Master's Thesis

Jochum Konijn

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The Association between Expense Components and Stock Returns: An Empirical Study

Accounting, Auditing & Control

Erasmus University Rotterdam – Erasmus School of Economics

Supervisor: Dr. Y. Li

2nd Assessor: Dr. J. Bae

Abstract

The association between accounting information and stock returns is important for accountants and capital market participants. This thesis divides total expenses into six expense components to determine whether expense information is useful for explaining the behaviour of share prices. The *sign* and *magnitude* of expense component changes are both valuable to the stock market. The *sign* focuses on whether changes are positive or negative, while the *magnitude* considers the amount of change as a percentage of their total assets. The *signs* of *Cost Of Goods Sold, Selling, General and Administrative expense* and *Tax expense* are positively associated with abnormal returns, while the *signs* of *Depreciation expense, Special Items expense* and *Other expenses* are negatively associated with abnormal returns. An investment strategy is created based on the associations between the *signs* of the components and stock returns. The investment strategy shows the combined *signs* of expense component change are more valuable to the stock market than the *sign* of earnings change. Managers who want to maximize their stock returns should focus more on expense components instead of earnings. It could lead to a decreased importance of net income and the increased importance of expenses when trying to achieve certain abnormal returns.

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I. Introduction

This study examines the association between accounting information and stock returns. It provides insights into the economic relevance of financial accounting and reporting as a source of information about firm performance and value. This question is important for accountants and capital market participants. Earnings are the 'bottom-line' accounting indicator of a company's performance. It measures the firm's profit or loss over time and indicates the change in value to common stock shareholders. Stock returns are a measure of a company's 'bottom-line' performance in the capital market, and they equal the change in the company's market value. What is the relationship between these 'bottom lines'? How do earnings relate to stock returns?

Ball & Brown (1968) were the first to find an association between earnings and stock returns. They found a positive association between the bottom lines. Firms with unexpected increases (decreases) in accounting earnings experience positive (negative) abnormal returns. A large fraction is anticipated by the stock market and impounded in the stock price before the earnings release. This explains why investors and analysts devote so much time and energy to forecasting earnings. Nichols & Wahlen (2004) used this association to examine the value relevance of annual earnings changes. They sharpen the analysis by focusing on the firms with the most extreme annual changes and show that both the sign and magnitude of earnings changes explain differences in abnormal returns. They also show a weaker association of cash flows and stock returns (compared to the association of earnings and stock returns), proving the importance of accruals on stock returns.

Accruals are used to solve timing and matching problems in the underlying cash flows (Dechow, 1994). However, Dichev & Tang (2008) show that matching problems are becoming worse over time. They present evidence of a decreasing correlation between current-period revenues and current-period expenses and an increasing correlation between current-period revenues and expenses from prior and subsequent periods. Matching expenses to revenue has a great impact on the determination of earnings. This is important because net income is the most important output of the accounting system (Graham et al., 2005). Donelson et al. (2011) explain this decline in matching by disaggregating the total expenses into six expense components: Cost of Goods Sold (COGS); Selling, general and administrative expenses (SGA); Depreciation expenses (DEPR); Tax expenses (TAX); Special Items (SI); and Other expenses (OTH). By using a decomposition analysis, they show the decline in matching is primarily attributable to one specific expense component: Special items. Special items are one-time, special charges such as asset write-offs, asset sales, and restructuring charges. These current-period expenses are not directly related to current-period revenues, which explains the decrease in correlation between current-period revenues and current-period expenses.

This thesis examines whether there exists an association between changes in the expense components used by Donelson et al. (2011) and stock returns. The positive association between earnings changes and stock returns provides evidence that the stock market reacts to earnings changes. This can be extended to expense components, such as special items. Donelson et al. (2011) showed special items cause a decrease in correlation between current-period revenues and current-period expenses. The mismatch between revenues and expenses increases the volatility of earnings and decreases the persistence of earnings (Dichev & Tang, 2008). Firms with high earnings volatility and low earnings persistence have low-quality earnings because today's earnings are practically irrelevant for evaluating current performance, predicting future performance, or determining firm valuation (Dechow & Schrand, 2004). An increase in special items is associated with low-quality earnings. Low-quality earnings are associated with lower stock returns (Chan et al., 2006). This raises the following research question:

'Which expense components drive the stock returns?'

Previous research on the information content of accounting numbers other than earnings aims to determine whether information beyond 'bottom line' earnings numbers is useful for explaining the behaviour of share prices. The mixed results suggest some decompositions of earnings are informative while others are not.

Lipe (1986) used earnings components to indicate whether significant cross-component variation in the return reactions is associated with unexpected changes of these components. The earnings components were *Gross Profit, General and Administrative expense*, *Depreciation expense*, *Interest expense*, *Income taxes*, and *Other items*. It showed that the variation in returns is better explained by including these components than by using earnings alone. This means that each component has additional explanatory power and provides a small but statistically significant amount of information that would be lost if only earnings were reported. Rayburn (1986) showed results supporting the association of both operating cash flows and aggregate accruals with abnormal returns.

Gheyara & Boatsman (1980) found no evidence indicating the replacement costs disclosures introduces information during the 50 trading days surrounding disclosure. This was consistent with earlier research suggesting that replacement costs were 'simply uninteresting to market agents' and they used the decomposition of earnings and stock returns to examine this. Ro (1980) also found no evidence for the effect of ASR190 compliance costs on returns, which means the compliance costs were not relevant to the value of the firms. Stober (1986) observed a difference in stock returns conditional on the earnings impacts of LIFO liquidations. He showed that these disclosures have information content. This effect is similar to the market's response observed by Wilson (1987), who observed unexpected returns for firms with high and low unexpected cash from operations.

This thesis shows that all expense components are associated with stock returns. *COGS*, *SGA* and *TAX* are positively associated with abnormal returns, while *DEPR*, *SI* and *OTH* are negatively associated with abnormal returns. There exist a significant difference in abnormal returns between the positive and negative portfolios at the month of the announcement date. However, the difference between the positive SGA and negative SGA portfolio disappears in the after-announcement drift. Therefore SGA is excluded from the investment strategy. The investment strategy consists of a positive and negative portfolio. The positive portfolio consists of a selection of firms that show a positive change (increase) of *COGS*, *TAX* and *SI* and a negative change (decrease) of *DEPR* and *OTH*. The negative portfolio consists of a selection of firms that show a negative change (decrease) of *COGS*, *TAX* and *SI* and a positive change (increase) of *DEPR* and *OTH*. There is a difference of 37.7 percent abnormal returns between the positive investment portfolio and the negative investment portfolio. The investment strategy shows that managers who want to maximize their stock returns should focus more on expense components instead of earnings. It could lead to a decreased importance of net income and the increased importance of expenses when trying to achieve certain abnormal returns.

This thesis contributes to the existing literature in several ways. Firstly, this thesis is the first study to measure the direct impact of changes in different expense components on stock returns. Other studies examine whether, for example, the variation in stock returns can be explained by information of expenses. Secondly, this thesis contributes to the existing literature by proving that changes in the annual expense components are valuable to investors.

This thesis is divided into the following sections: II. Literature review with the construction of several hypotheses based on previously conducted research; III. Description of the data and methodology used; IV. Presentation of the statistical analysis and results; V. Conclusion; and VI. Limitations and recommendations for future research.

II. Literature Review

Before 1968, accounting research was mainly concerned with theoretical (rather than empirical) analysis of the usefulness of accounting information. In accounting theory, income numbers were seen as the application of a set of procedures and therefore an aggregate of non-homogeneous components. They lacked meaning outside accounting theory and were therefore of doubtful utility. Ball & Brown (1968) started a shift in accounting research by finding an association between accounting income numbers and stock returns using empirical analysis. Since then, accounting researchers have developed many theories and assembled evidence on the relation between earnings and stock returns.

The association between earnings changes and stock returns has been extended by several researchers. Nichols & Wahlen (2004) show that the *magnitude* of earnings changes also contains important information. While the *sign* of the change in earnings is associated with an average difference of 35.6 percent in abnormal annual returns, the *magnitude* of earnings changes shows a 72.2 percent difference in abnormal returns between the top and bottom decile of annual earnings changes. They also show a weaker association of cash flows and stock returns with an average difference of 15 percent in abnormal returns (compared to the 35.6 percent of earnings changes), proving the importance of accruals on stock returns. Kormendi & Lipe (1987) use earnings persistence to explain the differences in the association between stock returns and earnings changes. When earnings are extreme, there is a 'post-earnings-announcement drift': a failure to adjust abnormal returns for risk and a delay in the response to the earnings (Bernard & Thomas, 1989). The positive association between the 'bottom-lines' made it possible for other researchers to examine the value relevance of different accounting topics, such as earnings management.

Earnings management occurs for a variety of reasons, including influencing the stock market perceptions (Healy & Wahlen, 1999). Perry & Williams (1994) examine unexpected accruals controlling for changes in revenues and depreciable capital and show negative unexpected accruals, which means management decreases income before a management buyout. Recent studies have also examined whether managers overstate earnings in periods before equity offers. The findings indicate that firms report positive (income-increasing) unexpected accruals before seasoned equity offers (Teoh et al., 1998a), initial public offers (Teoh et al., 1998b) and stock financed acquisitions (Erickson & Wang, 1999). Other studies show that earnings are increased to meet the expectations of financial analysts' forecasts (Burgstahler & Eames, 2003), and firms in danger of falling short of a management earnings forecast use unexpected accrual to manage earnings upwards (Kasznik, 1999).

Hypotheses development

Beaver (1998) developed a theoretical model that linked a company's profit numbers to stock price movements. It is made up of three links. The first link assumes that current-period earnings provide information on which equity shareholders can base future earnings forecasts. The second link assumes that the firm's predicted future dividend-paying capacity is determined by current and expected future profitability. The third link assumes that the current value of all predicted future dividends is reflected in share prices. Earnings numbers (and related financial reports) provide information to shareholders to help them forecast future earnings and dividends, which ultimately determine share value. These three connections provide an intuitive framework for understanding the relation between earnings and stock value. The changes in share value (stock price) are ultimately driven by changes in current period earnings.

Hypothesis 1: There exists an association between net income changes and abnormal returns.

Profit or loss is defined as "the total of income less expenses, excluding the components of other comprehensive income" [IAS 1.7]. Other comprehensive income is not included in the profit or loss statement and therefore not included in this thesis. The association between earnings (total of income less expenses) and stock returns can be split into the associations between (1) revenue changes and stock returns and (2) expenses changes and stock returns.

Hypothesis 2a: There exists an association between revenue changes and abnormal returns.
Hypothesis 2b: There exists an association between expense changes and abnormal returns.

Earnings is the most important metric reported to outsiders. Managers care about earnings benchmarks and want to meet or beat earnings benchmarks to build credibility, maintain or increase stock price, improve the reputation of the management team, and convey future growth prospects (Graham et al., 2005). The matching of expenses to revenues has a great impact on the determination of earnings but changes significantly over time. While accruals were used to resolve timing and mismatching problems of cash accounting, matching has become worse over time. The accounting standards have taken a turn away from matching as a fundamental concept in the determination of earnings and towards a more balance sheet-based model of the determination of income (Dichev & Tang, 2008).

The contemporaneous correlation between revenues and expenses has decreased substantially over time. Instead, the correlation between current revenues and past and future expenses has increased. This has a couple of consequences. Earnings volatility has nearly doubled while underlying volatilities of revenues and expenses have remained (roughly) the same. In conclusion, the mismatch between revenues and expenses increases the volatility of earnings and decreases the persistence of earnings (Dichev & Tang, 2008). Firms with high earnings volatility and low earnings persistence have low-quality earnings because today's earnings are practically irrelevant for evaluating current performance, predicting future performance, or determining firm valuation (Dechow & Schrand, 2004). Low-quality earnings are associated with below-average stock returns (Chan et al., 2006).

Donelson et al. (2011) explain the decline of matching expenses to revenues by disaggregating the total expense into six expense components: Cost of Goods Sold (COGS); Selling, general and administrative expenses (SGA); Depreciation expenses (DEPR); Tax expenses (TAX); Special Items (SI); and Other expenses (OTH). The decomposition analysis with these expense components explains the decline of matching expenses to revenues, which influences the behaviour of stock prices. The purpose of this paper is to find an association between the expense components and abnormal stock returns.

Hypothesis 3: There exists an association between expense component changes and abnormal returns.

According to Phillips et al. (2003), there are three settings in which earnings management is likely to occur: An earnings decline, to avoid earnings decline, or to avoid failing the meet or beat consensus analysts' earnings forecast. The three settings are all based on the total earnings of the firm. This paper seeks to contribute to the existing literature by proving there exists an association between certain expense components and abnormal stock returns. This could influence the managers of a firm. Instead of focusing on the earnings of the firm, they could focus on the expenses to achieve the stock returns they want. It could lead to a decreased importance of earnings and increased importance of expenses when trying to achieve certain abnormal stock returns.

Hypothesis 4: The combined association between the sign of expense component changes and abnormal returns is larger than the association between the sign of net income changes and abnormal returns.

III. Research Methodology

This section explores the different variables used in the research design and explains the methodology. Whether an association exists between expense components and abnormal stock returns will be tested using the event study of Brown & Ball (1968), the adjustment and extension of Nichols & Wahlen (2004), and the expense components of Donelson et al. (2011).

Research Design

The event study of Ball & Brown (1968) uses the stock market's reaction to measure the information content and timeliness of accounting numbers. The event window consists of nineteen months: twelve months before until six months after the announcement date of annual earnings. To measure the stock market's reaction, Ball & Brown (1968) use two portfolios based on the difference between actual income and expected income. Firms with more income than expected are 'good news' firms and are included in the positive portfolio. Firms with less income than expected are 'bad news' firms and are included in the negative portfolio. Nichols & Wahlen (2004) adjusted the portfolios using actual and previous income figures to determine the 'good news' and 'bad news' portfolios. Instead of using expected income, they calculated the portfolios as current year net income minus the previous year's net income. This adjustment is important for this paper because the expected value of the income components (of hypothesis 2) and expense components (of hypothesis 3) are not available for each firm. Nichols & Wahlen (2004) show that firms with positive annual earnings changes experience average abnormal returns of 19.2 percent, whereas firms with negative annual earnings changes experience average abnormal returns of -16.4 percent. These results suggest that the *sign* of the change in earnings is associated with an average difference of 35.6 percent in abnormal annual returns. By comparison, Ball & Brown (1968) report a difference of 18 percent based on differences between the 'good news' and 'bad news' portfolios. An explanation could be that the stock market reacts stronger to the difference in actual income than to the difference with the expected income. Another explanation could be the returns implication of earnings changes from 1988-2001 have increased substantially since 1946-1966. The volatility of the stock market could also contribute to the increased implication of earnings changes on the stock market (Nichols & Wahlen, 2004).

After creating the portfolios, the abnormal returns of these portfolios are compared. Abnormal stock returns *(AR)* are calculated as the *Returns* (the percentage change of the adjusted monthly closing stock price *(CP)* minus the equal-weighted market returns *(EWRETX)*, in the same period.

$$AR = \frac{CP_1 - CP_0}{CP_0} - EWRETX \qquad 1.1$$

The *EWRETX* and *CP* are both excluded from dividends, because split events have a huge effect on the stock price. The *CP* is calculated as the monthly closing price *(PRCCM)* adjusted by the ex-date cumulative adjustment factor *(AJEXM)*.

$$CP = PRCCM \ / \ AJEXM \qquad 1.2$$

The *AJEXM* is used to adjust for split events, such as stock splits, stock dividends and other distributions with price factors such as spin-offs, stock distributions, and rights. For example, a company has 100 million outstanding shares, with 1$ share price. If the company splits the stock into 2 stocks, the company now has 200 million outstanding shares with a share price of 0.5$. The company still has a market capitalization of 100 million dollars, but the share price has decreased by 50%. By using the adjustment factor, this effect is nullified. After the abnormal returns *(AR)* are calculated by the

percentage increase in adjusted monthly closing price *(CP) minus* the equal-weighted market returns *(EWRETX)*, the abnormal returns are winsorized. Winsorization means the most extreme values are replaced by less extreme values. The outliers are all set to 99 percent winsorization: All data below the 1st percentile is set to the 1st percentile, and data above the 99th percentile is set to the 99th percentile. The most extreme values are winsorized instead of deleted to keep the observations constant and the 19 observations per company-year complete.

After the winsorization, for each firm-year observation the abnormal returns are cumulated over 19 months. The average cumulative abnormal return for the full dataset is 4.68 percent. This means an investor, who has no knowledge about the financial performance and invests in all firms every year, averages 4.68 percent abnormal returns per year between 1971 and 2019. This seems high, but Nichols & Wahlen (2004) show an investor can average 35.6 percent abnormal returns per year between 1988 and 2001 using the portfolios, which is significantly more than the 4.68 percent abnormal annual returns of the full dataset.

Extension of Nichols & Wahlen (2004)

Nichols & Wahlen (2004) also sharpen the analysis by focusing on the firms with the most extreme annual changes to show that the *sign* and *magnitude* of earnings changes explain differences in abnormal returns. The firms are again grouped into two portfolios each year, but the change in earnings are also scaled by total assets to see if not only the *sign* but also the *magnitude* of the changes are associated with stock returns. The firms are ranked into ten groups (called deciles) based on the magnitude of the scaled earnings changes. All sample firms are grouped into two portfolios (firms with positive or negative earnings changes) and ten deciles (earnings changes scaled by total assets). Decile 1 to 5 consist of firms with positive changes (from high to small) and decile 6 to 10 consist of firms with negative changes (from small to high). Decile 1 consist of firms with the highest increase in changes per total assets, while decile 10 consist of firms with the highest decrease in changes per total assets.

