Erasmus School of Economics

Repurchase activity and executive equity compensation: an empirical study into the usage of the buyback anomaly

Master Thesis (Financial Economics)

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The purpose of this thesis is to get a deeper understanding of the reasons why executives announce a repurchase of stock. In this thesis, the main focus will be on the personal interest of executives in their repurchasing activity. This thesis will provide a better comprehension of executives' behavior based on equity incentives. I will evaluate the executives' behavior considering the repurchase of stock and the abnormal returns paired with the repurchase.

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1. Introduction

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Executives have tremendous impact on the performance of a firm. Acting on behalf of the firm to gain higher equity compensations can lead to a downfall in the firm performance. Executives can be incentivized through equity compensations to act out of self-interest. Bebchuck and Friend's (2004) openly spoke about their concerns of CEOs getting rewarded through methods highly sensitive to short-term stock price increases.

In practice there is a strong incentive for managers who get rewarded with options to repurchase shares, due to the increase in stock prices after a buyback announcement. Ikenberry, Lakonishok, and Vermaelen (1995) found a buy-and-hold strategy that generated an abnormal return of 12.1% over the 4 years following the buyback announcement. Peyer and Vermaelen (2009) found a similar result.

Executives acting on inside information could explain the buyback anomaly. In this manner, a repurchase signals an undervaluation towards the market . The price will converge towards the true value, thus creating an excess return. Another explanation can be the relatively higher decline of stock prices before the announcement. This fall in prices could not have been fundamentally correct, which again makes the repurchase a signal that the price is undervalued. These reasons are widely known by market participants, making it possible for executives to increase stock performances through repurchase announcements. If executives believe that a repurchase announcement will increase the stock performance, which in turn will increase their equity compensation, repurchases can be used to increase private gains.

In this thesis, I want to investigate the following research question: do executives use share repurchases to increase their equity-based compensation?

More specifically, I want to investigate whether managers repurchase shares for their equity gain or in the interest of the company and what the effect of private benefit repurchases is on the short-term and long-term performance of the company.

Grullon and Michaely (2002) discovered that in the period from 1980 till 2000 the most common payout policy form for companies were share repurchases. Without fundamental reasons to repurchase stock, a repurchase could impact the company's long-term performance. If repurchases create a substantial loss in available cash, a loss in good available investment opportunities could be the consequence. The image of the company will take damage and can stimulate long-term growth opportunities to diminish.

Empirical results on whether managers repurchase shares to increase private equity gains, are inconsistent. Despite the potential motives managers have, literature shows that vesting equity does influence the firm on several levels. Jochem, Ladika, and Sautner (2018) find results that vesting equity is correlated with CEO turnover. Van Alfen (2018) concludes that the amount of vesting equity does hurt product market reputation.

Edmans, Fang, and Lewellen (2017) find that vesting equity is significantly correlated with equity sales, and vesting equity is significantly correlated with a decrease of investment growth.

Dittmar (2000) tried to find evidence for the theory by computing a regression including the value of unvested shares the company has outstanding. The value of unvested shares did not show a significant effect on the amount of dollar volume of repurchases, divided by the prior year-end market value of equity. Babenko (2009) and Kahle (2002) both found results that were in contradiction with Dittmar.

Kahle (2002) found that there is a positive relation between companies with high total options exercisable, as a percentage of shares outstanding, and the number of dollars spent on repurchases in the year of- and the year after the announcement, divided by the market value of equity. When the total options are divided into exercisable and unexercisable, the amount of repurchase expenditures is positively correlated to total options exercisable. The results find an exception for managerial options, as unexercisable executive options are positively related to repurchase decisions.

Babenko (2009) found a very similar result and concluded that the number of unvested stocks does have an impact on the managerial choice of repurchasing shares. Edmans, Fang, and Huang (2017) also found a positive relation between the amount of vested stock and repurchase activity. They investigated whether short-term incentives do have long-term

consequences. One of the short-term incentives was share repurchases. They concluded that share repurchases do decrease long-term stock performances.

Dittmann, Keusch, and Obernberger (2019) show that repurchase activity increases in the month after a stock option grant compared to the month before the stock option grant.

In this thesis I will use the value of exercisable but unexercised options as a factor for managers to choose for private gains. As exercisable options are one-to-one related to the stock price, managers can try to stimulate the stock price to exercise their options at a higher gain. Literature shows that repurchases increase stock performance, managers can use repurchases to boost the stock price of their exercisable options. The main goal of this thesis is to find out to what extent managers misuse the increase in stock prices after a repurchase announcement for their private benefits.

In the setup of this thesis, repurchases can be seen as the method for managers to accomplish higher stock prices at the moment of their preference and unexercised but exercisable options can be seen as the short-term incentive for managers to choose for increasing stock performances. If repurchases are announced with the prospect of higher stock prices, but without fundamental firm-based reasons, this can impact the performance of the firm.

To investigate whether managers use the buyback anomaly as a method to boost the stock prices for their private gains I will test 4 hypotheses

In the late 1900s share repurchases started to become the main form of payout policy. Whether the increase in share repurchases is due to a decrease in dividends is an important question to answer before elaborating into the first hypothesis. The substitution hypothesis suggests that there is a fully interchangeable effect between share repurchases and dividend payouts, an increase in one of them results in a decrease in the other.

John and Williams (1985) conclude that dividends are preferred over share repurchases due to the positive signal send towards the market. An increase in dividends instead of share repurchases signals that the firm's quality is high and promising. Bernheim (1991) supports these conclusions as well as Allen, Bernardo, and Welch (2000). The findings of these papers suggest that share repurchases and dividends are not interchangeable, but the choice between one of the payout policies is a result of the firm's quality.

Miller and Modigliani (1961) are one of the first researchers concluding that the choice between dividends or share repurchases is mainly chosen based on whether the firm wants to signal an undervaluation of their stock, by repurchasing stock or to reduce agency conflicts by using dividend payouts. These results suggest that share repurchases and dividends are interchangeable. Not only Miller and Modigliani support interchangeable payout policies, Bhattacharya (1979), Easterbrook (1984), Miller and Rock (1985), and Jensen (1986) found results supporting interchangeable payout policies.

In this thesis, the methodology is based on interchangeable payout policies. Assuming payout policies are interchangeable, a firm with higher amounts of exercisable options should therefore prefer share repurchases instead of dividend payouts when accounting for factors impacting the payout decision. Jolls (1998) examined the repurchase versus dividend theory and concluded that the amount of executive options does impact repurchase behavior. Fenn and Liang (2001) find that managerial stock options are related with a lower usage of dividends to distribute excess cash to shareholders.

The results shown throughout literature results in the following hypothesis:

1. Firms with a higher value of exercisable options should prefer share repurchases over dividend payouts.

Through the years, several papers suggest that repurchases can be a consequence of managers revealing private information about their firm's performance. This hypothesis, the information-revealing hypothesis, is strongly supported by existing literature. Lakonishok and Vermaelen (1990), do find support for the hypothesis as well as Comment and Jarrell (1991), and Hertzel and Jain (1991).

More precisely, the information-revealing hypothesis not only indicates the firm’s performance but also the prospect of managers about the future performance. This favorable information can be signaled towards the market throughout a repurchase. The information-revealing hypothesis leads to the undervaluation hypothesis. The undervaluation hypothesis suggests that managers inform the market that the stock of their firm is undervalued compared to the market value of equity of the stock. D’Mello and Shroff (2000) find results supporting this hypothesis. They show that the undervaluation hypothesis is stronger for

smaller firms due to information asymmetry and that on average the hypothesis is present throughout their sample.

Bonaimé and Ryngaert (2013) find that insider trading either validates or mitigates the undervaluation hypothesis. Cziraki, Lyandres, and Michaely (2019) show that insider trading predicts short-term and long-term abnormal returns.

In this thesis, the creation of the second hypothesis is based on the information-revealing hypothesis, the undervaluation hypothesis, and the found results from Bonaimé and Ryngaert (2013), and Cziraki, Lyandres, and Michaely (2019). The undervaluation hypothesis suggests that stocks are underpriced, which results in abnormal returns after a repurchase announcement. If a firm initiates a repurchase with the prospect of increasing the stock prices to increase executive equity ownings, thus the repurchase is affected by insider trading, the undervaluation returns should be validated or mitigated. The market does adjust for insider trading, in this case executives trying to increase stock returns. Firms with fundamental reasons, such as being undervalued, should show higher returns compared to firms without fundamental reasons. This concludes the basis for my second hypothesis.

