* is equal to 1, if the decrease in dividend is bigger than 10%, otherwise it is equal to 0. The second explanatory variable *largeinc* is a dummy for measuring the effect of extreme increase in dividend on abnormal returns. The dummy variable *largedrop* is equal to 1, if the increase in dividend is bigger than 10%, otherwise it is equal to 0.

There were many other explanatory variables considered for this regression model, but none of them appeared to be statistically significant. The first explanatory variable tested was the change in dividend which was computed for grouping the dividend announcements. Other explanatory variable that was tested was the GDP growth, but as resulted, it has no effect on abnormal return. Two country specific dummies were also added to the regression model, but they also showed no statistical significance.

In terms of regression analysis, it is also important to choose the relevant confidence level. A confidence level of 0% means that there is no possibility that in case of new, identical research, the results would be the same. On the contrary, a confidence level of 100% means that there is no possibility for the results to differ in case of another identical study. When taking into account the limitations of analyzing stock market events and the relevance of collected data, the author decided that a confidence level of 95% would be suitable for this regression analysis. The following figure presents the descriptive statistics of both dependent and explanatory variables. (Laidroo & Grigaliuniene, 2012)

Table 1. The Descriptive Statistics of Dependent and Explanatory Variables

Variable	Mean	Median	Maximum	Minimum	StDev
Dependent variables					
AR (-3;1)	0,0104	0,0064	0,2741	-0,0979	0,0406
AR (-3;3)	0,0090	0,0030	0,3579	-0,1382	0,0518
AR (-3;7)	0,0059	0,0037	0,3428	-0,3648	0,0618
AR (-1;1)	0,0093	0,0039	0,2909	-0,1218	0,0376
AR (-1;3)	0,0079	0,0033	0,3897	-0,1318	0,0499
AR (-1;7)	0,0047	0,0012	0,3512	-0,3025	0,0580
AR (0;1)	0,0040	-0,0001	0,2488	-0,0937	0,0278
AR (0;3)	0,0027	0,0002	0,3398	-0,1226	0,0415
AR (0;7)	-0,0005	-0,0011	0,3579	-0,3175	0,0511
Explanatory variables					
largedrop	0,3164	0	1	0	0,4658
largeinc	0,3881	0	1	0	0,4880

Source: Author's calculations

Notes:

1. *largedrop* – dummy variable for extreme decrease in dividend compared to previous year;
2. *largeinc* – dummy variable for extreme increase in dividend compared to previous year.

3 ANALYSIS OF THE IMPACT OF DIVIDEND ANNOUNCEMENT EVENT ON STOCK PRICES OF NASDAQ OMX BALTIC LISTED COMPANIES

The last chapter of the thesis focuses on the empirical analysis of the stock price behaviour around the dividend announcement date. The first subchapter gives a broad overview of the market model event study analysis. The second subchapter concentrates on the regression analysis.

3.1 Event Study

The first stage of the research was identifying the dividend paying companies. Altogether 58 companies were part of the NASDAQ OMX Baltic Main List at some point during 2004-2019. Out of these 58 there were 5 companies who did not pay dividends. Out of these 58 companies Hansapank was left out as an outlier because of short period of participation in the stock market and only a single dividend announcement. Out of the 58 companies, there were three companies who paid dividends every year during the studied period 2004-2019.

Altogether 438 dividend payments were publicly announced during 2004-2019 in the NASDAQ OMX Baltic Stock Exchange. Out of these 438 dividend announcements, 335 were divided into four groups and their impact to the share price was analyzed. Out of the 103 announcements that were left out, 30 were zerodividend announcements and 73 occurred for the first time after not paying dividends. The following figure shows the number of companies who paid dividends during the studied period.