Expense components of Donelson et al. (2011)

The first hypothesis groups firms with positive or negative earnings changes into portfolios and deciles. The second hypothesis splits the net income into *total revenue* and *total expenses*. The sample stays constant, but the portfolios and deciles are regrouped. The third hypothesis divides *total expenses* into six expense components of a firm: Cost of Goods Sold *(COGS)*; Selling, general and administrative expenses *(SGA)*; Depreciation expenses *(DEPR)*; Tax expenses *(TAX)*; Special Items *(SI)*; and Other expenses *(OTH)*. These expense components are used by Donelson et al. (2011) to determine which expense items are responsible for changes in the revenue-expense relation over time. This thesis tries to determine which expense items are responsible for changes in stock returns, instead of changes in the revenue-expense relation. Again, the sample stays constant, but the portfolios and deciles are regrouped per expense component.

Investing Strategy

The previous analyses show whether the changes in earnings, revenue, expenses, and the six expense components are associated with abnormal stock returns. The fourth hypothesis combines the information from the previous results to show whether 1) the change in earnings; 2) the combined changes in revenue and expenses; or 3) the combined changes in expense components give the most information to the stock market. The investment strategies each consist of a positive and negative portfolio. The positive portfolio consists of a selection of firms with changes associated with positive abnormal returns, while the negative portfolio consists of a selection of firms with changes associated with negative abnormal returns. The difference in cumulative abnormal returns between the positive

and negative portfolio will show how valuable the combined information from the hypothesis is to the stock market.

The first investment strategy considers the four possible combinations of the *signs* of revenue changes and expense changes. The possible combinations influence the selection of firms in the portfolios. The four possible combinations of *signs* of revenue and expenses are: 1) Increase in both revenue and expenses; 2) Increase in revenue and decrease in expenses; 3) Decrease in revenue and increase in expenses; 4) Decrease in both revenue and expenses. The results of Ball & Brown (1968) and Nichols & Wahlen (2004) show a positive association between the *sign* of earnings change and stock returns. Net income is defined as the total income (revenue) less expenses [IAS 1.7]. An increase in revenue and a decrease in expenses would both lead to an increase in income and therefore positive abnormal stock returns. Therefore, the expectation is that the second combination (Increase in revenue and decrease in expenses) would lead to the highest abnormal returns. Simultaniously, the third combination (Decrease in revenue and increase in expenses) would lead to the lowest abnormal returns. All four combinations are calculated and shown in the investment strategy.

The second investment strategy shows how valuable the combination of expense components is to the stock market. Each expense component has two *signs*, which means there are twelve *signs* of expense components to consider and combine. In total, there are more than half a million options to combine the *signs* considering each *sign* can be included in the positive strategy, negative strategy or no strategy at all. Instead of calculating the cumulative abnormal returns for all the different combinations, this thesis only considers one combination. This combination is based on the previous results from the associations between the *signs* of expense components and abnormal returns.

According to Donelson et al. (2011), the increase in special items over time leads to the decline of matching expenses to revenues. A decline in matching between revenues and expenses are associated with negative abnormal returns. If, for example, the results show that *COGS* changes are positively associated with stock returns and *SI* changes are negatively associated with stock returns. This would mean that an increase in *COGS* and a decrease in *SI* are both associated with positive stock returns. Simultaniously, a decrease in *COSG* and an increase in *SI* are both associated with negative stock returns. The positive portfolio of the investment strategy will then consist of a selection of firms with both an increase in *COGS* and a decrease in *SI*. The negative portfolio will consist of a selection of firms with both a decrease in *COGS* and an increase in *SI*. All the expense components with a significant association in the previous results will be included in the investment strategy. The difference in abnormal returns between the investment strategy portfolios shows how valuable the combination of earnings components is to the stock market.

The investment strategy considers the *sign* of changes instead of the *magnitude* of changes. When combining the information from previous hypothesis it is not possible to find firms with changes in all the top or bottom deciles. However, there are firms with changes in all the positive or negative portfolios. The results of the *magnitude* of changes in earnings components and expense components show importance to the stock market, but these are not included in the investment strategies because there are no firms with all the extreme changes (in the most extreme deciles). Also, the knowledge would be less practical for the stock market to use in their future investing strategies. It's impossible to know in advance in which decile the relative changes to their total assets belong. This is also supported by Nichols & Wahlen (2004): *"Of course, this interpretation of the evidence is extreme because perfect forecast accuracy is impossible."* It's not realistic to know at month -12 (at the point of investing) whether the change in a specific expense component that will occur is in the top decile.

Sample Description

The sample consists of firms listed on the NYSE and NASDAQ exchanges during the period from 1971 to 2019. The sample includes 62,328 firm-year observations for which the financial changes and monthly stock prices are available in Compustat. Outliers are checked and observations with measurement errors are deleted. Table 1 provides descriptive statistics of the annual sample.

Table 1: Descriptive Statistics of the Annual Sample (in million dollars, N = 62,328)

Statistic	***Mean***	***St. Dev.***	***Min***	***Pctl(25)***	***Median***	***Pctl(75)***	***Max***
Year	*2001*	*12.89*	*1971*	*1993*	*2003*	*2012*	*2019*
Exchange	*12.46*	*1.50*	*11*	*11*	*11*	*14*	*14*
Total Assets	*3,952.52*	*17,996.26*	*0.01*	*102.16*	*403.70*	*1,813.43*	*797,769.00*
Net Income	*184.40*	*1,272.11*	*-98,696.00*	*-1.15*	*11.38*	*73.87*	*44,880.00*
Total Revenue	*2,996.62*	*13,939.63*	*-65.58*	*92.52*	*358.80*	*1,548.00*	*475,793.50*
Total Expenses	*2.812,22*	*13,148.72*	*-23,423.00*	*92.61*	*345.60*	*1,467.14*	*464,869.30*
COGS	*1,954.19*	*10,845.31*	*-366.64*	*44.65*	*198.40*	*941.52*	*435,726.30*
SGA	*505.94*	*2,018.78*	*-283.00*	*22.29*	*71.22*	*257.20*	*100,244.00*
DEPR	*187.80*	*95.00*	*0*	*3.39*	*15.23*	*73.28*	*33,144.75*
TAX	*86.80*	*626.33*	*-34,831.00*	*0.06*	*86.80*	*33.38*	*31,051.00*
SI	*40.39*	*510.64*	*-12,490.00*	*0*	*0*	*5.60*	*45,873.00*
OTH	*37.11*	*537.66*	*-23,976.00*	*-0.59*	*1.68*	*21.22*	*58,681.00*

Table 1 presents descriptive statistics of the annual sample. The sample consists of 62,328 firm-year observations from the NYSE and NASDAQ exchanges between 1971 and 2019.

The descriptive statistics show the two exchanges (NYSE: 11 & NASDAQ: 14) are evenly distributed in the sample and the total assets show a good distribution between small firms (10 thousand dollars) and big firms (798 billion dollars) with a median of 403.7 million dollars. These values can directly be found in the annual reports of the firms. All statistics (except for *TAX*) have a lower median than mean, which means the dataset is skewed to the right. There are fewer, but very high values for all statistics. Therefore, the combination of median and mean values is useful to examine the distribution of the sample. The only expense component with negative value of the first percentile is *OTH*. An explanation could be that other expenses *(OTH)* are described as 'Other Income and Expenses'. This is mostly a bottom-line figure for other activities, such as finance activities. An increase in value in finance activities is therefore recorded as negative other expenses, which explains the high number of negative values in the dataset. The most remarkable descriptive statistics are included in appendix A with supporting evidence. Some examples of outliers are:

- AOL Time Warner reported a net income of -98.7 billion dollars in 2002 after taking a fourth-quarter charge of 45.5 billion dollars, due to a decrease in value of its America Online unit (Wall Street Journal, 2003). The firm-year observation [AOL Time Warner, 2002] is responsible for the following financial outliers: *Net Income (= -98,696)* and *SI (= 45,873)*.
- Altria Group, inc. recorded special item expenses of -12.5 billion dollars in 2016. This special item income was largely due to the AB InBev/SABMiller Business Combination, which resulted in a pre-tax gain of approximately 13.9 billion dollars. (Altria Group Inc, 2016) The firm-year observation [Altria Group, Inc., 2016] is responsible for *SI (=-12,490)*.
- Alliance Bernstein Holding L.P. recorded a negative revenue of 65.6 million dollars in 2011. The holding of the 'private wealth management' company recorded an equity loss of 65.6 billion dollars attributable to Alliance Bernstein Unitholders (Alliance Bernstein, 2011). The firm-year observation [Alliance Bernstein Holding L.P, 2011] is responsible for *Total Revenue (=-65.58)*

Table 2: Descriptive Statistics of differences in the Annual Sample (in million dollars, N = 62,328)

Statistic	***Mean***	***St. Dev.***	***Min***	***Pctl(25)***	***Median***	***Pctl(75)***	***Max***
Δ *Net Income*	*8.82*	*972.13*	*-93,762.00*	*-7.14*	*1.57*	*17.22*	*101,335.00*
Δ *Total Revenue*	*156.86*	*2,626.44*	*-156,145.00*	*-0.30*	*19.13*	*106.38*	*108,236.90*
Δ *Total Expenses*	*148.04*	*2,638.72*	*-143,210.00*	*-1.12*	*18.81*	*105.00*	*107,633.00*
Δ *COGS*	*99.84*	*2,254.09*	*-140,429.70*	*-0,32*	*9.25*	*61.10*	*106,079.80*
Δ *SGA*	*27.67*	*336.79*	*-18,398.00*	*-0.13*	*3.98*	*19.77*	*19,402.00*
Δ *DEPR*	*12.25*	*160.48*	*-5,877.00*	*-0.07*	*0.67*	*5.02*	*9,799.00*
Δ *TAX*	*2.16*	*430.76*	*-34,721.00*	*-1.90*	*0.19*	*5.68*	*36,958.00*
Δ *SI*	*4.15*	*655.53*	*-46,206.00*	*-1.55*	*0*	*2.23*	*45,623.00*
Δ *OTH*	*1.97*	*500.78*	*-56,580.00*	*-2.17*	*0.05*	*3.46*	*53,768.00*

Table 2 presents the new financial statement variables created calculated as the current year number minus the previous year number. The differences are used to create portfolios and analyse whether the change in financial data is associated with the behaviour of stock prices.

Table 2 shows the differences for each observation. The differences are calculated as the current year number minus the previous year number. The minimal value of -93,7 billion dollars Δ *Net Income* means a decrease in *Net Income* compared to previous year. The Time Warner had a *Net Income* of -98.7 billion dollars in 2002, which was a decrease of 93.7 billion dollars compared to the *Net Income* of -5 billion dollars in 2001. The differences of *SGA*, *DEPR* and *TAX* are the least volatile with a standard deviation of less than 500 million dollars. *TAX* is based on the income received and *DEPR* allocates the costs of an asset over its useful life or life expectancy. These expenses are not expected to differ much each year. This thesis provides no explanation for the low volatility of *SGA* differences. The sample represents a wide range of changes, with an earnings changes ranging from a decline of 93,7 billion dollars to an increase of 101,3 billion dollars.

The annual differences of *Total Revenue*, *Total Expenses* and *COGS* are the most volatile with a standard deviation of more than 2 billion dollars. *COGS* are the costs of materials and labour directly used to create the good. The high volatility is due to the volatility in commodities (Moheb-Alizadeh & Handfield, 2018), but also because of management. For example, the Gross Profit Margin is the percentage of revenue that exceeds the *COGS*. It reflects how successful a company's executive management team is in generating revenue, considering the costs involved in producing their products and services. The high volatility of total revenues could also be due to the high volatility of *COGS*. Managers could use the *COGS* to manipulate the Gross Profit Margin to be more appealing to investors. Also, Donelson et al. (2011), who used the same decomposition analysis of the total expenses, show COGS hold a large weight on the total expenses. The results from Donelson et al. (2011) show the average weight for each expense component for two periods as well as the change between periods. Their results are shown in table 3.

Table 3: The weight of expense components on total expenses from Donelson et al. (2011)

Period:	***COGS***	***SGA***	***DEPR***	***TAX***	***SI***	***OTH***
1967-1985	0.834	0.106	0.006	0.039	0.009	0.007
1986-2005	0.711	0.122	0.013	0.011	0.129	0.013
Difference	- 0.122	0.016	0.008	- 0.027	0.120	0.006

Table 3 presents an analysis from Donelson et al. (2011) showing the weight of expense components on the total expenses of a company using the same decomposition analysis as this thesis.

The differences between observations from table 2 are tested for association with cumulative abnormal returns from 12 months before the announcement date until 6 months after the announcement date. Each firm-year observation has 19 monthly observations, which are shown in table 4.

Table 4: Descriptive Statistics of the Monthly Sample (N = 1,184,232)

Statistic	***Mean***	***St. Dev.***	***Min***	***Pctl(25)***	***Median***	***Pctl(75)***	***Max***
T	*-3*	*5.477*	*-12*	*-8*	*-3*	*2*	*6*
PRCCM	*26.439*	*48.231*	*0.004*	*7.375*	*17.250*	*33.160*	*4,600.000*
AJEXM	*2.228*	*6.403*	*0*	*1.000*	*1.000*	*1.250*	*1,050.000*
CP	*68.347*	*2,091.647*	*0.008*	*6.000*	*13.625*	*27.790*	*389,400.000*
Returns	*0.014*	*0.243*	*-0.985*	*-0.059*	*0*	*0.071*	*136.500*
EWRETX	*0.010*	*0.053*	*-0.273*	*-0.019*	*0.011*	*0.039*	*0.297*
AR	*0.004*	*0.236*	*-1.030*	*-0.066*	*-0.006*	*0.057*	*136.435*
WinAR	*0.001*	*0.125*	*-0.333*	*-0.066*	*-0.006*	*0.057*	*0.470*

Table 4 presents the descriptive statistics of the monthly sample. Each firm-year observation consists of 19 monthly observations based on the month of the announcement date. The abnormal returns *(AR)* are calculated as the *Returns* (the relative change in adjusted closing price *(CP)*) minus the equal-weighted market returns *(EWRETX)*. The *AR* are winsorized at 1% and 99% into the *WinAR.*

Table 4 shows the descriptive statistics of the monthly sample. Variable *T* shows the relative period to the announcement month of the firm-year observation the monthly observation belongs to. The event study starts 12 months before announcement date *(T = -12)* and ends 6 months after the announcement date *(T = 6)*. As mentioned in the methodology, the *PRCCM* and *AJEXM* are used to calculate the adjusted closing price *(CP)* for each month. *Returns* are calculated as the percentage change of the *CP* and is adjusted by the *EWRETX* into the abnormal returns *(AR)*. The *AR* are winsorized at 1% and 99% into the *WinAR*. There are a few remarkable statistics:

- The highest adjusted closing price *(CP)* of a stock in the sample is Neurometrix at April, 2006 with a adjusted closing price of 389,400 dollar. The corresponding *WinAR* was only 4.9 percent because of the already high *CP* at March, 2006.
- The highest *Return* was 136.500, which means an increase in *CP* of 13,650 percent. Future Fintech Group experienced an increase in stock price from 66.7 dollars (in December, 2003) to 9,166.7 dollars (in January, 2004). When adjusted by the market returns, the *AR* is 136.435. This is winsorized into a *WinAR* of 0.470.

The results from *AR* are winsorized into *WinAR*. Winsorization means the most extreme values are replaced by less extreme values. The outliers are all set to 99 percent winsorization: All data below the 1st percentile is set to the 1st percentile, and data above the 99th percentile is set to the 99th percentile. This reduces the effect of outliers such as the extreme increase of 13650 percent increase in stock returns from the Future Fintech Group. The most extreme positive and negative values are replaced by 0.470 and -0.333 percent respectively. A comparison in table 4 between *AR* and *WinAR* shows the same percentile values and median. This is because these values are not adjusted by the winsorization. The mean has decreased, which means the positive extreme values have more impact on the than the negative extreme values. Also, the standard deviation is naturally lower because of less extreme values. The mean value of the *WinAR* shows the average winsorized abnormal returns are 0.1 percent per month. When the *WinAR* is cumulated for 19 months for each firm-year observation, the cumulated average abnormal return of the full dataset is 4.68 percent. In other words, when an investor invests in all firms in the sample period, he averages abnormal returns of 4.68 annually from 1971-2019.

IV. Results

This section consists of four parts. The first part focuses on the association between earnings and stock returns. The second part focuses on the association between earnings components (revenue and expenses) and stock returns. The third part focuses on the association between expense components and stock returns. The fourth part uses investment strategies based on information of previous results to see which hypothesis gives the most valuable information to the stock market.

The Association between Earnings and Stock Returns

The first hypothesis of this thesis is as follows: *There exists an association between net income changes and stock returns*. This is first tested by grouping the observations in one of the two portfolios: firms with positive earnings change and firms with negative earnings change. Second, the observations are grouped into one of 10 deciles, based on the magnitude per total assets. The cumulative abnormal stock returns are calculated for each portfolio as described in the methodology section. The results are presented in figure 1 and appendix B and C.

