MASTER THESIS

The effect of share repurchase announcements on share price for Dutch firms

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Abstract

This study examines the short-term effect of share repurchase announcements on stock prices of Dutch firms through event study methodology and regression analyses. The sample contains 77 share repurchase announcement in the period from 2015 to 2019. A significant cumulative average abnormal return of 1.33% is found for the event window [-1;+1] around the announcement date. Subsequently is tested whether Firm size, Market-to-book ratio, and leverage ratio are related to the stock price return. The cumulative abnormal return (CAR) was not successfully explained by the constructed model, possibly due to omitting variables. Future research could advance the study when incorporating more accurate variables to explain the CAR from share repurchase announcements.

Keywords: share repurchase announcements, open market repurchase, cumulative abnormal returns, event study, information asymmetry, free cash flow, signalling theory, short-term effect.

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1. Introduction

1.1. Context of the research question

The concept of share repurchases, also called buybacks, is a financial management tool to distribute cash to a firm's shareholders. Share repurchase is simply the process of buying back previously issued shares from the market. This can be attractive for a firm when the management believes that the shares are under-priced in the market. Later, when the share price is higher, these shares could be sold again in the market one day. From this perspective, the announcement of a share repurchase is a signal to the shareholders that the shares are undervalued and so, share repurchase announcements result often in a higher share price.

Most research on the share repurchase topic involve the US market. However, results from these studies cannot be directly applied in different countries, given the considerable differences between the US market and other markets. Regulations controlling share repurchases in the US are practically absent (Vermaelen, 2005). However, this is different for most countries. For instance, in the Netherlands, share repurchases were not allowed until 1980. Further changes were made in 2001 and 2006, which further loosened the regulations around share repurchases for Dutch firms. Since then, the number of buy backs have increased and are currently more common in the Netherlands and the rest of Europe (Andriosopoulos & Hoque, 2013). This late development of share repurchase in European markets, has ensured that the effect of share repurchase in these markets are still poorly described in academic literature. Hence, this study focuses on how a European market responds to share repurchase announcements. Specifically, how the lately 'coming to age' Dutch market responses.

The dominant theory about buy-backs is the signalling theory, which is the main theory that is tested in this thesis. This theory seeks to explain the changes in share price, after share repurchase announcements, through the information asymmetry between both the market and a firm's management. This theory departs from the availability of information about a company within the market, resulting in a share price. The more information is available about the company, the more accurate they can estimate a firm's value. When a firm's managers consider the firm's shares to be undervalued, they can decrease the information asymmetry between the managers and the market by using the signalling power of share repurchase announcements. Vermaelen (2005) explains the signalling power as: "an attempt to communicate to investors that their current forecasts about future performance are too pessimistic". Because the share price is adjusted instantly by the market, after the

share repurchase announcement, the short-term effect on the share price covers the impact of the share repurchase.

The information asymmetry between the market and a company's management has declined in the last decades (Kelly, 2014). Therefore, the information that is provided by the management when announcing a share repurchase, might not be as valuable as it was in the past. This makes it especially interesting to not only investigate the effect of share repurchase announcements on share price in a different market than the US market, but also to assess the value of share repurchase in recent years.

Many articles look at whether there are certain firm characteristics that influence the stock price effect of a share repurchase announcement. For this thesis, these tests are also conducted, to determine whether findings from other authors also apply to Dutch listed companies that announce share repurchase.

1.2. Contributions

This thesis contributes to prior academic papers, because of the specific data sample and the observed period. Unlike previous studies, this study focuses solely on Dutch listed firms. Furthermore, also the relatively stable, post-crisis, period (2015-2019) has been examined to a lesser extent than prior 2015. Hence, this thesis fills an academic gap and examines whether the existing ideas and theories also apply to Dutch companies and are still applicable in a more recent time frame.

Also, this thesis contributes in a more practical way. First, it could provide Dutch financial managers more insights about motivations for exercising share repurchase programs. Second, for investors, it could help to value a share repurchase announcement. Especially understanding the value for smaller firms, when information asymmetry is declining, can attribute to a better market valuation of a firm.

2. Literature review

In this chapter, various theoretical backgrounds to the topic of share repurchase are discussed. Although share repurchase is mainly characterised as a pay-out policy, as explained in 2.1., in many cases this is not the main reason for the announcement. Chapter 2.2. is primarily written with the intention of making the concept of share repurchase more comprehensible. Hereafter, in chapter 2.3. is explained what different motivations a firms management can have to proceed to share buy-backs. These different theories are then discussed with examples of current empirical research in chapter 2.4. Lastly, in chapter 2.5. the formulation of the hypotheses for this thesis is explicated.

2.1. Pay-out policy

Share repurchase is categorised as a pay-out method. Paying out conveys a surplus of cash being distributed to the shareholders of the company. Another important pay-out method is dividend payment. According to the theory of Miller and Modigliani in 1961, in a world without taxes, transaction costs, and other market imperfections, the choice between dividends or share repurchase is irrelevant because a change in capital structure would not affect a firm's value (Brealey et al., 2017, p. 416).
However, the world is not without taxes and other market imperfections, and so, dividends are taxed as income and share repurchases are taxed as capital gains. Thus, for some shareholders, share repurchases are preferred over dividends, whereas this leads to lower tax costs (Brealey et al., 2017, p. 422).
On the other hand, this downside does not mean that there is no reason for shareholders to prefer pay-out via dividend. An important motivation for preferring dividend pay-out is *the information content of dividends* (Brealey et al., 2017, p. 429). It follows from the believe that when firms pay-out dividends, they are perceived as mature. Moreover, its managers are ought to be confident about future cash-flows, and it is expected that dividend payment is feasible for several years ahead.
Contrary to dividends, where it is common to be paid consistently for years, share repurchases can be executed just occasionally. This makes it a more flexible financial tool for managers (Caton et al., 2016).

2.2. Methods of share repurchase

When analysing share repurchase and trends within this subject, it is necessary to describe the common terminology and definitions. In academic literature, several methods of share repurchase are distinguished. For this thesis, four primary methods of share repurchase are categorised, what seems to be in line with most literature (Brealey et al., 2017; Vermaelen, 2005). These four methods are explained in the following sections: open market (2.2.1.); fixed price tender offer (2.2.2.); Dutch auction (2.2.3.); and negotiated repurchase (2.2.4.). However, these repurchase methods are primary methods. Based on these four methods, several tailored variations can be identified on company level. Nevertheless, for this thesis, it is appropriate to only discern these four methods.

2.2.1. Open market

The most common method of share repurchase is via the open market method. It is most prevailing in terms of value and volume (Andriosopoulos & Lasfer, 2015; Vermaelen, 2005). Companies execute the share repurchase program by buying back shares at the market price on the stock market. Often, a third party such as an investment bank or broker, is commissioned to buy these shares in the same manner as individuals could (Brealey et al., 2017). The event of share repurchase is often referred to as a program, because the amount of shares that will be repurchased as well as the timespan wherein this will happen is often announced. A company makes this announcement normally in a press release. Despite the announced volume and period of the share repurchase program, companies still have some flexibility depending on the regulations. Often, a firm that announces a certain repurchase program, is still allowed to redefine the volume and pricing, but also the timing. This is a specific characteristic of an open market repurchase, where the company can trade in the market anonymously. Apparently, it is this freedom that makes the open market repurchase method the most prevailing. Nevertheless, it is important to notice that this method has hardly no control over the share price that needs to be paid (Stonham, 2002).

This freedom becomes apparent from research showing that 90% of the repurchases in the U.S. is an open-market repurchase, but only 57% of the firms actually repurchases the announced amount of shares (Stephens & Weisbach, 1998). This might be a proof for the signalling power of the announcement on itself.

2.2.2. Fixed price tender offer

Contrary to an open market repurchase a fixed price tender offer consists of an arrangement between the firm and selling shareholders. First, the firm makes an offer to rebuy a target number of shares for a fixed price. Simultaneously, a time frame for the repurchase is set. The fixed price is typically set at about 20% above the current stock price on the market (Brealey et al., 2017). This difference between the share price and the offered price is referred to as the offer price premium. This premium is provided as an incentive for the shareholder to sell its shares. Next, shareholders are then in position to decide whether to tender their shares for this price (Brealey et al., 2017). When the tendering period is expired, the company has knowledge of both the offered number of shares and which shareholders are willing to sell. When the number of offered shares is lower than the targeted number, the firm is obliged to repurchase all offered shares. However, the firm may decide to extend the tendering period to find the targeted number of shares. Depending on country specific regulations, the tender offer can even be terminated entirely (Hsieh & Wang, 2011). On the other hand, the offered number of shares can be higher than the targeted quantity, a so-called oversubscribed tender offer. In this situation, a firm is obliged to repurchase the targeted number of shares but does not have an obligation to repurchase the surplus of offered shares. In these situations, there is an important restriction. All shareholders should be treated equally, that is, the shares must then be purchased pro rata from the various shareholders (Vermaelen, 2005). Also, to counteract wrong intentions of a company's management for tender offers, managers are usually not allowed to sell their shares during a tender offer event.

A variation on the fixed price tender offer is the transferable put right. The repurchasing firm issues put options to the shareholders. With this put option, shareholders have the right to sell their shares at the put option specified price at any time. The shareholders are also able to trade with these put options (Hsieh & Wang, 2011).

Share repurchase via a fixed price tender offer has declined in usage in recent decades. This may be mainly due to the relatively expensive tender offer premium that must be paid (Grullon & Michaely, 2002).

