

LAPPEENRANTA-LAHTI UNIVERSITY OF TECHNOLOGY LUT  
School of Business and Management  
Business Administration

*Alexi Roti*

## **THE TIMING OF SHARE REPURCHASES IN THE LONDON STOCK EXCHANGE**

Examiners:           Professor Satu Pätäri  
                              D.Sc. Timo Leivo

## ABSTRACT

Author: Aleksi Roti  
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Share repurchases have been popular topic on the previous research, with overall results being in favor of companies succeeding in repurchase timing. There is also contradicting evidence that companies could not time repurchases correctly. The correct time when to execute repurchases has also not been defined. Objective of this thesis is to study how companies are timing their share repurchases in the London Stock Exchange between 2010-2019. Whether the companies are using their own share price down days, market downturns or company valuation to decide when to execute share repurchases. The company valuation is measured by using the price to book ratio and it is compared to the market median.

The results of this thesis show that on average companies repurchase shares cheaper compared to the possible alternative repurchase programs and therefore minimize repurchase costs. However, the results are only statistically significant on one of the years. On the market downturns companies repurchase more shares after the downturns compared to before, but this is not statistically significant. Most important finding of the study is that when companies are valued under the market median price to book ratio they repurchase much more of their own shares and when they are valued over the market median, they repurchase much less shares. This suggests that company valuation can signal whether company is likely to execute share repurchases.

## TIIVISTELMÄ

Tekijä:	Aleksi Roti
Tutkielman nimi:	Omien osakkeiden takaisinostojen ajoitus Lontoon pörssissä
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Omien osakkeiden takaisinostot ovat pitkään olleet suosittu tutkimuskohde, jossa tulokset osoittavat, että yritykset keskimäärin onnistuvat takaisinostojen ajoituksessa. Kuitenkin myös päinvastaisia havaintoja on esitetty. Ei ole myöskään selvillä tiettyä aikaa, milloin osakkeiden takaisinostot kannattaisi toteuttaa. Tämän tutkielman tavoitteena on selvittää, miten yritykset ajoittivat takaisinostojaan Lontoon Pörssissä vuosina 2010–2019. Käyttävätkö yritykset oman osakekurssinsa laskupäiviä, yleisesti markkinoiden laskupäiviä tai yrityksen arvostusta päättäessään toteuttaa takaisinostoja. Yritysten arvostusta mitataan tutkielmassa käyttäen P/B-lukua ja sitä verrataan markkinoiden mediaaniin.

Tutkielman tulokset osoittavat, että yritykset keskimäärin ostavat osakkeitaan mahdollisia vaihtoehtoisia takaisinostosuunnitelmia halvemmin ja näin minimoivat kustannuksensa. Kuitenkin tulokset olivat tilastollisesti merkitseviä vain yhtenä vuotena. Markkinoiden yleisten laskupäivien jälkeen yritykset ostavat enemmän osakkeitaan, mutta tulokset eivät ole tilastollisesti merkitseviä. Tutkielman tärkeimpänä havaintona on, että kun yritykset ovat aliarvostettuja verrattuna markkinoiden mediaaniin ne ostavat enemmän omia osakkeitaan ja kun ne ovat yliarvostettuja niin ne ostavat sen sijaan vähemmän omia osakkeitaan. Tämä kertoo, että yrityksen arvostus voi signaloida onko yritys todennäköisesti toteuttamassa omien osakkeiden takaisinostoja.

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## 1. INTRODUCTION

From the beginning of modern corporations' companies have been paying out excess cash cumulated by their earnings to the shareholders. Companies have paid significant share of their earnings out by dividends and for centuries it has been the most common payout form for corporations all over the world. Studies conducted by von Eije and Megginson (2008, 347-349) suggest that there is however, no reason for investors to demand dividends from companies as often as they do. Unlike dividends share repurchases provide companies much more flexibility with timing and the amount paid (Bonaimé, Hankins & Jordan 2016, 345-362). The number of dividend payers has slowly been decreasing and companies have been replacing dividends with share repurchases (von Eije & Megginson 2008, 347-349). Skinner (2008, 582-608) shows that repurchases are increasingly becoming a substitute payout form to dividends. Lately, also Manconi, Peyer, and Vermaelen (2019) have confirmed that the number of share repurchases has increased around the world. Since the late 1990s this has been made possible by the changes in legislation, which has liberated repurchases and increased their popularity around the world.

Share repurchases are simply executed by company buying back its own shares from the shareholders. It is possible to cancel these shares, be held in treasury to be reissued in the future back to market or to be used in business, for example to pay employees with repurchased shares. Repurchases for listed companies are often done through a broker from the open market. Repurchases can also be executed by tender offers, where shareholders receive the same fixed or minimum price, or by directly negotiated invitations, which are most often used by private companies. Sometimes repurchases are viewed as free gifts to the shareholders. However, this is not true as in exchange for the cash received by shareholder, they no longer own the shares. It means that bought out shareholders do not receive any future earnings, and this frees future funds of the company to investments for example. (BEIS 2019, 20-21)

In Europe, number of announced repurchases has been lacking and the reason for long been the regulatory environment. However, that has changed in multiple countries such as United Kingdom, Netherlands, Germany and France. They have made changes to their legislation to allow and make share repurchase implementation more simple. (Ginglinger & Hamon 2007, 915-937) According to Andriosopoulos and Lasfer (2015, 327-337) most repurchases in Europe are announced in France, Germany and United Kingdom. Of the three countries United Kingdom has the most repurchase announcements, best suited the corporate culture and legal restrictions for share repurchases. According to BEIS (2019) the level of repurchases is still in comparison to market capitalization three times smaller than in United States, where the most repurchases in the world are announced. This can be due to more favorable tax treatment in United States, where capital gains are taxed less. The level of repurchases in United Kingdom is more comparable to Australia and Canada, but higher than in Germany.

As the number of shares repurchased has increased worldwide, this has created repurchase waves that have attracted attention in the financial press. On the press and amongst the politicians, repurchases have been criticized for undermining economic growth and making companies to focus on short term objectives such as earnings per share. (Manconi, Peyer, and Vermaelen 2019) For example the Economist (2014) presented that in the United States companies have been repurchasing shares with record high numbers and repurchases have overcome dividends as a way to payout cashflows to the owners. Also, in Europe and Asia repurchases have become more common. Economist (2014) shows that there are worries that the waves of repurchases will damage companies and the economy as companies can payout too much cash. This could damage the company's balance sheet and their ability to invest. (Economist 2014) Financial times also argued that companies should use the money from the market to invest in future growth but use it instead to share repurchases. (Luce 2015)

The arguments in the Economist and Financial Times (Economist 2014; Luce 2015) present that companies do not invest enough, and use repurchases to drive the stock price up in the short term at the expense of long-term shareholder value. However, Manconi, Peyer, and Vermaelen (2019) disagree with this and show that share repurchases are beneficial for the long-

term investors on average. There is no support for the claim that repurchases would on average destroy long term shareholder value. However, around the world not all repurchases are created equal. These long-term returns are not found in all countries, for example Greece and Spain. (Manconi, Peyer, and Vermaelen 2019)

## **1.1 Background and motivation of study**

Most of the previous studies about the share repurchases have been done in the United States, where historically the largest percentage of repurchases are executed (Ikenberry, Lakonishok & Vermaelen 2000, 2373-2397). In the United States repurchases have for a long time been the de-facto way to distribute wealth to shareholders, but this has not been always the case. There has been relative tax advantage compared to dividends, but many companies have continued paying dividends to shareholders. However, over time share repurchases have surpassed the dividends as a payout form. Based on previous literature the main reason for repurchases has been to signal undervaluation to the market and therefore make the share price reflect company's true value. (Ikenberry, Lakonishok & Vermaelen 1995, 181-207; Grullon & Michaely 2002, 1649-1653)

By indicating the initiation to buy their own shares back the company is possibly trying to correct its share price. If the company is seeing clear undervaluation on their share price, for example if the stock is trading for half of its current value. Why should not the company invest in itself if they can get 1 euro for paying 50 cents. In theory should the announcement correct the price to the correct value, then there is no more need for the actual repurchase to be executed. However, as can be seen from the literature this often does not happen. (Ikenberry, Lakonishok & Vermaelen 1995, 181-207)

There have been fewer studies done about share repurchases in Europe, which makes it more interesting market to study compared to United States. Historically 60 % of all repurchase announcements in Europe have happened in the United Kingdom, where the regulatory envi-

ronment is most similar to the United States (Rau & Vermaelen 2002, 245-246). United Kingdom is still leading the Europe in repurchases which has been confirmed by BEIS (2019) and Andriosopoulos and Lasfer (2015). As the most repurchases are executed in the United Kingdom and it has the most suited regulatory environment (Andriosopoulos and Lasfer 2015, 327-337), it is chosen for this study.

On average during the years 2007-2017 share repurchases amounted between 15 to 20 billion pounds per year (approximately 16.5 - 22 billion Euros) in the United Kingdom. The repurchases were concentrated on 62 of the FTSE 350 companies. FTSE 350 includes the 350 biggest companies listed in the London Stock Exchange. Overall FTSE 350 companies account for the 97 % of all repurchases announced in the UK public companies. During 2007-2017 all but 35 companies included in FTSE 350 had conducted some repurchase activity, which would suggest that most companies take part in repurchases periodically rather than on yearly basis. Share repurchases are very cyclical to market conditions and since the financial crisis in 2008, repurchases amount for 10 % of companies operating profits. Compared to dividends (40 %) the payout number is much lower and overall share repurchases account for 23 % of all cash returned to shareholders. (BEIS 2019, 5)

This thesis is focusing on the timing aspect of share repurchases, how companies are timing the repurchases and how companies are succeeding on repurchase timing. This is not as widely studied as many other aspects of the share repurchases such as the abnormal returns (for example Rau & Vermaelen 2002; Lie 2005; Andriosopoulos & Lasfer 2015). As the number of repurchases is increasing it is important to study this aspect of the share repurchases. Badly timed repurchases could have significant effects on the company's future, as shown by the Economist (2014).

## 1.2 Objective of the thesis

The most of share repurchases in Europe are happening in United Kingdom, which has been confirmed by the previous research (Andriosopoulos & Lasfer 2015; Rau & Vermaelen 2002, 245-246). Previous studies have also shown that companies indeed can manage to time share repurchases very well (Ikenberry, Lakonishok & Vermaelen 1995; Brockman & Chung 2001; Chan, Ikenberry & Lee 2007), with few studies arguing otherwise (Bonaimé, Hankins & Jordan 2016; Cook, Krigman & Leach 2004). Overall, the trend seems to be in the favor of company's management succeeding in the timing aspect of share repurchases. But when is the correct time to buy, is it when the company's share price is down or when the whole market is in turmoil? Or perhaps when the company is undervalued on the market? This thesis aims to provide evidence for the following main question from the London Stock Exchange:

### ***How are companies timing their share repurchases in the London Stock Exchange?***

The following research sub questions are formed to study the subject more in detail:

***1. Do companies time their share repurchases on the days when their share price is down?***

***2. Do companies time their share repurchases when the stock market overall is down?***

***3. Does company's price to book ratio effect the decision to repurchase shares?***

These research questions will provide additional evidence to the widely studied subject of share repurchases, but on the different perspective compared to most of the previous studies. The timing of the share repurchases is not as widely studied compared for example to abnormal returns, which may occur from the repurchase announcement. Results of the previous research are presented later in the previous research part of this thesis. As most studies are focused on the United States (see e.g. Ikenberry, Lakonishok & Vermaelen 2000), the study will provide more information about the situation in Europe and particularly United Kingdom, where fewer studies have been conducted. United Kingdom is the largest market in Europe

and there is significant amount of repurchases happening as presented earlier. This makes it an ideal market to study repurchases in Europe. Also, the price to book effects have not been extensively studied in the past, which provides new perspective alongside previous research on share repurchases.

### **1.3 Delimitations of the thesis**

The thesis focuses on the companies listed in the London Stock Exchange, which is the oldest and largest stock exchange in the Europe (London Stock Exchange Group, 2020b). The most share repurchases in Europe are executed in United Kingdom (BEIS 2019). The companies chosen are only from the premium segment on the London main market as they must fulfill both the United Kingdom listing authority and London Stock Exchange criteria to be accepted to the highest class. With premium listing the companies can be accepted to the FTSE indexes. From the possible indexes FTSE 350 is chosen for the comparison index and it includes 350 companies with the highest market capitalization from the London Stock Exchange. (London Stock Exchange Group, 2020a) This makes sure most of the repurchases from the London Stock Exchange are included the research sample as BEIS (2019) confirms that FTSE 350 companies execute 97 % of all repurchases in the United Kingdom.

The years from which the share repurchases are studied is starting from the beginning of 2010 until the end of 2019. This makes sure that the analyzed repurchases are recent and there are no significant events on the time-period, such as the financial crisis in 2008 which made the whole market go down for a long time. It could have significant effects on the results if crisis periods would be included. The different repurchase methods are not detected from the data as will be presented in the data chapter. Therefore, the study will include all the different share repurchase methods, which companies may use to repurchase shares.

## **1.4 Research methodology**

The data used in this thesis is obtained from the Thomson Reuters DataStream as a timeseries for all the companies included in the sample. From Thomson Reuters DataStream all the daily share prices, number of shares repurchased, price to book ratios and FTSE 350 index prices are obtained for all the years to be studied. The obtained daily share prices are closing prices for each trading day. After removing all the companies with missing data, unclear transactions and no share repurchases 256 companies are left to be studied in this thesis.

Methods used to the study the share repurchase timing are bootstrapping, event study and accounting study. Bootstrapping is method similar to simulation (Brooks, 2002), which is used to create alternative repurchase programs to study share repurchases on the days where the share prices are down. Second selected method is event study, that focuses on the impact of a certain event on the company (MacKinley 1997). Event study methodology is used to study whether companies time their repurchases on the days when the market overall is down, which is measured by using the FTSE 350 index down days. Lastly the accounting study methodology is used to study the effects of price to book ratio to companies' decision to repurchase shares by forming two different P/B groups yearly. These groups are overvalued companies and undervalued companies for each year.

## **1.5 Structure of the thesis**

This thesis consists of five main chapters: introduction, the theoretical background of share buybacks including previous research, data and methodologies, the results and lastly the summary and conclusions. Theoretical background chapter will go through the basic concepts of share repurchases, the possibility to use repurchases instead of dividends to transfer wealth from the company to its shareholders, different methods of how share repurchases can be constructed, limitations to repurchases, factors and motivations that lead to repurchases and the timing of when companies execute repurchases and company valuation. The chapter also includes previous research subsection, which will disclose previous studies about the subject

of share repurchases, how they are studied and constructed, which are the themes that are consistent throughout the literature and are there any possible subjects that are not studied. It is divided into two parts between the abnormal performance research and the timing and motivations. At the end of the chapter two the research hypotheses will be presented based on the literature.

After that on the chapter three data and methodologies, will present how the subject will be studied empirically, what methods are used and present briefly the studied data. Results of the empirical study will be disclosed in detail on the results chapter, where all the results are presented and discussed in detail. Lastly final conclusions of the thesis will be presented on the summary and conclusions chapter, where all answers to the research questions are presented and discussed. After that results are summarized, and possible implications of the thesis are presented. Finally, the limitations of this thesis will be discussed and possible ideas for a future study will be presented.

## 2. THEORETICAL BACKGROUND OF REPURCHASES

This theoretical background chapter of share repurchases will first present the basic terminology and different repurchase methods. Thereafter the different motivations behind the repurchases, from which four classical theories and hypothesis explaining the factors leading to repurchases are selected for more in-depth presentation for this thesis. Afterwards the previous research on the subject of share repurchases will be presented. The chapter will also focus on how the companies are timing their repurchases and whether they are succeeding in it. Thereafter the price to book ratio is presented on the company valuation chapter and discussed whether it has any effects on the timing of repurchases. Lastly the research hypotheses are formed based on the previous literature.

### 2.1 Basic concepts of share repurchases

Share repurchases are executed by company buying back its own shares from the shareholders (Vermaelen 1981, 139-143). The regulations in the United Kingdom make it possible to cancel these shares, be held in treasury to be reissued in the future or to be used in business (Companies Act 2006). Repurchases are often executed through a broker from the open market. Other way to execute repurchases is tender offers, where shareholders receive the same fixed or minimum price. Tender offers can be either fixed price offers, or Dutch auction offers depending on the company's choice. (Comment & Jarrell 1991, 1243-1246). Lastly repurchases can also be executed by direct invitations between the parties. (Vermaelen 1981, 139-143)

Strong (2004, 293-295) suggests that share repurchases are one possible way for companies to payout cash to their shareholders. Using share repurchases in a flexible way can be very efficient way to return excess cash to shareholders. It can be used for example to signal undervaluation to the market. Compared to United States there has been less repurchase activity in the United Kingdom. According to BEIS (2019) the level of repurchases in comparison to market capitalization is three times smaller in United Kingdom than in United States. This can be due to more favorable tax treatment in United States, where capital gains are taxed less.