Figure 1: The Association between Annual Earnings Change and Cumulative Abnormal Returns

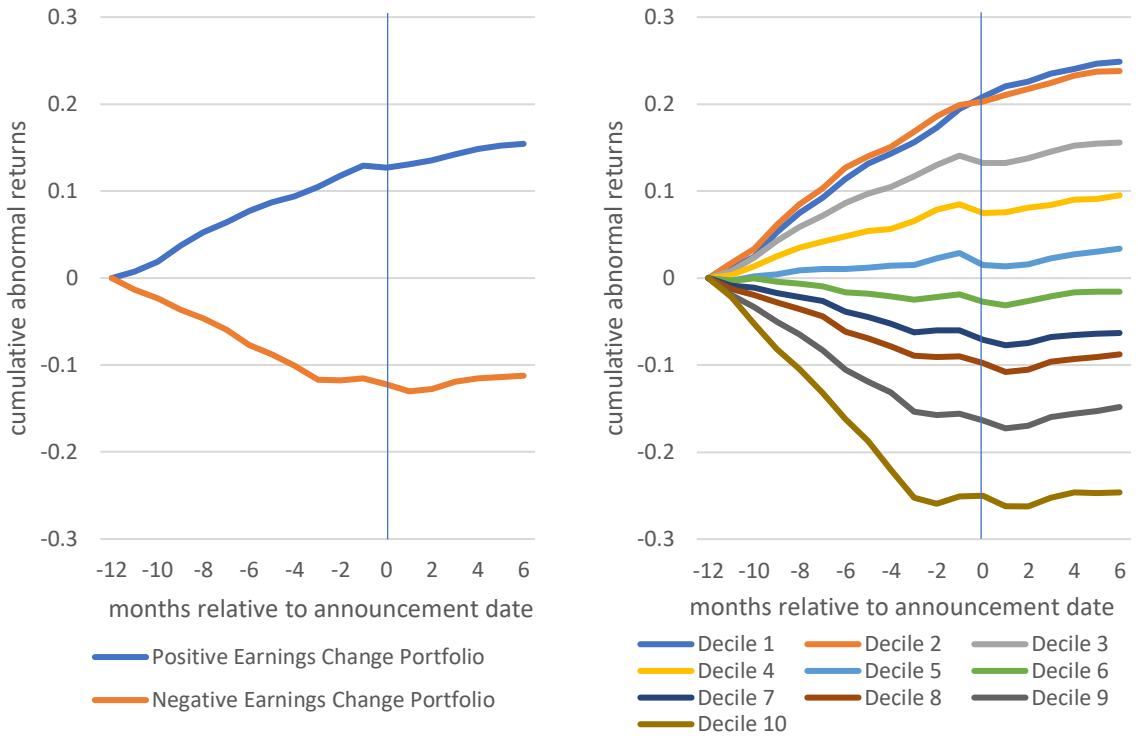

Figure 1 presents analysis for the association between annual earnings change and cumulative abnormal returns. The left figure shows the difference between cumulative abnormal returns between portfolios based on the *sign* of the earnings change. The right figure shows the difference between cumulative abnormal returns between deciles based on the *magnitude* of the earnings change. The results and statistical significance can be found in appendix B (for the portfolios) and C (for the deciles).

Figure 1 shows the portfolios on the left and the deciles on the right. The result on the left shows there exists a positive association between the *sign* of earnings change and stock returns. At the month of the announcement date (month 0), the sign of the change in earnings is associated with an average difference of 24.9 percent in abnormal annual returns. Firms with positive earnings change experience average abnormal returns of 12.7 percent and firms with negative earnings change experience average

abnormal returns of -12.2 percent. The stock market reacts to the information contained in the annual income number. The information contained in the annual income number is useful for the stock market. The information contained in the reported income is for the most part already anticipated by the stock market before the annual report is released. The anticipation of the information by the stock market is so accurate the actual income number doesn't cause any unusual jumps in the cumulative abnormal returns in the last few months before the announcement month. This is illustrated by the fact that the stock market already starts reacting to the *sign* of earnings changes eleven months before the announcement report is released. Also, the drifts show an almost monotonic increase in value, suggesting not only that the stock market begins to anticipate the earnings changes eleven months before the announcement date, but also continues to do so throughout the year.

At the end of the sample period (month 6), the sign of the change in earnings is associated with an average difference of 26.7 percent in abnormal returns (with 15.4 percent returns for positive changes and -11.2 percent returns for negative changes). This shows that the difference in stock returns increase with 1.8 percent from month 0 onwards. The positive portfolio experiences an average abnormal return of 2.8 percent, and the negative portfolio experiences an average abnormal return of 1 percent. This is called the post-earnings-announcement-drift: The stock market reacts to the earnings changes even after the announcement date. According to Bernard & Thomas (1989), there are two competing explanations. The first explanation suggests that a portion of the price response to new information is delayed. This might occur because either traders fail to assimilate available information, or because certain costs (such as transaction or opportunity costs) exceed gains from immediate exploitations of information for a large number of traders. The second explanation suggests the calculation of abnormal returns is either incomplete or misstated.

Figure 1 shows the stock market also reacts to the *magnitude* of earnings difference. The right figure shows a difference between the top and bottom decile of 45.8 percent abnormal returns. The cumulative abnormal returns of firms in the top decile of annual earnings changes are 20.8 percent on average, whereas firms in the bottom decile of annual earnings changes experience abnormal returns of -25 percent. These results suggest that the most extreme changes in earnings are associated with a 45.8 percent difference in abnormal annual returns on average over 1971-2019. The results on the right also strengthen the conclusion that earnings changes and stock returns are positively associated. The results show that the *sign* of changes are also important for the stock returns of the deciles. The first five deciles containing firms with positive earnings changes all experience positive abnormal returns, while the last five deciles containing firms with negative earnings changes all experience negative abnormal returns. Decile 3, with the average increase in earnings, experiences similar abnormal returns as the positive portfolio. Decile 8, with the average decrease in earnings, experiences similar abnormal returns as the negative portfolio. The *magnitude* of these changes shows the following association: The more extreme annual earnings changes, the more extreme abnormal stock returns in the same direction. Therefore, the stock market reacts to both the *sign* and *magnitude* of the annual revenue changes. The only exception is the second decile. This decile contains firms with less extreme positive earnings changes than the top decile. However, the abnormal stock returns of the first two deciles are almost the same. Together, the first two deciles consist of firms with an increase in earnings of more than 3.6 percent of their total assets and experience average abnormal returns of 20.5 percent.

The results are comparable to the results of Ball & Brown (1968) and Nichols & Wahlen (2004), who report a difference in abnormal returns of 16.8 and 35.6 percent annually respectively. The difference in abnormal returns between Ball & Brown (1968) and Nichols & Wahlen (2004) can be explained by a more volatile market between 1988-2002 than 1946-1966. This is also mentioned by Nichols & Wahlen (2004) and consistent with previous papers about stock volatility (Campbell et al., 2011; Bartram et al., 2012; Thesmar & Thoenig, 2011).

Another explanation could be the stock market reacts stronger to the difference in actual income than to the difference with the expected income. The results from figure 1 report a difference in abnormal returns of 24.9 percent annually, which at first sight doesn't seem to be consistent with the results of 35.6 percent of Nichols & Wahlen (2004).

Table 5: Difference in Abnormal Returns between Portfolios over time

Period	***Konijn (2021)***	***Ball & Brown (1968)***	***Nichols & Wahlen (2004)***
1946 – 1966		16.8 percent	
1971 – 1987	24.7 percent		
1988 – 2002	33.5 percent		35.6 percent
2003 – 2019	21.0 percent		

Table 5 presents the results from figure 1 divided into three different periods, the results from Ball & Brown (1968) and results from Nichols & Wahlen (2004). This table shows the similarities and differences between periods and papers while performing similar event studies.

Table 5 shows the results of this thesis divided into three periods, Ball & Brown (1968) and Nichols & Wahlen (2004). The results of this thesis are divided into three sample periods for comparison. The explanation of a more volatile market between Nichols & Wahlen (2004) and Ball & Brown (1968) could still be true, but there's no explanation why the volatility drops after the sample period of Nichols & Wahlen (2004). The volatility increases over time until 2002, after which it decreases massively.

The Association between Earnings Components and Stock Returns

The second hypothesis of this thesis is based on the standard economic assumption that net income consists of total revenue minus total expenses. The association between earnings changes and stock returns can be extended to the following hypotheses: *A) There exists an association between revenue changes and stock returns. B) There exists an association between expenses changes and stock returns.* First, the revenue changes are discussed. The results are shown in figure 2 and appendix D and E.

Figure 2: The Association between Annual Revenue Change and Cumulative Abnormal Returns

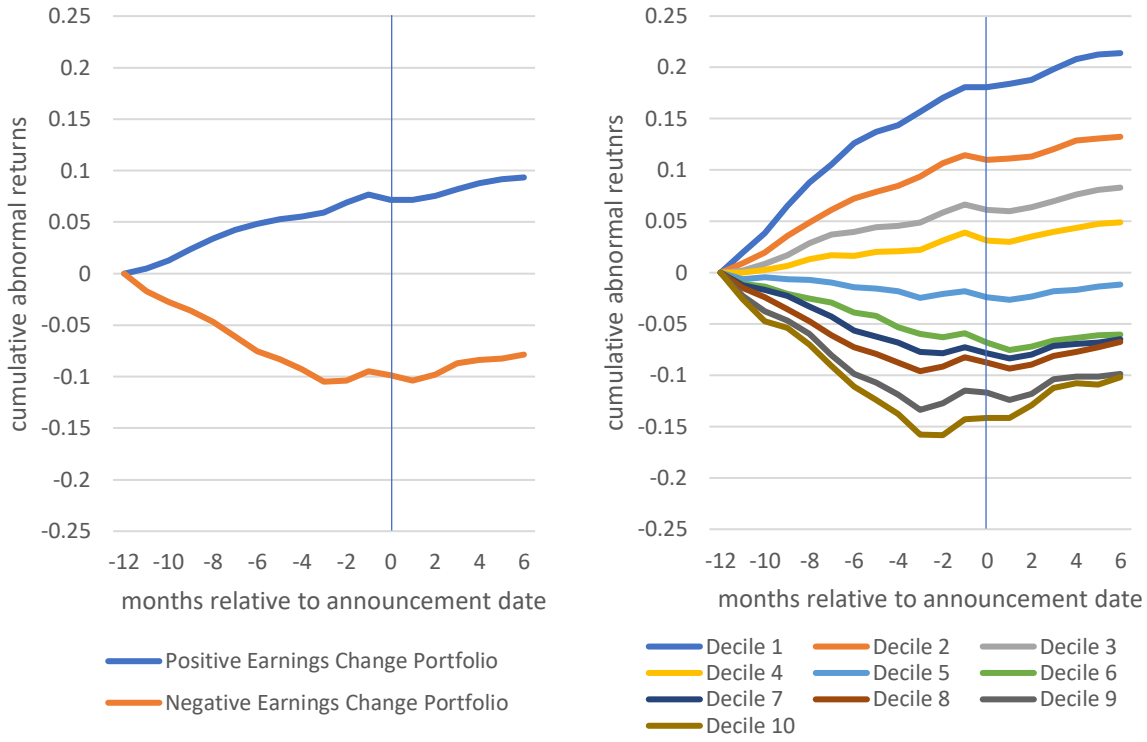

Figure 2 presents analysis for the association between annual revenue change and cumulative abnormal returns. The left figure shows the difference between portfolios based on the *sign* of the revenue change. The right figure shows the difference between deciles based on the *magnitude* of the revenue change. The results and statistical significance can be found in appendix D (for the portfolios) and E (for the deciles).

The results in figure 2 show the stock market reacts to the information contained in the annual revenue number. The left figure shows there exists a positive association between revenue changes and stock returns. At the month of the announcement date (month 0), the sign of the change in revenue is associated with an average difference of 17.1 percent in abnormal annual returns. Firms with positive earnings change experience average abnormal returns of 7.2 percent and firms with negative earnings change experience average abnormal returns of -9.9 percent. The *sign* of the annual revenue change is associated with 17.1 percent abnormal returns annually. This is lower than the 24.9 percent abnormal returns for earnings changes, which means the *sign* of the annual earnings change gives more valuable information to the stock market than the *sign* of the annual revenue change. The drifts of the portfolios show an almost monotonic increase and decrease in value which starts eleven months before the annual report is released. The positive revenue portfolio experiences average abnormal returns of 0.7 percent until the announcement date, while the negative revenue portfolio experiences average abnormal returns of -1.3 percent until month -3. After month -3, the negative portfolio stays relatively constant until month 0, which could indicate that all the new information from the *sign* of the annual revenue is impounded in the stock price. After the announcement date, both portfolios increase around 2.1 percent

abnormal returns in the after-announcement date. The after-announcement drift is also visible for the deciles, who increase between 0.8 and 4 percent between month 0 and month 6. The negative deciles also show they tend to move to similar points at month 6. The abnormal returns of the negative portfolio (-9.9 percent) contribute more to the difference of 17.1 percent between portfolios than the abnormal returns of the positive portfolio (7.2 percent). This means the stock market reacts stronger to the *sign* of negative revenue changes than to the *sign* of positive revenue changes. However, the stock market reacts stronger to the *magnitude* of positive revenue changes than to the *magnitude* of negative revenue changes. The results on the right show a difference between the positive deciles (1-5) of 22.5 percent annual abnormal returns, while the negative deciles (6-10) show a difference of 4.2 percent annual abnormal returns. The stock market reacts 5.4 times stronger to the *magnitude* of positive changes than to the *magnitude* of negative changes. Also, the abnormal returns of the top and bottom deciles are more extreme than the abnormal returns of the portfolios. The first decile experiences 2.5 times higher abnormal returns than the positive portfolio (18.1 percent versus 7.2 percent) and the last deciles experiences 1.4 times more negative abnormal returns than the negative portfolio (-14.1 percent versus -9.9 percent). Therefore, the stock market reacts to both the *sign* and *magnitude* of the annual revenue changes. Decile 5 shows an unexpected result. Decile 5 consists of firms with minimum positive revenue changes and experiences negative abnormal returns. The positive association between revenue changes and stock returns doesn't count for a minimal increase in revenue. In other words, firms with an increase of revenue of more than 4.3 percent of their total assets (deciles 1-4) experience positive abnormal returns, while firms with an increase of revenue of less than 4.3 percent of their total assets (or a decrease of revenue) experiences negative abnormal returns. Next, the expenses are discussed. The results are presented in figure 3 and appendix F and G.

Figure 3: The Association between Annual Expense Change and Cumulative Abnormal Returns

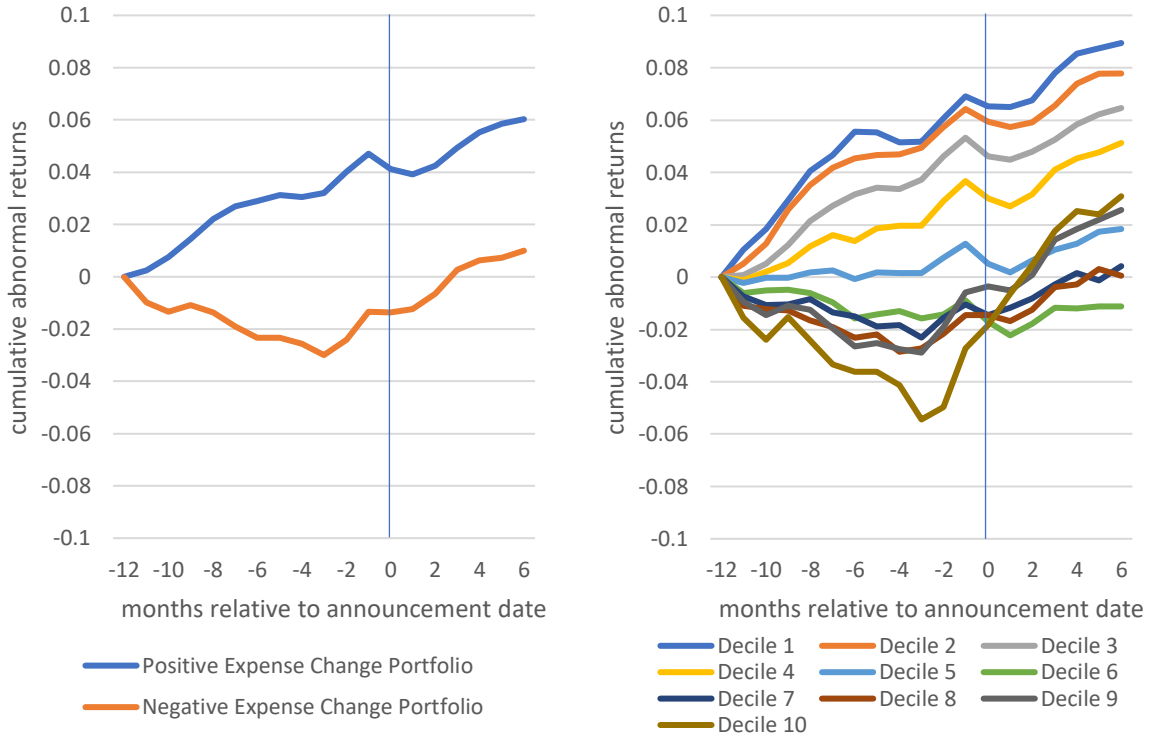

Figure 3 presents analysis for the association between annual expense change and cumulative abnormal returns. The left figure shows the difference between portfolios based on the *sign* of the expense change. The right figure shows the difference between deciles based on the *magnitude* of the expense change. The results and statistical significance can be found in appendix F (for the portfolios) and G (for the deciles).

Figure 3 shows there exists a positive association between the *sign* of expense changes and stock returns. The left figure shows a difference of 5.5 percent at the month of the announcement date. Firms with positive earnings change experience average abnormal returns of 4.1 percent and firms with negative earnings change experience average abnormal returns of -1.4 percent. This is the lowest difference between portfolios so far, which means the *sign* of total expense change gives the less valuable information than the *sign* of earnings change or the *sign* of revenue change.

The negative *expense* portfolio experiences a similar pattern as the negative *revenue* portfolio with negative abnormal returns until month -3, after which the cumulative abnormal returns increase immediately. This is different from the revenue association. The abnormal returns of the negative expense portfolio could show that all new information from the *sign* of the annual expense number is already impounded in the stock price in month -3. From month -3 onwards, the cumulative abnormal returns increase due to the after-announcement drift.

