MSc Accounting, Auditing & Control – Master Thesis Accounting and Finance

Stock-Based Compensation: Interest Alignment or Earnings Dilution?

Abstract

This study investigates the relation between stock-based compensation and firm performance. Previous research finds two contrasting explanations: a negative relation indicates earnings dilution, while a positive relation implies interest alignment between managers and shareholders. I empirically show that firms with a high level of interest alignment have on average higher expected stock returns, whereas firms with a high level of earnings dilution have on average lower expected stock returns. Inconsistent with Aboody (1996), I find evidence that the interest alignment effect of stock-based compensation on expected stock returns dominates the earnings dilution effect.

Keywords: Stock-Based Compensation; Interest Alignment; Earnings Dilution; Firm Performance.

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1. Introduction

Alphabet, Amazon, Apple, Facebook and Microsoft together handed out $20.4 billion worth of restricted stock units and other share-based pay to employees in 2016 (Waters, 2017). In 2011, these companies only paid about $6 billion in equity-based compensation. With share prices rising to all time highs, the average value of equity-based compensation also increases. Murphy (2013) shows the increasing popularity of share-based pay for S&P 500 CEO's compared to non-equity pay since the 1990s. The effect of stock-based compensation on firm performance is widely investigated. Academics find two different explanations for the effect of stock-based compensation on firm performance. On the one hand, a positive relation between stock-based compensation and firm performance is interpreted as interest alignment. Equity-based compensation aligns the interests of shareholders and managers. On the other hand, researchers infer that the explanation for a negative relation between stock-based compensation and firm performance is earnings dilution. Paying out a high level of stock-based compensation to employees leads to a higher number of shares outstanding once the employees vest these shares and consequently the earnings per share (EPS) decreases. The dilution cost of stock-based compensation for shareholders arises because shares are granted to employees at prices below the market price. The relative strength of the interest alignment effect compared to the earnings dilution effect is unclear to date and this research aims to find out which effect of stock-based compensation on firm performance dominates.

Do the benefits of stock-based compensation outweigh the dilution cost?

Aboody (1996) finds that the dilution effect of share-based compensation is stronger than the interest alignment effect in a cross-sectional study. However, Skinner (1996) argues that cross-sectional studies have severe shortcomings. Among other reasons, Aboody (1996) does not control for future growth prospects of firms. In my paper, I combine the benefits of the cross-section with a time-series approach by sorting stocks into portfolios and controlling for the well-known risk factors that influence stock returns to be more confident that the effect is not influenced by an omitted variable. With data available on the stock-based compensation expense instead of hand collecting and tension around the effect of equity-based compensation on firm performance this research aims to clarify if the interest alignment effect is more pronounced than the earnings dilution effect of stock-based compensation on firm performance. Investors benefit if a high level of stock-based compensation is associated with high expected stock returns, which implies that there is interest alignment and this effect is not offset by earnings dilution. Companies might resolve agency conflicts between managers and shareholders by paying out high levels of equity-based compensation.

This paper first isolates the effect of interest alignment due to stock-based compensation on stock returns and subsequently separates the effect of earnings dilution due to equity-based compensation on stock returns. After investigating these effects separately, I analyze subsamples in which the level of interest alignment and earnings dilution is balanced. Previous research often focuses either on the interest alignment- or earnings dilution effect of share-based pay on firm performance independently, but do not consider these effects as coexisting. My paper shows that the interest alignment effect dominates when the dilution effect is similar in relative magnitude, i.e. they belong to the same percentile in the cross-sectional distribution of alignment strength and dilution.

I empirically show that companies with a high level of interest alignment due to equity-based compensation have higher average expected stock returns, whereas companies with a high level of earnings dilution have lower average expected stock returns. Common risk factors in asset pricing cannot explain the outperformance of high interest alignment-stocks or low earnings dilution-stocks respectively. Inconsistent with Aboody (1996), the interest alignment effect of share-based compensation on firm performance is stronger than the earnings dilution effect. Firms with a high level of equity-based compensation have on average higher expected stock returns. Excluding companies with dilutive debt outstanding does not alter the results. Aligning the interests of managers and shareholders by paying out high levels of stock-based compensation to managers (partly) resolves the principal-agent problem. The conventional asset pricing models might not fully capture the type of risks firms with a high level of stock-based compensation face though, which is a limitation of my study.

The paper proceeds with the literature review in chapter 2. Chapter 3 outlines the hypotheses used to answer the research question. In chapter 4, I elaborate on the data-selection process. Chapter 5 describes the methodology and chapter 6 contains the empirical results. After analyzing the results, I formulate my conclusions and recommendations for future research in chapter 7. Finally, chapter 8 incorporates the references and chapter 9 contains the appendix.

2. Literature Review

The two most common forms of share-based compensation are restricted stock units and stock options. Even though some companies are starting to use more exotic types of stock-based compensation, such as stock appreciation rights (SAR), which entitle employees to a payment in cash or shares when the stock price increases over a specific period, most companies compensate executives in the form of stock options and restricted stock (Murphy, 2013). Restricted stock grants are ‘restricted’ until certain conditions are met and as a consequence they allow for favorable tax treatment (Murphy, 1999). Employees do not have to pay taxes until the restricted stock vests. Stock options are contracts that give the right to buy a share of stock at the exercise price for a pre-specified term (Murphy, 1999). Most stock option grants expire after 10 years. Contrary to restricted stock units, stock options can become worthless if the exercise price is higher than the price of the underlying stock.

The cost of stock-based compensation boils down to the dilution cost and the stock-based compensation expense. Under the new regulation for stock-based compensation (FAS 123R), the stock-based compensation expense is deducted from the reported earnings. I explain FAS 123R in more detail in the next paragraph. Guay et al. (2003) outline that granting share-based compensation can be seen as paying out cash to an employee for services rendered. Therefore, the value of the stock-based compensation should be deducted from reported earnings. The dilution cost of share-based compensation is reflected in the Earnings per Share (EPS) measure. The numerator of EPS should be deducted by the value of stock-based compensation grants, while the denominator includes an adjustment for the extra shares outstanding when the different forms of stock-based compensation vest. Even though EPS is affected by stock-based compensation, the dilution cost arises if a company grants stock to employees at prices below the market price.

In December 2004 the Financial Accounting Standards Board (FASB) issues the revised version of the Share-Based Payment Statement Financial Accounting Standard No. 123 (FAS 123R). FAS 123R requires that the cost resulting from all share-based payment transactions must be recognized in the financial statements effective June 2005 (FASB, 2004). The revised Statement thus builds forward upon FASB Statement 123 and Accounting Principles Board (APB) Opinion No. 25. APB Opinion No. 25 dates back to 1972 and highlights the desire to expense stock-based compensation with variable exercise prices. However, in the absence of a proper option-valuation model accurate valuation of the options was rather difficult. With the introduction of FAS 123R and accurate valuation techniques, share-based payment transactions have to be measured at fair-value at the grant date. Companies recognize the fair-value of share-based payment transactions as an asset at the grant date and expense the asset over the vesting period (period in which the employee needs to earn the right to exercise the share-based payment). The FASB allows many valuation techniques to estimate the fair value of the share-based payment transactions. The Black-Scholes option valuation-model is one of the most common techniques to estimate the fair value of an option. Black and Scholes (1973) create the first widely used option model that is still being used today. The inputs are the exercise price, the market price of the underlying stock, the risk-free interest rate, the expected dividend yield, volatility and the expected term of the option. Prior to the implementation of FAS 123R, firms were encouraged to expense options at the intrinsic value (the amount by which the stock price exceeds the exercise price of the option). Most firms handed out at-the-money options to their employees with no intrinsic value and therefore no expense was booked in the income statement.

The usefulness of GAAP-reported earnings is a constantly returning topic in financial accounting discussions. Ball and Brown (1968) were one of the first to empirically document the usefulness of accounting income numbers by examining the information content of earnings to investors. For my paper the relationship between earnings numbers and stock returns is also important, because high levels of the stock-based compensation expense lead to lower current GAAP earnings under the new regulation (FAS 123R) and as a consequence the information content of the earnings may change. However, this only holds if the stock-based compensation expense exceeds the higher future earnings that result from the incentives provided by the stock-based compensation. The stock price of a firm is determined by the present value of future discounted cash flows. A higher level of stock-based compensation leads to higher future cash flows. Higher future cash flows result in a higher current stock price as these cash flows are discounted and therewith also lead to higher expected stock returns. However, under the new regulation FAS 123 R, higher share-based compensation also increases the stock-based compensation expense. A higher stock-based compensation expense reduces the current earnings. Consequently, the strength of these effects is unclear. On the one hand, current earnings and stock returns are negatively related. But the stock-based compensation can lead to higher future cash flows and thus higher expected stock returns. The paper by Ball and Brown (1968) leads to further contributions by not just looking at the sign of earnings changes, but also the magnitude of earnings changes and therewith also better controlling for risk factors (such as the book-to-market risk factor) leading to more accurate estimates of the abnormal returns (e.g., Fama and French, 2015). Previous research on the effect of stock-based compensation on expected stock returns outlines two different explanations. A positive relation between stock-based compensation and future stock returns is often evidence for interest alignment between managers and shareholders, while a negative relation is evidence for earnings dilution. To date there is tension around which explanation dominates.

On the one hand academics believe that equity-based compensation improves the alignment of interests. Stock-based compensation can resolve the principal-agent problem. The principal-agent theory by Jensen and Meckling (1976) boils down to the moral hazard problem in which the agent (manager) does not always act in the best interests of the principal (shareholders). The interest alignment-research starts with the general relation between executive compensation, the incentives of managers and the alignment of interests of shareholders and managers. Initial research on this topic is focused on the level of compensation rather than the structure of compensation and thus ignored if it is better to reward executives in the form of cash compensation or equity-based compensation. Masson (1971) finds that firms with executives whose financial rewards more closely paralleled stockholders' interests perform better in the stock market. Jensen and Meckling (1976) argue that managers need a large fraction of ownership to maximize shareholder welfare and to resolve the principal-agent problem. Shavell (1979) shows a principal-agent model in which pay-for-performance of managers provides incentive alignment between shareholders and managers. Coughlan and Schmidt (1985) also document that executive compensation plans align the incentives of top management with those of the firm's owners. Murphy (1985) further explores if all the different sources of executive compensation still align the incentives of the management with the shareholders after controlling for firm-specific variables and finds that the shareholders' realized return is indeed positively related to managerial remuneration. Even though Murphy (1985) looks at different sources of executive compensation, he is not able to answer whether cash based compensation beats equity-based compensation to maximize firm value because he does not consider the percentage of common shares that executives already own. Only the managerial remuneration in the current year is taken into account. Morck et al. (1988) find that managerial equity ownership is too low at most companies, but performance is likely to improve if the level of managerial equity ownership increases.

