Aalto University
School of Business

Share repurchases: Abnormal performance and motives behind the announcements

Bachelor's Thesis

Jerry Salomaa
Aalto University School of Business
Finance

Fall 2020

Author Jerry Salomaa

Title of thesis Share repurchases: Abnormal performance and motives behind the announcements

Degree Bachelor’s Degree

Degree programme Finance

Thesis advisor(s) Theresa Spickers

Year of approval 2020 **Number of pages** 29+5 **Language** English

Abstract In this paper I study the short- and long-term abnormal returns around open-market share repurchase program announcements. I focus on announcements in Western Europe from 1990 to 2020. Additionally, I obtain cross-sectional regressions aiming to understand the factors causing the abnormalities. I find statistically significant announcement returns of 1.06% and long-term cumulative abnormal returns of 14.2%. The closer examination of the returns does not suggest that either short-term or long-term returns are in decline. The results fail to find an explicit explanation for the initial impact of the announcement, such as the signaling undervaluation hypothesis or agency theory.

Keywords share repurchase, signaling undervaluation, announcement returns

Contents

1. Introduction

Open-market share repurchases are one of the few ways to distribute a firm's income to its shareholders. Corporations have generally two methods of returning profits to shareholders, dividends and share repurchases. Share repurchases can be done either via open-market or tender offer. Globally, the majority of share repurchase transactions are open-market purchases. This is mostly due to their flexibility.

The discussion on whether it is one of the more beneficial ways of splitting the pot started when Ikenberry et al. (1995) found that in the 1980s managers announced repurchases when shares were undervalued. The average four-year buy-and-hold abnormal post-announcement return was 12.1%. The paper suggested that correction of that undervaluation takes time, usually several years. Many other studies find similar evidence, with slightly varying reasoning. Motivations for share repurchases include at least signaling of undervaluation, agency theory, capital structure, and dividend substitution. A Survey in the U.S. reports that more than 80% of managers execute repurchase activity when they assume that the stock is being undervalued, Harvey et al. (2005).

As signaling undervaluation seems to be the motivation behind most of the open-market share repurchases, its counterpart, the Underreaction Hypothesis, would explain the slow adjustments to the managers' signals. In a perfect market, mispricing of the underlying should lead to a short-term boost to its valuation. Underreaction Hypothesis in this context claims that small short-term abnormal returns are paired with multi-year positive abnormal returns. The reasoning for that is, as Ikenberry et al. (1995) say, that the market treats repurchase announcements with skepticism and because of that the market adjusts slowly.

While the older literature finds positive long-term abnormal performance, more recent studies suggest that the positive abnormal drift is realized mostly on the dates following the repurchase announcement (Bargeron et al., 2017). Fu and Huang (2016) obtain different findings, one of the most interesting being that the long-term post-announcement abnormal returns have disappeared for recent repurchases. A global study, conducted by Manconi et al. (2019), suggests that those long-term abnormal returns still exist.

I study open-market share repurchase program announcements from 1990 to 2020 in Western Europe. I examine short-term abnormal returns around the event and long-term performance following the announcement. Additionally, I obtain cross-sectional regressions on short-term cumulative abnormal returns (CARs) with the firm and repurchase characteristics to better understand the motives behind share repurchases.

I find statistically significant positive short-term and long-term CARs, 1.06% and 14.2% respectively. The motives include two topics: 1) signaling of undervaluation and 2) agency theory. These theories have prior background in literature, but without a clear winner in the explanations. I find some evidence favoring the signaling theory, but also factors against it.

My contribution to the topic is to use data from 1990 to 2020 and examine the development of short-term and long-term CARs. Except for the global study made by Manconi et al. (2019), short-term and long-term CARs have been studied, but not simultaneously in the Western European scheme. Additionally, I try to bring insight into the motives behind the most recent announcements. The rest of this paper is constructed as follows: Section 2 reviews the relevant theory and literature, Section 3 considers the hypotheses development, Section 4 describes the data, Section 5 views the methods in use, Section 6 discusses the results and Section 7 concludes.

2. Literature review

The review is divided into two sections. First, I will focus on the theoretical side of share repurchases, and then view the empirical evidence from prior literature.

2.1. Motivations behind share repurchases

Modigliani and Miller (1961) claim that under perfect capital markets, a firm's payout policy has no impact on its value. The well-known theorem is usually called the capital structure irrelevance principle. In that universe, a dividend and a share repurchase have an equal effect on shareholder's cash-flow rights. If the Modigliani and Miller universe were the actual reality, the discussion on the abnormal returns around a share repurchase would not exist.

Many motives for share repurchases have been found and discussed thoroughly in prior literature[1]. Multiple factors may come to play at any given time for just a single firm. Dittmar (2000) concludes a few of the many reasons: stock being potentially undervalued, to distribute excess cash, increase the firm's net leverage, fend off takeover attempts, and counter the dilution of effects of

[1] Dittmar (2000), Chan et al. (2004) and Zhang (2005), among others

stock options. My paper focuses on the first two: Signaling undervaluation and distributing the excess cash, i.e. agency theory.

The traditional signaling hypothesis is one of the most reviewed theories to explain management's decision to repurchase shares. Information asymmetry between a firm's insiders and outsiders is the key element behind the hypothesis (Spence, 2002). The management has better knowledge of a firm's prospects and current competitive position, which may result in disagreement with the market's view on the valuation of the firm's equity.

If the management thinks that their stock is undervalued, executing a share repurchase is a credible middle-ground method to signal the mismatch in views between the management and the market (Vermaelen, 1984). It is considered as the main reason for a management team to pursue a share repurchase by many of the academics and the CEOs, according to a survey made by Harvey et. al (2005). It would not be a surprise if there is upward shit in the firm's stock price after an announcement of share repurchase to correct the potential mispricing.

Not all repurchase programs are realized, which casts some doubt on the signaling credibility of the repurchase programs. Ikenberry et al. (1995) state that it would not seem plausible for managers to have the ability to see valuation errors of 3%, which is the magnitude of the announcement returns in the US at that time, and react to these errors. It might be the case that managers are not signaling for undervaluation but a change in the firm's prospects as proposed by Barth and Kasznik (1999).

Another potential view on the motives is the distribution of excess cash. The share repurchase is a great substitute for a dividend payment when the amount of excess cash is uncertain. The market usually reacts positively when excess cash is distributed to shareholders, because of the diminishing opportunity for managers to fall victim to the Free Cash Flow problem (Jensen, 1986). Jagannathan et al. (2000) document that repurchases do not mandate firm commitment, whereas dividends are often expected to occur regularly. The authors also conclude that dividends are usually the distribution of permanent excess cash balance and repurchases are more likely caused by temporal excess cash balance. Strengthening the point that shareholders expect to receive dividends on a usual basis, forming a major part of its payout policy for some firms, where news regarding share repurchases are positive uncommon occasions.

Grullon and Michaely (2002) raise the dividend substitution hypothesis when dividends and capital gains taxation differ. They argue that the increasing number of share repurchases is possibly driven by the learning curve in firms' understanding that shareholders are better off with whichever method of distributing profits, repurchases or dividends, has preferable taxation. At the time of that study, the U.S. investors had an advantage in the form of looser taxation on long-term capital gains. Furthermore, empirically, the share repurchase activity has faced an upward shift, which can be also explained by the adoption of the rule 10b-18. Rule 10b-18 is a safe harbor provision for the companies if certain conditions are met. In the case of share repurchases, an issuer must provide information regarding the manner, timing, volume, and price of repurchases if they want to reduce their regulatory liability. Most of the prior, similar studies have been made in a single country, or in the United States, where the treatment is nowadays the same. Within Western Europe, tax treatment varies most in the UK.

According to Manconi et al. (2019), share repurchases may be caused by takeover activity. A firm with a high risk of being acquired might want to have additional voting power against hostile acquirers. The authors do not find first-hand evidence that the long-term abnormal performance could be driven by the decrease in takeover risk, but it is a valid rationale to keep in mind. Furthermore, Lee et al. (2020) argue managers could be self-interested or subject to managerial-hubris. Meaning that the managers announce share repurchases to benefit themselves, i.e. by equity-linked compensations, or that they are over-optimistic of the firm's value.

2.2. Related empirical evidence

Empirical literature offers insight into the topic in terms of long-term and short-term effects. First, I review the short-term effects of share repurchases from previous research in this matter. Next, I examine the empirical studies regarding the long-term effects.

Share repurchase research can be categorized into two different branches: studies that focus on repurchase program announcements, and those that focus on actual share repurchases. Most of the literature focuses on share repurchase announcements and not as much on actual share repurchases. This is mostly due to the reporting standards where information of a single repurchase activity may not be recorded. This paper examines share repurchase program announcements, but I see it useful to review both branches, since it gives better knowledge of the mechanisms driving the phenomenon. Table 2.1. provides a non-exhaustive select series of prior studies considering both branches, summarizing the empirical evidence.

Table 2.1. Results from prior literature
The table presents a non-exhaustive list of selected and significant studies within the context of this paper. CARs are cumulative abnormal returns around an announcement, or a share repurchase event. The table is partly adopted from Bratli and Rehman (2015) and further filled with relevant studies. Panel A shows literature regarding program announcements and Panel B concerns actual repurchases.