The right figure shows the *magnitude* of positive expense changes is valuable to the stock market, while the *magnitude* of negative expense changes is not valuable. The positive portfolio experiences 4.1 percent abnormal returns. The positive deciles experience abnormal returns between 0.5 percent and 6.5 percent. The abnormal returns of the positive deciles give more information about the stock market reaction than the positive portfolio. The *magnitude* of negative expense changes doesn't give additional information. The negative portfolio experiences -1.4 percent abnormal returns. The negative deciles experience abnormal returns of -0.4 percent and -1.8 percent with four deciles around the -1.5 percent abnormal returns. The stock market reacts 4.6 times stronger to the *magnitude* of positive expense changes (6.5 percent difference) than to the *magnitude* of negative expense changes (1.4 percent difference). The distribution of the negative deciles gives no additional information to the stock market.

In conclusion, the *sign* of revenue changes and expense changes are both positively associated with abnormal stock returns. The *sign* of revenue changes is associated with an average difference of 14.2 percent abnormal returns and the *sign* of expense changes is associated with an average difference of 5.5 percent abnormal returns. Also, the *magnitude* of revenue changes and expense changes experience a stronger stock market reaction to positive changes (deciles 1-5) than to negative changes (deciles 6-10). The stock market reacts 5.4 times stronger to the *magnitude* of positive revenue changes than to the *magnitude* of negative revenue changes and 4.6 times stronger to the *magnitude* of positive expense changes than to the *magnitude* of negative expense changes.

The Association between Expense Components and Stock Returns

The third hypothesis of this thesis is as follows: *There exists an association between the expense components and stock returns.* To capture the association of the separate expense components, the portfolios are regrouped for each expense component. The six components will be discussed in a slightly different order. First the components with a positive association (*COGS*, *SGA* and *TAX*) are discussed. Then the components with a negative association (*DEPR*, *SI* and *OTH*) are discussed.

Figure 4: The Association between Annual COGS Change and Cumulative Abnormal Returns

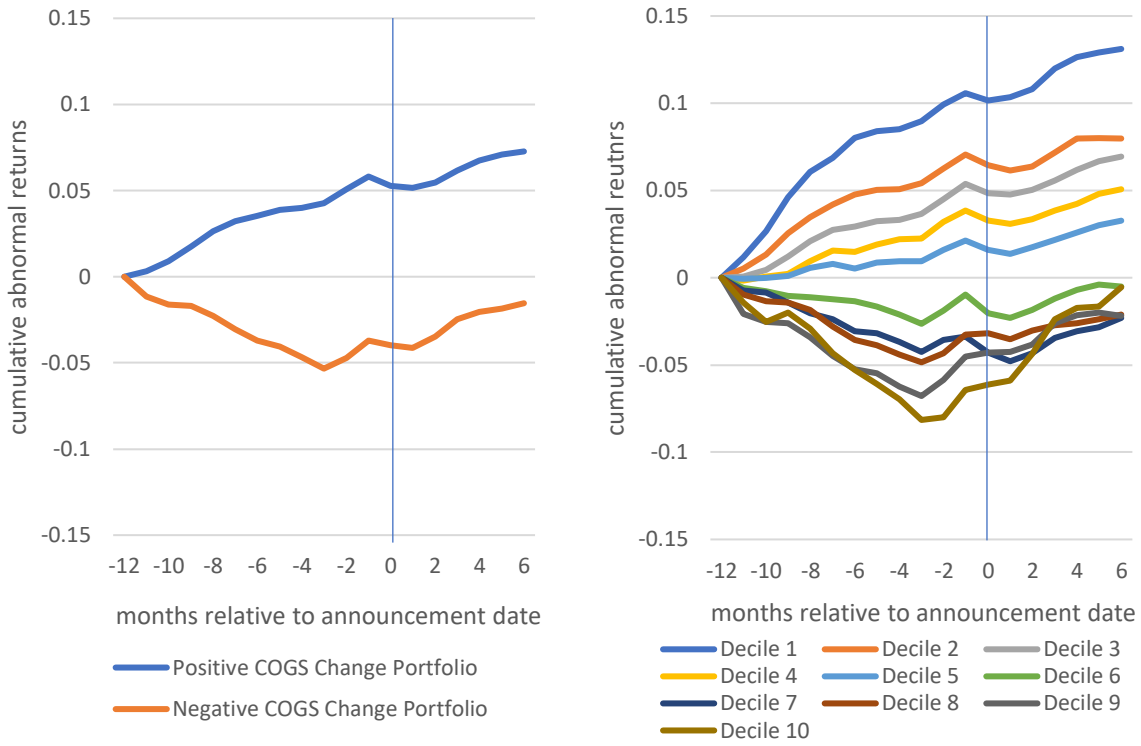

Figure 4 presents analysis for the association between annual *COGS* change and cumulative abnormal returns. The left figure shows the difference between cumulative abnormal returns between portfolios based on the *sign* of the *COGS* change. The right figure shows the difference between cumulative abnormal returns between deciles based on the *magnitude* of the *COGS* change. The results and statistical significance can be found in appendix H (for the portfolios) and I (for the deciles).

Cost of Goods Sold (*COGS*) are direct production costs of goods sold by a company, such as costs of materials and labour. Figure 4 (and appendix H and I) shows a positive association between the *sign* of *COGS* change and stock returns. The left figure shows a difference of 9.3 percent abnormal returns between the positive and negative portfolio. The positive portfolio experiences 5.3 percent abnormal returns and the negative portfolio experiences -4.0 percent abnormal returns.

The right figure shows the stock market reacts 2.1 times more to the *magnitude* of positive *COGS* changes than to the *magnitude* of negative *COGS* changes. The difference between the first five deciles is 8.6 percent and the difference between the last five deciles is 2.3 percent. The *magnitude* of positive *COGS* change is more valuable to the stock market than the *magnitude* of negative *COGS* change. The deciles with the most extreme changes (1 and 10) experience more extreme abnormal stock returns than the portfolios. Decile 1 experiences 10.2 percent abnormal returns compared to the 5.3 percent abnormal returns of the positive portfolio. Decile 10 experiences -6.1 percent abnormal returns compared to the -4.0 percent abnormal returns from the negative portfolio.

These results are comparable to the results of both the *expense*-returns association and the *revenue*-returns association. *COGS* hold a large weight on total expenses (see table 5) and is directly related to the revenue because the *COGS* are direct costs of producing goods sold by a company. Similar to the *revenue*-returns association, decile 5 shows an unexpected result. Decile 5 consists of firms with minimum positive *COGS* changes and experiences negative abnormal returns. In other words, firms with an increase of *COGS* of more than 2.0 percent of their total assets (deciles 1-4) experience positive abnormal returns, while firms with an increase of *COGS* of less than 2.0 percent of their total assets (or a decrease of *COGS*) experiences negative abnormal returns.

Figure 5: The Association between Annual SGA Change and Cumulative Abnormal Returns

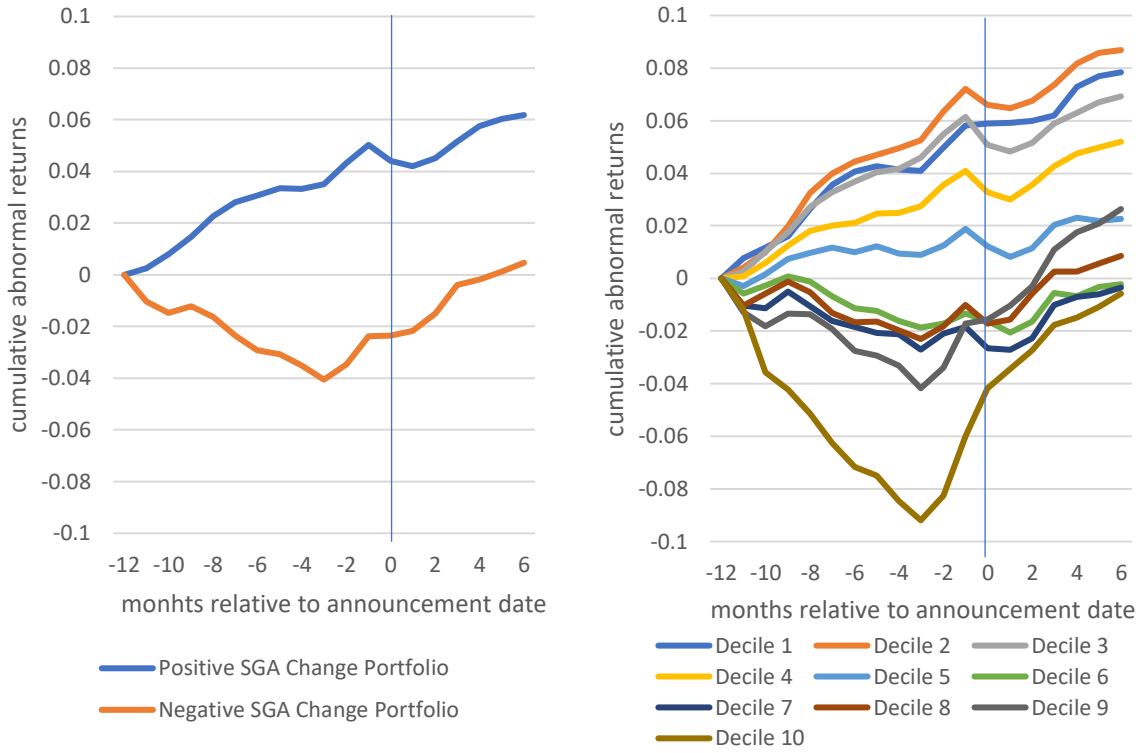

Figure 5 presents analysis for the association between annual *SGA* change and cumulative abnormal returns. The left figure shows the difference between cumulative abnormal returns between portfolios based on the *sign* of the *SGA* change. The right figure shows the difference between cumulative abnormal returns between deciles based on the *magnitude* of the *SGA* change. The results and statistical significance can be found in appendix J (for the portfolios) and K (for the deciles).

Selling, General and Administrative expense *(SGA)* includes all costs not directly tied to making a product or performing a service, such as costs to sell and deliver products and services, and costs to manage the company. Figure 5 (and appendix J and K) shows a positive association between the *sign* of *SGA* change and stock returns. There exists a difference of 6.8 percent abnormal returns between the positive and negative portfolio. The positive portfolio experiences 4.4 percent abnormal returns and the negative portfolio experiences -2.4 percent abnormal returns. The stock market reacts stronger to a positive *sign* in *SGA* than to a negative *sign*. The negative portfolio experiences a steady trend with an average of -0.46 percent abnormal returns per month until month -3. After month -3, the cumulative abnormal returns increase with an average of 0.51 percent abnormal returns per month until month 6.

The right figure shows the stock market reaction to the *magnitude* of SGA changes. The stock market reaction can be divided into four trends. Firstly, the top three deciles experience an average of 5.9 percent abnormal returns and consist of firms with an increase in SGA of at least 1.7 percent of their total assets. Secondly, the fifth decile (with minimal positive changes in SGA) experiences negative

abnormal returns. On average, only firms with an increase of SGA of at least 0.7 percent of their total assets experience positive abnormal returns. Thirdly, deciles 6 to 9 experience average abnormal returns of -1.9 percent annually. Lastly, firms with a decrease in SGA of more than 6.1 percent (decile 10) experiences -4.2 percent abnormal returns. The last decile shows a dramatic decrease in abnormal returns until month -3 with an average returns of -1.02 percent per month. From month -3 onwards, the cumulative abnormal returns increase with an average of 0.96 percent abnormal returns until month 6. The difference between the positive deciles is 4.7 percent and the difference between the negative deciles is 2.6 percent. For both the *sign* and *magnitude*, the stock market reacts stronger to positive changes than to negative changes of the SGA expenses.

Figure 6: The Association between Annual TAX Change and Cumulative Abnormal Returns

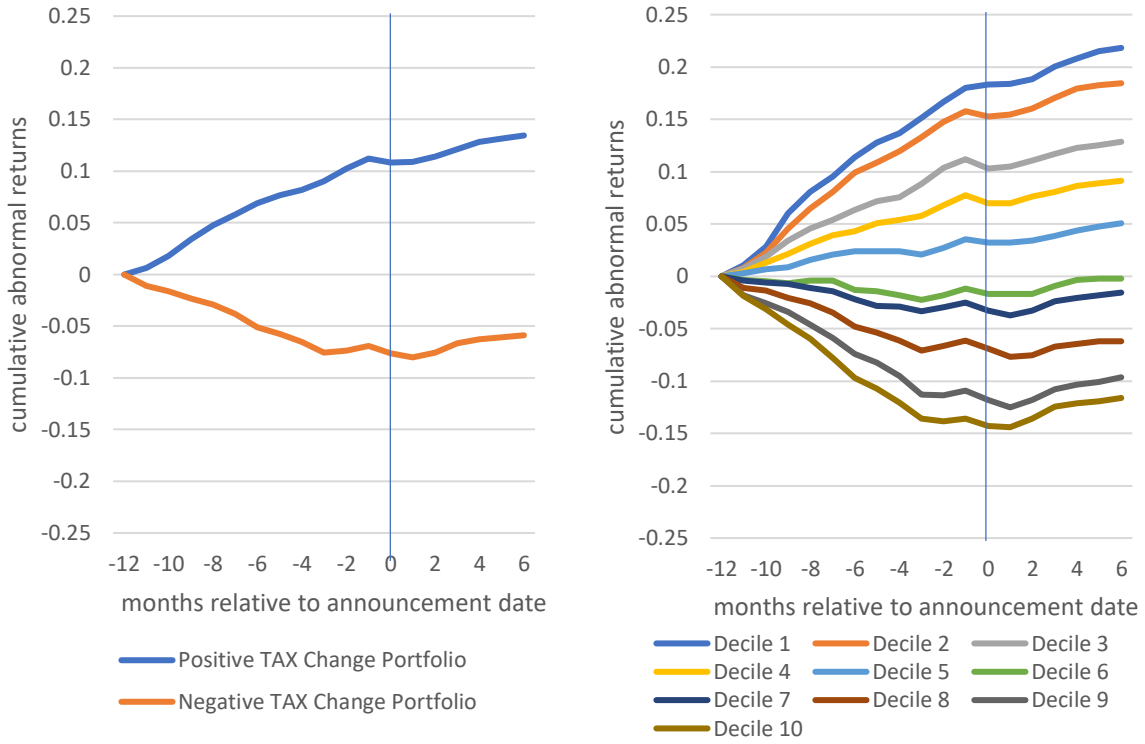

Figure 6 presents analysis for the association between annual *TAX* change and cumulative abnormal returns. The left figure shows the difference between cumulative abnormal returns between portfolios based on the *sign* of the *TAX* change. The right figure shows the difference between cumulative abnormal returns between deciles based on the *magnitude* of the *TAX* change. The results and statistical significance can be found in appendix L (for the portfolios) and M (for the deciles).

Tax expense (TAX) is a liability owed to federal or state/provincial governments and is calculated by multiplying the tax rate by the income received. Figure 6 (and appendix L and M) shows a positive association between the *sign* of *TAX* change and stock returns. There exists a difference of 18.4 percent abnormal returns between the positive and negative portfolio. The positive portfolio experiences 10.8 percent abnormal returns and the negative portfolio experiences -7.6 percent abnormal returns. This shows that the information contained in the annual *TAX* number is useful for the stock market. This is probably because de tax expense is based on the income received. 71.5 percent of the companies with increasing income also had an increasing tax expense. The difference of 18.4 percent in annual returns between portfolios is less extreme compared to the abnormal returns of the *earnings* portfolios (with a difference of 24.9 percent annual returns), which shows the stock market reacts more to the *sign* of earnings changes than the *sign* of *TAX* changes. An explanation could be that firms try to minimize the tax expense to maximize profit. The tax expenses are a good way to know whether a company has made

a loss or profit, but managers might have an incentive to adjust tax expenses. This gives a less accurate view and is therefore less reliable information for investors. This is consistent with Dhaliwal et al. (2004), who showed that firms lower their effective tax rate when they miss the consensus forecast. Firms decrease their tax expense if non-tax sources of earnings management are insufficient to achieve targets. The deciles show the stock market also reacts to the *magnitude* of *TAX* difference. The top decile experiences 18.3 percent abnormal returns and the last decile experiences -14.3 percent abnormal returns. The stock market reacts to both the *sign* and *magnitude* of *TAX* changes. The positive deciles all experience positive abnormal returns, and the negative deciles all experience negative abnormal returns. The difference between the positive deciles is 15.1 percent and the difference between the negative deciles is 12.6 percent. For both the *sign* and *magnitude*, the stock market reacts stronger to positive changes than to negative changes of the tax expenses.

