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The value-growth anomaly and overpricing of discretionary accruals: one effect or two?

Tests of return behavior around earnings announcements

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Abstract

This paper investigates whether the overpricing of discretionary accruals documented by Xie (2001) is a manifestation of the value-growth stock phenomenon documented in the finance literature. Investigating the return behavior of stocks around earnings announcements, it is found that both mispricing patterns are manifested around earnings announcements. The reversal pattern of both anomalies is apparent around the four earnings announcements following portfolio formation, which supports the behavioral explanation of extrapolation for both anomalies. Regression analysis shows that growth stocks are more likely to conduct earnings management than value stocks. The results do not support the hypothesis that earnings reactions of growth stocks and stocks that conduct income increasing earnings management are related. A hedge test confirms the finding that the anomalies represent different phenomena. A joint strategy of both anomalies yields an abnormal return of 4.42% that exceeds the abnormal return that can be earned for the individual strategies on the days surrounding earnings announcements. This indicates that the anomalies present different effects. Risk factors are unlikely to explain these effects.

Keywords: market efficiency, value-growth anomaly, discretionary accruals, earnings management, earnings surprises

1 Introduction

The mispricing of accruals may in fact be the "glamour stock" phenomenon in disguise.

- William H. Beaver (2002, 468)

The overpricing of total accruals that Sloan (1996) documents is due largely to abnormal accruals… stemming from earnings management.

- Hong Xie (2001, 357)

This paper investigates the relation between two prominent anomalies - the value-growth anomaly identified in the finance literature (e.g. Fama and French, 1992) and the overpricing of discretionary accruals documented in the accounting literature by Xie (2001). The aim of this research is to determine whether they cover the same market inefficiency or whether they represent self-contained anomalies that, in combination, reveal more extreme mispricing than has been documented in the literature to date.

The value-growth anomaly, the phenomenon that stocks with high book-to-market ratio (value stocks) historically outperform stocks with low book-to-market ratio (growth or glamour stocks), is one of the most documented anomalies in the finance literature. Existing research focuses on three explanations for the inferior return to growth stocks. Fama and French (1992) argue that growth stocks are less risky, while Fama (1998) points out methodological problems causing the phenomenon. The behavioral explanation is that investors are overly optimistic about the prospects of growth stocks (Lakonishok, Shleifer and Vishny, 1994; Skinner and Sloan, 2002). Essentially, the behavioral literature on this phenomenon suggests that investors *overreact* to negative earnings surprises of stocks with high past growth rates.

The overpricing of discretionary accruals, documented by Xie (2001), refers to the empirical finding that the market overestimates the persistence of abnormal[1] accruals and consequently overprices these accruals. It is an extension of Sloan's (1996) notion that total accruals are overpriced. Xie (2001) finds that overpricing of total accruals is primarly due to the market failure of pricing the one-year-ahead earnings implications of abnormal accruals. Essentially, the overpricing of discretionary accruals suggests that the market *overreacts* to negative earnings surprises that contain large discretionary accrual components.

[1] Abnormal accruals are also termed "discretionary accruals" and are used as proxy for earnings management. However, abnormal accruals may not only capture discretionary accruals, but also unusual nondiscretionary accruals (Xie, 2001). This study uses abnormal accruals and discretionary accruals interchangeably. Section 3.2 elaborates on this issue.

Based on Beaver's (2002) notion that the mispricing of accruals may in fact be the "glamour stock" phenomenon in disguise, Desai, Rajgopal and Venkatachalam (2004) relate the value-growth anomaly to the accruals anomaly identified by Sloan (1996). They find that the variable operating cash flow scaled by price captures both anomalies. Xie (2001) further investigates the mispricing of accruals and concludes that the accruals anomaly is due largely to the mispricing of abnormal accruals stemming from earnings management. This paper reinvestigates the relationship that Desai et al. (2004) identify. The main contribution is that this paper relates the value-growth anomaly to the overpricing of discretionary accruals stemming from earnings management instead of the accruals anomaly in general[2] and uses a different research methodology focusing on earnings surprises.

For at least three reasons it is expected that the mispricing patterns are related. First, the anomalies appear to be closely linked, because earnings equal accruals plus cash flows. McNichols (2000) points out that discretionary accruals are correlated with earnings performance. Dechow, Sloan and Sweeney (1995) show that firms with higher (lower) earnings exhibit significantly positive (negative) discretionary accruals. Moreover, firms that use discretionary accruals to smooth earnings have consistent earnings growth by construction. Second, both mispricing patterns are expected to be corrected around earnings announcements, because investors re-examine their prior (incorrect) beliefs based on new information released at earnings announcements (DeFond and Park, 2001; Skinner and Sloan, 2002). Relative to other news events, information released at earnings announcements is more likely to correct for prior beliefs, because the information resolves uncertainty about prior periods and investors' divergent beliefs about prior events (Bernard, Thomas and Wahlen, 1997). Third, both patterns relate future returns to accounting data and represent a reversal of prior returns (Lakonishok et al., 1994; DeFond and Park, 2001). The income increasing effect of abnormal accruals in the short run is offset by an income decreasing effect later. For growth rates of earnings, Little (1962) shows that these are highly mean reverting.

From the reasons above, it might be argued that the value-growth anomaly is not due to extrapolation of past growth rates in general, but more specifically to overestimation of the persistency of discretionary accruals stemming from earnings management. This leads to the following research question:

Research question. To what extent are the earnings responses to the value-growth anomaly and the overpricing of discretionary accruals stemming from earnings management related?

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[2] Desai et al. (2004) briefly touch upon discretionary accruals specifically. They find that discretionary accruals drive accruals mispricing, which is consistent with Xie (2001). They do not elaborate on the relationship between the value-growth anomaly and the overpricing of discretionary accruals.

The key to answering the research question is identifying the events that inform investors that their prior valuations of growth stocks and stocks that conduct earnings management were too high. Both overreaction patterns are reversed as soon as the market learns that the previously reported earnings are not sustainable. As argued above, investors are likely to learn that they underanticipated the future reversal of growth rates and abnormal accruals at earnings announcements. This suggests four related questions to further understand the interaction between both mispricing patterns. First, are the mispricing patterns manifested around earnings announcements? That is, is the predicted reversal pattern of both anomalies apparent around earnings announcements? Second, are growth stocks more likely to conduct income increasing earnings management? Third, are the differential earnings responses to both anomalies subsumed by each other or do they respond to distinct forces? That is, do the return responses of growth stock to negative earnings responses correct for overestimation of growth rates due to earnings management or due to other growth characteristics? Finally, is it possible to obtain abnormal returns when the anomalies are combined in a joint strategy? Similar to Skinner and Sloan (2002) and DeFond and Park (2001) the stock price behavior around earnings announcements is investigated using an event study. Second, using a regression analysis based on the methodology of McNichols (2000) and Madhogarhia, Sutton and Kohers (2009), it is identified whether growth stocks are more likely to conduct income increasing earnings management. Third, formal statistical tests of the similarity in earnings responses are provided using regression analysis. Finally, a hedge portfolio test is used to test whether one anomaly dominates or is subsumed by the other around earnings announcements, and in general.

The event study results indicate that a disproportionally large portion of both anomalies is corrected around earnings announcements. The reversal pattern of both anomalies is apparent around the four earnings announcements following portfolio formation supporting the behavioral explanation of extrapolation for both anomalies. When the anomalies are studied in combination, it is found that growth stocks are more likely to conduct earnings management. At portfolio formation they conduct income increasing earnings management to a larger extent than income decreasing earnings management. This implies that the anomalies might be related. However, regression analysis and the hedge portfolio test indicate that the earnings responses are based on different underlying forces. The regression analysis shows that the earnings response to negative earnings surprises of growth stocks as well as stocks that conduct income increasing earnings management are significant on their own even when a variable capturing the combined effect is included. The hedge test proves that a joint strategy of both anomalies yields an abnormal return that exceeds the abnormal return that can be earned for the individual strategies on the days surrounding earnings announcements. On only 12 trading days an abnormal return of 4.42% could have be earned by combining the strategies. Risk factors are unlikely to explain these returns. Overall, the results indicate that the earnings responses to the value-growth anomaly and the overpricing of discretionary accruals stemming from earnings management are not related.

This study contributes to the research on the relation between capital markets and financial statements in the following three ways. First, while expectational errors and earnings management are studied in depth on their own, this study is among the first to bring them combined in relation with the value-growth anomaly. Second, this study focuses on the mispricing around earnings surprises, whereas previous research on the association between the accrual anomaly in general and the value-growth anomaly focuses on mispricing during the whole year (Desai et al., 2004). Third, this study contributes to accounting literature by investigating the meaning of accounting numbers around earnings surprises and improves investors' ability to assess firm performance. The theoretical idea of market efficicency is that as soon as accounting data become publicly available, the implication will be fully reflected in security prices (Fama, 1970). When markets are inefficient, financial reporting is not as effective and the interpretation of financial statements may differ. This study intends to improve the understanding of the manner in which markets price accounting information for growth versus value firms and for firms conducting earnings management. Since this research links accounting data to market efficiency, it has important implications for regulators. Financial reporting and disclosure are less effective when markets are inefficient and therefore do not fully incorporate the information in security prices. Regulators should consider whether altering the presentation of accounting data could mitigate the deficiency.

The remainder of this paper proceeds as follows. Section 2 provides an overview of the existing literature concerning the value-growth anomaly and the overpricing of discretionary accruals and provides arguments for the relation between the two anomalies. Moreover, it develops the hypotheses. Section 3 describes the sample selection and variable measurement. The methodology used to investigate the stock price behavior of both anomalies around earnings surprises and the relation between both anomalies is presented in section 4. Section 5 presents the results. In section 6 the role of risk factors instead of correction of behavioral mistakes around earnings announcements is investigated. Section 7 provides a summary, an interpretation of the results and suggestions for future research.

2 Earnings announcements and anomalies

2.1 Earnings announcement in the light of the efficient market hypothesis

Accounting plays a central role in the way capital markets work. According to (Fama, 1970), a market is efficient when prices always "fully reflect" all available information. One of the implications of market efficiency is that the information contained in accounting data will be widely appreciated and reflected in security prices once firms make the data public.

Earnings are an important source of information for determining security value (Beaver, 1968). Explanatory power of earnings in determining security value is a necessary condition for earnings to have informational content. Valuation theory has posited that the earnings term is the most important explanatory variable in the valuation equation. Specifically, Miller and Modigliani (1954-57) postulate that the market value of all firm's securities equals the expected level of average annual earnings discounted by the cost of capital of the risk class to which a particular firm belongs. Therefore, in the light of the efficient market hypothesis, earnings announcements should lead to a change in investors' assessments of the probability distribution of future returns, such that there is a change in equilibrium value of the market price (Beaver, 1968). To determine the magnitude and direction of price changes, the expectation model of investors should be known. Section 2.2, 2.3 and 2.4 shed further light on investors' expectations. The focus of this study is positive rather than normative; it is not investigated whether investors *should* react to earnings announcements, but whether they *do* react to earnings announcements.

Event studies are a common tool in the literature for testing market efficiency in finance, economics and accounting. In their seminal paper, Ball and Brown (1968) use an event study to demonstrate that when the actual income differs from the expected income, the market typically reacts in the same direction. Beaver (1968) does not focus on the sign of the reaction, but on the trading volume and stockprice volatility around earnings announcements. He proves that an increase in volatility and trading volume characterizes an increased flow of information. Moreover, Beaver, Clarke and Wright (1979) prove that the magnitude of the forecast error also contains stock price information.

Although Fama (1998) argues that event studies are useful to provide evidence on the stock price reaction to new information, he points out an important problem concerning the inferences of event studies: the joint hypothesis problem. This problem states that market efficiency must be jointly tested with a model for expected normal returns, a capital asset pricing model. It cannot be inferred whether the observed reaction is due to market inefficiency or whether the abnormal return is nothing more than a fair compensation for bearing risk that is priced, but not captured by the capital asset pricing model. Although different pricing models are used in this study, bad model risk cannot be ruled out.

2.2 Value-growth anomaly

Market efficiency also has implications for the interpretation of the association between accounting numbers and security prices. According to the efficient market hypothesis, it should not be possible to gain excess risk-adjusted returns using strategies based on accounting numbers. However, one of the empirical findings is the so called 'value-growth anomaly'. This is the widely known finding in the cross-sectional tests of return predicatability, that stocks with high book-to-market value historically outperform stocks with low book-to-market value (Fama and French, 1992; Lakonishok et al., 1994). Research shows that the return differential between growth and value stocks persists for five years after the date growth/value characteristics are measured. The literature offers three explanations for this anomaly and there is no consensus yet on the underlying reason. First, Fama and French (1992, 1993, 1996) provide a rational explanation. They argue that the higher returns for value stock are a compensation for higher systematic risk. However, Daniel and Titman (1997) argue that the return premia on high book-to-market stocks do not arise because of the comovement of these stocks with risk factors. They find that portfolios with similar characteristics, but different loadings on the Fama and French (1993) factors, have similar returns. Therefore, they conclude that the characteristics rather than the covariance structure of returns that explain the cross-sectional variation. The second explanation is provided by Fama (1998) and states that the observed phenomenon is only an illusion of inferior returns to growth stocks created by problems with the measurement of long-term abnormal returns. He proves that most long-term return anomalies tend to disappear with reasonable changes in techniques. Third, there is a widely supported behavioral explanation for the value-growth anomaly: expectational errors made by investors (Lakonishok et al., 1994; La Porta, Lakonishok, Shleifer and Vishny, 1997; Skinner and Sloan, 2002). This specification is in line with the results of Tversky and Kahneman (1974) on the behavioral heuristic known as representativeness. It is the naive process of perceiving events as representative for some specific class and ignoring the laws of probability. Investors may classify a stock as growth stock based on past consistent earnings growth that they extrapolate too far in the future (La Porta et al., 1997; Barberis, Shleifer and Vishny, 1998), while Little (1962) shows that earnings are close to a random walk and that it is useless to predict future earnings from any past earnings growth ratio. This paper tests a specific form of the naive expectations model. It tests a model in which the extrapolation of growth rates is due to discretionary accruals stemming from earnings management.

Basu (1977) and Dreman and Berry (1995) were among the first to study the relationship between growth stocks and earnings surprises. Their evidence shows that the value-growth return differential occurs regardless of the earnings surprise being positive or negative. La Porta et al. (1997) and Bernard et al. (1997) later report inconclusive results on the effect of earnings surprises. Their evidence implies that learning about future earnings prospects does not explain all of the return differential. Skinner and Sloan (2002) show that growth stocks exhibit an asymmetrically large negative price response to negative earnings suprises. Accounting for preannouncements that are especially common for negative earnings surprises, they provide evidence that the asymmetic reaction explains the value-growth anomaly. They state that this result indicates that inferior returns to growth stocks are directly linked to expectational errors. The reasoning is that investors perceive high past earnings growth as representative pattern for long-run future earnings. These overoptimistic expectations cause high market values, leading to low book-to-market ratios. The prices fall to earth around subsequent earnings announcements, because new information causes traders to re-examine their previous overoptimistc beliefs. Therefore, the first hypothesis tested is:

Hypothesis 1a. Growth stocks exhibit a more negative reaction to subsequent negative earnings surprises than value stocks.

Hypothesis 1b. The differential return between growth and value stocks is clustered around earnings announcements.

Although the earnings surprise approaches used in the studies mentioned above do not provide an unambigious method for separating mispricing from mismeasured risk, the mispricing explanation is most likely to hold when the hypotheses are accepted. It is difficult to construct explanations for temporary increases or decreases in systematic risk around earnings announcements. Section 6 elaborates on this issue.

2.3 The overpricing of discretionary accruals and earnings management

While the value-growth anomaly is based on a generic treatment of accounting numbers, other studies combine the composition of accounting numbers with market efficiency. Sloan (1996) investigates the persistency of the accruals and cash flow components of current earnings. He finds that investors fail to correctly identify the persistence of these two components. Capital markets overestimate the persistency of accruals and underestimate the persistency of cash flows, because accruals are more subject to estimation uncertainty and management's discretion and manipulation. DeFond and Park (2001) prove that this phenomenon also holds on a quarterly basis. Abnormal accruals should have little or no impact in reasonable efficient capital markets, because they have little or no effect on long-term earnings. Subramanyam (1996) proves that stock markets price discretionary accruals, but does not provide evidence on the direction of the pricing. Xie (2001) demonstrates that the market not only prices, but, more specifically, overprices accruals. He shows that overpricing of accruals reported by Sloan (1996) is due largely to abnormal accruals stemming from earnings management.