Panel A: Share repurchase programs

Nation	Authors	Sample period	Obs.	Announcement Window	CAR
The U.S.	Ikenberry et al. (1995)	1980-1990	1239	(-2, +2)	3.54% ***
	Stephens & Weisbach (1998)	1981-1990	450	(-1, +1)	2.69% ***
	Grunnon & Michaely (2002)	1972-2000	3935	(-1, +1)	2.57% ***
	Chan, Ikenberry, & Lee (2004)	1980-1996	5508	(-2, +2)	2.18% ***
	Lie (2005)	1981-2000	4729	(-1, +1)	3.00% ***
	Peyer & Vermaelen (2005)	1984-2001	737	(-1, +1)	2.39% ***
	Lee, Park, & Pearson (2015)[2]	2007-2011	2395	(-2, +2)	1.37% ***
The U.K.	Rau & Vermaelen (2002)	1985-1998	264	(-2, +2)	1.08% ***
Canada	Li & McNally (2003)	1989-1992	329	(-1, +2)	0.92%
Germany	Andriosopoulos & Lasfer (2015)	1997-2006	194	(-1, +1)	2.32% ***
France	Ginglinger & L'her (2006)	1998-1999	363	(0, +1)	0.57% **
Australia	Ramsay & Lamba (2000)	1989-1998	136	(-1, +1)	2.81% ***
Japan	Zhang (2002)	1995-1999	72	(-1, +2)	4.58% ***
Sweden	Råsbrant (2013)	2000-2009	126	(0, +1)	1.94% ***

Panel B: Actual share repurchases

Nation	Authors	Sample period	Obs.	Announcement Window	CAR
Hong Kong	Zhang (2005)	1993-1997	800	(0, +2)	0.43% ***
Australia	Akyol & Foo (2012)	1998-2008	927	(0, +1)	0.43% ***
Norway	Skjeltorp (2004)[3]	1998-2002	100	(-1, +1)	0.88% ***
Norway	Bratli & Rehman (2015)	2005-2014	819	(0, +1)	0.47% ***

[2] Lee et Al. (2016) included sub-periods for 1994-2001 & 2002-2006, finding CARs of 2.01%*** and 1.20%, respectively.

[3] Skjeltorp (2004) found only the first repurchase event to have significantly higher positive abnormal returns.

There are consistent patterns that can be found in the existing literature. First, the vast majority of these studies are done using U.S. data. Secondly, it comes as no surprise at this point to find abnormal returns around an announcement of the share repurchase program. The European markets are not as studied, since many of the countries prohibited share repurchases similarly to rule 10-18b in the US and the majority of the studies focus on a single country. Since the models may vary a lot depending on the event study setting, comparing the presented CARs in the table above is nonideal.

For this thesis, the most relevant reference was conducted by Andriosopoulos and Lasfer (2015). They assess the market reaction for France, the UK, and Germany, finding announcement returns of 0.80%, 1.68%, and 2.32%, respectively. They failed to reject the hypothesis that implementation of the Market Abuse Directive would lower the announcement returns, indicating that added regulations do not control the market behavior regarding the share repurchase announcements. The tax treatment does not seem to explain CARs, since the tax differential explanatory variable provides mixed results. Finally, dividends and share repurchases are seen as independent from each other, indicating that the dividend substitution hypothesis might not explain their results.

Recent scrutiny around the topic is that share repurchase programs are announced without firms engaging in repurchases. The required information provided with share repurchase announcements is incomplete for investors to make any assumptions for causes, leading to a situation where the potential signal of undervaluation cannot be correctly distinguished. Furthermore, the increase in repurchase programs raises the question of whether executives aim for short-term gains rather than complete value creation for the company. Voth (2018, p. 57) argues that share buybacks should be prohibited by law, decreasing the opportunity for managers to manipulate the market. In the non-U.S. markets, the repurchase announcements are required to be explicitly authorized by shareholders, which could explain the smaller short-term CARs in European markets.

The latest relevant study of long-term performance was done by Manconi, Peyer, and Vermaelen (2019). It covers 31 non-U.S. countries with 9 034 repurchase announcements. The authors try to find an anomaly under the Efficient-market hypothesis using international data to detect whether long-term excess returns can be found in a such broad sample. They find cumulative abnormal returns using Returns Across Time and Securities-method ranging from 21% to 32% over a 48-month period and calendar-time alphas of approximately 28%-42%. Noting that share repurchase program announcements are unequal, initial undervaluation and executives' ability to time the market varies across securities. In conclusion, the results suggest that any real negative consequences (i.e. underinvestment) associated with the share repurchase are smaller than the initial undervaluation. They also argue that a reduction in risk of being acquired might explain long-term abnormal returns, and thus share repurchases do not create “value”.

3. Hypothesis

The purpose of this paper is twofold. First, I test whether there is positive short-term price impact and see whether a firm’s characteristics explain the CARs. Second, I examine whether the announcements carry long-term abnormal performance, taking a stand on managerial timing ability and signaling of undervaluation issue in extent. The literature review provides a basis to develop the following structure for testable hypotheses.

3.1. Hypotheses regarding the short-term impact

Table 2.1. collects relative studies on the topic and shows significant abnormal returns around an announcement. To contribute to the prior studies, I form the following hypotheses:

H0: There is no positive price impact on the announcement day of a share repurchase.

H1: There is a positive price impact on the announcement day of a share repurchase.

If the null hypothesis is rejected, I proceed to try to understand which motives would drive the abnormal returns. I form the following auxiliary hypotheses similarly to Bratli and Rehman (2015) to achieve the goal:

H1.1: The signaling hypotheses explains the positive announcement returns.

The most quoted reason for share repurchases is the management’s attempt to signal undervaluation to the market. Similarly to Chan et al. (2004), I use firm and repurchase characteristics, such as size, intangibles-to-assets ratio, repurchase size, market-to-book ratio, and preceding cumulative abnormal returns, to explain the extent of the signaling of undervaluation in event window CARs.

Smaller firms are subject to larger information asymmetry and are therefore are more likely to be mispriced than larger firms (Vermaelen, 1981). Thus, I expect the firm's size to have a negative impact on the announcement returns. Repurchase size is to capture the credibility of the undervaluation signal; however, it could be included in hypothesis H1.2, but Chan et al. (2004) argue that it is most consistent with the signaling hypothesis. I expect the initial price impact to be positively impacted by the announced repurchase size. According to Dittmar (2000), high market-to-book ratio firms (growth firms) are less likely subject to undervaluation than low market-to-book firms (value firms). Therefore, I expect a negative relation between market-to-book ratios and announcement day abnormal returns. The intangibles-to-assets ratio is in line with Barth and Kasznik (1999), who argue that firms with a higher ratio in intangibles are faced with larger information asymmetry, which generates more uncertainty about the value of the firm. Thus, I expect the intangibles-to-assets ratio to have a positive impact on announcement returns. Following Lee et al. (2020), I include a dummy variable for subsequently announcing firms to check if the signaling strength decreases for repeaters. Additionally, the authors argue that repeaters may be subject to managerial hubris or self-interest. Finally, Zhang (2005) finds that firms have negative performance preceding the purchase. I assume that this holds also in the case of announcements, where management is more likely to announce a share repurchase program due to undervaluation when their stock is continually getting beaten by the market. I expect pre-cumulative abnormal returns to have a negative relation with price impact on the announcement day.

H1.2: The agency costs explain the positive price impact.

Jensen (1986) argues that firms with an excess cash balance face agency conflict. The issue emerges due to self-interested managers who use the financial slack to their benefit. Managers can tax-efficiently cut the slack to avoid such conflicts via share repurchase. Following Fenn and Liang (2001), I use EBITDA less CAPEX as a proxy for free cash flow. I expect this coefficient to have a positive impact on the returns, to reflect that announcements are attempts to distribute the temporary excess cash balance. Firms with a lower return on assets (ROA) are expected to have a positive impact on announcements of share repurchases, indicating that firms without new and attractive investment opportunities are better off distributing their wealth to shareholders (Hatakeda & Isagawa, 2004). On a similar note, firms with high ROA are expected to have lower announcement day abnormal returns, thus I expect to have a negative coefficient for ROA.

Table 3.1. Variables and predictions based on hypotheses

Explanatory variables categorized by the corresponding hypothesis and predicted sign of the coefficient

Variable	Predicted coefficient	Hypotheses
Firm size	Negative	H1.1: Signaling of undervaluation
Repurchase size	Positive	
Market-to-book	Negative	
Intangibles-to-assets	Positive	
Prior performance	Negative	
Repeater	Negative	
Free Cash Flow	Positive	H1.2: Agency costs
ROA	Negative	

Each auxiliary hypothesis is paired with a null hypothesis, which states that a given phenomenon does not explain the positive price impact on the announcement day. Table 3.1. summarizes each presented variable above and predictions regarding the coefficients.

3.2. Hypotheses regarding the long-term effects

The market timing hypothesis claims that managers are able to time the market by using share repurchases when stock is perceived to be undervalued to benefit the firm's long-term shareholders. It focuses more on when rather than why firms repurchase their shares (Manconi et al., 2019). Under the hypothesis, I expect to find positive abnormal returns following an announcement. The examination of long-term abnormal returns contributes mostly to the signal of the undervaluation issue. In a way, it forms an additional check to see whether shareholders are in fact prone to the underreaction hypothesis, i.e., receiving the signal of undervaluation with skepticism. The final hypotheses are as follows:

H0: Firms announcing repurchase programs do not experience positive long-term abnormal returns.

H2: Firms announcing repurchase programs experience positive long-term abnormal returns.

4. Data description

In this section, I provide a descriptive summary of the open-market share repurchase announcements from 1990 to 2020 in Western-Europe (Austria, Belgium, France, Germany, Luxemburg, Netherlands, Switzerland, and the UK). Repurchase announcements data is collected using the Thomson Reuters Refinitiv Eikon M&A module and daily stock prices using Eikon time-series data.