However, the overall payout ratios are similar between the countries. The level of repurchases is comparable to Australia and Canada, and higher than in Germany. (BEIS 2019)

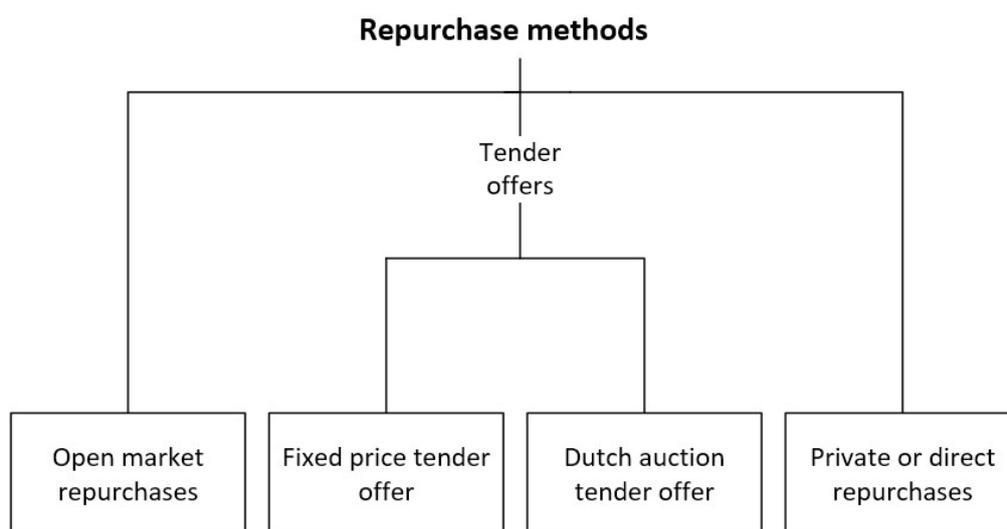
Oswald and Young (2004, 257-289) and Rau and Vermaelen (2002, 245-246) report that repurchases are becoming relatively more common and the number of announced repurchases is increasing in United Kingdom. Andriosopoulos and Lasfer (2015, 327-337) studies also show that United Kingdom has more repurchase announcements compared to France and Germany, and the corporate culture and legal restrictions are most suited for share repurchases in Europe. There has been regulatory change in 2003, which allowed companies to keep repurchased stock as treasury stock and it had significant impact on the market valuation. This would indicate that the regulatory reform decreased the signaling role of repurchases in United Kingdom as it made possible for bad companies to announce repurchases. These companies could more easily back out of the commitment to repurchase the shares and shareholders may potentially be concerned about market manipulation.

The legal regulations for share repurchase, which both public and private companies must follow are determined in the Companies Act (2006). It specifies the conditions when companies can buy shares, what processes to follow, limitations to the timing and quantity. Public companies need to use profits or proceed to selling shares and not use any share capital, except under specified circumstances. The process contains shareholder approval, authorization, and notification to repurchase shares. Private companies have more loose rules for repurchases. (Companies Act 2006) Oswald and Young (2004, 257-289) found that despite the United Kingdom's regulatory environment share repurchases are still driven by desire to exploit market mispricing and the abnormal returns surrounding the announcement are in line with earlier studies done in the United States. Even though in the United Kingdom the repurchase timing cannot happen when the information is most asymmetric between the managers and the market.

## 2.2 Repurchase methods

Repurchase methods can be divided into; tender offers, open market repurchases and private purchases. On tender offer the company puts out an offer to buy specified number of shares at a certain price until the offer expiration date and the price is normally over the current market price. Open market purchases are executed by buying the shares from the market, usually gradually with small quantities day by day. Open market repurchase plans can take multiple years and amounts are usually smaller compared to tender offers. The last method is direct or private repurchases, which are executed by repurchasing significant number of shares from a big shareholder directly. This can happen from either side initiating. Direct repurchases are the most uncommon repurchase method. (Vermaelen 1981, 139-143)

Tender offers can be divided into fixed price tender offers or Dutch auction tender offers, which both are similar but have some differences. Out of all the repurchase methods the Dutch auction is often viewed as the least risky method as it has multiple different price ranges. This means that with low minimum ranges the Dutch auction offer can be seen as the most unconvincing signal to market compared to the other methods. (Comment, Jarrell 1991, 1243-1246) The different repurchase methods are presented in the figure 1 below.



*Figure 1. Repurchase methods* (Comment & Jarrell 1991, 1243-1246; Vermaelen 1981, 143)

According to Rau and Vermaelen (2002, 245-281) on United Kingdom companies announce on average that they will repurchase 9.8 % of total shares using open market repurchases, 23.4 % using tender offers and 17.2 % using private repurchases. However, most used repurchase method reported by Comment and Jarrell (1991, 1243-1246) is open market repurchases. On open market repurchases company buys shares at market prices for a long period of time as suggested by Vermaelen (1981, 143). Also, Ikenberry, Lakonishok and Vermaelen (1995, 181-207) indicate that most companies seem to choose the open market option.

When companies purchase shares using open market or tender offers, share prices often increase. Usually this happens because of the signaling effect or possible improved capital structure. Signaling could either be deliberate or unintentional. Capital structure improvements include corporate tax savings from increased leverage and reduction of agency costs of free cashflow. Previous evidence shows that managers can time the market when shares are undervalued, which is possible because market underreacts to the repurchase announcement. (Peyer & Vermaelen 2005, 362)

### **2.2.1 Fixed price tender offer**

When company makes a fixed price offer it has defined the price, wanted number of shares, security class and the expiration date for the offer. Tendered number of shares can sometimes be exceeded, which means the offer is oversubscribed and the company can buy the number of shares wanted. In case of oversubscription often the company will purchase the exceeded amount on pro rata basis. However, sometimes the tendered amount is below the offer. Then the company may purchase all the tendered shares at the offered price, extend the tender offer or cancel the offer. However, offer cancellations are very unusual. (Ahn, Cao & Choe 2001, 448; Comment & Jarrell 1991, 1247)

Tender offers make it normally possible to buy back more shares than wanted originally, extend the offers for a longer period, or buy the shares tendered pro rata. Companies can put

maximums and minimums to the offers to eliminate small shareholders in order avoid servicing costs and to stop outsiders from getting control. Tender offers are very similar to the open market purchases as they are executed at market prices and usually run for long periods. (Vermaelen 1981, 139-143) In fixed price offer the managers set the terms for the deal and then outsiders react to these terms by accepting or rejecting. (Comment & Jarrell 1991, 1247)

Usually if managers intend to signal private information to the market, they are more likely to use tender offers rather than open market repurchases. To be credible the signal must be costly to the company. Open market offers normally are not, but tender offers can be very costly. Louis and White (2007) argue that fixed price offers are more likely to signal positive private information compared to Dutch auction offers. On fixed auction offers managers are more interested in signaling their private beliefs of the company value and on Dutch auction offers managers are more interested in minimizing the repurchase price. (Louis & White, 2007)

### **2.2.2 Dutch auction tender offer**

Dutch auction tender offer is very similar to the fixed price offer but has few exceptions on the way how company sets the offer price and the purchase price. Normally in a Dutch offer the company announces range of prices instead of a single offer price. (Ahn, Cao & Choe 2001, 448) The Dutch auction specifies the number of wanted shares but instead of one single price, it has range of prices. From the range the shareholder can choose the minimum acceptable price. The shareholder then informs company the number of shares he is offering and the minimum price from the selected range. Company then collects all these responses from shareholders and arranges them by minimum prices. Then they determine the price that will cumulate wanted number of shares and afterwards the same price is paid to all shareholders who have equaled or offered to sell on a lower price. (Comment & Jarrell 1991, 1247)

Dutch auction tender offers can also be undersubscribed or oversubscribed. Undersubscribed Dutch offer is like a fixed price offer, but if the offer is oversubscribed the company will choose the lowest price where it can get the number of shares it is seeking. Then it will pay that price to all shareholders who have tendered at that price or lower. (Ahn, Cao & Choe 2001, 448)

When oversubscription happens the purchase price is often lower than in fixed price offers. Therefore, it guarantees managers with lower minimum price. This indicates less risk and is not as credible signal than fixed price offer. In Dutch auction outsiders have more active role in choosing the prices and they seem to reveal information about the company's supply curve. (Comment & Jarrell 1991, 1247)

Due to how Dutch offers are constructed it means that for tendering shareholders the chance of tender being accepted is inverse function of the tender prices and too high tender price will lead to chance of tender not being accepted. This ensures that company will not pay too much for tendering shareholders when the auction is oversubscribed and can make the repurchases less risky for a company compared to normal fixed price offer. (Ahn, Cao & Choe 2001, 448) Assuming efficiency on the market, managers can have superior information of company's future prospects and repurchases will allow companies to use this information to their advantage. This can happen when managers are sure there is low risk of false signaling, which occurs when the premium announced exceeds the undervaluation of stock. This costly for non-tendering owner-managers as the market price falls short of the tender price. They often pre-commit to not tendering to make the signaling stronger, which makes them lose wealth if the premium is higher. Dutch auction is the least risky of all methods as it has multiple price ranges, but with low minimum ranges it should not be very convincing signal to market. And it has lower announcement returns as a result. (Comment & Jarrell 1991, 1243-1246)

### **2.2.3 Open market share repurchases**

In an open market repurchase program company buys its own shares from the market over a period of several days, months or even years. Open market repurchases have become popular way of paying out cash to shareholders. Unlike Dutch auctions or fixed price tender offers open market programs do not commit companies to actually acquire the shares. Often only small number of the announced number is executed if anything at all. (Oded 2005, 271-275) Open market repurchases are executed by companies buying the shares from the market gradually with small quantities. Company needs to pay normal commission on the purchases and the seller does not usually who he is selling to. These repurchase plans can take multiple

years and amounts are usually smaller compared to tender offers. (Vermaelen 1981, 139-143) Sometimes companies want to hide the repurchases from the market and only buy small number of shares during multiple years. (Chan et al. 2010, 137-155)

In comparison to fixed price repurchases, open market repurchase programs are just authorizations for managers to buy shares but do not commit the company to actual repurchases. Due to this flexibility open market share repurchases can also be seen as weak signals lacking commitment. But if company announces repurchase program because of undervaluation and the share price corrects itself to fair value, there is no more need for the actual repurchase to be executed. (Chan et al. 2010, 137-155)

According to Comment and Jarrell (1991, 1266) open market repurchases provide support that share repurchases increase company's share price, because open market repurchases are credible signals from the management that company's shares are undervalued. Some managers may even use the flexibility to mislead investors by conveying false signals. In some countries like the United States repurchase disclosure requirements are minimal and there is no penalty for failing to repurchase shares. In the United Kingdom number of repurchased shares needs to be disclosed at the beginning of the next business day. Companies can initiate repurchase program even though they do not have any immediate intentions to execute repurchases. In cases where managers could mislead investors, over long-run these companies do not see improvements in their economic performance. This is only considering a minority of all managers. (Chan et al. 2010, 137-155)

#### **2.2.4 Direct or private share repurchases**

The last method which is also the most uncommon is direct or private share repurchases. Private share repurchases are executed by company buying significant number of shares from a large shareholder directly. This can happen from either the buying or the selling side initiating the share exchange. (Vermaelen 1981, 139-143) Private companies often use direct invitations

to sellers as they normally have fewer shareholders than public companies. Private share repurchases are normally used for ownership transactions between shareholders. (BEIS 2019, 20-21)

Private repurchases are unique for several reasons. In case of seller initiating the company only needs to agree as the initiative can come from either side. Therefore, seller can be the more proactive party in the transaction. Large investors could want to sell their shares privately if the stock is not widely traded. Seller is typically a large individual investor or company, and according to Peyer and Vermaelen (2005, 361-394) these sellers on average own 13 % of all the shares. As the seller knows who the buyer is, this can make it more difficult for the company to use its possible information advantage. The repurchases can be considered as negative signal if company buys the shares under the current market value. Large investor can reduce agency costs, but it is not clear if the excess cash reduction will lead to lower agency costs. For these reasons private repurchases can be associated with different motivations and price behaviors than other methods. Peyer & Vermaelen (2005, 361-394) found out that there is no signaling to be conveyed and the discount or premium on the price depends on the bargaining power of the seller and the buyer.

### **2.3 Motivations behind the repurchase decision**

In previous literature there have been multiple possible theories, which have been trying to explain the market reactions to share repurchases. Andriosopoulos and Lasfer (2015, 327) found in their studies positive price reactions to repurchase announcements and they present multiple hypotheses which could explain this: signaling, agency theory, capital restructuring, substitute to dividends, management compensation and firms' reputation. Also, Ikenberry, Lakonishok and Vermaelen (1995, 181-207) list many possible reasons for share repurchases such as: capital structure adjustment, takeover defense, signaling low valuation, excess cash distribution, substitution to dividends and wealth exploration from bondholders.

Most common reason for share repurchases has been the signaling, which is also confirmed by Vermaelen (1981, 139-181). He presents in his studies that signaling hypothesis is the most

likely explanation for the abnormal returns in both tender and open market repurchases. According to Kahle (2002) two of the most common motivations for the abnormal returns after repurchase announcement are signaling theory and free cashflow theory. The most likely motivations for the repurchases are presented in the figure 2 below.

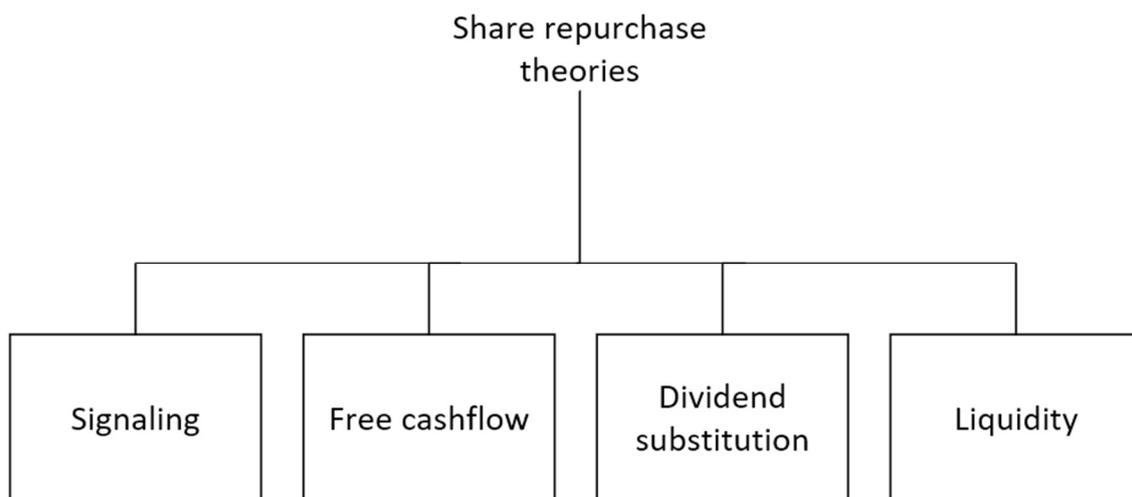


Figure 2. Most widely accepted repurchase theories (Andriosopoulos and Lasfer, 2015; Ikenberry, Lakonishok and Vermaelen, 1995; Kahle, 2002 & Vermaelen, 1981)

The chapter will present more in detail the four most widely accepted share repurchases motivations presented above in the figure 2. Those are the signaling, free cashflow, dividend substitution and liquidity hypothesis. All of them have been closely linked to share repurchases on the previous literature.

### **2.3.1 Signaling**

According to Vermaelen (1981, 140) signaling hypothesis suggests that, when company decides to repurchase shares management signals new unknown information to the market. When the company buys the shares with premium it can show that they are signaling share price undervaluation to the market. However, the signal can be unclear as it may also show

that the company has no other profitable use for the available cash. This can be due to that there is nothing to invest in. Kahle (2002) on the other hand suggests that the management is conveying new favorable information to market about the value and future prospects of the company. Nohel and Tarhan (1998, 187-190) agree and suggest that signaling hypothesis indicates company's willingness to pay more for its own shares, which sends a signal to investors that company's future prospects are improving.

Ikenberry, Lakonishok and Vermaelen (1995, 181-207) point out that signaling is motivated by asymmetric information between the market and the managers. If managers see their company undervalued on the market, they can choose to buy back their shares. This should make the market adjust immediately and the new value should reflect the correct value. No wealth transfer should happen between the shareholders and the sellers. If the market would be completely efficient only the announcement would be enough to correct the share price and it would eliminate the need for actual repurchase. Often that does not happen, and the managers do not cancel their announcement, because it seems that the market reaction is too low (on average 3.5%). This is also noticed by Chan et al. (2010, 137-155) who argue that if company announces repurchase program and the share price corrects itself to fair value, there is no more need for the actual repurchase to happen. Management often suggests that the reason for repurchases is that the shares are undervalued or good investment. This shows that managers may have superior information about the company's value. In addition, most of the empirical research supports repurchases as a signal of undervalued shares. (Persons 1997)

Comment and Jarrel (1991) argue that there are reasons to doubt that signaling truly explains most companies repurchase activity. Assuming efficiency on the market managers can have superior information about the company's prospects. Share repurchases allow companies to make a bet on those prospects. This is most convincing when managers have the most financial risk of false signaling. False signaling happens when company announces repurchase premium, which significantly exceeds the current undervaluation. Babenko, Tserlukevich, and Vedrashko (2012) on the other hand argue that investors should only react to the signaling if company insiders make it credible, specially whether managers have recently bought the company's shares in their own name. This is more credible as it is considerable risk and very costly

if the shares are overpriced. Large insider purchases may indicate that managers consider the shares to be undervalued. Based on their results this seemed to happen when companies were considered to be undervalued.