2.2.3. Dutch auction

A Dutch auction, or a Dutch auction tender offer, is fairly related to the fixed price tender offer. In both methods, a company specifies the target number of shares sought. The procedure of Dutch auction starts when a firm states a series of prices whereat it is willing to repurchase stock. Hereafter, shareholders bring their offers stating the number of shares they are willing to sell at every price. This allows the company how to buy the desired amount of shares for the lowest price (Brealey et al., 2017).

The so-called final offer price is set as the minimum price, at which all desired shares can be repurchased. All tendered shares at or below the final offer price will be repurchased for this set price. Shares that are tendered above this final offer price, stay possessed by its shareholders (Hsieh & Wang, 2011).

There are several advantages for companies when purchasing via the Dutch auction. First, it is a less costly method compared to a fixed price tender offer due to the absence of a fixed price premium. Second, because tending shareholders all get the same final offer price, there is no likelihood for a winner's curse comparable situation. Shareholders are more protected and are therefore less likely to opt for protecting themselves by tendering at a higher price. Third, shareholders valuing the firm's shares lower are bought out after the procedure. The remaining shareholders are those that have valued the shares higher and are presumed to be more committed. This can also be meaningful when protection against hostile takeover is desirable (Caton et al., 2016; Vermaelen, 2005). This is further elaborated in chapter 2.3.1.

The cumulative abnormal returns as a response on the announced [Dutch auction] tender offer is stated to be bigger than for an announced open market repurchase (Lakonishok, 1990). The announcement of a tender offer repurchase is interpreted as a compelling signal, it exudes stronger management confidence since they are willing to pay a high premium. Accordingly, whereas the premium for fixed tender offers is usually higher than for Dutch auctions, the signal given off for fixed tender offers is also stronger than for Dutch auction (Stonham, 2002).

2.2.4. Direct negotiation

The last method is via direct negotiation with large shareholders. Via this manner, an agreement about the price and the number of repurchased shares is made without publicly specifying the details. Especially because of the privately negotiated element, this repurchase method differs from the earlier mentioned ones, where all shareholders are treated equally. Also, contrary to the beforementioned repurchase methods that come with a price premium, direct-negotiated repurchases come often with a discount to the market price, due to the liquidity of shares (Vermaelen, 2005). The bargaining power of the repurchasing company is in these situations stronger than that of the large shareholder. Furthermore, direct negotiation is seen especially in case of acquisitions by private equity and venture capital parties, but also with privatisations of firms. Another important motivation for direct negotiation or targeted stock repurchase is to repel an unwanted takeover. This is known as greenmail and is after the 1980s less seen in the market (Hsieh & Wang, 2011).

2.3. Share repurchase motives

Share repurchase is mostly referred to as a pay-out method to distribute surplus cash to a firm's shareholders. Accordingly, this can be considered as the main motive for a firm's management to conduct a share repurchase. However, exercising a buy-back has influence on different firm characteristics and has various market effects. So, a firm's management that is aware of these conceivable effects, could use share repurchase for more sophisticated objectives than only the distribution of cash to the firm's shareholders. Therefore, share repurchase is not primary a replacement, but to a greater extent a complementary tool to dividend payment (Brav et al., 2005). Moreover, persisting expected cash flows seem to be attributed to dividends, whereas additional short-term cashflows are used to fund share repurchases. Likewise, management considers buy-backs especially when the share price of the firm is trading in the market for a lower price than its true value (Brav et al., 2005). The motives for share repurchase are explained in following sections: Signalling hypothesis (2.3.1.); Free cash flow hypothesis (2.3.2.); Capital structure adjustment hypothesis (2.3.3.); the Shareholder tax benefit (2.3.4.); and the managerial wealth incentive (2.3.5.).

2.3.1. Signalling hypothesis

The availability of information about a firm on the market, determines the share price. When managers consider the market to underestimate the firm's value, there is regularly an information asymmetry between the managers and the investors. This could lead to an underestimation of expected cash flows or an overestimation of the risk (Vermaelen, 2005). Managers have more inside information and so, they are better able to evaluate the firm's value. When managers prefer to minimise this information asymmetry, they can make use of the signalling power of share repurchase. The signal they give is that investing in the own shares of the company is less risky and gives a better return than other investment opportunities, i.e., the market value of the firm is too low.

Interviews with financial managers about their motivation to execute share repurchase also show that the management's believe that the shares are undervalued in the market is the most important reason (Brav et al., 2005).

When a share repurchase announcement is made, it enriches the already available information, and so, it then affects the share price. Consequently, the actual execution of the repurchase has minimum effects on the share price, whereas this action already triggered a reappreciation of the share price. However, Lie (2005) stated that share prices of firms that have actually repurchased shares after the

announcement, show a better financial performance and later earnings announcements have a stronger positive effect on the share price than for companies that did not repurchase after the announcement. The cumulative average abnormal return on share repurchase announcements can be 3,37% in the United States (Vermaelen, 1981). However, since then, the topic is explored by many other researchers. This is discussed in more detail in section 2.4.

Another implication of a higher market price as a result of the signalling power of a repurchase announcement is called the takeover deterrence hypothesis. Due to the fact that repurchases come with a higher market price, the firm can be made less attractive for acquisitions. Especially hostile takeovers can be deterred by raising the share price by buying back shares from the market. It is the opposite of greenmail. In these situations, a shareholder could try to threatening to sell a large amount of stock to an unwanted third party and by doing so, force the firm to buy back these shares for a premium in order to prevent for an unwanted takeover (Vermaelen, 2005). This practice is forbidden nowadays.

2.3.2. Free cash flow hypothesis

Holding large amounts of cash does not give any return and so, surplus cash is typically invested. Especially for low risk, mature firms, access to cash is relatively easy and cheap. Hence, they often have large free cashflows. On the other hand, for these mature companies, new investment opportunities are usually limited. In an ideal situation, various opportunities are present to invest profit or additional raised capital. However, when there is a lack of investment opportunities, costs of agency can occur. These costs derive from management choices that conflict with the shareholders' benefits. To avoid these costs, the management can decide to pay-out their capital surplus to investors (Caton et al., 2016). There is many empirical evidence that support the free cash flow cost of agency theory (Hsieh & Wang, 2011; Vermaelen, 2005). For example, a positive correlation between the free cash flows and share repurchase is found (Dittmar, 2000). Also, financial managers in the U.S. name the reducing of excess cash as a motivation for share repurchase (Brav et al., 2005).

The distribution of surplus cash through share buybacks can be preferred by managers because it is not a long-term commitment, as the adjustments of dividends are. Moreover, it can be applied quickly when unexpected high free cash flows from operations occur (Andriosopoulos & Hoque, 2013; Grullon & Michaely, 2002).

2.3.3. Capital structure adjustment hypothesis

When exercising share repurchases, several changes occur in a firm's characteristics. Share repurchases change the capital structure, affect the ownership percentages and other parameters such as earnings per share change. Given the possible impact, share repurchases can be adopted for more sophisticated motivations than only signalling undervaluation or the distribution of cash to the shareholders. Managers can even use it to make the firms results look better than they actually are and ultimately receive a higher compensation (Vermaelen, 2005).

The first side effect of share repurchase on capital structure is not that arguable. Share repurchase can be used in favour of approaching the optimal leverage ratio. The optimal leverage ratio can be adjusted by buybacks because repurchases change the debt to equity ratio, due to a changing quantity of outstanding equity (Vermaelen, 1981). Moreover, when the repurchase is financed with debt, the effect on the change in debt-to-equity ratio becomes stronger. The existence of an optimum in leverage derives from the tax-deductible aspect of debt. This means that on a certain debt level, the deducted taxes accrues to the shareholders, that means higher earnings per share, which results in a rise in share price (Dittmar, 2000). Also, a higher debt equity ratio is perceived as higher risk, and so a higher return is desired for investors.

The second, more questionable side effect of share repurchase is linked to executive compensation. A higher compensation for managers can be the result of the so-called value-creating effect of share buybacks. For example, some companies and analysts focus on ROE (return on equity) and EPS (earnings per share). Share repurchase will increase both ROE and EPS. At the same time, as explained earlier, it is accompanied with a higher risk (Boot, 2013). Normally, share buybacks have a positive effect on the ROE measured in book value. This in itself has no meaning. After all, the book value says nothing about the real economic value, the market value. Still, directors and analysts tend to value a share higher if the book value per share is higher. Indeed, if stocks have a market value lower than book value, then by buying back stocks managers can further increase the book value per share and thereby try to fool oneself and the market (Chan et al., 2010). Another problem is that the value creation of a company must be measured as the total market value of the company minus the total capital invested in the company. These are absolute numbers, and the outcome depends on yield and size. A measure such as ROE only reflects the return and not the size. Maximization of ROE, aside from its inaccuracy for other reasons, do not account for the size. For example, a return of 20% over ten million is probably better than a return of 30% over just one million (Boot, 2013).

2.3.4. Shareholder tax benefits

A fourth motivation for managers to consider share repurchase are the tax benefits for shareholders. These advantages for personal income taxes can also explain the positive abnormal returns of share repurchase announcements. There is a difference in tax approach between dividend and share repurchase, because dividends are taxed as personal income and share repurchase is taxed as capital gain. Despite the claim of Modigliani & Miller that the pay-out policy does not affect the company's value, it does actually have an effect, due to tax costs (Brealey et al., 2017).

So, according to this different taxation policy, investors have preference for a certain pay-out. When a repurchase program occurs, shareholders can decide to sell its shares and receive capital in cash or they can decide to keep the shares and when the share price rises, the capital gain is in this new stock value. This is taxed lower than when dividend is paid, because this is seen as ordinary income by the government (Vermaelen, 2005). This situation applies for most countries, however, in Germany for example, dividends and repurchase have the same tax rate (Andriosopoulos & Lasfer, 2015).