I find 2040 unique announcements within the period. However, only 1663 of the announcements are available with a firm identifier sufficient for gathering time-series data of the prices. I require over 50% data availability for the estimation window (120 trading days before the event), ending up with 1526 announcements. Finally, I exclude the observations that do not have data for the event window (-10, +10) days completely, resulting in 894 announcements.

Table 4.1. Summary of filtered announcements in Western Europe during 1990-2020
The table provides descriptive statistics of the filtered announcements in Western Europe during 1990-2020. Repeaters are defined as firms who subsequently announce repurchase programs within 5-year window.

Panel A: General info	
Total No. Of announcements	894
Individual Companies	626
No. Repeaters	157
Average repurchase size ($M)	728.46
Average % of shares sought	14.9 %
Panel B: Announcements per Nation	
France	276
United Kingdom	175
Germany	172
Switzerland	110
Netherlands	82
Belgium	37
Austria	30
Luxembourg	12

Repeaters are defined as firms who subsequently announce repurchase programs within a 5-year window. Firms with multiple events might be categorized as repeaters for a given event if there is another event within 5 years, but not as repeaters for non-subsequent events, which makes the approach consistent with Lee et al. (2020).

Cross-country examination of abnormal returns around an announcement comes with a couple of advantages. Firstly, most of the prior studies focus on a single country, which leaves room for country-specific factors (e.g. quality of governance and regulation) to affect the excess returns. Secondly, I am able to document the existence of the anomaly in European markets by including the largest marketplaces in Europe.

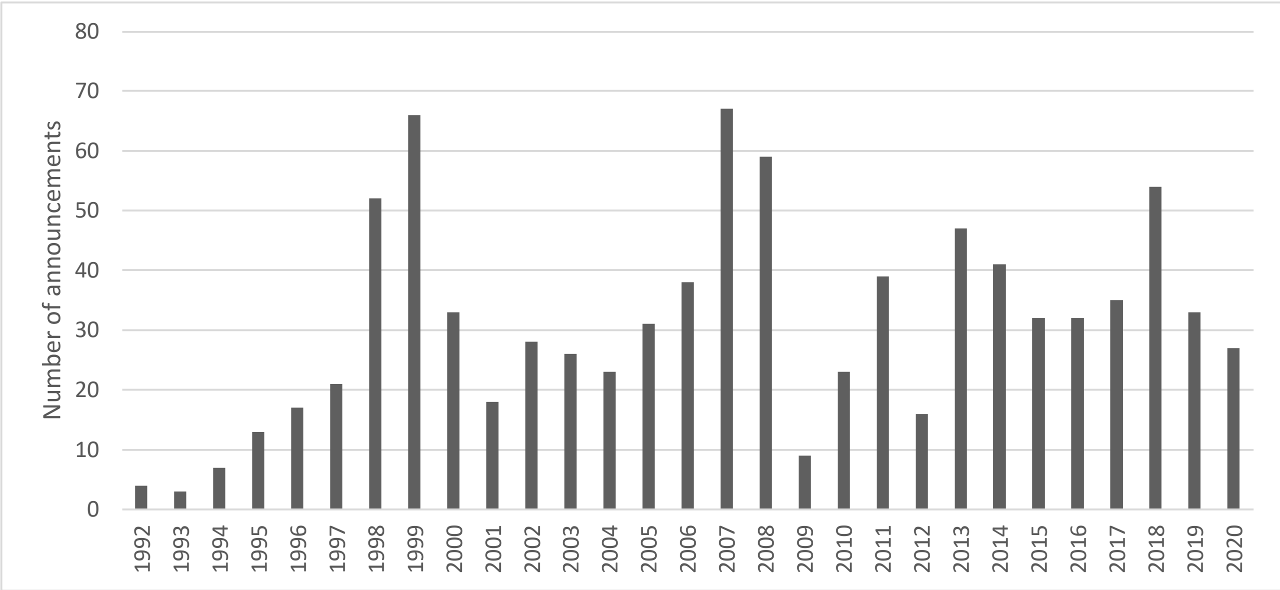

Figure 1 Yearly distribution of announcements

Similarly to Lee et al. (2020), I divide my sample into three subperiods: 1990-1999, 2000-2009, and 2010-2020, with 183, 332, and 379 announcements, respectively. Splitting up the whole period into three smaller categories is essential to examine the development of CARs and simultaneously examine the motives for share repurchases. The 1990-1999 subperiod mostly contains only announcements from the UK and Switzerland since the other countries were heavily regulated on share repurchases (e.g., France and Germany relaxed their regulations in 1998).

Table 4.2. presents descriptive statistics regarding accounting and repurchase characteristics data in use. Initial announcement return (CAR(-1, +1)) is the cumulative abnormal return -1 to +1 days around the event. Firm size (SIZE) is the natural logarithm of the firm's market capitalization. Prior performance (PRECAR) is the cumulative abnormal performance from 60 to 20 days before the event. Return-on-assets ratio (ROA) is the firm's net income divided by total assets. Market-to-book ratio (MTB) is the market capitalization divided by total assets. Intangibles-to-assets ratio (INTANG) is the firm's intangible assets divided by total assets. Free cash flow-to-assets (FCF) is calculated by forming a proxy for free cash flow, which is earnings before interest, taxes, depreciation, and amortization less capital expenditures (EBITDA – CAPEX), divided by total assets. Repeaters is dummy variable (REP), where the value is 1 if the firm is considered as repeater, and 0 otherwise. All the columns are winsorized at the 1st and 99th percentile.

Table 4.2. Descriptive statistics of a firm and repurchase characteristics

Accounting data for announcing companies are obtained from Thomson Reuters Eikon, dating to the last fiscal year preceding the announcement. CAR(-1,+1) is the calculated announcement window return -1 to +1 days around the announcement, SIZE is the natural logarithm of the firm's market capitalization, PRECAR is -60 to -20 days abnormal performance before the announcement, ROA is the firm's return-on-assets ratio, MTB is the market-to-book ratio, INTANG is the intangibles-to-assets ratio, FCF is proxy for free-cash-flow-on-assets ratio, calculated as (Net income – CAPEX) / Assets, and REP is dummy variable for repeatedly announcing firms. All the columns are winsorized at the 1st and 99th percentile.

	CAR (-1, +1)	SIZE	PRECAR	REPSIZE	ROA	MTB	INTANG	FCF	REP
count	894	828	894	828	831	828	724	743	894
mean	0.01	7.73	-0.01	0.15	0.06	44.29	0.07	0.25	0.17
std	0.06	3.02	0.10	1.51	0.13	360.70	0.10	2.24	0.38
min	-0.43	-1.24	-0.57	0.00	-1.79	-2452.95	0.00	-0.60	0.00
max	0.31	16.35	0.52	43.45	1.39	9076.33	0.89	61.24	1.00

5. Methodology

In this section, I describe the methodologies applied to answer to the hypotheses presented in Section 3. First, I present the standard approach for the event study methodology to analyze the price impact around an announcement of a share repurchase. Second, I show the cross-sectional regressions which are used to analyze the motives behind share repurchases. Finally, I present the framework and models used to examine long-term abnormal performance.

5.1. Short-term abnormal returns

I use a method similar to what was proposed by McKinlay (1997) to analyze the price impact on the event day. The main result from the method is the mean of abnormal returns for each event day. I estimate abnormal returns by calculating the expected return for each firm using the market model with a standard ordinary least squares (OLS) regression, where the single factor is the market excess return. The use of multifactor models at this point would add relatively little explanatory power (MacKinlay, 1997).

I calculate the model parameters by forming an estimation window, which is -151 to -31 days before the event window. My proxy for market returns is Kenneth R. French's European market daily returns[4]. The event window is defined as -10 to +10 from an announcement, totaling 21 days for observing the price movements around the event. Figure 2 illustrates the timing principles of the methodology.

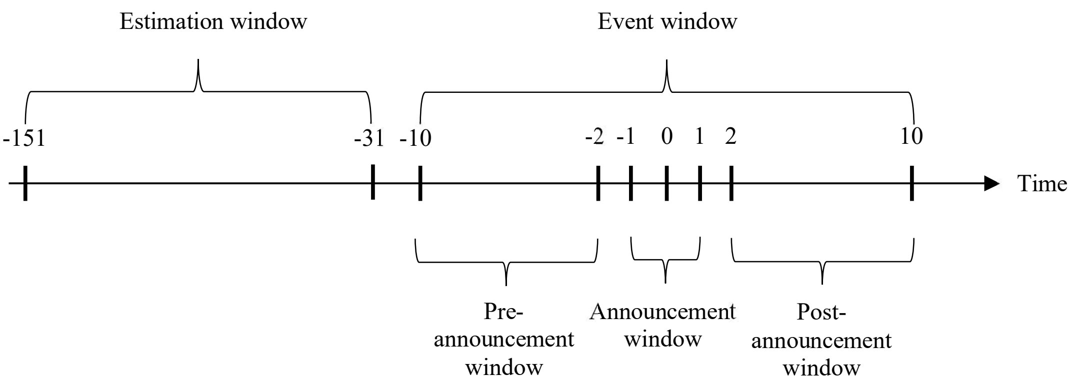

Figure 2 The event study frame

The expected daily returns are defined by the market model:

$$E\left(R_{i,t}\right) = \hat{\alpha}_i + \hat{\beta}_i R_{m,t}$$

Where $E(R_{i,t})$ is the expected return of stock i at day t, $R_{m,t}$ is the market return (European market portfolio) at day t, $\hat{\alpha}_i$ and $\hat{\beta}_i$ are market-model coefficients for the stock i. After calculating the expected returns for each stock, I compute abnormal returns as follows:

$$AR_{i,t} = R_{i,t} - (\hat{\alpha}_i + \hat{\beta}_i R_{m,t})$$

Where $AR_{i,t}$ is the abnormal return of stock i at day t, $R_{i,t}$ is the stock's actual return at day t and in the parentheses is the previously calculated expected return for stock i at day t. After calculating the abnormal returns for the event window (-10, +10) for each stock, I can compute the average of Cumulative Abnormal Returns (CARs) for different time periods (i.e. announcement window CAR(-1,+1)) as follows:

$$\overline{CAR}(\tau_1, \tau_2) = \frac{1}{N}\sum_{i=1}^{N}\sum_{t=\tau_1}^{\tau_2} AR_{i,t}$$

Where $\overline{CAR}(\tau_1, \tau_2)$ is the average of CARs from τ_1 to τ_2, N is the number of events, and $AR_{i,t}$ is the stock i's abnormal return at day t. Under the null hypothesis H0 presented in Section 3, I test whether there are statistically significant average CARs in the announcement window. Statistical

[4] French, K., 2020. *Kenneth R. French - Data Library*. [online] Mba.tuck.dartmouth.edu. Available at: <https://mba.tuck.dartmouth.edu/pages/faculty/ken.french/data_library.html> [Accessed 1 October 2020].

significance tests are calculated as proposed by Brown and Warner (1985) for average ARs ($\overline{AR}$). For the average of CARs ($\overline{CAR}$), I use the event study t-test proposed by Brown and Warner (1980).