Out of the different methods Dutch auction offer with minimum low price should not be convincing signal to the market. This is due to that the minimum premium is much lower compared to the fixed price offers, which makes them less strong signals. However large open market repurchases can signal share undervaluation almost as much as premium Dutch auction offers. Overall, repurchases increase share prices as they are credible signals that the company is undervalued on the market. (Babenko, Tserlukevich, & Vedrashko, 2012) Strong (2004, 293-295) suggests that undervaluation is the leading reason for repurchases rather than, for example tax benefits or regulatory restrictions. Companies that repurchase undervalued shares from the sellers on market benefit their long-term investors at the expense of the selling investors. Issuing shares damages new investors and is not maximizing the long-term shareholder value. However, repurchase authorizations are an option and not commitment to repurchase shares. The actual repurchases may happen many months or even years later than the authorization. Market timing is much easier for the company when using open market repurchases as the seller is not aware that he is selling to the company itself. The authorization creates an option to take advantage of repurchases if the shares are undervalued. This is very valuable if the shares are very volatile. Companies are more likely to have superior information when the share prices are driven by the company related events. (Evgeniou et al. 2018)

### **2.3.2 Free cashflow**

Free cash flow hypothesis suggests that the companies with excess cash and poor investment options will have large agency costs if the excess cash is not paid out to shareholders. If the cash is not paid out company's managers can have incentives to invest in bonuses, empire building and other negative net present value investments. Share repurchases make it possible to payout free cashflow, which reduces these agent conflicts by transferring free cashflow to shareholders. Therefore, it eliminates the incentives for wasteful investments and increases

company value. (Nohel & Tarhan 1998, 187-190) When companies have substantial amounts of free cash flow, it can lead to conflicts of interest between the managers and shareholders about the payouts. Companies with available free cash flow can use it to increase dividends or to repurchase shares, which means that cash used otherwise for low-return projects is now paid out. The problem is how convince managers to payout cash. Managers can announce permanent changes such as increases on dividends, but this is not a very strong signal. However, most often capital markets punish companies from dividend cuts, which supports the free cash flow hypothesis. (Jensen 1986)

Howe, He and Kao (1992) suggest that the free cash flow hypothesis presents problem between the managers and shareholders about the cash flow generated by the company. Managers can have incentives to invest too much to the company by using the free cashflows to negative NPV (net present value) investments rather than to payout the cashflows to the shareholders. However, their results are inconsistent with Jensen (1986) results as they did not find any statistically significant results supporting the free cash flow hypothesis for the repurchases.

There are many different methods to pay cash out such as debt to equity swaps, recapitalizations and dividends but overall repurchases are more flexible and efficient. As companies with excess cashflows and no investment opportunities will face agency costs if they do not transfer the excess cash to the shareholders. The managers may have intensives to invest excess cash to empire building or other negative net value projects. (Nohel & Tarhan 1998, 187-190) However, according to Bozanic (2010) free cashflow hypothesis means that the timing of repurchases is also based on the amount of free cashflow in hand. Companies repurchase more shares when they have available additional, unforeseen, or discretionary cash flows.

### **2.3.3 Dividend substitution**

Vermaelen (1981, 140) defines dividend substitution hypothesis, that companies repurchase shares and therefore shareholders can take advantage of preferential tax treatment compared to dividends. Share repurchases can be interpreted as capital gains, but it is still unclear

if the share price will reflect the personal tax effects. This is also confirmed by BEIS (2019, 5) that for sellers the repurchases will lead to capital tax liability, where dividends are normally taxed as income. Nohel and Tarhan (1998, 187-190) agree and suggest that compared to dividends repurchases are more tax beneficial and do not imply any future commitments.

From the beginning of modern corporations, companies have been paying large part of their earnings as dividends. However, there is no clear reason why the investors should want dividends. Eije & Meggison (2008) studied dividends and share repurchases in the European union between 1989-2005. European dividend and share repurchase policies are very similar compared to United States. The number of companies in Europe that pay dividends has declined, but the total amount of dividends has increased. Also, the total value of repurchases has increased and it accounted for half of total value of dividends. The number of companies that execute repurchases is only one quarter of the number of dividend payers. Dividends are becoming more concentrated. Overall, the number of all companies, which pay dividends has declined. Simultaneously repurchase numbers have increased. Characteristics such as size, market-to-book and profitability explained the likelihood of dividends or repurchases. (von Eije, Meggison 2008, 347-349)

Skinner (2008, 582-608) report that repurchases are increasingly used for substitute to dividends and are more flexible. Overall, his results strongly support the substitution hypothesis. Share repurchases now seem to be dominant form of payout. There may even come time in the future where dividends are no longer used. Grullon and Michaely (2002, 1649-1653) also found evidence to support the substitution hypothesis. However, Almeida et al. (2016, 168-184) report that even though share repurchases can be good way for companies to pay shareholders, that money could also be used for example to investments or employment. On table 1 below differences between dividends and repurchases are presented.

Table 1. Comparison between dividends and repurchases (Brav et al. 2005, 521-522)

	<b>Dividends</b>	<b>Repurchases</b>
<b>Historical level</b>	Important and cannot be cut	Not important
<b>Flexibility</b>	Inflexible	Very flexible
<b>If increased</b>	Little reward	Stock price increase
<b>If decreased</b>	Big market penalty	Little consequences
<b>Target</b>	Most common target is the level of dividends	Most common target is amount of repurchases (flexible)
<b>External funds</b>	External funds raised before cutting	Reduced before raising external funds
<b>Investments</b>	Maintain historic level before making investment decisions	First investment decisions and then repurchases
<b>Earnings quality</b>	Increases tied to stable earnings	Increase with permanent earnings but also with temporary
<b>Taxes</b>	Tax disadvantage second-order importance	Tax advantage second-order importance
<b>Information</b>	Convey information	Convey information
<b>Retail investors</b>	Prefer dividends even if tax disadvantaged	Prefer repurchases less than dividends
<b>Institutional investors</b>	Generally, prefer	Generally, prefer as much as dividends
<b>Share price</b>	Not important	Repurchases when shares are undervalued
<b>Earnings per share</b>	Not important	Very important in attempt to increase
<b>Stock options</b>	Not important	To offset stock options is important
<b>Cash on balance sheet</b>	Not important	Used to reduce cash holding when high
<b>Float or liquidity</b>	Not important	No repurchases when not sufficient
<b>Mergers &amp; acquisitions</b>	Not important	Important
<b>Takeovers</b>	Not important	Not important
<b>Cash cows</b>	Expected to pay	Expected to return capital

<b>If company would have a chance to start over</b>	Minimize dividend commitment	Would rely on repurchases to return capital
<b>Nonpayers will initiate when</b>	Earnings are stable, institutions demand or few profitable investments	Market is undervaluing, extra cash, institutions demand, few profitable investments, increase EPS or offset stock options

Dividends are not very flexible as the market expects regular dividends or slight increases. Dividend cuts often lead to share price decreases, but this is not true for repurchases as they are not expected to be executed every year. (BEIS 2019, 22) Brav et al. (2005) suggest that sustaining the dividend level is a priority for companies on par with the investment decisions. Company's managers want to avoid dividend cuts unless something extraordinary happens and beyond that company's payout policy is not number one priority. The dividend increases are only considered after all the investment and liquidity needs are met. Many dividend payers are hoping that they would have not committed to dividends and could pay smaller dividends. Dividend increasements are led by two factors: long-term increases in earnings or demands from institutional investors. Repurchase decisions are also made by managers only after investment decisions. Manager's view repurchases as more flexible than dividends and are using repurchases to time the market when their stock price is down. They are also conscious how repurchases affect EPS. Managers are more likely to execute repurchases when there is nothing to invest in, when stock float is adequate and when they want to offset option dilution. Managers also believe that dividends and repurchases transmit information to investors. (Brav et al. 2005)

#### 2.3.4 Liquidity

Liquidity provision is one of the short-term reasons listed for repurchases according to Cook, Krigman and Leach (2004, 463-467). One of the first studies surrounding the liquidity of companies' shares was done by Barclay and Smith (1988) who suggest that distributing cash using open market repurchases instead of dividends can have effects on the liquidity. There are two

contradicting hypotheses, one that liquidity will increase and one that liquidity will decrease depending on whether the company's management has inside information.

Hillert, Maug & Obernberger (2016) studied how companies affect liquidity when repurchasing shares and they found that it is positive impact. Companies are large patient buyers with no immediate need to repurchase. Companies provide liquidity even when there is lot of cash to disburse and when the repurchase authorization is ending. Also, repurchases do not reduce liquidity when companies are trading with nonpublic information. Companies try to minimize transaction costs on average by repurchasing shares when the liquidity is high. Companies can also take more active approach and supply liquidity to the market. They are providing liquidity together with price support. Liquidity is also provided in the middle of crises when returns are low, and volatility is high.

Cook, Krigman and Leach (2004, 463-467) found that share repurchases do not retract any market liquidity and repurchases are net contributor on increasing market liquidity. The research of Hillert, Maug and Obernberger (2016) shows that repurchases clearly improve liquidity, but it also influences how companies are executing repurchase programs. Repurchases provide liquidity when other investors sell the company's shares. They found no evidence that companies reduced liquidity when they were trading on private information.

However, according to Ginglinger and Hamon (2007, 915-937), who found on their study that liquidity significantly reduces after the repurchases. This also applied to all the market segments. Peyer and Vermelen (2009) also argue that repurchases reduce liquidity. Brockman and Chung (2001, 417-446) found evidence supporting the hypothesis where share repurchases increase liquidity cost of the company when market participants notice the informed trading.

At times when market liquidity is low companies repurchase less shares and reduce the float as transaction on the market could increase the price effect of trading. They argue that managers repurchase shares rather than pay dividends when the market liquidity is high. When companies announce repurchase programs investors know that there is higher possibility to

be trading against the informed insiders. This has effects on the company's trading and increases liquidity costs. It means that managers need to consider the liquidity when making the decision whether to repurchase shares or payout dividends. (Brockman, Howe & Mortal, 2008)

## **2.4 Timing of share repurchases**

Based on the survey with financial executives done by Brav et al. (2005) share repurchases can be used to time the market by increasing repurchases when the executives believe the share price is low. Out of all companies executing repurchases 86.4 % believe that their shares are good value relative to the company's true value when executing repurchases. Half of the companies track the repurchase timing and whether they can beat the market, with few companies suggesting they can beat the market by 1 or 2 dollars per share. Therefore, companies seem to indicate their ability to identify undervaluation in the form of mispricing on the market. This also supported by Chan and Ikenberry (2007) as mispricing can viewed as key reason for repurchases. And the decision to repurchase shares is dependent on how much the share price is believed to be undervalued.

Cook, Krigman and Leach (2004, 463-467) describe short term reasons bit different as companies do not buy shares every day from the market. Short term reasons for share repurchases are cost minimization, price support, liquidity provision and using company specific information strategically. For the company specific information use strategically, they do not find any supporting evidence if the repurchases are timed specifically with releasing information to the market. However, they report that larger firms generally minimize costs better than smaller firms, which means that they pay comparable less for their shares. Companies also support their share prices and often buy back shares when the prices drop to stabilize the price level.

Brockmann and Chung (2001, 417-446) suggest that cost minimization is unlikely the only objective when executing share repurchases, but they expect that companies use private infor-

mation to time share repurchases to lowest possible prices. Their results implicate that companies have timing abilities when repurchasing shares and this is related to general market conditions. They studied executed open market share repurchases on the Stock Exchange of Hong Kong, where companies need to report their repurchases by start of the following business day similarly to United Kingdom. They found out that managers successfully happen to time the repurchases, which would indicate that managers use private information when trading the shares. Rau and Vermaelen (2002, 245-246) described the fact that companies are not allowed to repurchase their shares when managers have superior information about the future earnings in the United Kingdom, which could have implications to the timing.

Based on Chan, Ikenberry and Lee (2007, 2673-2692) results, company managers seem to have abilities to time the market when announcing and executing share repurchases. Previous evidence by Peyer and Vermaelen (2005, 362) shows that managers can time the market when shares are undervalued, which is possible because market underreacts to the repurchase announcement. Ikenberry, Lakonishok and Vermaelen (1995, 181-207) suggest that the information transferred by the open market repurchase is mostly ignored and the managers that repurchase the shares appear to be right. Managers on average buy shares from the market on bargain prices. They also find support that managers possess market timing abilities. Managers issue more shares when prices are high and repurchase shares when the prices are low. Manconi, Peyer and Vermaelen (2019) also present results that support the market timing hypothesis, that companies can time their repurchases to the point when their shares are undervalued.

Managers view share repurchases to be more flexible compared to dividends and are taking advantage of repurchases to time the market when their stock price is down (Brav et al. 2005). Unlike dividends which are consistent over the years, share repurchases provide managers flexibility to the timing and the amount. However, according to Bonaimé, Hankins & Jordan (2016, 345-362) managers have not succeeded in timing their repurchases. They found out that strategy with less or no flexibility would lead to lower prices on average. Many managers state undervaluation as the motive for repurchases but could have made a better investment by spreading the repurchases over longer periods. Which indicates that there are costs to this

flexibility. Their findings do not support previous studies, which indicate that managers possess repurchase timing abilities over short period of time.

Dittmar and Dittmar (2008) suggest two possible options for share repurchases, market or company undervaluation. They expect that companies repurchase more shares when the market is undervalued and less when the market is overvalued. Based on the studies of Chan and Ikenberry (2007) there are relative decline in share repurchases after bull-market, where the share prices are rising. However, there are not much evidence for noticeable change in repurchased shares when the market performance declines substantially. Dittmar and Field (2015) indicate that companies repurchase shares on lower prices than the average price on market. They also found out that companies pay lower prices following downturns on the market, which indicates than that companies can indeed time the market. Peyer and Vermaelen (2009) suggest that managers execute repurchases to respond to market overreacting to bad news. Most beaten up companies experience the highest abnormal returns after the repurchase announcement. They also argue that companies with low price to book ratios are most likely to be undervalued. (Peyer & Vermaelen 2009) Similarly Dittmar and Field (2015) found support for the low price to book companies repurchasing shares at lower relative prices compared to more highly valued companies.

Alternative option is that companies do not repurchase shares when the market overall is undervalued, but when there are high amounts of company misevaluation on the market. This leads to some companies to be undervalued and some to be overvalued. (Dittmar and Dittmar, 2008) Jagannathan, Stephens, and Weisbach (2000) report that companies often repurchase shares after share price decline. Bozanic (2010) indicates that companies repurchase more shares when their shares are undervalued. Companies may use their own internal knowledge of the company's valuation, which may maximize the repurchase value. He found out that companies are timing share repurchase on perceived undervaluation on the market. Cook, Krigman and Leach (2004) present that companies repurchase shares following declines in their share prices and this stabilizes the share price. They suggest that companies repurchase shares against the market.

Ginglinger and Hamon (2007) suggest that company's share price should be lower on the repurchase days compared to the non-repurchase days. Repurchases would then be expected to be executed on the days where the share prices are falling or immediately after the fall. Their evidence from the Paris Stock Exchange suggests that companies do repurchase shares against the market trends and take advantage of decreasing prices. On average share repurchases occur on lower prices than other investors are paying as the repurchases were executed after the price decreases. Zhang (2005) suggest that it is not clear whether company's managers have better judgement than other investors on the market about their own shares. They might have more insider information but outside investors may have more market-wide information or capacity to process information. However, he suggests that companies behave opportunistically and repurchase shares following decreases in price. Kahle (2002) also presents that companies are more likely to execute repurchases when the share prices have been down or free cashflow has been high.

## 2.5 Company valuation

P/B (price to book) ratio is calculated by dividing company's market price by its book value. Companies with lower market values are sometimes considered to be safer investments as the book value is viewed as a floor supporting the market price. Therefore, in theory companies always have an option to liquidate or sell book assets if there is need. This is not always the case as companies on the market are sometimes valued under their book value. Better interpretation can be a measure of growth opportunities. (Bodie, Kane & Marcus, 2014, 652) Based on the earlier studies on value strategies high P/B companies can be called glamour stocks and companies with low P/B ratios value stocks. (Lakonishok, Shleifer and Vishny, 1994)

Lakonishok, Shleifer and Vishny (1994) present that P/B ratio reflects multiple different factors. High ratio can illustrate company with lot of intangible assets, for example R&D (research and development) capital which is not shown in the book value as R&D is expensed. High P/B ratio can also illustrate company with large growth opportunities which only show on the mar-

ket value but not on the book value. Natural resource companies without good growth opportunities but with high temporary profits can have high P/B ratios if the resource price on the market increases. If the risks are low and future cash flows are discounted at low rate it can also lead to increased P/B ratio. High P/B can be a sign of overvalued glamour stock. Based on Lakonishok, Shleifer and Vishny (1994) studies companies with high P/B have much lower annual returns compared to companies with low P/B ratios. This value premium in average returns is based on that the market undervalues distressed stocks and overvalues growth stocks. According to Fama and French (1995) low price to book ratio signals sustained low earnings on book equity. Low P/B companies are less profitable than high P/B companies. High P/B is typical for companies that have high average returns on capital (growth stocks) and low for companies that are relatively distressed.

According to Von Eije and Megginson (2008) P/B ratio can explain the likelihood of dividends or repurchases. Baker and Wurgler (2002) argue that often price to book ratio can be seen as an indicator of investment opportunities. Ikenberry, Lakonishok and Vermaelen (1995, 181-207) also studied the effects of companies' different price to book ratios. They present that for out of favor stocks with low price to book ratios, repurchases should be important motive to combat the undervaluation. However, the market reaction was similar across all price to book groups, but the largest abnormal returns were found from low price to book companies. High price to book companies do not have any abnormal performance in the long term. Zhang (2005) presents that different price to book groups do have different and significant returns. Over long period of time value firms deliver superior performance. He suggests that companies with low price to book ratios are the most likely to be undervalued. They also can identify and take advantage of these opportunities for the long-term shareholders.