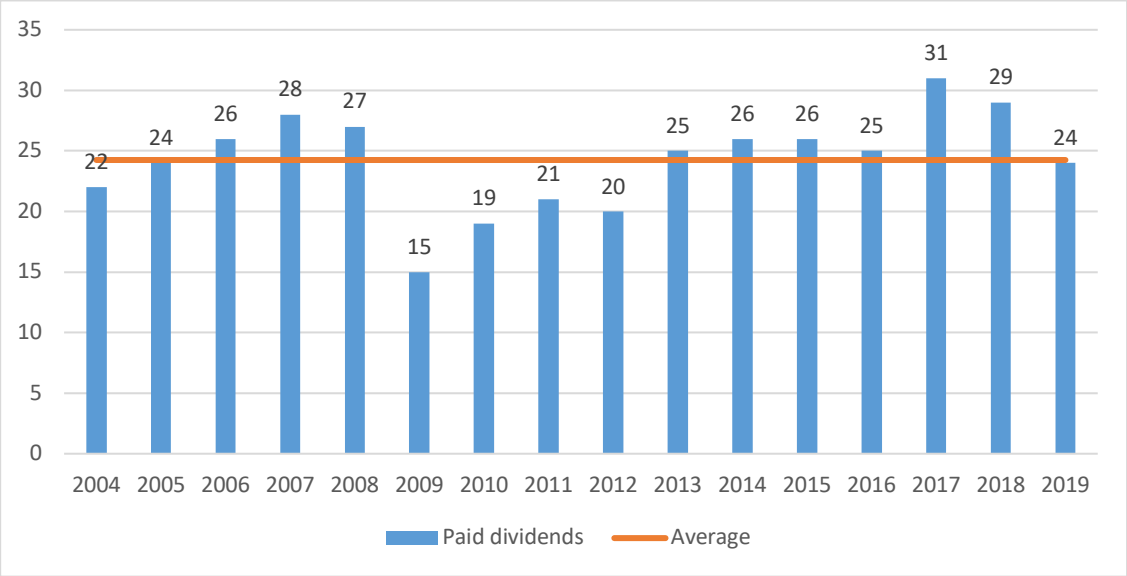

Figure 1. Dividend paying companies on NASDAQ OMX Baltic market during 2004-2019
Source: Author's calculations based on data from NASDAQ OMX Baltic webpage

From the graph it can be seen, that the highest number of dividend paying companies is 31 companies in 2017 and the lowest number is 15 companies in 2009. The lowest result of 15 dividend paying companies in 2009 is most probably caused by the economic recession in the market. The companies' profit was lower or even negative, so there were less companies who were able to pay dividends to their shareholders. Still, a steady rise in the number of dividend paying companies can be seen from 2004-2008 as well as after the recession. The highest result of 31 companies is most probably caused by reaching the peak in economy after the recession. The average value line shows that in 9 years out of 16 the number of dividend paying companies was above the average. This shows that most of the companies are financially healthy enough in order to pay more or less constant dividends. From 2017-2019 there is a decline, which is most probably caused by the difficult economic conditions and many changes in the market.

In the second stage of the research the dividend announcement event impact on stock prices was evaluated by employing market model event study methodology. For determining market reaction to dividend announcements, first the abnormal returns (ARs) and then the cumulative abnormal returns (CARs) were calculated for all nine investment strategies for 2004-2019. The companies were divided into four different groups based on the changes in their dividend payments.

For determining market reaction to dividend announcements, abnormal returns and cumulative abnormal returns were calculated for each of the group. The following figure presents the cumulative abnormal returns (CARs) of NASDAQ OMX Baltic Main Listed companies during studied period.