Discretionary accruals are broadly accepted as measure of earnings management (Jones, 1991; McNichols, 2000). Although Bernard and Skinner (1996) point out that discretionary accruals not only capture earnings management, but also unusual nondiscretionary accruals and unintentional misstatements, Xie (2001) shows that even after controlling for major unusual accruals and company specific events, the discretionary accruals are still overpriced. Using a sample of earnings manipulation subject to SEC enforcement actions, Dechow et al. (1995) find that these earnings manipulations are primarily due to accruals that reverse the year following earnings management, which is consistent with earnings management contributing to the lower persistence of discretionary accruals. The literature has taken three broad perspectives on earnings management (Holthausen, 1990): (1) an opportunistic perspective, (2) efficient contracting and (3) an information perspective. From the opportunistic perspective, managers engage in earnings management to transfer wealth form shareholders to themselves. The more information asymmetry between the management and shareholders, the less supsect the earnings management will be. Information asymmetry is a necessary condition for earnings management being opportunistic. If there was no asymmetry in information, shareholders could easily account for the extent to which earnings were managed. The efficient contracting perspective implies that accounting methods are selected to minimize agency costs for the different parties to the firm and reduce the potential loss due to conflicts of interest between various parties in an organization. Finally, the information perspective suggests that earnings management improves the ability of earnings to reflect the economic value of the firm (Subramanyam, 1996). By using their discretion over accruals, managers improve the value relevance of earnings with information that is not reflected in historical costs. Information asymmetry also plays a role in this perspective. Diamond and Verrecchia (1991) show that revealing public information to reduce information asymmetries can improve a firm's liquidity. Reducing initially large information asymmetries will increase the stock price. These three perspectives are not mutually exclusive. Moreover, earnings management can have many specific reasons as compensation contracts, debt covenants, litigation and regulatory behavior (Beaver, 2002). On top of that, Degeorge, Patel and Zeckhauser (1999) identify behavioral thresholds that trigger earnings management. The aim is to exceed each of the three thresholds: report positive earnings, sustain recent performance and meet analysts' expectations. It is hard to identify the precise reason for earnings management. Therefore, this study does not try to identify the reason for earnings management, but rather investors' reaction to earnings surprises for stocks that conduct earnings management.

DeFond and Park (2001) relate discretionary accruals measured by the difference between reported working capital and the market's expectations of the normal working capital, to quarterly earnings surprises. They provide more evidence that stock prices do not fully reflect the implication of abnormal accruals for future earnings and valuation. They find for negative (positive) earnings surprises income increasing abnormal accruals increase (decrease) the stock price reaction and for income decreasing abnormal accruals the stock price reaction is decreased (increased). They conclude that the market anticipates the reversing nature of abnormal working capital accruals to some extent, but the subsequent stock returns provide evidence that market participants do not fully impound the pricing implications of abnormal accruals at the earnings announcement date. Their hypotheses are not supported when the Jones model is used to proxy abnormal accruals. Collins and Hribar (2000) analyse the relation between the accruals anomaly and the post-earnings announcement drift. They find that when the level of accruals has an opposite sign to the earnings surprise, the drift is substantially greater. However, when the accruals have the same sign as the earnigns surprise, they find that the drift is mitigated or even disappeared.

Although DeFond and Park (2001) show that the market anticipates the reversing nature of abnormal working capital accruals to some extent[3], it is hypothesized that the lack of persistency is underestimated. Therefore, it is expected that investors revise their expectations around subsequent earnings announcemens.

Hypothesis 2a. Firms that conduct income increasing earnings management exhibit a more negative reaction to subsequent negative earnings surprises than stocks that do not.

Hypothesis 2b. The return differential between stocks that conduct income increasing earnings management and stocks that do not is clustered around earnings announcements.

Kothari, Leone and Wasley (2005) point out the double testing problem that is created when testing earnings management and market efficiency. The joint hypothesis problem when testing market efficiency is pointed out above. The inferences drawn from tests of earnings management hinge critically on the ability of estimating discretionary accruals.. It is important to note that in the context of testing market efficiency with respect to earnings management, the discretionary accruals model and market efficiency are jointly tested. Again, this causes a double joint hypothesis problem.

2.4 One or two anomalies?

McNichols (2000) points out that the accruals anomaly might be the value-growth anomaly in disguise, because discretionary accruals are correlated with earnings performance. Dechow et al. (1995) show that firms with higher (lower) earnings exhibit significantly positive (negative) discretionary accruals. A possible explanation could be that firms that experience high earnings have positive shocks to earnings that include an accrual component. As a consequence, income increasing earnings management is more likely to be detected for the most profitable firms than for the least profitable firms. Using the distribution of earnings suprises, Brown (2001) confirms this finding by proving that managers of growth firms are relatively more likely than managers of value firms to

[3] They find that the market anticipates 19-23 percent of the pricing implications of the abnormal accruals.

report good news profits. Madhogarhia et al. (2009) test whether growth firms are more likely to conduct earnings management, but do not provide evidence on the direction of earnings management for growth firms. They acknowledge that growth stocks suffer disproportionally large negative adjustments when these firms report negative earnings surprises. Therefore, growth firms have an incentive to avoid negative earnings surprises. Moreover, they argue that earnings management is less suspect for firms having large information asymmetries between management and shareholders. This is most likely the case for growth stocks. Finally, they state that earnings management is largely triggered by the threshold to sustain recent performance and meet analysts' expectations. This leads to the following hypothesis:

Hypothesis 3. Growth firms are more likely to conduct income increasing earnings management than value firms.

The common behavioral explanation for both anomalies is that investors naively fixate on (past) earnings rather than earnings' ability to summarize value relevant information. For both anomalies, this means that stock prices do not fully impound the implications of current quaterly earnings for future earnings. For the value-growth anomaly, the naive model implies that investors fixate on earnings growth and fail to recognize the mean reversing nature of earnings. The naive model for discretionary accruals entails that investors fixate on earnings and fail to distinguish the persistency of the cash flow, nondiscretionary and discretionary accruals component. These model specifications indicate that the discretionary accruals anomaly might be a more specific version of the value-growth anomaly. In short, naive extrapolation means overestimating the persistency of earnings growth and discretionary accruals respectively, whereas earnings growth and discretionary accruals are known to exhibit a reversing structure. Since discretionary accruals are a component of earnings, it could be argued that the overpricing of discretionary accruals specifies the value-growth anomaly. This suggests that investors do not extrapolate earnings growth in general, but rather overestimate the discretionary accruals component of earnings. While Skinner and Sloan (2002) state that the negative reaction of growth stocks to negative earnings surprises is due to the extrapolation of growth rates, the above reasoning suggests that earnings management might construct these growth rates. This leads to the fourth hypothesis.

Hypothesis 4. The negative reaction to negative earnings surprises for growth stocks can be explained by income increasing earnings management.

If the earnings responses to both anomalies are subsumed by each other, a joint strategy that exploits both individual mispricing patterns around earnings announcements should not yield larger abnormal returns than a strategy based on one anomaly. Specifically, a strategy taking a long (short) position in value (growth) stocks having extreme negative (positive) discretionary accruals around earnings announcements is not expected to generate larger excess returns than a strategy based on one anomaly if the anomalies reflect the same effect.

Hypothesis 5. When both anomalies are combined into a joint strategy on the days surrounding earnings announcements, the abnormal returns are not significantly larger than those based on a trading strategy that exploits only one anomaly.

3 Sample selection and variable measurement

The initial sample consists of firms listed on the New York Stock Exchange (NYSE), NYSE MKT (formerly known as the American Stock Exchange (AMEX)) and the National Association of Security Dealers Automatic Quotation System (NASDAQ) from 2000 to 2015. Financial statement data are obtained from Compustat and stock return data from the Center for Research in Security Prices (CRSP). Quarterly earnings are obtained from the Institutional Brokers' Estimate System (I/B/E/S). (1) Firms with SIC codes 6000-6799 are excluded from the sample due to difficulties in interpreting the accounting information of financial institutions, insurance companies and real estate companies. Those firms often have high leverage that does not necessarily signal financial distress as it would for non-financial firms. (2) Similar to Lakonishok et al. (1994) and Desai et al. (2004), firms with negative book values are excluded from the sample, since negative book values are hard to interpret. The book value of equity represents the difference between the firm's assets and liabilities. Because of the firm's limited liability structure, shareholders cannot hold a negative value. (3) Also excluded from the sample are observations missing monthly stock returns on the CRSP files and (4) observations without adequate data to compute the financial statement data required for the Jones-model (discussed in section 3.2). The variables required for the modified Jones model are winsorized at the 1st and 99th percentile to avoid outliers influencing the results. This yields a final sample of 62,138 firm-quarter observations, consisting of 3,688 firms.[4]

3.1 Growth and value stocks

Research identifies different fundamentals-to-price ratios to identify growth and value stocks. Common measures are the book-to-market, earnings-to-price and cash flow-to-price ratio. The book-to-market (BM) ratio is favored by Fama and French (1992) and used as measure of growth in this study. Moreover, Fama and French (1995) show that the BM ratio is related to persistent properties of earnings. The BM ratio for a particular quarter is measured as the book value of common equity at the end of the previous quarter divided by the market value of outstanding shares at the end of the previous quarter. The market value of shares outstanding is computed by multiplying the shares outstanding by the price at the moment of measurement. Based on the BM ratio at the end of the previous quarter the stocks are divided in quarterly rebalancing deciles. The lowest decile contains so called growth stocks and the highest decile value stocks. By using deciles the results are not influenced by outliers. The summary statistics are reported in Panel A of Table 2. The second row of Panel A shows the average earnings management decile (construction of these deciles is explained in section 3.2) of the firms in the particular BM decile. Since the earnings management deciles are based on the raw values of the discretionary accruals, it is hard to infer the extent to which firms conduct

[4] There are 326,626 NYSE, AMEX and NASDAQ quarterly observations on the Compustat tapes from 2000-2015.

earnings management. Firms that conduct income increasing earnings management have negative discretionary accruals by construction during later periods. Firms that do no conduct earnings management have no discretionary accruals. Therefore, whether firms do conduct earnings management or not, they will have no discretionary accruals on average. All portfolios have a mean earnings management decile between 5.28 and 5.63. However, it is noteworthy that growth stocks have a mean earnings management decile of 5.47, which is significantly larger than the mean of 5.28 for value stocks (*t*-statistic: 2.41). This provides preliminary evidence that growth stocks are, on average, more likely to conduct income increasing earnings management than value stocks. Table A2 in the Appendix provides descriptive statistics using the absolute value of accruals. The Table provides descriptive evidence that earnings management is concentrated in growth stocks, because the average earnings management decile is highest for growth stocks (BM decile 1). In line with previous evidence on the value-growth anomaly (e.g. Fama & French, 1992), the raw returns as well as size-adjusted returns on the value portfolio exceed the growth portfolios returns. The hedge portfolio return is calculated by subtracting the average abnormal return of the short (growth) portfolio from the average abnormal return of the long (value) portfolio. The raw (value-weighted size-adjusted)[5] hedge return is 28.49% (25.75%). The remainder of this paper uses value-weighted size-adjusted returns.

3.2 Earnings management

The Jones (1991) model is broadly classified as model to measure earnings management. Although a lot of academics question this model, the large number of studies published using this approach suggests that it is widely accepted as proper measure for earnings management (McNichols, 2000). The management's use of discretionary accruals is often the focus of analyses of earnings management (Jones, 1991; Dechow et al., 1995; Subramanyam, 1996; Xie, 2001; Kothari et al., 2005; Madhogarhia et al., 2009). This analysis requires for model of estimating the discretionary component(s) of reported income, since one cannot readily identify discretionary accruals. Dechow et al. (1995) evaluate the relative performance of competing models based on the specification and power of commonly used test statistics. They compare the Healy (1985) model, the DeAngelo (1986) model, the Jones (1991) model, a modified version of the Jones model and the industry model (Dechow and Sloan, 1991). In contrast to the Healy and DeAngelo model, the Jones model relaxes the unrealistic assumption that nondiscretionary accruals are constant. Dechow et al. (1995) argue that discretion can be exercised over revenues and therefore propose a modification of the Jones model that eliminates the tendency of the Jones model of measuring discretionary accruals with error when discretion is exercised over revenues. They find that a version of the classic Jones model that is modified to detect revenue-based earnings management generates the fewest type II errors. Type II errors arise when the null hypothesis that earnings are not systematically managed is rejected when the

[5] Computation of size-adjusted returns is explained in section 3.4.

null is true. Since Dechow et al. (1995) provide evidence that the modified Jones model is well specified when applied to a random sample of firm years and generate the fewest type II errors compared to the other examined models, the modified Jones model as specified by Dechow et al. (1995) is used as basis to detect earnings management. Whenever adjustments are made compared to the modified Jones model, it is explicitely mentioned.

To decompose accruals of a firm into a discretionary and nondiscretionary part, first the amount of total accruals is computed. Total accruals include changes in working capital accounts, such as accounts receivable, accounts payable, future tax liability and goodwill. In line with previous research (Jones, 1991; Desai et al., 2004), total accruals (TA_t) are computed using the balance sheet approach:

$$\frac{TA_t}{A_{t-1}} = \frac{\Delta CA_t - \Delta CL_t - \Delta Cash_t + \Delta STD_t - Dep_t}{A_{t-1}} \qquad (1)$$

Where:

ΔCA	=	Change in current assets (Compustat item 40)
ΔCL	=	Change in current liabilities (Compustat item 49)
$\Delta Cash$	=	Change in cash and cash equivalents (Compustat item 36)
ΔSTD	=	Change in debt included in current liabilities (Compustat item 45)
Dep	=	Depreciation and amortization expense (Compustat item 5)
A	=	Total assets (Compustat item 44)

As in DeFond and Jiambalvo (1994), Subramanyam (1996) and Xie (2001) the cross-sectional version of the Jones model is used. The cross-sectional model is preferred over the time series model for three reasons. First, in contrast to the cross-sectional approach the time series approach requires that firms in the event period have data available for the years prior to the event period. Second, the time series approach is estimated over a longer period which increases the likelihood of structural change during the esitmation period. Third, the cross-sectional model has more observations per group for the regression estimation than the time series model.[6] Moreover, Subramanyam (1996) proves that the parameter estimates for the cross-sectional model are better specified than for the time series model.

The following regression is estimated as expectation model for total accruals separately for each combination of two-digit SIC code and fiscal quarter using the ordinary least squares (OLS) method.[7] This regression is the same as in the original Jones model. A combination with less than ten observations is dropped from the sample.

[6] The average number of observations per group for the cross-sectional model is 57.2 compared to 29.3 for the time series model.

[7] The error terms from this cross-sectional model are not independent, because the firms are clustered on time and industry.

$$\frac{TA_{it}}{A_{it-1}} = \alpha_j + \beta_{1j}\frac{1}{A_{it-1}} + \beta_{2j}\frac{\Delta REV_{it}}{A_{it-1}} + \beta_{3j}\frac{PPE_{it}}{A_{it-1}} + \varepsilon_{jt} \qquad (2)$$

Where:

TA_{it}	=	Total accruals in quarter *t* for firm *i*
ΔREV_{it}	=	Revenues in quarter *t* less revenues in quarter *t-1* for firm *i*
PPE_{it}	=	Gross property, plant and equipment in quarter *t* for firm *i* (Compustat item 118)
A_{it-1}	=	Total assets in quarter *t-1* for firm *i*
i	=	1 to *N* firm index (N = 3,688)
j	=	1 to *N* two-digit SIC code and fiscal quarter index (N = 2,643)
t	=	1 to T_i quarter index for the quarters included in the estimation period for firm *i* (T_i ranges from 2000 to 2015)

It should be noted that it is an open question whether total accruals are linear in the change in revenues and the level of property, plant and equipment in the absence of earnings management. When no systematic earnings management is hypothesized, total accruals are expected to be nondiscretionary. The model controls for the effects of economic conditions on the level of accruals and therefore estimates the accruals due to business conditions rather than managers' discretion. The change in revenues is included in the regression, because total accruals depend on revenues to some extent. The aim of including revenues is controlling for the economic environment of the firm. The level of gross property, plant and equipment is included rather than the change in the account, because the level (instead of the change) of depreciation expense is included in the calculation of total accruals. The variable is included to control for the portion of total accruals related to depreciation expense before managers' manipulations. All variables are scaled by lagged assets to reduce heteroskedasticity and enhance the cross-sectional comparability. While previous research typically does not include a constant in the regression for total accruals, here an intercept is included. This is in line with the model used by Kothari et al. (2005). Including the intercept provides an additional control for heteroskedasticity that is not alleviated by the deflation of variables by total lagged asset.