## **2.6 Previous research**

There has been a lot of previous studies done on the share repurchases, which have mostly focused on the stock market price reactions after the announcements and whether there are abnormal returns to be found. Different hypotheses explaining the repurchases are also very widely studied, which can be seen from the number of different hypotheses presented in the literature. The timing of the repurchases has received some attention on the previous research, but it has not been the main area. This chapter will go through the previous research, which are the most used methodologies in the earlier studies and what are the possible limitations of those studies.

### **2.6.1 Research measuring post repurchase performance**

Vermaelen (1981) studied the share price behavior of companies, which repurchased their own shares with open market or tender offers and announced the decision on the Wall Street Journal. They used event study methodology to study the effects. United States allows companies to make tender offers over the market price, which is quite uncommon around the world in order to protect non insider investors. Insiders could potentially manipulate the market by giving false signals or try to extrapolate bondholders by reducing their part of the company's assets. Vermaelen (1981) results show that the signaling hypothesis is the most likely explanation for the abnormal returns in both tender and open market repurchases. With open market purchases the results are not as conclusive but are still consistent with the hypothesis. Following the evidence, repurchase announcement makes the market more efficient by correcting the mispricing.

Ikenberry, Lakonishok and Vermaelen (1995) studied the long run performance after the open market share repurchase announcements in 1980-1990 on their accounting study. Their sample consisted of 1239 open market share repurchases announced in the United States. Most common reason for repurchases has been the signaling. If managers see their company undervalued on the market, they can choose to execute repurchases. This should lead to the

market adjusting immediately and if the market would be completely efficient only the announcement would be enough to correct the share price. Therefore, eliminating the need for repurchases. Often that does not happen, and the managers do not cancel their announcement, because the market reaction was too low (on average 3.5 % abnormal returns). The most striking finding of the study was that the information transferred by the open market repurchases was mostly ignored and when managers repurchase shares, they appeared to be right. On average managers bought stocks on bargain prices from the market. In the month following the repurchase announcement, the average buy and hold return for the following four years was more than 12 % over the control portfolio and for long term returns 15 %. For out of favor companies with low price to book ratios repurchases should be important motive to combat the undervaluation. However, in the study the market reaction was similar across all price to book groups, but the largest abnormal returns came from low price to book companies. The high price to book companies did not have any abnormal performance in the long term. The researchers suggested that managers possess market timing abilities. Managers can issue more shares when prices are high and repurchase shares when the prices are low.

Nohel and Tarhan (1998, 187-190) studied 242 tender offers between 1978-1991 and saw significant performance improvements on the repurchasing companies. The improvements came entirely from low growth companies when companies did manage to deploy their assets rather efficiently. Their results seem to indicate that repurchases were part of a company restructuring program and support the free cash flow hypothesis rather than information signaling hypothesis.

Ikenberry, Lakonishok and Vermaelen (2000) studied the repurchases between 1989-1997 in the Toronto Stock Exchange. In Canada companies need to report the number of repurchased shares each month. Using three factor model they did find that undervaluation was as important factor as it has been in earlier studies done in the United States. Companies showed 0.59 % abnormal returns per month for over three years after the announcement, but negative -0.35 % returns prior to the repurchase announcement. This supports the undervaluation hypothesis, where mispricing is the leading factor for managerial decision making. Price

changes did have significant impacts on the repurchase activity, as when the prices increased the number of shares repurchased decreased.

Rau and Vermaelen (2002) also studied the motivations and consequences of share repurchases with event study methodology in the United Kingdom. Their sample consisted of 264 share repurchase announcements from the United Kingdom between the years 1985 and 1998. On the sample they included open market share repurchases, private repurchases, and tender offers reported by SDC (Securities Data Company). They found that share repurchase announcements on average generated statistically significant abnormal returns (1.14 %) in the 11-day window surrounding the announcement. In the long run open market announcements led to negative (-7.0 %) returns year after the announcement, because of the agency repurchases where the seller did know that he was selling to the company (-13.55 %). In a case of non-agency repurchase, the negative returns were much lower (-2.01 %). United Kingdom's regulatory environment discourages repurchases and when the excess returns are small it discourages companies to use undervalued share prices to their advantage.

Oswald and Young (2004) re-examined the open market share repurchase findings of Rau and Vermaelen (2002). They compared the available data from Securities Data Company database to alternative sources such as London Stock Exchange Regulatory News Service, The Financial Times, and the annual statements from companies. They found out that more than half of announcements were missing from the SDC data, which makes the earlier study conducted by Rau and Vermaelen (2002) incomplete in measuring the United Kingdom share repurchases. Oswald and Young (2004) reported that number of repurchases were increasing and driven by the desire to exploit market mispricing. This was true even though in United Kingdom share repurchases cannot be executed when the information is most asymmetric between the managers and the market. Their final conclusions were that the abnormal returns are in line with earlier studies done in the United States.

Lie (2005) studied operating performance of 4729 open market share repurchase announcements between 1981 and 2000. He examined operating performance based on quarterly data, which differs from previous studies using yearly data. Descriptive statistics used were book

value of assets, cash ratio, debt ratio, market to book ratio and announcement period return. Share price reaction to announcements was positive for mean and median abnormal share returns for three days centered the announcements (3.0 % and 1.9 %). Repurchases seemed to indicate favorable information to the market. One of the findings of the study was that the operating performance increased following the announcement, which occurred usually two quarters after the announcement and would last for two years after. Other finding was that the capital market responded favorably to earning announcements after the share repurchases, but only when those were happening in the same quarter. In further look both the operating performance improvement and the positive earnings announcement return were limited only to firms that executed the repurchases in the same quarter. The final finding was that part of the companies that executed the repurchases in the following quarters after the announcement were noticing improvements after the announcement quarter. This suggests that executed repurchases lead to future performance improvements. Companies that announce repurchases, but do not execute them in the same quarter do not receive any performance or share price improvements. Lie (2005) argued that companies might be tempted to just announce repurchases programs without executing repurchases, because announcement would lead to increased share price. However, it is very unlikely that it would be permanent increase as the stock market learns that the company is not going through with the repurchase execution.

Chan, Ikenberry and Lee (2007, 2673-2692) studied 5508 repurchase announcements between the years 1980-1996 in the United States. They did not find any significant dependency on past market performance on the repurchases announcements. There was relative decrease of repurchases when the market was bullish, but when the market was down overall there was not any noticeable increase in repurchased shares. However, they did find support for abnormal returns after the repurchase announcements on the long term. On average the managers were informed. When they were aggressively buying back shares abnormal performance increased and when no shares were repurchased company's long-term performance seemed to be lower. Based on their results managers have abilities to time the market when announcing and executing share repurchases.

Andriosopoulos and Lasfer (2015) studied the effects of share repurchases to the market valuation on major European countries. France, Germany and United Kingdom were selected for the countries studied with event study methodology. They constructed dataset containing 970 open market share repurchase announcements. In line with earlier studies the researchers found 1.55 % positive abnormal reaction from the market. Compared to United States the reaction was smaller, and they tested if it was due to the corporate governance differences between the countries. United Kingdom had the most repurchase announcements, most suitable corporate culture and legal restrictions for share repurchases. Similar returns were found from United Kingdom and Germany, which could indicate that companies in low investor protection countries are inclined to maximize shareholder value. In relation they also tested if recurring announcements led to lower excess returns. They found out that initial announcement generated 2.01 % reaction from the market, but the subsequent announcements led only to 0.98 % returns. After the United Kingdom's regulatory change in 2003, the abnormal market reaction decreased from 2.95 % to 0.72 %, which could indicate that the reform decreased the signaling role of repurchases as it made possible for bad companies to announce repurchases.

*Table 2. Abnormal returns found on the previous studies*

<b>Author(s)</b>	<b>Published</b>	<b>Observations</b>	<b>Country</b>	<b>Time period</b>	<b>Abnormal return</b>	<b>Notes</b>
Vermaelen	1981	243	United States	1970-1978	3.37 % *	
Ikenberry, Lakonishok and Vermaelen	1995	1239	United States	1980-1990	3.50 % *	
Nohel and Tarhan	1998	242	United States	1978-1991	1.29 % *	
Ikenberry, Lakonishok and Vermaelen	2000	1060	Canada	1989-1997	0.93 %	
Rau and Vermaelen	2002	264	United Kingdom	1985-1998	1.14 % *	

Oswald and Young	2004	266	United Kingdom	1985-2000	1.95 % *	
Lie	2005	4729	United States	1981-2000	3.00 % *	
Chan, Ikenberry and Lee	2007	5508	United States	1980-1996	6.68 % *	Long term (1 year post announcement)
Andriosopoulos and Lasfer	2015	970	France, Germany and United Kingdom	1997-2006	1.55 % *	

(\* indicates statistically significant results)

In table 2 the abnormal returns found on the previous studies related to share repurchases are presented. Most of the previous studies have found significant positive abnormal returns in relation to share repurchases. All but one of the studies are focusing on the short-term results, from which the 3.37 % abnormal return found on Vermaelen (1981) research is the highest and 0.93 % on Ikenberry, Lakonishok and Vermaelen (2000) research the lowest. The studies are mostly from the United States market, with Europe and United Kingdom still represented in three of the studies. Rau and Vermaelen (2002), Oswald and Young (2004) and Andriosopoulos and Lasfer (2015) studied the United Kingdom stock market and found significant abnormal returns (1.14 %, 1.95 % & 1.55 %), which compared to the returns from United States market are slightly lower.

### 2.6.2 Repurchase timing and motivation research

Jagannathan, Stephens and Weisbach (2000) measured the growth of open market repurchases and how repurchases and dividends were used in the United States during 1985-1996. They examined companies' decisions to payout cashflows in dividends or repurchases using factor analysis methodology. Dividends and repurchases were used at different times and in different companies. Repurchases followed the market cycles and dividends usually increased

over time steadily. Dividends were used more for high permanent cash flows and repurchases for high temporary cash flows. They found out that repurchasing companies had more volatile cash flows and distributions compared to dividend paying companies. Repurchases followed poor stock market performance and dividends increased when company had good performance. This is in line with the consensus that share repurchases are more flexible than dividends and one reason is being substitute to dividends. Repurchases preserve financial flexibility as they do not commit company to future payouts unlike dividends. Even announcing the repurchase program is not an obligation to repurchase shares.

Ikenberry, Lakonishok and Vermaelen (2000) suggested potential motives for share repurchases such as tax benefits, excess cash or adjusting the company's capital structure. They found out that company managers often use the undervaluation as a motive to decide whether to repurchase shares from the market. However, they confirmed that international evidence has been very lacking, and most studies have been done on the United States stock market.

Brockman and Chung (2001) studied the executed open market share repurchases in the Stock Exchange of Hong Kong using bootstrapping and regression analysis. Hong Kong market is similar to the United Kingdom in the sense that companies need to report their repurchases by beginning of the next business day. They found out that managers successfully happen to time the purchases, which would indicate that managers use private information when trading the shares. They did also find evidence supporting the information asymmetry hypothesis as the open market share repurchases increased liquidity costs of the company when market participants noticed the informed trading.

Baker and Wurgler (2002) found in their research that highly valued companies on the market relative to book values and also compared to earlier valuations, are more likely to issue equity. Similarly, when the prices were low companies repurchased shares. This refers to the market timing, where the intention is to exploit temporary variations in the cost of shares. The timing benefits the current shareholders at the expense of new and leaving shareholders. This creates incentives for managers to use timing to their advantage, if they can and believe it is

possible. Previous analyses did indicate that on average market timing is successful. The researchers found in their accounting study, that market timing had significant effects to the company's capital structure. Company's current capital structure was also widely related to the past market values and attempts to time the market.

Grullon and Michaely (2002) suggest that companies substitute dividends with share repurchases. Companies based in the United States have been paying dividends even though there has been relative tax advantage on capital gains over ordinary income. They reported that repurchases had become more popular than dividends and most payouts were executed by repurchasing shares. The total amount of dividends paid did not decrease, but it also did not increase. From tax perspective share repurchases have been the obvious choice. Their results show that for repurchasing companies' announcement of dividend cuts were slightly less negative compared to companies that did not use repurchases, which supports the substitution hypothesis.

Cook, Krigman and Leach (2004) used voluntarily disclosed repurchase data from 64 United States based companies to study repurchase timing and execution on their event study. Companies used different execution strategies from immediate repurchasing to delayed and smoothed repurchasing. Most likely long-term reason for repurchases was undervaluation on the market and belief that the repurchase was a good investment. Short term reasons were bit different as companies did buy shares only on specific days. Short term reasons were cost minimization, price support, liquidity provision and using company's specific information strategically. They found out that larger companies generally minimized costs better than smaller companies, which would indicate that they paid comparable less for their shares. Companies also did try to support their share price and the researchers found out that companies often bought shares when the prices dropped to stabilize the price level. Regarding strategic use of company specific information strategically, they did not find any supporting evidence that the repurchases were timed specifically with releasing information to the market.

Ginglinger and Hamon (2007) studied the data from the Paris Stock Exchange to examine the timing of actual repurchases and the impact on liquidity in the years 2000-2002. Their sample

contained 352 companies that executed share repurchases. France was suitable for this kind of study as French companies need to disclose repurchase data at the beginning of following month similarly to Canada (Ikenberry, Lakonishok & Vermaelen 2000). They studied if the motivation for repurchases was price support or to profit from private information. They did find that repurchases were executed when the share price was dropping, which would indicate that companies buy shares against the market on lower prices than other investors. There were no increases in the share price after the purchase, which is in line with the price support hypothesis. Share repurchases are enough to stabilize the price, but not enough to increase the prices. They found out that the liquidity significantly reduced after the repurchases and this applied to all market segments.

Skinner (2008) studied the relation between the corporate payout policy and earnings on his accounting study. He presented that repurchases are more increasingly used as a substitute to dividends. This was happening on companies that have always paid dividends and companies that only make repurchases. He separated three different groups from the sample. First group included companies that paid yearly dividends, made regular repurchases and continued to pay dividends because of their dividend history. When studying the relation between dividends and earnings the relation was not strong, which makes the dividends very inflexible. However, with earnings and repurchases the relation was much stronger, which would indicate that repurchases are much more flexible and adjust more in line with the earnings. Companies executed share repurchases as often as every other year, with managers trying to time the repurchases. The second group included companies that made repurchases regularly but did not pay any dividends. The third and the largest group of companies also did not pay dividends but did make occasional share repurchases. For both these groups their earnings explained repurchases very well.

The data of Skinner (2008) showed that companies, which paid dividends but did not execute repurchases were no longer economically important. These companies only counted for 7 % all companies and 2 % of all payouts in the years between 1980 and 2005. This link between repurchases and earnings is important evidence that repurchases are substitute for dividends, but not all of them are used as such as repurchases can be used other things, for example

stock options and acquisitions. Overall, his results strongly support the substitution hypothesis, and that share repurchases are becoming dominant form of corporate payouts. There may even come time in the future where dividends are no longer used.

Almeida, Fos et al. (2016) studied the consequences of share repurchases on company's investments and employment. They used quarterly observations between the years 1988-2010 from the United States market with Ordinary Least Squares model. This was important study because United States based companies had high levels of cash on their balance sheets and they had immense pressure from stakeholders to use it wisely. They noticed that companies which did miss their EPS (earnings per share) forecasts by few cents are more likely to repurchase shares compared to those companies that beat forecasts by similar amount. Their findings suggest that repurchases did lead to less employment and investments, but also that the companies hold less financial slack. On average this should not lead to shareholder value destruction, but share repurchases that are purely motivated only to meet EPS targets can have consequences for value and performance.

## **2.7 Hypotheses**

The purpose of the thesis is to research the timing of the repurchases in the London Stock Exchange. There are different approaches used in the literature to analyze how and when the repurchases are happening. Based on earlier literature and the research questions presented earlier in the chapter 1, multiple research hypotheses are formed and presented in this chapter. These hypotheses are used in the later empirical study part of this thesis. Final conclusions for the hypotheses are presented in the summary and conclusions chapter.

The first hypothesis is chosen based on that the companies could try to minimize the costs of share repurchases. If company manages to time their repurchases to the point when the share prices are low as presented by (Brav et al. 2005), they can maximize the advantages of the repurchases. However, the conclusion based on the previous literature is not unanimous. Some researchers (for example, Brockman & Chung 2001; Brav et al. 2005; Chan, Ikenberry &

Lee 2007; Manconi, Peyer & Vermaelen 2019) show that companies manage to time their repurchases very well, but few studies also have contradicting evidence (Bonaimé, Hankins & Jordan 2016; Cook, Krigman & Leach 2004).

When the share prices are low the overall costs for repurchases are also low and as Ginglinger and Hamon (2007) research suggests the share price should be lower on the repurchase execution days compared to non-repurchase days. Dittmar and Dittmar (2008) suggest that there are two possible options for share repurchases, market or company undervaluation. The first research question is based on the company undervaluation option. This is often linked to the signaling hypothesis where companies signal undervaluation to the market. Therefore, the first research hypothesis is formed as follows to study the company undervaluation based on the earlier literature:

*H1: Companies minimize their share repurchase costs by repurchasing shares when the share prices are low.*

The second hypothesis suggests that when the market overall goes down also most of the companies share prices come down. This the second option of the Dittmar and Dittmar (2008) two possible options for share repurchases, market undervaluation. Very often these market crashes have nothing to do with the company in question and this makes it a great opportunity to consider share repurchases. Dittmar and Field (2015) suggest that companies pay lower prices after downturns on the market, which indicates that companies possess market timing ability.