2. Firms with a higher percentage of exercisable options should have relatively lower short-term announcement returns.

For my third hypothesis, I will look at the direct relation between the value of unexercised options and the total value of announced repurchases. The total amount of announced repurchases will be divided by the total value of market equity. This creates a ratio equally representative throughout the data sample for every year and resulting in the following hypothesis.

3. Firms with a higher value of exercisable options should have a positive effect on the amount of dollar volume of repurchases divided by the market value of equity.

The final hypothesis is based on the idea that repurchases without fundamental reasons, should harm the firm. Repurchasing stock for personal equity gain is one of those reasons. To measure this, the value of exercisable options is seen as the motivator for management to repurchase stock for personal gains. A higher percentage of exercisable options compared to total compensation should increase this incentive and result in an overall increase of repurchases without fundamental reasons. This should in turn have negative consequences

for the firm's performance. Edmans, Fang, and Huang (2017) find results that support the negative consequences in the long run for firms who decide to act on short term-incentives. In their paper, the short-term incentive is vesting equity, which is related to a higher chance of firms repurchasing stock. The amount of stock repurchased and the probability of firms announcing a merger or acquisition are also affected. In turn, repurchases do have negative effects on the long-term returns as well as a merger and acquisition. This domino effect towards a long-term loss on returns is initiated by short-term incentives. I expect to find this same effect with the value of exercisable options on the long-term returns, resulting in the final hypothesis.

4. Firms with a higher percentage of exercisable options should have relatively lower long-term stock returns.

In order to investigate the hypothesis, I obtained a data sample of 1351 open market share repurchase announcements from the time period January 2010 until December 2016. Each unique announcement has corresponding overall variables, yearly variables, and monthly variables.

I find results supporting the idea that executives are influenced in their payout decision by the percentage of exercisable options they are holding compared to their total compensation. Firms with higher percentages of payouts, compared to total compensation, do realize significantly higher short-term abnormal returns compared to firms with lower percentages. I also find that the amount of exercisable options does not influence the total value of repurchases announced. The results indicate that executives do get impacted by exercisable options in their payout decision, repurchases or dividends. Lastly do the results also suggest that the amount of exercisable options does influence the long-term abnormal returns negatively, these results are not significant.

In this thesis both new and existing methods are used to investigate executives' behavior. The methods used to investigate the effect of exercisable options on the short-term and long-term abnormal returns are new to existing literature, indicating the contribution of this thesis. These new used methods are extremely sensitive to omitted variables. If not executed correctly the significance is impacted by unknown factors and diminishing the power of found results. The absence of significance for the long-term abnormal returns are indicating the importance for further research. Long-term abnormal returns show to be consistently

impacted by the percentage of exercisable options, but not significantly, decreasing the power of this thesis but increasing the essence for further research. Known methods are also used to strengthen existing results. Results are similar to previous papers indicating that short-term compensation does impact executives' repurchase activity throughout different time-periods, for this thesis from 2010 until 2016.

2. Data

To test the hypotheses, I compiled the following data set. All open market repurchase announcements made between January 2010 and December 2016 were collected from ThomsonOne. In this time period stock prices reached rock bottom during the financial crisis, followed by slow recovery because of the sovereign dept crisis. Stock prices plumbing can be reasons for executives to initiate in stock repurchases. For this chosen time period, more undervaluation could be observed increasing the expected found effects between repurchases based on the undervaluation of stock and repurchases based on the potential equity gains for executives.

Observations where the repurchase was intended to be withdrawn or already withdrawn, are excluded. Duplicate repurchases, with identical cusip codes and announced within the same month, are removed, which resulted in 9375 unique repurchase announcements with the respective value of the announcement. ThomsonOne also provides information about firms being targeted as a takeover possibility by other firms.

CRSP provides monthly data on stock returns and prices as well as the number of shares outstanding. Merging this data with the announcements resulted in a sample of 3068 repurchase announcements. The market value of equity is calculated by multiplying the amount of outstanding shares by the price of the stock, this is done monthly.

To obtain information about annual fundamental values, I used COMPUSTAT. From COMPUSTAT I collected the total amount of exercisable options and unvested shares all executives were holding for each year in the sample period. I also used COMPUSTAT to obtain the total cash, the total liabilities, the total assets, salary, bonus, age of the executives, working years for the company, extraordinary earnings, and the amount of retained earnings for each year in the sample period. Merging these parameters into the data set reduced the number of repurchase announcements to 1351. Table 1 gives a detailed overview of the descriptive statistics concerning the repurchase sample.

To test the first hypothesis, all the companies' increasing dividends are monitored. A company is labeled as 'dividend increasing' if the value of dividends paid in the last quarter of the fiscal year is higher than the first quarter of that same year. Data is obtained through COMPUSTAT merging the companies increasing dividends with the number of repurchases left a sample of

928 repurchases. Table 2 gives a detailed overview of the descriptive statistics for the repurchase sample including dividends.

Table 1:
Descriptive statistics on open market share repurchases

Variables	N (Unique repurchases)	Mean	SD	Min	25 Quantile	Median	75 Quantile	max
REP_{t-1}	1351	.12	.18	0.00	0.03	0.07	0.13	4.42
$UnExOpt_{t-1}$	1351	1049.66	1693.48	0.00	100.00	484.18	1366.09	65445.14
$TotUnv_{t-1}$	1351	9605.71	40276.15	0.00	1632.14	3671.06	8585.09	2.1e+06
$Salary_{t-1}$	1351	3129.99	1339.71	0.00	2232.35	2941.07	3773.85	16445.05
$Bonus_{t-1}$	1351	573.14	2043.60	0.00	0.00	0.00	200.00	41835.20
Age_{t-1}	1351	53.24	3.97	32.25	50.83	53.40	55.80	74.83
$WorkYears_{t-1}$	1351	8.16	7.41	0	3.00	6.00	11.00	55.00
$RatioCTA_t$	1351	0.11	0.11	0.00	0.03	0.08	0.16	0.76
$RatioNATA_t$	1351	0.41	0.24	-1.33	0.25	0.41	0.57	0.94
$Undervalued_{j-3,j+1}$	1351	0.02	0.35	-0.56	-0.11	-0.03	0.09	9.05
Takeover	1351	0.02	0.15	0.00	0.00	0.00	0.00	1.00

Descriptive statistics for 1351 repurchase announcements between the period 2010 and 2016 where t equals the year of the announcement. REP is the total value of repurchases divided by the market value of equity, UnExOpt is the total value of unexercised options which are exercisable, TotUnv is the total value of unvested stocks, Salary is the salary of all executives, Bonus is the bonus for all executives, Age is the mean age of all the executives, WorkYears is the amount of working years of the CEO, RatioCTA is the ratio of cash to total assets, RatioNata is the ratio of net assets to total assets, Undervalued is the percentage difference between the returns on j-3 and j+1, Takeover is the percentage of repurchases announced within 548 days after a rumor or announcement a company is seen as a potential target by other companies. UnExOpt, TotUnv, Salary, and Bonus are in thousands of dollars. Age and WorkYears are in years.

Table 2:
Descriptive statistics on dividend increasing companies also announcing repurchases

Variables	N (Unique repurchases)	Mean	SD	Min	25 Quantile	Median	75 Quantile	max
DIF	928	896.64	7853.05	-1.6e+04	-39.51	83.68	493.70	2.1e+05
UnExOpt_{t-1}	928	1340.71	1803.69	0.00	168.01	735.80	1728.85	16001.50
TotUnv_{t-1}	928	10735.88	26476.17	0.00	1859.68	4259.11	10145.14	3.2e+05
Extra_t	928	-0.10	1.46	-41.35	-0.01	-0.00	0.00	1.54
$\text{Volatility}_{t,t+end}$	928	1401.64	3413.77	3.92	113.78	344.03	1218.52	34782.61
$\text{Undervalued}_{j-3,j+1}$	928	0.01	0.39	-0.38	-0.11	-0.03	0.07	9.05

Descriptive statistics for 928 repurchase announcements between the period 2010 and 2016, which also increased dividends during the same year as the announcement year. Where t equals the year of the announcement, DIF is the difference between the total amount of repurchases and dividends, UnExOpt is the total value of unexercised options which are exercisable, TotUnv is the total value of unvested stocks, Extra are the extraordinary returns or losses per share returns or losses are in thousands of dollars, Volatility is the volatility on retained earnings from the announcement date until the end of the sample period, Undervalued is the percentage difference between the returns on j-3 and j+1. DIF, UnExOpt, and TotUnv are in thousands of dollars.