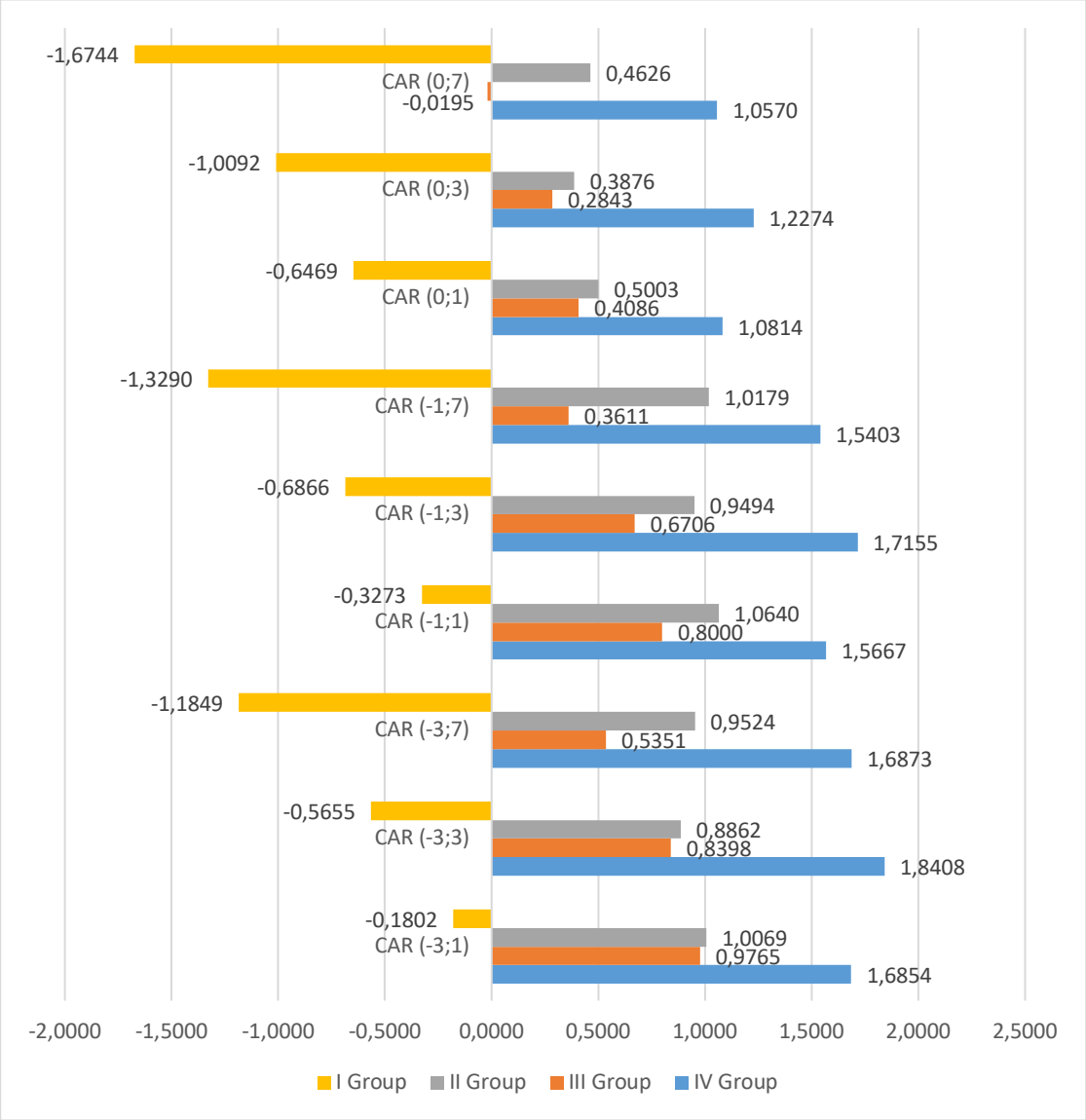

Figure 2. The Cumulative Abnormal Returns of NASDAQ OMX Baltic Stock Market listed companies during 2004-2019
Source: Author's calculations based on data presented in Appendix 1

From Figure 3 it can be clearly seen that the cumulative abnormal returns were the lowest for the first group and the highest for the fourth group. This is positively correlated with the grouping strategy. The first group, where the changes in dividend payments were negative (from -100% to

-33%) also has the lowest cumulative abnormal returns. The fourth group, where the changes in dividend payments were positive (from 35% to 24900%) and the increase was the highest also has the highest cumulative abnormal returns. When it comes to the second and third group, it can be seen that the cumulative abnormal returns were higher for the second group than they were for the third group. The second group had changes in dividend from -33% to 0% and the third group had changes in dividend from 0% to 33%. This shows that when a company pays the exact same amount of dividend every year or increases it constantly by small amounts, the abnormal returns for the investors are lower compared to the situation where a company pays slightly less dividend comparing to the previous year.