If the market downturn is only temporary company can save a lot of money on the repurchase costs when buying on the market downturns, if they can notice and time their share repurchases correctly. Based on the Dittmar and Field (2015) research companies' time their repurchases to the periods when the market is down, but this is not always the case as there may be some other motivations for the repurchases (Chan, Ikenberry & Lee 2007; Kahle 2002). Based on the literature market undervaluation is chosen to be studied on the second research hypothesis. The following second hypothesis is formed to study the market undervaluation:

*H2: Companies time their share repurchases when the market overall is down.*

The final two research hypotheses are related to the price to book ratio, which equals the company's market value divided by its book value (Bodie, Kane & Marcus 2014, 652). According to Persons (1997) often the reason for repurchases is undervaluation or that the own shares are good investment. Von Eije and Megginson (2008) argue that the likelihood of dividends or repurchases can be explained by the price to book ratio.

Ikenberry, Lakonishok and Vermaelen (1995) also suggest that price to book ratio effects repurchase motivations and the following performance. Often price to book ratio can be seen as an indicator of investment opportunities (Baker, Wurgler 2002) and the repurchases can be seen as an investment to the company itself. Mean price to book values for the London Stock Exchange are presented in the appendix 1. The overall mean market price to book ratio on the London Stock Exchange between the 2010 and 2019 is 4.2, which is quite high as there are few companies with very high P/B values. The median is 1.61, which more normal for P/B value and the companies can be more evenly divided in to two separate groups. Therefore, median price to book is used to study the groups. This forms two groups the undervalued and overvalued companies. Based on the studies of Ikenberry, Lakonishok and Vermaelen (1995) undervalued companies should be repurchasing more shares. The two final hypotheses are formed as follows:

*H3a: Companies repurchase more shares when the company is valued under the market median price to book ratio.*

*H3b: Companies repurchase less shares when the company is valued over the market median price to book ratio.*

### **3. DATA AND METHODOLOGY**

This chapter presents the data and methodologies used in the thesis. The used data is obtained from the Thomson Reuters DataStream. Data will be introduced and presented with multiple figures and tables. As the previous studies have been widely using quantitative methods to study share repurchases and the timing, this thesis will also use three different quantitative methods to analyze share repurchases in the London Stock Exchange. The three methods used in this thesis are, bootstrapping, accounting study, and event study. All the methods are presented on the analysis method chapter.

#### **3.1 Data**

The companies chosen for the study are all from the FTSE 350 index, which includes 350 companies with the highest market capitalization from the London Stock Exchange. Being part of the premium segment companies must fulfill both the United Kingdom listing authority and London Stock Exchange criteria to be accepted to this highest class. Only with the premium listing companies can be accepted to the FTSE indexes. (London Stock Exchange Group 2020b) As BEIS (2019) shows, almost all share repurchases in United Kingdom are executed by FTSE 350 index companies, which makes it an ideal index for studying the repurchases in the United Kingdom market.

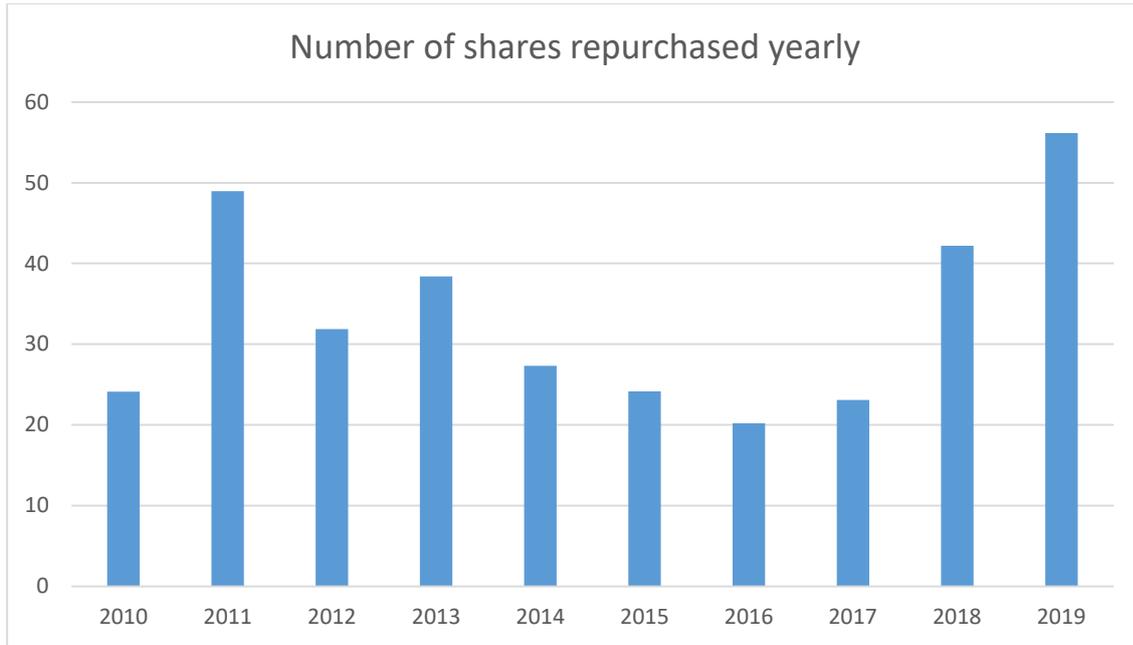
The data is obtained from the Thomson Reuters DataStream where all the daily share prices, repurchased shares, price to book ratios and the index values are obtained. Share prices are obtained as a timeseries containing all the closing stock prices for each trading day. Repurchased shares are calculated from the number of outstanding shares per each day. As the company executes share repurchases the number of shares outstanding will decrease and therefore the number of shares repurchased for each trading day can be calculated. That does not however take on account the different methods used in the process. Also, the effects of stock splits are removed from the data. Price to book ratios are available for each day and are used to analyze whether they have any effects on the decision to execute share repurchases.

After removing all the companies with missing data, unclear transactions and no share repurchases, 256 companies are left to be studied.

*Table 3. Repurchase statistics 2010-2019 in United Kingdom*

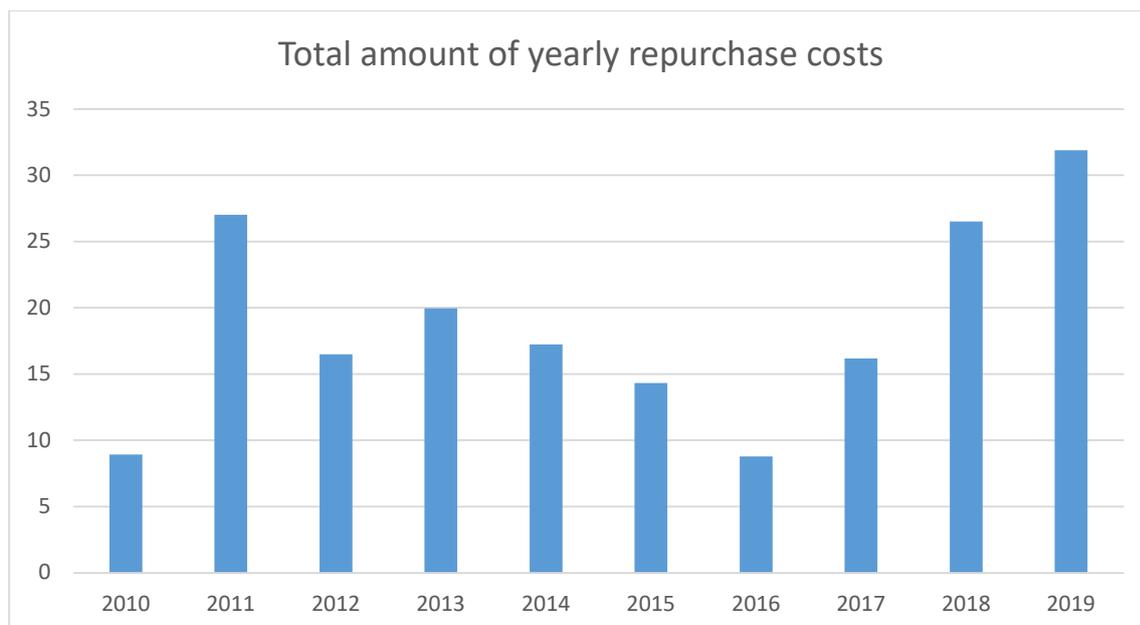
<i>Year</i>	<i>Companies executing share repurchases</i>	<i>Number of shares repurchased (Million)</i>	<i>Total costs of share repurchases (Billion GBP)</i>	<i>Mean price paid per share (GBP)</i>
2010	98	24	9	370
2011	119	49	27	552
2012	119	32	16	517
2013	113	38	20	520
2014	100	27	17	631
2015	116	24	14	592
2016	116	20	9	435
2017	98	23	16	701
2018	94	42	27	629
2019	111	56	32	568
<i>Total</i>	256	336	187	557

Table 3 presents the repurchase statistics in the United Kingdom between the years 2010-2019. Out of all companies included in the FTSE 350 index 256 companies have executed share repurchases between 2010-2019. Number of companies executing repurchases yearly has varied from 94 to 119. Number of shares repurchased at lowest has been 20 million in 2016 and highest at 56 million in 2019. The total repurchase costs for all companies has been highest in 2019 with 32 billion pounds and lowest at 9 billion pounds in 2010 and 2016. The mean price paid per share has been 557 pounds for the total sample. Figure 3 shows the number of shares repurchased per each year in millions. The trend seems to be that repurchases are increasing after the low point in 2016. After 2010 the amount increased shortly but decreased to lower levels than 2010 in 2016. After 2016 repurchases have been rising and reaching new record numbers in 2019.



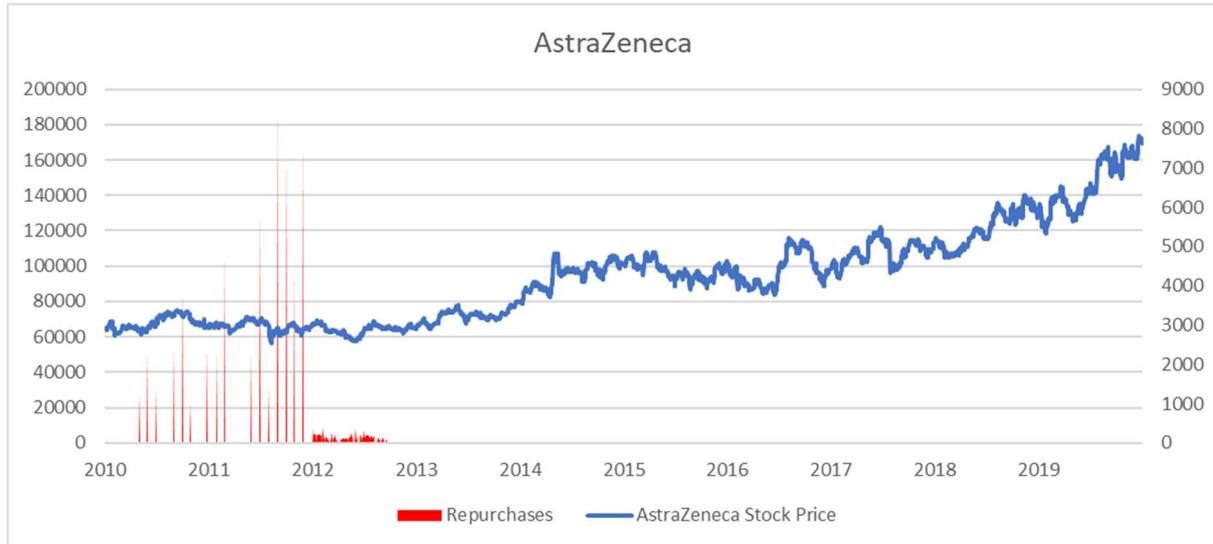
*Figure 3. Number of shares repurchase yearly (million)*

Figure 4 shows the total share repurchase costs overall for all companies in billion GBP. The trend is very similar to the figure 3 with 2010 and 2016 having the lowest repurchase costs. In 2019 repurchases reached the highest level with over triple the amount spent on repurchasing shares compared to 2010 and 2016. Trend on both figures is clearly following the economic cycles with high numbers on the years when the economy is booming and lower numbers when economy is down (figure 7).



*Figure 4. Total amount of yearly repurchase costs (billion GBP)*

Figure 5 and figure 6 present two separate companies to show more in detail the repurchase programs executed on a company level. Two companies which have executed multiple large repurchase programs between 2010 and 2019 have been selected to be presented. These companies are AstraZeneca and Vodafone. This way the repurchase programs can be more precisely presented and observed as companies have clear patterns when they are executing the repurchases. Figure 5 presents AstraZeneca's share repurchases and stock price development in the same figure. In the left axis is the number of shares repurchased and in the right axis the share price. In the years 2010-2012 AstraZeneca was repurchasing large number of shares on few specific days. However, in 2012-2013 the repurchase program was much smaller, but more evenly distributed between the days as can be seen from the higher frequency in the figure 5. Based on the share price development they bought shares on stable prices during 2010-2013 and after that the share price has increased significantly. The timing seems be very well executed on their part as all the repurchased are executed at the lowest share prices of the time period.



*Figure 5. AstraZeneca's stock price & repurchases*

Another example of repurchase programs is Vodafone as presented in the figure 6. Vodafone was repurchasing large number of shares between 2011-2012 on few specific days with multiple week gaps between the repurchase days. After 2012 their programs were more concentrated similarly to AstraZeneca and were executed almost daily when the program was active. The amounts were smaller, but in total amount of shares repurchased was still very significant. Vodafone had five smaller programs after 2012 and with the latest being in 2019. The share price increased after the first programs but overall, it has stayed at the same levels on the years between 2010-2019. On the timing it could be said that they at least did not bought significant amount of shares at the highest share price levels, which could indicate successful timing efforts.

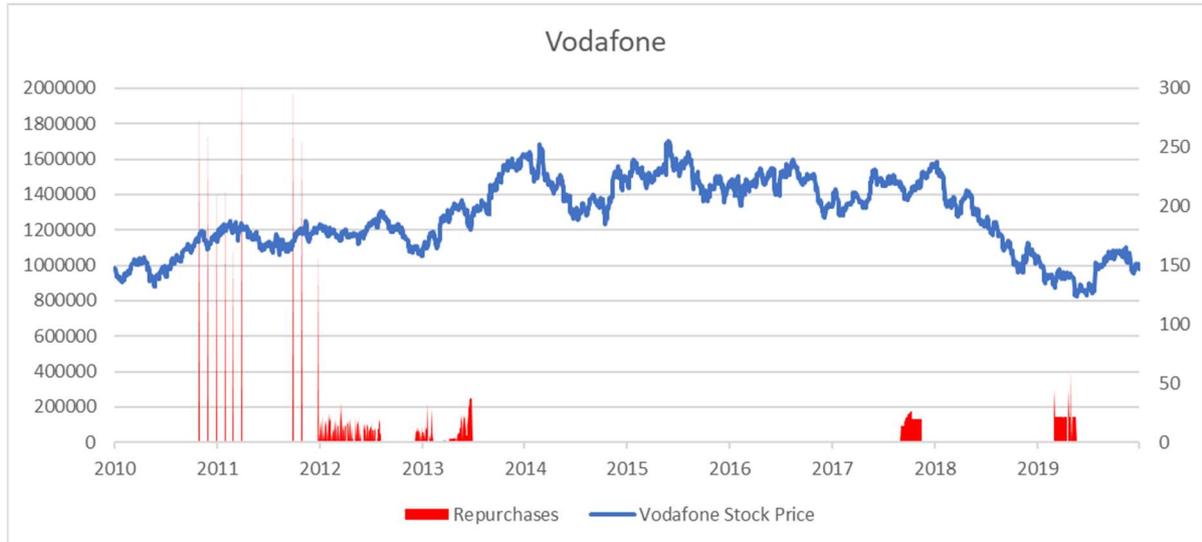


Figure 6. Vodafone's stock price & repurchases

Finally, the FTSE 350 index price is presented in the Figure 7. As it can be seen from the figure, the FTSE 350 index has increased from nearly 3000 to over 4000 during the years 2010-2019. There have been many smaller price decreases but overall, the index price has steadily increased over the years. The few specific trading days where the index price has fallen provide an interesting case to study if that has increased the number of repurchases executed in the London Stock Exchange.