Jensen and Murphy (1990) believe that equity-based compensation instead of cash compensation has the correct incentive effect for managers to maximize firm value. However, prior to 1990 not many researchers provide evidence that companies with a high percentage of equity-based compensation to total executive compensation perform better. McConnell and Servaes (1990) document that there is a significant relation between Tobin's Q and the fraction of common stock owned by corporate insiders. The curve slopes upward until the inside ownership reaches approximately 40 to 50 percent and then slopes slightly downwards, indicating that too much inside ownership might not be beneficial. Mehran (1995) finds evidence that firm performance is positively related to the percentage of equity held by managers and to the percentage of their compensation that is equity-based. Core and Guay (2001) show that companies reward non-executives with employee stock options to attract and retain employees as well as to align the interests of employees and shareholders to maximize firm value. Core and Larcker (2002) test the findings of Morck et al. (1988) on a sample of firms that require minimum equity ownership levels for executive officers. Managers with below-equilibrium equity ownership are obligated to increase their ownership and consequently firm performance improves. Bell et al. (2002) show that there is a positive relationship between the equity market values of profitable firms and the stock-based compensation expense in a software company setting. Lastly, Hanlon et al. (2003) find that there is a positive relation between stock-based compensation and future cash flows. Higher stock-based compensation better aligns the interests of managers and shareholders.

On the other hand, there is a stream of research that relates stock-based compensation to earnings dilution. Companies reward employees with stock options or restricted stock units and once employees decide to exercise these options or the restricted stock units vest, the number of shares outstanding increases and consequently EPS decreases. However, EPS also decreases if the company issues new shares. The dilution cost of stock-based compensation arises, because the company grants shares to employees at prices below the market price. In 1969 the Accounting Principles Board (APB) first stressed their concerns about earnings dilution: "potentially dilutive convertible securities, options, warrants or rights that upon conversion or exercise could in the aggregate dilute earnings per common share (APB, 1969, paragraph 14)." Research about the earnings dilution effect on stock returns immediately after APB no. 15 is limited. Aboody (1996) argues that there is a negative correlation between the value of outstanding employee stock options and a firm's share price. He argues that the dilution effect dominates the incentive effect of stock-based compensation on firm performance. However, Skinner (1996) believes that the employee stock option values that Aboody (1996) uses have measurement error because they have to be estimated with inputs for the option pricing formula that are not directly available in financial statements (e.g., companies only disclose a range of exercise prices). Moreover, Aboody (1996) does not control for the future growth prospects of firms inherent in earnings and book values. These issues are common in cross-sectional studies and difficult to control for. Morgan and Poulsen (2001) look at pay-for-performance schemes and document that shareholders gain at the announcement of these plans as long as dilution is not excessive. Shareholders do not like pay-for-performance schemes with high dilution levels. Huson et al. (2001) show that the relationship between abnormal returns and unexplained earnings becomes weaker due to expected dilution. This indicates the negative effect of earnings dilution, however this negative effect on EPS can be reduced if a company buys back shares. Nevertheless, this only holds if the cash used to repurchase the shares does not reduce profits (excess cash). Fenn and Liang (2001) find a strong positive relationship between share repurchases and stock options, indicating that companies use more and more open market share repurchases. Companies use more share repurchases as the dilutive effect of employee stock options on diluted EPS increases (Bens, Nagar, Skinner, & Wong, 2003). Aboody et al. (2004) document a negative relation between the stock-based compensation expense and share price or annual return. Consequently, firms who have a high stock-based compensation expense should have a low share price (and low returns).

3. Hypothesis development

3.1 Interest alignment

The principal-agent problem between managers and shareholders is widely investigated by many renowned academics. Equity-based compensation instead of cash compensation delivers the correct incentive effect for managers to maximize firm value and to act in the best interest of shareholders (Jensen and Murphy, 1990; Mehran, 1995; Core and Guay, 2001). As proxy for firm performance researchers use equity market values (Bell et al., 2002), Tobin's Q (McConnell and Servaes, 1990; Mehran, 1995), ROA and stock prices (Core and Larcker, 2002) and future cash flows (Hanlon et al., 2003). Stock returns allow for proper measurement of shareholder interests. Based on previous research, I predict that there is a positive relation between stock-based compensation and expected stock returns.

Hypothesis 1: Firms with a high level of stock-based compensation have higher average expected stock returns (interest alignment)

3.2 Earnings dilution

The negative effect (expected) dilution can have on earnings per share (EPS) is extensively documented. Morgan and Poulsen (2001) find that companies who offer stock-based compensation plans benefit shareholders in the form of a higher stock price compared to matched control firms without stock-based compensation plans. They argue that this only holds if the level of dilution is not excessive though. Furthermore, Huson et al. (2001) show that the Earnings Response Coefficient (ERC) becomes weaker due to expected dilution. The ERC measures the relation between abnormal returns and unexplained earnings. Combining this evidence, I predict that there is a negative relation between the level of earnings dilution and expected stock returns.

Hypothesis 2: Firms with a high level of earnings dilution have lower average expected stock returns

3.3 Interest alignment versus earnings dilution

The relative strength of the interest alignment effect versus the earnings dilution effect of equity-based compensation on stock returns is not intensively investigated. Most researchers focus either on the interest alignment effect or the earnings dilution effect. Aboody (1996) believes the insignificant negative coefficient of ESO value in a cross-sectional regression on share prices is evidence for the earnings dilution effect dominating the incentive alignment effect. Nevertheless, because of the possible measurement error and omitted correlated variable bias inherent in these cross-sectional studies as outlined by Skinner (1996), the interest alignment effect might still have explanatory power. Aboody et al. (2004) document a significant negative relation between the stock-based compensation expense and share prices, which supports the notion that the earnings dilution effect dominates the interest alignment effect of stock-based compensation on stock returns. Based on the possible measurement error and omitted correlated variable bias inherent in these cross-sectional studies, I predict that the interest alignment effect dominates the earnings dilution effect of stock-based compensation.

Hypothesis 3: The interest alignment effect of stock-based compensation on expected stock returns is stronger than the earnings dilution effect

4. Data

My dataset includes all the U.S. listed companies from 2005 to 2016, but only common stocks (share codes 10 and 11). Not many companies recognized the stock-based compensation expense before this time period, because the FASB only encouraged companies to recognize it. Moreover, I do not have to address self-selection issues, because my time period only covers the period in which recognizing the stock-based compensation expense is mandatory. I obtain the stock price data from the CRSP database and I create monthly stock returns. I also drop stocks that have a monthly return higher or lower than 50 percent as these are often penny stocks, which have different characteristics and do not reflect the general market. I use the year 2005 only for portfolio creation. The regression estimation period starts in 2006 and ends in 2016. The dataset has 606.092 firm-month observations before merging with the relevant Compustat financial statement data. I download the stock-based compensation expense, GAAP net income, common shares used to calculate basic EPS and shares used to calculate fully diluted EPS from Compustat. I create the absolute yearly ratio of stock-based compensation expense to GAAP net income, which reflects the level of interest alignment across different firms. I scale the stock-based compensation expense to the level of net income to be sure the results are not driven by profitability differences. Furthermore, I create an earnings dilution ratio based on: (Net income / common shares used to calculate basic EPS) – (Net income / shares used to calculate fully diluted EPS). The earnings dilution ratio I use is similar to the ratio of Morgan and Poulsen (2001), but I also scale it to level of net income to measure the relative impact on earnings. I merge the Compustat data with the CRSP stock return data. I drop stocks that do not have these Compustat variables available. There are no duplicates in my sample, so no need to remove them. The final dataset has 216.215 firm-month observations. As a robustness test to identify whether the results are driven by dilutive debt (which is included in the common shares used to calculate fully diluted EPS), I drop companies that have dilutive debt such as convertible bonds on the balance sheet during the sample period. The dataset drops to 159.688 firm-month observations for this part.

Table 1 displays the summary statistics of my dataset. Not many companies immediately expense stock-based compensation in 2006, which explains the fewer observations. Moreover, the number of observations decreases during the financial crisis. This indicates a decrease in companies that use stock-based compensation, because firms that do not report the stock-based compensation expense in the financial statements are not included in my sample. Murphy (2013) confirms that the average equity-pay for S&P 500 CEO's decreased during the financial crisis. Additionally, the average monthly return and market capitalization are also affected by the financial crisis. The average monthly return in 2008 is -2.76 percent and the average monthly market capitalization also declines in 2008 and 2009. After the financial crisis, the average monthly return and average monthly market capitalization recover. The average monthly market capitalization reaches almost 10 billion in 2016 from a low of 5.4 billion in 2009.

I download the risk factor loadings and the risk-free rate from the Kenneth French Data Library. Table 6 in the appendix displays the descriptive statistics of the risk factors. The market risk factor is the value-weighted return of all CRSP firms incorporated in the U.S. and listed on the NYSE, AMEX, or NASDAQ (share code 10 or 11) minus the one-month Treasury bill rate (risk-free rate). I explain the other risk factors in the methodology section.

Table 1: Summary Statistics

Year	No. of Observations	Av. Monthly Return	Av. Monthly Market Cap.
2006	13.195	0.0126	6.19 billion
2007	22.771	-0.0017	6.44 billion
2008	19.101	-0.0276	5.91 billion
2009	16.362	0.0261	5.40 billion
2010	18.084	0.0201	6.25 billion
2011	21.257	-0.0001	6.53 billion
2012	21.505	0.0137	6.64 billion
2013	21.001	0.0290	8.09 billion
2014	21.658	0.0065	9.20 billion
2015	20.961	-0.0001	9.70 billion
2016	20.320	0.0178	9.86 billion

5. Methodology

The Libby boxes display how I want to operationalize the relationship between the two different effects of stock-based compensation on firm performance (Figure 7 and 8, appendix). I use four asset pricing models to acquire the abnormal returns of stocks. The abnormal return of a stock is the difference between the actual and the expected return. Asset prices adjust relatively fast to new information and reflect all the information available to investors. Fama (1970) is the originator of this assumption and he believes that security prices at any time fully reflect all available information. In my analysis I assume that capital markets are efficient as well, but even in efficient markets abnormal returns can be present. The abnormal returns are merely an approximation of the actual outperformance, because of numerous assumptions underlying these models.

First of all, the Capital Asset Pricing Model (CAPM) by Sharpe (1964) and Litner (1965) corrects the excess return of a stock (return minus risk-free rate) for the market risk. The market risk is systematic and cannot be diversified away. The three other asset pricing models are all extensions of the CAPM and correct the excess return of a stock for more risk factors that cannot be diversified. Previous research shows that these risk factors capture more cross-sectional variation in the average returns than solely the market risk factor. The Three-factor model by Fama and French (1993) includes the risk factors size (SMB) and book-to-market (HML). Small firms have higher average returns than large firms and value firms (low market value of equity relative to a high book value) have higher average returns than growth firms (high market value of equity relative to a low book value).

Capital Asset Pricing Model by Sharpe (1964) and Litner (1965):

$$R_i - R_f = \alpha + \beta_i * (R_m - R_f) + \varepsilon_i \quad (1)$$

Fama and French three-factor model by Fama and French (1993):

$$R_i - R_f = \alpha + \beta_i * (R_m - R_f) + S_i * (SMB) + H_i * (HML) + \varepsilon_i \quad (2)$$

Fama and French (1993) construct 6 value-weighted portfolios in total: ranging from a Small Market Capitalization/Low Book-to-Market value of equity-portfolio (S/L), a Small Market Capitalization/Medium Book-to-Market value of equity-portfolio (S/M) to a Big Market Capitalization/High Book-to-Market value of equity-portfolio (B/H). The Small minus Big (SMB) risk factor is constructed by taking the average return on three portfolios of stocks with a small market capitalization minus the average return of three portfolios of stocks with a large market capitalization. Similarly, the High minus Low (HML) book-to-market factor is the average return of two value portfolios (high book value, low market value of equity and either small or big market capitalization) minus the average return of two growth portfolios (low book value, high market value of equity and either small or big market capitalization).