T-statistic to test significance of average abnormal returns: $t_{\overline{AR}_\tau} = \frac{\overline{AR}_t}{\sqrt{\frac{s^2_{\overline{AR}_\tau}}{n}}}$

$$\text{where } s^2_{\overline{AR}_\tau} = \frac{1}{n-1}\sum_{i=1}^{n}(AR_{i,t} - \overline{AR}_t)^2$$

T-statistic to test significance of average cumulative abnormal returns: $t_{\overline{CAR}(\tau_1,\tau_2)} = \frac{\overline{CAR}(\tau_1,\tau_2)}{\hat{\sigma}_{\overline{CAR}(\tau_1,\tau_2)}}$

$$\text{where } \hat{\sigma}_{\overline{CAR}(\tau_1,\tau_2)} = \sqrt{\frac{1}{n(n-d)}\sum_{i=1}^{n}(CAR_{(\tau_1,\tau_2)} - \overline{CAR}_{(\tau_1,\tau_2)})^2}$$

5.2. Cross-sectional Regressions

Cross-sectional regressions are made to test the auxiliary hypotheses H1.1 and H1.2, aiming to understand the motives behind repurchases. I continue with MacKinlay's (1997) approach to regress firm-specific CARs with fundamental data:

$$CAR_i(\tau_1,\tau_2) = \alpha + \beta_1 SIZE_{i,\tau_i} + \beta_2 REPSIZE_{i,\tau_i} + \beta_3 MTB_{i,\tau_i} + \beta_4 INTANG_{i,\tau_i} + \beta_5 PRECAR_{i,\tau_{1-k}} + \beta_6 FCF_{i,\tau_i} + \beta_6 ROA_{i,\tau_i} + \beta_7 REP_{i,\tau_i} + IND_{Dummy} + NAT_{Dummy} + \varepsilon_{i,t}$$

Where α is the intercept symbol, $CAR_i(\tau_{1,}\tau_2)$ is Cumulative Abnormal Return for stock i between τ_1 to τ_2, $\text{IND}_{\text{Dummy}}$ is the industry dummy for stock i, $\text{NAT}_{\text{Dummy}}$ is the country dummy for stock i, and other variables are specified in Table 5.2.

Table 5.2. Cross-sectional regression variables
Variables considered in the cross-sectional regressions listed and defined.

Variable	Definition
SIZE	Natural logarithm of a firm's market capitalization
REPSIZE	Repurchase size: % of total shares
MTB	Market-to-Book Ratio
INTANG	Intangibles-to-Assets Ratio
PRECAR	-60 to -20 days cumulative abnormal performance
FCF	Proxy for Free Cash Flow-to-assets: (EBIT - CAPEX) / Total Assets
ROA	Return-on-Assets Ratio
REP	Dummy variable: 1 if the firm is a repeater, otherwise 0

5.3. Long-term performance

More sophisticated models are required to perform a test to examine long-term abnormal returns, thus the use of the presented market model is nonideal. The historical performance of an asset has very little predicting power for the future when there is an event like a share repurchase announcement, therefore I follow Manconi et al.'s (2019) procedure to view long-term performance. I use Ibbotson's (1975) Returns Across Time and Securities (RATS) methodology with post-event estimates to perform analysis of long-term abnormal returns.

RATS allows the use of different sets of regional Fama-French factors, but since the sample is selected from Western European counties I use Kenneth French's[5] European 4-factor market portfolio (Carhart, 1997) as the benchmark. For each month after the announcement τ = 1,...,36, I perform the following regression:

$$R_{i,\tau} - R_{f,\tau} = \alpha_\tau + \beta_{1,\tau}\left(R_{m,\tau} - R_{f,\tau}\right) + \beta_{2,\tau}SMB_\tau + \beta_{3,\tau}HML_\tau + \beta_{4,\tau}MOM_\tau + \varepsilon_{i,\tau}$$

where $R_{i,\tau} - R_{f,\tau}$ is the firms i's excess return on month τ, α_τ is the abnormal return for month τ, and β:s are the factor coefficients. Cumulative abnormal returns are the sum of monthly alphas, e.g. one-year abnormal return is $\sum_{\tau=1}^{12} \alpha_\tau$. Furthermore, the standard error for a certain time window is the square root of the sum of the squares of monthly standard errors (Peyer and Vermaelen, 2009). I also perform analogous regressions for the single-factor (Sharpe, 1963) and 3-factor models (Fama and

[5] French, K., 2020. *Kenneth R. French - Data Library*. [online] Mba.tuck.dartmouth.edu. Available at: <https://mba.tuck.dartmouth.edu/pages/faculty/ken.french/data_library.html> [Accessed 1 October 2020].

French, 1993). The use of different models adds robustness to the examination of long-term performance, however, long-term performance following an event are fundamentally joint tests of market efficiency and the model of expected returns.

6. Results

This section considers my main results for the hypotheses presented using the data and methodologies presented in sections 4 and 5. First, I present the short-term abnormal returns and CARs. Second, I view the cross-sectional regressions and the possible motives behind share repurchases. Finally, I present the findings on long-term performance.

6.1. Short-term abnormal returns: results

Table 6.1. shows event window abnormal returns and CARs over various periods of the full sample. Figure 3 presents the trend for CARs in the event window. Partly in line with prior EU studies (Andriosopoulos and Lasfer, 2015), I find significant negative performance prior to the announcement of -0.56% and a significant positive impact within the announcement window (-1.+1) of 1.06%. Andriosopoulos and Lasfer (2015) find an average CAR(-1,+1) of 1.55% using announcements in the UK, France, and Germany, but no significant negative pre-announcement CARs. US studies suggest that the positive price impact is preceded by negative daily abnormal returns, suggesting that managers usually announce a new repurchase program after poor performance (Ikenberry et al., 1995).

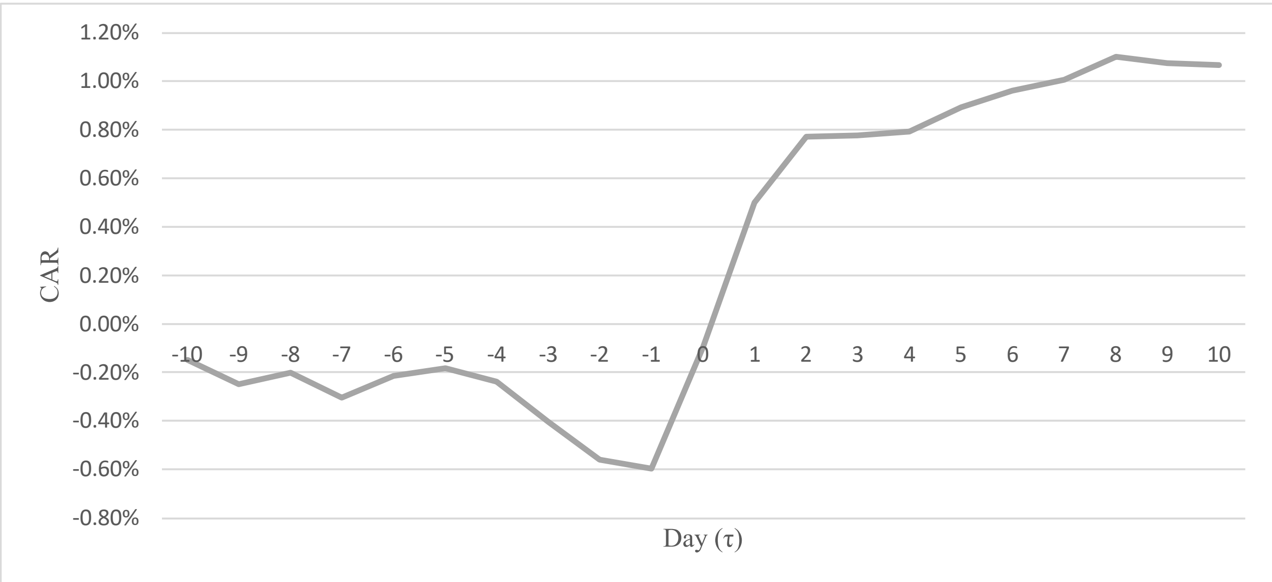

Figure 3 Event window (-10,+10) CAR, full sample.