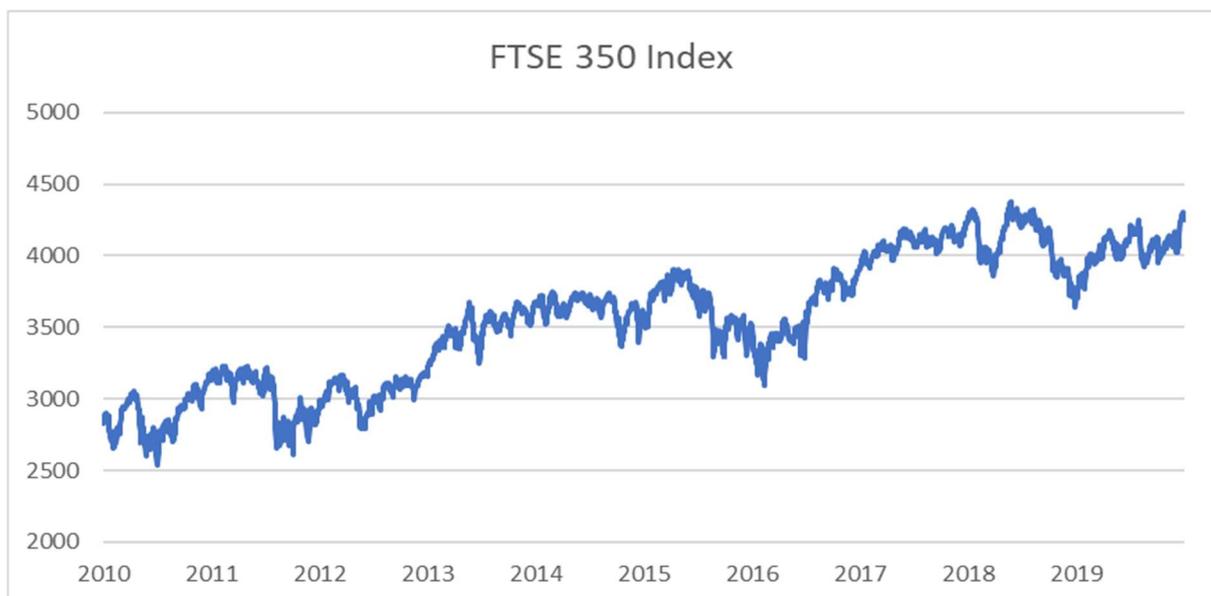


Figure 7. FTSE 350 index price

## 3.2 Analysis methods

In the subsections below the methodologies used in this thesis to study the share repurchase timing in the London Stock Exchange will be presented. First method presented is the bootstrapping, where multiple alternative repurchase programs are simulated. Second is event study methodology, where the biggest market downturns are analyzed. Lastly the accounting study methodology, where two different prices to book groups for each year are created. All these methods are used previously in the earlier research to study share repurchases and timing of repurchases.

### 3.2.1 Bootstrapping

The timing ability of companies is studied using the bootstrapping methodology by comparing costs of the executed repurchases to bootstrapped results. The similar approach is also used by Brockmann and Chung (2001) on their study in the Hong Kong market. If companies would possess timing ability in relation to the repurchases, most often the actual executed costs should be lower than the bootstrap results. However, this is not always the case with all companies as they may repurchase shares with different motivations or do not consider timing to be that important.

Bootstrapping as a method is similar to simulation with one key difference on the data construction. Simulation uses completely artificial data and bootstrapping is based on obtaining a description of the properties of empirical estimators. This is done by using the sample data points themselves and sampling repeatedly with replacement from the original data. Bootstrapping technique has its advantages compared to analytical results as it allows to make inferences without making strong distributional assumptions. (Brooks, 2002)

Similarly Brooks (2002) Efron and Tibshirani (1993) suggest that the bootstrap is data-based method for statistical inference. It is used to make certain statistical inferences. Bootstrap works by drawing the replacement from the sample population and this is repeated for

a larger number of times. Bootstrap works by using independent data points such as  $x_1, x_2, \dots, x_n$ , which are then assigned to the following vector (Efron & Tibshirani 1993):

$$X = (x_1, x_2, \dots, x_n) \quad (1)$$

Where the statistic of interest  $s(X)$  can be calculated. The bootstrap sample is formulated as follows (Efron & Tibshirani 1993):

$$X^* = (x_1^*, x_2^*, \dots, x_n^*) \quad (2)$$

This is formed by randomly sampling  $n$  times with replacement from the original data points  $x_1, x_2, \dots, x_n$ . For example, if the  $n = 5$  the sample that is produced by the bootstrapping might be (Efron & Tibshirani 1993):

$$X^* = (x_5, x_1, x_2, x_4, x_3) \quad (3)$$

Each bootstrap sample has  $n$  elements generated by sampling with replacements from the original data. The bootstrap algorithm starts by creating large number of independent samples  $X^{*1}, X^{*2}, \dots, X^{*B}$  with the size  $n$ , with  $B$  being the number of bootstrap samples. The different bootstrap replicates are obtained by calculating the value of the  $s(X)$  for every bootstrap sample (Efron & Tibshirani 1993):

$$s(X^{*1}), s(X^{*2}), \dots, s(X^{*B}) \quad (4)$$

For example, if  $s(X)$  is sample median then  $s(X^*)$  is the median of the bootstrap sample. The statistical significance is tested by using the paired samples t-test to compare the means between the two samples to see if there are any significant changes on the repurchase costs by

simulating the costs. The two samples tested are the original executed repurchases and the bootstrap simulated sample.

### **3.2.2 Event study**

The second method used to study repurchases in London Stock Exchange is the event study methodology. The focus is on the timing of repurchases on the market, whether companies increase repurchases when the market is facing downturns. In theory the company's management could try to support the share price and to profit from these market disruptions. In the study specific event days where the FTSE 350 index price decreased significantly during 2010-2019 has been selected to be studied using event study methodology. This methodology is used earlier by Tomperi (2004) in his studies about the share repurchase timing in Finland.

When measuring effects of an economic event it can be constructed by using event study methodology. Event study estimates the impact of specific event on the value of company. The usefulness comes from that if market is rational the effects of a given event are immediately reflected on the market. Therefore, the measure of events economic impact can be observed using security prices over a relatively short period of time. This has been used in multiple applications in accounting and finance for multiple company and economy wide events such as mergers and acquisitions, earnings announcements, debt and equity issuance and trade deficit announcements. The null hypothesis is that the event has no effect on the returns. (MacKinley 1997)

There is no unique structure for event study, but it usually starts with identifying the event of interest and defining the period from which the event will be studied. This is referred as the event window. Normally the event day can be the day of the announcement. Usually, the event window is wider than the period of interest. This makes it possible to examine the period surrounding the actual event itself. Normally the period of interest is expanded for at least a day before the announcement and day after the announcement. This captures the effects which happen after the market is closed at the event day. Sometimes the market can receive information before the event, and this can also be investigated by the pre-event days.

The selected event window is presented in the figure 8. After the event has been determined companies that are to be selected need to be determined. Selected companies can be restricted by the data availability or for example by company's industry. (MacKinley 1997)

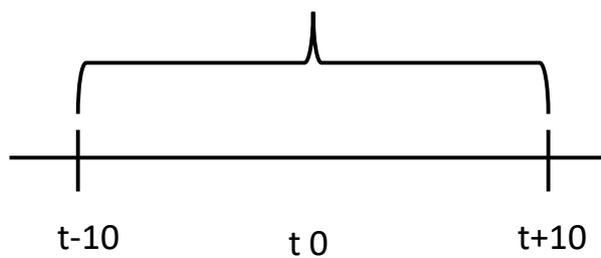


Figure 8. Event window (MacKinley 1997)

### 3.2.3 Accounting study

The effect of price to book ratio to the number of executed shares repurchased is studied by using accounting study. As von Eije and Megginson (2008) suggest price to book ratio can explain repurchase execution and Baker and Wurgler (2002) argue that P/B ratio can indicate possible investment opportunities. This is also suggested by Ikenberry, Lakonishok and Vermaelen (1995) who argue that P/B ratio effects share repurchase motivations and performance following repurchases. In their studies Lakonishok, Shleifer and Vishny (1994), Ikenberry, Lakonishok and Vermaelen (1995) and Zhang (2005) studied the effects of companies' different price to book ratios. They constructed between 3 to 5 different groups of companies based on their P/B ratio and used the same methods to study different P/B groups. The different P/B groups are constructed similarly to those earlier studies. All companies are divided into two groups, but this is done on yearly level which means that companies can be on different groups based on their yearly P/B ratio. This is done as the time period (2010-2019) is quite long and the company valuations are constantly changing, therefore only one division for the period is not enough.

Two separate groups are constructed to test the relationship between the price to book ratio and share repurchases. The groups are constructed for each year separately as mentioned earlier. Also, for the whole sample these two groups are formed to test the overall effects during the years 2010-2019. Median values are used to form the groups as the mean values for each year are skewed because of the companies with very high P/B ratios. This is presented in the appendix 1, which clearly shows that the overall mean (4.22) is much higher compared to the median P/B (1.61). It also varies much more between the years.

## 4. RESULTS

In this chapter the results of all the different methods are presented and analyzed. First the results of bootstrapping are presented, which compares the resampled repurchase program costs to the actual executed repurchase costs by forming alternative repurchase programs. This shows whether companies can manage to time their repurchases successfully by minimizing repurchase costs or could they in theory have possibilities to do much better. Afterwards the event study results are presented, where the market downturns are studied if those have effects on the number of repurchases executed by the companies around the downturns. And lastly the accounting study results are presented, which would indicate if the company's market to book ratio would have decreasing or increasing effects on the number of repurchases executed among the companies in the London Stock Exchange. This is done by forming separate P/B groups yearly and comparing them.

### 4.1 Bootstrapping results

Company repurchase timing is studied by using bootstrapped costs (hypothesis 1). The bootstrapping is constructed to mimic company's decisions as closely as possible similarly to Brockmann & Chung (2001) studies. Aspects of the repurchase decision are held constant except the timing of repurchase. The number of shares repurchased per day and the number of execution days are kept constants for all companies on the period. The actual repurchase costs for all companies are calculated earlier and presented in the table 3. The bootstrapping is replicated 10 000 times for each of the 256 companies to have significant accuracy. Therefore, 10 000 alternative repurchase programs are formed for all 256 companies and afterwards the overall statistics and the results are calculated based on that.

The actual share repurchase costs are compared to the 10 000 bootstrap simulated programs. If company can manage to time their share repurchases optimally, they can minimize the repurchase costs by purchasing when the share price is at the lowest point and avoid repurchasing on the highest points. Companies may have insider information that they can consciously

or unconsciously use on timing the repurchases, which should lead to decreased repurchase costs.

For example, focusing on one specific repurchase plan, Vodafone's repurchases in 2019. Vodafone acquired 8 266 900 of their own shares with a total cost of 1.15 billion GBP. Using bootstrapping with 10 000 replications the mean cost for repurchases in 2019 is 1.19 billion GBP. The minimum and maximum are 1.14 billion GBP and 1.24 billion GBP. This seems to indicate that Vodafone possesses clear timing ability in the year 2019. Of the simulated 10 000 repurchase plans only 4 are under the Vodafone's actual costs 1.15 billion GBP. The pseudo p-value can be calculated by dividing repurchase plans under the actual cost with the number of replications. This gives a value of 0.0004, which is under 1 % confidence level and indicates statistically significant timing ability for Vodafone in 2019.

In the table 4 bootstrap results are presented. The actual repurchase costs are compared to the bootstrap simulated costs by dividing the bootstrapped costs by the actual costs, forming minimum, mean, median and maximum costs. The number of all companies executing repurchases and the costs for all years between 2010-2019 are presented. The bootstrapped mean repurchase costs are compared to actual costs by using paired two sample t-test. The significance levels for the test are presented in the table after the t-statistic.

*Table 4. Comparison between actual repurchase costs and bootstrap simulated costs*

<i>Year</i>	<i>Companies executing repurchases</i>	<i>Minimum cost</i>	<i>Mean (median) cost</i>	<i>Maximum cost</i>	<i>t-stat</i>
2010	98	0.96	1.00 (0.99)	1.04	0.46
2011	119	0.96	0.99 (0.99)	1.02	0.75
2012	119	0.98	1.00 (1.00)	1.02	-0.16
2013	113	0.98	1.01 (1.01)	1.04	-1.04
2014	100	0.96	0.99 (0.99)	1.02	1.80 *
2015	116	0.93	0.98 (0.98)	1.04	1.18
2016	116	0.95	1.03 (1.01)	1.14	-0.50
2017	98	0.98	1.00 (1.00)	1.01	0.49
2018	94	0.99	1.02 (1.02)	1.04	-1.13
2019	111	0.98	1.00 (1.00)	1.02	-0.22
<i>Total</i>	256	1.00	1.05 (1.05)	1.10	-1.17

(\*\*\*, \*\* and \* represent significance levels, 1 %, 5 % and 10 %)

The minimum costs for the whole sample between the years 2010-2019 vary from 0.93 to 0.99, which seems to indicate that there have been lower repurchase strategies for the time period in the London Stock Exchange. Mean costs vary from 0.98 to 1.03 and median costs from 0.98 to 1.02, which however shows that overall companies have been able to time their repurchases better than the average simulated costs. Maximum cost varies 1.01 to 1.04, which also shows that there are not much more expensive programs. Overall, for the whole sample minimum is 1.00, mean and median 1.05 and maximum 1.10.

Table 5 presents the number and percentage of companies with pseudo p-values under 5 % and 1 %, which would indicate significant timing abilities. However, for the whole sample only 10 % of the companies are under 5 % p-value and only 5 % are under 1 % p-value, meaning only 10 % of companies can time their repurchases successfully compared to the bootstrap simulated costs. This means that there have been more optimal repurchase programs possible. The situation is not much better when looking at the specific years as the percentage varies from 8 % to 16 % under 5 % p-value and from 2 % to 10 % under the 1% p-value level.

*Table 5. Pseudo p-values*

<i>Year</i>	<i>Number (percentage) of companies with pseudo p-value under 5%</i>	<i>Number (percentage) of companies with pseudo p-value under 1%</i>
2010	12 (12 %)	6 (6 %)
2011	19 (16 %)	9 (8 %)
2012	10 (8 %)	2 (2 %)
2013	13 (12 %)	2 (2 %)
2014	11 (11 %)	8 (8 %)
2015	10 (9 %)	4 (3 %)
2016	16 (14 %)	7 (6 %)
2017	12 (12 %)	10 (10 %)
2018	12 (13 %)	4 (4 %)
2019	15 (14 %)	7 (6 %)
<i>Total</i>	25 (10 %)	12 (5 %)

Using t-test to test statistical significance of the results, for the whole sample result is not significant as the p-value is 0.25. Simulated yearly mean repurchase costs for companies are over the actual repurchase costs on all but three years, which would indicate that companies possess timing ability. However, only the year 2014 is statistically significant on the 10 % significance level. Therefore, the first hypothesis cannot be accepted as there are no statistically significant results, which would confirm that companies minimize their repurchase costs by repurchasing when the share prices are low.

Results from the London Stock Exchange are similar to the results of Brockmann & Chung (2001) study where they received 1.09 mean and 1.04 median bootstrapped cost for their overall sample. Their minimum cost between the years varied from 0.82 to 0.95 and the maximum from 1.11 to 1.58. This shows that in their sample the variance was much higher compared to the results of this study. Their results would suggest that companies possess timing abilities. Unlike the results of this study, they show that mean and median cost are above the actual costs every year, whereas on this study for three years the simulated mean cost was under the actual costs. Overall, their results suggest that management possesses timing ability, which however cannot be confirmed on this study as the results are mainly not statistically significant.

## **4.2 Event study results**

The market timing ability of companies (hypothesis 2) is studied by using the event study methodology similarly as Tomperi (2004). This is constructed by focusing around the biggest daily decreases on the FTSE 350 index closing prices, which would be an opportunity for companies to repurchase their own shares from the market. Based on earlier literature companies should repurchase more of their own shares when the market overall is down (Dittmar & Field 2015).

The biggest down days of the FTSE 350 index closing price have been selected as the event days. The event window T is set to be 21 days in total [-10; +10], 10 days before and after are used as an event window. The T = 0 is the event day. The days before the event are analyzed

to see whether it has effects on the number of shares repurchased. Statistical significance of the event study is tested by using the paired two sample t-test, which takes into account that the samples are connected to each other. The test shows if the number of repurchases changed significantly after the event.

In the below table 6 the selected event days for the study are presented. The chosen dates were the seven biggest daily decreases on the FTSE 350 index during the years 2010-2019. Event windows where there were consecutive days with big decreases inside the same event window were not included in the study. Therefore 7 different event periods were left to be studied. Table 6 shows that the biggest change percent on the index price varies from -4.54 % to -3.02 %. The number of companies executing repurchases on the event day were at highest 28 and at lowest only 6 on two event days. Number of shares repurchased on the event day also differs from only 8 600 to over 140 thousand, which is quite large difference between the dates.

*Table 6. Selected event days*

<i>Date</i>	<i>FTSE 350 Index (close)</i>	<i>Change-% from previous trading day</i>	<i>Companies executing repurchases on the day</i>	<i>Number of shares repurchased</i>
24.8.2015	3 293	-4.54 %	15	39 710
22.9.2011	2 674	-4.54 %	6	24 240
20.1.2016	3 169	-3.37 %	14	18 310
6.12.2018	3 719	-3.10 %	23	140 360
29.6.2010	2 597	-3.08 %	9	98 610
14.5.2010	2 781	-3.07 %	6	8 570
2.10.2019	3 972	-3.02 %	28	122 150

The combined event window statistics are presented more specifically in the table 7. The total number of shares repurchased is over 14 million and most of them are repurchased on the 10 days after the event, which would indicate that there could be some evidence supporting that companies time their repurchases on times when the market is down or around that time.

Mean, median, minimum, maximum and standard deviation for the event window are also presented in the table 7. All the statistics are higher for the 10 days after the event compared to before the event day, which would indicate that the price downturn of the index has effects on companies repurchase decisions.