3. Methodology

In this chapter, I will elaborate on the different methodologies required to test my hypothesizes

3.1 Short-term incentives on payout policies

In order to find a positive relation between the value of exercisable options and the difference in value between dividend payouts and repurchase payout I will make use of an ordinary least squares (OLS) regression.

To include long-term incentives the amount of unvested shares is included in the regression. Besides long-term incentives, Jagannathan, Stephens, and Weisbach (2000) find that firms with more stable earnings tend to payout excess cash through dividends, and firms with higher extraordinary earnings tend to payout excess cash through repurchases. Firm and year fixed effects are added to account for firm and year fixed effects. To get a representative result for the relation between the total amount of exercisable options and the difference between the value of repurchases and dividends the following regression is conducted.

$$DIF_t = a_t + bExOpt_{t-1} + cTotUnv_{t-1} + dExtra_{t-1} + eVolatility_{t,t+end} + fUndervalued_{j-3,j+1} + FirmFE + YearFE + \varepsilon_t \quad (1)$$

Where DIF_t is the difference between the total amount of repurchases and dividends for year *t,* $ExOpt_t$ is the total value of exercisable options held by all executives for year *t,* $TotUnv_t$ is the total amount of unvested shares held by a firm for year t, $Extra_t$ is the extraordinary earnings divided by the shares outstanding for year *t,* $Volatility$ is the total volatility for the retained earnings over the sample period 2010 till 2016, $Undervalued_j$ is a variable indicating the percentage change between 3 months j before the announcement month and 1 month j after the announcement month for year t, $FirmFE$ are firm fixed effects for every firm in the data sample, $YearFE$ are year fixed effects for every year in the data sample, and ε_t is the error term.

3.2 Effect of exercisable options on the short-term abnormal returns

The methodology used in this thesis is based on the research of Peyer and Vermaelen (2009) The method used to conduct abnormal returns in their paper will be used to calculate abnormal returns in this thesis.

In this thesis, the short-term abnormal returns are considered as returns between 3 event months (*j)* and 12 event months (*j)*. The data sample is divided into quintiles based on the value of exercisable options of the executives divided by the total compensation of the executives, quintile 1 with the lowest ratio, and quintile 5 with the highest ratio. To compute the abnormal returns, the Fama&French 5 factor model (FF5) will be used.

FF5 includes a profitability factor and an investment factor as well as the factors from the Fama&French 3 factor model, which are the excess market return, a size factor and a book-to-market factor. Chiah, Chai, Zhong, and Li (2016) find that the 5-factor model is superior compared to existing models, including the FF3 model. Fama and French (2015) find that the 5-factor model is superior in explaining cross-sectional stock returns, especially for asset pricing anomalies. This will be the reason to use the FF5 model as the main model in explaining abnormal returns.

The observed returns after the repurchase announcement are regressed on the FF5 factors. The intercept a_j represents the return compensated for the factors used, and can be interpreted as the abnormal return.

The regression conducted with the FF5 factors looks as follows:

$$(RET_{i,t} - R_{f,t}) = a_j + b_j(R_{m,t} - R_{f,t}) + c_j SMB_t + d_j HML_t + e_j RMW_t + f_j CMA_t + \varepsilon_{i,t} \quad (2)$$

Where $RET_{i,t}$ is the return on security *i* in month *t,* corresponding to event month *j.* Event month *j* = 0 for the month with the repurchase announcement. $R_{f,t}$ is the risk free rate, $R_{m,t}$ is the market return, SMB_t is the size factor, and HML_t is a book-to-market factor. RMW_t is a profitability factor. CMA_t is an investment factor, and $\varepsilon_{i,t}$ is the error term.

As mentioned before, managers who initiate a repurchase for private gains should show lower short-term returns. I will conduct a T-test between the returns of the first and the fifth quintile.

As my hypotheses suggest I expect the first quintile to have significantly higher returns compared to the fifth quintile.

3.3 Short-term incentives on repurchase activity

The third hypothesis stated that the value of exercisable options should impact the repurchase activity. In order to test this I will conduct an OLS regression which looks into the direct relation between the value of exercisable options and the total value of repurchases divided by the market value of equity.

Jensen (1986) concludes that firms repurchase stock to distribute excess cash. This theory, the excess capital hypothesis, is supported by Stephens and Weisbach (1998) who conclude a positive relation between repurchase activity and the amount of cash available. They did not only show a positive relation, but they also concluded that undervaluation is a reason for repurchasing stock. Bagwell (1991) introduced the takeover deterrence hypothesis, which states that repurchasing stock is used as a takeover defense. I will include the excess capital hypothesis, the undervaluation hypothesis, and the takeover deterrence hypothesis in the regression to reduce omitted variable biases. Based on previous research from Edmans, Fang, and Huang (2017) I will also include the age of the executives, their salary, years working for the firm, and amount of bonus they received. In this manner, their career prospects and incentives for higher compensations are included in the regression. To evaluate long-term incentives, I will include the value of unvested shares. To account for firm and year effects I will include firm and year fixed effects. This results in the following regression.

$$\begin{aligned} REP_t = a_t &+ bExOpt_{t-1} + cTotUnv_{t-1} + dSalary_{t-1} + eBonus_{t-1} + fAge_{t-1} \\ &+ gLabYears_{t-1} + hRatioCTA_t + iRatioNATA_t + jUndervalued_{j-3,j+1} \\ &+ kTakeover + FirmFE + YearFE + \varepsilon_t \end{aligned} \quad (3)$$

Where REP_t is the total value of repurchase announcements divided by the total market value of equity for year *t,* $ExOpt_t$ is the total value of exercisable options hold by all executives for year t, $TotUnv_t$ is the total amount of unvested shares hold by a firm for year t, $Salary_t$ is the mean salary from all executives for year *t,* $Bonus_t$ is the mean amount of bonus received for year *t,* Age_t is the mean age from all executives for year *t,* $LabYears_t$ is the number of years the CEO is working for the firm, $RatioCTA_t$ is the ratio of cash to total assets for year *t,* $RatioNATA_t$ is the ratio of net assets to total assets for year t, $Undervalued$ indicates the

percentage change between 3 months before the announcement month and 1 month after the announcement month, and $Takeover$ is a dummy variable indicating whether a repurchase could be announced to protect the firm from potential takeovers. $FirmFE$ are firm fixed effects for every firm in the data sample, $YearFE$ are year fixed effects for every year in the data sample, and ε_t is the error term.

I expect to find a positive relation between the value of exercisable options and the dependent variable REP.

3.4 Effect of exercisable options on long-term returns

To test the effect of exercisable options on the long-term abnormal returns an OLS regression with the FF5 factors is used.

The long-term abnormal returns are considered as returns between 12 event months (*j)* and 48 event months (*j)*. The data set is divided into quintiles based on the amount of exercisable options divided by the total compensation from executives. Quintile 1 with the lowest percentage, and quintile 5 with the highest percentage. To compute the abnormal returns the FF5 factors are used. The excess return realized by a security is regressed on FF5 factors for each month in event time. The intercept a_j represents the abnormal return. This resulted in the following regressions for each quintile.

$$(RET_{i,t} - R_{f,t}) = a_j + b_j(R_{m,t} - R_{f,t}) + c_j SMB_t + d_j HML_t + e_j RMW_t + f_j CMA_t + \varepsilon_{i,t} \quad (4)$$

Where $RET_{i,t}$ is the return on security *i* in month *t,* corresponding to event month *j.* Event month *j* = 0 for the month with the repurchase announcement. $R_{f,t}$ is the risk free rate, $R_{m,t}$ is the market return, SMB_t is the size factor, and HML_t is a book-to-market factor. RMW_t is a profitability factor. CMA_t is an investment factor, and $\varepsilon_{i,t}$ is the error term.

I expect the returns from the first quintile to be significantly higher than the returns from the fifth quintile. To test this, I will conduct a T-test between the two quintiles.

4. Results

In this chapter I will elaborate on the found results per hypothesis and I will conclude whether the hypothesis can be rejected or accepted.

4.1 Differences in repurchases compared to dividends

In this section I will elaborate on the found results regarding the differences in values between repurchases and dividends. I used an OLS regression, shown in the methodology, to come to these results. In the regression fixed effects are used to compensate for firm and year fixed effects. Beside the fixed effects I used independent variables known throughout literature to influence the decision making between repurchases and dividends. In Table 3 the results can be found, Table 3 shows there is a positive effect between the value of exercisable options and the difference in repurchases and dividends.