Table 6.1. Event window averages and CARs

The standard event study method proposed by MacKinlay (1997) is used to obtain abnormal returns. The market portfolio is Kenneth French's European market portfolio. Ordinary Least Square regressions are made to calculate expected returns for each stock -151 to -31 days before the event (Section 5.1. Short-term abnormal returns). AR presents the average abnormal returns for each event day. CAR, cumulative abnormal return, is the sum of ARs given the interval. The sample is formed with 894 announcements during 1990-2020 in Western Europe. ***, **, and * denote statistical significance at the 10%, 5%, and 1% levels, respectively.

Panel A: Average ARs and CARs in the event window

Day	AR (%)	t-stat	CAR (%)
-10	-0.15 %**	-1.98	-0.15 %
-9	-0.10 %	-1.34	-0.25 %
-8	0.05 %	0.66	-0.20 %
-7	-0.10 %	-1.46	-0.30 %
-6	0.09 %	0.92	-0.22 %
-5	0.03 %	0.38	-0.18 %
-4	-0.06 %	-0.80	-0.24 %
-3	-0.16 %**	-2.21	-0.40 %
-2	-0.16 %**	-2.03	-0.56 %
-1	-0.04 %	-0.42	-0.59 %
0	**0.50 %*** **	4.36	-0.09 %
1	**0.59 %*** **	5.33	0.50 %
2	**0.27 %*** **	3.12	0.77 %
3	0.01 %	0.09	0.78 %
4	0.01 %	0.22	0.79 %
5	0.10 %	1.29	0.89 %
6	0.07 %	0.63	0.96 %
7	0.04 %	0.68	1.00 %
8	0.10 %	1.18	1.10 %
9	-0.03 %	-0.36	1.07 %
10	-0.01 %	-0.10	1.07 %

Panel B: CARs over different intervals

Interval	CAR (%)	t-stat
Day -1 to +1	1.06 %***	5.59
Day -2 to +2	1.17 %***	5.21
Day -10 to +10	1.07 %***	2.81
Day -10 to -2	-0.56 %***	-2.68
Day +2 to +10	0.57 %**	2.39

The initial impact of 1.06% in the announcement window is line with the prior literature reviewed in Section 2. On average, I can reject the null hypothesis that there is no positive price impact on the announcement date. The price impact is considerably smaller than found by Ikenberry et al. (1995) in the US and slightly smaller than by Andriosopoulus & Lasfer (2015) in Western Europe (UK, Germany, and France), differences being -2,48% and -0.49%, respectively. However, Lee et al. (2015) find a 1.37% announcement return by using recent announcements in the US, which raises the question of whether the announcement returns are in decline. I examine the price impact across subperiods 1990-1999, 2000-2009, and 2010-2020 in Table 6.2.

The review of subsample announcement returns does not show a decline in CARs as time goes by. I find statistically significant positive announcement returns on subperiods 2010-2020 and 2000-2009 (1.09% and 1.21%), but not in 1990-1999 (0.72%), suggesting that the signal is more responsive in recent years or the latter subsample is more prone to the underreaction hypothesis. However, the variation of announcement returns is rather small and CARs (-2,+2) are within 0.31% from each other, thus there is not much evidence for any specific motive behind share repurchases by only looking at the trend.

Table 6.2. Daily Abnormal returns and CARs split by subperiod

See Section 5.1. "Short-term abnormal returns" for the methodologies applied to derive abnormal returns (ARs) and cumulative abnormal returns (CARs). The table reports average ARs and relevant average CARs for subperiods 2010-2020, 2000-2009, and 1990-1999. The number of observations are as follows 2010-2020: 379, 2000-2009: 334, and 1990-1999: 181. ***, **, and * denote statistical significance at the 10%, 5%, and 1% levels, respectively.

Panel A: Average daily abnormal returns

	2010-2020 (n= 379)		2000-2009 (n=334)		1990-1999 (n=181)	
Day	AR (%)	t-stat	AR (%)	T-stat	AR (%)	t-stat
-10	-0.11 %	-1.06	-0.37 %***	-2.73	0.19 %	1.21
-9	-0.04 %	-0.39	-0.08 %	-0.50	-0.28 %*	-1.88
-8	0.20 %**	1.90	-0.19 %	-1.58	0.17 %	1.09
-7	-0.09 %	-0.95	-0.14 %	-1.02	-0.06 %	-0.45
-6	0.01 %	0.07	0.17 %	0.81	0.11 %	0.59
-5	-0.10 %	-1.22	0.17 %	0.99	0.05 %	0.31
-4	-0.05 %	-0.50	-0.09 %	-0.77	-0.01 %	-0.05
-3	0.02 %	0.18	-0.43 %***	-3.36	-0.07 %	-0.46
-2	-0.31 %***	-2.79	-0.10 %	-0.79	0.08 %	0.48
-1	-0.11 %	-1.29	0.08 %	0.52	-0.09 %	-0.34
0	0.67 %***	4.31	0.36 %	1.88	0.41 %	1.33
1	0.53 %***	3.12	0.77 %***	4.10	0.40 %*	1.67
2	0.22 %**	2.08	0.21 %	1.25	0.49 %***	2.41
3	-0.03 %	-0.24	0.02 %	0.18	0.04 %	0.28
4	0.00 %	-0.01	-0.01 %	-0.09	0.10 %	0.68
5	0.18 %	1.61	0.03 %	0.20	0.07 %	0.37
6	-0.06 %	-0.57	0.18 %	0.71	0.13 %	0.81
7	0.06 %	0.59	0.10 %	0.87	-0.09 %	-0.62
8	0.18 %	1.39	0.10 %	0.69	-0.08 %	-0.61
9	0.13 %	1.03	-0.10 %	-0.76	-0.22 %	-1.56
10	0.03 %	0.26	-0.04 %	-0.30	-0.02 %	-0.12

Panel B: CARs over different intervals

Interval	CAR (%)	t-stat	CAR (%)	t-stat	CAR (%)	t-stat
Day -1 to +1	1.09 %***	4.39	1.21 %***	3.60	0.72 %	1.50
Day -2 to +2	1.00 %***	3.43	1.31 %***	3.19	1.29 %***	2.36
Day -10 to +10	1.31 %***	2.62	0.65 %	0.92	1.33 %	1.56
Day -10 to -2	-0.48 %	-1.84	-1.05 %***	-2.85	0.19 %	0.34
Day +2 to +10	0.70 %**	2.23	0.49 %	1.06	0.42 %	0.91

6.2. Motives behind share repurchases

I regress fundamental information presented in Table 4.2. on announcement returns to find motives behind share repurchases. Table 6.3. shows the coefficients and respective t-stats for the whole sample and each subperiod. In all the cross-sectional regressions presented in Section 6.2., if the exploratory data is unknown, I fill the missing values with column means. The number of NA's are rather small as can be seen in Table 4.2. presented earlier. The approach gives me more observations to examine.

Table 6.3. Cross-sectional regressions on CARs.

The table reports cross-sectional regressions of announcement window CARs on a firm and repurchase characteristics. Table 5.2. defines the explanatory variables in use and table 4.2. describes the data in use. Multicollinearity is not an issue, see Appendix Table A.3. Heteroscedasticity is an issue depending the subsample, see Appendix Table A.5. In case of fundamental data is missing, the NA is filled with the mean of the available data from the sample. T-statistics are below the corresponding coefficient in italic. ***, **, and * denote statistical significance at the 10%, 5%, and 1% levels, respectively.

	All:	2010-2020:	2000-2009:	1990-1999:
Variable	CAR(-1,+1)	CAR(-1,+1)	CAR(-1,+1)	CAR(-1,+1)
SIZE	-0.002**	-0.001	-0.001	-0.005*
	-2.37	*-0.98*	*-0.74*	*-1.77*
REPSIZE	0.001	0.001	0.030	-0.015
	0.54	*0.52*	*1.28*	*-0.38*
MTB	0.000	0.000	-0.000***	0.000
	-1.42	*-1.45*	*-3.01*	*0.24*
INTANG	-0.039	-0.067	-0.063	-0.043
	-1.61	*-2.59*	*-1.26*	*-0.36*
PRECAR	-0.053***	-0.073***	-0.031	-0.114**
	-2.80	*-2.76*	*-1.01*	*-2.30*
FCF	-0.001	0.000	0.043	-0.039
	-0.59	*-0.17*	*1.13*	*-0.56*
ROA	0.004	0.051**	-0.049	0.060
	0.29	*2.50*	*-1.65*	*1.19*
REP	0.001	0.004	-0.005	-0.002
	0.26	*0.60*	*-0.56*	*-0.15*
Intercept	0.029***	0.027***	0.019	0.022
	4.59	*3.40*	*1.42*	*0.88*
Adj. R^2	0.029	0.093	0.071	0.090
Obs.	894	379	332	183
Industry dummies	Yes	Yes	Yes	Yes
Country dummies	Yes	Yes	Yes	Yes

I find prior performance and company size to impact CARs as expected on the full sample level. Smaller firms are more prone to information asymmetries and thus on average, they might be more undervalued than large firms (Grullon and Michaely, 2002). Worse performance preceding repurchase announcement results in larger initial announcement returns. This is consistent with Chan et al. (2004).

The pooled regressions do not provide additional results of significance for the motives. This might be caused by the fact that institutional and legal settings might vary from country-to-country as proposed by Andriosopoulos and Lasfer (2015). As the motives of earlier announcements may be driven by very different reasons than recent events, I am also examining the 2010-2020 announcement returns more closely. Table 6.4. shows cross-sectional regressions for France, UK, and Germany during the years 2010-2020.