Next to the Three-factor model, I use the Carhart Four-factor model by Carhart (1997). Carhart adds the momentum risk factor to the Fama and French Three-factor model. Mutual funds with high returns in the past year have higher expected returns in this year. Furthermore, I use the Five-factor model by Fama and French (2015). Fama and French include the firm-specific risk factors investments (CMA) and profitability (RMW) to their Three-factor model. Firms that invest conservatively outperform firms that invest aggressively, while firms with a robust operating profitability outperform firms with a weak operating profitability.

Carhart four-factor model by Carhart (1997):

$$R_i - R_f = \alpha + \beta_i * (R_m - R_f) + S_i * (SMB) + H_i * (HML) + U_i * (UMD) + \varepsilon_i \quad (3)$$

The Up minus Down (UMD) momentum-factor is the average return of two portfolios with high returns in the past year minus the average return of two portfolios with low returns in the past year.

Fama and French five-factor model by Fama and French (2015):

$$R_i - R_f = \alpha + \beta_i * (R_m - R_f) + S_i * (SMB) + H_i * (HML) + R_i * (RMW) + C_i * (CMA) + \varepsilon_i \quad (4)$$

Fama and French (2015) construct 6 value-weighted portfolios based on size and operating profitability and 6 value-weighted portfolios based on size and investment. These portfolios range from a small market capitalization/weak operating profitability-portfolio to a large market capitalization and aggressive investment-portfolio. Operating profitability is defined as the previous year: annual revenues minus cost of goods sold, interest expense, selling, general and administrative expenses, all divided by the previous year-end book value of equity. The Investments-variable is defined as: the previous year growth in total assets divided by the year-end total assets of t-2. The Robust (or high) minus Weak (RMW) profitability-factor is the average return of two robust operating profitability portfolios minus the average return of two weak operating profitability portfolios. Finally, the Conservative minus Aggressive (CMA) investments-factor is the average return of two portfolios of stocks that invest conservatively minus the average return of two portfolios that invest aggressively.

The interest alignment portfolio creation process starts by sorting stocks based on the absolute past year ratio of stock-based compensation expense to GAAP net income into decile portfolios. I control for GAAP net income to make sure the results are not due to profitability differences between companies. Portfolio 10 includes the companies with the highest absolute ratios of stock-based compensation expense to GAAP net income. I rebalance the portfolios annually and create both equally and value-weighted portfolios. I use the CAPM, Fama and French Three-factor, Carhart Four-factor and Fama and French Five-factor asset pricing models to obtain the abnormal returns (α) of portfolio 1 to 10 and to be able to formulate robust conclusions about the performance of the portfolios. Moreover, I create the difference portfolio 10-1 to evaluate if there is a significant and positive abnormal return pattern observable based on the level of stock-based compensation expense in coherence with my expectations.

To investigate the effect of earnings dilution on stock returns, I sort stocks based on a absolute measure of dilution for the past year in decile portfolios: (Net income / common shares used to calculate basic EPS) - (Net income / shares used to calculate fully diluted EPS). Companies that have the same number of weighted average number of common shares outstanding as the number used to calculate diluted EPS are not included in the analysis (no dilution). The common shares used to calculate fully diluted EPS also include dilutive debt (convertible preferred stock), but serve as a good proxy for the increase in number of shares outstanding due to dilution. I create 10 equally and value-weighted portfolios similar to the process before. Portfolio 10 includes companies with the highest absolute ratios of earnings dilution. I expect a negative and significant abnormal return of the difference portfolio (portfolio 10 minus 1) to support hypothesis 2.

To identify the relative strength of the interest alignment effect of stock-based compensation compared to the earnings dilution effect, I double sort stocks in 3x3 portfolios. Firstly, I sort stocks based on the level of interest alignment and then based on the level of earnings dilution. I create 9 portfolios in total. Portfolio (1,1) contains stocks with the lowest 33 percent interest alignment- and earnings dilution-ratios. Portfolio (3,3) contains stocks with the highest 33 percent interest alignment- and earnings dilution-ratios. In every interest alignment-tertile, a negative and significant difference portfolio (e.g., (1,3) minus (1,1)) indicates the negative effect of earnings dilution. In every dilution-tertile, a positive and significant difference portfolio can be interpreted as interest alignment consistent with previous sorting based on solely interest alignment (e.g., (3,1) minus (1,1)). The relative strength of the interest alignment and dilution effect can be determined by the 'diagonal'-portfolios, such as (1,1), (2,2) and (3,3), because for these subsamples the interest alignment- and dilution-effect are similar in magnitude. As a robustness test, I drop stocks that have dilutive debt on the balance sheet in any given year during the sample period and double sort based on interest alignment and dilution again. Moreover, I double sort stocks in 5x5 portfolios as a robustness test to be sure one of the effects truly dominates the other.

Furthermore, I use HAC-Newey West standard errors to correct the relevant regressions for heteroskedasticity and autocorrelation. The portfolios in both the interest alignment- and the earnings dilution-part appear to have problems with heteroskedasticity and autocorrelation as outlined by the Breush-Pagan and Cook-Weisenberg test for heteroskedasticity and the Breusch-Godfrey LM test for autocorrelation. Due to heteroskedasticity the variance of the residuals is not constant and consequently the significance of the coefficients can be biased. Autocorrelation leads to similar significance problems with the coefficients, as the standard error in a certain period contains information about the standard error in the next period. Multicollinearity can also influence the standard errors of the estimated coefficients, because of high correlations between the independent variables in the regression. A rule of thumb is that correlations above 0.9 are too high. The highest correlation is only 0.51 between the HML risk-factor (book-to-market) and the CMA risk-factor (investments), so no multicollinearity problems (table 9, appendix). Lastly, I take the natural logarithm of the monthly firm size (market capitalization). The monthly firm size is not normally distributed and is necessary for the value-weighted portfolio returns.

6. Empirical Results

6.1 Interest Alignment

*Table 2: Value-weighted monthly excess- and abnormal returns of the decile portfolios based on different asset pricing models by sorting on interest alignment. Interest alignment is measured as the absolute previous year ratio stock-based compensation expense to GAAP net income. Portfolio 1: stocks with low interest alignment, portfolio 10: stocks with high interest alignment. Difference portfolios: long in portfolio 10, short in portfolio 1. T-statistics are in parentheses. Significance: * 10%, ** 5%, *** 1%.*

Interest Alignment											
Portfolio **Asset Pricing Model**	**P1** (Low alignment)	**P2**	**P3**	**P4**	**P5**	**P6**	**P7**	**P8**	**P9**	**P10** (High alignment)	**P10-1**
Observations	21.704	21.584	21.619	21.654	21.603	21.625	21.620	21.620	21.621	21.565	
Av. Ratio of Alignment	0.013	0.030	0.043	0.057	0.074	0.095	0.124	0.175	0.290	2.563	
Excess Return	0.0067*	0.0063	0.0065	0.0071*	0.0083**	0.0091**	0.0079*	0.0093**	0.0100**	0.0120**	0.0049**
	(1.79)	*(1.60)*	*(1.64)*	*(1.72)*	*(2.08)*	*(2.13)*	*(1.84)*	*(2.10)*	*(2.28)*	*(2.48)*	*(2.43)*
CAPM Alpha	0.0008	-0.0001	-0.0000	0.0003	0.0018***	0.0021***	0.0009**	0.0021	0.0029***	0.0041***	0.0033**
	(0.95)	*(-0.11)*	*(-0.04)*	*(0.60)*	*(3.97)*	*(3.52)*	*(2.31)*	*(1.52)*	*(2.77)*	*(3.35)*	*(1.97)*
Three-Factor Alpha	0.0010	0.0000	0.0000	0.0004	0.0018***	0.0022***	0.0009**	0.0020***	0.0028***	0.0039***	0.0029**
	(1.09)	*(0.01)*	*(0.13)*	*(0.56)*	*(7.39)*	*(9.36)*	*(2.01)*	*(2.64)*	*(8.27)*	*(11.17)*	*(2.54)*
Four-Factor Alpha	0.0011	0.0000	0.0000	0.0004	0.0018***	0.0021***	0.0008**	0.0020**	0.0029***	0.0039***	0.0029***
	(1.11)	*(0.03)*	*(0.07)*	*(0.58)*	*(8.35)*	*(9.33)*	*(2.32)*	*(2.71)*	*(9.38)*	*(13.67)*	*(2.67)*
Five-Factor Alpha	0.0009	-0.0002	-0.0002	0.0003	0.0015***	0.0015***	0.0010***	0.0020**	0.0033***	0.0051***	0.0042***
	(1.09)	*(-0.18)*	*(-0.55)*	*(0.60)*	*(7.53)*	*(5.51)*	*(3.72)*	*(2.21)*	*(6.45)*	*(8.58)*	*(3.19)*

Table 2 displays the value-weighted coefficients of the interest alignment decile portfolios and the difference portfolios (long in portfolio 10 and short in portfolio 1) of the relevant asset pricing models. Portfolio 1 contains stocks with a low level of interest alignment, while portfolio 10 contains stocks with a high level of interest alignment. Equally weighted portfolios deliver similar coefficients, so company size does not drive the results (table 10, appendix). The number of observations is gradually divided across the ten portfolios. The average ratio of interest alignment increases steadily until portfolio 9 and becomes relatively high in portfolio 10. The average excess return of portfolio 10 is almost twice as high as the average excess return of portfolio 1. The excess return of a stock is the return minus the risk-free rate. The difference portfolio-coefficient of the average excess returns is 0.49% per month with a t-statistic of 2.43 (or 5.88% per year). This outlines the significantly positive effect interest alignment between managers and shareholders due to share-based compensation can have on the expected returns of companies, consistent with hypothesis 1. However, it could be the case that firms with higher interest alignment are more risky so that the higher excess return is a compensation for risk.

Abnormal returns are required to formulate a more robust conclusion about the effect of interest alignment due to share-based compensation on expected stock returns. Table 2 shows the CAPM alpha, three-factor alpha, four-factor alpha and five-factor alpha from portfolio 1 to portfolio 10 as well as the difference portfolio abnormal returns. The abnormal returns are qualitatively similar across the different models. Consequently, I will formulate conclusions on the outperformance of the decile portfolios on solely the three- and five-factor asset pricing models. The Three-factor alpha shows a threefold increase from portfolio 1 (low alignment) to portfolio 10 (high alignment). The Three-factor alpha of portfolio 1 is 0.10% per month (1.20% per year) and is not significant. Portfolio 10 has a significant three-factor alpha of 0.39% per month (4.68% per year, t-statistic of 11.17). The significant three-factor alpha of the difference portfolio (10-1) is 0.29% per month (3.48% per year, t-statistic of 2.54). Similarly, the significant five-factor alpha of the difference portfolio (10-1) is 0.42% per month (5.04% per year, t-statistic of 3.19). As a consequence, I reject the null hypothesis 1. The positive effect of interest alignment between managers and shareholders due to stock-based compensation on stock returns is in coherence with the results of e.g., Jensen and Murphy (1990) and Core and Larcker (2002). Companies can resolve agency conflicts between managers and shareholders due to interest alignment by paying out equity-based compensation, but still have to be aware of the negative effect earnings dilution due to share-based compensation can have on stock returns.