An increase in exercisable options by 1 dollar corresponds with an increase of 11.3 cents between the difference in dividends and repurchases. The value of exercisable options does not find significance throughout the full sample, which was not expected, this makes it hard to conclude whether exercisable options do have impact on the decision made by executives to either pay out excess cash through repurchases or through dividends. The value of unvested shares is significant at the 10% level for the full sample, indicating that an increase of 1 dollar in the value of unvested shares corresponds with a decrease of 3.87 cents in the difference between repurchases and dividends.

This can be explained by the results from Peyer and Vermaelen (2009). The abnormal returns are observed the highest shortly after the announcement. The value of unvested shares is a long-term incentive for executives, as the stocks are not yet exercisable. The long-term vision paired with the value of unvested shares can stimulate executives to postpone repurchases, making it logical that the value of unvested shares has a negative effect on the difference between the value of repurchases and dividends.

The value of extraordinary gains or losses, the volatility of the retained earnings and the percentage of undervaluation do not show significance, making it hard to interpret the results. The explanatory power of the model is 91.04%, which is abnormally high. This can be explained by the usage of fixed effects. If the data shows trends, which is possible due to the chosen

time period, the R-squared will increase. Indicating that the difference in repurchases or dividends is mainly firm based, and not really effected by the used independent variables.

As the variables are not significant, apart from the unvested shares, it is obvious to think that the usage of fixed effects does increase the explanatory power, indicating that firm-based decision making impacts the choice between repurchases or dividends.

Overall, the results do not show enough evidence to say that the amount of exercisable options does increase the difference between share repurchases and dividend payouts. The model does give reason to further investigate the subject, as the explanatory power is high. Based on the effects from the value of exercisable options and the value of unvested shares managers do show to be influenced in their corporate decisions by individual incentives.

Table 3:
Effect of unexercised but exercisable options on the value difference between dividends and repurchases

DIF	Full sample	2010	2011	2012	2013	2014	2015	2016
UnExOpt_{t-1}	0.113	0.251	0.252***	-0.309	-0.443	0.457**	1.481***	-0.0829
TotUnv_{t-1}	-0.0387*	0.0351	-0.00692	0.269***	-0.0962*	0.0543**	0.0133	0.144***
Extra_t	256.080	-1027.3	-108.8	1036.8	-1522.9	-21.83	317.8	-341.6***
$\text{Volatility}_{j,j+end}$	2.407	-0.307**	0.0766*	0.216	0.767*	-1.132***	-0.746***	-0.388
$\text{Undervalued}_{j-3,j}$	-40.246	371.4	914.5	-17564.2	-321.2	-3097.7**	264.3	-377.6
Firm Fixed Effects	Yes	-	-	-	-	-	-	-
Year Fixed Effects	Yes	-	-	-	-	-	-	-
R-squared	0.9104	0.1005	0.0910	0.3345	0.0604	0.3027	0.3914	0.3707
N	928	96	169	119	108	152	162	122

$$DIF_t = a_t + bExOpt_{t-1} + cTotUnv_{t-1} + dExtra_{t-1} + eVolatility_{t,t+end} + fUndervalued_{j-3,j+1} + FirmFE + YearFE + \varepsilon_t$$

*Where DIF is the difference between the total amount of repurchases and dividends, t equals the announcement year, UnExOpt is the total value of unexercised options which are exercisable, TotUnv is the total value of unvested stocks, Extra are the extraordinary returns or losses per share returns or losses are in thousands of dollars, Volatility is the volatility on retained earnings from the announcement date until the end of the sample period, Undervalued is the percentage difference between the returns on j-3 and j+1. Firm Fixed Effects are firm fixed effects for every firm in the data sample, Year Fixed Effects are year fixed effects for every year in the data sample. R-squared is the measure for the proportion of variance explained by the model. N is the number of observations. DIF, UnExOpt, and TotUnv are in thousands of dollars. The statistical significance is given by *,**,*** respectively being significant at the 10%,5%, and 1% level.*

4.2 The relation between short-term incentives and short-term returns

In my methodology I already explained to use the FF5 model in computing abnormal returns for the short-term. Based on literature the usage of the FF5 model is the best fit for this thesis. By using the FF5 model I will compute a time-series regression using the 5 factors from the model, which are the market excess return, a book-to-market factor, a size factor, a profitability factor and an investment factor.

In Table 4A and 4B, the results can be observed for the abnormal returns with the FF5 approach. Table 4A shows that abnormal returns are consistently present. With 1,351 repurchases, the first (lowest) quintile of exercisable options is consistently outperforming the fifth (highest) quintile.

The results also show that the mean abnormal return is around 0.25% per month after the first 3 months. The highest abnormal returns are consistently present throughout the quintiles, except from the third quintile, in the first 3 months. This is an indication that returns are highest shortly after the announcement.

The FF5 model shows that the abnormal returns are consistently higher for the lowest quintile compared to the highest quintile. This indicates that within 1 year the firms with the lowest amount of exercisable options compared to executive total compensation achieve higher abnormal returns compared to firms in the highest amount of exercisable options compared to executive total compensation.

Table 4B shows this difference more clearly. The lowest quintile is, with a minimum of 0.150% mean abnormal return per month, outperforming the highest quintile. Over 12 months the mean difference between abnormal returns is 0.206%, indicating a substantial difference. Up to 6 months, the lowest quintile significantly outperforms the highest quintile, on a 90% significance level. Up to 9 months, the lowest quintile significantly outperforms the highest quintile on a 95% significance level.

The results found with the FF5 model show strong support for the hypothesis, indicating that the percentage of exercisable options compared to the total compensation of executives influences the abnormal returns after a repurchase announcement. Abnormal returns decline if executives are more incentivized by the value of exercisable options as a percentage of their total compensation.

Table 4A:
Effect of unexercised but exercisable options on the short-term returns after repurchase announcements, according to FF5

Months (j)	Full	UEO1	UEO2	UEO3	UEO4	UEO5
	AR(M)	AR(M)	AR(M)	AR(M)	AR(M)	AR(M)
+1, +3	0.384%*	0.395%	0.517%	0.0921%	0.733%**	0.245%
+1, +6	0.252%*	0.346%*	0.410%	0.171%	0.329%*	0.0983%
+1, +9	0.249%**	0.299%**	0.306%	0.181%	0.604%**	0.0410%
+1, +12	0.258%***	0.302%	0.257%	0.275%*	0.573%***	0.0967%
Observations	1351	204	213	287	313	334

$$(RET_{i,t} - R_{f,t}) = a_j + b_j (R_{m,t} - R_{f,t}) + c_j SMB_t + d_j HML_t + e_j RMW_t + f_j CMA_t + \varepsilon_{i,t}$$

Where $RET_{i,t}$ is the return on security i in month t, corresponding to event month j. Event month j = 0 for the month with the repurchase announcement. $R_{f,t}$ is the risk free rate for month t, $R_{m,t}$ is the market return for month t, SMB_t is the size factor for month t corresponding to event month j, and HML_t is the book to market factor for month t corresponding to event month j. RMW_t is a profitability factor for month t corresponding to event month j. CMA_t is a investment factor for month t corresponding to event month j.

The mean abnormal monthly return AR(M) *is reported over the period j+1 till j+3(6,9,12), for the full sample and every quintile based on the total value of unvested stock. Abnormal returns are calculated using the IRATS method combined with the Fama&French five-factor model over the full sample of 1351 open market repurchases and the subsamples based on the total value of unexercised exercisable options divided by the combined salary of the executives. Observations is the amount of observations in the full sample and subsamples. The statistical significance is given by *,**,*** respectively being significant at the 10%,5%, and 1% level.*

Table 4B:
Difference between the highest and lowest quintile of unexercised but exercisable options, according to FF5

Months (j)	Full	UEO1	Difference (UEO1-UEO5)	UEO5
	AR(M)	AR(M)	AR(M)	AR(M)
+1, +3	0.384%*	0.395%	0.150%*	0.245%
+1, +6	0.252%*	0.346%*	0.248%*	0.0983%
+1, +9	0.249%**	0.299%**	0.258%**	0.0410%
+1, +12	0.258%***	0.302%	0.206%	0.0967%
Observations	1351	204		334

*Where Difference (UEO1-UEO5) equals the difference between mean monthly returns (AR(M)). The statistical significance is given by *,**,*** respectively being significant at the 10%,5%, and 1% level.*

4.3 Exercisable options and repurchase activity

In this section I will elaborate on the chosen short-term incentive, exercisable options, and the direct relation with the value of repurchases. In order to compensate for firm size, the value of repurchases is divided by the market value of equity. This ratio will be the dependent variable in the used OLS regression, the independent variables are year and firm fixed effects as well as known variables used throughout literature to include for omitted variables biases.