The highest cumulative abnormal returns of 1,8408 were acquired by the fourth group when buying the stock three days prior to the dividend announcement date and selling the stock three days after the dividend announcement date. The second highest cumulative abnormal returns of 1,7155 were also received by the fourth group when buying the stock one day prior to the dividend announcement day and selling the stock three days after the dividend announcement day. The lowest cumulative abnormal returns of -1,6744 were acquired by the first group when buying the shares on the dividend announcement date and selling the shares seven days after the dividend announcement date. The second lowest cumulative abnormal returns of -1,329 were also received by the first group when buying the stock one day prior to the dividend announcement date and selling the stock seven days after the dividend announcement date. This shows that not depending on the day of purchase, the highest abnormal returns will occur when selling the stock three days after the dividend announcement day and the lowest abnormal returns will occur when selling the stock seven days after the dividend announcement day. These results demonstrate that the share prices do not drop shortly after the announcement, which is the indicator of an efficient market, but instead take at least three but no more than seven days in order to react to the event.

When it comes to the day of purchasing the stock, the investors were assumed to acquire the shares whether one or three days prior to the announcement date or on the announcement day. Figure 3 shows the highest cumulative abnormal returns for the investors buying the shares three days before the dividend announcement date and the lowest cumulative abnormal returns for the investors buying the shares on the dividend announcement date.

Table 2. NASDAQ OMX Baltic Dividend Paying Companies' CARs and *t-statistics* for the I and IV Group

Group	Days before / after dividend announcement	CAR	t-statistics	Critical value
I group	**[t - 3; t + 1]**	-0,1802	-0,4705	1,989
	[t - 3; t + 3]	-0,5655	-0,9590	1,989
	[t - 3; t + 7]	-1,1849*	-2,1555	1,989
	[t - 1; t + 1]	-0,3273	-1,1529	1,989
	[t - 1; t + 3]	-0,6866	-1,2178	1,989
	[t - 1; t + 7]	-1,3290*	-2,7791	1,989
	[t; t + 1]	-0,6469*	-3,4899	1,989
	[t; t + 3]	-1,0092*	-2,0210	1,989
	[t; t + 7]	-1,6744*	-4,3997	1,989
IV group	**[t - 3; t + 1]**	1,6854*	3,6453	1,989
	[t - 3; t + 3]	1,8408*	3,6230	1,989
	[t - 3; t + 7]	1,6873*	2,3036	1,989
	[t - 1; t + 1]	1,5667*	3,4044	1,989
	[t - 1; t + 3]	1,7155*	3,4707	1,989
	[t - 1; t + 7]	1,5403*	2,2265	1,989
	[t; t + 1]	1,0814*	2,8252	1,989
	[t; t + 3]	1,2274*	3,1110	1,989
	[t; t + 7]	1,0570	1,7035	1,989

*Significant with significance level $\propto = 0{,}05$
Source: Author's calculations

In order to confirm the results of computed cumulative abnormal returns (CARs), their statistical significance has to be evaluated. For the statistical significance, *t-statistics* for the first and fourth group were computed, evaluated and are presented in Table 2. The *t-statistics* for the second and third group are presented in Table 3. For the value of computed cumulative abnormal return (CAR) to be statistically significant, the *t-statistics* has to be higher than the critical value. Since it is a two-tail test, the computed cumulative abnormal return (CAR) is also statistically significant when the absolute value of the *t-statistic* is higher than the critical value. The significance level chosen for this study is 95%.

Table 3. NASDAQ OMX Baltic Dividend Paying Companies' CARs and *t-statistics* for the II and III Group