Figure 7: The Association between Annual DEPR Change and Cumulative Abnormal Returns

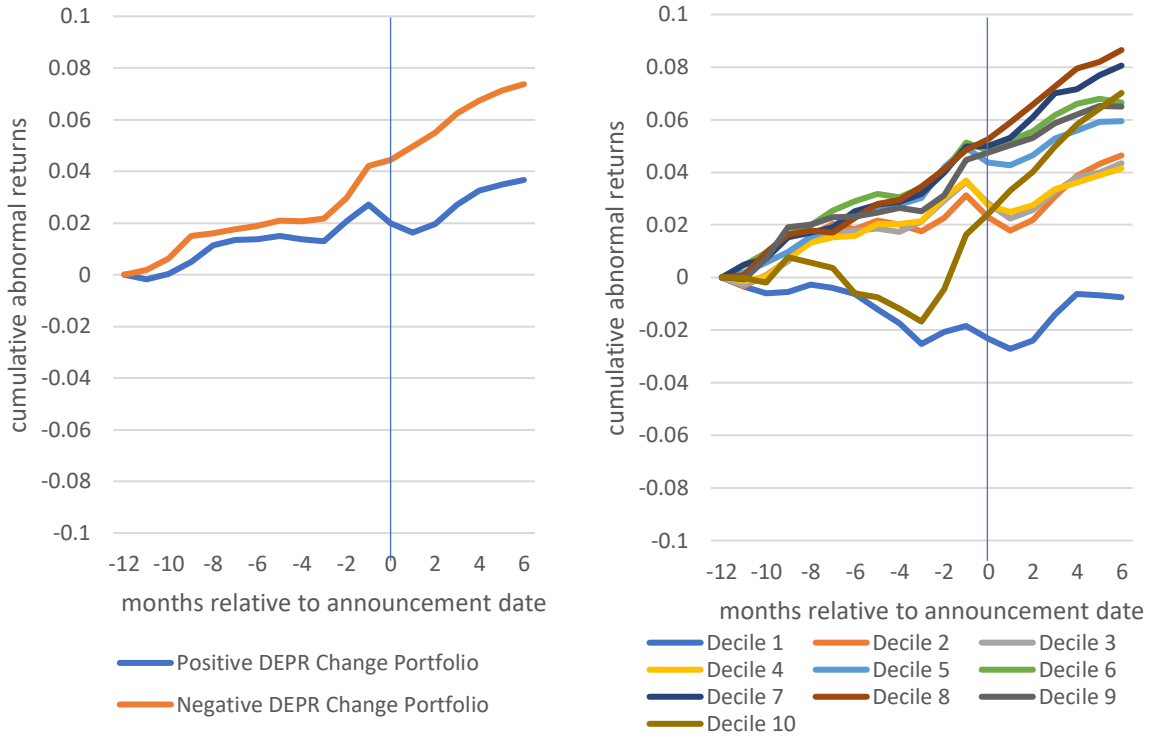

Figure 7 presents analysis for the association between annual *DEPR* change and cumulative abnormal returns. The left figure shows the difference between cumulative abnormal returns between portfolios based on the *sign* of the *DEPR* change. The right figure shows the difference between cumulative abnormal returns between deciles based on the *magnitude* of the *DEPR* change. The results and statistical significance can be found in appendix N (for the portfolios) and O (for the deciles).

Depreciation expense *(DEPR)* is an accounting method that allocates the costs of an asset over its useful life or life expectancy. The accumulated depreciation on the balance sheet represents how much of an asset's value has been used up and it helps firms with matching expenses with revenues. Figure 7 (and appendix N and O) shows a negative association between the *sign* of *DEPR* change and stock returns. There exists a (rounded) difference of 2.5 percent abnormal returns between the positive and negative portfolio. The negative portfolio experiences 4.4 percent abnormal returns and the positive portfolio experiences 2.0 percent abnormal returns. The portfolios follow a similar trend of approximately 0.3 percent abnormal returns per month until one month before the announcement date (month -1).

After month -1, the cumulative abnormal return of the negative portfolio drops with 0.7 percent, which is a large drop on a cumulative abnormal return of -2.7 percent. The positive portfolio follows

the same trend with an increase of 0.2 percent cumulative abnormal returns. This is also confirmed by the positive deciles who all experience decreasing abnormal returns in the last month before the announcement date. An explanation could be that depreciation expense number, in contrast to earnings or revenue, is not yet available for the stock market. The new information contained in the depreciation expense number shows the stock market their anticipation was not sufficient, and the actual depreciation number includes relevant information for the stock market.

The right figure shows the stock market reaction to the *magnitude* of *DEPR* changes. Only the top decile experiences negative abnormal returns. In other words, firms with an increase in depreciation expense of more than 1.3 percent of their total assets experience an average of -2.3 percent abnormal returns. This shows how small the differences in depreciation expenses are relative to the total assets. The other deciles experience an average of 3.8 percent abnormal returns, with a slight distinction between positive and negative deciles. Deciles 2 to 5 experience 3.1 percent abnormal returns and deciles 6 to 10 experience 4.4 percent abnormal returns. The deciles show the stock market also reacts to the magnitude of *DEPR* difference. The stock market reacts to both the *sign* and *magnitude* of *DEPR* changes. The difference between the positive deciles is 6.7 percent and the difference between the negative deciles is 2.8 percent. For both the *sign* and *magnitude*, the stock market reacts stronger to negative changes than to positive changes of depreciation expenses.

Figure 8: The Association between Annual SI Change and Cumulative Abnormal Returns

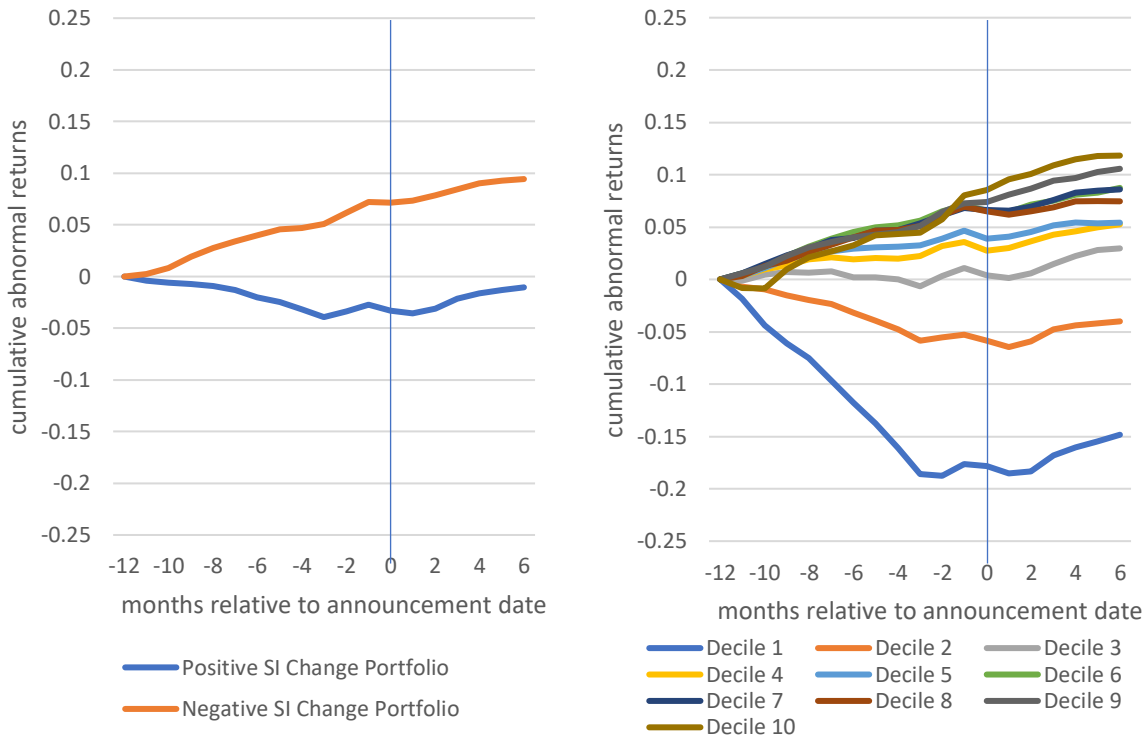

Figure 8 presents analysis for the association between annual *SI* change and cumulative abnormal returns. The left figure shows the difference between cumulative abnormal returns between portfolios based on the *sign* of the *SI* change. The right figure shows the difference between cumulative abnormal returns between deciles based on the *magnitude* of the *SI* change. The results and statistical significance can be found in appendix P (for the portfolios) and Q (for the deciles).

Special items (SI) are large one-time expenses/source of income that a company doesn't expect to recur in future years, such as extraordinary expenses, gains from the elimination of debt, restructuring charges and earnings from discontinued operations. Figure 8 (and Appendix P and Q) shows a negative association between the *sign* of *SI* change and stock returns. There exists a difference of 10.4 percent

abnormal returns between the positive and negative portfolio. The negative portfolio experiences 7.1 percent abnormal returns and the positive portfolio experiences -3.3 percent abnormal returns. This shows that the information contained in the annual *SI* number is useful for the stock market.

The deciles show the stock market also reacts to the magnitude of *SI* difference. The top decile experiences -17.8 percent abnormal returns and the bottom decile experiences 8.5 percent abnormal returns. The stock market reacts to both the *sign* and *magnitude* of *SI* changes. Only firms with an increase of *SI* of more than 2.03 percent of their total assets (decile 9 and 10) experience negative abnormal returns. Also, decile 3 experiences cumulative abnormal returns of 0.4 percent. In other words, an increase in *SI* between 0.86 and 2.03 percent of their total assets is perceived as normal and doesn't contain information for a stock market reaction.

The difference between the positive deciles is 21.7 percent abnormal returns and the difference between the negative deciles is 1.9 percent. This means the stock market reacts 11.4 times stronger to the *magnitude* of positive *SI* changes than to the *magnitude* of negative *SI* changes. The stock market reacts stronger to the *sign* of negative *SI* changes, but stronger to the *magnitude* of positive *SI* changes. This is mostly due to the cumulative abnormal returns of -17.8 percent of the tenth decile. The stock market reacts very badly to a large increase in *SI*. The top decile consists of firms with the largest one-time expenses. This has a big impact on the net income: 89.4 percent of the firms in the top decile also have a decrease in earnings. However, the abnormal returns of -17.8 percent are more extreme than the -12.2 percent abnormal returns of the negative *earnings* portfolio. It's more valuable for the stock market to know whether a firm has an increase in *SI* of more than 5.6 percent of their total assets than knowing if a firm has decrease in earnings.

Figure 9: The Association between Annual OTH Change and Cumulative Abnormal Returns

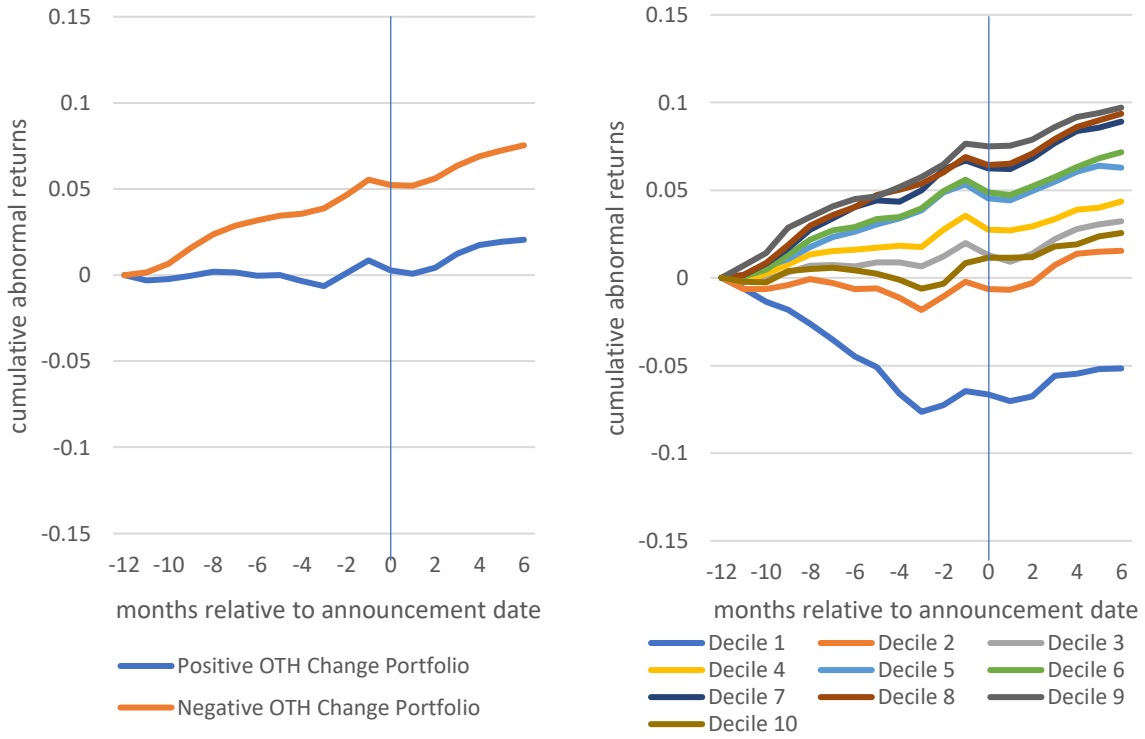

Figure 9 presents analysis for the association between annual *OTH* change and cumulative abnormal returns. The left figure shows the difference between cumulative abnormal returns between portfolios based on the *sign* of the *OTH* change. The right figure shows the difference between cumulative abnormal returns between deciles based on the *magnitude* of the *OTH* change. The results and statistical significance can be found in appendix R (for the portfolios) and S (for the deciles).

Other expenses *(OTH)* are the remainder of total expenses that are not included in the previous expense components. This is often stated in financial statements as: 'Other income and expenses' and is mostly a bottom-line figure for other activities, such as finance activities. Figure 9 (and Appendix R and S) shows a negative association between the *sign* of *OTH* change and stock returns. There exists a (rounded) difference of 5.0 percent abnormal returns between the positive and negative portfolio. The negative portfolio experiences 5.2 percent abnormal returns and the positive portfolio experiences 0.3 percent abnormal returns. This shows that the information contained in the annual *OTH* number is useful for the stock market.

The deciles show the stock market also reacts to the magnitude of *OTH* difference. Similar to special items, only the first and second decile experiences negative abnormal returns. In other words, firms with an increase in other expense of more than 1.0 percent of their total assets experience negative abnormal returns. Firms with an increase of more than 2.2 percent of their total assets experience -6.6 percent abnormal returns. The distribution of deciles shows that firms with a high decrease in *OTH* experience the highest abnormal returns and firms with a high increase in *OTH* experience the lowest abnormal returns. However, the bottom decile deviates from the pattern. Higher decreases in *OTH* are better than low decreases in *OTH*, but the highest decrease in *OTH* experiences lower abnormal returns. The difference between the positive deciles is 11.2 percent abnormal returns and the difference between the negative deciles is 3.7 percent. This means the stock market reacts 3 times stronger to the *magnitude* of positive *OTH* changes than to the *magnitude* of negative *OTH* changes. The stock market reacts stronger to the *sign* of negative *OTH* changes, but stronger to the *magnitude* of positive *OTH* changes.

The Comparison of Associations: Investment Strategy

The fourth hypothesis of this thesis is as follows: *The combined association between expense component change and abnormal stock returns is larger than the association between earnings changes and abnormal stock returns.* The fourth hypothesis is tested by creating new portfolios based on the information from previous results. The difference in cumulative abnormal returns between portfolios will show how valuable the combined information is to the stock market. Previous results show that earnings change is the most valuable information for the stock market with a difference of 24.9 percent abnormal returns between portfolios. This is significantly higher than the *sign* of revenue changes (17.1 percent) and *sign* of expense changes (5.5 percent). However, the first investment strategy with the combination of *signs* of revenue change and expense changes could result in more valuable information for the stock market. There are four possible combinations: 1) An increase in both revenue and expenses; 2) An increase in revenue and a decrease in expenses; 3) A decrease in revenue and an increase in expenses; 4) A decrease in both the revenue and expenses. Figure 10 shows the previous *earnings*-returns association on the left and the new association between the first investment strategy and cumulative abnormal returns on the right.

Figure 10: The Association between the First Investment Strategy and Cumulative Abnormal Returns

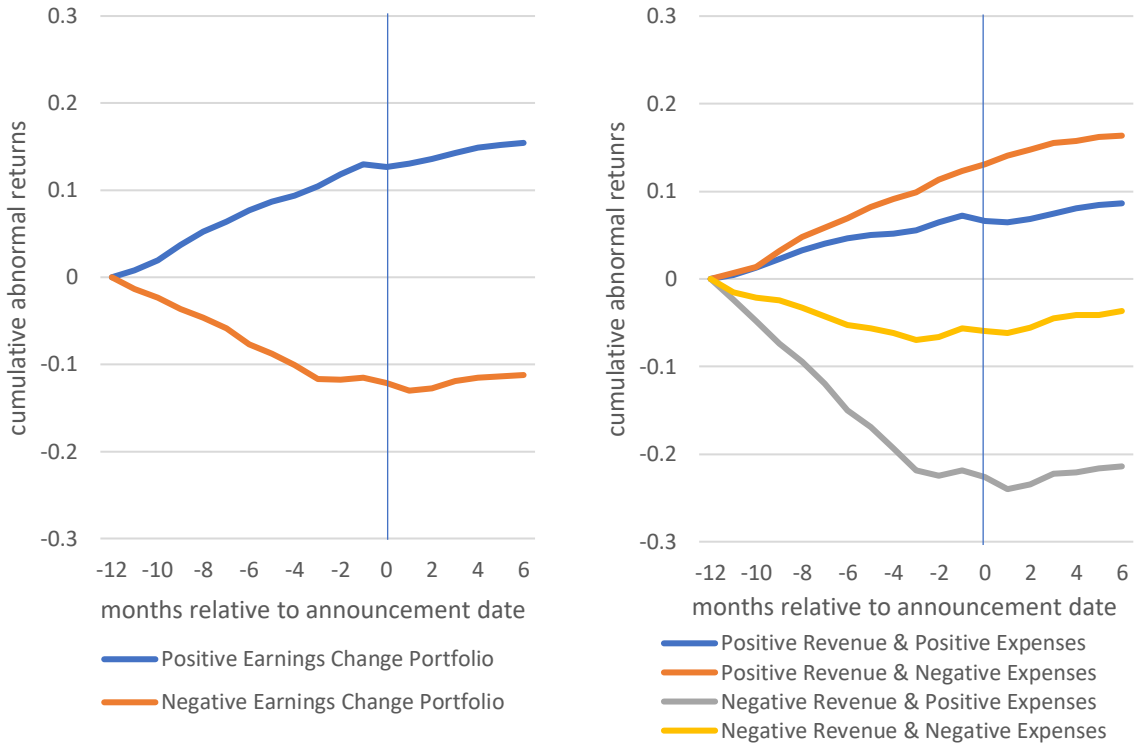

Figure 10 presents analysis for the association between the first investment strategy and cumulative abnormal returns. The left figure shows the difference between cumulative abnormal returns between portfolios based on the *sign* of the *earnings* change. The right figure shows the difference between cumulative abnormal returns between portfolios based on the first investment strategy. The results can be found in appendix T.