In Table 5 the results can be found of the OLS regression per year. The table shows that there is a negative relation between the value of exercisable options and the ratio of repurchases divided by the market value of equity. An increase of 1 dollar in exercisable options, decreases the dependent variable REP by -0.00000401. This means that an increase of 1 million dollars corresponds to a decrease of -0.401 in the ratio of repurchases to the market value of equity. This effect is not significant. The result is in contradiction with the expected effect, as a positive effect was expected to be found.

The negative effect is not only in contradiction it is also not significant. The total value of unvested shares seems to harm the REP ratio. An increase of total unvested shares of 1 million dollars corresponds with a decrease of 0.109 on the REP ratio. These results are not significant at any level, meaning that the coefficient is not interpretable. The effect of unvested shares is consistent with existing literature, as unvested shares function as a long-

term incentive variable in the regression. Indicating that higher long-term incentives decrease the value of repurchases.

Repurchases especially increase the stock performance shortly after the announcement. The negative effect of unvested shares strengthens the idea that executives decide to postpone repurchase announcements.

The cash to total assets does have a positive effect on the repurchase activity and the cash to net assets does have a negative effect. The effects are minimal and not significant.

The percentage of undervaluation has a negative effect of -0.0199 on the REP ratio. An increase of undervaluation of 1% decreases the REP ratio by -0.0199. This is inconsistent with existing literature. As the undervaluation hypothesis suggests that firms which are, to their believes, undervalued initiate more repurchases. An explanation can be that firms in the data sample are unaware of their undervaluation. As the financial crisis still had its impact on firm decisions at the beginning of the data sample, executives could have been more hesitant in their beliefs of potential undervaluation.

Salary has a negative effect and bonus has a positive effect on the REP ratio. The positive effect of salary is consistent with literature as a higher salary should increase the incentives to repurchase. Salary is a compensation for executives which disregards performance, this can in turn result in the avoidance of executives taking risk. The positive effect of bonus on the REP ratio is consistent with literature, due to the same explanation. The amount of bonus often is determined by performance, mostly measured in stock. Repurchases increase stock performance and are therefore a good method to increase the value of bonuses received.

The age of the executives decreases the REP ratio, older executives tend to be less risk-taking which explains this effect. The amount of work years by the CEO increases the REP ratio, which can be explained by the theory that CEOs who work at the same company for a longer period start being more comfortable taking risk. Age and the amount of work years are not significant.

The overall results lack significance, not only for the full sample but also for many single years, this means that the hypothesis, suggesting that the value of exercisable options does impact the repurchase activity, cannot be accepted. The R-squared is 0.7281 for the full sample, indicating an explanatory power of 72.81%. This is relatively high, even though the

independent variables do not show much significance. This can be explained by the usage of fixed effects, meaning that a lot of explanatory power is found within firms itself.

Table 5:
Effect of unexercised but exercisable options on the total value of repurchases

REP	Full sample	2010	2011	2012	2013	2014	2015	2016
$UnExOpt_{t-1}$	-4.01e-06	0.00000446	0.00000395	0.00000625	-0.00000678	0.000000739	0.00000235	-0.0000115
$TotUnv_{t-1}$	-1.09e-06	0.000000339	-0.000000253	0.000000276	0.000000232	0.00000206	-0.000000216	0.000000209
RatioCTA	0.171	-0.0222	-0.0881	-0.0532	0.0993	0.159**	0.0565	0.0312
RatioNATA	-0.0800	-0.0164	0.0623	-0.0125	-0.000967	-0.106**	-0.00312	0.0463
$Undervalued_{j-3,j+1}$	-0.0199	-0.0375	0.00957	-0.185**	-0.0168	-0.0697	-0.0212	-0.103
$Salary_{t-1}$	-0.0000307**	0.0000125	0.0000120	-0.0000277*	0.0000276*	-0.0000130	0.000000616	0.0000134
$Bonus_{t-1}$	3.04e-06	0.0000355**	-0.00000810	0.00000941	-0.0000121	-0.00000688	0.00000688	-0.00000224
Age_{t-1}	-0.00109	0.00121	0.00340	0.00310	-0.00329	-0.00232	-0.00107	-0.000118
$WorkYears_{t-1}$	0.00296	-0.00124	0.00235	-0.00120	0.000497	0.00134	0.000498	-0.00176
Takeover	0.000401	-0.00195	-0.0194	-0.0234	0.200	(omitted)	0.0134	-0.0430
Firm Fixed Effects	Yes	-	-	-	-	-	-	-
Year Fixed Effects	Yes	-	-	-	-	-	-	-
R-squared	0.7281	0.9927	0.9371	0.9919	0.9490	0.9881	0.9711	0.9911
N	1351	187	247	179	154	205	220	159

*Where REP is the total value of repurchases divided by the market value of equity, t equals the announcement year,. UnExOpt is the total value of unexercised options which are exercisable, TotUnv is the total value of unvested stocks, Salary is the salary of all executives, Bonus is the bonus for all executives, Age is the mean age of all the executives, WorkYears is the amount of working years of the CEO, RatioCTA is the ratio of cash to total assets, RatioNata is the ratio of net assets to total assets, Undervalued is the percentage difference between the returns on j-3 and j+1, Takeover is a dummy variable indicating whether a repurchase is announced within 548 days after a rumor or announcement a company is seen as a potential target by other companies. Firm Fixed Effects are firm fixed effects for every firm in the data sample, Year Fixed Effects are year fixed effects for every year in the data sample. R-squared is the measure for the proportion of variance explained by the model. N is the number of observations. (omitted) for Takeover in the year 2014 is due to no observations for the variable during that year. UnExOpt, TotUnv, Salary, and Bonus are in thousands of dollars. Age and WorkYears are in years. The statistical significance is given by *,**,*** respectively being significant at the 10%,5%, and 1% level.*

4.4 The relation between short-term incentives and long-term returns

In order to investigate the effect of exercisable options on the long-term abnormal stock returns the FF5 factors are used in an OLS regression where the alpha equals the abnormal returns. The exercisable options are divided by the total compensation of all executives to account for salary. A relatively higher percentage of exercisable options compared to total compensation should therefore result in more incentives to boost the stock performance as the stock performance is a bigger part of the compensation received by executives. The ratio of exercisable options compared to total compensation is divided into quintiles, where I expect to find consistently higher abnormal returns for the lowest quintile.

In Table 6A and 6B, the results for the abnormal returns are shown according to the FF5 model. With 1,351 repurchases the abnormal returns are persistent with a time horizon of 48 months. Looking at the full sample the abnormal mean monthly return is at least 0.264%. The highest abnormal returns are seen within the first 12 months, meaning that the results draw a trend, where the abnormal returns are diminishing over time, but stay persistent for at least up to 48 months after the repurchase announcement. Surprising are the increasing abnormal returns overtime for the highest quintile. Despite the increasing returns for the highest quintile, the lowest quintile realizes higher abnormal returns for the first 36 months.

In Table 6B the difference is shown. The difference observed between the 2 quintiles is not significant. Even though the absence of significance, the results speak in favor of the hypothesis, suggesting that firms with a lower percentage of exercisable options compared to total salary outperform the full sample and outperform firms with a higher percentage of exercisable options compared to salary.

The consistent outperformance of the first quintile compared to the fifth quintile gives space to investigate the subject further.

Table 6A:
Effect of unexercised but exercisable options on the long-term returns after repurchase announcements, according to FF5

Months (j)	Full	UEO1	UEO2	UEO3	UEO4	UEO5
	AR(M)	AR(M)	AR(M)	AR(M)	AR(M)	AR(M)
+1, +12	0.258%***	0.302%	0.257%	0.275%*	0.573%***	0.0967%
+1, +24	0.264%***	0.341%**	0.403%***	0.0569%	0.374%**	0.232%*
+1, +36	0.292%***	0.414%***	0.0882%	0.0633%	0.235%	0.326%**
+1, +48	0.280%***	0.320%***	0.0215%	0.257%*	0.305%*	0.376%***
Observations	1351	204	213	287	313	334

$$(RET_{i,t} - R_{f,t}) = a_j + b_j(R_{m,t} - R_{f,t}) + c_j SMB_t + d_j HML_t + e_j RMW_t + f_j CMA_t + \varepsilon_{i,t}$$

Where $RET_{i,t}$ is the return on security *i* in month *t,* corresponding to event month *j.* Event month *j* = 0 for the month with the repurchase announcement. $R_{f,t}$ is the risk free rate for month *t*, $R_{m,t}$ is the market return for month *t*, SMB_t is the size factor for month *t* corresponding to event month *j*, and HML_t is the book to market factor for month *t* corresponding to event month *j*. RMW_t is a profitability factor for month *t* corresponding to event month *j*. CMA_t is a investment factor for month *t* corresponding to event month *j*.