Then arises the question whether managers are willing to adapt their pay-out policy to the tax preferences of the shareholders. In Europe it is considered that besides taxation, also the governance frameworks have strong impact on pay-out policy. For example, in the United Kingdom, which is a strong investor protection country, managers are more likely to pay-out more via tax-efficient share repurchase. On the other hand, in weak investor protection countries such as Germany and France, managers do not seem to take the investors taxation into account when settling pay-out policies (Andriosopoulos & Hoque, 2013).

Finally, another study poses whether the choice for a personal tax-attractive pay-out policy is based on the situation of external shareholders or whether it is actually designed for benefits of internal shareholders. Managers often hold large amounts of stock and stock options, hence their personal tax advantages are an important motivation for choosing for share repurchases as pay-out method (Hsieh & Wang, 2011).

2.3.5. Managers wealth incentive

The fifth and last motivation for managers to announce a share repurchase program, is because of an individual wealth increase. In literature, this is known as a defence mechanism to prevent from the cost of agency theory. In most firms, managers are holding a package of shares in the company. This is done to ensure that managers make decisions in the favour of the company and its shareholders. When exercising share repurchase programs, managers are typically not allowed to sell their shares

(Vermaelen, 2005). This is to prevent them from insider selling their stock at a better price than they expect the stock to return later. This better guarantees that a share repurchase program will be announced if it is better for the company, the shareholders, and therefore also the managers. Managers are therefore more likely to make a share repurchase announcement if they expect it to lead to a higher share price.

2.4. Current empirical research

The previous chapter 2.3. explains why firms repurchase shares from the managers perspective. In this chapter is elaborated why there is an effect on the share price detectible as a response to the share repurchase announcement. First, some basic assumptions are explained.

There is a strong belief in market efficiency within academia (Vermaelen, 2005). This efficient market hypothesis states that the share prices reflect all available information. This implies that shares are traded at their fair market value. If new information becomes available, due to the efficiency of the market, this will be appropriately weighted in a new appreciation of the firm's market value. Following this theory, shares are neither over- nor undervalued.

The market efficiency theory is important in understanding share repurchase announcements. With share repurchases announcements, managers inform the market that their shares are undervalued and therefore, are attractive to buy-back. Consequently, the prices of these shares increase up to a value that fairly reflects the firms' value. In the same manner, share issuances can be announced. In such instances, the managers inform the market that their respective firms are overvalued. As a result, the prices of the shares will decrease.

Theoretically, a share repurchase announcement itself should be sufficient to obtain the fair market value, effectively reversing the undervaluation of the firm. The actual repurchasing shares should be redundant. Given their now fair market value, it would be financially unattractive for the firm to actually buy-back shares.

In practice, share repurchases often take place after the initial announcement (Kahle et al., 2011; Stephens & Weisbach, 1998). This suggests that, even after making the announcement and despite change in share price, the firm can still be undervalued. This means that the market is not as efficient as the market efficiency theory prescribes. Indeed, empirical studies do find that share repurchase announcements are linked with abnormal returns. The following paragraphs will dissect the short and long-term effects of share repurchase announcements and firms' determinant factors leading to abnormal returns. Furthermore, country specific characteristics will be discussed.

2.4.1. Short term effect

The general conclusion is that, regardless of the repurchase method, stock prices increase significantly after share repurchase announcements as is shown in table 1. These studies are conducted with datasets from various countries and different timeframes. Overall, a positive cumulative abnormal return from the share repurchase announcement is observed. This seems to support the signalling ability of management. When financial managers are questioned about their motivation to execute share repurchase, their main motivation is the management's believe that the shares are undervalued in the market (Brav et al., 2005). Indeed, one of the largest studies about the effect of share repurchase announcement on share price is conducted in recent years (Manconi et al., 2018). The dataset for this research contains more than 17.000 announcement observations, of which 7.000 outside the U.S. The researchers found empirical evidence that the abnormal return equals 2,2% in the United States. For other countries, an abnormal return of 1,3% is found. The explanation for this discrepancy is the difference in governance quality. This will be addressed in section 2.4.3.

2.4.2. Long term effect

The study within this thesis only focusses on short-term returns of share repurchase announcements. However, long-term abnormal returns have been investigated as well, only to a much lesser extent. This is primary a consequence of the, in paragraph 2.4. introduced, belief in the efficient market. Assuming that the share price takes into account the future profitability of a company, then, according to market efficiency theory, no long-term effects could be visible in the share price. But as stated above, this assumption is not always correct. Also, share repurchase is usually considered as a short term decision: It is based on a short term incentive and declines financial resources in the long run (Boot, 2013). Moreover, the long-term studies encounter methodological issues and are therefore criticised. For example, compared with the normal returns, abnormal returns are more often seen in the long term. This can also be partly explained due to the statistical properties of the tests. Even though it has been done to a much lesser extent, some studies have been conducted into the long term returns after share repurchases.

Especially buy and hold strategies are elaborated to determine long-run returns. This analytical strategy consists of the date of a share repurchase announcement, and a long-term monitoring period to determine how this share performed compared to the market. In most research a positive long-term abnormal return is found (Ikenberry et al., 1995; Peyer & Vermaelen, 2009). Especially firms that

repurchase shares are outperforming other firms in operating performance in the long run. For another study, a Belgian investment fund was created that only consists of US firms that announced a share repurchase. This was one of the best performing investment funds in the 1, 3 and 5 year period till February 2004 (Peyer & Vermaelen, 2009). This result is so exceptional that it could not been explained by luck (Vermaelen, 2005). However, Caton et al., (2016) used a 20 year timeframe dataset from 1991 to 2011 and found a positive long-term post-announcement performance that tend to disappear in the latter half of their sample period.

Because of the methodological restrictions, it is important to realise what conclusion can be drawn from finding a long-term positive return after share repurchase. Most long-term studies reveal a positive abnormal return for most repurchasing firms. This does not necessarily mean that companies that buy back perform better in the long term, but that companies buy back shares when the share is valued at its lowest within the studied timeframe (Caton et al., 2016; Manconi et al., 2018; Peyer & Vermaelen, 2009). This is also supported by the fact that firms that repurchase shares seem to underperform the market the year prior to the repurchase (Stephens & Weisbach, 1998).

2.4.3. Country specific differences

As mentioned in 4.2.1., differences in abnormal returns occur between countries. This is a result of various country specific characteristics.

First, in countries known as better investor protection countries, managerial choices are more likely to be in favour of the investors (Brav et al., 2005). In these countries, predominantly the U.S., Canada and the U.K., announcements tend to lead to higher abnormal returns.. Especially in the United States, share repurchase programs are very common, and the short-term abnormal returns are quite high compared to other countries. This has to do with four important characteristics (Vermaelen, 2005): Unlike European or Asian countries, the carrying out of a repurchase program does not need the authorisation of the shareholders. Also, no limitation to the number of repurchased shares is given, while in most countries a maximum of 10% of the shares are allowed to be repurchased. Further, unlike many other countries, within the U.S., firms are allowed to hold repurchased shares as treasury stock and re-issue these shares without further restrictions. Lastly, the financing of a repurchase program can be done via debt, due to low creditor protection, which is not legislated in most other countries. Overall, this makes the U.S. one of the least stringent countries compared to governance of other countries, when it comes to share repurchases (Kim et al., 2012).

Second, depending on the maturity of the financial markets, the information asymmetry differs and thus the effect of repurchase announcements. Financial markets that are less developed, such as the South America and Asian markets, have less well-developed governance (Caton et al., 2016). Announcements such as share repurchase are therefore important signals about the management quality and inform the market about the expected performances of the firms. They copy the successful mature US market. Thus, in these markets the effects of share repurchase announcements on the share price is considerable. Well-developed and matured markets, such as Europe mainland, have a better governance and also a better information infrastructure, hence the signalling effect of share repurchase announcements is smaller (Kelly, 2014).

Third, regulations affect the effect of share repurchase announcements. Germany is a good example. In Germany, until two decades ago, it was not allowed to conduct these practices (Hackethal & Zdantchouk, 2006). Hence, after changes in the financial regulations, investors reacted very positively towards these new introduced signals (Manconi et al., 2018). Especially the first years announcing share repurchases did lead to higher abnormal returns (see Table 1).

Fourth, there appear to be differences in organizational structure and culture that mitigates the effect of share repurchase announcements. In Europe, managers tend to own a lesser amount of stock compared to their US colleagues. Therefore, these European managers are considered to be less motivated by own wealth increase via share repurchase. Moreover, especially in Germany and France, boards are less likely to determine decision making on the benefits for shareholders (Vermaelen, 2005). Furthermore, in Germany, it is quite common that unions have a seat in the board of a firm, and therefore have hostile attitude towards share repurchase considering it to be self-enrichment for shareholders and management (Vermaelen, 2005). This might be the reason that a strong positive abnormal return is seen for German firms, because it is quite unlikely that an actual share repurchase will be executed.

2.4.4. Firm specific determinant factors

Besides country specific differences, firm specific characteristics such as firm size, market-to-book ratio and leverage ratio, are considered to be determinant factors for the effect of share repurchase announcements on abnormal returns. For this study, especially these characteristics are used for the hypothesis design and are accordingly tested in the regression analysis.