Table 6.4. Cross-sectional regressions on CARs, 2010-2020, France, Germany & UK

The table reports cross-sectional regressions of announcement window CARs on a firm and repurchase characteristics. Table 5.2. defines the explanatory variables in use and Table 4.2. describes the data in use. Multicollinearity is not an issue, see Appendix Table A.3. Heteroscedasticity is an issue depending the subsample, see Appendix Table A.5. In case of fundamental data is missing, the NA is filled with the mean of the available data from the sample. Column "Combined" includes all the 2010-2020 announcements in France, the UK, and Germany. T-statistics are below the corresponding coefficient in italic. ***, **, and * denote statistical significance at the 10%, 5%, and 1% levels, respectively.

	Combined:	France	Germany	UK
Variable	CAR(-1,+1)	CAR(-1,+1)	CAR(-1,+1)	CAR(-1,+1)
SIZE	0.002**	0.002	-0.002	-0.004
	2.40	*1.57*	*-0.76*	*-1.29*
REPSIZE	0.001	-0.047**	0.000	-0.131
	0.87	*-2.37*	*0.31*	*-1.39*
MTB	0.000	0.001	-0.001	0.000
	-0.61	*0.91*	*-0.85*	*1.27*
INTANG	-0.047*	-0.055**	-0.102	-0.097
	-1.82	*-2.32*	*-0.93*	*-1.70*
PRECAR	-0.076	0.003	-0.097	-0.306***
	-2.65	*0.13*	*-1.27*	*-2.92*
FCF	0.000	-0.013	0.001	-0.117
	0.08	*-0.49*	*0.29*	*-1.39*
ROA	0.044**	0.049**	0.074	-0.017
	2.11	*2.59*	*0.92*	*-0.17*
REP	-0.001	-0.015***	0.026	0.041*
	-0.17	*-2.66*	*1.35*	*1.91*
Intercept	-0.007	0.001	0.026	0.087
	-0.94	*0.08*	*1.11*	*2.21*
Adj. R^2	0.056	0.201	0.000	0.126
Observations	267	143	69	55
Industry dummies	No	No	No	No

The cross-sectional regressions provide mixed results. The model does not seem to explain the CARs in Germany but does a decent job for announcements in France and the UK. I find statistically significant positive coefficient of 0.002 for SIZE in 2010-2020 for France, UK, and Germany. This is inconsistent with the findings in Table 6.3. In France, repurchase size receives a negative coefficient, which is not expected by the hypothesis and prior studies (Bratli and Rehman, 2015). Repurchase size in this matter is not an indicator of signaling strength. Continuing with the findings in France, I find statistically significant coefficient of -0.015 for REP. Repeaters face smaller announcement returns, indicating that first-time announcers could have a larger signaling value (Andriosopoulos and Lasfer, 2015) or they are more prone to non-fundamental hypotheses e.g. managerial self-interest (Lee et al., 2020). Intangibles-to-assets ratio's negative coefficient would suggest that the asset structure does not capture the degree of information asymmetry between shareholders and executives as proposed by Barth and Kasznik (1999). The negative coefficient of -0.306 for PRECAR in the UK is in line with the full sample examination and findings of Bratli and Rehman (2015) with the share repurchases in Norway.

Considering the agency theory hypothesis, the evidence shows that the explanatory variables do not meet the expectations, since I find statistically significant positive coefficients (0.049) for ROA in the combined sample (UK, France, Germany). Return-on-assets does not predict the investment opportunity explanation, where firms with larger ROA may have more attractive positive net-present-value projects as an option for distributing cash. Firms with high free cash flow might be subject to agency issues, however, my evidence shows no significant coefficients in favor of the motive proposed by Fenn and Liang (2001).

For each cross-sectional regression, a multicollinearity and heteroscedasticity are tested. Appendix Table A.3. considers the multicollinearity issue (O'Brien, 2007) and Appendix Table A.5. the heteroscedasticity issue (White, 1980 & Breusch and Pagan, 1979). In general, multicollinearity is not a problem, but depending on the regression, heteroscedasticity may be one.

Finally, the prior studies, e.g. Bratli and Rehman (2015) & Andriosopoulos and Lasfer (2015), have similar struggles to find significant results for motives behind share repurchases. The reasons why the market appreciates different share repurchase announcements more than others remain unclear.

6.3. Empirical long-term performance following announcements

This section considers the evidence for long-term abnormal returns following the announcement of share repurchase programs. Figure 4 presents the cumulative abnormal returns for each subperiod (sum of alphas) based on monthly regressions. Table 6.5. shows 12-, 24-, and 36-month alphas and t-stats over subperiods and the three largest countries in my sample: France, UK, and Germany. In Table 6.5. 114 announcements during late 2017 and 2020 got excluded since the 3-year returns are not yet realized.

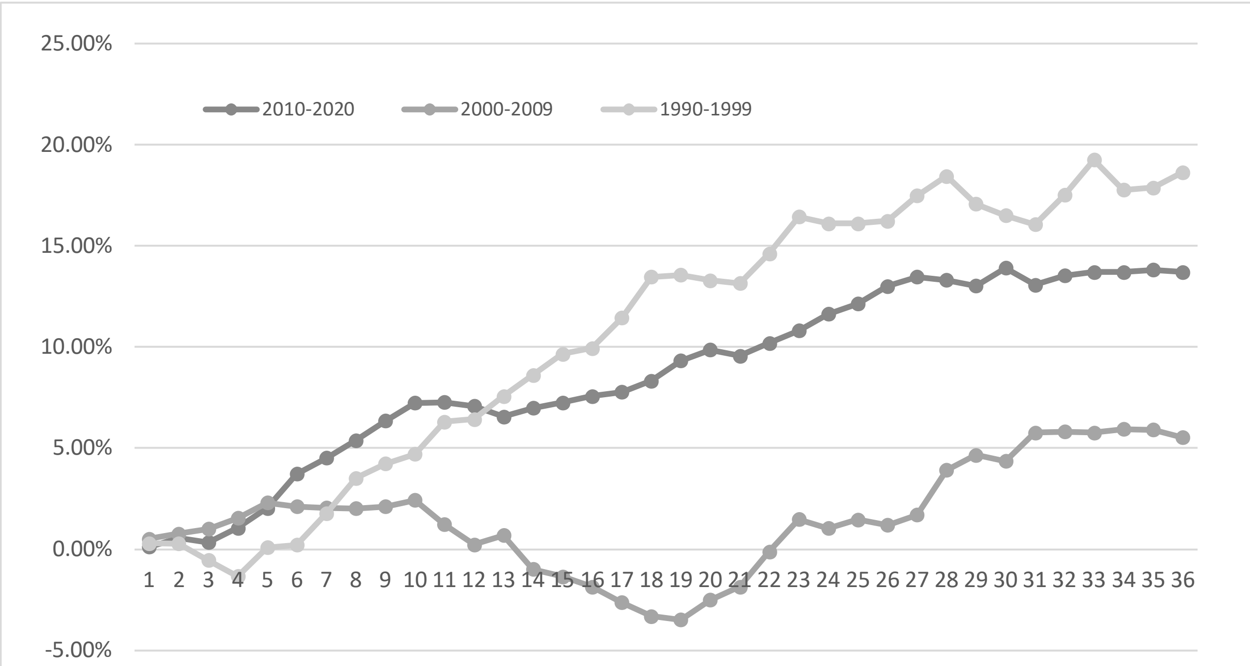

Figure 4 Long-term CARs over subperiods

The long-term abnormal returns are largest in the 1990-1999 period (4-factor 36-month CAR of 18.6%), suggesting that share repurchases were a larger anomaly in the past. Interestingly, I find nonsignificant 36-month average CAR of 5.5% using four-factor model during 2000-2009, which is not in line with Manconi et al. (2019) who find a 36-month alpha of 12.13% in Europe using announcements from 1999 to 2010 with the same model. However, this could be driven by the fact that my sample consists only of Western European firms, which seem to face lower long-term alphas than for example Nordic firms.

In general, the more sophisticated models show larger alphas than the single-factor model. The 14.2% four-factor 36-month alpha for the full sample is consistent with Peyer and Vermaelen (2009) who find an alpha of 18.6% by using a similar approach. Country-level alphas are in the same order of magnitude as Manconi et al. (2019) in Germany and the UK, but the deviation in France is +14.37% with larger alphas on my side.

Table 6.6. Long-term abnormal returns (RATS)

The table presents post-event long-term abnormal performance for Western European 780 share repurchase announcements from 1990 to 2017, 114 announcements during late 2017-2020 got excluded since the 36-month returns have not all realized yet. Section 5.3. describes the methodologies in use. Returns are obtained using the Thomson Reuters Eikon monthly time-series data. Observations with a single missing return are dropped. FF4 denotes Carhart's (1997) four-factor model, FF3 denotes Fama and French's (1993) three-factor model, and Single denotes Sharpe's (1963) single-index model. The number of observations is in the parentheses under the corresponding sample. ***, **, and * denote statistical significance at the 10%, 5%, and 1% levels, respectively.