Table 11 and 12 in the appendix show the value-weighted coefficients of the CAPM and three-factor model and the four factor - and five factor model respectively. The equally weighted risk factors are similar. Can the different risk factors explain (part) of the outperformance of portfolio 5 to 10? As previously discussed, the three factor- and five-factor monthly alpha increase by threefold and fourfold respectively from portfolio 1 to 10. The three-factor market risk factor (beta), which corrects the excess return of a portfolio for the market risk, also increases from 0.76 (t-statistic of 39.11) to 1 (t-statistic of 64.55). Stocks with a higher beta are more risky and thus are expected to have higher returns. The size (SMB)- risk factor increases from 0.44 for portfolio 1 (t-statistic of 12.03) to 0.78 for portfolio 10 (t-statistic of 37.16). This indicates that smaller companies use more equity-based compensation relative to earnings, probably because small companies do not have the necessary cash-resources to pay employees. Table 23 in the appendix shows that portfolio 10 contains companies with a smaller average market capitalization than companies in portfolio 1. The book-to-market (HML)- risk factor decreases from 0.20 for portfolio 1 (t-statistic of 3.91) to -0.24 for portfolio 10 (t-statistic of -5.26). Hence, growth stocks (high market value compared to book value of equity) use more equity-based compensation than value stocks. The profitability (RMW)- risk factor also significantly decreases by -0.24 with a t-statistic of -7.23. These risk factor loadings are supported by the average market capitalization, book-to-market ratio and net income of the different portfolios (table 23, appendix). The average market capitalization, book-to-market ratio and net income show a similar pattern as the factor loadings. Growth firms, with a small market capitalization and a low level of profitability, benefit from paying out a high level of stock-based compensation to employees by means of aligning the interests of managers and shareholders.

6.2 Earnings Dilution

Table 3 displays the value-weighted excess- and abnormal returns of the decile portfolios sorted on dilution from the relevant asset pricing models and the difference portfolios. Equally weighted coefficients are similar (table 13, appendix). Portfolio 1 contains stocks with a low level of earnings dilution, while portfolio 10 contains stocks with a high level of earnings dilution. The level of earnings dilution increases steadily from portfolio 1 to 10. The average excess return decreases from 1.04% per month for portfolio 1 (t-statistic of 2.54) to 0.74% per month for portfolio 10 (low dilution). The difference portfolio of the average excess return is -0.29% per month with a t-statistic of -2.05 (or -3.48% per year).

*Table 3: Value-weighted monthly excess- and abnormal returns of the decile portfolios based on different asset pricing models by sorting on earnings dilution. Earnings dilution is measured as the absolute previous year ratio: (Net income / common shares used to calculate EPS) – (Net income / shares used to calculate fully diluted EPS). Portfolio 1: stocks with low dilution, portfolio 10: stocks with high dilution. Difference portfolios: long in portfolio 10, short in portfolio 1. T-statistics are in parentheses. Significance: * 10%, ** 5%, *** 1%.*

Earnings Dilution											
Portfolio **Asset Pricing Model**	**P1** (Low dilution)	**P2**	**P3**	**P4**	**P5**	**P6**	**P7**	**P8**	**P9**	**P10** (High dilution)	**P10-1**
Observations	21.701	21.616	21.605	21.641	21.587	21.646	21.612	21.630	21.625	21.552	
Av. Ratio of Dilution	0.0008	0.004	0.007	0.011	0.017	0.024	0.033	0.048	0.074	0.294	
Excess Return	0.0104**	0.0087**	0.0086**	0.0082**	0.0083**	0.0073*	0.0075*	0.0087**	0.0078*	0.0074*	-0.0029**
	(2.54)	*(2.09)*	*(2.16)*	*(2.00)*	*(1.99)*	*(1.74)*	*(1.81)*	*(2.14)*	*(1.83)*	*(1.68)*	*(-2.05)*
CAPM Alpha	0.0039***	0.0020***	0.0022***	0.0016**	0.0015***	0.0004	0.0007	0.0021***	0.0007	0.0001	-0.0037***
	(4.38)	*(3.00)*	*(4.00)*	*(2.40)*	*(2.62)*	*(0.75)*	*(1.20)*	*(3.75)*	*(1.52)*	*(0.17)*	*(-8.73)*
Three-Factor Alpha	0.0040***	0.0022***	0.0023***	0.0016***	0.0016**	0.0005	0.0007	0.0020***	0.0007	0.0000	-0.0039***
	(13.63)	*(9.06)*	*(3.75)*	*(4.84)*	*(2.35)*	*(0.70)*	*(1.57)*	*(6.95)*	*(1.01)*	*(0.09)*	*(-12.80)*
Four-Factor Alpha	0.0040***	0.0021***	0.0022***	0.0016***	0.0016**	0.0005	0.0006	0.0020***	0.0007	0.0001	-0.0039***
	(13.62)	*(9.58)*	*(4.03)*	*(5.08)*	*(2.38)*	*(0.71)*	*(1.62)*	*(6.91)*	*(1.03)*	*(0.28)*	*(-12.06)*
Five-Factor Alpha	0.0040***	0.0023***	0.0021***	0.0016***	0.0012**	0.0002	0.0008***	0.0018***	0.0008	0.0005	-0.0035***
	(8.70)	*(10.67)*	*(4.00)*	*(4.68)*	*(2.07)*	*(0.46)*	*(2.71)*	*(7.10)*	*(1.43)*	*(1.01)*	*(-8.20)*

Hence, a high level of earnings dilution leads to lower average excess returns. However, more interesting are the abnormal returns.

As previously discussed, I use the three- and five-factor asset pricing models to identify the effect of earnings dilution on expected stock returns. Table 3 shows that the three-factor alpha drops from 0.40% per month in portfolio 1 (4.80% per year, t-statistic of 13.63) to 0.00% in per month in portfolio 10 (high dilution). Similarly, the five-factor alpha decreases from 0.40% per month (4.80% per year, t-statistic of 8.70) to 0.05% per month. The significant three- and five-factor difference portfolios are -0.39% per month (-4.68% per year, t-statistic of -12.80) and -0.35% per month (-4.20% per year, t-statistic of -8.20). Therefore, I reject the null hypothesis 2. Firms with a high level of earnings dilution have lower expected stock returns consistent with Morgan and Poulsen (2001) and Huson et al. (2001). Nevertheless, stocks with a low level of earnings dilution and therewith higher expected stock returns could also be caused by an unknown form of risk that is not reflected in the conventional asset pricing models.

Table 14 and 15 in the appendix display the value-weighted abnormal returns and risk factors of the decile portfolios from different asset pricing models by sorting on dilution. The equally weighted risk factors are similar and therefore not displayed. Given that the momentum risk factor is often not significant, I discuss the five-factor risk factors (as the five-factor model is solely an extension of the three-factor model). Beta increases from 0.83 (t-statistic of 54.14) to 1.01 (t-statistic of 58.21). Companies with a higher beta are more risky. The conventional asset pricing models argue that a higher beta also leads to higher abnormal returns. However, Frazzini and Pedersen (2014) find that stocks with a high beta have a low alpha. This might explain the lower abnormal returns for stocks with a high level of dilution. The SMB-risk factor decreases from 0.62 for portfolio 1 (t-statistic of 31.09) to 0.47 for portfolio 10 (t-statistic of 12.85), which indicates that companies with high levels of dilution are often companies with a large market capitalization. The average market capitalization indeed increases from portfolio 1 to 10 (table 24, appendix). The book-to-market (HML)- risk factor is not significant in portfolio 10 and therefore I am unable to address whether value or growth stocks have on average more earnings dilution. The risk factors are not able to completely explain the outperformance of portfolios with low earnings dilution, which supports the notion that the higher expected returns of stocks with a low level of dilution are robust.

6.3 Relative strength interest alignment and dilution

*Table 4: Value-weighted monthly three-factor abnormal returns of the 3x3 double-sorted portfolios based on first interest alignment and then earnings dilution. Portfolio (1,1): stocks with the 33 percent lowest ratios of both interest alignment and dilution, portfolio (3,3): stocks with the 33 percent highest ratios of both interest alignment and dilution. Difference portfolios are long/short portfolios: within each interest alignment or dilution tertile, what is the influence of dilution and interest alignment respectively? T-statistics are in parentheses. Significance: * 10%, ** 5%, *** 1%.*

		Dilution			
	Portfolio	1	2	3	Difference (3-1)
Interest Alignment	1	0.0020*	-0.0008	-0.0000	-0.0020**
		(1.85)	*(-0.71)*	*(-0.04)*	*(-2.33)*
	2	0.0019***	0.0007***	0.0019***	0.0001
		(5.54)	*(2.94)*	*(4.21)*	*(0.24)*
	3	0.0041***	0.0026***	0.0014***	-0.0027***
		(7.50)	(8.74)	(3.57)	(-4.94)
	Difference	0.0021	0.0034***	0.0014**	
	(3-1)	*(1.34)*	*(2.66)*	*(2.19)*	

Table 4 shows the three-factor alphas of the 3x3 double-sorted value-weighted portfolios based on first interest alignment and subsequently dilution and the difference portfolios. Four- and five-factor alphas are similar (table 16 and 17, appendix). Double sorting into 5x5 portfolios makes the results slightly weaker (table 22, appendix). Both the interest alignment and dilution ratios are increasing from portfolio 1 to 3. Equally weighted portfolios are also similar (table 18, 19 and 20 in the appendix). The difference portfolios allow me to examine whether these results are consistent with my previous univariate interest alignment- and dilution results. To investigate if both the interest alignment and dilution effect of stock-based compensation are economically relevant, the difference portfolio (3,1) minus (1,3) has to be positive and significant. Interest alignment has to dominate in portfolio (3,1) and dilution has to dominate in portfolio (1,3). The three-factor difference portfolio (3,1) minus (1,3) has a significantly positive value of 0.41% per month with a t-statistic of 5.08 (4.92% per year).

The portfolios in the first interest alignment-tertile show the increasingly negative effect of earnings dilution. Portfolio (1,1) has a three-factor abnormal return of 0.20% per month, while portfolio (1,3) has a three-factor alpha of 0. The difference portfolio (1,3) minus

(1,1) confirms this pattern with an alpha of -0.20% per month (-2.40% per year, t-statistic of -2.33). The other difference portfolio (2,3) minus (2,1) is approximately zero, which is not in line with the univariate results of dilution. The difference portfolio in the final interest alignment-tertile (3,3 minus 3,1) is -0.27% (-3.24% per year, t-statistic of -4.94), which is consistent with my previous results.

Taken together, my results are in line with Morgan and Poulsen (2001) and Huson et al. (2001) and reflect the negative effect of earnings dilution on expected stock returns. However, in the second interest alignment-tertile, the abnormal returns do not decrease when the level of earnings dilution increases. The average alignment portfolios are not significantly negative influenced by earnings dilution, which might be caused by outliers in portfolio (2,3). Future research might be able to further elaborate on this inconsistent finding.