First, share repurchase programs seem to be initiated mostly by small firms (McNally, 1999). These small companies also show a higher cumulative abnormal return than larger firms, when announcing a buy-back program (Brav et al., 2005). This is primarily explained by the signalling hypothesis, following the information asymmetry between management and investors, which tend to be smaller for larger firms, due to better developed governance. Also, larger firms tend to be better monitored by investors and financial news media such as newspapers and magazines. This declines the information asymmetry between investors and larger firms compared to less monitored, smaller listed firms. Accordingly, the announcement of a repurchase program has a larger declining effect on the information asymmetry and so, has a stronger effect on the stock price in the days following the announcement (Stephens & Weisbach, 1998; Vermaelen, 1984). However, it is suggested that the information asymmetry is declined for all firms over the years, due to better governance and general improvement of availability of information (Caton et al., 2016; Manconi et al., 2018).

Second, firms that have a lower market to book ratio show a higher drift (Ikenberry et al., 1995). Shares of these firms are typically known as value-stock (Peyer & Vermaelen, 2009). The idea is that firms with a lower market-to-book ratio are potentially more often undervalued. The market has medium performance expectations for these firms, due to limited investment opportunities. Therefore, the signal of a share repurchase announcement can be perceived as a positive surprise. High returns in subsequent periods after buy-back announcements are observed for low market-to-book ratio firms (Ikenberry et al., 1995; Lakonishok & Vermaelen, 1990). Moreover, the abnormal stock returns for firms with higher market-to-book ratios after share repurchase announcement is stated to be significant lower (Dittmar, 2000).

Third, the changes in capital structure that occur when repurchasing shares differ between firms. It is suggested that leverage ratios tend to adjust slowly to its optimum. It is assumed that an optimal debt ratio exists, and so, share repurchase can be exercised to increase leverage and move to this optimum (Hsieh & Wang, 2011). Firms with a lower leverage ratio are potentially further from the optimum and show a higher abnormal return when announcing a share repurchase program, than firms with a higher leverage ratio (Dittmar, 2000).

Table 1: Overview of academic research on returns around share repurchase announcements.

Country	Author (publishing year)	CAR	Event Window	Number of Observations	Time span
		Africa			
South-Africa	Wesson, Muller & Ward (2018)	Insign.	[0;+10]	69 open market	(1999-2009)
		2,58%	[0,+2]	15 tender offers	
		0,28%	[0;+2]	28 private offers	
		Americas			
Brazil	Micheloud (2013)	Insign.	[+1;+5]	377	(2006-2012)
Canada	Li & McNally (1999)	3,6%	[-2;+2]	183	(1989-1992)
	Ikenberry, Lakonishok & Vermaelen (2000)	0,9%	[-15;+15]	1.060	(1989-1997)
U.S.	Vermaelen (1981)	3,7%	[-1;+1]	243	(1970-1978)
	Comment & Jarrell (1991)	2,3%	[-1;+1]	1.197	(1984-1988)
	Ikenberry, Lakonishok & Vermaelen (1995)	3,54%	[-2;+2]	1.239	(1980-1990)
	Stephens & Weisbach	2,7%	[-1;+2]	591	(1981-1990)
	McNally (1999)	2,5%	[-1;+1]	702	(1984-1988)
	Grullon and Michaley (2002)	2,7%	[-1;+1]	4.443	(1980-1997)
	Manconi, Preyer & Vermaelen (2014)	2,2%	[-1;+1]	10.093	(1998-2008)
		Asia Pacific			
Australia	Lamba & Ramsay (2000)	3,3%	[-1;+1]	103	(1989-1998)
	Balachandran, Faff &Nguyen (2004)	4,44%	[-1;+1]	102 Industrial	(1989-2002)
		2,48%		40 Financial	
		2,46%		25 Resources	
	Mitchell & Watson (2006)	2,6%	[-2;+2]	323	(1996-2000)
	Brown (2007)	1,2%	[-1;+1]	28	(1996-2003)
		0,9%	[-1;0]		
	Akyol & Foo (2013)	2,85%	[0;+1]	212	(1998-2008)
Hong Kong	Zhang (2005)	0,43%	[0;+2]	800	(1993-1997)
India	Thirumalvalavan & Sunitha (2006)	3,2%	[-1;+1]	22	(2002-2004)
Japan	Zhang (2002)	4,58%	[-1;+2]	72	(1995-1999)
	Hatakeda & Isagawa (2004)	2,15%	[-1;+1]	452	(1995-1998)
Malaysia	Isa, Ghani & Lee (2017)	1,18%	[0;+2]	149	(2001-2005)
South-Korea	Jung, Lee & Thornton (2005)	1,6%	[-1;+1]	675	(1994-2000)
		1,3%	[-2;+2]		
Thailand	Nittayagasetwat & Nittayagasetwat (2013)	2,2%	[0]	78	(2001-2012)
		Europe			
Belgium	Manconi, Preyer & Vermaelen (2014)	1,46%	[-1;+1]	27	(1998-2008)
France	Ginglinger & L'Her (2006)	0,6%	[0;+1]	363	(1998-1999)
	Andriosopoulos & Lasfer (2014)	0,8%	[-1;+1]	263	(1997-2006)
Germany	Schremper (2002)	4,1%	[-1;+1]	112	(1998-2000)
	Gerke, Fleisher & Langer (2003)	6,1%	[-1;+1]	120	(1998-2002)
	Seifert & Stehle (2003)	4,8%	[-1;+1]	188	(1998-2003)
	Hackethal & Zdantchouk (2006)	6,0%	[-1;+1]	224	(1998-2003)
	Andriosopoulos & Lasfer (2014)	2,3%	[-1;+1]	194	(1997-2006)
	Anders, Betzer, Doumet & Theissen (2016)	3,55%	[-1;+1]	2.676	(1998-2008)
Netherlands	Manconi, Preyer & Vermaelen (2014)	1,54%	[-1;+1]	52	(1998-2008)
Switzerland	Dumont, Isakov & Pérignon (2004)	1,8%	[-2;+2]	83	(1993-2003)
U.K.	Rees (1996)	0,3%	[-2;+2]	882	(1981-1990)
	Rau & Vermaelen (2002)	1,1%	[-2;+2]	126	(1985-1998)
	Oswald & Young (2004)	1,4%	[-1;+1]	266	(1995-2000)
	Andriosopoulos & Lasfer (2014)	1,7%	[-1;+1]	513	(1997-2006)

This table is based on the overview of Van de Kerckhove & Van Holder (2015).

2.5. Hypotheses

According to the aforementioned literature, the announcement of a share repurchase program is an indication for undervaluation of the firm. Also, because a share repurchase program reduces agency costs and the capital structure moves to the leverage optimum, it is perceived as a positive signal by investors. Most studies, both within and outside the United States, illustrate that such announcements are often welcomed by a positive market response. Hence, it is also expected that for the Dutch market, announcements of buyback programs will result in a positive abnormal return. This leads to the first hypothesis:

H1: *There is a positive abnormal return for firms in the Netherlands in the three-day-event-window around a share repurchase announcement.*

Then, three additional hypotheses are constructed that will determine if the firm characteristics (as described in chapter 2.4.4.) also influence the stock price returns for Dutch firms.
The presence of undervaluation in a company is mostly explained by information asymmetry. Because small companies are less assessed and monitored, and have less publicity in financial media, the appearance of information asymmetry and thus the appearance of undervaluation is argued to be greater than for larger companies. So, the signal of a share repurchase announcement tends to be stronger for smaller firms. Moreover, the need for signalling to decrease information asymmetry is also larger for smaller firms. Accordingly, a larger abnormal return is expected for smaller firms than for larger firms. After taking these considerations into account, the second hypothesis is therefore formulated as follows:

H2: *The effect of a share repurchase announcement on share price is negatively related to firm size.*

Identically, firms with a lower market-to-book ratio are more likely to be undervalued. For example, a market-to-book ratio below zero means that the book value is higher than the market value. This can be a sign for the firm to be undervalued. Typically, managers of firms with a low market-to-book ratio that believe the firm to be undervalued, are willing to signal to the market that the market price is too low. Announcing a share repurchase program can be used for this signal. Therefore, the abnormal returns around a share repurchase announcement are expected to be larger for firms with a smaller market-to-book ratio. The third hypothesis is formulated as follows:

H3: *The effect of a share repurchase announcement on share price is negatively related to market-to-book ratio.*

The latter hypothesis has been constructed from the perspective that share repurchases provide the opportunity to adjust a firm's capital structure. Share buy-backs result in a higher leverage ratio. Also, it is believed that firms tend to move to the optimum leverage ratio. If a firm has a lower than optimal leverage, repurchasing shares will increase the leverage ratio and moves towards its leverage optimum. Accordingly, it is expected that the abnormal return of a share repurchase announcement is larger for firms with a lower leverage ratio, because they might be further from the leverage optimum. The last hypothesis is formulated as follows:

H4: *The effect of a share repurchase announcement on share price is negatively related to leverage.*

3. Research methodology

3.1. Event study

In line with comparable research (Andriosopoulos & Lasfer, 2015; Caton et al., 2016; Lie, 2005), an event study will be conducted to make the required analyses to answer the research questions. An event study can be used to measure the effects when a certain economic event occurs. According to MacKinlay (1997), who has developed the event study, the share repurchase announcement date is defined as the event of interest and three event windows will be tested; [-20+20], [-10; +10], [-5; +5], [-1; +1], where zero is the day of announcement. The expected return will be calculated based on the estimation window of 200 days [-220, -21], which is in line with MacKinlay (1997). This expected return is the average daily return for a firm when there is no repurchase announcement.