The mean abnormal monthly return AR(M) *is reported over the period j+1 till j+12(24,36,48), for the full sample and every quintile based on the total value of unvested stock. Abnormal returns are calculated using the IRATS method combined with the Fama&French five-factor model over the full sample of 1351 open market repurchases and the subsamples based on the total value of unexercised exercisable options divided by the combined salary of the executives. Observations is the amount of observations in the full sample and subsamples. The statistical significance is given by *,**,*** respectively being significant at the 10%,5%, and 1% level.*

Table 6B:
Difference between the highest and lowest quintile of unexercised but exercisable options, according to FF5

Months (j)	Full	UEO1	Difference (UEO1-UEO5)	UEO5
	AR(M)	AR(M)	AR(M)	AR(M)
+1, +12	0.258%***	0.302%	0.206%	0.0967%
+1, +24	0.264%***	0.341%**	0.109%	0.232%*
+1, +36	0.292%***	0.414%***	0.0742%	0.326%**
+1, +48	0.280%***	0.320%***	-0.0594%	0.376%***
Observations	1351	204		334

*Where Difference (UEO1-UEO5) equals the difference between mean monthly returns (AR(M)). The statistical significance is given by *,**,*** respectively being significant at the 10%,5%, and 1% level.*

5. Additional analysis and robustness checks

In this chapter I will conduct extra analysis, or robustness checks to introduce new impactful results or strengthen the found results.

5.1 Additional findings on dividends versus repurchases

The results shown in section 4.1 gave reason to investigate further on the payout decisions between repurchases and dividends. In order to do this I used a method similar to the method used to investigate abnormal returns.

If executives do get impacted based on the compensation they receive through exercisable options, it is expected to find a relation between the percentage exercisable options to total compensation and the difference between repurchase payout value and dividend payout value.

The value of exercisable options is divided by the total value of compensation of all executives and split into quintiles. The data sample used is the data sample shown in Table 2. After splitting the sample into quintiles, the difference in repurchase value and dividend payout value is divided by the market value of equity. Dividing by the market value of equity compensates for firm size.

I expect to find a higher difference in value between repurchases and dividends for the higher quintiles. In order to statistically validate this, I will conduct a t-test between the mean percentage exercisable options of the first and fifth quintile. The results are shown in Table 7A and 7B

The results show that the mean difference between repurchases and dividends increases after the first quintile, as the mean difference goes from 0.0000275 in the first quintile towards 0.0000544 in the fifth quintile. The fifth quintile is not only higher than the first quintile, the difference is also significant at the 5% level. The highest difference is measured for the second quintile (0.0000788) and declines while moving towards the fifth quintile. Overall do the results show to be in favor of executives being impacted in their choice between repurchases and dividends by the percentage of exercisable options.

Table 7A:
Effect of unexercised but exercisable options on the short-term returns after repurchase announcements, according to FF5

	Full Sample	UEO1	UEO2	UEO3	UEO4	UEO5
DIF/MVE	0.0000609	0.0000275	0.0000788	0.000711	0.000696	0.0000544
Difference	-	-	0.0000513	-0.0000077	-0.0000015	-0.0000152
Observations	928	154	158	184	215	217

Where DIF/MVE is the difference in repurchases and dividends divided by the market value of equity. Difference is the difference between DIF/MVE from the observed quintile compared to the previous quintile. Observations is the amount of observations.

Table 7B:
Effect of unexercised but exercisable options on the short-term returns after repurchase announcements, according to FF5

	Full Sample	UEO1	Difference	UEO5
DIF/MVE	0.0000609	0.0000275	0.0000269*	0.0000544
			*	
Observations	928	154	-	217

*Where DIF/MVE is the difference in repurchases and dividends divided by the market value of equity. Difference is the difference between DIF/MVE from the first quintile compared to the fifth quintile. Observations is the amount of observations. Statistical significance of the difference is given by *,**,*** respectively being significant at the 10%,5%, and 1% level.*

5.2 Robustness checks for short-term abnormal returns.

In this section I will elaborate on the executed robustness checks for determining short-term abnormal returns. As I used the FF5 model in section 4.2 for determining abnormal returns and concluding that firms with lower percentages exercisable options do realize higher abnormal returns, other models can be used to potentially strengthen these results.

The Fama&French 3 (FF3) factor as well as the Carhart 4 factor (C4) model, are used. The excess return realized by a security is regressed on the 3 factors from Fama&French, and the 4 factors from Carhart for each month in event time. The intercept a_j represents the return compensated for the factors used.

The regressions linked to the FF3 and C4 models are respectively shown below.

$$(RET_{i,t} - R_{f,t}) = a_j + b_j(R_{m,t} - R_{f,t}) + c_j SMB_t + d_j HML_t + \varepsilon_{i,t} \quad (5)$$

$$(RET_{i,t} - R_{f,t}) = a_j + b_j(R_{m,t} - R_{f,t}) + c_j SMB_t + d_j HML_t + e_j UMD_t + \varepsilon_{i,t} \quad (6)$$

Where $RET_{i,t}$ is the return on security *i* in month *t,* corresponding to event month *j.* Event month *j* = 0 for the month with the repurchase announcement. $R_{f,t}$ is the risk-free rate, $R_{m,t}$ is the market return, SMB_t is a size factor, and HML_t is a book-to-market factor. UMD_t is a momentum factor, and $\varepsilon_{i,t}$ is the error term.

In Table 8A and 8B, the results can be found for the FF3 approach. Table 8A shows the returns, which appear to be abnormal. With 1,351 repurchases, the full sample shows that after a repurchase announcement the mean abnormal return is higher than 0.3% per month for up to 12 months. The first 3 months (first row Table 8A) show to be consistently higher than the later periods (last 3 rows Table 8A), indicating that the abnormal returns are the highest shortly after the announcement.

The abnormal returns seem to decay with months passing. Not only do every quintile and the full sample have significant abnormal returns for most of the periods, but the first (lowest) quintile does also have higher abnormal returns for every period compared to the full sample. The last (highest) quintile has lower abnormal returns compared to the full sample for every period. To validate my hypothesis, I expected the highest quintile to have significantly lower abnormal returns than the lowest quintile, Table 8B shows the results on the difference between the 2 quintiles. As the table indicates, the abnormal returns between the highest and

lowest quintile are consistently different from each other, with the lowest quintile having higher abnormal returns. This difference is significantly different from 0 for the period up to 9 months on a 90% significance level. This indicates that the first quintile does have significantly higher mean abnormal returns for the first 9 months compared to the highest quintile, while accounting for the factors from the FF3 model. The results overall do strengthen the results found with the FF5 model, especially for the abnormal returns considered in the first 9 months. Significance is lacking but the first quintile seems to have consistently higher abnormal returns for the first 12 months after a repurchase announcement.

Table 8A:
Effect of unexercised but exercisable options on the short-term returns after repurchase announcements, according to FF3

Months (j)	Full	UEO1	UEO2	UEO3	UEO4	UEO5
	AR(M)	AR(M)	AR(M)	AR(M)	AR(M)	AR(M)
+1, +3	0.450%*	0.435%	0.516%	0.210%	0.813%**	0.344%
+1, +6	0.350%**	0.398%*	0.467%	0.361%*	0.388%*	0.237%
+1, +9	0.337%***	0.361%**	0.390%*	0.346%**	0.614%**	0.107%
+1, +12	0.342%***	0.352%*	0.376%**	0.438%***	0.600%***	0.164%
Observations	1351	204	213	287	313	334

$$(RET_{i,t} - R_{f,t}) = a_j + b_j(R_{m,t} - R_{f,t}) + c_j SMB_t + d_j HML_t + \varepsilon_{i,t}$$

Where $RET_{i,t}$ is the return on security i in month t, corresponding to event month j. Event month j = 0 for the month with the repurchase announcement. $R_{f,t}$ is the risk free rate for month t, $R_{m,t}$ is the market return for month t, SMB_t is the size factor for month t corresponding to event month j, and HML_t is the book to market factor for month t corresponding to event month j.