Moving on to the effect of interest alignment due to stock-based compensation, while keeping the level of dilution constant. In every dilution-tertile, the three-factor alpha increases from portfolio 1 of interest alignment to portfolio 3 of interest alignment. The difference portfolios of interest alignment, while keeping dilution constant, indicate that the double-sorted difference portfolios are consistent with the univariate results of incentive alignment. The difference portfolio (3,1) minus (1,1) is 0.21% per month, however it is not significant. The other two difference portfolios, (3,2) minus (1,2) and (3,3) minus (1,3), are positive and significant with values of 0.34% per month (4.08% per year, t-statistic of 2.66) and 0.14% per month (1.68% per year, t-statistic of 2.19). Stock-based compensation aligns the interests of managers and shareholders, but firms with high interest alignment can also be more risky and the asset pricing models do not capture this type of 'risk'.

To test hypothesis 3, the 'diagonal'-portfolios are the most interesting, as for these subsamples interest alignment and dilution should be similar in magnitude. Portfolio (1,1) has a three-factor alpha of 0.20% per month, but is not significant. Portfolio (2,2) has a three-factor alpha of 0.07% per month with a t-statistic of 2.94 (0.84% per year). Likewise, portfolio (3,3) has a three-factor alpha of 0.14% per month with a t-statistic of 3.57 (1.68% per year). The difference portfolios between (3,3) and (2,2) and (2,2) and (1,1) respectively are not significant, but the fact that the three-factor alphas are positive and significant in two of these portfolios implies that the interest alignment effect dominates the earnings dilution effect in most of the 'diagonal'-portfolios. I therefore reject the null hypothesis 3. The interest alignment effect of stock-based compensation on expected stock returns is stronger than the earnings dilution effect. This is inconsistent with Aboody (1996), who argues that the dilution effect dominates the incentive effect of stock-based compensation on firm performance due to a negative correlation between the value of employee stock options outstanding and stock prices. Measurement error of the value of employee stock options or omitted correlated variable bias inherent in the results of Aboody (1996) might explain this inconsistency as pointed out by Skinner (1996). Aboody (1996) uses a cross-sectional study and because I use a time-series approach in a different sample period the results are difficult to compare. My results can obviously be influenced by measurement error and omitted correlated variable bias as well.

6.4 Robustness

The earnings dilution ratios are based on the number of common shares used to calculate fully diluted EPS that companies report in their financial statements. Dilutive debt, such as convertible debt and convertible preferred stock, is also included in the number of common shares used to calculate fully diluted EPS. Therefore, I exclude companies that have dilutive debt outstanding in any given year during the sample period to formulate a more robust conclusion on the relative strength of the interest alignment- versus the earnings dilution effect of stock-based compensation. I double sort stocks again into 3x3 portfolios based on first the interest alignment ratio and subsequently the earnings dilution ratio.

*Table 5: Value-weighted monthly three-factor abnormal returns of the 3x3 double-sorted portfolios based on first interest alignment and then earnings dilution excluding companies that have any dilutive debt outstanding during the sample period. The sample drops to 159.688 observations. Portfolio (1,1): stocks with the 33 percent lowest ratios of both interest alignment and dilution, portfolio (3,3): stocks with the 33 percent highest ratios of both interest alignment and dilution. T-statistics are in parentheses. Significance: * 10%, ** 5%, *** 1%.*

		Dilution			
	Portfolio	1	2	3	Difference (3-1)
Interest Alignment	1	0.0010***	-0.0010***	0.0005	-0.0006
		(4.12)	*(-3.34)*	*(1.56)*	*(-1.63)*
	2	0.0021***	0.0007***	0.0019***	-0.0001
		(7.44)	*(2.65)*	*(6.84)*	*(-0.29)*
	3	0.0046***	0.0028***	0.0020***	-0.0027***
		(4.15)	(5.51)	(2.75)	(-3.05)
	Difference	0.0036***	0.0039***	0.0015*	
	(3-1)	*(2.84)*	*(5.31)*	*(1.86)*	

Table 5 displays the value-weighted three-factor alphas by double sorting based on interest alignment and dilution into 3x3 portfolios excluding companies that have dilutive debt outstanding. Equally weighted portfolios are similar (table 21, appendix). The results remain relatively similar and the same patterns can be observed. The three-factor difference portfolio (3,1) minus (1,3) is 0.41% per month with a t-statistic of 3.51, indicating that both the interest alignment- and dilution effect of share-based compensation are economically relevant. The negative difference portfolios in every interest alignment tertile show the negative effect earnings dilution has on the abnormal returns, while the positive difference portfolios in every dilution tertile reflect the influence of interest alignment on the abnormal returns. Especially in the third interest alignment tertile, the significantly negative difference portfolio of -0.27% per month (-3.24% per year, t-statistic of -3.05) is consistent with Morgan and Poulsen (2001). They argue that dilution needs to be excessive to significantly influence the stock prices, and therewith returns. The difference portfolios in every dilution tertile are all positive and significant with values ranging from 0.15% per month to 0.39% per month, which is in line with my previous interest alignment results.

The ‘diagonal’-portfolios still support hypothesis 3. Portfolio (1,1) has a three-factor alpha of 0.10% per month (1.20% per year, t-statistic of 4.12), portfolio (2,2) has a three-factor alpha of 0.07% per month (0.84% per year, t-statistic of 2.65) and lastly portfolio (3,3) has a three-factor alpha of 0.20% per month (2.40% per year, t-statistic of 2.75). The interest alignment effect dominates the dilution effect of stock-based compensation on firm performance when companies with dilutive debt outstanding are excluded. Hence, the results are not driven by companies with dilutive debt and are robust.

7. Conclusion

Two main effects of stock-based compensation have been extensively documented by many renowned academics: the alignment of interests between managers and shareholders due to equity-based compensation and the dilution of equity when companies grant shares to employees below market prices. The relative power of these two effects of share-based compensation is unclear to date. This paper seeks to identify whether companies with a high level of equity-based compensation dilute the value of existing shareholders' claims on the firm or have higher expected stock returns.

I find empirical evidence that firms with a high level of interest alignment due to stock-based compensation have on average higher expected stock returns, while firms with a high level of dilution have on average lower expected stock returns. These univariate empirical results do not take the conflicting effects of earnings dilution and interest alignment into account. Common risk factors that explain much of the variation in the cross-section of expected stock returns cannot fully explain the outperformance of stocks with a high level of interest alignment or a low level of dilution respectively.

My multivariate results are inconsistent with Aboody (1996) and Aboody et al. (2004). The interest alignment effect of equity-based compensation is stronger than the earnings dilution effect of equity-based compensation on firm performance. Firms that have dilutive debt on the balance sheet do not drive the results. Paying out a high level of share-based compensation relative to earnings alleviates the principal-agent problem even after controlling for dilution. Companies with a high level of stock-based compensation have higher expected stock returns and do not dilute the value of existing shareholders' claims on the firm. Therefore, I recommend investors to choose firms with a high ratio of stock-based compensation relative to earnings and/or a low level of dilution. Given that the sample period covers the financial crisis, the standard errors of the abnormal returns can be biased and therewith also the significance of the abnormal returns. Future research can investigate the influence of the financial crisis on the interest alignment- and dilution-effect of equity-based compensation. Another remarkable finding also gives food for thought: the average interest alignment-portfolio is not negatively influenced by dilution. Moreover, a better proxy for earnings dilution that captures only dilution due to stock-based compensation might alter the results. My proxy includes companies that have dilutive debt on the balance sheet and dropping these firms decreases the sample size significantly.

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9. Appendix

Table 6: Descriptive Statistics Risk Factors

Variables	Mean	Q1	Median	Q3	St. Dev
Risk-free rate	0.0009	0	0.0001	0.0011	0.0014
Rm-Rf	0.0065	-0.0176	0.0105	0.0324	0.0436
SMB factor	0.0015	-0.0147	0.0016	0.0159	0.0242
HML factor	0.0003	-0.0136	-0.0022	0.0112	0.0269
UMD factor	-0.0006	-0.0192	0.0031	0.0249	0.0486
RMW factor	0.0026	-0.0070	0.0029	0.0119	0.0158
CMA factor	0.0014	-0.0082	0.0004	0.0100	0.0139

Figure 7: Libby box hypothesis 1

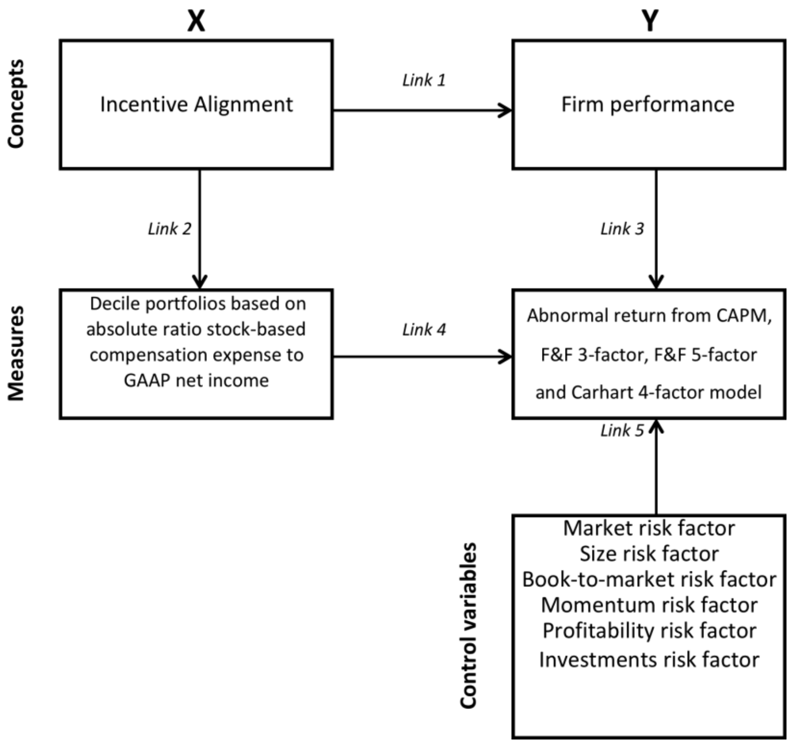

Figure 8: Libby box hypothesis 2

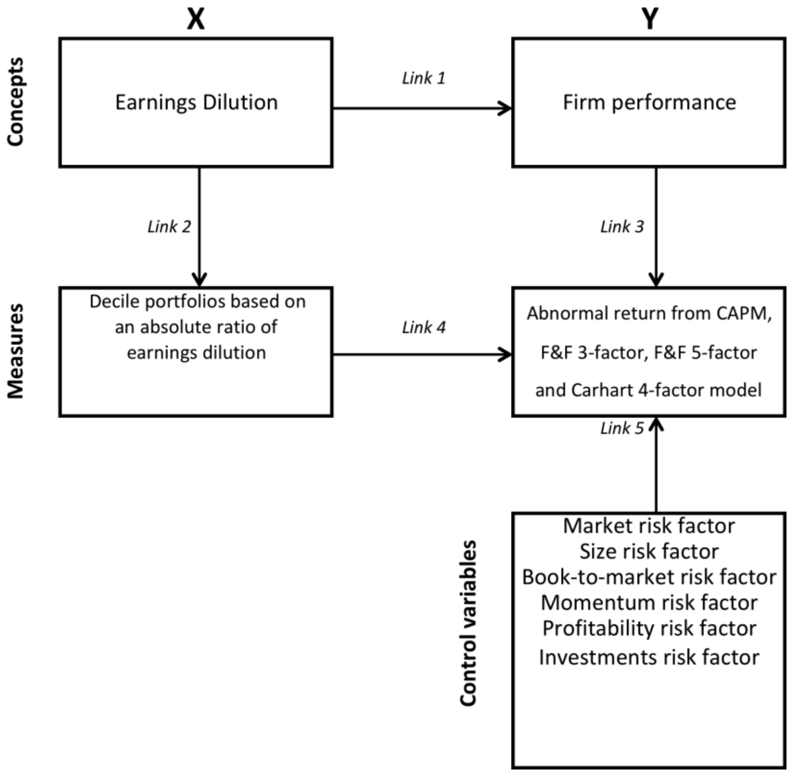

Table 9: Correlation Matrix Risk Factors

The bold numbers indicate that the displayed coefficient is significant at the 5 percent level