Group	Days before / after dividend announcement	CAR	t-statistics	Critical value
II group	**[t - 3; t + 1]**	1,0069*	2,9831	1,989
	[t - 3; t + 3]	0,8862*	2,1525	1,989
	[t - 3; t + 7]	0,9524	1,7582	1,989
	[t - 1; t + 1]	1,0640*	3,1959	1,989
	[t - 1; t + 3]	0,9494*	2,3797	1,989
	[t - 1; t + 7]	1,0179	1,9132	1,989
	[t; t + 1]	0,5003*	3,0306	1,989
	[t; t + 3]	0,3876	1,3978	1,989
	[t; t + 7]	0,4626	0,9879	1,989
III group	**[t - 3; t + 1]**	0,9765*	3,9947	1,989
	[t - 3; t + 3]	0,8398*	2,6952	1,989
	[t - 3; t + 7]	0,5351	1,6464	1,989
	[t - 1; t + 1]	0,8000*	3,4995	1,989
	[t - 1; t + 3]	0,6706*	2,2971	1,989
	[t - 1; t + 7]	0,3611	1,1945	1,989
	[t; t + 1]	0,4086*	2,2050	1,989
	[t; t + 3]	0,2843	1,0879	1,989
	[t; t + 7]	-0,0195	-0,0672	1,989

*Significant with significance level $\propto = 0{,}05$
Source: Author's calculations

From Table 2 it can be seen that for the first group, five cumulative abnormal return (CAR) values out of nine are statistically significant. This result shows that when the dividend decreases, meaning that the change compared to previous year is negative, the share price decreases as well. When it comes to the results of the fourth group, which are also presented in Table 2, it can be seen that all the computed cumulative abnormal returns (CARs) are statistically significant except the CAR for the last strategy where investor buys the stock on the dividend announcement date and sells it seven days after the dividend announcement date. This strategy also has the lowest cumulative abnormal return in the fourth group, which causes the low value of its *t-statistics* and the insignificance.

The second and third group were compiled from dividend changes that were close to zero and it can be seen that there is more variance in the significance results compared to the other two groups. When looking at the results of the second group from Table 3, it can be stated that the cumulative abnormal returns for all the three strategies where the investor sells the stock seven days after the

dividend announcement date are statistically insignificant. In addition, the CAR for the (0;3) holding period is insignificant. All the other results in the second group are statistically significant. The reason behind such results is most probably connected to the standard deviation of abnormal returns (ARs). Since the standard deviation is considered in the Formula 5, the higher the standard deviation of the sample abnormal returns (ARs), the lower the computed *t-statistics* value. When looking at the third group, it can be seen that the same results apply. The cumulative abnormal returns for all the three strategies where the investors sell the stock seven days after the dividend announcement date are statistically insignificant. In addition, the cumulative abnormal return for the strategy of buying the stock on the dividend announcement date and selling three days later, is insignificant. All the other results in the third group are statistically significant.

3.2 Regression Analysis

The third stage of the research was regression analysis. Separate regressions were conducted for each of the nine holding strategies. For each of the regression there were 335 observations. The analysis started with the following regression model:

$$AR_{i,t} = \propto + \beta_1 largedrop + \beta_2 largeinc + \varepsilon_{i,t} \quad (6)$$

where

$\propto$	–	constant,
largedrop	–	dummy variable for extreme decrease in dividend,
largeinc	–	dummy variable for extreme increase in dividend,
$\varepsilon_{i,t}$	–	error term for a stock i during the holding period.

The results are presented in the following three tables. The first table, Table 4, shows the regression analysis results for AR (-3;1), AR (-3;3) and AR (-3;7). The second table, Table 5, shows the regressions of AR (-1;1), AR (-1;3) and AR (-1;7). The third table, Table 6, shows the results of the regression analysis for AR (0;1), AR (0;3) and AR (0;7).

Table 4. NASDAQ OMX Baltic Dividend Paying Companies' ARs Regression Analysis for AR (-3;1), AR (-3;3) and AR (-3;7)

	Variable	*Constant*	*t-stat*	*P-value*
AR (-3;1)	Intercept	0,014	3,444	0,001
	largedrop	-0,015	-2,664	0,008
	largeinc	0,003	0,633	0,527
AR (-3;3)	Intercept	0,010	1,992	0,047
	largedrop	-0,014	-2,029	0,043
	largeinc	0,009	1,254	0,211
AR (-3;7)	Intercept	0,008	1,382	0,168
	largedrop	-0,019	-2,198	0,029
	largeinc	0,009	1,080	0,281

Source: Author's calculations

When looking at the Table 4, it can be seen that there is statistical significance with the significance level of 95% in case of *largedrop* explanatory variable. The explanatory variable *largeinc* is statistically insignificant. When it comes to the P-values, then the smaller the P-value, the better. For *largedrop* variable the P-values are all smaller than 0.05 (0.008, 0.043 and 0.029). The statistical significance of *largedrop* variable shows that when the dividend decreases, the share price decreases as well. In case of AR (-3;1), when the dividend decreases by 1€, the share price decreases by 0,015€. In case of AR (-3;3), when the dividend decreases by 1€, the share price decreases by 0,014€. In case of AR (-3;7), when the dividend decreases by 1€, the share price decreases by 0,019€.