Table 1 **Descriptive statistics for the multiple regression equations (2) for total accruals**

	Mean	Median	Std. Dev.	Minimum	Maximum
a_j	-0.005	-0.004	0.041	-0.369	0.368
t-statistic	-0.36	-0.29	1.55	-14.55	6.94
b_{1j}	0.035	-0.021	4.067	-50.822	77.436
t-statistic	-0.23	-0.10	3.23	-44.84	29.29
b_{2j}	0.270	0.082	5.100	-7.256	197.703
t-statistic	0.83	0.59	3.36	-67.57	61.34
b_{3j}	-0.008	-0.011	0.411	-8.894	18.926
t-statistic	-0.55	-0.53	1.50	-11.15	14.73
Adjusted R^2	0.189	0.114	0.262	-0.498	0.99999
Number of observations	57.18	27	76.66	10	772

This table provides the descriptive statistics for the estimated cross-sectional multiple regression equation (2) based on a sample of 151,131 firm-quarter observations in 2,643 combinations of industry group and quarter:

$$\frac{TA_{it}}{A_{it-1}} = \alpha_j + \beta_{1j}\frac{1}{A_{it-1}} + \beta_{2j}\frac{\Delta REV_{it}}{A_{it-1}} + \beta_{3j}\frac{PPE_{it}}{A_{it-1}} + \varepsilon_{jt}$$

Where

TA_{it} = Total accruals in quarter *t* for firm *i*

ΔREV_{it} = Revenues in quarter *t* less revenues in quarter *t-1* for firm *i*

PPE_{it} = Gross property, plant and equipment in quarter *t* for firm *i* (Compustat item 118)

A_{it-1} = Total assets in quarter *t-1* for firm *i*

i = 1 to *N* firm index (N = 3,688)

j = 1 to *N* two-digit SIC code and fiscal quarter index (N = 2,643)

t = 1 to T_i quarter index for the quarters included in the estimation period for firm *i* (T_i ranges from 2000 to 2015)

Table 1 provides descriptive statistics for the coefficients of regression 2. The average coefficient for property, plant and equipment is negative (-0.008), which is the expected sign because property, plant and equipment are related to depreciation which is an income decreasing accrual. Changes in revenues can have income increasing as well as decreasing effects on accruals. The average coefficient for the change in revenues is 0.270 whereas the median estimate is 0.082. The average adjusted R^2 for the estimated regressions is 0.189. A histogram presenting the distribution of the adjusted R^2 is included in the Appendix (Figure A1). Although the histogram shows that the value of adjusted R^2 of most regressions is conventional, there are some extreme negative and extreme positive observations. The regressions having low explanatory power (low values for adjusted R^2) do not cluster in one or more industries. They do have less observations than the average of 57.2 which might explain the low adjusted R^2. Remarkably, the coefficients of the regressions having extremele high adjusted R^2 values are insignificant. The variance inflation factor (VIF) for these regressions reveals multicollinearity among the independent variables[8], which explains the insignificance. The regressions with extreme values for adjusted R^2 are included in the sample, because the use of deciles mitigates the influence of these observations. The average number of observations per fiscal quarter and indusrtry is 57.2. Compared to previous research, this average exceeds the average number of observations (25.3) for

[8] The VIF far exceeds 10, the threshold for multicollinearity.

the time series approach in Jones (1991), but slightly lower than the average number (59.6) of the cross-sectional approach in Subramanyam (1996). Overall, the average number of observations per industry code and fiscal quarter does not seem a matter of concern.[9] Table A1 in the Appendix provides the descriptive statistics of the variables in the sample. The Table shows that total accruals are negative (-0.015), which is probably due to depcreciation.

The OLS estimates of firm-specific parameters, α_j, β_{1i}, β_{2j} and β_{3j} per fiscal quarter and industry code are used to estimate the nondiscretionary part of accruals (NDA_{it}) for the individual firm-quarter observations that belong to the industry code.

$$\frac{NDA_{it}}{A_{it-1}} = \hat{\alpha}_j + \hat{\beta}_{1j} \frac{1}{A_{it-1}} + \hat{\beta}_{2j} \frac{\Delta REV_{it} - \Delta REC_{it}}{A_{it-1}} + \hat{\beta}_{3j} \frac{PPE_{it}}{A_{it-1}} \quad (3)$$

Where ΔREC_{it} are net receivables for firm *i* in quarter *t* less net receivables in quarter *t-1* (COMPUSTAT item 37). The values of $\hat{\alpha}_j$, $\hat{\beta}_{1j}$, $\hat{\beta}_{2j}$and $\hat{\beta}_{3j}$ are the OLS estimates of α_j, β_{1j}, β_{2j} and β_{3j}. This is where the modified Jones model differs from the original model in that the change in revenues is adjusted for the change in receivables. Where the original model assumed that revenues could not be subject to managers' discretion, the modified version assumes that all changes in accounts receivable are due to management's discretion. Dechow et al. (1995) provide as reason for this concept that it is easier to exercise discretionary power over the recognition of credit sales than over cash sales.

Finally, the discretionary part of accruals can be inferred by the following formula, where DA_{it} refers to the discretionary accruals of firm *i* in quarter *t*:

$$DA_{it} = TA_{it} - NDA_{it} \quad (4)$$

Based on discretionary accruals at the end of the previous quarter, quarterly rebalanced earnings management deciles are computed. Table A1 shows that, as expected, the discretionary accruals are approximately zero (0.0005)[10] and about half of the observations have positive discretionary accruals (51.17%).

[9] To increase the number of observations, the regression is also run for combinations of one-digit SIC codes and fiscal quarters. This creates 555 industry fiscal-quarter combinations and increases the average number of observations per regression to 213.8. Although the number of observations per regression increases while the number of predictors remains the same, the adjusted R^2 decreases to an average of 0.118 (ranging between -0.294 and 0.9995). This indicates that the estimation of accruals is industry dependent more specific than the one-digit level. The estimation of the total accruals regressions per two-digit SIC code and fiscal quarter has higher explanatory power and therefore the two-digit industry code is used in the remainder of this paper.

[10] Since the modified version of the Jones model used in this research includes an intercept, the residuals sum to zero. It should be noted that for calculating the discretionary accruals (formula (4)), the change in net receivables (ΔREC_{it}) is subtracted from the change in revenue (ΔREV_{it}), whereas regression (2) does not subtract net receivables (ΔREC_{it}). Therefore, the value of discretionary accruals does not exactly equal the residuals of regression (2).

The summary statistics of the earnings management deciles are reported in panel B of Table 2. The earnings management deciles are based on the raw values of discretionary accruals. From panel B it can be inferred that firms that conduct earnings management are more likely to be growth stocks, since the mean of the BM decile is lower in the extreme earnings management portfolios. In the first and tenth accruals decile the mean BM decile are 5.35 and 5.04 respectively, indicating that growth stocks are more likely to fall in the extreme income increasing earnings management decile than in the extreme income decreasing earnings management decile. The discretionary accruals are near zero in the fifth decile, where the mean BM decile is highest (5.83). In line with previous evidence on the overpricing of discretionary accruals (Xie, 2001), the raw and size-adjusted returns on the portfolio with negative discretionary accruals are higher than on the portfolios with positive discretionary accruals. The raw return (size-adjusted value-weighted) differential between the highest and lowest portfolio is 7.15% (7.15%). These values are slightly lower than the values reported by Xie (2001).

3.3 Earnings surprises

Earnings surprises are computed as the actual quarterly earnings per share less the expected earnings deflated by the close price on the last day of the quarter. This measure is comparable to the measure used by Skinner and Sloan (2002). The expected earnings are defined as the median consensus of analyst forecasts in the latest month. If analysts efficiently process information, the expected value of the forecast error would be zero. Following Skinner and Sloan (2002), the 1% tails of the earnings surprise variable are winsorized to mitigate the outliers problem. Evidence suggests that concerning expectations of earnings growth, analysts' forecasts tend to be too extreme, but still representative of investors' expectations (La Porta, 1996). Therefore, using analysts' forecasts as proxy for expected earnings seems reasonable.

3.4 Abnormal returns

Throughout the paper buy-and-hold with dividend returns are used as stock return. Following Sloan (1996), Xie (2001) and Skinner and Sloan (2002) abnormal returns are computed by subtracting the quarterly return on a size-matched portfolio from the buy-and-hold with dividend returns. The size-adjusted returns are calculated by assigning all firm-quarter observations in the sample to deciles based on market capitalization at the end of the previous quarter. The market capitalization is calculated by multiplying the close price of the previous quarter by the total shares outstanding at that time. Subsequently, the NYSE/AMEX/NASDAQ universe is divided into size deciles and an equal-weighted portfolio return is computed for each size decile in each quarter.[11] Raw buy-and-hold with dividend returns are then adjusted for each security by subtracting the return on the size portfolio of the NYSE/AMEX/NASDAQ decile to which the firm belongs at the end of the previous quarter.

[11] http://mba.tuck.dartmouth.edu/pages/faculty/ken.french/data_library.html

Table 2 Descriptive statistics and portfolio returns

Panel A: Book-to-market ratio

	Quarterly portfolio ranking											
	Growth									Value		
	1	2	3	4	5	6	7	8	9	10	10 minus 1	*t*-stat hedge
BM	0.107	0.208	0.280	0.349	0.420	0.499	0.590	0.710	0.0895	3.757	3.650	2.87
Mean EM decile	5.467	5.525	5.529	5.468	5.626	5.516	5.478	5.499	5.479	5.276	-0.191	2.41
Earnings surprise	-0.00003	-0.00004	0.0001	-0.00003	-0.00001	-0.0002	-0.001	-0.001	-0.002	-0.004	-0.004	-6.55
Return	6.85%	4.79%	4.77%	7.77%	-7.89%	10.58%	12.85%	12.12%	17.56%	35.34%	28.49%	4.88
SAR equal-weighted	-2.93%	-5.41%	-5.77%	-2.98%	-3.42%	-0.05%	1.81%	0.68%	5.84%	22.24%	25.16%	5.07
SAR value-weighted	-2.20%	4.66%	-5.13%	-2.29%	-2.71%	0.58%	2.54%	1.50%	6.65%	23.55%	25.75%	4.98

Panel B: Discretionary accruals based on cross-sectional Jones model

	Quarterly portfolio ranking											
	Income-decreasing									Income-increasing		
	1	2	3	4	5	6	7	8	9	10	1 minus 10	*t*-stat hedge
EM	-0.079	-0.029	-0.017	-0.009	-0.002	0.004	0.010	0.018	0.020	0.086	-0.166	-35,1
Mean BM decile	5.349	5.330	5.481	5.670	5.835	5.665	5.620	5.508	5.368	5.036	0.313	3,97
Earnings surprise	-0.001	-0.001	-0.0002	-0.001	-0.001	-0.0002	-0.0003	-0.0002	-0.001	-0.002	0.0001	0,33
Return	16.13%	13.31%	12.65%	9.71%	10.89%	12.32%	9.23%	10.45%	11.88%	8.97%	7.15%	2,88
SAR equal-weighted	4.73%	1.76%	1.50%	-1.03%	-0.12%	1.56%	-1.32%	-0.29%	1.06%	-2.37%	7.10%	2,92
SAR value-weighted	5.61%	2.61%	2.35%	-0.32%	0.68%	2.31%	-0.65%	0.39%	1.68%	-1.53%	7.15%	2,92

The sample (62,138 observations) comprises all firms (excluding financial institutions, insurance companies and real estate companies) listed on the NYSE, NYSE MKT (formerly known as the American Stock Exchange (AMEX)) and the NASDAQ with coverage on CRSP and Compustat from 2000 to 2015 with available data. Panel A provides the descriptive statistics and portfolio returns for portfolios based on the book-to-market (BM) ratio. The BM ratio is the ratio of book value of equity to market value of equity. Panel B presents the descriptive statistics and portfolio returns for portfolios based on discretionary accruals. The discretionary accruals are approximated using the cross-sectional modified Jones model (1991). The hedge portfolio return is computed by subtracting the average size-adjusted return on the short portfolio from the average size-adjusted return on the long portfolio.

BM = Mean book-to-market ratio
EM = Mean discretionary accruals approximated by the cross-sectional modified Jones model (1991)
Mean BM decile = Mean book-to-market decile
Mean EM decile = Mean earnings management decile based on discretionary accruals approximated by the cross-sectional modified Jones model (1991)
Earnings surprise = Average earnings surprise in the quarter following portfolio formation
Return = Average raw return in the quarter following portfolio formation
SAR equal-weighted = Size-adjusted returns in the quarter following portfolio formation. The size-adjusted return is calculated by subtracting the equal-weighted return of the size portfolio (based on the classification of all NYSE/AMEX/NASDAQ firms) the firm belongs to in that quarter from the raw return.
SAR value-weighted = Size-adjusted returns in the quarter following portfolio formation. The size-adjusted return is calculated by subtracting the value-weighted return of the size portfolio (based on the classification of all NYSE/AMEX/NASDAQ firms) the firm belongs to in that quarter from the raw return.

4 Methodology

4.1 Earnings surprises event study

The first two hypotheses focus on return behavior of stocks around earnings announcements and are investigated using event study methodology. Event studies, a methodology introduced by Fama, Fisher, Jensen and Roll (1969), are conducted to test whether the value-growth anomaly and the overpricing of abnormal accruals are centered around subsequent earnings announcements. Often event studies focus on 2-3 day event windows. However, the information contained in earnings may be more timely captured by other sources. Moreover, it is known that negative earnings announcements are prone to preannouncement (Skinner, 1997; Kasznik and Lev, 1995; Soffer, Thiagarajan and Walther, 2000). Since those negative earnings announcements are hypothesized to exhibit the negative abnormal returns that are subject to investigation, an interval capturing preannouncements is used. Following Skinner and Sloan (2002), the event window starts on average twelve days before the end of the current fiscal quarter and ends the day after the announcement of earnings of the current quarter. To calculate the average event window per category (decile and sign of the earnings surprise), quarters with quarter end during the weekend are dropped from the sample. Skinner and Sloan (2002) refer to this period as 'postret'. This interval has 37.6 trading days on average. Table A3 in the Appendix provides the average number of trading days in the interval per category, which are used as event period length of the postret interval. According to Skinner (1997) and Soffer et al. (2000) over 75% of earnings preannouncements occur within two weeks on either side of the end of the fiscal quarter. Therefore, it is expected that a large part of the preannouncements is captured in this event window. If the window is longer than necessary to capture the market's reaction to the earnings surprise, the R^2 will be depressed. However, a mistake in the other direction, an event window that is too short and fails to capture part of the market's reaction, would bias the abnormal return downwards. To check whether the relationship also holds for shorter windows, a 3-day window that starts the day prior to the earnings announcement and ends the day afterwards, is used. Size-adjusted abnormal returns as described in section 3.3 are investigated during the event window. Therefore the event study uses the following regression:

$$R_{it} = R_{pt} + \sum_{k=x}^{y} c_{i,t+k} D_{i,k} + \varepsilon_{i,t} \tag{5}$$

Where $D_{i,k}$ is a dummy variable that equals unity during the event window. The event window lasts from x to y in formula (5). The average event window is 37.6 days, meaning x equals -36 on average and y equals +1. R_{pt} is the return on the corresponding size portfolio at time t. The coefficient $c_{i,t+k}$ is the daily leading, simultaneous or lagging effect of an event. The summed values of $c_{i,t+k}$ yield the cumulative abnormal return.

The objective is to examine the stock return behavior around earnings announcements over the subsequent year, meaning the subsequent four quarterly earnings announcements. The empirical analysis focuses on the first year following portfolio formation, since the return predicatblility for both anomalies are known to be the highest in this year (Lakonishok et al., 1994; Xie, 2001). This means that earnings reactions are cumulated over the next four quarters. It is expected (hypotheses 1a and 2a) that the reactions to negative earnings surprises show a systematic trend as a function of growth and earnings management.

The second prediction (hypotheses 1b and 2b) is that the return differential between value and growth stocks and stocks that conduct income increasing earnings management and stocks that do not, is clustered around earnings surprises. To distinguish between the stock price movements that are due to earnings news and other factors such as risks, the returns on a hedge portfolio in the event period are compared to the returns on the same hedge portfolio during the non-announcement period. Following Bernard and Thomas (1990) and Sloan (1996) the event period consists of three days starting the day prior to the earnings announcement and ending the day after the announcement. The remaining days are the non-announcement period. For this part of the analysis the short event window is used to capture clustering of returns around earnings announcements. The longer event window (postret) used for the event study would capture the returns of about half of the trading days. It would be no surprise if a large part of the return differential is clustered in half of the number of trading days. One would not investigate clustering when taking the large event window. Using a shorter announcement period, each announcement period consists of 3 days. Given that there are 4 quarterly announcements each year, the announcement period comprises 12 trading days. Therefore, the non-announcement period will average to 239.6 trading days.[12] It is expected that a disproportionally large amount of the total return differential for both anomalies manifests around earnings annoucements, since new information is released during these announcements and investors revise their prior (irrational) expectations.

4.2 Regression analysis earnings management among growth firms

As previously discussed, discretionary accruals are related to earnings performance and growth stocks have greater information asymmetries. Moreover growth stocks exhibit a disproportionally large negative response to negative earnings surprises. Therefore, growth firms should have greater incentives to conduct income increasing earnings management. To test the third hypothesis whether growth firms are more likely to conduct income increasing earnings management, a regression analysis based on Madhogarhia et al. (2009) is used:

[12] The average number of trading days per year that is included in the sample equals 251.6.

$$ABSDA = \beta_1\ GROWTH + \beta_2\ GROWTH \cdot INCINC + \ \beta_3\ LSIZE + \beta_4\ ANALYST + \beta_5\ ROA + \beta_6\ ROA \cdot INCINC + \beta_7\ \frac{D}{E} + \varepsilon \tag{6}$$

Where

$ABSDA$	=	The absolute value of discretionary accruals, which estimates are obtained from the Jones model described in section 3.2.
$GROWTH$	=	Dummy variable to which a firm is assigned in quarter *t*, where 1=growth firms and 0=value firms. Firms in BM decile 1 and 2 are classified as growth firms and firms in BM decile 9 and 10 are classified as value firms.
$INCINC$	=	Dummy variable for income increasing earnings management, where the variable equals 1 if discretionary accruals are positive and 0 if discretionary accruals are negative.
$LSIZE$	=	Natural logarithm of the market value of equity for quarter t-1.
$ANALYST$	=	Number of analysts that estimate earnings for quarter *t*.
ROA	=	Return on assets measured as net income (Compustat item 69) divided by total assets.
$\frac{D}{E}$	=	Debt-to-equity ratio measured as long-term debt (Compustat item 51) divided by total assets minus long-term debt.