*Table 7. Event window statistics*

	<i>[-10, -1]</i>	<i>Event day</i>	<i>[+1, +10]</i>	<i>Total</i>
<i>Total shares repurchased</i>	5 588 390	451 950	8 297 910	14 338 250
<i>Mean</i>	48 595	7 409	72 156	124 680
<i>Median</i>	11 400	250	12 650	37 440
<i>St dev</i>	120 543	11 912	232 393	303 723
<i>Min</i>	0	0	0	100
<i>Max</i>	753 650	84 370	1 967 700	1 967 700
<i>Number of companies</i>	115	61	115	115

The final results of the event study are presented in the table 8 below. There have been 128 companies executing repurchases during the event window in total. The number of shares repurchased, number of repetition dates and number of active companies are tested if there are any statistically significant changes in repurchase activity during the event period. Mean shares repurchased is 48 thousand before the event and 72 thousand after the event day. The median and standard deviation are 11 400 and 120 543 before the event, 12 650 and 232 393 after the event. However, the number of repetition dates is lower after the event day (1.13 vs 1.20) and the number of active companies is also lower after the event day (13.93 vs 12.94). The statistical significance of the shares repurchased, number of repetition dates and active companies are tested by using t-test. For the share repurchase mean the result is not statistically significant. The number of repetition days is also not statistically significant. However, for the number of active companies' result is statistically significant on the 10 % significance level, which is only sign of weak statistical significance.

Table 8. Event study results

	<i>[-10, -1]</i>	<i>Event day</i>	<i>[+1, +10]</i>	<i>t-stat</i>
<i>Shares repurchased</i>				
<i>Mean</i>	48 595	7 409	72 156	-1.16
<i>Median</i>	11 400	250	12 650	
<i>St dev</i>	120 543	11 912	232 393	
<i>Number of repetition dates</i>				
<i>Mean</i>	1.20	-	1.13	1.34
<i>Median</i>	0.71	-	1.13	
<i>St dev</i>	1.31	-	1.23	
<i>Active companies</i>				
<i>Mean</i>	13.84	-	12.94	1.88 *
<i>Median</i>	12	-	12	
<i>St dev</i>	8.69	-	7.92	
<i>Number of companies</i>				
	115	61	115	

(\*\*\*, \*\* and \* represent significance levels, 1 %, 5 % and 10 %)

Figure 9 presents the mean of daily shares repurchased and the index price changes on the event window days. At the highest point [+5] the daily mean reaches over 340 thousand shares repurchased and at the lowest point [-3] only under 50 thousand shares were repurchased. The daily means are much lower before the event day and decreasing significantly six days prior to the event. On the actual event day there is no significant increase in repurchases, only slight increase compared to the previous day. However, after the event day there are more large increases on the mean of shares repurchased, especially on the second, fifth, sixth and tenth day. After the sixth day the repurchases seem to decrease and stabilize to a lower level before increase in the tenth day. The index price change varies between -3.5 % and 0.7 %. The lowest point is on the event day and the highest three days after. Overall, the index change is on average 2.75 % negative before the event day and 0.24 % positive after the event day.

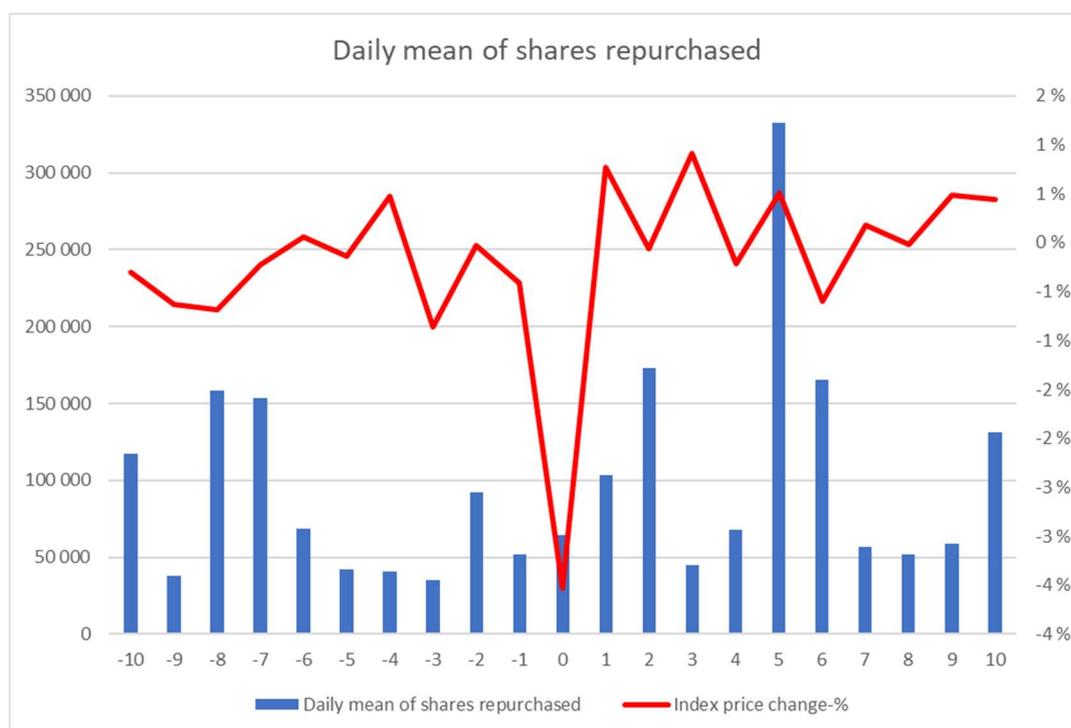


Figure 9. Daily mean of shares repurchased with index price change-%

Overall, the number of shares repurchased increases after the event day. However, based on the results of the event study presented it is not clear that all the companies are timing their repurchases when the market overall has downturns. The number of active companies and repetition dates decreased after the event, which is not in line with the hypothesis. Mostly the results of the event study are not statistically significant. Only the number of the active companies is weakly significant on the 10 % confidence level. However, it must be noted that the number of repurchases increased after the event day, but as the results are not statistically significant the hypothesis 2 is rejected. These results are in line with findings of Tomperi (2004) as he did not find support for increased repurchasing activity after the event day in his studies from the Helsinki Stock Exchange. Only the number of active companies increased statistically significantly after the event day, which is the opposite of the results from the London Stock Exchange.

### 4.3 Accounting study results

The final two hypotheses are formed to study the effect of price to book ratio to the company's executed share repurchases (hypotheses H3a & H3b). This is done similarly to studies of Lakonishok, Shleifer and Vishny (1994), Ikenberry, Lakonishok and Vermaelen (1995) and Zhang (2005) who studied the effects of companies' different price to book ratios by forming groups for the different P/B ratios. Therefore, the effects of price to book ratio are studied by forming two separate groups for each year between 2010-2019, one which represents the undervalued companies and one which represents the overvalued companies. The groups are formed by using yearly median values to divide the companies to the groups.

The hypothesis is that when company is valued under the median price to book value on the market, company may take advantage of the undervaluation and combat this by repurchasing their own shares. Therefore, company would profit from repurchases as it could invest in itself under the correct value. This would lead to the corrected price on the market. Vice versa when company is valued over the market median P/B ratio, the company should in theory repurchase less if there are no other reasons for the share repurchases. The statistical significance of the results will be tested by using unpaired sample t-test, which is more suitable for the sample as the groups are independent from each other. This will show whether the differences in the two groups are statistically significant.

In the table 9 P/B statistics are presented. Yearly median P/B ratios for the companies vary from 1.45 to 1.92. For the overall sample which consist of 227 companies the median price to book ratio is 1.61. Of all the companies 109 are over the median and 118 under the median. Yearly the numbers are bit different as not all companies are included in the sample starting from 2010 and there are missing data for some companies, but mainly the two groups are similarly sized as the median is used to separate the companies. Companies are overall repurchasing almost 320 million shares during 2010-2019. On the years when the median price to book is overall lower companies are repurchasing more shares compared to years when the P/B is higher.

Table 9. P/B statistics between 2010-2019

<i>Year</i>	<i>P/B median</i>	<i>Companies over median P/B</i>	<i>Companies under median P/B</i>	<i>Total repurchases (millions)</i>
<i>2010</i>	1.45	106	104	23.91
<i>2011</i>	1.46	107	108	47.29
<i>2012</i>	1.45	107	109	29.74
<i>2013</i>	1.72	109	109	36.6
<i>2014</i>	1.91	110	112	26.26
<i>2015</i>	1.92	113	111	22.12
<i>2016</i>	1.64	114	111	19.71
<i>2017</i>	1.76	113	112	22.55
<i>2018</i>	1.61	114	111	39.56
<i>2019</i>	1.51	113	114	51.88
<i>Total</i>	1.61	109	118	319.61

In the table 10 the results of the price to book study are presented. Overall undervalued companies measured by using the median P/B are repurchasing 246 million shares with mean of 2,2 million and overvalued companies are repurchasing just 73 million shares with mean of 0,67 million. At the highest point in year 2019 undervalued companies have repurchased over 45 million shares, which is over half of the overvalued companies' total number of shares repurchased during the years 2010-2019. At the lowest point share repurchases for undervalued companies have been almost 14 million. For the overvalued companies, the yearly numbers have been much lower with 15 million at the highest and only 3 million at the lowest point. It seems that there are quite big differences between the two groups on the number of yearly repurchased shares.

Table 10. P/B results

<i>Year</i>	<i>Repurchases executed by undervalued companies (millions)</i>	<i>Repurchases executed by overvalued companies (millions)</i>	<i>Mean of repurchases by undervalued companies (millions)</i>	<i>Mean of repurchases by overvalued companies (millions)</i>	<i>T-stat</i>	
2010	17.31	6.60	0.16	0.06	-1.18	
2011	32.03	15.25	0.30	0.14	-0.83	
2012	22.01	7.73	0.20	0.07	-1.11	
2013	28.79	7.81	0.26	0.07	-1.74	*
2014	13.90	12.37	0.13	0.11	-0.19	
2015	16.68	5.44	0.15	0.05	-1.94	**
2016	16.37	3.34	0.14	0.03	-1.43	
2017	18.17	4.38	0.16	0.04	-1.73	*
2018	35.18	4.38	0.31	0.04	-1.84	*
2019	45.66	6.22	0.40	0.06	-1.86	*
<i>Total</i>	246.09	73.53	2.21	0.67	-3.63	***

(\*\*\*, \*\* and \* represent significance levels, 1 %, 5 % and 10 %)

Figure 10 presents the yearly repurchase means for each of the groups. The average number of repurchases for all the sample years during 2010-2019 is much higher for undervalued companies, which are executing significantly more repurchases yearly compared to overvalued companies. Year 2014 is the only exception where the means are very close, but otherwise undervalued companies are repurchasing more than double the number of shares each year. After 2015 the difference in means grows even higher and in 2019 difference in repurchases has increased to almost 10 times higher compared to the overvalued companies.

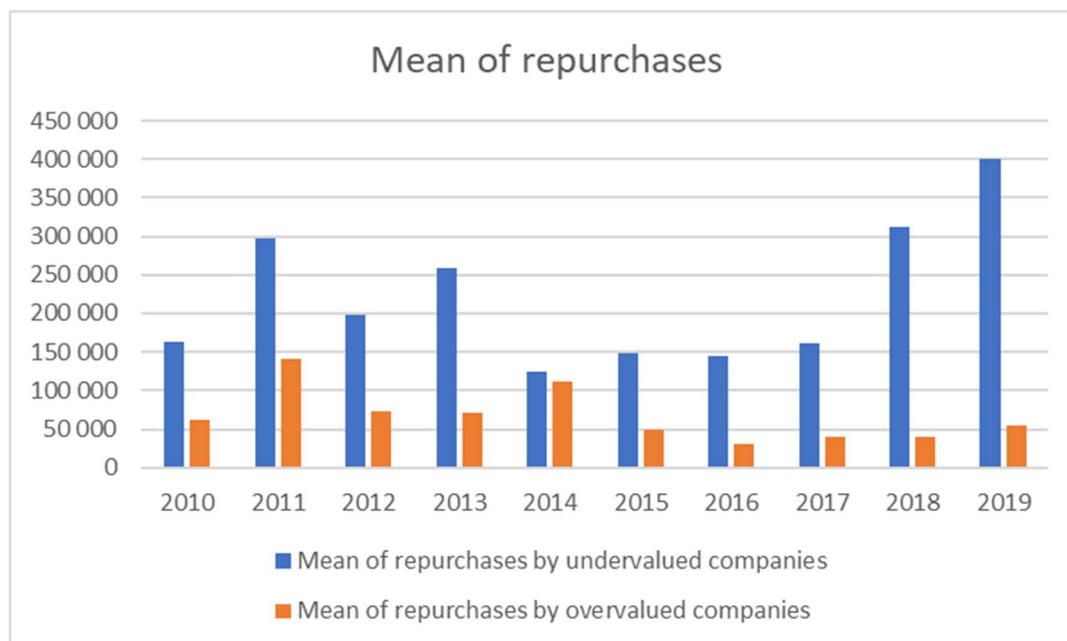


Figure 10. Mean of repurchases per group

The significance of the price to book differences is tested by using unpaired t-test for each of the years using the two separate median groups and overall, for the total sample. The t-statistics and significance levels are presented in the table 10. For five of the years 2013, 2015, 2017, 2018 and 2019 the results are statistically significant at least on the 10 % significance level. On the year 2015 the result is even more significant at the 5 % significance level. Only on the years 2010, 2011, 2012, 2014 and 2016 results are not statistically significant between the groups.

For the whole sample, the result is statistically significant on the 1 % significance level, which indicates highly significant results and shows that there are differences between the two groups. Therefore, the following conclusions can be reached that the companies, which have been undervalued using the median price to book ratio are repurchasing significantly more shares. This confirms the hypothesis 3a. During the years 2010-2019 overvalued companies are repurchasing significantly less shares and accordingly the hypothesis 3b can also be confirmed. Therefore, both hypothesis 3a and 3b will be accepted based on the results of the accounting study.

## 5. SUMMARY AND CONCLUSIONS

The aim of this thesis was to study share repurchases and how companies are timing their share repurchases in the United Kingdom, where there have been less studies compared for example to the United States. In the United States repurchases have for a long time been the de-facto way to distribute wealth to shareholders, which might have influenced researchers to conduct studies on the subject of share repurchases. In Europe repurchases have not been that popular amongst corporations and therefore much less studies have concentrated to the European market. Historically it has been proved that in Europe most of the repurchases are executed in the United Kingdom and the legal environment is the most suited, which makes it an ideal market to study the effects of repurchases. (Ginglinger & Hamon 2007; Andriosopoulos & Lasfer 2015) Many previous studies (Brockman & Chung 2001; Chan, Ikenberry & Lee 2007) have confirmed that companies can execute repurchases with timing ability. The thesis was focusing on the FTSE 350 index companies which execute most repurchases and therefore companies not included in the index were not included in the research sample. The years which the repurchases were studied started from the beginning of 2010 to the end of 2019. This study aimed to answer the following three sub questions:

- 1. Do companies time their share repurchases on the days when their share price is down?***
- 2. Do companies time their share repurchases when the stock market overall is down?***
- 3. How does company's price to book ratio effect the decision to repurchase shares?***

In order to answer these sub questions multiple hypotheses were tested in the thesis. Those hypotheses were formulated based on the earlier literature, hypotheses and studies done on the subject of share repurchases around the world. The hypotheses, results of the study and the final conclusions are presented in the table 11 below.

Table 11. Results of the study

<i>Hypothesis</i>	<i>Results</i>	<i>Conclusion</i>
<i>H1: Companies minimize their share repurchase costs by repurchasing shares when the share prices are low.</i>	Companies do on average repurchase shares cheaper than on the simulated repurchase programs, but the results were only statistically significant on one of the years studied and therefore the hypothesis is rejected.	Rejected
<i>H2: Companies time their share repurchases when the market overall is down.</i>	Companies repurchase more shares on the ten days after the event day, but the results are not statistically significant. Companies also had less repetition dates after the event, but it was also not significant. However, the number of active companies was less after the event day, which was only weakly significant.	Rejected
<i>H3a: Companies repurchase more shares when the company is valued under the market median price to book ratio.</i>	More shares are repurchased when companies are valued under the median price to book ratio. The results are mostly statistically significant.	Accepted
<i>H3b: Companies repurchase less shares when the company is valued over the market median price to book ratio.</i>	Less shares are repurchased when the company is valued over the median price to book ratio. The results are mostly statistically significant.	Accepted

The first research question was about whether companies time their share repurchases on the days when their share price is down to minimize the costs of share repurchases. This was studied by using bootstrapping methodology to simulate 10 000 alternative repurchase programs to see, if companies could have timed their repurchases better. All the other aspects were hold constant except the actual repurchase day when the repurchase was executed. Some companies executed small number of repurchases each day for long periods of time and some repurchased larger number of shares more rarely.

When companies are repurchasing shares on the down days, the costs should be much lower compared to repurchasing on increasing prices. According to Brockmann & Chung (2001) companies may have some insider's information that they may use to more accurately time their repurchases. Therefore, it was expected that companies would be able to repurchase shares at lower rates compared to the market. The actual executed costs were then compared to the simulated costs. The results indicate that the bootstrap simulated costs were higher on the period, which would indicate companies possessing timing ability. The mean simulated cost was only lower on three of the years studied. However, by using t-test the results of the bootstrap were only statistically significant in 2014 and not on any of other years. Using pseudo p-values to measure timing abilities overall only 10 % of companies could time their repurchases successfully. Therefore, the first research hypothesis was rejected.