The mean abnormal monthly return AR(M) *is reported over the period j+1 till j+3(6,9,12), for the full sample and every quintile based on the total value of unvested stock. Abnormal returns are calculated using the IRATS method combined with the Fama&French three-factor model over the full sample of 1351 open market repurchases and the subsamples based on the total value of unexercised exercisable options divided by the combined salary of the executives (UEO, unexercised but exercisable options). Observations is the amount of observations in the full sample and subsamples. The statistical significance is given by *,**,*** respectively being significant at the 10%,5%, and 1% level.*

Table 8B:
Difference between the highest and lowest quintile of unexercised but exercisable options, according to FF3

Months (j)	Full	UEO1	Difference (UEO1-UEO5)	UEO5
	AR(M)	AR(M)	AR(M)	AR(M)
+1, +3	0.450%*	0.435%	0.0909%	0.344%
+1, +6	0.350%**	0.398%*	0.161%	0.237%
+1, +9	0.337%***	0.361%**	0.254%*	0.107%
+1, +12	0.342%***	0.352%*	0.188%	0.164%
Observations	1351	204		334

*Where Difference (UEO1-UEO5) equals the difference between mean monthly returns (AR(M)). The statistical significance is given by *,**,*** respectively being significant at the 10%,5%, and 1% level.*

The results for the C4 model are shown in tables 9A and 9B. The results show that abnormal returns stay present, also according to the C4 model. In comparison to the other models the C4 model does not show consistent higher returns between the lowest quintile and the full sample. With 1,351 repurchases the C4 model also shows that the lowest quintile outperforms the highest quintile consistently. The overall abnormal returns do show to be higher compared to the FF5 model and the FF3 model, but clear conclusions cannot be drawn.

The abnormal returns for the full sample are at the minimum 0.371%, which is after the first six months of the repurchase announcement. After 12 months the mean abnormal return per month is 0.382%. The abnormal returns decay over time, except for the third quintile. This shows that the highest abnormal returns are realized shortly after the repurchase announcement. This is consistent with the FF3 and FF5 models. Table 6B clearly shows that the lowest quintile is outperforming the highest quintile in every period. Similar to the FF3 model, the C4 model lacks significance in the results.

Up to 9 months, the abnormal returns for the lowest quintile are significantly higher than those of the highest quintile, at the 90% significance level. After 12 months the firms in the lowest quintile realize 0.216% higher abnormal returns compared to the highest quintile. This means that the lowest 20% of firms, when looking at the percentage of exercisable options held by their executives compared to their total compensation, outperform the firms in the highest 20%. This indicates that the stock performance of a firm gets influenced by the percentage of exercisable options from executives, which could be caused by executives

taking unjustified decisions to maximize personal profits. The results appear to be in favor of the second hypothesis and strengthen the initial analyses.

Table 9A:
Effect of unexercised but exercisable options on the short-term returns after repurchase announcements, according to Carhart 4

Months (j)	Full	UEO1	UEO2	UEO3	UEO4	UEO5
	AR(M)	AR(M)	AR(M)	AR(M)	AR(M)	AR(M)
+1, +3	0.481%*	0.451%	0.517%	0.262%	0.823%**	0.399%
+1, +6	0.371%**	0.413%*	0.469%	0.421%*	0.410%*	0.226%
+1, +9	0.381%***	0.374%**	0.457%*	0.431%**	0.712%***	0.0975%
+1, +12	0.382%***	0.365%**	0.447%**	0.520%***	0.711%***	0.149%
Observations	1351	204	213	287	313	334

$$(RET_{i,t} - R_{f,t}) = a_j + b_j(R_{m,t} - R_{f,t}) + c_j SMB_t + d_j HML_t + e_j UMD_t + \varepsilon_{i,t}$$

Where $RET_{i,t}$ is the return on security i in month t, corresponding to event month j. Event month j = 0 for the month with the repurchase announcement. $R_{f,t}$ is the risk free rate for month t, $R_{m,t}$ is the market return for month t, SMB_t is the size factor for month t corresponding to event month j, and HML_t is the book to market factor for month t corresponding to event month j. UMD_t is a momentum factor for month t corresponding to event month j.

*The mean abnormal monthly return AR(M) is reported over the period j+1 till j+3(6,9,12), for the full sample and every quintile based on the total value of unvested stock. Abnormal returns are calculated using the IRATS method combined with the Carhart four-factor model over the full sample of 1351 open market repurchases and the subsamples based on the total value of unexercised exercisable options divided by the combined salary of the executives. Observations is the amount of observations in the full sample and subsamples. The statistical significance is given by *,**,*** respectively being significant at the 10%,5%, and 1% level.*

Table 9B:
Difference between the highest and lowest quintile of unexercised but exercisable options, according to Carhart 4

Months (j)	Full	UEO1	Difference (UEO1-UEO5)	UEO5
	AR(M)	AR(M)	AR(M)	AR(M)
+1, +3	0.481%*	0.451%	0.0520%	0.399%
+1, +6	0.371%**	0.413%*	0.187%	0.226%
+1, +9	0.381%***	0.374%**	0.277%*	0.0975%
+1, +12	0.382%***	0.365%**	0.216%	0.149%
Observations	1351	204		334

*Where Difference (UEO1-UEO5) equals the difference between mean monthly returns (AR(M)). The statistical significance is given by *,**,*** respectively being significant at the 10%,5%, and 1% level.*

5.3 Robustness checks for long-term abnormal returns.

As with the short-term abnormal returns, the usage of extra models can strengthen the results found with the FF5 model.

The FF3 and C4 models will be used for the robustness checks. The percentage of exercisable options compared to total compensation will be split into quintiles. I will conduct a T-test between the returns of the first and the fifth quintile. As my hypothesis suggests I expect the first quintile to have significantly higher returns compared to the fifth quintile.

The regression corresponding with the FF3 and C4 model are respectively shown below.

$$(RET_{i,t} - R_{f,t}) = a_j + b_j(R_{m,t} - R_{f,t}) + c_j SMB_t + d_j HML_t + \varepsilon_{i,t} \quad (7)$$

$$(RET_{i,t} - R_{f,t}) = a_j + b_j(R_{m,t} - R_{f,t}) + c_j SMB_t + d_j HML_t + e_j UMD_t + \varepsilon_{i,t} \quad (8)$$

Where $RET_{i,t}$ is the return on security *i* in month *t,* corresponding to event month *j.* Event month *j* = 0 for the month with the repurchase announcement. $R_{f,t}$ is the risk-free rate, $R_{m,t}$ is the market return, SMB_t is a size factor, and HML_t is a book-to-market factor. UMD_t is a momentum factor, and $\varepsilon_{i,t}$ is the error term.

In Table 10A and 10B, the results for the long-term abnormal returns according to the FF3 model are shown. In comparison with the short-term results, the long-term abnormal returns for the FF3 model are similar. The abnormal returns are still existent after 48 months and highly significant. After 48 months, firms with a repurchase announcement realize positive abnormal returns for every quintile, which is the highest for the highest quintile with 0.376%

followed by the lowest quintile with 0.320%. The full sample overall realizes an abnormal return of 0.280% after 48 months. For the lowest quintile of percentage exercisable options, the abnormal returns are consistently higher than the full sample. This means that the lowest quintile outperforms the overall sample in every period, up to 48 months. Surprising is the pattern of abnormal returns for the highest quintile, as they are increasing, resulting in an outperformance after 48 months in comparison with every other quintile. Except for the time-period up to 48 months, the lowest quintile outperforms the highest quintile.

Table 10B shows the difference between the 2 quintiles. As previously mentioned, the lowest quintile outperforms the overall sample for every period and for up to 36 months in the highest quintile. The difference between the highest and lowest quintile is not significant but does support the hypothesis. Because of lacking significance it is hard to conclude that the amount of exercisable options does influence the long-term abnormal returns, even though the results do support the hypothesis, and strengthen the results found with the FF5 model.

Table 10A:
Effect of unexercised but exercisable options on the long-term returns after repurchase announcements, according to FF3

Months (j)	Full	UEO1	UEO2	UEO3	UEO4	UEO5
	AR(M)	AR(M)	AR(M)	AR(M)	AR(M)	AR(M)
+1, +12	0.342%***	0.352%*	0.376%**	0.438%***	0.600%***	0.164%
+1, +24	0.329%***	0.391%**	0.449%***	0.125%	0.426%**	0.259%*
+1, +36	0.292%***	0.414%***	0.0882%	0.0633%	0.235%	0.326%**
+1, +48	0.280%***	0.320%***	0.0215%	0.257%*	0.305%*	0.376%***
Observations	1351	204	213	287	313	334

$$(RET_{i,t} - R_{f,t}) = a_j + b_j(R_{m,t} - R_{f,t}) + c_j SMB_t + d_j HML_t + \varepsilon_{i,t}$$

Where $RET_{i,t}$ is the return on security i in month t, corresponding to event month j. Event month j = 0 for the month with the repurchase announcement. $R_{f,t}$ is the risk free rate for month t, $R_{m,t}$ is the market return for month t, SMB_t is the size factor for month t corresponding to event month j, and HML_t is the book to market factor for month t corresponding to event month j.