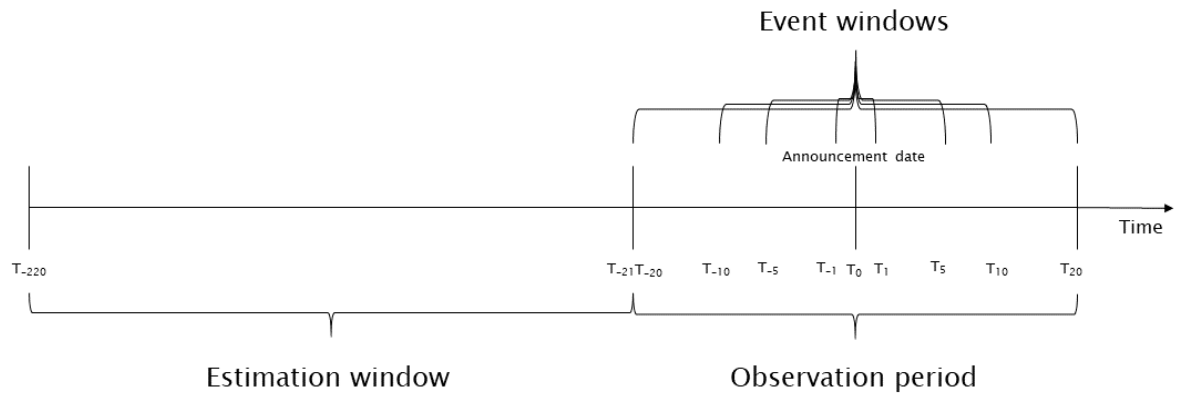

Figure 1. Illustration of different windows within the event study.

Microsoft Excel will be used to do the analyses. With the collected data (described in chapter 4), the expected return, abnormal return, cumulative abnormal return and the cumulative average abnormal return in the timeframes around the event date will be calculated. These outcomes will be statistically tested via a t-test to determine if the effect of share repurchase announcements is significant or not. The null hypothesis is an (cumulative) (average) abnormal return of zero.

In the event study, the abnormal return (AR) is calculated as the return (R) observed in the event period minus the normal return (NR) or expected return. This gives the formula:

$$AR_{it} = R_{it} - E(R_{it})$$

Where *it* stands for stock i at time t

3.2 Normal return

When calculating the abnormal return, first the normal return of a stock needs to be determined. Specifically, it is the expected return without influence of the certain event taking place. For determining this normal return, several approaches are used and are typically categorised as economic or statistical. Economic models derive from the assumptions concerning the behaviour of investors. On the other hand, statistical models are founded on statistical assumptions concerning the asset return behaviour.

Two economic models are notable, the Capital Asset Pricing Model (CAPM) and the Arbitrage Pricing Theory (APT). The APT is derived from the CAPM test, because the CAPM appeared to predict too low normal returns for smaller firms (MacKinlay, 1997). There are no considerable advantages preferring economic models above statistical models when conducting event studies. Hence, economic models are rarely used (Kolari & Pynnönen, 2010). Moreover, it should also be acclaimed that adding statistical assumptions is required when using economic models (MacKinlay, 1997). Therefore statistical models are more common in research.

There are several statistical models used in event studies. The most common statistical models are the Market model, Adjusted market model, Constant mean return model, and various kinds of multi-factor models.

The market model finds its basis in the single factor market model and the formula is $R_{it} = \alpha_i + \beta_i R_{mt} + \varepsilon_{it}$. Where α is a constant and β is the regression coefficient that represents the sensitivity of the asset on the reference market return.

The adjusted market model is a simplification of the market model, where β=1 and α=0, following in the formula: $AR_{it} = R_{it} - R_{\mathrm{m}}$. So, in this situation, no security specific sensitivity on the reference market return is taken into account. Also, no estimation period is necessary because no alfa or beta needs to be calculated. It is important to be aware of eventually arising bias when imposing wrong restrictions (Kolari & Pynnönen, 2010).

The constant mean return model is approximated when β=0. The formula $R_{it}=\mu_{\mathrm{i}} + \xi_{\mathrm{it}}$ gives a vector for the asset I return in time t, so $AR = R_{it} - \bar{R}_t$.

The last statistical model, the multi-factor models have limited gains compared with the other models (MacKinlay, 1997). The explanatory power of the additional factors is limited and also the reduction in variance on the normal return is small. Only when common characteristics are present within sample firms, an additional factor can make a difference (MacKinlay, 1997). Moreover, the mean return model and market model are in fact multi-factor models (Kolari & Pynnönen, 2010).

When choosing an expected return model for an event study, one important difference between the (adjusted) market model and the constant mean return model needs to be taken into account. The (adjusted) market model assumes there is a stable and linear relation between the market return and the return of the particular asset. The constant mean return model, instead, assumes that the mean return for an asset is constant through time. From an econometric point of view, the use of the market model compared to the constant mean return model, comes with a reduced variance of the abnormal return in tests. Resulting in a better ability to observe event effects (Kolari & Pynnönen, 2010). An important disadvantage of the mean return model is that an abnormal return is observed, even if the entire market shows better performance during the event window. However, it is stated that both required assumptions are empirically reasonable and the normal return models tend to be robust to deviations following from these assumptions (MacKinlay, 1997).

Depending on the sample characteristics can be considered how each expected return model may carry different biased results. Most studies that are focussed on the financial value of individual event types tend to adapt the most used model, namely the market model. In 79,1% of the event studies this model is used. Many researchers build on this model, rather than considering another model because the abnormal return biases seem to be small when comparing these different models (Holler, 2012).

The selection of one of these statistical models to calculate the normal return is considered for this research. Because the market model is most common in event studies, the tests within this thesis will be conducted with the market model. So, the event study will be done with the market model, to be better able comparing the results with other research. To ensure the robustness of the tests, the constant mean return model is also used to compare for similar outcomes (Anolick et al., 2021).

In the following section is the exercising of the event study when making use of the market model explained. This procedure is similar when using one of the other models, only a different formula is used for calculating the normal return.

The normal return is calculated with the market model formula:

$$R_{it} = \alpha_i + \beta_i R_{mt} + \varepsilon_{it}$$

Where the estimation window t =[−220; −21] is used. The Normal Return is then calculated as the residuals of the prediction errors:

$$NRit = \hat{\alpha}i + \beta i Rmt, \text{ for t= } [-1; +1]$$

3.3. Abnormal return

After the normal return has been calculated, and thus the expected return for the event windows can be determined, the next step is to calculate the abnormal return. This will be done for separately for each event using the formula $AR_{it} = R_{it} - E(R_{it})$.

To calculate then the performance over the chosen event window, the Cumulative Abnormal Return (CAR), can be found as following:

$$CAR_i = AR_{i,t1} + \cdots + AR_{i,t2} = \sum_{t=t1}^{t2} AR_{it}$$

t1 and t2 are dependent of the different event windows: [−10; +10], [−5; +5], [−1; +1].

After calculating the cumulative abnormal returns for all the events found, the mean of these returns can be calculated. This is the so-called Cumulative Average Abnormal Return (CAAR) and is found across all events and firms with the formula:

$$CAAR = \frac{1}{N}\sum_{i=1}^{N} CAR_i$$

3.4. Testing abnormal returns

Last, a statistical test is needed to determine if the abnormal returns are significantly different from the calculated normal returns.

For the abnormal return: $H_0: E(AR_{it}) = 0$

For the cumulative abnormal return: $H_0: E(CAR_i) = 0$

To do so, following t-tests are used:

For the abnormal return: $TS_1 = \sqrt{N}\,\frac{AAR_t}{s_t} \approx N(0,1)$

For the cumulative abnormal return: $TS_2 = \sqrt{N}\,\frac{CAAR}{s} \approx N(0,1)$

The standard deviation can then be calculated via the formula's:

For the abnormal return: $s_t = \sqrt{\frac{1}{N-1}\sum_{i=1}^{N}(AR_{it} - AAR_t)^2}$

For the cumulative abnormal return: $s_t = \sqrt{\frac{1}{N-1}\sum_{i=1}^{N}(CAR_i - CAAR)^2}$

3.5. Testing hypotheses

To further explore the effect of share repurchase announcements on share price, additional regression tests will be carried out. Independent variables will be added in the research, to determine if certain firm characteristics result in stronger post-announcement returns. These independent variables are in line with hypotheses 2, 3, and 4 (see 2.5.).

First, the variable firm size will be added. By doing so, it can be examined if smaller firms have a higher cumulative abnormal return than larger firms. This can be expected since the hypothesis that the information asymmetry is larger for smaller firms is commonly accepted. According to the signalling hypothesis, as explained in 2.3.1., managers of smaller firms are more likely to announce a share repurchase program as a signal of undervaluation to investors. This signal would probably be stronger for smaller firms whereas less monitoring power from the market is present and, when less information is available, the perceived information content of a share repurchase announcement for a smaller firm is larger. Hence, a negative relationship between firm size and CAR is expected. In line with literature (Andriosopoulos & Lasfer, 2015; Dittmar, 2000; Grullon & Michaely, 2002), the independent firm size variable is defined as the natural log of the firm's total assets.

Second, the market-to-book ratio is used to also determine to what extent the signalling theory is detectable. The market-to-book ratio is calculated when dividing the market value of a firm by the book value of the firm. The market-to-book ratio can be a proxy to determine whether a company is under- or overvalued. Ordinarily, a large market-to-book value is a sign that a firm is probably overvalued, because the market value is much higher than the book value of the company. Investors are expecting the firm to generate more profits in the future (Hackethal & Zdantchouk, 2006). A market-to-book ratio above 1 indicates a higher market value than book value. Beneath 1 indicates a lower market- than book value and hence, can imply undervaluation. Therefore, the expectation is that the independent variable book-to-market ratio has a negative relationship with the dependent variable CAR.