Figure 10 shows the cumulative abnormal returns of the four portfolios on the right. The *sign* of revenue change and the *sign* of expense change are both separately positively associated with abnormal returns. Based on these results, the selection of firms with both an increase in revenue and expenses (blue line, right figure) should experience the highest abnormal returns. The results from figure 10 show that firms with an increase in revenue and a decrease in expenses (orange line, right figure) experience higher abnormal returns. This is not consistent with the separate associations, but it is consistent with the

positive association between the *sign* of earnings change and stock returns. Net income is defined as the total income (revenue) less expenses [IAS 1.7]. Firms with both an increase in revenue and a decrease in expense are per definition firms with an increase in earnings. Also, firms with both a decrease in revenue and an increase in expenses are per definition firms with a decrease in earnings. The definition of net income explains why the second combination (Increase in revenue and decrease in expenses) leads to the highest abnormal returns and the third combination (Decrease in revenue and increase in expenses) leads to the lowest abnormal returns.

The difference between these two combinations is 35.7 percent annual abnormal returns, which is larger than the difference of 24.9 percent abnormal returns between the positive and negative earnings portfolio. The first investment strategy contains more valuable information to the stock market than the *earnings*-returns association. Firms with the *signs* of an increase in revenue and a decrease in expenses is more valuable to the stock market than the *sign* of an increase in earnings. Therefore, the best way (for investors) to increase your earnings is to increase revenue and decrease expenses. This is difficult to achieve because a firm has to increase its efficiency and profit margin. The difficulty is shown in the sample size. From the 62,328 firm-year observations, 37,169 had an increase in earnings but only 4,171 had both an increase in revenue and a decrease in expenses.

The worst combination (for the stock market) is a decrease in revenue and an increase in expenses. The stock market reacts negatively to a decrease in earnings but is also sensitive to the *magnitude* of negative changes (see figure 1) and the underlying revenues and expenses. Firms with decreases in revenue and expenses experience average cumulative abnormal returns of -5.9 percent annually. The stock market reaction is 3.8 times stronger to an increase in expenses instead of a decrease in expenses when the revenue decreases. An increase in expenses shows the stock market that a firm doesn't react to their decreasing revenues and increase their spending. Firms know they should reduce their expenses when the revenues are decreasing. From the 62,328 firm-year observations, 25,150 had a decrease in earnings but only 3,776 firms have decreasing revenues and expenses.

The positive portfolios experience very similar cumulative abnormal returns with 12.7 percent for an increase in *earnings* and 13.1 percent for the positive first investment strategy. The negative portfolios are both associated with negative cumulative abnormal returns, but the stock market reacts stronger to the negative first investment strategy than a decrease in *earnings.* The portfolio consisting of firms with a decrease in *revenue* and an increase in *expenses* experience abnormal returns of -22.6 percent annually. This stock market reaction is 1.9 times larger than the reaction to the negative *earnings* portfolio. The information contained in the combination of the *signs* in revenue and expenses are more valuable to the stock market than the *sign* of earnings. This is largely due to the negative cumulative abnormal returns of -22.6 percent for a decrease in *revenue* and an increase in *expenses.*

Figure 11: The Association between Expense Component Portfolios and Cumulative Abnormal Returns

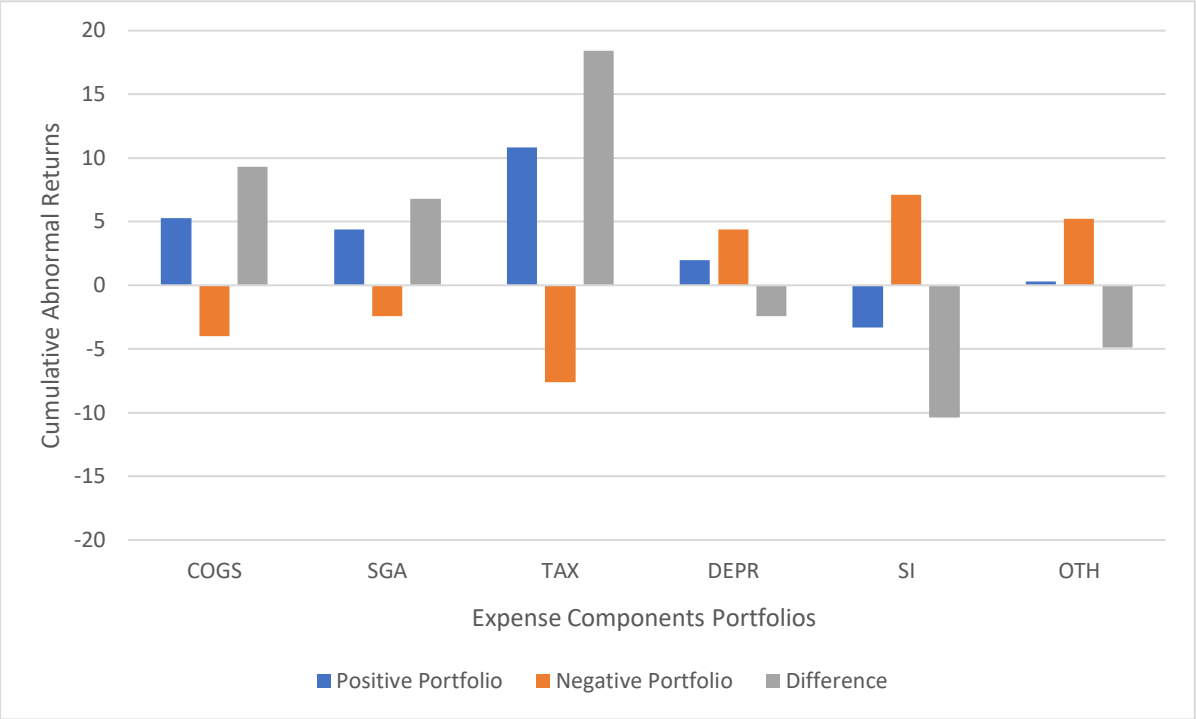

Figure 11 presents the previous results from hypothesis 3 in a bar chart. The blue bar shows the cumulative abnormal returns for firms with an increase in the expense component. The orange bar shows the cumulative abnormal returns for firms with a decrease in the expense component. The grey bar presents the difference between an increase and decrease in the expense component and shows the stock market reaction to the *sign* of changes in expense components.

Figure 11 shows the previous results from hypothesis 3. For each expense component, the cumulative abnormal returns of the positive portfolio, negative portfolio and the difference between portfolios are reproduced. The grey bar represents the association between the *sign* of change in an expense component and cumulative abnormal returns. *TAX* has the strongest positive association with a difference of 18.4 percent between portfolios (see figure 6) and SI has the strongest negative association with a difference of 10.4 percent between portfolios (see figure 8). The positive and negative portfolios of *DEPR* change both experience positive abnormal returns. The *sign* of change in *DEPR* is negatively associated with stock returns because the negative portfolio experiences higher abnormal returns than the positive portfolio.

In conclusion, there are three expense components (*COGS, SGA, TAX)* with a positive association between the *sign* of change and stock returns and three expense components (*DEPR, SI, OTH)* with a negative association between the *sign* of change and stock returns. These results from hypothesis 3 (shown in figure 11) are used to create the second investment portfolio in figure 12.

Figure 12: The Association between the Second Investment Strategy and Cumulative Abnormal Returns

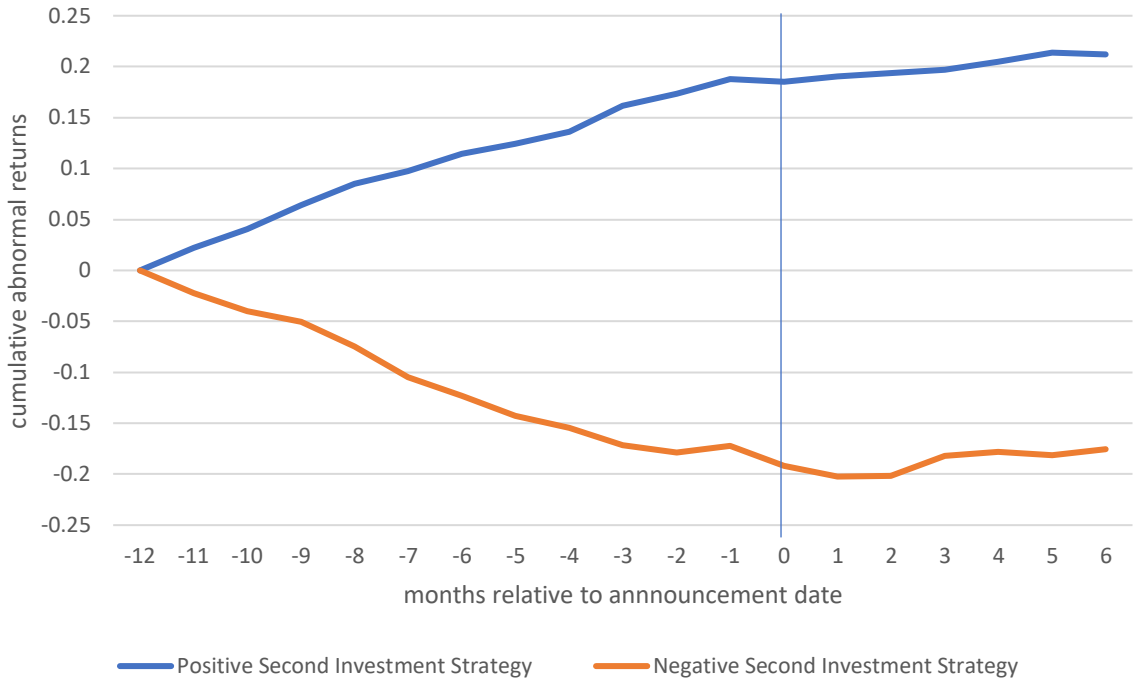

Figure 12 presents analysis for the association between the second investment strategy and cumulative abnormal returns. It shows the difference between cumulative abnormal returns between portfolios based on the second investment strategy. The positive investment strategy consists of firms with increases in *COGS*, *SGA* and *TAX* and decreases in *DEPR*, *SI* and *OTH*. The negative investment strategy consists of firms with decreases in *COGS*, *SGA* and *TAX* and increases in *DEPR*, *SI* and *OTH*. The results can be found in appendix U.

The second investment strategy from figure 12 (and appendix U) shows how valuable the combination of expense components is to the stock market. It contains the *signs* of component change based on the results from the previously found associations. There are three expense components (*COGS, SGA, TAX)* with a positive association between the *sign* of change and stock returns and three expense components (*DEPR, SI, OTH)* with a negative association between the *sign* of change and stock returns. The positive portfolio will consist of a selection of firms with all the expense component changes associated with positive abnormal stock returns. The negative portfolio will consist of a selection of firms with all the expense component changes associated with negative abnormal stock returns.

An investor with knowledge of the *sign* of change of these expense components can make the following selection: From the 62,328 firms included in the sample, there are 966 firm-year observations with an increase in *COGS*, *SGA* and *TAX* and a decrease in *DEPR*, *SI* and *OTH*. These firms experience an average of 18.5 percent cumulative abnormal returns annually. There are 561 firm-year observations with a decrease in *COGS*, *SGA* and *TAX* and an increase in *DEPR*, *SI* and *OTH*. These firms experience an average of -19.2 percent cumulative abnormal returns annually.

The portfolios of the second investment strategy show a difference of 37.7 percent annual abnormal returns. The information contained in the annual expense number is associated with a difference of 5.5 percent annual abnormal returns between portfolios. The decomposition of total expenses is much more valuable to the stock market than the annual expense number. This can be explained by the notion that total expenses contain three components with positive association with stock returns and three components with negative association with stock returns. The annual expense number doesn't show whether the change in expenses is associated with positive or negative stock returns.

The investment strategy is based on the previous results, because revenue and expenses can only form four different combinations, while the portfolios from the expense components can form over half a million different combinations. Instead of testing all the possible combinations, the associations found in previous results are used to create the investment strategy. The investment strategy captures the stock market reaction on the information contained in the variables. The evidence from previous results provides an interesting implication for the returns associated with forecasting annual changes. As mentioned before, Nichols & Wahlen (2004) provided evidence of an interesting implication for the returns associated with forecasting earnings changes. They reported a 72.2 percent difference in abnormal returns between the top and bottom deciles (the most extreme changes).

"During our sample period, if one could have forecasted the sign and magnitude of our sample firms' earnings changes with perfect accuracy 12 months in advance, and if one then could have taken long positions in the firms with top decile earnings increases and short positions in the firms with bottom deciles earnings decreases, then that portfolio would have earned an average abnormal return of 72.2 percent annually over 1988-2001." (Nichols & Wahlen, 2004)

The investment strategies use *sign* of the previous results instead of the *magnitude* of the results. The results of the *magnitude* of changes in earnings components and expense components show importance to the stock market, but these are not included in the investment strategies because there are no firms with all the extreme changes (in the most extreme deciles). Also, the knowledge would be less practical for the stock market to use in their future investing strategies. It's not realistic to know at month -12 (at the point of investing) whether the change in a specific expense component that will occur is in the top decile. It's more realistic to know whether a firm has an increase or decrease in a specific component (without the *magnitude* of these changes). The difference between the positive and negative portfolio is 37.7 percent abnormal returns. This can be described as follows:

During the sample period, if one could have forecasted the sign of the sample firms' expense component changes with perfect accuracy 12 months in advance, and if one then could have taken long positions and short positions according to the investment strategy, then that portfolio would have earned an average abnormal return of 37.7 percent annually over 1971-2019.

To answer the hypothesis:
The combined association between expense component change and abnormal stock returns is larger than the association between earnings changes and abnormal stock returns.

The expense components are all associated with the stock returns. *COGS*, *SGA* and *TAX* are positively associated with stock returns, while *DEPR*, *SI* and *OTH* are negatively associated with stock returns. The separate associations are weaker than the association between earnings and stock returns. However, when a selection is made of firms based on the combination of *signs* from previous results, this investment strategy experiences higher cumulative abnormal returns than the *sign* of earnings.

The implications of these results are interesting. According to Philips et al. (2003), the three settings in which earnings management is likely to occur are all based on the earnings of the firm. The investment strategy shows that managers who want to maximize their stock returns should focus more on expense components than on their net income. It could lead to a decreased importance of net income and an increased importance of expenses when trying to achieve certain abnormal stock returns.

V. Conclusion

A significant emphasis in this paper is put on the association between accounting information and stock returns, following previous literature considering the new accounting information (Dichev & Tang, 2008; Donelson et al., 2011) and the effect of accounting information on stock returns (Ball & Brown, 1968; Nichols & Wahlen, 2004). Further emphasis is placed on the implications of the results for investors. The investment strategy captures the stock market reaction on the information contained in the expense components. The key takeaways from this thesis are:

Firstly, the results show *earnings* changes are positively associated with stock returns. Most of the information from the income number is anticipated by the market before the annual report is released. This anticipation is so accurate that the actual income number doesn't appear to cause any unusual jumps in the announcement month. The *sign* and *magnitude* of earnings changes are positively associated with abnormal stock returns. The *sign* of earnings changes is associated with 24.9 percent difference in abnormal returns and the *magnitude* of earnings changes is associated with a difference of 45.8 percent abnormal returns. The more extreme annual earnings changes, the more extreme abnormal stock returns in the same direction.

Secondly, the results show that *signs* of revenue changes and expense changes are both positively associated with stock returns. The *sign* of the change in revenue is associated with an average difference of 17.1 percent in abnormal annual returns in the month of the announcement date. The *sign* of expense change is associated with an average difference of 5.5 percent abnormal returns. This means the *sign* of total expense change gives less valuable information than the *sign* of earnings change or the *sign* of revenue change. Also, the *magnitude* of revenue changes and expense changes experience a stronger stock market reaction to positive changes than to negative changes. The stock market reacts 5.4 times stronger to the *magnitude* of positive revenue changes than to the *magnitude* of negative revenue changes and reacts 4.6 times stronger to the *magnitude* of positive expense changes than to the *magnitude* of negative expense changes.

Thirdly, the results show changes in *COGS, SGA* and *TAX* are positively associated with stock returns and changes in *DEPR, SI* and *OTH* are negatively associated with stock returns:

***COGS*:** The *sign* of *COGS* changes is positively associated with abnormal returns with a difference of 9.3 percent between portfolios. The positive portfolio experiences 5.3 percent abnormal returns and the negative portfolio experiences -4.0 percent abnormal returns. The deciles show the *magnitude* of positive *COGS* change is more valuable to the stock market than the *magnitude* of negative *COGS* change. The difference between the positive deciles is 8.6 percent and the difference between the negative deciles is 2.3 percent.

SGA: The *sign* of *SGA* changes is positively associated with abnormal returns with a difference of 6.8 percent between portfolios. The positive portfolio experiences 4.4 percent abnormal returns and the negative portfolio experiences -2.4 percent abnormal returns. The difference between the positive deciles is 4.7 percent and the difference between the negative deciles is 2.6 percent. For both the *sign* and *magnitude*, the stock market reacts stronger to positive changes than to negative changes of the *SGA* expenses.

TAX: The *sign* of *TAX* change is positively associated with abnormal returns with a difference of 18.4 percent abnormal returns between portfolios. The positive portfolio experiences 10.8 percent abnormal returns and the negative portfolio experiences -7.6 percent abnormal returns. This shows that the information contained in the annual *TAX* number is useful for the stock market. This is probably because de tax expense is based on the income received. The deciles show the stock market also reacts to the magnitude of *TAX* difference. The top decile experiences 18.3 percent abnormal returns and the last decile experiences -14.3 percent abnormal returns. The stock market reacts to both the *sign* and

magnitude of *TAX* changes. The positive deciles all experience positive abnormal returns, and the negative deciles all experience negative abnormal returns. The difference between the positive deciles is 15.1 percent and the difference between the negative deciles is 12.6 percent. For both the *sign* and *magnitude*, the stock market reacts stronger to positive changes than to negative changes of the tax expenses.