Variable	Rf	MRP	SMB	HML	UMD	CMA	RMW
Rf	**1**						
MRP	-0.08	**1**					
SMB	-0.05	**0.42**	**1**				
HML	0.01	**0.32**	**0.30**	**1**			
UMD	0.06	**-0.36**	**-0.19**	**-0.44**	**1**		
CMA	-0.02	-0.02	0.10	**0.51**	-0.09	**1**	
RMW	0.05	**-0.48**	**-0.39**	**-0.25**	**0.24**	0.05	**1**

*Table 10: Equally weighted monthly excess- and abnormal returns of the decile portfolios based on different asset pricing models by sorting on interest alignment. Interest alignment is measured as the absolute previous year ratio stock-based compensation expense to GAAP net income. Portfolio 1: stocks with low interest alignment, portfolio 10: stocks with high interest alignment. Difference portfolios: long in portfolio 10, short in portfolio 1. T-statistics are in parentheses. Significance: * 10%, ** 5%, *** 1%.*

Interest Alignment

Portfolio **Asset Pricing Model**	**P1** (Low alignment)	**P2**	**P3**	**P4**	**P5**	**P6**	**P7**	**P8**	**P9**	**P10** (High alignment)	**P10-1**
Observations	21.704	21.584	21.619	21.654	21.603	21.625	21.620	21.620	21.621	21.565	
Av. Ratio of Alignment	0.013	0.030	0.043	0.057	0.074	0.095	0.124	0.175	0.290	2.563	
Excess Return	0.0063*	0.0060	0.0063	0.0066	0.0081**	0.0089**	0.0076*	0.0089**	0.0096**	0.0110**	0.0046**
	(1.69)	*(1.53)*	*(1.57)*	*(1.61)*	*(2.01)*	*(2.05)*	*(1.77)*	*(2.02)*	*(2.21)*	*(2.36)*	*(2.34)*
CAPM Alpha	0.0005	-0.0004	-0.0003	-0.0001	0.0015***	0.0018***	0.0006	0.0017	0.0026**	0.0036***	0.0031*
	(0.45)	*(-0.29)*	*(-0.61)*	*(-0.20)*	*(3.81)*	*(3.16)*	*(1.57)*	*(1.34)*	*(2.55)*	*(3.26)*	*(1.76)*
Three-Factor Alpha	0.0007	-0.0002	-0.0002	-0.0000	0.0016***	0.0019***	0.0006	0.0017**	0.0025***	0.0034***	0.0027**
	(0.60)	*(-0.15)*	*(-0.37)*	*(-0.04)*	*(4.88)*	*(7.57)*	*(1.06)*	*(2.45)*	*(8.15)*	*(12.44)*	*(2.20)*
Four-Factor Alpha	0.0007	-0.0002	-0.0002	-0.0000	0.0016***	0.0018***	0.0005	0.0017**	0.0026***	0.0034***	0.0027**
	(0.62)	*(-0.13)*	*(-0.45)*	*(-0.03)*	*(5.34)*	*(7.97)*	*(1.13)*	*(2.51)*	*(9.39)*	*(14.55)*	*(2.29)*
Five-Factor Alpha	0.0007	-0.0004	-0.0004	-0.0001	0.0014***	0.0012***	0.0007**	0.0017**	0.0030***	0.0045***	0.0038***
	(0.70)	*(-0.27)*	*(-0.76)*	*(-0.09)*	*(5.96)*	*(4.35)*	*(2.19)*	*(2.03)*	*(5.70)*	*(9.29)*	*(2.74)*

*Table 11: Value-weighted monthly alphas and risk factors of the decile portfolios based on the CAPM and three-factor model by sorting on interest alignment. Equally weighted risk factors are similar and therefore not displayed. Interest alignment is measured as the absolute previous year ratio stock-based compensation expense to GAAP net income. Portfolio 1: stocks with low interest alignment, portfolio 10: stocks with high interest alignment. Difference portfolios: long in portfolio 10, short in portfolio 1. T-statistics are in parentheses. Significance: * 10%, ** 5%, *** 1%.*

Interest Alignment								
Model		**CAPM**			**Three-factor**			
Independent Portfolio	Alpha **(1)**	Market **(2)**	Adj. R^2	Alpha **(1)**	Market **(2)**	SMB **(3)**	HML **(4)**	Adj. R^2
P1	0.0008	0.89***	0.84	0.0010	0.76***	0.44***	0.20***	0.92
	(0.95)	*(45.15)*		*(1.09)*	*(39.11)*	*(12.03)*	*(3.91)*	
P2	-0.0001	0.98***	0.90	0.0000	0.87***	0.40***	0.12**	0.95
	(-0.11)	*(79.41)*		*(0.01)*	*(88.59)*	*(13.51)*	*(2.57)*	
P3	-0.0000	1.00***	0.92	0.0000	0.90***	0.41***	0.05	0.96
	(-0.04)	*(112.78)*		*(0.13)*	*(109.32)*	*(9.41)*	*(1.04)*	
P4	0.0003	1.03***	0.91	0.0004	0.91***	0.47***	0.08***	0.96
	(0.60)	*(112.33)*		*(0.56)*	*(101.41)*	*(15.26)*	*(4.12)*	
P5	0.0018***	1.00***	0.90	0.0018***	0.88***	0.51***	0.03	0.96
	(3.97)	(40.38)		(7.39)	(54.96)	(34.23)	(0.61)	
P6	0.0021***	1.08***	0.91	0.0022***	0.95***	0.54***	0.06**	0.97
	(3.52)	*(79.66)*		*(9.36)*	*(99.61)*	*(19.68)*	*(1.97)*	
P7	0.0009**	1.07***	0.90	0.0009**	0.94***	0.58***	-0.03	0.97
	(2.31)	*(64.77)*		*(2.01)*	*(70.99)*	*(36.75)*	*(-0.78)*	
P8	0.0021	1.10***	0.90	0.0020***	0.98***	0.60***	-0.06***	0.97
	(1.52)	*(59.95)*		*(2.64)*	*(78.93)*	*(20.63)*	*(-2.87)*	
P9	0.0029***	1.09***	0.88	0.0028***	0.94***	0.70***	-0.10***	0.97
	(2.77)	*(64.89)*		*(8.27)*	*(102.98)*	*(19.86)*	*(-3.29)*	
P10	0.0041***	1.14***	0.86	0.0039***	1.00***	0.78***	-0.24***	0.96
	(3.35)	*(67.77)*		*(11.17)*	*(64.55)*	*(37.16)*	*(-5.26)*	
P10-1	0.0033**	0.24***	0.20	0.0029**	0.25***	0.34***	-0.44***	0.48
	(1.97)	*(19.21)*		*(2.54)*	*(7.88)*	*(6.43)*	*(-12.32)*	

*Table 12: Value-weighted monthly alphas and risk factors of the decile portfolios based on the four- and five-factor model by sorting on interest alignment. Equally weighted risk factors are similar and therefore not displayed. Portfolio 1: stocks with low interest alignment, portfolio 10: stocks with high interest alignment. Difference portfolios: long in portfolio 10, short in portfolio 1. T-statistics are in parentheses. Significance: * 10%, ** 5%, *** 1%.*

	Interest Alignment												
Model	**Four-factor**						**Five-factor**						
Independent	Alpha	Market	SMB	HML	UMD	Adj. R^2	Alpha	Market	SMB	HML	RMW	CMA	Adj. R^2
Portfolio	**(1)**	**(2)**	**(3)**	**(4)**	**(5)**		**(1)**	**(2)**	**(3)**	**(4)**	**(5)**	**(6)**	
P1	0.0011	0.75***	0.44***	0.19***	-0.02	0.91	0.0009	0.76***	0.45***	0.20***	0.01	0.03	0.91
	(1.11)	*(31.08)*	*(11.83)*	*(3.05)*	*(-1.15)*		*(1.09)*	*(35.82)*	*(12.09)*	*(3.40)*	*(0.25)*	*(0.54)*	
P2	0.0000	0.86***	0.40***	0.11*	-0.02	0.95	-0.0002	0.87***	0.41***	0.13***	0.08**	-0.04	0.95
	(0.03)	*(61.37)*	*(13.17)*	*(1.68)*	*(-0.72)*		*(-0.18)*	*(75.65)*	*(14.79)*	*(3.04)*	*(2.47)*	*(-0.99)*	
P3	0.0000	0.90***	0.41***	0.06	0.02	0.96	-0.0002	0.91***	0.42***	0.05	0.06*	0.02	0.96
	(0.07)	*(112.22)*	*(9.37)*	*(1.08)*	*(1.22)*		*(-0.55)*	*(84.81)*	*(10.91)*	*(0.87)*	*(1.77)*	*(0.58)*	
P4	0.0004	0.90***	0.47***	0.07***	-0.01	0.96	0.0003	0.91***	0.49***	0.13***	0.10*	-0.17***	0.97
	(0.58)	*(83.30)*	*(15.13)*	*(3.19)*	*(-1.02)*		*(0.60)*	*(56.53)*	*(16.85)*	*(9.83)*	*(1.81)*	*(-3.20)*	
P5	0.0018***	0.88***	0.51***	0.04	0.02**	0.96	0.0015***	0.89***	0.51***	0.00	0.03	0.09***	0.96
	(8.35)	*(52.45)*	*(34.50)*	*(0.79)*	*(2.07)*		*(7.53)*	*(46.32)*	*(30.22)*	*(0.05)*	*(0.50)*	*(3.26)*	
P6	0.0021***	0.95***	0.54***	0.08**	0.03***	0.97	0.0015***	0.97***	0.56***	0.04	0.14***	0.09***	0.98
	(9.33)	*(93.77)*	*(19.72)*	*(2.23)*	*(3.45)*		*(5.51)*	*(113.47)*	*(27.58)*	*(1.42)*	*(5.54)*	*(5.08)*	
P7	0.0008**	0.96***	0.58***	0.01	0.05***	0.97	0.0010***	0.94***	0.57***	-0.03	-0.03	-0.00	0.97
	(2.32)	*(74.54)*	*(36.40)*	*(0.28)*	*(5.24)*		*(3.72)*	*(80.01)*	*(25.74)*	*(-0.69)*	*(-0.41)*	*(-0.01)*	
P8	0.0020***	0.97***	0.60***	-0.08***	-0.02	0.97	0.0020**	0.98***	0.60***	-0.05*	0.02	-0.06	0.97
	(2.71)	*(72.09)*	*(20.99)*	*(-2.97)*	*(-1.31)*		*(2.21)*	*(73.95)*	*(17.53)*	*(-1.67)*	*(0.37)*	*(-1.56)*	
P9	0.0029***	0.94***	0.70***	-0.12***	-0.02***	0.97	0.0033***	0.93***	0.68***	-0.10**	-0.10	-0.03	0.97
	(9.38)	*(100.95)*	*(19.81)*	*(-3.94)*	*(-3.95)*		*(6.45)*	*(75.83)*	*(22.07)*	*(-2.14)*	*(-1.59)*	*(-0.48)*	
P10	0.0039***	0.99***	0.79***	-0.26***	-0.04***	0.96	0.0051***	0.96***	0.76***	-0.18***	-0.22***	-0.22***	0.97
	(13.67)	*(65.89)*	*(38.17)*	*(-5.87)*	*(-7.06)*		*(8.58)*	*(100.42)*	*(27.31)*	*(-2.95)*	*(-5.71)*	*(-6.49)*	
P10-1	0.0029***	0.24***	0.34***	-0.45***	-0.01	0.47	0.0042***	0.20***	0.31***	-0.38***	-0.24***	-0.24***	0.51
	(2.67)	*(6.80)*	*(6.47)*	*(-12.13)*	*(-0.59)*		(3.19)	(7.84)	(5.19)	(-11.12)	(-7.23)	(-4.22)	