While Madhogarhia et al. (2009) base the growth measure on a geometric mean variable based on five variables that measure growth characteristic and investigate the bottom and top 30 percentile, here a dummy variable based on the bottom and top quintile of the BM spectrum is used for ease of comparison with the other results in this paper. Madhogarhia et al. (2009) do not distinguish income increasing and income decreasing earnings management. Here, the regression is extended with an interaction term between growth stocks and positive discretionary accruals, because it is hypothesized that growth firms are more likely to conduct income increasing earnings management. $LSIZE$ is included, since it might be argued that small firms experience larger information asymmetries and are therefore more likely to conduct earnings management. Warfield, Wild and Wild (1995) argue that analysts mitigate the impact that information asymmetries might have on managers' accounting choices. Therefore the number of analysts' estimates is included as control variable. ROA is added as control variable based on McNichols (2000), because return on assets are significantly positively associated with discretionary accruals estimates (Dechow et al., 1995). An interaction term between ROA and positive discretionary accruals is included, because it is expected that return on assets are a function of the raw value of discretionary accruals rather than the absolute value. Finally the debt-to-equity ratio is added to control for the firms' ability to bind debt covenants, because managers of firms that are closer to binding debt covenants are more likely to use their discretion over earnings (Sweeney, 1994).

As described in this section, the regression model includes control variables for a number of firm-specific characteristics. Madhogarhia et al. (2009) also include industry characteristics that are left out in the current analysis. Whereas Madhogarhia et al. (2009) use the time series Jones model for discretionary accruals and control for industry and firm-specific effects in the regression model, here the cross-sectional version of the modified Jones model is used (section 3.2) and only firm-specific characteristics are included. The industry characteristics are left out as control variables, because the cross-sectional modified Jones model inherently controls for industry characteristics. Furthermore, the control variables for institutional ownership and insider ownership are left out of the analysis, because they have proven to be insignificant determinants of earnings management (Madhogarhia et al., 2009).

Following hypothesis 3, it is expected that after controlling for the firm specific characteristics, $GROWTH$ continues to have a significant positive coefficient. This would imply that growth firms are more likely to conduct earnings management compared to firms with lower growth rates. Furthermore, it is expected that the coefficient of the interaction term (β_2) is significantly positive, indicating that growth firms are not only more like to conduct earnings management, but also conduct income increasing to a greater extent than income decreasing earnings management.

4.3 Regression analysis abnormal returns around earnings surprises

This section provides statistical tests of hypothesis 4 using regression analysis. It is investigated whether the negative reaction to negative earnings surprises for growth stocks can be explained by income increasing earnings management (or vice versa). If high discretionary accruals have no impact on the abnormal return of growth stocks, it would imply that the effects discovered so far are due to other growth characteristics than consistent growth due to earnings management. The alternative possibility is that earnings management is related to asymmetric information that is revealed around negative earnings announcements. In that case, a form of asymmetric information that becomes public around negative earnings announcements might be that past growth rates of growth firms that were due to earnings management are not sustainable in the future. To investigate the fourth hypothesis, the effect of growth stocks and income increasing earnings management on cumulative size-adjusted abnormal returns is investigated using the following regressions.

$$\begin{aligned} CSAR_{it} = \alpha &+ \beta_1(GOOD_{it} \cdot ES_{it}) + \beta_2(GOOD_{it} \cdot GROWTH_{it} \cdot ES_{it}) + \beta_3(GOOD_{it} \cdot INCR_{it} \cdot ES_{it}) \\ &+ \beta_4(BAD_{it} \cdot ES_{it}) + \beta_5(BAD_{it} \cdot GROWTH_{it} \cdot ES_{it}) + \beta_6(BAD_{it} \cdot INCR_{it} \cdot ES_{it}) + \varepsilon_{it} \end{aligned} \quad (7)$$

$$
\begin{aligned}
CSAR_{it} = \alpha &+ \beta_1(GOOD_{it} \cdot ES_{it}) + \beta_2(GOOD_{it} \cdot GROWTH_{it} \cdot ES_{it}) + \beta_3(GOOD_{it} \cdot INCR_{it} \cdot ES_{it}) \\
&+ \beta_4(GOOD_{it} \cdot GROWTHINCR_{it} \cdot ES_{it}) + \beta_5(BAD_{it} \cdot ES_{it}) \\
&+ \beta_6(BAD_{it} \cdot GROWTH_{it} \cdot ES_{it}) + \beta_7(BAD_{it} \cdot INCR_{it} \cdot ES_{it}) + \beta_8(BAD_{it} \\
&\cdot GROWTHINCR_{it} \cdot ES_{it}) + \varepsilon_{it}
\end{aligned} \tag{8}
$$

Where:

$CSAR_{it}$	=	Cumulative size-adjusted return measured during the postret event window for firm *i* for the current period.
ES_{it}	=	Earnings surprise for firm *i* for the current period, computed by subtracting the median consensus of analyst forecasts from the actual earnings, deflated by the close price at the last day of the quarter.
$GOOD_{it}$	=	Positive earnings surprise dummy that equals 1 if actual earnings exceed forecasts.
BAD_{it}	=	Negative earnings surprise dummy that equals 1 if actual earnings fall short of forecasts.
$GROWTH_{it}$	=	Growth dummy that equals 1 if the stock falls in BM decile 1 to 5.
$INCR_{it}$	=	Dummy that equals 1 if discretionary accruals are positive (indicating income increasing earnings management).
$GROWTHINCR_{it}$	=	Growth interaction with income increasing earnings management dummy that equals 1 growth stocks have positive discretionary accruals.

Both regression (7) and (8) use the cumulative size-adjusted returns during the postret interval. The long instead of the short interval is chosen to include the effect of preannouncements. Regression (7) includes a dummy $GOOD_{it}$ that is used in an interaction term with ES_{it} to control for the magnitude of the earnings surprise and to allow for asymmetric reaction to positive and negative earnings surprises. In regression (7), the expected sign of β_1 is positive, because positive earnings surprises result in positive abnormal returns. The expected sign for β_2 is ambiguous. On one hand, positive earnings surprises confirm the positive expectations investors have for growth stocks. On the other hand, value stocks might exhibit a more positive reaction, because investors are more surprised by positive earnings for value stocks. The expected sign for β_3 is also ambiguous, because DeFond and Park (2001) prove that investors anticipate the reversing nature of discretionary accruals to some extent but it remains an open question whether this is sufficient to offset the income increasing effect of positive discretionary accruals. Bad news brings along negative cumulative size-adjusted returns and therefore β_4 is expected to be positive. Since this effect is expected to be even more pronounced for growth stocks and stocks that conduct income increasing earnings management, β_5 and β_6 also have a predicted positive sign. The effect is hypothesized to be more pronounced for growth stocks and stocks that conduct income increasing earnings management, because at negative earnings announcements investors learn that the past growth and past discretionary accruals are not persistent.

To investigate whether the earnings responses to both anomalous portfolios are separate effects or whether one or both earnings responses are subsumed by the joint effect, regression (8) is estimated. Compared to regression (7), two interaction terms that estimate the earnings response of growth stocks with positive discretionary accruals. Of interest for answering hypothesis 4, are the changes in coefficients β_2, β_3, β_6 and β_7 (compared to β_2, β_3, β_5 and β_6 in regression (7)) and the values of the added coefficients β_4 and β_8. If the earnings response of growth stocks to positive earnings surprises is subsumed by the earnings response of growth stocks that conduct income increasing earnings management, it is expected that β_2 renders insignificant in regression (8) and β_4 has a significantly positive value. This reasoning also holds for negative earnings surprises. Hypothesis 4 cannot be rejected if coefficient β_6 renders insignificant in regression (8) and β_8 has a significant positive value. It would indicate that the negative earnings response of growth stocks to negative earnings surprises is actually explained by the discretionary accruals component in growth stocks. The same regressions allow investigating whether the earnings response to stocks that conduct income increasing earnings management is actually concentrated in growth stocks. If the earnings response of stocks that conduct income increasing earnings management to positive (negative) earnings surprises is subsumed by the earnings response of growth stocks, it is expected that β_3 (β_6) renders insignificant in regression (8) and β_4 (β_8) has a significantly positive value.

4.4 Hedge-portfolio test

So far, the methodolgy focuses on the explanation of the return differential for both anomalies around earnings announcements. In this section hypothesis 5 is tested by investigating whether abnormal returns can be gained from combining the trading strategies using hedge portfolio tests.

4.4.1 Cell-based approach hedge test

Following Collins and Hribar (2000) and Desai et al. (2004) the hedge portfolio test is used, which essentially tests bivariate joint strategies. As described in section 3.1 and 3.2, hedge portfolios are formed by taking a short position in firms in extreme decile rankings and a corresponding long position is the other extreme for either MB ratio or discretionary accruals. To implement the biarivate joint strategy, the stocks are sorted independently into quintiles[13] based on growth characteristics and earnings management characteristics. Specifically, a long position is taken in value stocks (highest BM quintile) and a corresponding short position in growth stocks (lowest BM quintile). For the discretionary accruals, a long position is taken in the quintile with the lowest discretionary accruals (quintile 1) and a corresponding short position in the quintile with the highest discretionary accruals (quintile 5).

[13] Classifying stocks into deciles would divide the sample into 100 portfolios and thereby reduce the number of firms in each portfolio significantly. Using quintiles is consistent with the approach used in other studies in finance and accounting (e.g. Collins and Hribar, 2000; Desai et al., 2004).

Since this study focuses on the return behavior of both anomalies around earnings announcements, the hedge test also focuses on earnings announcements. That is, the hedge test investigates whether it is profitable to invest in the joint strategy during the four quarterly earnings announcements following portfolio formation. It means that the investment start each quarter the day before the earnings announcement and is sold the day after the earnings announcement. Therefore, the investment is only held on 12 trading days each year. If the anomalies represent the same mispricing phenomenon around earnings announcements, it is expected that the abnormal returns form the joint strategy are not higher than the returns gained from the individual strategies. In that case, hypothesis 5 cannot be rejected. If, however, the mispricing patterns do not reflect the same underlying mechanism, the joint strategy yields higher abnormal returns than the individual strategies.

4.4.2 Regression approach hedge test

Finally, a regression approach based on (Desai et al., 2004) is used complementary to the cell-based hedge portfolio analysis. A cross-sectional regression of abnormal returns on BM and discretionary accruals ranking is run for each of the 16 years in the sample:

$$CSAR_{it} = \alpha + \beta_1 \, Decile \; BM_{it} + \; \beta_2 \, Decile \; EM_{it} + \varepsilon \tag{9}$$

Using OLS, this regression imposes a linear structure on the relation between the abnormal returns and the firm characteristics. Although, there is no evidence that this is a truly linear relation, assuming linearity simplifies the interpretation of the results. $CSAR_{it}$ is defined as in regression (7) and (8). The deciles are not numbered 1-10, but 0-9 instead. Subsequently, each decile is divided by 9 so that the decile rankings range between 0 and 1. $Decile \; BM_{it}$ is the decile based on value-growth characteristics and $Decile \; EM_{it}$ the decile based on earnings management (EM) characteristics. Cross-sectional OLS regressions of cumulative size-adjusted returns on the days surrounding the subsequent four earnings announcement on BM decile and discretionary accruals decile ranking are run for each of the 16 years in the sample. The coefficients on the rankings can be interpreted as abnormal returns to zero-investment strategy based on the respective firm characteristic.

5 Results

This section begins by reporting descriptive evidence on the first two hypotheses after which more formal statistical tests of hypotheses three to five are reported using regression analysis and the hedge portfolio test.

5.1 Results earnings surprises event study

Table 3 provides descriptive evidence on the relation between the value-growth anomaly and earnings surprises. This table divides each decile into three categories based on the sign of the earnings surprise. The cells report the mean abnormal return around earnings announcements measured during the interval starting 12 days before the end of the fiscal quarter and ending the day after the announcement of earnings. The abnormal returns are cumulated over the four announcement periods following portfolio formation. The cells report the *t*-statistic in parentheses and number of observations that fall into that cell. The rightmost column and the bottom row report the averages across growth porfolios and earnings surprises.

The columns show clear evidence of the value-growth anomaly. For the negative (positive) earnings suprises the mean abnormal return increases from -8.34% (5.27%) to 1.44% (16.04%). The bottom row presents the return differential between positive and negative earnings surprises. The average abnormal return for firms with negative surprises is -2.46%, while the average return for firms reporting positive surprises is 6.66%. The average abnormal return around zero earnings surprises is as expected not significantly different from zero.

Table 3 provides descriptive evidence for hypothesis 1a. The abnormal returns of negative earnings surprises show a systematic trend as a function of growth. This trend is less clear for positive earnings surprises. Following the behavioral explanation of the value-growth anomaly, it is expected that investors overreact to negative earnings surprises of growth stocks, while the reaction to positive earnings surprise is ambiguous. This is confirmed by the results in Table 3. As expected, the return reaction to zero earnings surprises are not significantly different from zero, except for decile 2. The rightmost column provides preliminary evidence that the value-growth anomaly is centered around earnings surprises. Stocks in the growth decile have an average reaction of 0.81% to earnings announcements, but this reaction is not significantly different from zero. Stocks in the value decile have an average reaction of 9.22%. This pattern predicts that predictable lower returns for growth firms are realized around earnings surprises. This is the topic of the next section.

Table 3 Size-adjusted returns BM deciles around earnings announcements using long event window

	Earnings surprise portfolio			
	Negative	Zero	Positive	All
1	-8.34%	-2.00%	5.27%	0.81%
(Growth)	(-5.71)	(-1.45)	(5.73)	(1.00)
	1,259	694	2,708	4,661
2	-4.96%	-3.37%	1.00%	-1.99%
	(-2.80)	(-2.71)	(0.49)	(-1.00)
	1,283	659	2,931	4,873
3	-5.11%	-0.21%	4.71%	1.19%
	(-4.68)	(-0.15)	(3.40)	(1.03)
	1,265	569	3,046	4,880
4	-2.89%	1.37%	6.39%	2.90%
	(-2.41)	(0.95)	(6.28)	(3.40)
	1,435	547	2,942	4,924
5	-3.10%	-0.84%	5.68%	2.53%
	(-2.81)	(-0.53)	(6.67)	(3.14)
	1,522	489	2.826	4,837
6	-0.25%	-1.93%	5.56%	3.13%
	(-0.21)	(-1.31)	(9.86)	(5.02)
	1,598	428	2,905	4,931
7	-1.81%	1.64%	7.08%	3.65%
	(-1.69)	(0.81)	(7.12)	(4.35)
	1,695	369	2,785	4,849
8	0.13%	2.63%	6.21%	4.01%
	(0.10)	(1.68)	(5.11)	(3.49)
	1,713	419	2,695	4,827
9	0.12%	0.47%	8.96%	5.48%
	(0.08)	(0.21)	(7.34)	(4.21)
	1,814	373	2,512	4,699
10	1.44%	6.51%	16.04%	9.22%
(Value)	(0.72)	(1.85)	(7.56)	(4.86)
	1,775	335	2,075	4,185
All	-2.46%	0.13%	6.66%	3.09%
	(-5.26)	(0.22)	(15.06)	(7.67)
	15,359	4882	27,425	47,666

The table presents the mean size-adjusted stock returns over the subsequent four quarters for portfolios of stocks formed on growth and the sign (positive, negative or zero) of the quarterly earnings surprise. Growth is measured using the BM ratio. Stock returns are cumulated over the period beginning twelve days before the end of the fiscal quarter and ending the day following the earnings announcement. Each cell reports the mean abnormal portfolio stock return, the *t*-statistic in parentheses and the number of observations in the portfolio.

To investigate the robustness of the results, the results are replicated for an event window with a more conventional length of three days that starts the day before the earnings announcement and ends the day after the announcement. The results are reported in Table A4 in the Appendix and are qualitatively similar to the results reported in Table 3. It should be noted however, that the returns are somewhat smaller in magnitude for the shorter interval. This is not surprising, because the event window only has three trading days instead of 38 (average of long event window). Whereas Skinner and Sloan (2002) argue that the reaction to negative earnings surprises is only captured by a longer event window due to preannouncements of negative earnings, here the short event window also shows a clear trend in abnormal returns as a function of growth. This trend is more apparent for negative earnings surprises in the short event window than for positive earnings surprises.

To further check the robustness of the results reported in Table 3, it is examined whether the results are robust to a different method of calculating abnormal returns. Instead of size-adjusted returns, the abnormal returns are computed according to the CAPM.[14] It means the following regression is used for the event study:

$$R_{it} = R_f + \alpha_i + \beta_i(R_m - R_f) + \sum_{k=x}^{y} c_{i,t+k} D_{i,k} + \varepsilon_{i,t} \qquad (10)$$

Where R_m is the market return and R_f the risk free rate. The market model uses an estimation period of 250 trading days to avoid seasonality. Table A5 reports the abnormal returns for the long event window. The results are qualitatively similar to the results for the size-adjusted returns. Although the market model seems to make a slightly different adjustment during the long event window than the size adjustment does, it does not change the conclusion that returns to earnings surprises reveal a systematic trend as a function of growth that is most apparent in negative earnings surprises.