DEPR: The *sign* of *DEPR* change is negatively associated with abnormal returns with a difference of 2.46 percent abnormal returns between portfolios. The negative portfolio experiences 4.44 percent abnormal returns and the positive portfolio experiences 1.98 percent abnormal returns. The deciles show that only the firms with an increase in depreciation expense of more than 1.3 percent of their total assets (top decile) experience negative abnormal returns (of -2.3 percent). For both the *sign* and *magnitude*, the stock market reacts stronger to negative changes than to positive changes of depreciation expenses.

SI: The *sign* of *SI* change is negatively associated with abnormal returns with a difference of 10.4 percent abnormal returns between portfolios. The negative portfolio experiences 7.1 percent abnormal returns and the positive portfolio experiences -3.3 percent abnormal returns. The deciles show the stock market also reacts to the magnitude of *SI* difference. The top decile experiences -17.8 percent abnormal returns and the bottom decile experiences 8.5 percent abnormal returns. The stock market reacts to both the *sign* and *magnitude* of *SI* changes. Only firms with an increase of *SI* of more than 2.03 percent of their total assets (decile 9 and 10) experience negative abnormal returns. The stock market reacts stronger to the *sign* of negative *SI* changes, but stronger to the *magnitude* of positive *SI* changes.

OTH: The *sign* of *OTH* change is negatively associated with abnormal returns with a difference of 4.97 percent abnormal returns between portfolios. The negative portfolio experiences 5.23 percent abnormal returns and the positive portfolio experiences 0.26 percent abnormal returns. The difference between the positive deciles is 11.2 percent abnormal returns and the difference between the negative deciles is 3.7 percent. This means the stock market reacts 3 times stronger to the *magnitude* of positive *OTH* changes than to the *magnitude* of negative *OTH* changes. The stock market reacts stronger to the *sign* of negative *OTH* changes, but stronger to the *magnitude* of positive *OTH* changes.

Lastly, the investing strategies show that if one could have forecasted the sign of the changes of the expense components, and if then could have taken long and short positions in these firms according to the strategy, that strategy would have earned an average return of 37.7 percent annually over 1971-2019. The positive investment strategy is a selection of firms with an increase in *COGS, SGA* and *TAX* and a decrease in *DEPR, SI* and *OTH*. These firms experience an average of 18.5 percent cumulative abnormal returns annually. The negative investment strategy is a selection of firms with a decrease in *COGS, SGA* and *TAX* and an increase in *DEPR, SI* and *OTH*. These firms experience an average of -19.2 percent cumulative abnormal returns annually. The investment strategy shows that managers who want to maximize their stock returns should focus more on expense components than on their net income. It could lead to a decreased importance of net income and an increased importance of expenses when trying to achieve certain abnormal stock returns.

To conclude, the answer to the research question:

'Which expense components drive the stock returns?

All of the expense components experience a significant difference between the positive and negative portfolio at the month of the announcement date. *COGS, SGA* and *TAX* are positively associated with abnormal returns, while *DEPR, SI* and *OTH* are negatively associated with abnormal returns. The investment strategy based on the *signs* of expense component changes gives more valuable information than the *sign* of earnings changes. The investment strategy shows that managers who want to maximize their stock returns should focus more on expense components instead of revenue or earnings. It could lead to a decreased importance of net income and an increased importance of expenses when trying to achieve certain abnormal stock returns.

VI. Limitations & Future Research

This section looks at the limitations encountered in conducting this research and discusses potential topics that might be interesting for future research but exceeded the scope of this thesis.

Firstly, the entirety of the research is based on U.S. listed firms, so the external validity towards firms outside the U.S. is potentially low. However, Ball & Brown (2019) showed their research from 1968 had a high external validity, because they showed the same results for firms in Australia, Japan, Korea and Malaysia. Therefore, it is to be expected that the results from this thesis also have a high external validity.

This thesis provides no explanation for some interesting findings. For example, this thesis provides no explanation for the low volatility of *SGA* differences. Also, the difference in abnormal returns between earnings portfolios is quite volatile over time. Ball & Brown (1968) show a difference of 16.8 percent between 1946-1966. From 1971 to 1987 the difference is 24.6 percent. From 1988 to 2002 this is 32.8 percent, which is comparable with the 35.6 percent difference reported by Nichols & Wahlen (2004). From 2003 to 2019 this difference is 22.1 percent. These findings are also presented in table 5. These findings can't be explained by previous literature. More information about these anomalies could have an impact on the way managers and firms look at the information these changes provide for the capital market.

The first investment strategy shows the best way (for investors) to increase your earnings is to increase revenue and decrease expenses. This is difficult to achieve because a firm has to increase its efficiency and profit margin. The larger difference of cumulative abnormal returns between portfolios shows the first investment strategy has more valuable information for the stock market and could be due to the higher profit margin. Future research could investigate the *signs* and *magnitude* of changes in ratio analyses, such as the profit margin.

The second investment strategy includes *signs* of expense components based on the previous results. The difference of 37.7 percent abnormal returns between the positive and negative portfolios of the second investment strategy could be larger when the perfect combination of *signs* of expense components is found. However, this is only possible to find when calculating the cumulative abnormal returns for over half a million possible combinations. Future research could find the perfect combination of expense component *signs* to show managers which *signs* of expense components are more important than others (in the perfect combination of *signs*).

Lastly, the inclusion of expectations for expense component changes could impact the results of this thesis. This thesis only regards the actual changes of the expense components compared to previous year. Future research could examine whether it's possible to make realistic expectations for expense components and compare these to the abnormal returns of a firm.

To conclude, I hope this research area draws interest to other researchers and sees renewed interest from the community. The association between expense components and stock returns is not written about often and interesting anomalies can't be explained by previous literature.

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Appendix

A: *Remarkable Descriptive Statistics of the Annual Sample*

Company, Year	***Minimal Values***	***Source***
AOL Time Warner, 2002	*Net Income:* -98.7 billion	Wall Street Journal (2003)
AllianceBernstein, 2011	*Total Revenue:* -65.6 million	AllianceBernstein (2012)
MediaOne Group, 1998	*Total Expenses:* -23.4 billion	SEC (2001)
US Steel Corporation, 1999	*SGA:* -283 million	US Steel Group (2000)
General Motors, 2012	*TAX:* -34.8 billion	SEC (2012)
AOL Time Warner, 2002	*SI:* 45.9 billion	Wall Street Journal (2003)
Exxon, 2012	*OTH:* -32.5 billion	Exxon (2012)

B: *The Association between Annual Earnings Change Portfolios and Cumulative Abnormal Returns*

	Portfolios		
T	**+**	**-**	**Difference**
-11	0,008	-0,013	0,021***
-10	0,019	-0,023	0,042***
-9	0,037	-0,036	0,073***
-8	0,052	-0,046	0,099***
-7	0,064	-0,059	0,123***
-6	0,077	-0,077	0,154***
-5	0,087	-0,088	0,175***
-4	0,094	-0,101	0,195***
-3	0,104	-0,117	0,221***
-2	0,118	-0,118	0,236***
-1	0,130	-0,115	0,245***
0	0,127	-0,122	0,249***
1	0,131	-0,130	0,261***
2	0,136	-0,128	0,263***
3	0,143	-0,119	0,262***
4	0,149	-0,116	0,264***
5	0,152	-0,114	0,266***
6	0,154	-0,112	0,267***

C: *The Association between Annual Earnings Change Deciles and Cumulative Abnormal Returns*

T	**Deciles**									
	1	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**
-11	0,012	0,018	0,008	0,004	-0,003	-0,003	-0,009	-0,013	-0,020	-0,022
-10	0,024	0,033	0,023	0,013	0,002	-0,001	-0,011	-0,020	-0,033	-0,053
-9	0,053	0,061	0,043	0,025	0,004	-0,004	-0,017	-0,028	-0,050	-0,082
-8	0,075	0,085	0,059	0,035	0,009	-0,007	-0,022	-0,035	-0,064	-0,105
-7	0,093	0,103	0,072	0,042	0,011	-0,009	-0,027	-0,044	-0,083	-0,132
-6	0,114	0,127	0,086	0,048	0,010	-0,017	-0,039	-0,061	-0,105	-0,162
-5	0,132	0,140	0,097	0,054	0,012	-0,018	-0,045	-0,070	-0,119	-0,187
-4	0,143	0,151	0,105	0,056	0,014	-0,021	-0,052	-0,078	-0,131	-0,220
-3	0,156	0,169	0,117	0,066	0,015	-0,025	-0,063	-0,089	-0,154	-0,252
-2	0,173	0,186	0,130	0,079	0,022	-0,022	-0,060	-0,091	-0,157	-0,259
-1	0,194	0,199	0,141	0,085	0,029	-0,018	-0,060	-0,090	-0,156	-0,251
0	0,208	0,203	0,132	0,075	0,015	-0,027	-0,070	-0,098	-0,164	-0,250
1	0,221	0,211	0,133	0,076	0,013	-0,031	-0,077	-0,108	-0,173	-0,262
2	0,226	0,217	0,138	0,081	0,016	-0,027	-0,075	-0,105	-0,170	-0,262
3	0,235	0,224	0,146	0,084	0,023	-0,021	-0,067	-0,096	-0,160	-0,253
4	0,241	0,233	0,152	0,091	0,027	-0,017	-0,066	-0,093	-0,156	-0,246
5	0,247	0,238	0,155	0,091	0,031	-0,016	-0,064	-0,091	-0,153	-0,247
6	0,249	0,238	0,156	0,095	0,034	-0,015	-0,063	-0,088	-0,148	-0,247

D: *The Association between Annual Revenue Change Portfolios and Cumulative Abnormal Returns*

	Portfolios		
T	**+**	**-**	**Difference**
-11	0,005	-0,017	0,022***
-10	0,013	-0,028	0,041***
-9	0,024	-0,036	0,060***
-8	0,034	-0,047	0,081***
-7	0,042	-0,061	0,103***
-6	0,048	-0,075	0,124***
-5	0,053	-0,083	0,136***
-4	0,055	-0,093	0,148***
-3	0,059	-0,105	0,164***
-2	0,069	-0,104	0,173***
-1	0,077	-0,094	0,171***
0	0,072	-0,099	0,170***
1	0,072	-0,104	0,175***
2	0,075	-0,098	0,173***
3	0,082	-0,087	0,169***
4	0,088	-0,084	0,172***
5	0,092	-0,082	0,174***
6	0,093	-0,079	0,172***

E: *The Association between Annual Revenue Change Deciles and Cumulative Abnormal Returns*

T	**Deciles**									
	1	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**
-11	0,020	0,009	0,002	0,000	-0,006	-0,011	-0,013	-0,015	-0,023	-0,026
-10	0,038	0,020	0,008	0,003	-0,005	-0,013	-0,017	-0,024	-0,037	-0,047
-9	0,065	0,036	0,017	0,006	-0,006	-0,020	-0,023	-0,036	-0,046	-0,054
-8	0,088	0,049	0,029	0,013	-0,007	-0,025	-0,033	-0,047	-0,060	-0,070
-7	0,106	0,061	0,037	0,017	-0,010	-0,029	-0,043	-0,061	-0,081	-0,091
-6	0,126	0,072	0,040	0,016	-0,014	-0,039	-0,056	-0,073	-0,098	-0,111
-5	0,137	0,079	0,044	0,020	-0,016	-0,042	-0,062	-0,079	-0,107	-0,124
-4	0,144	0,085	0,045	0,021	-0,018	-0,053	-0,068	-0,088	-0,119	-0,138
-3	0,157	0,094	0,049	0,022	-0,025	-0,060	-0,077	-0,096	-0,134	-0,157
-2	0,170	0,107	0,059	0,031	-0,021	-0,063	-0,078	-0,092	-0,127	-0,158
-1	0,181	0,114	0,067	0,039	-0,018	-0,059	-0,072	-0,083	-0,115	-0,143
0	0,181	0,110	0,061	0,031	-0,024	-0,068	-0,079	-0,088	-0,117	-0,141
1	0,184	0,111	0,060	0,030	-0,026	-0,075	-0,084	-0,093	-0,124	-0,141
2	0,188	0,113	0,064	0,035	-0,023	-0,072	-0,080	-0,089	-0,118	-0,129
3	0,198	0,120	0,069	0,040	-0,018	-0,066	-0,072	-0,081	-0,104	-0,112
4	0,208	0,129	0,076	0,044	-0,017	-0,064	-0,069	-0,077	-0,101	-0,108
5	0,212	0,131	0,080	0,047	-0,013	-0,061	-0,068	-0,073	-0,101	-0,109
6	0,214	0,132	0,083	0,049	-0,011	-0,060	-0,065	-0,068	-0,099	-0,102

F: *The Association between Annual Expense Change Portfolios and Cumulative Abnormal Returns*

	Portfolios		
T	**+**	**-**	**Difference**
-11	0,003	-0,010	0,012***
-10	0,008	-0,013	0,021***
-9	0,014	-0,011	0,025***
-8	0,022	-0,014	0,036***
-7	0,027	-0,019	0,046***
-6	0,029	-0,023	0,052***
-5	0,031	-0,023	0,055***
-4	0,031	-0,026	0,056***
-3	0,032	-0,030	0,062***
-2	0,040	-0,024	0,064***
-1	0,047	-0,013	0,061***
0	0,041	-0,014	0,055***
1	0,039	-0,012	0,052***
2	0,043	-0,007	0,049***
3	0,049	0,003	0,047***
4	0,055	0,006	0,049***
5	0,058	0,007	0,051***
6	0,060	0,010	0,050***

G: *The Association between Annual Expense Change Deciles and Cumulative Abnormal Returns*

T	**Deciles**									
	1	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**
-11	0,010	0,005	0,001	-0,001	-0,002	-0,006	-0,007	-0,011	-0,010	-0,015
-10	0,018	0,013	0,005	0,002	0,000	-0,005	-0,011	-0,012	-0,015	-0,024
-9	0,029	0,026	0,012	0,005	0,000	-0,005	-0,011	-0,013	-0,011	-0,015
-8	0,040	0,035	0,021	0,012	0,002	-0,006	-0,009	-0,016	-0,013	-0,024
-7	0,047	0,042	0,027	0,016	0,002	-0,010	-0,013	-0,019	-0,020	-0,033
-6	0,055	0,045	0,031	0,014	-0,001	-0,016	-0,015	-0,023	-0,026	-0,036
-5	0,055	0,047	0,034	0,019	0,002	-0,014	-0,019	-0,022	-0,025	-0,036
-4	0,051	0,047	0,034	0,020	0,001	-0,013	-0,018	-0,029	-0,028	-0,041
-3	0,052	0,050	0,037	0,020	0,001	-0,016	-0,023	-0,027	-0,029	-0,054
-2	0,061	0,057	0,046	0,029	0,007	-0,014	-0,016	-0,022	-0,019	-0,050
-1	0,069	0,064	0,053	0,037	0,013	-0,009	-0,010	-0,014	-0,006	-0,027
0	0,065	0,059	0,046	0,030	0,005	-0,017	-0,015	-0,015	-0,004	-0,018
1	0,065	0,057	0,045	0,027	0,002	-0,022	-0,012	-0,017	-0,005	-0,006
2	0,067	0,059	0,048	0,032	0,006	-0,018	-0,008	-0,012	0,001	0,005
3	0,078	0,065	0,052	0,041	0,010	-0,012	-0,003	-0,004	0,014	0,018
4	0,085	0,074	0,058	0,045	0,013	-0,012	0,002	-0,003	0,018	0,025
5	0,087	0,078	0,062	0,048	0,017	-0,011	-0,001	0,003	0,022	0,024
6	0,089	0,078	0,065	0,051	0,018	-0,011	0,004	0,001	0,026	0,031

H: *The Association between Annual COGS Change Portfolios and Cumulative Abnormal Returns*

	Portfolios		
T	**+**	**-**	**Difference**
-11	0,003	-0,011	0,015***
-10	0,009	-0,016	0,025***
-9	0,017	-0,017	0,034***
-8	0,026	-0,023	0,049***
-7	0,032	-0,030	0,063***
-6	0,035	-0,037	0,073***
-5	0,039	-0,041	0,079***
-4	0,040	-0,047	0,087***
-3	0,042	-0,053	0,096***
-2	0,051	-0,047	0,098***
-1	0,058	-0,037	0,095***
0	0,053	-0,040	0,093***
1	0,051	-0,041	0,093***
2	0,055	-0,035	0,090***
3	0,062	-0,025	0,086***
4	0,067	-0,020	0,088***
5	0,071	-0,019	0,089***
6	0,073	-0,015	0,088***

I: *The Association between Annual COGS Change Deciles and Cumulative Abnormal Returns*

T	**Deciles**									
	1	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**
-11	0,012	0,005	0,001	-0,002	-0,001	-0,006	-0,007	-0,010	-0,021	-0,014
-10	0,027	0,013	0,004	0,001	0,000	-0,008	-0,008	-0,013	-0,025	-0,025
-9	0,046	0,026	0,012	0,002	0,001	-0,010	-0,014	-0,014	-0,026	-0,020
-8	0,061	0,035	0,021	0,010	0,006	-0,011	-0,020	-0,018	-0,034	-0,029
-7	0,069	0,042	0,028	0,015	0,008	-0,012	-0,024	-0,028	-0,045	-0,043
-6	0,080	0,048	0,029	0,015	0,005	-0,014	-0,030	-0,036	-0,052	-0,053
-5	0,084	0,050	0,032	0,019	0,009	-0,016	-0,032	-0,039	-0,055	-0,061
-4	0,085	0,051	0,033	0,022	0,009	-0,021	-0,037	-0,044	-0,062	-0,070
-3	0,090	0,054	0,036	0,023	0,010	-0,026	-0,043	-0,048	-0,068	-0,082
-2	0,099	0,062	0,045	0,032	0,016	-0,019	-0,036	-0,043	-0,059	-0,080
-1	0,106	0,071	0,054	0,039	0,021	-0,010	-0,034	-0,033	-0,045	-0,064
0	0,102	0,065	0,048	0,033	0,016	-0,020	-0,043	-0,032	-0,043	-0,061
1	0,103	0,062	0,048	0,031	0,014	-0,023	-0,048	-0,035	-0,042	-0,059
2	0,108	0,064	0,050	0,034	0,018	-0,019	-0,043	-0,030	-0,038	-0,044
3	0,120	0,072	0,056	0,039	0,022	-0,012	-0,035	-0,027	-0,026	-0,024
4	0,126	0,080	0,062	0,042	0,026	-0,007	-0,031	-0,026	-0,022	-0,017
5	0,129	0,080	0,067	0,048	0,030	-0,004	-0,028	-0,024	-0,020	-0,017
6	0,131	0,080	0,069	0,051	0,033	-0,005	-0,023	-0,021	-0,022	-0,005