The mean abnormal monthly return AR(M) *is reported over the period j+1 till j+12(24,36,48), for the full sample and every quintile based on the total value of unvested stock. Abnormal returns are calculated using the IRATS method combined with the Fama&French three-factor model over the full sample of 1351 open market repurchases and the subsamples based on the total value of unexercised exercisable options divided by the combined salary of the executives. Observations is the amount of observations in the full sample and subsamples. The statistical significance is given by *,**,*** respectively being significant at the 10%,5%, and 1% level.*

Table 10B:
Difference between the highest and lowest quintile of unexercised but exercisable options, according to FF3

Months (j)	Full	UEO1	Difference (UEO1-UEO5)	UEO5
	AR(M)	AR(M)	AR(M)	AR(M)
+1, +12	0.342%***	0.352%*	0.188%	0.164%
+1, +24	0.329%***	0.391%**	0.132%	0.259%*
+1, +36	0.292%***	0.414%***	0.0882%	0.326%**
+1, +48	0.280%***	0.320%***	-0.0557%	0.376%***
Observations	1351	204		334

*Where Difference (UEO1-UEO5) equals the difference between mean monthly returns (AR(M)). The statistical significance is given by *,**,*** respectively being significant at the 10%,5%, and 1% level.*

In Table 11A and 11B, the long-term abnormal returns are shown according to the C4 model. The abnormal returns are persistently present, this is in line with the FF3 and FF5 models. The abnormal returns are diminishing over the full sample but are still 0.292% after 48 months. Except for the first 12 months the abnormal returns for the lowest quintile are outperforming the abnormal returns for the full sample consistently. This indicates that firms in the lowest quintile outperform the full sample over a long-term time horizon.

The difference between the lowest and highest quintile is shown in table 11B. Similar to the FF3 and FF5 models the lowest quintile outperforms the highest quintile except for the period up to 48 months. The differences are not significant but they are in favor of the hypothesis. This makes it hard to conclude whether there is a real effect between the percentage of exercisable options compared to total salary and the misusage of repurchases to boost stock performances and potentially harming the firm.

Table 11A:
Effect of unexercised but exercisable options on the long-term returns after repurchase announcements, according to Carhart 4

Months (j)	Full	UEO1	UEO2	UEO3	UEO4	UEO5
	AR(M)	AR(M)	AR(M)	AR(M)	AR(M)	AR(M)
+1, +12	0.382%***	0.365%**	0.447%**	0.520%***	0.711%***	0.149%
+1, +24	0.362%***	0.377%**	0.516%***	0.230%**	0.475%**	0.287%**
+1, +36	0.305%***	0.377%***	0.125%	0.196%	0.252%	0.317%**
+1, +48	0.292%***	0.295%***	0.0305%	0.358%**	0.374%*	0.380%***
Observations	1351	204	213	287	313	334

$$(RET_{i,t} - R_{f,t}) = a_j + b_j(R_{m,t} - R_{f,t}) + c_j SMB_t + d_j HML_t + e_j UMD_t + \varepsilon_{i,t}$$

Where $RET_{i,t}$ is the return on security i in month t, corresponding to event month j. Event month j = 0 for the month with the repurchase announcement. $R_{f,t}$ is the risk free rate for month t, $R_{m,t}$ is the market return for month t, SMB_t is the size factor for month t corresponding to event month j, and HML_t is the book to market factor for month t corresponding to event month j. UMD_t is a momentum factor for month t corresponding to event month j.

*The mean abnormal monthly return AR(M) is reported over the period j+1 till j+12(24,36,48), for the full sample and every quintile based on the total value of unvested stock. Abnormal returns are calculated using the IRATS method combined with the Carhart four-factor model over the full sample of 1351 open market repurchases and the subsamples based on the total value of unexercised exercisable options divided by the combined salary of the executives. Observations is the amount of observations in the full sample and subsamples. The statistical significance is given by *,**,*** respectively being significant at the 10%,5%, and 1% level.*

Table 11B:
Difference between the highest and lowest quintile of unexercised but exercisable options, according to Carhart 4

Months (j)	Full	UEO1	Difference (UEO1-UEO5)	UEO5
	AR(M)	AR(M)	AR(M)	AR(M)
+1, +12	0.382%***	0.365%**	0.216%	0.149%
+1, +24	0.362%***	0.377%**	0.0899%	0.287%**
+1, +36	0.305%***	0.377%***	0.0602%	0.317%**
+1, +48	0.292%***	0.295%***	-0.0849%	0.380%***
Observations	1351	204		334

*Where Difference (UEO1-UEO5) equals the difference between mean monthly returns (AR(M)). The statistical significance is given by *,**,*** respectively being significant at the 10%,5%, and 1% level.*

6. Conclusion

In this thesis, I researched the understanding of executive incentives and bad usage of repurchases. Through the value of exercisable options held by all executives of firms, incentives were measured for executives to potentially participate in stock repurchases to increase personal equity gains. The results are not uniform in whether executives get influenced by exercisable options.

Executives do get impacted in their payout decision based on exercisable options. The results do give room for further research, as I did find a significant difference between repurchases and dividends for firms holding higher percentages exercisable options but I did not find significance between exercisable options and the difference in repurchases and dividends while using an OLS regression.

Furthermore, I found results showing that the percentage of exercisable options compared to total salary has impact on the short-term abnormal returns. According to the FF5 model, the FF3 model and the C4 model, the firms in the lowest 20% of percentage payout through exercisable options of total compensation do outperform the highest 20% consistently. All models show that the outperformance is significant up to 9 months after the announcement, and according to the FF5 model the outperformance is also significant 3 and 6 months after the announcement.

This strongly supports the idea that executives initiate bad repurchases, because of their potential personal gains and thus destroy firm value in the short term. When looking into the direct relation between the value of exercisable options and the repurchase activity I did not find significant results. The used time period and setup for the analyses are questionable. The dependent variable in the used regression was the value of repurchases divided by the market value of equity. Since the financial crisis and sovereign debt crisis were influencing stock returns for the majority of the used time frame, the dependent variable was influenced. This could have been of influence on the results, potentially explaining the negative effect of exercisable options on the value of repurchases divided by the market value of equity.

Lastly, the results show that the percentage of exercisable options compared to total salary does influence the abnormal long-term returns. According to the FF5 model, the FF3 model and the C4 model the lowest quintile based on percentage exercisable options outperforms

the highest quintile consistently up to 36 months after the announcement. The outperformance is not significant, this means that the persistent difference between the 2 quintiles can be based on coincidence, but it shows support for the hypothesis that executive decisions to personally gain equity can destroy long-term firm value. This, however, needs further investigation.

With the methodology of this thesis, strong signals have been found that firm value gets destroyed because of potential personal equity gain through repurchases. Unfortunately, the lack of significance in the majority of the results does have impact on the power of this thesis. In addition, most of the methods used are very sensitive to omitted variables. Since omitted variables are hard or maybe even impossible to detect, the true power of this thesis is affected. However, with this research, stepping stones have been set towards further investigation.

In conclusion, there is a strong indication that executives do get impacted in their decision-making with the view of personal equity gains.

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Appendix

List of variables

REP	The total value of repurchases divided by the total market value of equity
UnExOpt	Unexercised but exercisable options for all executives of a firm
TotUnv	Total value of unvested shares for all executives of a firm
Salary	Total value of salary for all executives of a firm
Bonus	Total value of bonusses received for all executives of a firm
Age	Average age of all executives of a firm
WorkYears	The total number of years the CEO has been working of a firm
RatioCTA	Ratio of cash to total assets of a firm
RatioNATA	Ratio of net assets to total assets of a firm
Undervalued	The difference in percentage between the stock price 3 months before the repurchase announcement and 1 month after the announcement
Takeover	A dummy variable indicating if a repurchase could have been announced as a defense against takeovers
DIF	The difference in value between the paid out dividends and the value of repurchases for all firms
Extra	The gains or losses from extraordinary activities, divided by the shares outstanding
Volatility	The volatility of the retained earnings for all months after the repurchase announcement until December 2016
UEO (i)	Quintile (i) for unexercised but exercisable options divided by the total salary of all executives
AR(M)	Mean abnormal return per month
DIF/MVE	Difference between the value of repurchases and the value of dividends divided by the market value of equity
Firm Fixed Effects	Fixed effects used in the regressions to compensate for firm effects
Year Fixed Effects	Fixed effects used in the regressions to compensate for year effects