Before further investigating whether the returns are centered around earnings announcements, the event study results for the earnings management deciles are reported to get descriptive results for hypothesis 2. Table 4 provides descriptive evidence for hypothysis 2a. The abnormal returns of earnings surprises do not show as monotonically a trend as a function of discretionary accruals as shown in Table 3 for growth deciles. This is in line with the finding of Xie (2001) for returns of portfolios based on discretionary accruals for the year following portfolio formation. Although the relationship does not seem to be monotone, the extreme deciles do show a return differential in line with the overpricing of discretionary accruals. As expected, the return reactions to earnings announcements that do not contain a surprise, are not significantly different from zero, except for the decile 8. The predicted overreaction is only found for negative earnings surprises implying that hypothesis 2a cannot be rejected. The rightmost column provides preliminary evidence that the overpricing of discretionary accruals is centered around earnings surprises. Stocks in the highest discretionary accruals decile have an average reaction of 0.74% to earnings announcements, but this reaction is not significantly different from zero. Stocks in the lowest discretionary accruals decile have an average reaction of 4.62%. This pattern shows that predictable lower returns for firms that conduct

[14] It is explicitly avoided making adjustments for the BM effect, because that is one of the effects under investigation.

earnings management are realized around earnings surprises. The magnitude of the return differential around earnings surprises between the extreme deciles for value-growth stocks (8.41%) is larger than the return differential between the extreme deciles based on discretionary accruals (3.88%). This indicates that although there might be a relation between the anomalies, it is unlikely that they entirely capture the same phenomenon.

Table 4 Size-adjusted returns earnings management deciles around earnings announcements using long event window

	Earnings surprise portfolio			
	Negative	Zero	Positive	All
1	-1.03%	2.36%	8.47%	4.62%
(Income	(0.76)	(1.26)	(6.36)	(4.05)
decreasing)	1,529	416	2,589	4,534
2	-2.12%	-0.71%	6.64%	2.78%
	(-1.70)	(-0.47)	(5.26)	(2.29)
	1,514	510	2,715	4,739
3	-1.91%	0.74%	5.03%	1.78%
	(-1.37)	(0.52)	(2.73)	(0.99)
	1,465	470	2,837	4,772
4	-1.62%	-0.50%	6.52%	3.20%
	(-1.68)	(-0.36)	(9.73)	(4.96)
	1,509	488	2,870	4,867
5	-1.06%	1.85%	6.93%	4.00%
	(-0.93)	(0.94)	(6.19)	(3.75)
	1,569	495	2,799	4,863
6	-0.72%	-0.30%	5.52%	2.78%
	(-0.80)	(-0.21)	(6.90)	(4.63)
	1,535	539	2,825	4,898
7	-0.67%	-2.27%	5.50%	3.01%
	(0.52)	(1.38)	(7.60)	(3.28)
	1,647	518	2,776	4,941
8	-2.23%	-3.75%	6.43%	2.86%
	(-2.00)	(-3.11)	(8.59)	(3.80)
	1,531	497	2,823	4,851
9	-1.41%	0.71%	7.53%	3.92%
	(-0.66)	(0.41)	(5.85)	(3.18)
	1,494	510	2,707	4,711
10	-6.63%	-1.89%	6.04%	0.74%
(Income	(-3.85)	(-1.06)	(5.59)	(0.78)
increasing)	1,566	440	2,484	4,490
All	-1.93%	-0.38%	6.46%	2.97%
	(-4.43)	(0.74)	(17.88)	(8.61)
	15,359	4,882	27,425	47,666

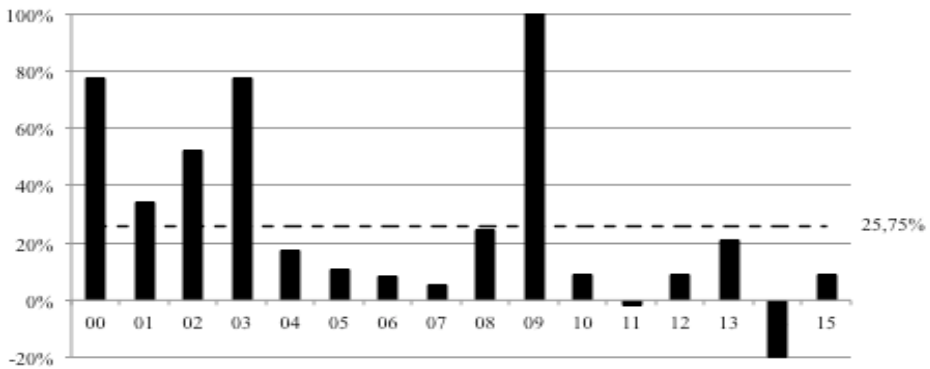
The table presents the mean size-adjusted stock returns over the subsequent four quarters for portfolios of stocks formed on earnings management and the sign (positive, negative or zero) of the quarterly earnings surprise. Earnings management is measured using the discretionary accruals obtained from the cross-sectional modified Jones model. Stock returns are cumulated over the period beginning twelve days before the end of the fiscal quarter and ending the day following the earnings announcement. Each cell reports the mean abnormal portfolio stock return, the *t*-statistic in parentheses and the number of observations in the portfolio.

Again, in Table A6 in the Appendix it is proven that the results in Table 4 are robust to changing the event window to an event window starting the day before the earnings announcement and ending the day after. As for the results reported in Table 3, the magnitude of the abnormal returns declines as the event window declines. Untabulated results show that the results in Table 4 are also robust to using abnormal returns computed by the CAPM.

Figure 1a and 2a present evidence on the abnormal returns of the trading strategies. The figures plot the average annual hedge portfolio return for the 16 fiscal years in the sample. The returns used to calculate the hedge portfolio returns are size-adjusted returns in the first year after portfolio formation. The average of the 16 yearly returns to the hedge portfolio based on BM deciles is reported in Figure 1a and equals 25.75% which corresponds to the sixth row of the hedge column of Table 2 Panel A. The fact that the hedge portfolio return is positive for 14 out of the 16 sample years illustrates that the relation is fairly stable. The average hedge portfolio return based on earnings management deciles is reported in Figure 2a and corresponds to the 7.14% reported in Table 2 Panel B. The hedge portfolio return to a strategy based on earnings management seems less stable than the strategy based on value-growth stocks. In 3 out of the 16 sample years the hedge portfolio return to an earnings management strategy is negative. The negative return in 2014 is neglible, but the other two negative returns more substantive. Overall, it can be concluded that both strategies deliver fairly stable positive returns. Since there is no sustained negative effect of implementing the strategies over an extended period, the results in Figure 1a and 2a suggest that unidentified risk factors are unlikely to explain the abnormal returns.

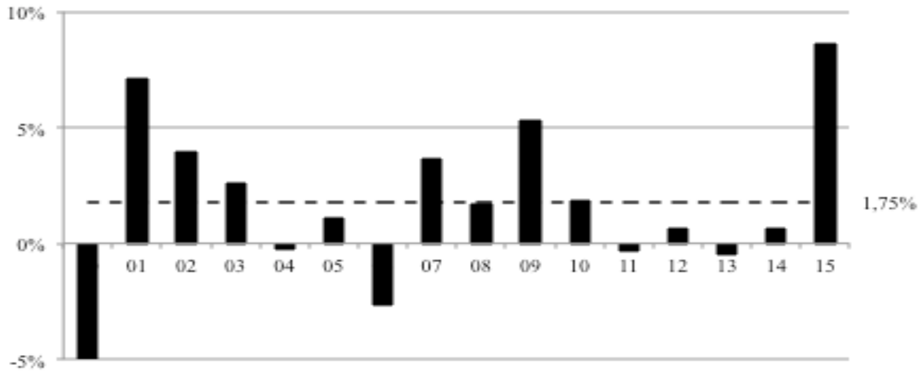
To investigate whether the return differentials for both strategies are centered around earnings suprises (hypotheses 1b and 2b), Figure 1b and 2b show the hedge portfolio returns to both strategies around earnings announcements using an event window starting the day prior to the earnings announcement and ending the day thereafter. The average return to the BM (earnings management) strategy around earnings announcements is 1.75% (1.09%). It means that in only 12 trading days (4.76% of all trading days) 6.81% (15.32%) of the total return is explained. Although during the majority of sample years positive returns are reported around earnings announcements, both trading strategies report 5 years of negative earnings responses. An explanation could be that the preannouncement of negative earnings is not included in the short event window, while the results in Tables 3 and 4 indicate that the return differentials are most pronounced around negative earnings surprises. Untabulated results show that when using the event window that captures preannouncements, only 3 (2) hedge portfolio returns are negative for the BM (earnings management) strategy around earnings announcements. However, this event window does not allow for investigation of clustering, since it contains about half of all tradings days. Table A7 Panel A and B in the Appendix report the announcement period return and total period return for BM deciles and earnings management deciles respectively.

Figure 1a BM yearly hedge portfolio returns



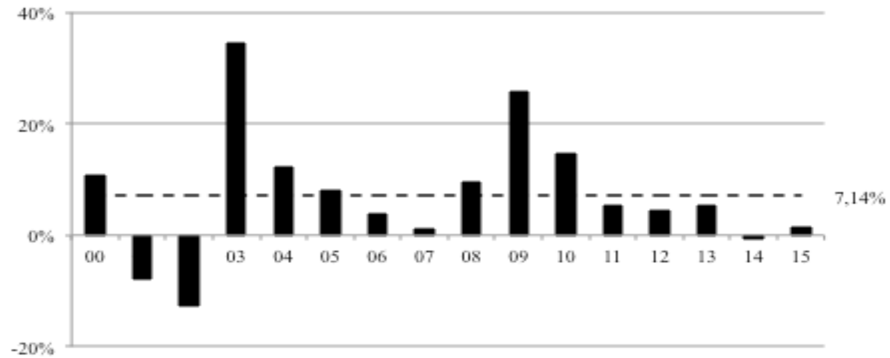
This figure shows the returns by calendar year to a hedge portfolio taking a long position in value stocks (BM decile 10) and a short position in growth stocks (BM decile 1) using size-adjusted returns. The dashed line provides the average yearly hedge portfolio return over the years 2000-2015.

Figure 1b BM hedge portfolio returns around earnings announcements [-1;+1]



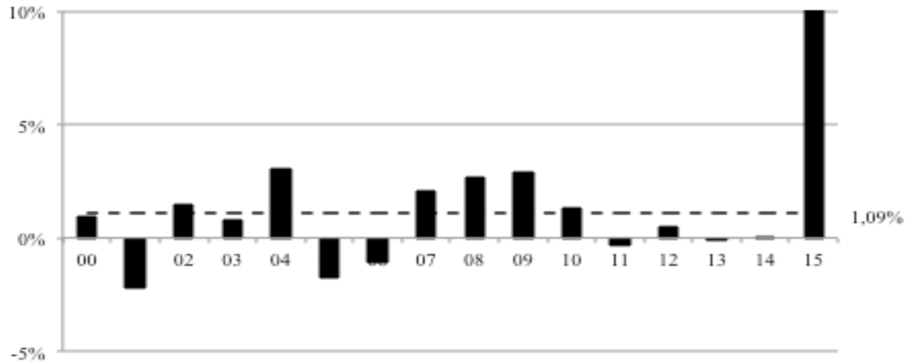
This figure shows the announcement period returns by calendar year to a hedge portfolio taking a long position in value stocks (BM decile 10) and a short position in growth stocks (BM decile 1) using size-adjusted returns. First, the returns are cumulated over the event window starting the day prior to the earnings announcement and ending the day after the announcement. Then the abnormal returns over the subsequent four quarterly earnings announcements are accumulated. The dashed line provides the average hedge portfolio return around earnings announcements over the years 2000-2015.

Figure 2a Earnings management yearly hedge portfolio returns



This figure shows the returns by calendar year to a hedge portfolio taking a long position in stocks with low discretionary accruals (earnings management decile 1) and a short position in stocks with high discretionary accruals (earnings management decile 10) using size-adjusted returns. The dashed line provides the average yearly hedge portfolio return over the years 2000-2015.

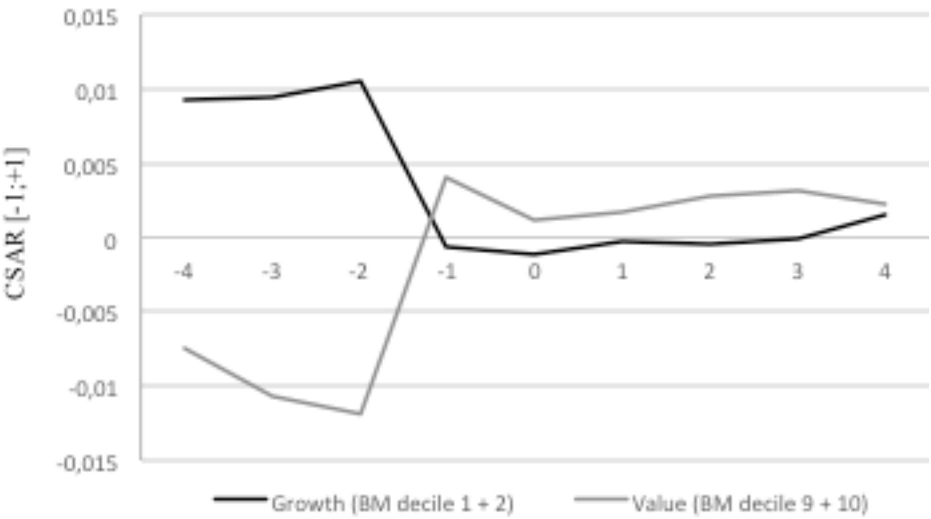
Figure 2b Earnings management hedge portfolio returns around earnings announcements [-1;+1]



This figure shows the announcement period returns by calendar year to a hedge portfolio taking a long position in stocks with low discretionary accruals (earnings management decile 1) and a short position in stocks with high discretionary accruals (earnings management decile 10) using size-adjusted returns. First, the returns are cumulated over the event window starting the day prior to the earnings announcement and ending the day after the announcement. Then the abnormal returns over the subsequent four quarterly earnings announcements are accumulated. The dashed line provides the average hedge portfolio retrun around earnings announcements over the years 2000-2015.

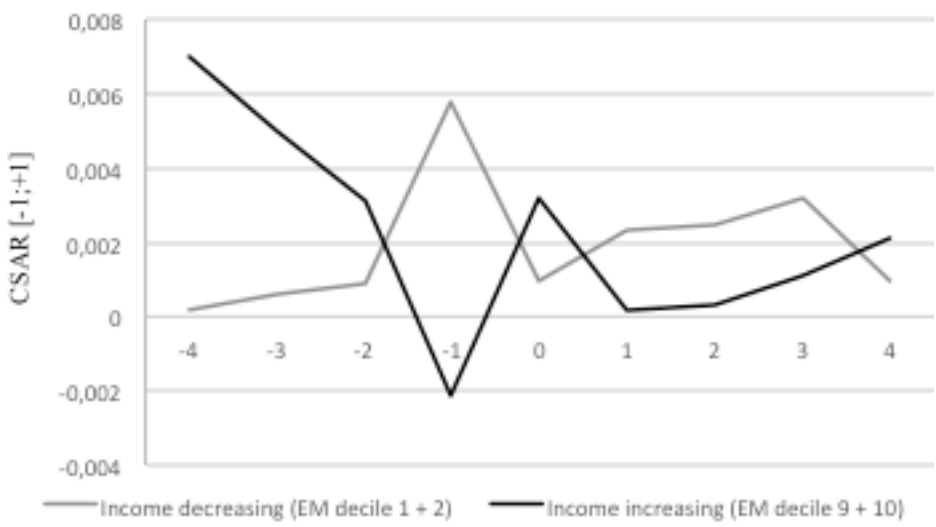
Finally, Figure 3a and 3b shed light on the reversal pattern that both anomalies are expected to reveal. Both anomalies are expected to be in favor with the market prior to portfolio formation. Since growth characteristics and income increasing earnings management both have shown not to be persistent, prices will fall to earth around subsequent earnings announcements after portfolio formation. Figure 3a shows the cumulative size-adjusted returns (CSAR) on the days surrounding earnings announcements for value and growth stocks. The value stocks are the stocks having a BM ratio falling into the upper quintile and the growth stocks are the stocks with BM ratios in the lower quintile. The figure shows that up to the quarter before portfolio formation (portfolio formation = 0), growth stocks exhibit higher CSAR on the days surrounding earnings announcements. From the quarter prior to portfolio formation onwards, the CSAR of growth stocks are lower than those of value stocks until a year after portfolio formation when the effect seems to fade away. It clearly shows the expected reversal pattern. For stocks sorted along the earnings management range, a similar pattern is shown in Figure 3b. However, at time 0 the income increasing earnings management stocks exhibit a higher earnings response than stocks conducting income decreasing earnings management. The fact that both reversals already start the quarter before portfolio formation might be explained by the fact that portfolios are formed based on lagged values of BM ratio and discretionary accruals.