*Table 13: Equally weighted monthly excess- and abnormal returns of the decile portfolios based on different asset pricing models by sorting on earnings dilution. Earnings dilution is measured as the absolute previous year ratio: (Net income / common shares used to calculate EPS) – (Net income / shares used to calculate fully diluted EPS). Portfolio 1: stocks with low dilution, portfolio 10: stocks with high dilution. Difference portfolios: long in portfolio 10, short in portfolio 1. T-statistics are in parentheses. Significance: * 10%, ** 5%, *** 1%.*

Earnings Dilution											
Portfolio / **Asset Pricing Model**	**P1** (Low dilution)	**P2**	**P3**	**P4**	**P5**	**P6**	**P7**	**P8**	**P9**	**P10** (High dilution)	**P10-1**
Observations	21.701	21.616	21.605	21.641	21.587	21.646	21.612	21.630	21.625	21.552	
Av. Ratio of Dilution	0.0008	0.004	0.007	0.011	0.017	0.024	0.033	0.048	0.074	0.294	
Excess Return	0.0099**	0.0083**	0.0082**	0.0077*	0.0079*	0.0068	0.0072*	0.0084**	0.0076*	0.0072	-0.0027*
	(2.43)	*(2.00)*	*(2.06)*	*(1.88)*	*(1.90)*	*(1.63)*	*(1.74)*	*(2.05)*	*(1.77)*	*(1.61)*	*(-1.90)*
CAPM Alpha	0.0034***	0.0016***	0.0017***	0.0011*	0.0012**	-0.0000	0.0004	0.0017***	0.0005	-0.0002	-0.0036***
	(4.77)	*(2.73)*	*(2.95)*	*(1.90)*	*(1.99)*	*(-0.07)*	*(0.73)*	*(3.25)*	*(0.94)*	*(-0.19)*	*(-7.70)*
Three-Factor Alpha	0.0035***	0.0018***	0.0019**	0.0012***	0.0012	0.0000	0.0004	0.0016***	0.0005	-0.0003	-0.0038***
	(17.35)	*(7.01)*	*(2.35)*	*(2.77)*	*(1.61)*	*(0.03)*	*(0.76)*	*(4.30)*	*(0.60)*	*(-0.73)*	*(-9.96)*
Four-Factor Alpha	0.0036***	0.0018***	0.0018**	0.0012***	0.0012	0.0000	0.0004	0.0016***	0.0005	-0.0002	-0.0038***
	(17.59)	*(7.69)*	*(2.48)*	*(2.92)*	*(1.63)*	*(0.02)*	*(0.78)*	*(4.29)*	*(0.61)*	*(-0.62)*	*(-10.44)*
Five-Factor Alpha	0.0037***	0.0021***	0.0018***	0.0012***	0.0009	-0.0001	0.0006*	0.0015***	0.0007	0.0002	-0.0035***
	(11.06)	*(10.63)*	*(2.60)*	*(3.32)*	*(1.38)*	*(-0.22)*	*(1.75)*	*(5.13)*	*(0.97)*	*(0.40)*	*(-8.32)*

*Table 14: Value-weighted monthly alphas and risk factors of the decile portfolios based on the CAPM and three-factor model by sorting on dilution. Equally weighted risk factors are similar and therefore not displayed. Portfolio 1: stocks with low earnings dilution, portfolio 10: stocks with high earnings dilution. Difference portfolios: long in portfolio 10, short in portfolio 1. T-statistics are in parentheses. Significance: * 10%, ** 5%, *** 1%.*

	Earnings Dilution							
Model		**CAPM**			**Three-factor**			
Independent	Alpha	Market	Adj. R^2	Alpha	Market	SMB	HML	Adj. R^2
Portfolio	**(1)**	**(2)**		**(1)**	**(2)**	**(3)**	**(4)**	
P1	0.0039***	0.99***	0.86	0.0040***	0.83***	0.62***	0.10***	0.95
	(4.38)	*(53.32)*		*(13.63)*	*(63.08)*	*(38.67)*	*(3.28)*	
P2	0.0020***	1.02***	0.87	0.0022***	0.85***	0.64***	0.15***	0.97
	(3.00)	*(44.22)*		*(9.06)*	*(51.80)*	*(42.18)*	*(5.25)*	
P3	0.0022***	0.99***	0.89	0.0023***	0.84***	0.57***	0.10**	0.97
	(4.00)	*(76.01)*		*(0.13)*	*(62.66)*	*(41.49)*	*(2.45)*	
P4	0.0016**	1.01***	0.88	0.0016***	0.85***	0.63***	0.06***	0.97
	(2.40)	*(61.73)*		*(4.84)*	*(50.67)*	*(15.83)*	*(4.26)*	
P5	0.0015***	1.04***	0.89	0.0016**	0.90***	0.56***	0.05*	0.96
	(2.62)	(59.89)		(2.35)	(54.96)	(37.75)	(1.81)	
P6	0.0004	1.05***	0.91	0.0005	0.93***	0.50***	0.04	0.97
	(0.75)	*(92.30)*		*(0.70)*	*(119.37)*	*(39.59)*	*(1.16)*	
P7	0.0007	1.04***	0.91	0.0007	0.93***	0.52***	-0.05	0.96
	(1.20)	*(68.65)*		*(1.57)*	*(69.76)*	*(17.10)*	*(-0.95)*	
P8	0.0021***	1.03***	0.91	0.0020***	0.94***	0.47***	-0.09*	0.96
	(3.75)	*(77.84)*		*(6.95)*	*(100.42)*	*(15.70)*	*(-1.72)*	
P9	0.0007	1.09***	0.93	0.0007	0.99***	0.45***	-0.06	0.97
	(1.52)	*(89.52)*		*(1.01)*	*(141.66)*	*(21.72)*	*(-1.50)*	
P10	0.0001	1.12***	0.92	0.0000	1.03***	0.48***	-0.13**	0.96
	(0.17)	*(45.75)*		*(0.09)*	*(85.76)*	*(12.87)*	*(-2.57)*	
P10-1	-0.0037***	0.12***	0.09	-0.0039***	0.20***	-0.14***	-0.23***	0.27
	(-8.73)	*(4.37)*		*(-12.80)*	*(11.56)*	*(-3.04)*	*(-6.94)*	

*Table 15: Value-weighted monthly alphas and risk factors of the decile portfolios based on the four- and five-factor model by sorting on dilution. Equally weighted risk factors are similar and therefore not displayed. Portfolio 1: stocks with low earnings dilution, portfolio 10: stocks with high earnings dilution. Difference portfolios: long in portfolio 10, short in portfolio 1. T-statistics are in parentheses. Significance: * 10%, ** 5%, *** 1%.*

	Dilution												
Model	**Four-factor**						**Five-factor**						
Independent	Alpha	Market	SMB	HML	UMD	Adj. R^2	Alpha	Market	SMB	HML	RMW	CMA	Adj. R^2
Portfolio	**(1)**	**(2)**	**(3)**	**(4)**	**(5)**		**(1)**	**(2)**	**(3)**	**(4)**	**(5)**	**(6)**	
P1	0.0040***	0.83***	0.62***	0.10***	-0.01	0.95	0.0040***	0.83***	0.62***	0.09*	-0.03	0.03	0.95
	(13.62)	*(56.58)*	*(39.14)*	*(2.94)*	*(-0.59)*		*(8.70)*	*(54.14)*	*(31.09)*	*(1.92)*	*(-0.46)*	*(0.48)*	
P2	0.0021***	0.85***	0.64***	0.16***	0.02*	0.97	0.0023***	0.84***	0.63***	0.13***	-0.06***	0.05**	0.97
	(9.58)	*(48.63)*	*(43.12)*	*(4.92)*	*(1.94)*		*(10.67)*	*(49.20)*	*(42.30)*	*(3.76)*	*(-2.80)*	*(2.03)*	
P3	0.0022***	0.85***	0.57***	0.12**	0.03**	0.97	0.0021***	0.85***	0.57***	0.10**	0.04	0.01	0.97
	(4.03)	*(76.19)*	*(42.41)*	*(2.47)*	*(2.31)*		*(4.00)*	*(70.34)*	*(51.33)*	*(2.12)*	*(0.90)*	*(0.38)*	
P4	0.0016***	0.85***	0.63***	0.06***	0.00	0.97	0.0016***	0.86***	0.62***	0.01	-0.04	0.15***	0.97
	(5.08)	*(38.29)*	*(15.55)*	*(2.69)*	*(0.08)*		*(4.68)*	*(42.64)*	*(17.24)*	*(0.79)*	*(-1.05)*	*(5.52)*	
P5	0.0016**	0.90***	0.56***	0.05*	0.00	0.96	0.0012**	0.91***	0.57***	0.04	0.08	0.02	0.96
	(2.38)	*(63.99)*	*(37.58)*	*(1.87)*	*(0.28)*		*(2.07)*	*(58.03)*	*(51.41)*	*(1.35)*	*(1.41)*	*(0.35)*	
P6	0.0005	0.93***	0.50***	0.04	0.00	0.96	0.0002	0.93***	0.52***	0.06*	0.08	-0.06***	0.97
	(0.71)	*(121.68)*	*(39.90)*	*(1.05)*	*(0.15)*		*(0.46)*	*(113.98)*	*(28.13)*	*(1.69)*	*(1.55)*	*(-3.79)*	
P7	0.0006	0.93***	0.52***	-0.05	0.01	0.96	0.0008***	0.92***	0.52***	-0.02	0.01	-0.10***	0.96
	(1.62)	*(75.37)*	*(16.96)*	*(-0.77)*	*(0.48)*		*(2.71)*	*(73.74)*	*(20.66)*	*(-0.39)*	*(0.16)*	*(-4.88)*	
P8	0.0020***	0.93***	0.47***	-0.10*	-0.02	0.96	0.0018***	0.94***	0.48***	-0.07	0.07	-0.05	0.96
	(6.91)	*(121.46)*	*(15.56)*	*(-1.69)*	*(-1.34)*		*(7.10)*	*(131.74)*	*(17.14)*	*(-1.55)*	*(1.25)*	*(-1.29)*	
P9	0.0007	0.99***	0.45***	-0.06	-0.00	0.97	0.0008	0.99***	0.45***	-0.03	0.00	-0.10***	0.97
	(1.03)	*(153.75)*	*(21.34)*	*(-1.27)*	*(-0.02)*		*(1.43)*	*(117.43)*	*(23.35)*	*(-0.73)*	*(0.06)*	*(-3.88)*	
P10	0.0001	1.02***	0.48***	-0.16***	-0.04***	0.96	0.0005	1.01***	0.47***	-0.07	-0.04	-0.20***	0.96
	(0.28)	*(75.99)*	*(12.83)*	*(-2.99)*	*(-4.67)*		*(1.01)*	*(58.21)*	*(12.85)*	*(-1.16)*	*(-0.66)*	*(-7.46)*	
P10-1	-0.0039***	0.18***	-0.14***	-0.25***	-0.04**	0.27	-0.0035***	0.18***	-0.14***	-0.16***	-0.0059	-0.23***	0.29
	(-12.06)	*(10.13)*	*(-3.03)*	*(-9.17)*	*(-2.49)*		(-8.20)	(8.37)	(-2.64)	(-5.31)	(-0.10)	(-3.56)	