Third, adding the variable leverage allows to determine whether a higher leverage result in a higher abnormal return. This is in line with the capital structure hypothesis. Leverage is the total outstanding

liabilities divided by the total assets of the firm. When assuming that a share repurchase program will be conducted to approach the optimum leverage ratio, it can be expected that the CAR will be stronger for firms with a lower leverage ratio because when repurchasing, the leverage moves in the direction of the optimum (Dittmar, 2000). Therefore, a negative relationship between the independent variable leverage and the dependent variable CAR is expected.

Although the constructed hypotheses for this thesis are limited to three independent variables, more variables might determine abnormal returns. By adding these so-called control variables, the robustness of the results is covered. To prevent from introducing bias by adding these control variables, the regression analysis is done with and without the control variables in two separate models.

First, the control variable cash holdings is added. In previous research, the variable cash holdings functions as a variable to test for the free cash flow theory (Anolick et al., 2021; Caton et al., 2016; Hackethal & Zdantchouk, 2006). The distribution of excess cash via share repurchase can diminish the risk of agency costs. Therefore, share repurchase announcements can be perceived more as good news for firms with large cash holdings than for firms with smaller cash holdings. In line with the previous literature, the variable cash is determined as a log of cash holdings (Anolick et al., 2021; Caton et al., 2016; Hackethal & Zdantchouk, 2006).

Second, as another control variable, the dividend dummy is added. Because dividends are an important pay-out method, it is stated to be a substitute to stock buy backs in distributing cash to investors (Anolick et al., 2021; Dittmar, 2000; Grullon & Michaely, 2002). The abnormal return around share repurchase announcements for firms that are already making dividend payments might be smaller, because they already pay-out surplus cash to investors.

The last control variable added is return on assets (ROA). Return on assets can be used to measure operating performance (Chan et al., 2010; Chen & Wang, 2012; Lee et al., 2010). Investors might perceive share repurchase announcements from firms with a relatively low operating performance as a stronger signal about future profitability than for firms with better return on assets.

A multiple regression analysis via the ordinary least squares test will be conducted to reflect the importance of these variables to the dependent variable. The corresponding regression model can be shown by the equation: $CAR_i = \alpha_i + \beta_1 Firmsize_i + \beta_2 MTBV_i + \beta_3 Leverage_i + \beta_{4,5,6} Control_i + \varepsilon_i$

CAR_i represents the cumulative abnormal return for stock i and is the dependent variable. The betas in this formula are the coefficients that explain the influence of the specific independent variable on the dependent variable. The control variables discussed above are also part of this regression model. However, these are not individually shown in the regression model equation.

4. Data

For this research, target firms are firms listed on the Dutch AEX, AMX and AScX indexes that have exercised share repurchase announcements in the 5-year period of January 1st, 2015 to December 31st, 2019. This sample period is chosen because for two important reasons. First, it is a very recent and relatively financial stable period. Second, it is also less explored than the period around the financial crisis in 2008 and the period between 2000 and 2008 where share repurchase became more in use.

To limit the period to 2019 and not include data of 2020 has a practical motivation. Data from 2020 is not deemed reliable due to possible highly deviating repurchase behaviour as a response to the threat of the corona pandemic (Aramonte, 2020).

In previous research, authors made use of databases as Security Data Corporation and Zephyr, where many company characteristics including share repurchase announcements are collected. The University of Twente does not have access to these databases, so a different approach will be adopted.

First, Dutch newspapers, such as Het Financieele Dagblad, and trade magazines, especially Maandblad Accounting and Banking, are consulted to collect press releases about share repurchases of Dutch firms. Second, because these sources will probably contain gaps, the annual reports of Dutch listed firms will be collected from the Orbis database and then analysed to determine which firms have repurchased shares in the sample period. Hereafter, via the AFM register openbaarmaking voorwetenschap, a collection of Dutch company publications, the date of the share repurchase announcement will be determined. Via Yahoo Finance, historical daily share prices are downloaded for these firms. Last, the Orbis database, where firm characteristics of companies all over the world are centralised, is used to collect the firm specific information for testing the independent variables.

Unfortunately, a gap in the data may arise due to this method of data collection. As explained in the theoretic framework, the share repurchase announcement is more valuable for a rise of the share price than the share repurchase itself. When data is collected in the above-described method, share repurchase announcements can be missed and not included in the dataset and so not included in the tests. However, this will only return into a smaller sample size and might not influence the outcome. Furthermore, it cannot be estimated in advance how many announcements will be missed in this described data collection method.

5. Results

This chapter describes the results of this study. The in chapter 2.5. formulated hypotheses are tested and the results are explained in this section. First, the outcome of the abnormal returns from the event study are illustrated. Then, the results of the regression analysis are presented. This consists of an explanation of the descriptive statistics and the clarification of the correlation matrix and VIF analysis. Last, the results of the OLS regression are formulated.

5.1. Event Study

The stock price performance around share repurchase announcements of firms, listed on the AEX, AMX and AScX indexes, are examined through an event study. In total, 125 events of share repurchase announcement were found in the period between January 1st 2015 and December 31st 2019. For two of these events, no daily stock price 220 days prior to the announcement was available. Also, some companies perform share repurchases regularly, causing a share repurchase to occur during the 220 days estimation window for another announcement. According to the literature (Anolick et al., 2021; MacKinlay, 1997), it is assumed that this might occur a kind of bias. And so, 46 of the found events from the sample are removed, and only 77 events remain.

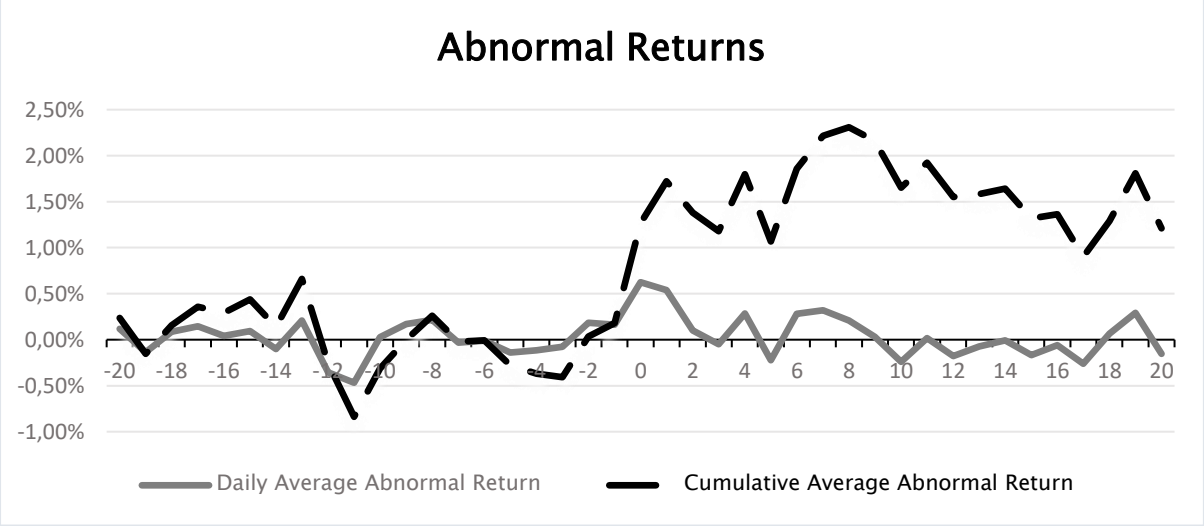

Figure 2. Average abnormal returns for the event window [-20; +20].

For this event study, the cumulative average abnormal returns are calculated in seven different event windows. Within an observation window of 41 days, the average abnormal returns and cumulative average abnormal returns are calculated. These results are made visible in figure 2. Within these event windows, one pre-event window [-20; -2] and one post-event window [+2; +20] can be distinguished. Especially the [-1; +1] window is relevant within this study. Therefore this window is known as the

"announcement event window". The results of the CAAR in the different event windows with the corresponding t-test results are shown in table 2. These results are also divided into the different years of announcement.

Table 2: Cumulative average abnormal returns for all event windows.

	ALL		2015		2016		2017		2018		2019	
#OBS	77		11		12		20		13		21	
	CAAR	T-Stat	CAAR	T-Stat	CAAR	T-Stat	CAAR	T-Stat	CAAR	T-Stat	CAAR	T-Stat
CAAR -20;+20	1,36%	1,30	4,82%*	1,85	-2,14%	-0,72	2,75%	1,48	1,25%	0,53	0,31%	0,14
CAAR -20;-2	-0,15%	-0,21	-0,66%	-0,37	-1,24%	-0,61	1,14%	0,90	0,20%	0,13	-0,70%	-0,48
CAAR -10;+10	2,26%***	3,01	4,20%**	2,26	2,61%	1,23	2,07%	1,56	0,48%	0,28	2,34%	1,51
CAAR -5;+5	1,29%**	2,37	1,07%	0,80	3,34%**	2,17	2,73%***	2,84	-1,00%	-0,83	0,28%	0,25
CAAR -1;+1	1,33%***	4,68	0,69%	0,98	1,74%**	2,16	1,77%***	3,53	1,78%	2,81	0,73%***	1,24
CAAR 0	0,62%***	3,81	0,91%**	2,23	0,36%	0,78	0,88%***	3,05	0,48%	1,30	0,47%	1,39
CAAR +2;+20	0,18%	0,26	4,79%***	2,70	-2,65%	-1,31	-0,16%	-0,13	-0,74%	-0,46	0,29%	0,20

* p<0.1; ** p<0.05; *** p<0.01 (two-tailed)

5.1.1. Robustness

As explained in chapter 3.2., to prove the robustness of the results, the abnormal returns are compared with both the market model and the average return model. The results of both calculations are shown in table 3. Small differences can be noticed between the two normal return models. But overall, the results have the same direction, order of magnitude, and the returns of the same windows are significant. Especially results for the announcement event window [-1; +1], which is most relevant for this study, are almost identical. According to this table, the results are accepted to be robust. Hence, the market model is more sophisticated and is therefore more appropriate for executing the calculations.