		12-months		24-months		36-months	
	Model	Alpha (%)	t-stat	Alpha (%)	t-stat	Alpha (%)	t-stat
Panel A: Full sample							
Full Sample (n = 780)	Single	2.6 %**	2.43	6.4 %***	4.32	7.8 %***	4.28
	FF3	1.7 %	1.55	5.0 %***	3.34	5.4 %***	2.93
	FF4	4.6 %***	4.15	10.1 %***	6.56	14.2 %***	7.37
Panel B: Different time periods							
2010-2017 (n = 265)	Single	7.7 %***	4.98	12.9 %***	6.28	15.4 %***	5.95
	FF3	6.3 %***	3.94	10.7 %***	5.07	12.1 %***	4.55
	FF4	7.1 %***	4.19	11.6 %***	5.17	13.7 %***	4.81
2000-2009 (n = 332)	Single	-3.4 %*	-1.85	-4.5 %*	-1.72	-3.0 %	-0.96
	FF3	-2.7 %	-1.37	-4.5 %*	-1.67	-3.9 %	-1.22
	FF4	0.2 %	0.11	1.0 %	0.37	5.5 %*	1.69
1990-1999 (n = 183)	Single	8.0 %***	3.61	15.3 %***	5.01	14.9 %***	3.77
	FF3	6.1 %**	2.53	15.0 %***	4.50	13.1 %***	3.01
	FF4	6.4 %***	2.61	16.1 %***	4.71	18.6 %***	4.12
Panel C: Different countries							
France (n = 245)	Single	11.4 %***	5.64	17.5 %***	6.80	18.7 %***	6.04
	FF3	8.1 %***	3.79	13.4 %***	4.92	13.9 %***	4.24
	FF4	10.2 %***	4.48	16.6 %***	5.79	21.5 %***	6.23
Germany (n = 148)	Single	-3.0 %	-1.04	-6.5 %	-1.58	-7.2 %	-1.42
	FF3	-2.5 %	-0.84	-3.1 %	-0.74	-3.7 %	-0.71
	FF4	4.6 %	1.51	7.2 %*	1.66	11.3 %**	2.10
UK (n = 155)	Single	-3.2 %	-1.54	3.2 %	1.02	7.0 %*	1.81
	FF3	-2.5 %	-1.19	3.6 %	1.12	5.0 %	1.29
	FF4	0.0 %	0.01	8.7 %***	2.65	12.1 %***	2.98

Looking at the returns in 2010-2017, I find all the models resulting in positive long-term abnormal performance at the 1% significance level. The abnormal performance has not vanished as proposed by Fu and Huang (2016), and the results are consistent with Manconi et al. (2019). The takeover activity hypothesis is credible explanation to understand the anomaly. As I am considering the signaling undervaluation question, the results give evidence also for the signaling hypothesis after considering the possible underreaction to the initial announcement. However, my examination exceeds only to the managers' market timing ability.

The results suggest that long-term abnormal returns are an anomaly under the efficient market hypothesis in Western European countries. Short-term CARs combined with positive long-term abnormal performance indicate that managers can time the market and the signal of undervaluation may be the answer to these abnormalities. The underreaction hypothesis might explain the slow adjustment to the manager's signal and therefore it would be feasible to see long-term abnormal returns. The findings are consistent with a large number of studies, but also against some, such as the findings of Zhang (2005), and Bratli & Rehman (2015).

7. Conclusions

In this paper I study the short- and long-term performance following open-market share repurchase program announcements. My data is constructed from 1990-2020 using announcements in Western Europe. The initial impact of share repurchase announcements in Western Europe is evident and consistent with prior literature. Explanations for such appreciation in a firm's stock have a strong background, but there is no clear winner. I try to use multiple proxies for signaling of undervaluation and checks for agency theory but fail to find unambiguous insight on the explanations behind the announcement returns.

As stated, the explanatory variables are only proxies to find evidence for the corresponding theory. Prior poor performance predicts larger announcement returns and subsequent announcers face lower announcement returns. Both findings are consistent with the signaling undervaluation theory. Evidence against the theory is also present. The amount of intangible assets on a firm's balance sheet does not seem to strengthen the indicator of information asymmetries and therefore does not explain the larger announcement returns in my sample. Finally, the repurchase size of the announced program does not seem to define the signaling strength, as the smaller repurchase programs receive higher announcement returns in France.

The positive long-term abnormal performance is a puzzle of its own. The performance has not disappeared as I examine the long-term returns on the subperiod level, it seems to be stronger than earlier. Managers possess insider information about the firm's near future and they might use announcements as a tool to share their information. Another possible explanation is the takeover activity, e.g. reduction in risk of being acquired might be the value-creating tool here. One could interpret the findings favoring the signaling hypothesis after accepting the assumptions presented by the underreaction hypothesis. My results support the market timing hypothesis, which is consistent with Manconi et al. (2019), but I also find evidence of repeaters receiving smaller announcement returns to back up the findings of Lee et al. (2020).

Lastly, I suggest further research on the topic. Executive compensation paired with non-fundamental based hypotheses in Europe could further explain the announcement returns similarly to Lee et al. (2020) in the US. The non-fundamental based explanations are a fresh addition to the presented theories in this paper.

References

Akyol, A.C. & Foo, C.C. 2013, "Share Repurchase Reasons and the Market Reaction to Actual Share Repurchases: Evidence from Australia", *International Review of Finance,* vol. 13, no. 1, pp. 1-37.

Andriosopoulos, D. & Lasfer, M. 2015, "The market valuation of share repurchases in Europe", *Journal of Banking & Finance,* vol. 55, pp. 327-339.

Bargeron, L., Bonaime, A. & Thomas, S. 2017, "The Timing and Source of Long-Run Returns Following Repurchases", *Journal of Financial and Quantitative Analysis,* vol. 52, no. 2, pp. 491-517.

Barth, M.E. & Kasznik, R. 1999, "Share repurchases and intangible assets", *Journal of Accounting and Economics,* vol. 28, no. 2, pp. 211-241.

Bratli, D. & Rehman, O. 2015, *The Price Impact and Timing of Actual Share Repurchases in Norway*, Norwegian School of Economics.

Breusch, T.S. & Pagan, A.R. 1979, "A Simple Test for Heteroscedasticity and Random Coefficient Variation", *Econometrica,* vol. 47, no. 5, pp. 1287-1294.

Brown, S.J. & Warner, J.B. 1985, "Using daily stock returns: The case of event studies", *Journal of Financial Economics,* vol. 14, no. 1, pp. 3-31.

Brown, S.J. & Warner, J.B. 1980, "Measuring security price performance", *Journal of Financial Economics,* vol. 8, no. 3, pp. 205-258.

Carhart, M.M. 1997, "On Persistence in Mutual Fund Performance", *The Journal of Finance,* vol. 52, no. 1, pp. 57-82.

Chan, K., Ikenberry, D. & Lee, I. 2004, "Economic Sources of Gain in Stock Repurchases", *The Journal of Financial and Quantitative Analysis,* vol. 39, no. 3, pp. 461-479.

Dittmar, A.K. 2000, "Why Do Firms Repurchase Stock", *The Journal of Business,* vol. 73, no. 3, pp. 331-355.

Fama, E.F. & French, K.R. 1993, "Common risk factors in the returns on stocks and bonds", *Journal of Financial Economics,* vol. 33, no. 1, pp. 3-56.

Fenn, G.W. & Liang, N. 2001, "Corporate payout policy and managerial stock incentives", *Journal of Financial Economics,* vol. 60, no. 1, pp. 45-72.

Fu, F. & Huang, S. 2016, "The Persistence of Long-Run Abnormal Returns Following Stock Repurchases and Offerings", *Management Science,* vol. 62, no. 4, pp. 964-984.

Ginglinger, E. & L’her, J. 2006, "Ownership structure and open market stock repurchases in France", *null,* vol. 12, no. 1, pp. 77-94.

Grullon, G. & Michaely, R. 2002, "Dividends, Share Repurchases, and the Substitution Hypothesis", *The Journal of Finance,* vol. 57, no. 4, pp. 1649-1684.

Harvey, C., Michaely, R., Brav, A. & Graham, J. 2005, "Payout Policy in the 21st Century", *Journal of Financial Economics,* vol. 77, pp. 483-527.

Hatakeda, T. & Isagawa, N. 2004, "Stock price behavior surrounding stock repurchase announcements: Evidence from Japan", *Pacific-Basin Finance Journal,* vol. 12, no. 3, pp. 271-290.

Ibbotson, R.G. 1975, "Price performance of common stock new issues", *Journal of Financial Economics,* vol. 2, no. 3, pp. 235-272.

Ikenberry, D., Lakonishok, J. & Vermaelen, T. 1995, "Market underreaction to open market share repurchases", *Journal of Financial Economics,* vol. 39, no. 2, pp. 181-208.

Jagannathan, M., Stephens, C.P. & Weisbach, M.S. 2000, "Financial flexibility and the choice between dividends and stock repurchases", *Journal of Financial Economics,* vol. 57, no. 3, pp. 355-384.

Jensen, M.C. 1986, "Agency Costs of Free Cash Flow, Corporate Finance, and Takeovers", *The American Economic Review,* vol. 76, no. 2, pp. 323-329.

Lee, I., Park, Y.J. & Pearson, N.D. 2020, "Repurchases after being well known as good news", *Journal of Corporate Finance,* vol. 62, pp. 101552.

Lee, I., Park, Y. & Pearson, N. 2015, "Repurchases Have Changed", *SSRN Electronic Journal,* .

Li, K. & Mcnally, W. 2003, "The Decision to Repurchase, Announcement Returns and Insider Holdings: A Conditional Event Study", *The ICFAI Journal of Applied Finance,* vol. 9.

Lie, E. 2005, "Operating performance following open market share repurchase announcements", *Journal of Accounting and Economics,* vol. 39, no. 3, pp. 411-436.

MacKinlay, A.C. 1997, "Event Studies in Economics and Finance", *Journal of Economic Literature,* vol. 35, no. 1, pp. 13-39.

Manconi, A., Peyer, U. & Vermaelen, T. 2019, "Are Buybacks Good for Long-Term Shareholder Value? Evidence from Buybacks around the World", *Journal of Financial and Quantitative Analysis,* vol. 54, no. 5, pp. 1899-1935.

Miller, M. & Modigliani, F. 1961, "Dividend Policy, Growth, and the Valuation Of Shares", *The Journal of Business,* vol. 34, pp. 411.