Figure 3a **Time series evolution of Cumulative Size-Adjusted Return (CSAR) around earnings announcements [-1;+1] for value and growth stocks**



This figure shows the 2-year time series evolution of the Cumulative Size-Adjusted Return (CSAR) on the days surrounding earnings management. The sample consists of 12,454 growth stocks and 12,398 value stocks. The x-axis shows the quarter *i* relative to the quarter of portfolio formation at time 0. The portfolio formation quarters range from 2000Q1 to 2015Q4. The y-axis shows the CSAR starting the day before earnings announcement and ending the day thereafter.

Figure 3b **Times series evolution of Cumulative Size-Adjusted Return (CSAR) around earnings announcements [-1;+1] for stocks that conduct income increasing and stocks that conduct income decreasing earnings management**



This figure shows the 2-year time series evolution of the Cumulative Size-Adjusted Return (CSAR) on the days surrounding earnings management. The sample consists of 12,454 income decreasing earnings management stocks and 12,399 income increasing earnings management stocks. The x-axis shows the quarter *i* relative to the quarter of portfolio formation at time 0. The portfolio formation quarters range from 2000Q1 to 2015Q4. The y-axis shows the CSAR starting the day before earnings announcement and ending the day thereafter.

Overall, the first part of the analysis confirms that both anomalies experience a disproportional part of their return differential around the four earnings announcement after portfolio formation. It should be noted that the hedge portfolios formed in this section do not represent zero net investment portfolios, because fiscal year ends and earnings announcement dates for the extreme portfolios do not necessarily match. So far, the evidence has been mainly descriptive and does not allow conclusion on the overlap of both anomalies. The next sections use regression analyses to investigate how the return differentials around earnings announcements of both anomalies relate to each other.

5.2 Regression results earnings management among growth firms

This section presents the results for the hypothesis that growth stocks are more likely to conduct income increasing earnings management. Table 5 and Table 6 show the univariate statistics of key variables and regression result for regression (6). The sample includes 24,706 firm quarter observations with 12,424 growth firm observations and 12,282 value firm observations. The first row of Table 5 shows that the discretionary accruals for growth stocks are positive while the discretionary accruals for value stocks are negative on average. Growth stocks also have larger discretionary accruals than value stocks based on absolute levels as can be seen in the second row. It provides preliminary evidence that growth stocks are more likely to conduct earnings management, which is income increasing on average. Similar to Madhogarhia et al. (2009), the data show that growth stocks, which are in favor with the market, have higher analyst coverage and higher return on assets than value stocks. In contrast to their findings, here growth firms are larger than value firms on average.

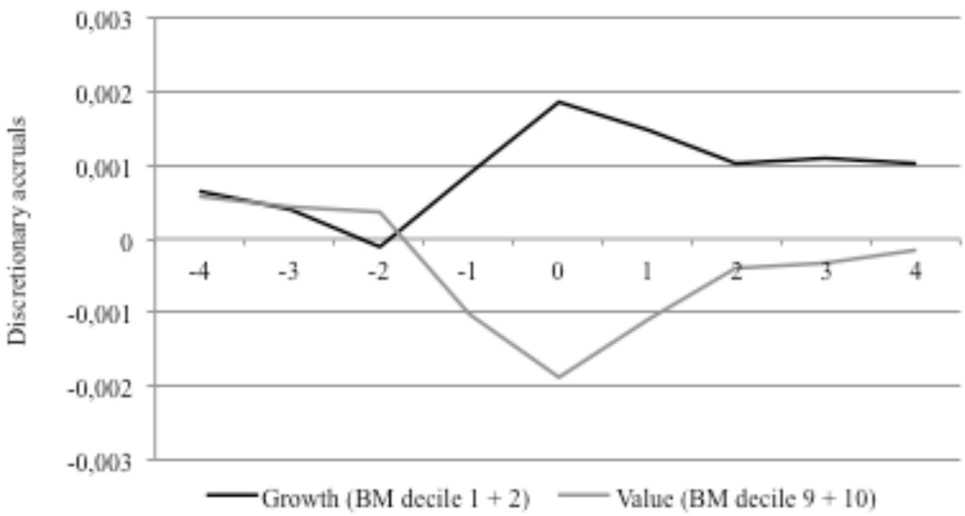
Table 5 Descriptive and univariate statistics of key variables of regression (6)

	Mean		Observations		*t*-test for differece
	Growth	Value	Growth	Value	Growth-value
DA	0.002	-0.002	12,424	12,282	4.39
ABSDAA	0.034	0.026	12,424	12,282	10.38
LSIZE	7.730	6.105	11,135	11,197	21.78
ANALYST	10.375	5.921	12,424	12,282	24.90
ROA	0.006	-0.015	12,424	12,282	6.59
D/E	0.397	0.631	12,397	12,296	-0.88

This table shows the means for value and growth stocks for the key variables used in regression (6). The sample includes 24,706 firm quarter observations of which 12,424 are growth firm observations and 12,282 are value firm observations. The variables are as specified in regression (6).

Figure 4 provides further preliminary evidence that growth stocks are more likely to conduct income increasing earnings management. The figure shows that growth stocks increase their discretionary accruals prior to the moment of portfolio formation and decrease those afterwards. The figure shows that discretionary accruals are not persistent and that growth stocks conduct income increasing earnings management prior and at portfolio formation.

Figure 4 Time series evolution of discretionary accruals for growth and value stocks



This figure shows the 2-year time series evolution of discretionary accruals for growth and value stocks. The sample consists of 12,424 growth stocks and 12,282 value stocks. The x-axis shows the quarter *i* relative to the quarter of portfolio formation at time 0. The portfolio formation quarters range from 2000Q1 to 2015Q4. The y-axis shows the value of discretionary accruals calculated by the cross-sectional modified Jones model as described in section 3.2.

Table 6 shows the results of equation (6), which tests for differences in earnings management and the direction of earnings management for the growth-value sample. As expected, across all models growth has a significant positive effect on the absolute value of discretionary accruals, even after controlling for firm-specific characteristics and firm- and year-fixed effects. The positive coefficient for the growth dummy indicates that growth firms are more likely to conduct earnings management than value firms. Also, as shown by the positive coefficient for the interaction variable between the growth dummy and the dummy for income increasing discretionary accruals, growth firms are more likely to conduct income increasing earnings management than value firms. This coefficient, however, is insignificant. For the models including firm- and year- fixed effects the effect disappears entirely. As shown in Table A8 in the Appendix, the coefficient is significantly positive when the whole sample is used and firms are classified as growth firms when they belong to the lower half of the BM range and as value firms when they belong to the upper half of the BM range. Again, the effect disappears as soon as firm-fixed effects are included. The other results in Table A8 are qualitatively similar to those found in Table 6.

Table 6 presents a positive coefficient for firm size, which indicates that larger firms are more likely to conduct earnings management. Since the growth firms in this sample are larger than the value firms as shown in Table 5, it supports the hypothesis that growth firms are more likely to conduct earnings management. In line with the finding of Madhogarhia et al. (2009), Table 6 shows a negative coefficient for the analyst coverage. Whereas McNichols (2000) finds a positive effect of return on assets on discretionary accruals, Table 6 shows a negative effect of return on assets on the absolute value of discretionary accruals. It is expected that return on assets increases the level of discretionary accruals, but not the absolute value of discretionary accruals. Therefore, the positive coefficient for the interaction term with return on assets and the dummy for positive discretionary accruals is a finding consistent with the positive coefficient found by (McNichols, 2000). The debt-to-equity ratio does not play a significant role in the regression results of Madhogarhia et al. (2009). In the regression results presented in specification 7 in Table 6, it is shown that firms with higher debt-to-equity ratios do have a statistically significant negative effect on earnings management. This is inconsistent with Sweeney's (1994) finding that firms with high debt-to-equity ratios are more likely to conduct earnings management. The coefficient found here is economically negligible and renders insignificant as soons as firm-fixed effects are included in the regression specification.

Table 6 Regressions results value and growth firms differences in earnings management

Dependent variable: ABSDA									
	1	2	3	4	5	6	7	8	9
GROWTH	0.0336*	0.0328*	0.0096*	0.0112*	0.0115*	0.0116*	0.0116*	0.0078*	0.0075*
	(61.69)	(43.41)	(9.61)	(11.02)	(11.12)	(11.07)	(11.04)	(3.75)	(3.53)
GROWTH*		0.0017	0.0018	0.0014	0.0016	0.0013	0.0013	-0.0008	-0.0009
INCINC		(1.53)	(1.56)	(1.17)	(1.42)	(1.15)	(1.16)	(-0.74)	(-0.77)
LSIZE			0.0028*	0.0043*	0.0043*	0.0043*	0.0043*	-0.0009	-0.0010
			(55.44)	(62.34)	(60.39)	(60.09)	(60.05)	(-1.13)	(-1.09)
ANALYST				-0.0012*	-0.0012*	-0.0012*	-0.0012*	-0.0005*	-0.0004*
				(-25.33)	(24.76)	(-24.59)	(-24.55)	(-4.24)	(-3.29)
ROA					-0.0319*	-0.0377**	-0.0378**	-0.0062	-0.0060
					(-2.43)	(-2.07)	(-2.06)	(-1.27)	(-1.24)
ROA*INCINC						0.0309	0.0312	0.1145*	0.1146*
						(1.15)	(1.15)	(3.17)	(3.17)
D/E							-0.00001*	0.000001	0.000001
							(-4.47)	(0.71)	(0.63)
Year dummy	No	No	No	No	No	No	No	No	Yes
Firm dummy	No	No	No	No	No	No	No	Yes	Yes
Number of obs.	24,706	24,706	22,332	22,332	22,332	22,332	22,298	22,298	22,298
Adjusted R^2	0.170	0.170	0.217	0.232	0.235	0.236	0.247	0.404	0.405

This table shows the regression results for regression (6): $ABSDA = \beta_1\ GROWTH + \beta_2\ GROWTH \cdot INCINC + \beta_3\ LSIZE + \beta_4\ ANALYST + \beta_5\ ROA + \beta_6\ ROA \cdot INCINC + \beta_7\ \frac{D}{E} + \varepsilon$.

Where:

$ABSDA$	=	Absolute value of discretionary accruals, which estimates are obtained from the Jones model described in section 3.2.
$GROWTH$	=	Dummy variable to indicate growth stocks, where 1=growth firms and 0=value firms. Firms in BM decile 1 and 2 are classified as growth firms and firms in BM decile 9 and 10 are classified as value firms.
$INCINC$	=	Dummy variable for income increasing earnings management, where the variable equals 1 if discretionary accruals are positive and 0 if discretionary accruals are negative.
$LSIZE$	=	Natural logarithm of the market value of equity for quarter *t-1*.
$ANALYST$	=	Number of analysts that estimate earnings for quarter *t*.
ROA	=	Return on assets measured as net income (Compustat item 69) divided by total assets.
$\frac{D}{E}$	=	Debt-to-equity ratio measured as long-term debt (Compustat item 51) divided by total assets minus long-term debt.

The sample consists of 24,706 firm quarter observations of which 12,424 are growth firm observations and 12,282 are value firm observations. The t-statistics are corrected for heteroscedasticity using White's consistent estimator for standard errors. * and ** denote significance levels at the 1 and 5% level respectively.

Since Table 6 shows significant positive coefficients for the growth dummy after controlling for firm-specific characteristics, the results presented in this section support the hypothesis that growth firms are more likely to conduct earnings management than value firms. Moreover, the positive coefficient of the interaction term of growth with positive discretionary accruals indicates that growth stocks are more likely to conduct income increasing earnings management after controlling firm-specific characteristics. This effect disappears when firm- and year-fixed effects are included. The coefficient in the interaction term is only significant when all firms are included in the sample. Overall, the results presented in this section support hypothesis 3 that growth firms are more likely to conduct income increasing earnings management than value firms.

5.3 Regression results abnormal returns around earnings surprises

This section presents the results for the fourth hypothesis that the negative reaction to negative earnings surprises for growth stocks can be explained by income increasing earnings management. Table 7 presents univariate statistics for key variables of regressions (7) and (8). Panel A, B and C of Table 7 include the descriptive statistics for positive, negative and zero earnings surprises respectively. The observations are partitioned on growth characteristics and sign of earnings management. Panel A of Table 7 shows that the cumulative size-adjusted abnormal return (CSAR) during the long event window to positive earnings surprises is, as expected, positive and amount 3.70%. The CSAR is least positive for growth stocks that conduct income increasing earnings management (2.84%) and most positive for value stocks that conduct income decreasing earnings management (4.63%). This does not support the overreaction theory. The earnings surprises for value stocks are larger than for growth stocks on average, which might be due to lower expectations for value stocks. The last row indicates that growth stocks are most likely to be income increasing earnings management stocks. Moreover, growth stocks are more likely to report positive earnings surprises than value stocks. Panel B of Table 7 shows that the CSAR to negative earnings surprises is -4.01% on average. In line with the overreaction hypothesis, the return is most negative for growth stocks that conduct income increasing earnings management (-4.90%) and least negative for value stocks that conduct income decreasing earnings management (-3.31%). Value stocks are more likely to report negative earnings surprises, as shown in the last row. Overall, the sample contains more positive than negative earnings surprises. Panel C of Table 7 demonstrates that, as expected, the earnings reaction of growth as well as value stocks to zero earnings surprises is close to zero percent. As can be seen from the third row of Panel C, growth stocks are slightly more likely to report zero earnings surprises than value stocks. This might be due to the awareness of growth firms that their stocks are more negatively affected by a negative earnings surprise than value stocks. Therefore, growth firms have more incentives to avoid negative earnings surprises.

Table 7 Statistics of key variables for regressions (7) and (8) concerning abnormal returns around earnings surprises

Panel A: Positive earnings surprises

		Growth		Value	
	Total sample	Income-increasing	Income-decreasing	Income-increasing	Income-decreasing
CSAR	3.70%	2.84%	3.27%	4.23%	4.63%
Earnings surprise	0.004	0.003	0.003	0.006	0.006
Number of observations	34,066	9,311	8,518	8,406	7,831

Panel B: Negative earnings surprises

		Growth		Value	
	Total sample	Income-increasing	Income-decreasing	Income-increasing	Income-decreasing
CSAR	-4.01%	-4.90%	-4.33%	-3.78%	-3.31%
Earnings surprise	-0.009	-0.005	-0.007	-0.010	-0.013
Number of observations	20,401	4,469	4,401	5,705	5,826

Panel C: Zero earnings surprises

		Growth		Value	
	Total sample	Income-increasing	Income-decreasing	Income-increasing	Income-decreasing
CSAR	-0.01%	-0.02%	-0.01%	0.005%	0.004%
Earnings surprise	0	0	0	0	0
Number of observations	6,073	1,919	1,693	1,241	1,220

This table shows the distribution of cumulative size-adjusted returns and earnings surprises for the total sample of 60,540 firm-quarter observations. *CSAR* is the cumulative size-adjusted return for the long event window.

Table 8 presents the regression results of regressions (7) and (8). The first row shows that the unconditioned earnings response is 2.183. The coefficients in the second row of Panel A are in line with the predictions. The coefficients on the good news and bad news interactions terms (β_1 and β_3 respectively) are significantly positive both at the one percent level (one-tailed)[15]. Consistent with the findings of Basu (1977) and DeFond and Park (2001), the earnings responses are asymmetric with respect to the sign of the surprise. Positive earnings surprises are associated with higher subsequent abnormal returns than negative earnings surprises. The coefficient on the negative surprise growth partition is significantly positive as shown in the second row of Table 8. This is consistent with the hypothesis that growth stocks correct for their previously overoptimistic expectations around negative earnings surprises. The coefficient on the positive surprise growth partition is slightly negative, but only significant at the ten percent one tailed significance level. It is in line with the idea that the value-growth return differential is corrected around earnings surprises and mostly around negative earnings surprises. A possible explanation for the finding that value stocks have a more positive reaction to

[15] One-tailed significance levels are reported when the predictions are signed as in this section and two-tailed significance levels otherwise.

positive earnings surprises than growth stocks, might be that for value stocks a positive surprise is less in line with investors' expectations. The third confirms the predictions for stocks that conduct income increasing earnings management. Stocks with positive discretionary accruals have a earnings reaction indistinguishable form zero to positive earnings surprises. However, their earnings reaction to negative earnings surprises is significantly lower than the reaction of stocks having negative discretionary accruals. The fourth row shows that the earnings reactions of growth stocks and stocks having positive discretionary accruals are independent of each other. This holds for the positive as well as the negative earnings surprises. Including both variables in one regression does not substantially change the economic and statistical values of the coefficients. Most importantly, the fifth row of Table 8 shows that the earnings responses are not clustered in growth stocks with positive discretionary accruals, but rather substantive phenomena. This can be inferred, because the coefficients for growth stocks and stocks with positive discretionary accruals do not change economically or statistically when an interaction term with growth stocks and income increasing earnings management stocks is included. This last coefficients is insignificant.

To test the robustness of the results the regressions are also run for the CSAR during the short event-window. Table A9 in the Appendix shows that the results are qualitatively similar to the results presented in Table 8. This indicates that the results are not influenced by early announcements.

Overall, Table 8 suggests that the value-growth earnings reaction is not subsumed by the earnings reaction to stocks that conduct income increasing earnings management and is concentrated around negative earnings announcements. This does not support hypothesis 4 that expects that the value-growth earnings response differential is subsumed by the earnings response differential to stocks that conduct income increasing earnings management and those that do not. However, it does prove that the negative earnings response to negative earnings surprises for stocks that conduct income increasing earnings management is subsumed by the negative reaction of growth stocks around negative earnings surprises.