*Table 16: Value-weighted monthly four-factor abnormal returns of the 3x3 double-sorted portfolios based on first interest alignment and then earnings dilution. Portfolio (1,1): stocks with the 33 percent lowest ratios of both interest alignment and dilution, portfolio (3,3): stocks with the 33 percent highest ratios of both interest alignment and dilution. Difference portfolios are long/short portfolios: within each interest alignment or dilution tertile, what is the influence of dilution and interest alignment respectively? T-statistics are in parentheses. Significance: * 10%, ** 5%, *** 1%.*

		Dilution			
	Portfolio	1	2	3	Difference (3-1)
Interest Alignment	1	0.0020*	-0.0008	0.0000	-0.0019***
		(1.93)	*(-0.76)*	*(0.10)*	*(-2.61)*
	2	0.0018***	0.0007***	0.0019***	0.0002
		(7.68)	*(3.07)*	*(4.17)*	*(0.46)*
	3	0.0041***	0.0026***	0.0015***	-0.0027***
		(7.91)	(10.11)	(3.78)	(-4.87)
	Difference (3-1)	0.0021	0.0035***	0.0014**	
		(1.43)	*(2.88)*	*(2.07)*	

*Table 17: Value-weighted monthly five-factor abnormal returns of the 3x3 double-sorted portfolios based on first interest alignment and then earnings dilution. Portfolio (1,1): stocks with the 33 percent lowest ratios of both interest alignment and dilution, portfolio (3,3): stocks with the 33 percent highest ratios of both interest alignment and dilution. Difference portfolios are long/short portfolios: within each interest alignment or dilution tertile, what is the influence of dilution and interest alignment respectively? T-statistics are in parentheses. Significance: * 10%, ** 5%, *** 1%.*

		Dilution			
	Portfolio	1	2	3	Difference (3-1)
Interest Alignment	1	0.0018	-0.0012	-0.0001	-0.0019*
		(1.58)	*(-1.10)*	*(-0.27)*	*(-1.74)*
	2	0.0016***	0.0004*	0.0018***	0.0003
		(4.81)	*(1.81)*	*(4.63)*	*(0.64)*
	3	0.0044***	0.0028***	0.0024***	-0.0021***
		(5.32)	(6.19)	(5.22)	(-3.84)
	Difference (3-1)	0.0027	0.0040***	0.0025***	
		(1.39)	*(2.84)*	*(3.45)*	

*Table 18: Equally weighted monthly three-factor abnormal returns of the 3x3 double-sorted portfolios based on first interest alignment and then earnings dilution. Portfolio (1,1): stocks with the 33 percent lowest ratios of both interest alignment and dilution, portfolio (3,3): stocks with the 33 percent highest ratios of both interest alignment and dilution. Difference portfolios are long/short portfolios: within each interest alignment or dilution tertile, what is the influence of dilution and interest alignment respectively? T-statistics are in parentheses. Significance: * 10%, ** 5%, *** 1%.*

		Dilution			
	Portfolio	1	2	3	Difference (3-1)
Interest Alignment	1	0.0017	-0.0012	-0.0003	-0.0020**
		(1.38)	*(-0.87)*	*(-0.52)*	*(-2.33)*
	2	0.0015***	0.0004	0.0017***	0.0002
		(3.31)	*(1.16)*	*(3.46)*	*(0.66)*
	3	0.0036***	0.0022***	0.0011***	-0.0026***
		(8.21)	(8.76)	(2.75)	(-5.16)
	Difference	0.0019	0.0033**	0.0014*	
	(3-1)	*(1.19)*	*(2.48)*	*(1.75)*	

*Table 19: Equally weighted monthly four-factor abnormal returns of the 3x3 double-sorted portfolios based on first interest alignment and then earnings dilution. Portfolio (1,1): stocks with the 33 percent lowest ratios of both interest alignment and dilution, portfolio (3,3): stocks with the 33 percent highest ratios of both interest alignment and dilution. Difference portfolios are long/short portfolios: within each interest alignment or dilution tertile, what is the influence of dilution and interest alignment respectively? T-statistics are in parentheses. Significance: * 10%, ** 5%, *** 1%.*

		Dilution			
	Portfolio	1	2	3	Difference (3-1)
Interest Alignment	1	0.0017	-0.0012	-0.0002	-0.0019***
		(1.42)	*(-0.92)*	*(-0.36)*	*(-2.61)*
	2	0.0014***	0.0003	0.0017***	0.0003
		(4.19)	*(1.19)*	*(3.42)*	*(0.95)*
	3	0.0036***	0.0022***	0.0011***	-0.0025***
		(8.80)	(9.63)	(2.92)	(-5.10)
	Difference	0.0020	0.0034***	0.0013	
	(3-1)	*(1.26)*	*(2.69)*	*(1.64)*	

*Table 20: Equally weighted monthly five-factor abnormal returns of the 3x3 double-sorted portfolios based on first interest alignment and then earnings dilution. Portfolio (1,1): stocks with the 33 percent lowest ratios of both interest alignment and dilution, portfolio (3,3): stocks with the 33 percent highest ratios of both interest alignment and dilution. Difference portfolios are long/short portfolios: within each interest alignment or dilution tertile, what is the influence of dilution and interest alignment respectively? T-statistics are in parentheses. Significance: * 10%, ** 5%, *** 1%.*

		Dilution			
	Portfolio	1	2	3	Difference (3-1)
Interest Alignment	1	0.0016	-0.0014	-0.0003	-0.0020***
		(1.30)	*(-1.17)*	*(-0.66)*	*(-1.84)*
	2	0.0013***	0.0001	0.0016***	0.0003
		(3.19)	*(0.30)*	*(3.89)*	*(0.74)*
	3	0.0040***	0.0024***	0.0020***	-0.0021***
		(5.23)	(6.69)	(4.59)	(-3.98)
	Difference (3-1)	0.0024	0.0038***	0.0023***	
		(1.24)	*(2.63)*	*(2.81)*	

*Table 21: Equally weighted monthly three-factor abnormal returns of the 3x3 double-sorted portfolios based on first interest alignment and then earnings dilution excluding companies that have any dilutive debt outstanding during the sample period. The sample drops to 159.688 observations. Portfolio (1,1): stocks with the 33 percent lowest ratios of both interest alignment and dilution, portfolio (3,3): stocks with the 33 percent highest ratios of both interest alignment and dilution. T-statistics are in parentheses. Significance: * 10%, ** 5%, *** 1%.*

		Dilution			
	Portfolio	1	2	3	Difference (3-1)
Interest Alignment	1	0.0006	-0.0014***	0.0002	-0.0003
		(1.80)	*(-3.48)*	*(0.72)*	*(-0.90)*
	2	0.0018***	0.0004*	0.0017***	-0.0001
		(8.52)	*(1.69)*	*(5.50)*	*(-0.25)*
	3	0.0041***	0.0024***	0.0016**	-0.0025***
		(4.08)	(5.88)	(2.30)	(-3.14)
	Difference (3-1)	0.0035***	0.0038***	0.0014	
		(2.83)	*(5.34)*	*(1.64)*	

*Table 22: Value-weighted monthly three-factor abnormal returns of the 5x5 double-sorted portfolios based on first interest alignment and then earnings dilution. Portfolio (1,1): stocks with the 20 percent lowest ratios of both interest alignment and dilution, portfolio (5,5): stocks with the 20 percent highest ratios of both interest alignment and dilution. Difference portfolios are long/short portfolios: within each interest alignment or dilution tertile, what is the influence of dilution and interest alignment respectively? T-statistics are in parentheses. Significance: * 10%, ** 5%, *** 1%.*

		Dilution					
	Portfolio	1	2	3	4	5	Difference (5-1)
Interest Alignment	1	0.0029***	0.0004	-0.0005	0.0004	-0.0005	-0.0035***
		(3.50)	*(0.26)*	*(-0.28)*	*(0.29)*	*(-1.01)*	*(-4.26)*
	2	0.0015	0.0010***	-0.0018	0.0009***	-0.0002	-0.0017
		(1.13)	*(2.94)*	*(-1.31)*	*(2.65)*	*(-0.85)*	*(-1.26)*
	3	0.0016***	0.0037***	0.0013***	0.0008	0.0024***	0.0008
		(3.26)	*(17.05)*	*(2.88)*	*(1.58)*	*(5.30)*	*(1.00)*
	4	0.0034***	0.0003	0.0014***	0.0018***	0.0004	-0.0030***
		(4.34)	*(1.55)*	*(3.96)*	*(3.92)*	*(1.26)*	*(-2.78)*
	5	0.0050***	0.0032***	0.0028***	0.0040***	0.0019*	-0.0031***
		(8.79)	*(6.02)*	*(4.64)*	*(8.56)*	*(1.94)*	*(-5.27)*
	Difference (5-1)	0.0021	0.0029*	0.0033***	0.0036**	0.0025**	
		(1.58)	*(1.72)*	*(2.60)*	*(2.26)*	*(2.14)*	

Table 23: Risk characteristics of the interest alignment-portfolios

Portfolio	**Av. Market Cap**	**Av. B/M-ratio**	**Av. Net Income**
P1	7.43 billion	0.0019	557 million
P2	11.80 billion	0.0009	819 million
P3	11.00 billion	0.0008	738 million
P4	9.60 billion	0.0006	627 million
P5	8.59 billion	0.0009	556 million
P6	6.53 billion	0.0007	409 million
P7	6.03 billion	0.0006	386 million
P8	5.51 billion	0.0006	301 million
P9	3.84 billion	0.0006	208 million
P10	3.82 billion	0.0006	170 million

Table 24: Risk characteristics of the earnings dilution-portfolios

Portfolio	**Av. Market Cap**	**Av. B/M-ratio**	**Av. Net Income**
P1	1.84 billion	0.0008	101 million
P2	3.71 billion	0.0010	230 million
P3	4.74 billion	0.0008	297 million
P4	5.22 billion	0.0007	293 million
P5	6.85 billion	0.0008	432 million
P6	8.29 billion	0.0006	523 million
P7	9.13 billion	0.0017	567 million
P8	10.40 billion	0.0005	654 million
P9	11.60 billion	0.0006	766 million
P10	12.20 billion	0.0008	908 million