Table 3: Comparison of the two different normal return models for robustness.

	MARKET MODEL		AVERAGE RETURN MODEL	
#OBS.	77		77	
	CAAR	T-Stat	CAAR	T-Stat
CAAR -20;+20	1,36%	1,30	3,25%***	2,58
CAAR -20;-2	-0,15%	-0,21	1,30%	1,51
CAAR -10;+10	2,26%***	3,01	3,21%***	3,57
CAAR -5;+5	1,29%**	2,37	1,88%***	2,89
CAAR -1;+1	1,33%***	4,68	1,41%***	4,14
CAAR 0	0,62%***	3,81	0,59%***	3,02
CAAR +2;+20	0,18%	0,26	0,54%	0,63

* p<0.1; ** p<0.05; *** p<0.01 (two-tailed)

5.1.2. Cumulative Average Abnormal Returns

In line with other research, the pre-event window shows a negative abnormal return. This is stated as a coherent observation, when, according to the theory, managers announce share repurchase as a reaction to undervaluation. So, the negative stock return previous to the announcement is the trigger for the announcement itself. However, the results in this study show a return of -0,15% in the [-20; -2] pre-event window, which is a quite small negative return, and is also not significant.

It is noticeable that the post-event window gives almost opposite results. The [+2; +20] window shows a return of 0,18%, with a similar, not significant t-value as for the pre-event window. Because the overall observation window [-20; +20] shows a positive return of 1,36%, and the pre- and post-event windows seem to cancel each other out, this is an indication that the positive return occurs in the announcement window [-1; +1]. Indeed, this is in line with the results in the announcement window, where a highly significant positive return of 1,33% can be recognised.

It is hypothesised, that for the Dutch market, announcements of buyback programs will result in a positive abnormal return. The results show that the information content of share repurchase announcements is recognised by the market. The analyses provided a result of 1,33% abnormal return in the announcement window [-1; +1]. That is strongly significant with a p-value smaller than 0,01. Previous research carried out within Europe found comparable abnormal returns, as can be seen in table 1. Hence, these findings confirm the first hypothesis.

5.2. Regression analysis

OLS regression analyses are executed to investigate what firm characteristics determine the stock return of share repurchase announcements, The dependent variable in this analysis is the CAR for announcement event window [-1,+1]. Three independent variables have been added: Firm Size, Leverage and MTB ratio. Also three control variables are added, Available Cash, Return on Assets, and a Dividend Dummy variable.

5.2.1. Descriptive statistics:

Table 4 contains the descriptive statistics of the dependent, independent and control variables. The mean Cumulative abnormal return is equal to the outcomes described in 5.1.2. As can be seen in table 4, there are some missing values for the variables MTB and Cash. In order to being able to execute a proper regression analysis, the missing values are predicted via the TREND function in Microsoft Excel.

Table 4: Descriptive statistics.

	MEAN	*MEDIAN*	*ST DEV*	*MINIMUM*	*MAXIMUM*	*COUNT*
CAR -1,+1	0,0133	0,0147	0,0405	-0,1324	0,1111	77
FIRM SIZE	0,0226	0,0226	0,0020	0,0170	0,0268	77
LEVERAGE	0,1053	1,1715	23,6948	-201,1450	33,3516	77
MTB	2,2095	1,7458	1,5553	0,4240	7,4586	75
CASH	1655904	506000	3559872	223	26741000	71
ROA	0,0575	0,0546	0,0689	-0,1384	0,3025	77
DIVIDEND DUMMY	0,8571	1,0000	0,3522	0,0000	1,0000	77

5.2.2. Correlation and Multicollinearity

First, to avoid the risk of multicollinearity, a correlation matrix of all independent variables is calculated. Table 5 shows the Pierson's correlation coefficients between the beforementioned explanatory variables.

Table 5: Pierson's Correlation matrix.

	FIRM SIZE	*LEVERAGE*	*MTB*	*CASH*	*ROA*	*DIVIDEND DUMMY*
FIRM SIZE	1					
LEVERAGE	-0,0656	1				
MTB	-0,09943	-0,17227	1			
CASH	0,621495***	0,085811	-0,17528	1		
ROA	-0,03245	0,11162	0,280561**	-0,01265	1	
DIVIDEND DUMMY	0,136922	0,240096**	-0,13977	0,026061	0,457937***	1

* p<0.1; ** p<0.05; *** p<0.01 (two-tailed)

Because there are four significant coefficients found, an additional Variance inflation factor analysis is conducted. The results are shown in table 6. Within these results, no VIF score above 2,5 is found, and so, the presence of multicollinearity can be rejected. Therefore, the OLS regression analysis of the dependent variable CAR [-1; +1] with the six independent variables can be conducted.

Table 6: Variance Inflation Factors.

VARIABLE	VIF
FIRM SIZE	1,76736
LEVERAGE	1,131608
MTB	1,27501
CASH	1,752101
ROA	1,529582
DIVIDEND D	1,526937

5.2.3. Regression analysis:

This section discusses the main findings on the regression analysis. Table 7 shows the coefficients found for the explanatory variables for two models. The dependent variable is the cumulative abnormal return. The three independent variables are Firm Size, Leverage, and Market to Book ratio. The control variables are included in the first model.

Table 7: Regression analysis results.

	MODEL 1		MODEL 2	
VARIABLE	coefficient	T-Stat	coefficient	T-Stat
FIRM SIZE	1,600348	0,500087	-0,94134	-0,38845
LEVERAGE	-0,00012	-0,54405	-0,00014	-0,70108
MTB	0,001845	0,539888	0,001653	0,535524
CASH	-2,4E-09	-1,40606		
ROA	-0,0396	-0,46818		
DIVIDEND D	0,009487	0,574154		
CONSTANT	-0,02812	-0,40723	0,03091	0,549955
# OBS.	77		77	
R SQUARE	0,051845		0,014893	

* p<0.1; ** p<0.05; *** p<0.01 (two-tailed)

This study does not find evidence for an effect of the selected variables on the cumulative abnormal return after a share repurchase announcement. The R-squared indicates the proportion of the variance for the dependent variable that is explained by the independent variables. In this respect, firm size, leverage and market-to-book ratio. An R-squared close to 1, typically 0,7 or higher, illustrates a strong

relation between the dependent and independent variables. Two models are tested in this study. The first model uses added control variables to be more complete and to provide a better solution for the dependent variables. A second model solely utilises the independent variables. Although the R-squared is almost five times higher when the control variables are added, still only 5% of the observed CAAR can be explained.

First, it was hypothesised that the effect of share repurchase announcement by smaller firms results in a higher CAR. Therefore, a negative relation between firm size and CAR was expected. Smaller companies ought to be less assessed and monitored and do not appear in financial media as frequently as larger companies. This enhances the information asymmetry and so, smaller companies are more likely to be undervalued. Yet, the findings do not support this hypothesis. Only when controlling for cash, return on assets and dividend, a negative relation is found between firm size and CAR. However, this relation is not significant, hence does not provide evidence for this hypothesis.

Secondly, it was hypothesised that firms with a lower market to book ratio are more likely to be undervalued. Hence, a negative relation between market to book ratio and CAR is expected. A firm with a low market to book ratio could be undervalued. Therefore, management can signal the market through the announcement of share repurchase. However, this study does not find evidence to support this hypothesis. In both models, no significant negative correlation are found.
Thirdly, it was hypothesized that share repurchase announcements could be used as a mean to adjust a firm's capital structure. Through share buy-backs the leverage ratio increases, hence providing an instrument for management to move towards their leverage optimum. Therefore, a negative relation between leverage and CAR is expected. Although a small negative relation for both models are found, these are not significant and therefore do not support this hypothesis.

5.3. Robustness of the regression model

Contrarily to what was expected, no significant results were found for the coefficients of Firm Size, Leverage, and Market to Book ratio. Therefore it is important to assess the robustness of the model to exclude that the insignificance of these coefficients is caused by methodologic limitations. Accordingly, the sample size, multicollinearity and the goodness of fit, are assessed.

First, the sample size of the collected dataset for this study is compared to prior research done in other countries with comparable timeframes, as can be seen in table 1, the dataset collected for this research

is not one of the largest datasets, but for a relatively small country as The Netherlands, and a 5-year time window, it has a comparable size to the found articles. Especially because the dataset was collected manually, the sample might be more extensive, than when collected via e.g. Zephyr.

Another cause that may affect the insignificant results might be multicollinearity. As can be seen in table 5, some significance in the Pierson's correlation occurred. Three variables are significantly correlated with each other. However, the additional variance inflation factor test that is conducted, rejected the possibility for multicollinearity.

Lastly, the goodness of fit of the model is examined. As mentioned in chapter 5.2.3. the model finds a r-squared of 0.0518, which indicates that only 5,18% of the variances of the CAR [-1; +1] is explained by the variances of the independent variables. This means that almost 95% of the variances of CAR [-1; +1] cannot be explained by the included independent variables. This suggests the presence of an omitted variable bias and the endogeneity of the model, explaining the insignificant results of the independent variables in this model.