Table 8 Regression of cumulative size-adjusted returns around earnings announcements on growth-value and earnings management characteristics

	Intercept	ES	GOOD * ES	GOOD * GROWTH * ES	GOOD * INCR * ES	GOOD * GROWTH * INCR * ES	BAD * ES	BAD * GROWTH * ES	BAD * INCR * ES	BAD * GROWTH * INCR *ES	Adjusted R^2
			Positive earnings surprise				Negative earnings surprise				
Prediction		+	+	+/-	+/-	+/-	+	+	+	+	
Coefficient	0.008*	2.183*									0.026
	11.03	19.67									
Coefficient	0.0003		4.457*	-0.540***			1.130*	1.135*			0.034
	0.41		17.38	-1.35			7.36	3.74			
Coefficient	0.00001		4.387*		-0.135		1.229*		0.389***		0.033
	0.02		15.43		-0.35		6.93		1.49		
Coefficient	0.0004		4.522*	-0.539***	-0.126		0.995*	1.122*	0.358***		0.034
	0.47		14.49	-1.34	-0.32		5.18	3.70	1.37		
Coefficient	0.0004		4.483*	-0.404	-0.054	-0.247	0.967*	1.250*	0.431***	-0.314	0.034
	0.47		13.17	-0.70	-0.11	-0.31	4.77	3.14	1.45	-0.51	
N for dummy=1			34,066	17,829	17,717	9,311	20,401	8,870	10,227	4,469	

This table shows the estimation results of regression (7) and (8). The *t*-statistics are shown in parentheses. The sample consists of 60,540 firm-quarter observations.

$$CSAR_{it} = \alpha + \beta_1(GOOD_{it} \cdot ES_{it}) + \beta_2(GOOD_{it} \cdot GROWTH_{it} \cdot ES_{it}) + \beta_3(GOOD_{it} \cdot INCR_{it} \cdot ES_{it}) + \beta_4(BAD_{it} \cdot ES_{it}) + \beta_5(BAD_{it} \cdot GROWTH_{it} \cdot ES_{it}) + \beta_6(BAD_{it} \cdot INCR_{it} \cdot ES_{it}) + \varepsilon_{it} \quad (7)$$

$$CSAR_{it} = \alpha + \beta_1(GOOD_{it} \cdot ES_{it}) + \beta_2(GOOD_{it} \cdot GROWTH_{it} \cdot ES_{it}) + \beta_3(GOOD_{it} \cdot INCR_{it} \cdot ES_{it}) + \beta_4(GOOD_{it} \cdot GROWTHINCR_{it} \cdot ES_{it}) + \beta_5(BAD_{it} \cdot ES_{it}) + \beta_6(BAD_{it} \cdot GROWTH_{it} \cdot ES_{it}) + \beta_7(BAD_{it} \cdot INCR_{it} \cdot ES_{it}) + \beta_8(BAD_{it} \cdot GROWTHINCR_{it} \cdot ES_{it}) + \varepsilon_{it} \quad (8)$$

The variables in the regressions are defined as follows:

$CSAR_{it}$ = Cumulative size-adjusted abnormal return measured during the long event window for firm *i* for the current period.
ES_{it} = Earnings surprise for firm *i* for the current period, computed as the median consensus of analyst forecasts in the latest month deflated by the close price at the last day of the quarter.
$GOOD_{it}$ = Positive earnings surprise dummy that equals 1 if actual earnings exceed forecasts
BAD_{it} = Negative earnings surprise dummy that equals 1 if actual earnings fall short of forecasts.
$GROWTH_{it}$ = Growth dummy that equals 1 if the stock falls in BM decile 1 to 5.
$INCR_{it}$ = Dummy that equals 1 if discretionary accruals are positive (indicating income increasing earnings management).
$GROWTHINCR_{it}$ = Growth decile interaction with income increasing earnings management dummy that equals 1 if discretionary accruals are positive.
Newey-West HAC standard errors are used. * and *** denote significance levels at the 1 and 10% one-tailed level respectively

5.4 Results hedge portfolio test

This section presents the results for hypothesis 5 by investigating whether abnormal returns can be earned by using the hedge portfolio test. Two hedge portfolio tests are used: the cell-based and regression-based approach.

5.4.1 Results cell-based approach hedge test

Table 9 presents a contingency table of size-adjusted returns earned from portfolios that are double sorted on growth characteristics and discretionary accruals and invested in on the days surrounding the four quarterly earnings announcements following portfolio formation.[16] Each cell presents the average cumulative size-adjusted returns earned around the 12 trading days included in the investment period. The cells also contain the number of firm-quarters in each cell. The bold-type cells represent cells in which both strategies predict returns in the same directions and therefore would be used as long and short portfolios in the hedge portfolio strategy. To simplify the presentation, Table 9 combines quintiles 2-4 in one cell sorting the stocks essentially into three groups along each dimension. Table 9 allows for several insights into the excess returns on individual and joint strategies.

First, a joint strategy will be more profitable than the individual strategies outlined in section 5.1. The return around the four subsequent earnings announcements for the long position (*BM5/Acc1*) is 2.50%, which already exceeds the returns on the individual strategies (1.75% for the value-growth strategy and 1.09% for the earnings management strategy). The return to the short position (*BM1/Acc5*) equals -1.92%. Thus a hedge portfolio formed by taking a long position in *BM5/Acc1* and a short position in *BM1/Acc5* will yield an abnormal return of 4.42% on the 12 trading days surrounding the four quarterly earnings announcement in the year after portfolio formation. Second, the overpricing of discretionary accruals is only present in the growth stocks (*BM1*) as shown in the bottom row of Table 9. The strategy yields negative results in the other quintiles. Thus, overpricing of discretionary accruals is a phenomenon apparent in growth stocks around earnings announcements. A discretionary accruals strategy excluding value stocks from the portfolio would be more profitable than an unconditional strategy. Third, the BM effect is present among all discretionary accrual rankings and most pronounced in the highest discretionary accrual ranking. Therefore, a strategy excluding firms with low discretionary accruals from the BM portfolio is more profitable than an unconditional strategy. Finally, an unexpected result is that the highest return is not found in the long portfolio based on a combination of both strategies (*BM5/Acc1*), but in the *BM5/Acc5* firms. This could be explained by the finding that the overpricing of discretionary accruals is clustered in growth stocks.

[16] As noted before, both anomalies mostly materialize during the first year after portfolio formation.

Table 9 Cell- based hedge portfolio test around earnings announcements [-1;+1]

	BM - quintile			
	BM1	BM2-4	BM5	
Acc1	0.35%	1.15%*	**2.50%***	2.16%*
	(-0.58)	(3.03)	**(3.70)**	(3.15)
	2,885	7,035	**2,534**	
Acc2-4	0.11%	0.86%*	1.55%*	1.45%**
	(0.24)	(3.79)	(2.64)	(1.95)
	6,630	22,998	7,664	
Acc5	**-1.92%*** **	1.37%*	3.60%*	5.52%*
	(-1.83)	(3.84)	(4.11)	(3.67)
	2,939	7,256	2,203	
	2.27%***	-0.22%	-1.10%	
	(1.75)	(-0.04)	(-1.23)	

This table shows the abnormal returns for a holding period consisting of the days surrounding the four quarterly earnings announcements following portfolio formation based upon quarterly rankings of BM ratios and discretionary accruals. Quintiles 2-4 have been condensed in one cell. The mean values reported are the means across 64 quarters. Each cell reports the abnormal returns, the *t*-statistic in parentheses and the number of observations. Bold-type cells represent the long and short portfolios based on the joint strategy. *, ** and *** denote significance at the 1, 5 and 10% level respectively.

The results do not support hypothesis 5. Abnormal returns that exceed the returns of the individual strategies can be earned on the joint strategy on the days surrounding the four quarterly earnings announcements after portfolio formation. This indicates that the mispricing patterns capture different phenomena. However, the overpricing of discretionary accruals is only present in the growth quintile which might indicate that discretionary accruals are related to growth characteristics. It should be noted that this strategy does not present a true zero investment portfolio, because earnings announcement dates may not coincide. Moreover, the analysis does not take into account trading costs, which might be substantial since the portfolio is bought and sold several times per year.

Table A10 in the Appendix shows the results from Table 9 for portfolios based on deciles. The main result of Table 9 still holds. Using deciles an abnormal return of 5.50% can be earned on the 12 trading days surrounding the four quarterly earnings announcements in the year after portfolio formation. The interpretation of Table A10 requires more discretion, because the portfolios consist of considerably less stocks compared to the portfolios based on quintiles.

For sake of completeness, it is investigated whether those abnormal returns on the joint strategy are only obtainable on the days surrounding earnings announcements or hold during the year as well. Table 10 shows the results. In Table 10 yearly returns are used instead of CSAR around earnings announcements as in Table 9. Table 10 allows for several insights into the excess returns on individual and joint strategies.

Table 10 Cell-based hedge portfolio test

		BM - quintile			
		BM1	BM2-4	BM5	
Accrual - quintile	Acc1	-1.45%	1.10%	**17.57%***	19.02%*
		(-0.98)	(0.84)	**(4.62)**	(4.70)
		2,885	7,035	**2,534**	
	Acc2-4	-3.83%*	-0.95%	12.60%*	16.44%*
		(-4.09)	(-0.71)	(3.74)	(5.25)
		6,630	22,994	7,661	
	Acc5	**-5.91%***	-2.85%**	17.10%*	23.01%*
		(-5.10)	(-2.13)	(3.34)	(4.06)
		2,939	7,256	2,204	
		4.46%*	3.94%*	0.46%	
		(2.57)	(2.54)	(0.03)	

This table shows the abnormal returns for a holding period of a year based upon quarterly rankings of BM ratios and discretionary accruals. Quintiles 2-4 have been condensed in one cell. The mean values reported are the means across 64 quarters. Each cell reports the abnormal returns, the *t*-statistic in parentheses and the number of observations. Bold cells represent the long and short portfolios based on the joint strategy. * and ** denote significance at the 1 and 5% level respectively.

First, a joint strategy will provide a size-adjusted return of 23.48%. This is not more profitable than the return to a strategy based on growth characteristics, which earns a yearly size-adjusted return of 25.75% as shown in Table 2 and Figure 1a. However, the joint strategy is more profitable than a strategy based on discretionary accruals that yields 7.14%. Important to notice is that a joint strategy based on deciles is more profitable than both individual strategies yielding a size-adjusted return of 36.62%. This result is reported in Table A10 in the Appendix and should be interpreted carefully, since the strategy based on deciles significantly reduces the observations in the portfolios. Second, the overpricing of discretionary accruals is not present in the value quintile. Specifically, value firms do not suffer from overpricing of discretionary accruals, because among firms in the value quintile the accrual strategy yield an insignificant abnormal return of 0.46%. This discretionary accrual anomaly is mostly present in the growth quintile. Finally, the value-growth anomaly survives across all three discretionary accrual groups.

A potential concern is that the hedge portfolios contain a much smaller number (2,534 in the long position and 2,939 in the short position) of firms than the portfolios based on the individual strategies (both have 6,184 in the long position and 6,254 in the short position). To address this issue, both individual strategies are reexamined using a short position of 2,939 firms and a long position of 2,534 firms. Untabulated results show this procedure results in abnormal returns of 29.54% (2.67% short, 32.21% long) for the individual BM strategy during the year and 3.45% (0.51% short, 3.95% long) around earnings announcements. For the discretionary accruals strategy, this amount to 3.99% (1.52% short, 5.51% long) for the yearly strategy and 0.87% (0.42% short, 1.29% long) around earnings announcements. Although the BM strategy in the most extreme stocks present higher abnormal returns around earnings announcements than initially based on the extreme deciles, the return is still below the 4.42% found for the joint strategy.

Taken together, the results in this section do not support hypothesis 5 since abnormal returns that exceed those of the individual strategies are obtainable by the joint strategy around earnings announcements. However, the joint strategy offers no larger abnormal return than the individual strategies when considering yearly returns. This indicates that the mispricing patterns represent different underlying forces around earnings announcements. Moreover, it can be inferred that the abnormal returns to the discretionary accruals strategy reported by Xie (2000) are likely due to the growth characteristics of the firm, such as past earnings growth, since overpricing of discretionary accruals is not present in value stocks.

5.4.2 Results regression-based approach hedge test

Table 11 and 12 show the results of the regression based approaches of the hedge tests for the days surrounding earnings announcements and the yearly returns respectively. The results in Table 11 do have the expected signs for the portfolios, but the *t*-statistics are insignificant. Although the coefficients are not significant, the coefficient do not change much when the variables are included in the regression together, indicating that they represent different phenomena around earnings announcements.

Table 11 Regression-based hedge portfolio test around earnings announcements

Dependent variable: CSAR [-1;+1]			
	Intercept	BM	ACC
Mean	0.0043	0.0078	
	(0.74)	(0.74)	
Mean	0.0090		-0.0017
	(1.49)		(-0.18)
Mean	0.0050	0.0077	-0.0013
	(0.65)	(0.73)	(-0.14)

This table presents the results of the regression-based hedge portfolio test. Yearly returns are regressed on scaled decile ranks ranging from 0 to 1 for each of the 16 sample years from 2000-2015: $CSAR_{it} = \alpha + \beta_1\ Decile\ BM_{it} + \beta_2\ Decile\ EM_{it} + \varepsilon$
Each cell reports the mean regression coefficient and *t*-statistic in parentheses. Mean coefficients are based on estimates from the 16 yearly regressions.

Table 12 presents the results for the regression-based hedge portfolio test using size-adjusted returns during the year following portfolio formation. It shows that when both variables are included in the regression together, the return to BM is 14.92% (*t*-statistic = 3.94) and to the discretionary accruals strategy 5.41% (t-statistic = 1.84). Both mean values of the coefficients are close to the values when they are individually included in the regression, indicating that the discretionary accruals and BM strategies capture different mispricing patterns.

Table 12 Regression-based hedge portfolio test

Dependent variable: SAR (Size-Adjusted Return year 1)			
	Intercept	BM	ACC
Mean	-0.0771	0.1496*	
	(-0.43)	(3.94)	
Mean	0.0260		-0.594**
	(0.66)		(-1.94)
Mean	-0.0499**	0.1492*	-0.0541**
	(-2.05)	(3.94)	(1.84)

This table presents the results of the regression-based hedge portfolio test. Cumulative size-adjusted returns around the four earnings announcements following portfolio formation are regressed on scaled decile ranks ranging from 0 to 1 for each of the 16 sample years from 2000-2015:

$SAR_{it} = \alpha + \beta_1\ Decile\ BM_{it} + \ \beta_2\ Decile\ EM_{it} + \varepsilon$

Each cell reports the mean regression coefficient and t-statistic in parentheses. Mean coefficients are based on estimates from the 16 yearly regressions. * and ** denote significance at the 1 and 5% level respectively.

Overall, the regression-based hedge portfolio test confirms the result of the cell-based approach that the mispricing patterns capture different underlying forces around earnings announcements as well as during the other trading days.

6 Behavioral explanation or risk factors?

So far this study assumed that the value-growth anomaly and overpricing of discretionary accruals are both behavioral phenomena based on extrapolation of past earnings growth and discretionary accruals respectively. The results in section 5.1 support this behavioral explanation. It is found that both anomalies are corrected around earnings announcements when new information is released and investors revise their prior irrational believes. Growth stocks and stocks with positive discretionary accruals have lower average returns after portfolio formation, because the persistence in earnings growth and discretionary accruals is lower than expected. This section investigates whether the earnings responses are actually rational responses to risk factors in earnings instead of behavioral anomalies.

Bernard & Thomas (1990) and Collins & Hribar (2000) suggest that if risk is an omitted varirable that is driving the results, it should be apparent in either a high incendence of losses or a few extreme losses, which is according to the results in section 5.1 not the case for the anomalies. However, Fama and French show in their 1995 paper that once stocks are allocated to BM portfolios, the market makes unbiased forecasts of earnings growth and the market understands the different earnings growth rates of value and growth stocks. Their evidence is consistent with rational pricing. However, in their asset-pricing story, they do not find evidence for the BM factor in earnings driving the BM factor in returns.

With rational pricing, the returns around earnings announcements found in this paper must be due to common factors in shocks to expected earnings that are related to the BM ratio and discretionary accruals. This section tests for links between the risk factors in returns and earnings. Firstly, it is investigated whether there are factors for BM and discretionary accruals in returns and earnings shocks. It is hard to conclude that both returns and earnings shocks contain the same factors for BM and discretionary accruals. However, there are some apparent similarities in the factors. Next, it is tested whether the variation in return traces to the common factors in earnings. The results here indicate that it is very unlikely that the variation in returns traces to the common factors in earnings, since none of the coefficients are significant.