This is in line with Brockmann & Chung (2001) studies in the Hong Kong as their mean simulated costs were also over the actual repurchase costs indicating timing abilities. However, their results had much more variance between the yearly minimum and maximum values. Also, the pseudo p-values suggested that over 37 % of the companies studied possessed timing abilities. Overall, their results were mainly significant indicating that companies possess clear timing abilities whereas the results of this study are not statistically significant and do not support their findings.

Second research question is slightly different as it focuses on the market overall. This was measured by using the FTSE 350 index, which can present some opportunities for companies to execute share repurchases. The hypothesis was formed on the basis that companies would be more active and repurchase more shares after the downturns on the market. This was studied by using the event study methodology and focusing on the biggest daily decreases on the index closing price excluding consecutive days with large decreases. Therefore 7 event days were selected for the studied event days. The selected event period was 10 days before the event day and 10 days after the event day.

Based on the results companies repurchase less of their own shares before the event day and more on ten days after the event day. The number of repurchases decreased just before the

event day and increased on the days after it. After six days it seemed to stabilize to lower levels. On the actual event day there was no significant increase in the number of shares repurchased. The number of repetition dates and active companies however decreased after the event day. According to the hypothesis it was expected that the activity would increase, and more shares would be repurchased. The results of the event study are mostly statistically insignificant, with only the number of active companies on the period being significant on 10% significance level. Therefore, also the second research hypothesis was rejected.

These results are very similar to the findings of Tomperi (2004) as he did not also find any support for increasing repurchase activity after the market downturns. His research was focusing on the Helsinki Stock Exchange. Similarly, by using event study methodology he studied the number of shares repurchased, repetition dates and active companies. However, he did find support for increasing number of active companies around the event day, but only slight increase.

Third and fourth research questions were about the effects of company's valuation to the executed share repurchases. The company valuation was measured by using the price book ratio. The hypothesis was that the undervalued companies would repurchase more shares, and the overvalued companies would repurchase less shares. This was studied by creating two groups based on the median price to book ratios. Groups were formed for each year between 2010-2019 and also for the overall sample to see if there would be differences between the groups.

Based on the results from the two groups overall, undervalued companies repurchased over three times more shares (246 million) compared to overvalued companies (73 million). Most of the years the mean of repurchases for undervalued companies was over twice the amount compared to overvalued companies. This was increasing towards the year 2019 when undervalued companies repurchased almost 10 times more shares compared to overvalued companies. Overall, the undervalued companies repurchased much more shares every year and overvalued companies repurchased much less shares. Results were also statistically significant

on most of the years and for the overall sample highly significant. Therefore, there are significant differences between the groups and both research hypotheses are accepted.

These results are similar to those reported by Ikenberry, Lakonishok and Vermaelen (1995) who suggest that price to book ratio effects the repurchase motivation. This is in line with results from this study. Similarly, Lakonishok, Shleifer and Vishny (1994) and Zhang (2005) studied effects of company P/B ratio to the number of shares repurchased by forming multiple groups. On their results the same pattern continued, and the undervalued companies were repurchasing more shares than the overvalued. Taken together, these results together with the findings of this study suggest that the P/B ratio has clear indications on the number of shares repurchased.

Final conclusions of the study are that companies have different factors that affect the share repurchases. There are no statistically significant results on that companies repurchase share when their share price is down, which would confirm that companies have clear timing abilities and that they minimize costs. Therefore, as the results are not significant conclusions cannot therefore be made. This is contradicting the evidence of Brockmann and Chung (2001) who found statistically significant timing abilities in their study. For the market downturns the situation is similar, and no conclusions cannot be made as the results are not statistically significant. The most important findings to emerge from this study are the effects of the price to book ratio, which are mostly statistically significant. In general, the results from the study are very much in line with previous studies. Company's P/B ratio seems to have clear effects on the repurchase decision or at least signal that company is more likely to execute share repurchases, which is also in line with the results of Von Eije and Megginson (2008). Overall, the results of this study contribute to existing knowledge of the share repurchase timing in the United Kingdom market. This study lays the groundwork for future research into more in detail examination of how companies are timing their share repurchases.

## 5.1 Implications of the thesis

Implications of this thesis is it that it provided more information about the share repurchase timing, which has not been widely studied especially in the European market. London has the most repurchases in the Europe and this provides very important information from the European market. The previous research has been divided on whether companies can time the repurchases or is it just coincidence. This is still somewhat unclear as the thesis could not reach strong conclusions on the subject, as most of the results were not statistically significant. It is important to correctly time the repurchases, as it makes it possible for companies to maximize the value of the repurchases and not destroy shareholder value. As Manconi, Peyer, and Vermaelen (2019) confirm share repurchases should benefit long-term investors on average. When repurchases are becoming more common it is very important to focus on these aspects of the repurchases. Normally dividends have been the way to payout cashflow to owners, but that is not the only way anymore and more research on the subject is needed, which this thesis provides.

The thesis provides very valuable information for example to investors about the timing of repurchases, whether companies should even repurchase shares, when could be the correct time to do it and how companies are timing their repurchases. If the company sees itself as undervalued on the market and there are no better alternative investments, which would provide better returns then it might be a good idea to invest in itself to maximize the shareholder value. This also provides information to companies overall whether they have succeeded in repurchasing shares from the market and when could be the correct time to repurchase shares. Often the timing might be overlooked, and the management could think that the share price is only going up, therefore the current time would always be the correct one for repurchases. Often that is not the case and as the results showed there are often other possible better repurchase programs, which could have significant effects on the company's future, and this is important factor to consider going forward.

## 5.2 Limitations and future research

One of the limitations of this thesis is the method of how the repurchases are calculated. This is done by taking advantage of the number of outstanding shares of the company, but there might be other ways that the number of outstanding shares is changing. The thesis is also focusing on the actual repurchases, and most of the previous studies are instead focusing on the repurchase announcements. The companies that were chosen were only from the FTSE 350 index, which consists of the 350 largest companies from the London Stock Exchange. Most of the repurchases are executed by FTSE 350 companies, but there may be number of repurchases outside the FTSE 350 companies that were not included. The years which were chosen are all after the financial crisis, when the market has constantly been rising and there have not been any significant down years. This can be seen from the FTS 350 index development and it can limit the event study results as the index downturns are quite small compared to what they might have been if there would have been significant market downturns.

Possible future research could extend this thesis to cover more of the topic of timing or focus more on the different motivations of share repurchases. As there are a lot of different motivations which could explain the share repurchases it might be very good subject to focus on. The different effects of signaling, free cashflow, liquidity and dividend substitution on the repurchases could provide interesting subjects for future research. On this thesis the motivations were not the main focus, but those are still very important aspects of share repurchases where the research could be expanded. One possible future topic could also be to study whether companies use repurchases to support the company share price on the market as this has been often mentioned as one possible reason for share repurchases.

## REFERENCES

- Ahn, H., Cao, C. and Choe, H. (2001). Share repurchase tender offers and bid–ask spreads. *Journal of banking & finance*, 25 (3), pp. 445-478.
- Almeida, H., Fos, V. and Kronlund, M. (2016). The real effects of share repurchases. *Journal of Financial Economics*, 119 (1), pp. 168-185.
- Andriosopoulos, D. and Lasfer, M. (2015). The market valuation of share repurchases in Europe. *Journal of banking & finance*, 55, pp. 327-339.
- Babenko, I., Tserlukevich, Y. and Vedrashko, A. (2012). The Credibility of Open Market Share Repurchase Signaling. *Journal of financial and quantitative analysis*, 47 (5), pp. 1059–1088.
- Baker, M. and Wurgler, J. (2002). Market Timing and Capital Structure. *The Journal of finance (New York)*, 57 (1), pp. 1-32.
- Barclay, M. and Smith, C. (1988). Corporate Payout Policy: Cash Dividends versus Open-Market Repurchases. *Journal of Financial Economics*, 22, pp. 61-82.
- BEIS. (2019). Share Repurchases, Executive Pay and Investment. Department of Business, Energy and Industrial Sector Research Paper Number 2019/011. Available: [https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment\\_data/file/817978/share-repurchases-executive-pay-investment.pdf](https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/817978/share-repurchases-executive-pay-investment.pdf) [Accessed: 10.12.2020]
- Bodie, Z., Kane, A. and Marcus, A. (2014). Investments. Tenth edition. McGraw-Hill Education, New York.
- Bonaimé, A., Hankins, K. and Jordan, B. (2016). The cost of financial flexibility: Evidence from share repurchases. *Journal of corporate finance (Amsterdam, Netherlands)*, 38, pp. 345-362.
- Bozanic, B. (2010). Managerial motivation and timing of open market share repurchases. *Review of quantitative finance and accounting*, 34 (4), pp. 517–531.

Brav, A., Graham, J., Harvey, C. and Michaely, R. (2005). Payout policy in the 21st century. *Journal of Financial Economics*, 77 (3), pp. 483-527.

Brockman, P. and Chung, D. (2001). Managerial timing and corporate liquidity: evidence from actual share repurchases. *Journal of Financial Economics*, 61 (3), pp. 417-448.

Brockman, P., Howe, J. and Mortal, S. (2008). Stock market liquidity and the decision to repurchase. *Journal of corporate finance (Amsterdam, Netherlands)*, 14 (4), pp. 446–459.

Brooks, C. (2008). *Introductory Econometrics for Finance*. Cambridge University Press, New York.

Chan, K., Ikenberry, D. and Lee, I. (2007). Do managers time the market? Evidence from open-market share repurchases. *Journal of banking & finance*, 31 (9), pp. 2673-2694.

Chan, K., Ikenberry, D., Lee, I. and Wang, Y. (2010). Share repurchases as a potential tool to mislead investors. *Journal of corporate finance (Amsterdam, Netherlands)*, 16 (2), pp. 137-158.

Comment, R. and Jarrell, G. (1991). The Relative Signalling Power of Dutch-Auction and Fixed-Price Self-Tender Offers and Open-Market Share Repurchases. *The Journal of finance (New York)*, 46 (4), pp. 1243-1271.

Companies Act. (2006). c. 48. Available at: <https://www.legislation.gov.uk/ukpga/2006/46/contents> [Accessed: 20.4.2021]

Cook, D., Krigman, L. and Chris Leach, J. (2004). On the Timing and Execution of Open Market Repurchases. *The Review of financial studies*, 17 (2), pp. 463-498.

Dittmar, A. and Dittmar, R. (2008). The timing of financing decisions: An examination of the correlation in financing waves. *Journal of financial economics*, 90 (1), pp. 59–83.

Dittmar, A. and Field, L. (2015). Can managers time the market? Evidence using repurchase price data. *Journal of financial economics*, 115 (2), pp. 261–282.

Economist. (2014). The Repurchase Revolution. Economist. Available at: <https://www.economist.com/business/2014/09/12/the-repurchase-revolution> [Accessed: 20.4.2021]

Efron, B. and Tibshirani, R. (1993). An Introduction to the Bootstrap. First edition. Chapman and Hall.

Evgeniou, T., de Fortuny, E., Nassuphis, N. and Vermaelen, T. (2018). Volatility and the buyback anomaly. *Journal of corporate finance (Amsterdam, Netherlands)*, 49, pp. 4932–53.

Fama, F. and French, K. (1995). Size and Book-to-Market Factors in Earnings and Returns. *The Journal of finance (New York)*, 50 (1), pp. 131–155.

Ginglinger, E. and Hamon, J. (2007). Actual share repurchases, timing and liquidity. *Journal of banking & finance*, 31 (3), pp. 915-938.

Grullon, G. and Michaely, R. (2002). Dividends, Share Repurchases, and the Substitution Hypothesis. *The Journal of finance (New York)*, 57 (4), pp. 1649-1684.

Hillert, A., Maug, E. and Obernberger, S. (2016). Stock repurchases and liquidity. *Journal of financial economics*, 119 (1), pp. 186–209.

Howe, K., He, J. and Kao, W. (1992). One-Time Cash Flow Announcements and Free Cash-Flow Theory: Share Repurchases and Special Dividends. *The Journal of finance (New York)*, 47 (5), pp. 1963–1975.

Ikenberry, D., Lakonishok, J. and Vermaelen, T. (1995). Market underreaction to open market share repurchases. *Journal of Financial Economics*, 39 (2-3), pp. 181-208.

Ikenberry, D., Lakonishok, J. and Vermaelen, T. (2000). Stock Repurchases in Canada: Performance and Strategic Trading. *The Journal of finance (New York)*, 55 (5), pp. 2373-2397.

Jagannathan, M., Stephens, C. and Weisbach, M. (2000). Financial flexibility and the choice between dividends and stock repurchases. *Journal of Financial Economics*, 57 (3), pp. 355-384.

Jensen, M. (1986). Agency Costs of Free Cash Flow, Corporate Finance, and Takeovers. *The American Economic Review*, 76 (2), pp. 323-329.

Kahle, K. (2002). When a buyback isn't a buyback: open market repurchases and employee options. *Journal of Financial Economics*, 63 (2), pp. 235-261.

Lakonishok, S., Shleifer, A. and Vishny, R. (1994). Contrarian Investment, Extrapolation, and Risk. *The Journal of finance (New York)*, 49 (5), pp. 1541–1578.

Lie, E. (2005). Operating performance following open market share repurchase announcements. *Journal of accounting & economics*, 39 (3), pp. 411-436.

London Stock Exchange Group. (2020a) London Main Market Companies. Available: <https://www.lseg.com/markets-products-and-services/our-markets/london-stock-exchange/equities-markets/raising-equity-finance/main-market/companies> [Accessed: 24.10.2020].

London Stock Exchange Group, (2020b) London Stock Exchange Group History. Available: <https://www.lseg.com/about-london-stock-exchange-group/history> [Accessed: 24.10.2020].

Luce, E. (2015). US Share Buybacks Loot the Future. Financial Times. Available at: <https://www.ft.com/content/1aaac576-e9bb-11e4-a687-00144feab7de> [Accessed: 20.4.2021]

Louis, H. and White, H. (2007). Do managers intentionally use repurchase tender offers to signal private information? Evidence from firm financial reporting behavior. *Journal of financial economics*, 85 (1), pp. 205–233.

Mackinlay, C. (1997). Event Studies in Economics and Finance. *Journal of Economic Literature*, 35 (1), pp. 13-39.

Manconi, A., Peyer, U. and Vermaelen, T. (2019). Are Buybacks Good for Long-Term Shareholder Value? Evidence from Buybacks around the World. *Journal of financial and quantitative analysis*, 54 (5), pp. 1899–1935.

Nohel, T. and Tarhan, V. (1998). Share repurchases and firm performance: new evidence on the agency costs of free cash flow. *Journal of Financial Economics*, 49 (2), pp. 187-222.

Oded, J. (2005). Why Do Firms Announce Open-Market Repurchase Programs? *The Review of financial studies*, 18 (1), pp. 271-300.

Oswald, D. and Young, S. (2004). What Role Taxes and Regulation? A Second Look at Open Market Share Buyback Activity in the UK. *Journal of business finance & accounting*, 31 (1), pp. 257-292.

Persons, J. (1997). Heterogeneous shareholders and signaling with share repurchases. *Journal of corporate finance (Amsterdam, Netherlands)*, 3 (3), pp. 221–249.

Peyer, U. and Vermaelen, T. (2005). The many facets of privately negotiated stock repurchases. *Journal of Financial Economics*, 75 (2), pp. 361-395.

Peyer, U. and Vermaelen, T. (2009). The Nature and Persistence of Buyback Anomalies. *The Review of financial studies*, 22 (4), pp. 1693–1745.

Rau, P. and Vermaelen, T. (2002). Regulation, Taxes, and Share Repurchases in the United Kingdom. *The Journal of Business*, 75 (2), pp. 45-282.

Skinner, D. (2008). The evolving relation between earnings, dividends, and stock repurchases. *Journal of Financial Economics*, 87 (3), pp. 582-609.

Strong, N. (2004). Discussion of What Role Taxes and Regulation? A Second Look at Open Market Share Buyback Activity in the UK. *Journal of business finance & accounting*, 31 (1), pp. 293-295.

Tomperi, I. (2004) Liquidity effects, timing and reasons for open-market share repurchases. Vaasa: University of Vaasa.

Vermaelen, T. (1981). Common stock repurchases and market signalling: An empirical study. *Journal of Financial Economics*, 9 (2), pp. 139-183.

Vermaelen, T. (1984). Repurchase Tender Offers, Signaling, and Managerial Incentives. *Journal of financial and quantitative analysis*, 19 (2), pp. 163–181.

Von Eije, H. and Megginson, W. (2008). Dividends and share repurchases in the European Union. *Journal of Financial Economics*, 89 (2), pp. 347-374.

Zhang, H. (2005). Share price performance following actual share repurchases. *Journal of banking & finance*, 29 (7), pp. 1887–1901.

## APPENDICES

### *Appendix 1. Mean and median price to book ratios yearly*

Year	Mean P/B	Median P/B
2010	2.12	1.45
2011	2.39	1.46
2012	2.93	1.45
2013	3.52	1.72
2014	4.82	1.91
2015	6.68	1.92
2016	3.51	1.64
2017	4.00	1.76
2018	7.21	1.61
2019	4.72	1.51
Total	4.22	1.61