6. Conclusion

This study aims to determine the effect of share repurchase announcements on the share price of Dutch firms in the years 2015 to 2019. Previous studies focused mainly on the US and UK markets. However, since financial markets are regulated differently, not only per (economic) region, but also per country, the results of these previous studies cannot be directly applied to the Dutch market. This study fills this academic gap by testing the signalling theory within the Dutch market. This theory suggests that share prices will rise if firms announce that they are undervalued. The sample size consists of smaller and bigger companies, allowing to test the different characteristics of the signalling theory.

6.1. Conclusion

The observed CAAR shows that share repurchase announcements are perceived as good news by investors and result in a positive share price effect, similar to trends observed in previous research. Most of these studies have a similar sample size as this study. Within this study, the analysis provided a result of 1,33% in the announcement window [-1; +1]. That is strongly significant with a p-value smaller than 0,01. The market response to the share repurchase announcement fits in the European found returns. Although, the market reaction is relatively small compared to the Americas, the UK, and Australia. This is in line with the literature and can be explained by the relatively conservative pay-out policies in Europe mainland.

This study does not find evidence for an effect of the selected variables on the cumulative abnormal announcement return. The effect of leverage on the cumulative abnormal return is negative, as expected, but not statistically significant. Unexpectedly, the size of a share repurchase announcing firm, and the market to book value of the announcing firm, both have a positive effect on cumulative abnormal returns, where a negative effect was expected. However, also this result is not statistically significant.

There are several plausible explanations for this outcome. First, the Dutch market can be different from the markets analysed in previous studies. Second, the information asymmetry could have declined in recent years, especially for explaining the insignificant results for the variable of firm size, as is suggested by some authors. Third, the announcement of a share repurchase program might come as a positive surprise for investors, regardless of the leverage or market-to-book ratio of the announcing firm. This study uses two different models that test the impact of the different variables, but no obvious explanation is found. This suggest that the models lack certain independent variables.

6.2. Limitations

The study performed here has several limitations. The first concerns certain characteristics of some data. The Orbis database, which is used in this study, only presents the financial characteristics of firms per calendar year. So, the variables of leverage ratio and market-to-book ratio are assessed for the year where the share repurchase announcement took place. However, these firm characteristics specifically, might have changed within this year and especially around the share repurchase announcement date.
Also, 46 of the 123 events are dismissed from the analysis because another share repurchase announcement occurred in the 220 day estimation window of another announcement. As a result, potentially valuable sample data may be lost.

6.3. Recommendations

It is likely that the independent variables that can explain the CAR of share repurchase announcements are missing. Despite the fact that the independent variables chosen in this study are based on many scientific papers in this field of interest, they do not appear to be able to explain the CAR. So, for future studies, it is recommended to asses more independent variables within the analyses.
Furthermore, the 2015 - 2019 period is underrepresented in literature. Many studies focus on the period before, during and after the financial crisis of 2008. Less research has focussed on the relatively financially stable period from 2015 to 2019 and more could, therefore, be conducted for other countries during this period. Moreover, the corona pandemic, which started in 2020, has also had a strong effect on economic developments and financial security worldwide. This, too, may be a good indication to do more research on share buybacks in this time window.

7. References

Andriosopoulos, D., & Hoque, H. (2013). The determinants of share repurchases in Europe. *International Review of Financial Analysis*. https://doi.org/10.1016/j.irfa.2012.12.003

Andriosopoulos, D., & Lasfer, M. (2015). The market valuation of share repurchases in Europe. *Journal of Banking and Finance*, *55*, 327–339. https://doi.org/10.1016/j.jbankfin.2014.04.017

Anolick, N., Batten, J. A., Kinateder, H., & Wagner, N. (2021). Time for gift giving: Abnormal share repurchase returns and uncertainty. *Journal of Corporate Finance*, *66*(November 2020), 101787. https://doi.org/10.1016/j.jcorpfin.2020.101787

Aramonte, S. (2020). Mind the buybacks, beware of the leverage. *BIS Quarterly Review*, *September*.

Boot, A. W. A. (2013). Aandeleninkoop en waardecreatie. *Maandblad Voor Accountancy En Bedrijfseconomie*. https://doi.org/10.5117/mab.87.16951

Brav, A., Graham, J. R., Harvey, C. R., & Michaely, R. (2005). Payout policy in the 21st century. *Journal of Financial Economics*. https://doi.org/10.1016/j.jfineco.2004.07.004

Brealey, R. A., Myers, S. C., & Allen, F. (2017). *Principles of Corporate Finance - Principles of Corporate Finance (12th Edition).pdf*. McGraw-Hill/Irwin.

Caton, G. L., Goh, J., Lee, Y. T., & Linn, S. C. (2016). Governance and post-repurchase performance. *Journal of Corporate Finance*. https://doi.org/10.1016/j.jcorpfin.2016.02.005

Chan, K., Ikenberry, D. L., Lee, I., & Wang, Y. (2010). Share repurchases as a potential tool to mislead investors. *Journal of Corporate Finance*. https://doi.org/10.1016/j.jcorpfin.2009.10.003

Chen, S. S., & Wang, Y. (2012). Financial constraints and share repurchases. *Journal of Financial Economics*. https://doi.org/10.1016/j.jfineco.2012.03.003

Dittmar, A. K. (2000). Why do firms repurchase stock? *Journal of Business*. https://doi.org/10.1086/209646

Grullon, G., & Michaely, R. (2002). Dividends, share repurchases, and the substitution hypothesis. *Journal of Finance*. https://doi.org/10.1111/1540-6261.00474

Hackethal, A., & Zdantchouk, A. (2006). Signaling power of open market share repurchases in Germany. *Financial Markets and Portfolio Management*. https://doi.org/10.1007/s11408-006-0011-9

Holler, J. (2012). Event-Study-Methodik und statistische Signifikanz. *OIWR. Banking, Finance & Accounting Research Series.*, *3*(518798).

Hsieh, J., & Wang, Q. (2011). Stock Repurchases: Theory and Evidence, Part 1. In *Dividends and Dividend Policy*. https://doi.org/10.1002/9781118258408.ch14

Ikenberry, D., Lakonishok, J., & Vermaelen, T. (1995). Market underreaction to open market share repurchases. *Journal of Financial Economics*. https://doi.org/10.1016/0304-405X(95)00826-Z

Kahle, K. M., Dyl, E. A., & Banyi, M. L. (2011). Measuring Share Repurchases. *SSRN Electronic Journal*. https://doi.org/10.2139/ssrn.726284

Kelly, P. J. (2014). Information efficiency and firm-specific return variation. *Quarterly Journal of Finance*. https://doi.org/10.1142/S2010139214500189

Kim, J., Schremper, R., & Varaiya, N. P. (2012). Open Market Repurchase Regulations: A Cross-Country Examination. *SSRN Electronic Journal*. https://doi.org/10.2139/ssrn.496003

Kolari, J. W., & Pynnönen, S. (2010). Event study testing with cross-sectional correlation of abnormal returns. *Review of Financial Studies*. https://doi.org/10.1093/rfs/hhq072

Lakonishok, J., & Vermaelen, T. (1990). Anomalous Price Behavior Around Repurchase Tender Offers. *The Journal of Finance*. https://doi.org/10.1111/j.1540-6261.1990.tb03698.x

Lee, C. I., Ejara, D. D., & Gleason, K. C. (2010). An empirical analysis of European stock repurchases. *Journal of Multinational Financial Management*, *20*(2–3), 114–125. https://doi.org/10.1016/j.mulfin.2010.07.002

Lie, E. (2005). Operating performance following open market share repurchase announcements. *Journal of Accounting and Economics*. https://doi.org/10.1016/j.jacceco.2005.04.001

MacKinlay, A. C. (1997). Event Studies in Economics and Finance. *Journal of Economic Literature*.

Manconi, A., Peyer, U., & Vermaelen, T. (2018). Are Buybacks Good for Long-Term Shareholder Value? Evidence from Buybacks around the World. *Journal of Financial and Quantitative Analysis*. https://doi.org/10.1017/S0022109018000984

McNally, W. J. (1999). Open Market Stock Repurchase Signaling. *Financial Management*. https://doi.org/10.2307/3666195

Peyer, U., & Vermaelen, T. (2009). The nature and persistence of buyback anomalies. *Review of Financial Studies*. https://doi.org/10.1093/rfs/hhn024

Stephens, C. P., & Weisbach, M. S. (1998). Actual share reacquisitions in open-market repurchase programs. *Journal of Finance*. https://doi.org/10.1111/0022-1082.115194

Stonham, P. (2002). A game plan for share repurchases. *European Management Journal*. https://doi.org/10.1016/S0263-2373(01)00112-8

Van de Kerckhove, J., & Van Holder, T. (2015). *The effect of share repurchases in Belgium and The Netherlands*. 10.13140/RG.2.1.4398.3208

Vermaelen, T. (1981). Common stock repurchases and market signalling. An empirical study. *Journal of Financial Economics*. https://doi.org/10.1016/0304-405X(81)90011-8

Vermaelen, T. (1984). Repurchase Tender Offers, Signaling, and Managerial Incentives. *The Journal of Financial and Quantitative Analysis*. https://doi.org/10.2307/2330896

Vermaelen, T. (2005). Share repurchases. In *Foundations and Trends in Finance*. https://doi.org/10.1561/0500000007