J: *The Association between Annual SGA Change Portfolios and Cumulative Abnormal Returns*

	Portfolios		
T	**+**	**-**	**Difference**
-11	0,003	-0,010	0,013***
-10	0,008	-0,015	0,023***
-9	0,015	-0,012	0,027***
-8	0,023	-0,016	0,039***
-7	0,028	-0,024	0,052***
-6	0,031	-0,029	0,060***
-5	0,033	-0,031	0,064***
-4	0,033	-0,035	0,068***
-3	0,035	-0,041	0,076***
-2	0,043	-0,035	0,078***
-1	0,050	-0,024	0,074***
0	0,044	-0,024	0,068***
1	0,042	-0,022	0,064***
2	0,045	-0,015	0,060***
3	0,051	-0,004	0,055***
4	0,058	-0,002	0,059***
5	0,060	0,001	0,059***
6	0,062	0,005	0,057***

K: *The Association between Annual SGA Change Deciles and Cumulative Abnormal Returns*

T	**Deciles**									
	1	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**
-11	0,008	0,004	0,003	0,001	-0,003	-0,006	-0,010	-0,010	-0,013	-0,012
-10	0,012	0,010	0,010	0,006	0,002	-0,003	-0,011	-0,006	-0,018	-0,036
-9	0,016	0,020	0,018	0,012	0,007	0,001	-0,005	-0,001	-0,013	-0,042
-8	0,026	0,032	0,027	0,018	0,010	-0,001	-0,011	-0,005	-0,014	-0,051
-7	0,036	0,040	0,033	0,020	0,012	-0,007	-0,016	-0,013	-0,019	-0,062
-6	0,041	0,044	0,037	0,021	0,010	-0,011	-0,018	-0,017	-0,028	-0,072
-5	0,043	0,047	0,041	0,025	0,012	-0,012	-0,021	-0,016	-0,029	-0,075
-4	0,041	0,050	0,042	0,025	0,009	-0,016	-0,021	-0,020	-0,033	-0,085
-3	0,041	0,052	0,046	0,027	0,009	-0,019	-0,027	-0,023	-0,042	-0,092
-2	0,050	0,064	0,055	0,036	0,012	-0,017	-0,021	-0,018	-0,034	-0,083
-1	0,058	0,072	0,062	0,041	0,019	-0,013	-0,018	-0,010	-0,017	-0,060
0	0,059	0,066	0,051	0,033	0,012	-0,016	-0,027	-0,017	-0,016	-0,042
1	0,059	0,065	0,048	0,030	0,008	-0,021	-0,027	-0,016	-0,010	-0,034
2	0,060	0,068	0,052	0,036	0,011	-0,016	-0,023	-0,006	-0,003	-0,027
3	0,062	0,074	0,059	0,043	0,020	-0,006	-0,010	0,003	0,011	-0,018
4	0,073	0,082	0,063	0,047	0,023	-0,007	-0,007	0,003	0,017	-0,015
5	0,077	0,086	0,067	0,050	0,022	-0,003	-0,006	0,006	0,021	-0,011
6	0,078	0,087	0,069	0,052	0,023	-0,002	-0,003	0,009	0,026	-0,006

L: *The Association between Annual TAX Change Portfolios and Cumulative Abnormal Returns*

	Portfolios		
T	**+**	**-**	**Difference**
-11	0,007	-0,011	0,018***
-10	0,018	-0,016	0,034***
-9	0,034	-0,023	0,057***
-8	0,047	-0,029	0,077***
-7	0,058	-0,038	0,096***
-6	0,069	-0,051	0,120***
-5	0,077	-0,057	0,134***
-4	0,082	-0,065	0,147***
-3	0,090	-0,075	0,166***
-2	0,103	-0,073	0,176***
-1	0,112	-0,069	0,181***
0	0,108	-0,076	0,184***
1	0,109	-0,080	0,189***
2	0,114	-0,076	0,190***
3	0,121	-0,067	0,188***
4	0,128	-0,063	0,191***
5	0,132	-0,061	0,192***
6	0,135	-0,059	0,193***

M: *The Association between Annual TAX Change Deciles and Cumulative Abnormal Returns*

T	**Deciles**									
	1	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**
-11	0,011	0,008	0,007	0,004	0,003	-0,004	-0,004	-0,011	-0,018	-0,019
-10	0,029	0,022	0,019	0,013	0,007	-0,004	-0,006	-0,014	-0,026	-0,032
-9	0,061	0,045	0,034	0,021	0,009	-0,007	-0,007	-0,021	-0,034	-0,046
-8	0,081	0,065	0,046	0,031	0,016	-0,004	-0,011	-0,026	-0,046	-0,059
-7	0,096	0,081	0,054	0,039	0,021	-0,004	-0,014	-0,035	-0,059	-0,078
-6	0,114	0,099	0,064	0,043	0,024	-0,013	-0,022	-0,048	-0,074	-0,097
-5	0,128	0,109	0,072	0,051	0,024	-0,014	-0,028	-0,054	-0,083	-0,107
-4	0,136	0,119	0,076	0,054	0,024	-0,018	-0,029	-0,061	-0,095	-0,121
-3	0,151	0,133	0,088	0,058	0,021	-0,022	-0,033	-0,071	-0,113	-0,136
-2	0,166	0,148	0,103	0,068	0,027	-0,018	-0,030	-0,066	-0,113	-0,138
-1	0,180	0,158	0,112	0,078	0,036	-0,012	-0,025	-0,061	-0,109	-0,136
0	0,183	0,152	0,103	0,070	0,032	-0,017	-0,033	-0,069	-0,118	-0,143
1	0,184	0,155	0,105	0,070	0,032	-0,017	-0,037	-0,077	-0,125	-0,144
2	0,188	0,160	0,111	0,076	0,034	-0,017	-0,032	-0,075	-0,118	-0,136
3	0,200	0,170	0,117	0,080	0,039	-0,009	-0,024	-0,067	-0,108	-0,125
4	0,208	0,180	0,123	0,087	0,044	-0,003	-0,020	-0,065	-0,103	-0,122
5	0,215	0,182	0,125	0,089	0,048	-0,002	-0,018	-0,062	-0,101	-0,119
6	0,218	0,184	0,129	0,091	0,051	-0,002	-0,016	-0,062	-0,097	-0,116

N: *The Association between Annual DEPR Change Portfolios and Cumulative Abnormal Returns*

	Portfolios		
T	**+**	**-**	**Difference**
-11	-0,002	0,002	0,004***
-10	0,000	0,006	0,006***
-9	0,005	0,015	0,010***
-8	0,011	0,016	0,005***
-7	0,014	0,018	0,004***
-6	0,014	0,019	0,005***
-5	0,015	0,021	0,006***
-4	0,014	0,021	0,007***
-3	0,013	0,022	0,009***
-2	0,021	0,030	0,009***
-1	0,027	0,042	0,015***
0	0,020	0,044	0,025***
1	0,016	0,049	0,033***
2	0,020	0,055	0,035***
3	0,027	0,063	0,035***
4	0,032	0,067	0,035***
5	0,035	0,071	0,036***
6	0,037	0,074	0,037***

O: *The Association between Annual DEPR Change Deciles and Cumulative Abnormal Returns*

T	**Deciles**									
	1	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**
-11	-0,004	-0,003	-0,003	-0,001	0,002	0,005	0,005	0,001	-0,001	0,000
-10	-0,006	0,001	0,001	0,000	0,006	0,010	0,007	0,009	0,007	-0,002
-9	-0,005	0,007	0,006	0,007	0,010	0,016	0,015	0,016	0,019	0,008
-8	-0,003	0,016	0,015	0,013	0,015	0,020	0,017	0,018	0,020	0,006
-7	-0,004	0,020	0,017	0,015	0,019	0,025	0,019	0,017	0,023	0,004
-6	-0,006	0,018	0,018	0,016	0,023	0,029	0,025	0,023	0,023	-0,006
-5	-0,012	0,022	0,018	0,020	0,027	0,032	0,028	0,028	0,025	-0,008
-4	-0,017	0,020	0,017	0,020	0,028	0,030	0,029	0,029	0,026	-0,012
-3	-0,025	0,018	0,021	0,021	0,030	0,034	0,032	0,035	0,025	-0,017
-2	-0,021	0,023	0,029	0,030	0,042	0,040	0,040	0,041	0,031	-0,004
-1	-0,018	0,031	0,036	0,037	0,049	0,051	0,050	0,048	0,045	0,016
0	-0,023	0,023	0,028	0,027	0,044	0,048	0,050	0,053	0,047	0,024
1	-0,027	0,018	0,022	0,025	0,043	0,052	0,053	0,059	0,050	0,033
2	-0,024	0,022	0,026	0,027	0,047	0,056	0,061	0,066	0,053	0,040
3	-0,014	0,031	0,032	0,034	0,053	0,062	0,070	0,073	0,059	0,050
4	-0,006	0,039	0,038	0,036	0,056	0,066	0,071	0,079	0,062	0,058
5	-0,007	0,043	0,040	0,039	0,059	0,068	0,077	0,082	0,065	0,064
6	-0,008	0,046	0,043	0,041	0,059	0,066	0,081	0,086	0,065	0,070

P: *The Association between Annual SI Change Portfolios and Cumulative Abnormal Returns*

T	Portfolios		
	+	-	Difference
-11	-0,004	0,002	0,006***
-10	-0,006	0,009	0,014***
-9	-0,007	0,019	0,026***
-8	-0,009	0,028	0,037***
-7	-0,013	0,034	0,047***
-6	-0,020	0,040	0,059***
-5	-0,025	0,046	0,070***
-4	-0,032	0,047	0,079***
-3	-0,039	0,051	0,090***
-2	-0,034	0,062	0,096***
-1	-0,027	0,072	0,099***
0	-0,033	0,071	0,104***
1	-0,036	0,074	0,109***
2	-0,031	0,079	0,110***
3	-0,021	0,085	0,106***
4	-0,016	0,090	0,106***
5	-0,013	0,092	0,106***
6	-0,011	0,094	0,105***

Q: *The Association between Annual SI Change Deciles and Cumulative Abnormal Returns*

T	Deciles									
	1	2	3	4	5	6	7	8	9	10
-11	-0,019	-0,007	-0,001	0,003	0,003	0,006	0,006	0,003	0,006	-0,008
-10	-0,044	-0,010	0,004	0,010	0,011	0,012	0,015	0,013	0,012	-0,009
-9	-0,061	-0,015	0,007	0,014	0,019	0,022	0,023	0,018	0,022	0,009
-8	-0,075	-0,019	0,006	0,019	0,024	0,031	0,030	0,026	0,030	0,021
-7	-0,097	-0,024	0,008	0,021	0,027	0,039	0,037	0,033	0,036	0,027
-6	-0,118	-0,032	0,002	0,019	0,030	0,045	0,040	0,040	0,040	0,032
-5	-0,138	-0,040	0,002	0,021	0,031	0,050	0,047	0,046	0,043	0,042
-4	-0,161	-0,048	0,000	0,019	0,031	0,052	0,047	0,047	0,045	0,043
-3	-0,186	-0,058	-0,007	0,022	0,033	0,056	0,054	0,051	0,051	0,044
-2	-0,188	-0,055	0,003	0,032	0,039	0,065	0,061	0,061	0,064	0,057
-1	-0,176	-0,053	0,011	0,036	0,047	0,071	0,068	0,070	0,072	0,080
0	-0,178	-0,058	0,004	0,028	0,039	0,066	0,067	0,065	0,074	0,085
1	-0,185	-0,065	0,001	0,030	0,041	0,064	0,066	0,062	0,081	0,095
2	-0,184	-0,059	0,006	0,036	0,045	0,072	0,070	0,065	0,087	0,101
3	-0,168	-0,048	0,015	0,043	0,052	0,075	0,076	0,069	0,094	0,109
4	-0,160	-0,044	0,023	0,046	0,054	0,081	0,083	0,074	0,097	0,115
5	-0,155	-0,042	0,028	0,050	0,054	0,083	0,085	0,075	0,102	0,118
6	-0,148	-0,040	0,030	0,053	0,054	0,087	0,086	0,074	0,106	0,118

R: *The Association between Annual OTH Change Portfolios and Cumulative Abnormal Returns*

	Portfolios		
T	**+**	**-**	**Difference**
-11	-0,003	0,002	0,005***
-10	-0,002	0,007	0,009***
-9	0,000	0,016	0,016***
-8	0,002	0,024	0,022***
-7	0,002	0,029	0,027***
-6	0,000	0,032	0,032***
-5	0,000	0,035	0,035***
-4	-0,003	0,036	0,039***
-3	-0,006	0,039	0,045***
-2	0,001	0,047	0,046***
-1	0,008	0,055	0,047***
0	0,003	0,052	0,050***
1	0,001	0,052	0,051***
2	0,004	0,056	0,052***
3	0,012	0,063	0,051***
4	0,017	0,069	0,051***
5	0,019	0,072	0,053***
6	0,021	0,075	0,055***

S: *The Association between Annual OTH Change Deciles and Cumulative Abnormal Returns*

T	**Deciles**									
	1	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**
-11	-0,006	-0,006	-0,002	-0,002	0,001	0,001	0,002	0,002	0,007	-0,002
-10	-0,014	-0,006	-0,001	0,002	0,007	0,005	0,008	0,009	0,014	-0,003
-9	-0,018	-0,004	0,003	0,008	0,011	0,013	0,017	0,019	0,029	0,004
-8	-0,026	-0,001	0,007	0,013	0,018	0,022	0,028	0,030	0,035	0,005
-7	-0,035	-0,003	0,007	0,015	0,023	0,027	0,034	0,036	0,041	0,006
-6	-0,045	-0,007	0,007	0,016	0,026	0,029	0,040	0,040	0,045	0,004
-5	-0,051	-0,006	0,009	0,017	0,031	0,033	0,044	0,047	0,047	0,002
-4	-0,066	-0,011	0,009	0,018	0,034	0,035	0,043	0,050	0,052	-0,001
-3	-0,076	-0,018	0,007	0,018	0,039	0,040	0,050	0,054	0,057	-0,006
-2	-0,073	-0,011	0,012	0,027	0,049	0,050	0,062	0,060	0,065	-0,003
-1	-0,065	-0,002	0,020	0,036	0,053	0,056	0,067	0,069	0,076	0,008
0	-0,066	-0,006	0,013	0,027	0,045	0,049	0,062	0,064	0,075	0,011
1	-0,070	-0,007	0,009	0,027	0,044	0,047	0,062	0,065	0,075	0,012
2	-0,068	-0,003	0,014	0,029	0,049	0,052	0,068	0,071	0,079	0,012
3	-0,056	0,007	0,022	0,034	0,055	0,057	0,077	0,079	0,086	0,018
4	-0,055	0,014	0,028	0,039	0,061	0,063	0,084	0,086	0,092	0,019
5	-0,052	0,015	0,030	0,040	0,064	0,068	0,086	0,090	0,094	0,024
6	-0,052	0,015	0,032	0,044	0,063	0,072	0,089	0,094	0,097	0,026

T: *The Association between the first Investment Strategy and Cumulative Abnormal Returns*

	Portfolios			
T	***Rev +*** ***Exp +***	***Rev +*** ***Exp -***	***Rev -*** ***Exp +***	***Rev -*** ***Exp -***
-11	0,005	0,006	-0,024	-0,015
-10	0,013	0,014	-0,048	-0,022
-9	0,023	0,032	-0,074	-0,024
-8	0,033	0,048	-0,094	-0,032
-7	0,041	0,059	-0,119	-0,043
-6	0,046	0,069	-0,150	-0,053
-5	0,050	0,082	-0,169	-0,057
-4	0,052	0,091	-0,194	-0,062
-3	0,055	0,099	-0,219	-0,070
-2	0,065	0,113	-0,225	-0,066
-1	0,072	0,124	-0,219	-0,056
0	0,066	0,131	-0,226	-0,059
1	0,065	0,141	-0,240	-0,061
2	0,068	0,148	-0,234	-0,056
3	0,075	0,155	-0,223	-0,045
4	0,081	0,158	-0,221	-0,042
5	0,084	0,162	-0,216	-0,041
6	0,086	0,164	-0,214	-0,037

U: *The Association between the second Investment Strategy and Cumulative Abnormal Returns*

	Portfolios		
T	**+**	**-**	**Difference**
-11	0,022	-0,022	0,044***
-10	0,040	-0,040	0,080***
-9	0,064	-0,050	0,114***
-8	0,085	-0,074	0,160***
-7	0,098	-0,105	0,202***
-6	0,115	-0,123	0,238***
-5	0,124	-0,143	0,267***
-4	0,136	-0,154	0,291***
-3	0,162	-0,172	0,333***
-2	0,173	-0,179	0,352***
-1	0,188	-0,172	0,360***
0	0,185	-0,192	0,377***
1	0,190	-0,202	0,392***
2	0,194	-0,201	0,395***
3	0,197	-0,182	0,379***
4	0,205	-0,178	0,383***
5	0,214	-0,182	0,395***
6	0,212	-0,176	0,388***