Table 5. NASDAQ OMX Baltic Dividend Paying Companies' ARs Regression Analysis for AR (-1;1), AR (-1;3) and AR (-1;7)

	Variable	*Constant*	*t-stat*	*P-value*
AR (-1;1)	Intercept	0,014	3,875	0,000
	largedrop	-0,017	-3,264	0,001
	largeinc	0,001	0,115	0,909
AR (-1;3)	Intercept	0,011	2,190	0,029
	largedrop	-0,016	-2,357	0,019
	largeinc	0,006	0,865	0,388
AR (-1;7)	Intercept	0,009	1,582	0,115
	largedrop	-0,021	-2,590	0,010
	largeinc	0,006	0,749	0,455

Source: Author's calculations

When looking at the Table 5, the statistical significance of *largedrop* variable can also be seen. The explanatory variable *largeinc* is still statistically insignificant. The P-values of the *largedrop* variable are still smaller than the significance level, 0.05 (0.001, 0.019 and 0.01). For these holding periods, the statistical significance of *largedrop* variable again shows that when the dividend decreases, the share price decreases as well. In case of AR (-1;1), when the dividend decreases by 1€, the share price decreases by 0,017€. In case of AR (-1;3), when the dividend decreases by 1€, the share price decreases by 0,016€. In case of AR (-1;7), when the dividend decreases by 1€, the share price decreases by 0,021€.

Table 6. NASDAQ OMX Baltic Dividend Paying Companies' ARs Regression Analysis for AR (0;1), AR (0;3) and AR (0;7)

	Variable	***Constant***	***t-stat***	***P-value***
AR (0;1)	Intercept	0,009	3,149	0,002
	largedrop	-0,015	-3,989	0,000
	largeinc	0,001	0,168	0,867
AR (0;3)	Intercept	0,005	1,239	0,216
	largedrop	-0,015	-2,554	0,011
	largeinc	0,006	1,037	0,301
AR (0;7)	Intercept	0,003	0,679	0,498
	largedrop	-0,019	-2,753	0,006
	largeinc	0,006	0,833	0,406

Source: Author's calculations

When looking at the Table 6, the statistical significance of *largedrop* variable can be seen here as well. The explanatory variable *largeinc* is still statistically insignificant. The P-values of the *largedrop* variable are still smaller than the significance level, 0,05 (0.000, 0.011 and 0.006). In case of AR (0;1), when the dividend decreases by 1€, the share price decreases by 0,015€. In case of AR (0;3), when the dividend decreases by 1€, the share price decreases by 0,015€. In case of AR (0;7), when the dividend decreases by 1€, the share price decreases by 0,019€.

Table 7. NASDAQ OMX Baltic Dividend Paying Companies' ARs Regression Analysis

	Adj. R^2	Significance F	No. Of Obs
AR (-3;1)	0,032	0,002	335
AR (-3;3)	0,029	0,003	335
AR (-3;7)	0,029	0,003	335
AR (-1;1)	0,039	0,000	335
AR (-1;3)	0,029	0,003	335
AR (-1;7)	0,033	0,001	335
AR (0;1)	0,061	0,000	335
AR (0;3)	0,037	0,001	335
AR (0;7)	0,038	0,001	335

Source: Author's calculations

Based on the data presented in Table 7, it can be stated that the results for all nine strategies are statistically significant since their F-value is below 0.05. The number of observations was the same for all nine holding periods. The adjusted R-Squared has the highest value of 0.061 for AR (0;1). This might be caused by the short holding period as well as the very low significance level.