O’brien, R.M. 2007, "A Caution Regarding Rules of Thumb for Variance Inflation Factors", *Quality & Quantity,* vol. 41, no. 5, pp. 673-690.

Peyer, U.C. & Vermaelen, T. 2005, "The many facets of privately negotiated stock repurchases", *Journal of Financial Economics,* vol. 75, no. 2, pp. 361-395.

Peyer, U. & Vermaelen, T. 2009, "The Nature and Persistence of Buyback Anomalies", *Review of Financial Studies,* vol. 22.

Ramsay, I. & Lamba, A. 2000, "Share Buy-backs: An Empirical Investigation", *SSRN Electronic Journal,* .

Råsbrant, J. 2013, "The Price Impact of Open Market Share Repurchases", *SSRN Electronic Journal,* .

Rau, P.R. & Vermaelen, T. 2002, "Regulation, Taxes, and Share Repurchases in the United Kingdom", *The Journal of Business,* vol. 75, no. 2, pp. 245-282.

Sharpe, W. 1963, "A Simplified Model for Portfolio Analysis", *Management Science,* vol. 9, no. 2, pp. 277-293.

Skjeltorp, J. 2004, "The market impact and timing of open market share repurchases in Norway", *ANO,* vol. 8.

Spence, M. 2002, "Signaling in Retrospect and the Informational Structure of Markets", *American Economic Review,* vol. 92, no. 3, pp. 434-459.

Stephens, C.P. & Weisbach, M.S. 1998, "Actual Share Reacquisitions in Open-Market Repurchase Programs", *The Journal of Finance,* vol. 53, no. 1, pp. 313-333.

Vermaelen, T. 1984, "Repurchase Tender Offers, Signaling, and Managerial Incentives", *Journal of Financial and Quantitative Analysis,* vol. 19, no. 2, pp. 163-181.

Vermaelen, T. 1981, "Common stock repurchases and market signalling: An empirical study", *Journal of Financial Economics,* vol. 9, no. 2, pp. 139-183.

Vermaelen, T. & Ikenberry, D. 1996, "The Option to Repurchase Stock", *Financial Management,* vol. 25.

Voth, H.J. 2008, *Transparency and Fairness in the European Capital Market,* Hans-Böckler-Stiftung.

White, H. 1980, "A Heteroskedasticity-Consistent Covariance Matrix Estimator and a Direct Test for Heteroskedasticity", *Econometrica,* vol. 48, no. 4, pp. 817-838.

Zhang, H. 2005, "Share price performance following actual share repurchases", *Journal of Banking & Finance,* vol. 29, no. 7, pp. 1887-1901.

Zhang, H. 2002, "Share repurchases under the Commercial Law 212-2 in Japan: Market reaction and actual implementation", *Pacific-Basin Finance Journal,* vol. 10, no. 3, pp. 287-305.

Appendix

Table A.1: Daily Abnormal returns and CARs – Repeater vs. Non-repeater

The table presents daily abnormal returns and cumulative abnormal returns based on methodologies in Section 5.1. for subsequently announcing companies and non-repeaters in Western Europe during 1990-2020. Number of observations are in parentheses next to corresponding sample. ***, **, and * denote statistical significance at the 10%, 5%, and 1% levels, respectively.

Panel A: Average daily abnormal returns

	Repeater (n = 157)			Non-repeater (n = 737)		
Day	AR (%)	t-stat	CAR (%)	AR (%)	t-stat	CAR (%)
-10	0.02 %	0.15	0.02 %	-0.18 %**	-2.14	-0.18 %
-9	-0.15 %	-0.89	-0.13 %	-0.10 %	-1.15	-0.28 %
-8	0.12 %	0.77	-0.01 %	0.05 %	0.57	-0.23 %
-7	-0.11 %	-0.76	-0.11 %	-0.10 %	-1.29	-0.34 %
-6	0.42 %*	1.84	0.31 %	0.02 %	0.16	-0.32 %
-5	-0.14 %	-0.93	0.16 %	0.07 %	0.69	-0.25 %
-4	-0.07 %	-0.41	0.10 %	-0.05 %	-0.70	-0.31 %
-3	-0.31 %**	-2.03	-0.21 %	-0.12 %	-1.47	-0.43 %
-2	-0.17 %	-0.96	-0.39 %	-0.13 %	-1.55	-0.56 %
-1	-0.27 %	-1.14	-0.65 %	0.01 %	0.07	-0.56 %
0	0.79 %***	2.70	0.14 %	0.44 %***	3.52	-0.12 %
1	0.61 %**	2.50	0.75 %	0.59 %***	4.74	0.47 %
2	0.60 %***	2.93	1.35 %	0.20 %**	2.10	0.68 %
3	0.03 %	0.24	1.38 %	0.00 %	-0.01	0.67 %
4	0.08 %	0.72	1.46 %	0.00 %	0.00	0.68 %
5	0.45 %**	2.18	1.92 %	0.03 %	0.42	0.71 %
6	0.03 %	0.20	1.95 %	0.07 %	0.57	0.78 %
7	0.02 %	0.13	1.96 %	0.05 %	0.62	0.83 %
8	-0.02 %	-0.15	1.94 %	0.13 %	1.39	0.96 %
9	-0.22 %	-1.15	1.72 %	0.01 %	0.08	0.97 %
10	0.11 %	0.70	1.84 %	-0.02 %	-0.28	0.94 %

Panel B: CARs over different intervals

Interval	CAR (%)	t-stat	CAR (%)	t-stat
Day -1 to +1	1.05 %***	2.68	1.08 %***	4.95
Day -2 to +2	1.17 %***	2.65	1.22 %***	4.58
Day -10 to +10	0.91 %**	2.37	1.86 %**	2.12
Day -10 to -2	-0.62 %	-0.52	-0.26 %***	-2.72
Day +2 to +10	0.48 %**	2.21	1.04 %*	1.77

Table A.2: Correlation matrix of explanatory variables

Correlation between variables used in cross-sectional regression. The data is described in Table 4.2.

	SIZE	PRECAR	REPSIZE	ROA	MTBV	INTANG	FCF	REP
SIZE	1.000							
PRECAR	0.035	1.000						
REPSIZE	-0.089	-0.011	1.000					
ROA	0.158	0.030	0.006	1.000				
MTBV	0.177	0.039	-0.011	0.057	1.000			
INTANG	0.061	-0.038	-0.020	-0.016	0.049	1.000		
FCF	-0.059	0.032	0.000	0.024	0.000	0.310	1.000	
REP	0.027	0.027	-0.017	0.024	-0.038	-0.006	-0.017	1.000

Table A.3. Test for multicollinearity VIFs

Variance inflation factors to test the multicollinearity for the data described in Table 4.2. and to add robustness of findings in Tables 6.3. and 6.4. Column names denotes the subsample in use. FR, UK, DE denoting the collective "Combined" subsample including announcements in France, the UK, and Germany during 2010-2020. France, Germany, and the UK includes only announcements during 2010-2020.

	All	2020-2010	2000-2009	1990-1999	FR,UK,DE	France	UK	Germany
SIZE	1.08	1.23	1.26	1.28	1.27	1.37	1.38	1.26
PRECAR	1.01	1.04	1.03	1.04	1.05	1.12	1.91	1.07
REPSIZE	1.01	1.01	1.19	1.18	1.02	1.51	1.26	1.08
ROA	1.03	1.07	1.50	1.12	1.10	1.85	2.07	1.07
MTBV	1.04	1.17	1.15	1.08	1.22	1.31	2.73	1.12
INTANG	1.16	1.20	1.06	1.11	1.24	1.35	1.31	3.21
FCF	1.12	1.21	1.46	1.17	1.25	1.95	2.08	3.08
REP	1.01	1.01	1.01	1.05	1.01	1.02	1.20	1.04

Table A.4. Industry CARs

The table presents macro industry average cumulative abnormal returns (CAR(-1, +1)) within the announcement event, -1 to +1 days from the event during 1990-2020 in Western Europe. N denotes number of observations for corresponding industry.

Macro industry	CAR(-1, +1)	t-stat	N
Financials	1.38 %	3.15	144
Materials	1.70 %	3.70	88
Energy and Power	0.35 %	0.58	52
Healthcare	1.18 %	1.33	57
High Technology	0.82 %	1.37	149
Industrials	0.60 %	1.04	102
Consumer Staples	2.16 %	3.15	53
Consumer Products and Services	0.38 %	0.48	64
Retail	0.71 %	0.88	55
Media and Entertainment	0.82 %	1.09	41
Telecommunications	0.60 %	0.46	40
Real Estate	1.22 %	2.59	49

Table A.5. Test for heteroscedasticity

White's and Breusch-Pagan's heteroscedasticity tests are made to find bias in estimated model in Tables 6.3. and 6.4. Column names denotes the subsample in use. FR, UK, DE denoting the collective "Combined" subsample including announcements in France, the UK, and Germany during 2010-2020. France, Germany, and the UK includes only announcements during 2010-2020. White p-value and Breusch-Pagan p-value denotes the p-value obtained from each test. White Lagrange and Breusch-Pagan Lagrange denotes the Lagrange multiplier statistic obtained from each test.

	All	2010-2020	2000-2009	1990-1999	FR,UK,DE	France	UK	Germany
White p-value	0.00	0.43	0.34	0.30	0.17	0.01	0.22	0.96
White Lagrange	388.74	251.08	257.76	179.00	51.90	69.33	48.68	28.10
Breusch-Pagan p-value	0.00	0.18	0.00	0.03	0.41	0.01	0.09	0.35
Breusch-Pagan Lagrange	68.81	34.66	52.64	44.39	8.21	19.26	13.57	8.94