Based on this analysis, it can be clearly stated that the increase in dividend has no or very little impact on share prices, whereas a decrease in the dividend decreases the share price as well. These results can be connected to the dividend smoothing theory meaning that the companies try to keep their dividend payments stable. In the light of the results of this regression, it can be stated that for the company it is definitely more useful to pay stable dividends rather than switching between high and low dividends.

4 CONCLUSION

The aim of this paper was to analyse and evaluate the dividend announcement impact on stock prices of NASDAQ OMX Baltic stock market listed companies during years 2004-2019.

The first research question was about the impact of dividend announcements on share prices of NASDAQ OMX Baltic listed companies. The analysis showed that the prices go up after the dividend announcement and then drop. The highest cumulative abnormal returns were achieved when buying the stock three days prior to the dividend announcement date and selling the stock three days after the dividend announcement date. It was clearly seen that by the seventh day after the dividend announcement, the share prices drop significantly, decreasing the abnormal returns. The results showed that when the dividend decreases, the share price also decreases.

The second research question was about the efficiency of the NASDAQ OMX Baltic stock market. When comparing the results with the theoretical background about efficient markets, it can be said that NASDAQ OMX Baltic Stock market shows weak efficiency, since the price reaction to the event is not immediate. The share price did not drop one day after the dividend announcement but instead took at least three days to react.

The third research question focused on the impact of the economic recession in 2009 on dividend payments. It was clearly seen that in 2009 the number of dividend paying companies was the lowest during 2004-2019 and the amounts of dividends paid were small as well. The economic recession was also visible when looking at the share prices. The share prices dropped in 2008 and 2009 and the slowly started to increase again. However, despite the difficult times, there were still 15 companies who managed to pay dividend in 2009.

The fourth research question focused on identifying the variables that could possibly affect the abnormal returns in NASDAQ OMX Baltic Stock market. Based on the regression analysis it can be concluded that the increase in dividend has no or very little impact on share prices, whereas decreasing the dividend decreases the share price as well. This means that the variable, which has the most impact on abnormal returns, is the extreme decrease in dividend (more than 10%).

Overall, based on market model event study and regression analysis, it can be concluded that when investing in NASDAQ OMX Baltic Stock market, the highest abnormal returns are achieved when

buying the stock three days before the dividend announcement date and selling the stock three days after the dividend announcement date. Should the market become more efficient, it is expected that the share prices will react more quickly, meaning that the sale of the stock should happen right after the dividend announcement.

During the market model event study analysis many factors were not taken into account. Stock prices can be influenced by a number of other factors than dividend announcement and the detailness of the announcement can also affect the stock prices. The dividend announcements are taken with the precision of a day, since the exact time of announcing the dividend is not available. This thesis did not analyze the impact of tax neither the impact of the size of the company. The research did not take into account the abnormal return of different portfolios, but focused on separate dividend announcements. The main limitation for the regression analysis, was definitely the amount of factors that could affect abnormal returns. Only several of them had to be chosen, leaving out time factor, number of shares traded and multiple economic factors.

When it comes to investigating dividend annoucnement impact on stock prices, it is an important topic that is not very broadly investigated in the Eastern Europe. The Baltic countries, especially Estonia are developing very fast and the amount of shares traded in the market is growing. It is important to provide necessary information and ideas for the investors in order to keep developing the Baltic Stock Market. The author proposes to further investigate the dividend announcement impact on share prices choosing different event window and especially looking at the impact of recent corona virus on NASDAQ OMX Baltic market. It is also important to further develop the regression analysis and to add more explanatory variables, for example time and economic factors. The event study methodology should also applied to investigate the impact of other events on the market, for example ex-dividend day and the actual day of dividend payment. It would be interesting to see, whether there would be any fluctuations in price and would it differ from the impact of the dividend announcement date. Another proposal for further research is to study the dividend announcement impact on the share prices of companies who belong to the Baltic Secondary list.

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6 APPENDICES

Appendix 1. Database

https://livettu-my.sharepoint.com/:x:/g/personal/vihele_ttu_ee/EetBrdzHW_FNtC4r6a4tuK4BSSik12Ys50kzdfJN-gwwZg?e=7Sc4z4

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