To investigate the risk factors, six portfolios are formed based on BM characteristics and discretionary accruals. The stocks are sorted on BM ratio and divided into three groups: low (L) (30 percent), medium (40 percent) and high (H) (30 percent). The sample is also split in income increasing (+) and income decreasing (-) earnings management stocks creating six combined portfolios (H/-; M/-; L/-; H/+; M/+; L/+). The first regression tests for common variation in stock returns and risk factors. The dependent variables in the first regression are the value-weighted excess returns on the six portfolios

The explanatory variables are the variables used by Fama and French (1993, 1995)[17]: the excess return on the value-weighted market portfolio (*MKT*), the returns *SMB* (small minus big) and *HML* (high minus low) to mimic the risk factors size and BM. A variable based on discretionary accruals (*ACC)* is added to capture the returns on earnings management portfolios. This portfolio is constructed in the same way as the other Fama and French portfolios. It is the difference between the average of the returns on the portfolios with negative discretionary accruals (H/-; M/-; L/-) and the portoflios with positive discretionary accruals (H/+; M/+/ L/+). The following regression is estimated on a quarterly basis:

$$R_{it} - R_{ft} = \alpha + \beta_1\,(MKT_t) + \beta_2\,SMB_t + \beta_3\,HML_t + \beta_4\,ACC_t + \varepsilon_{i,t} \tag{11}$$

Where:

$R_{it} - R_{ft}$	=	Quarterly value-weighted return on the six portfolios (H/+; M/+/; L/+; H/-; M/-; L/-) minus the risk free rate observed at the beginning of the quarter.
MKT_t	=	Quarterly market return.
SMB_t	=	Quarterly difference between the average of the returns on the small stock portfolios and the big stock portfolios.
HML_t	=	Quarterly difference between the average returns on the high BM portfolios and the average of the returns on the low BM portfolios.
ACC_t	=	Quarterly difference between the average of the returns on the portfolios with negative discretionary accruals (H/-; M/-; L/-) and the portfolios with positive discretionary accruals (H/+; M/+/ L/+).

Table 13 shows that *SMB*, *HML* and *ACC*, the mimicking returns for risk factors related to size, BM ratio and discretionary accruals capture some common variation in stock returns missed by the market return. It is apparent that this does not hold for all six portfolios. The factors are especially important for the portfolio with the highest average stock return (H/-). The accruals factor has the least common variation with the stock returns. Controlling for discretionary accruals, the slope on HML increases rather monotonically from the low- to the high BM portfolios.

[17] http://mba.tuck.dartmouth.edu/pages/faculty/ken.french/data_library.html

Table 13 Summary statistics for and results of regression (11): excess returns on the six portfolios regressed on the market, *SMB*, *HML* and accruals factors

Panel A: Summary statistics

	MKT	SMB	HML	ACC	H/-	M/-	L/-	H/+	M/+	L/+
Mean	0.006	0.006	0.011	0.021	0.056	0.031	0.023	0.037	0.021	0.012
St. Dev.	0.088	0.043	0.059	0.094	0.101	0.065	0.066	0.096	0.068	0.063
t-statistic	1.43	2.90	3.67	4.32	4.47	3.86	2.77	3.13	2.49	1.49

Panel B: Regression analysis

	Constant	MKT	SMB	HML	ACC	Adjusted R^2
H/-	0.039*	0.608*	0.611*	0.380*	0.254*	0.535
	(6.86)	(8.90)	(4.43)	(4.13)	(4.39)	
M/-	0.025*	0.637*	-0.053	0.097	0.092	0.717
	(4.31)	(9.33)	(-0.38)	(1.05)	(1.58)	
L/-	0.019*	0.605*	-0.200	0.017	0.050	0.569
	(3.27)	(8.86)	(-1.45)	(0.18)	(0.87)	
H/+	0.028*	0.690*	0.442*	0.218*	-0.011	0.521
	(4.92)	(10.11)	(3.21)	(2.37)	(-0.20)	
M/+	0.014*	0.591*	0.197	0.165***	0.018	0.661
	(2.42)	(8.66)	(1.43)	(1.80)	(0.30)	
L/+	0.011*	0.596*	-0.133	-0.217	-0.032	0.649
	(1.85)	(8.73)	(-0.97)	(-1.38)	(-0.55)	

Panel A of this Table shows the summary statistics of the data used for regression (11). Panel B shows the regression results of regression (11). This regressions regresses the excess returns on the six portfolios on market, *SMB*, *HML* and accruals factors:

$R_{it} - R_{ft} = \alpha + \beta_1\ (MKT_t) + \beta_2\ SMB_t + \beta_3\ HML_t + \beta_4\ ACC_t + \varepsilon_{i,t}$

Where:

$R_{it} - R_{ft}$ = Quarterly return on the six portfolios (H/+; M/+/; L/+; H/-; M/-; L/-) minus the risk free rate observed at the beginning of the quarter.

MKT_t = Quarterly market return.

SMB_t = Quarterly difference between the average of the returns on the small stock portfolios and the big stock portfolios.

HML_t = Quarterly difference between the average returns on the high BM portfolios and the average of the returns on the low BM portfolios.

ACC_t = Quarterly difference between the average of the returns on the portfolios with negative discretionary accruals (H/-; M/-; L/-) and the portfolios with positive discretionary accruals (H/+; M/+/ L/+).

Each cell contains the estimated coefficient and *t*-statistic in parentheses. * and *** denote significance at the 1 and 10% level respectively.

To measure the relation between returns and the common factors in earnings, the shocks to earnings and the common factors in the shocks are measured. Whereas Fama and French (1995) use yearly earnings here quarterly earnings are used. The shocks to earnings are measured as the change in actual earnings. The changes in actual earnings for the six portfolios are regressed on market, *SMB*, *HML* and *ACC* factors in earnings changes to test for common factors in quarterly changes in earnings yields:

$$\Delta\ \frac{EARN_{(t+1)}}{BE_t} = \alpha + \beta_1\ \Delta MKT_{(t+1)} + \beta_2\ \Delta SMB_{(t+1)} + \beta_3\ \Delta HML_{(t+1)} + \beta_4\ \Delta ACC_{(t+1)} + \varepsilon_{(t+1)} \quad (12)$$

Where:

$\Delta\ \frac{EARN_{(t+1)}}{BE_t}$	=	The change in the fundamental, the earnings. The fundamental is the sum of the earnings in quarter *t+1* for all firms divided by the sum of the book equity for those firms.
$\Delta MKT_{(t+1)}$	=	The change in fundamental for the market, where the fundamental for the market is computed as the sum of the fundamentals for all stocks.
$\Delta SMB_{(t+1)}$	=	The size factor in the fundamental is the simple average of the change in fundamental for the small stock portfolios minus the average for the big stock portfolios.
$\Delta HML_{(t+1)}$	=	The BM factor in the fundamental is the simple average of the change in fundamental for the two high BM portfolios (H/- and H/+) minus the average for the two low BM portfolios (L/- and L/+).
$\Delta ACC_{(t+1)}$	=	The accruals factor in the fundamental is the simple average of the change in fundamental for the three stock portfolios having negative discretionary accruals (H/-; M/-; L/-) minus the average for the three stock portfolios having positive discretionary accruals (H/+; M/+; L/+).

Table 14 Results of regression (12): changes in fundamentals for the six portfolios regressed on market, *SMB*, *HML* and accruals factors in the changes in fundamentals

Dependent variable: $\Delta(EARN_{(t+1)}/BE_t)$

	Constant	ΔMKT	ΔSMB	ΔHML	ΔACC	Adjusted R^2
H/-	0.000	1.215*	2.789*	-0.104	-0.310*	0.501
	(0.74)	(4.92)	(2.36)	(-0.46)	(-3.57)	
M/-	0.000	0.997*	0.132	-0.073	-0.465*	0.582
	(-0.60)	(4.04)	(0.11)	(-0.32)	(-5.35)	
L/-	0.000	1.392*	3.736*	-1.078*	-0.861*	0.800
	(0.07)	(5.64)	(3.16)	(4.74)	(-9.91)	
H/+	0.000	1.297*	0.800	0.335	0.304*	0.546
	(0.25)	(5.26)	(0.68)	(1.47)	(3.50)	
M/+	0.000	1.046*	1.558	-0.202	-0.296*	0.533
	(-0.34)	(4.24)	(1.32)	(-0.89)	(3.41)	
L/+	0.000	1.298*	1.298	-0.922*	0.732*	0.831
	(0.33)	(5.26)	(1.21)	(-4.06)	(8.43)	

This Table shows the results of regression (12). This regression regresses the changes in fundamentals for the six portfolios on the market, *SMB, HML* and accruals factors in the changes in fundamentals:

$$\Delta\ \frac{EARN_{(t+1)}}{BE_t} = \alpha + \beta_1\ \Delta MKT_{(t+1)} + \beta_2\ \Delta SMB_{(t+1)} + \beta_3\ \Delta HML_{(t+1)} + \beta_4\ \Delta ACC_{(t+1)} + \varepsilon_{(t+1)}$$

Where:

$\Delta\ \frac{EARN_{(t+1)}}{BE_t}$	=	The change in the fundamental, the earnings. The fundamental is the sum of the earnings in quarter *t+1* for all firms divided by the sum of the book equity for those firms.
$\Delta MKT_{(t+1)}$	=	The change in fundamental for the market, where the fundamental for the market is computed as the sum of the fundamentals for all stocks.
$\Delta SMB_{(t+1)}$	=	The size factor in the fundamental is the simple average of the change in fundamental for the small stock portfolios minus the average for the big stock portfolios.
$\Delta HML_{(t+1)}$	=	The BM factor in the fundamental is the simple average of the change in fundamental for the two high BM portfolios (H/- and H/+) minus the average for the two low BM portfolios (L/- and L/+).
$\Delta ACC_{(t+1)}$	=	The accruals factor in the fundamental is the simple average of the change in fundamental for the three stock portfolios having negative discretionary accruals (H/-; M/-; L/-) minus the average for the three stock portfolios having positive discretionary accruals (H/+; M/+; L/+).

Each cell contains the estimated coefficient and *t*-statistic in parentheses. * denotes significance at the 1 % level.

The results in Table 14 identify market, size, BM and accruals factors in earnings that parallel those in returns. All regressions produce strong evidence of a market and accruals factor in earnings. This is not surprising, because accruals are part of earnings. Like the return regressions, the size and BM factor are important in the H/- portfolio. Unlike the returns regressions, the size and BM factor are significant for most low BM portfolios. The slopes of the earnings regressions do not show the same trend from low to high BM portfolios as the slopes of the return regressions. Overall, the Table does not unambiguously prove that the same factors are present in earnings as in returns, but does show some important similarities.

If there are a BM factor and a discretionary accruals factor in earnings as well as stocks returns, it leads to the presumption that the common factors in earnings drive the risk factors in returns. Therefore, the last regression regresses the returns on the six portfolios on the market, *SMB*, *HML* and accruals factors in fundamentals.

$$R_{it} - R_{ft} = \alpha + \beta_1 \, \Delta \frac{D_{(t-1)}}{P_{(t-1)}} + \beta_2 \Delta MKT_{(t+1)} + \beta_3 \, \Delta SMB_{(t+1)} + \beta_4 \, \Delta HML_{(t+1)} + \beta_5 \, \Delta ACC_{(t+1)} + \varepsilon_t \qquad (13)$$

The variables in this regression are as defined in regression (11) and (12). $\Delta \frac{D_{(t-1)}}{P_{(t-1)}}$ is the change in dividends of the total sample divided by the value of the sample at the end of the previous quarter. It is included as a rough control for common variation in expected returns. Using future changes in fundamentals is in line with the idea that stock prices are forward looking.

The results in Table 15 show that except for the market factor, none of the factors has significant explanatory power. The size, BM and accruals factors in earnings do not explain the returns on the six portfolios. The low and even negative values for adjusted R^2 reinforce this result. It indicates that the factors in earnings have no explanatory power for the returns on the portfolios. Since there is no link found between stocks returns and the common factors in earnings, it is unlikely that the earnings responses found in this study are due to risk factors. Therefore, this section does not overrule the behavioral explanation investigated in this study.

Table 15 Results of regression (13): returns on the six portfolios regressed on dividend yield and market, *SMB*, *HML* and accruals factors in the changes in fundamentals

Panel A: Regression analysis fundamentals in factors				
	Constant	D/P	ΔY	Adjusted R^2
MKT	-0.003	0.004	12.95	0.001
	(-0.33)	(1.48)	(0.37)	
SMB	0.007	-0.003	18.60	-0.002
	(1.79)	(-0.22)	(1.07)	
HML	0.036	-0.01	-29.2	0.080
	(6.63)	(-5.55)	(1.29)	
ACC	-0.044	0.025	-44.40	0.189
	(-5.48)	(9.56)	(-1.32)	

Panel B: Regression analysis the effect of changes in fundamentals on returns							
	Constant	$\Delta(D_{(t-1)}/P_{(t-1)})$	ΔMKT	ΔSMB	ΔHML	ΔACC	Adjusted R^2
H/-	0.058*	0.001	1156.027*	-109.898	395.155	-129.821	0.010
	(2.84)	(0.15)	(3.14)	(-0.07)	(1.25)	(0.92)	
M/-	0.042**	-0.002	528.309	-743.800	400.024	-162.378	-0.003
	(2.06)	(-0.30)	(1.44)	(-0.46)	(1.26)	(-1.15)	
L/-	0.008	0.006	-89.742	-777.742	249.731	195.500	-0.022
	(0.37)	(0.98)	(-0.24)	(-0.48)	(0.79)	(1.38)	
H/+	0.066*	-0.009	718.195***	-80.950	437.401	-110.280	-0.003
	(3.19)	(-1.43)	(1.95)	(-0.05)	(1.38)	(-0.78)	
M/+	0.032	-0.004	727.383**	-216.094	480.718	-46.630	0.103
	(1.58)	(-0.66)	(1.98)	(-0.13)	(1.52)	(-0.33)	
L/+	-0.003	0.006	-209.022	-1490.581	490.658	102.831	0.039
	(-0.12)	(0.89)	(-0.57)	(-0.92)	(1.55)	(0.73)	

This Table shows the result of regression (13). This regression regresses the returns on the six portfolios on the dividend yield and market, *SMB*, *HML* and accruals factors in the changes in fundamentals:

$$R_{it} - R_{ft} = \alpha + \beta_1 \Delta \frac{D_{(t-1)}}{P_{(t-1)}} + \beta_2 \Delta MKT_{(t+1)} + \beta_3 \Delta SMB_{(t+1)} + \beta_4 \Delta HML_{(t+1)} + \beta_5 \Delta ACC_{(t+1)} + \varepsilon_t$$

Where the variables are as defined in Table 13 and 14 and $\Delta \frac{D_{(t-1)}}{P_{(t-1)}}$ is the change in dividends of the total sample divided by the value of the sample at the end of the previous quarter. Each cell contains the estimated coefficient and *t*-statistic in parentheses. *, ** and *** denote significance at the 1, 5 and 10% level respectively.

Although the results in this section support the behavioral explanation that is propagated in this study, the methodology has a severe limitation. There are only 64 quarterly observations to estimate the time series model, which is less than the number of observations that is commonly used by Fama and French to detect risk factors. This might cause spurious insignificance of some of the results and imprecise parameter estimates. Moreover, quarterly changes in fundamentals are rough proxies for the shocks to future expected earnings that should drive stock returns.

7 Conclusion and discussion

This study investigates the value-growth anomaly and overpricing of discretionary accruals around earnings announcements both individually and in combination. It is tested whether both anomalies represent the same underlying behavioral phenomenon. That is, whether both mispricing patterns are due to extrapolation of past growth rates that are constructed by income increasing earnings management. Since a behavioral explanation of both anomalies is investigated, earnings announcements are key in the methodology. At earning announcements new information is released and investors revise their prior (incorrect) expectations. Based on prior literature it is expected that the value-growth anomaly might be explained by extrapolation of past earnings growth. This paper tests whether investors actually extrapolate the discretionary accruals part in past earnings of growth stocks. In that case, the overpricing of discretionary accruals is the value-growth anomaly in disguise. However, the evidence provided in this paper does not support this explanation.

An event study of earnings announcements shows that both mispricing patterns are manifested around earnings announcements. The earnings responses as a function of growth and discretionary accruals are most pronounced around negative earnings announcements. A disproportional part of both anomalies is corrected around the four subsequent earnings announcements after portfolio formation, which supports the idea that a behavioral explanation underlies the mispricing patterns. When investigating the anomalies in combination, it is found that growth stocks are more likely to conduct earnings management. They conduct income increasing earnings management to a larger extent than income decreasing earnings management. Since both anomalies are clustered around earnings announcements and growth stocks are more likely to conduct income increasing earnings management than value stocks, it is presumed that the anomalies are related. However, subsequent investigation of the earnings responses using regression analysis shows that the earnings response to negative earnings surprises of stocks that conduct income increasing earnings management is not subsumed by the earnings reaction of growth stocks or vice versa. The earnings responses are robust to including interaction variables consisting of the joint effect of growth stocks and income increasing earnings management. Therefore, the earnings reactions to both anomalies seem to be independent effects. The regression analysis confirms that the effect is most significant at negative earnings surprises. Finally, hedge tests prove that combining the two strategies on the days surrounding the four subsequent earnings announcements after portfolio formation yields abnormal returns (4.42%) that exceed those of the individual strategies (1.75% and 1.09%) by more than a factor two, indicating that the mispricing patterns are driven by different underlying forces. It leads to the conclusion that around earnings announcements, the anomalies represent different effects and a joint strategy exceeds the returns that are obtainable on the individual strategies. This implies that the anomalies have distinct underlying forces, but does not rule out some overlap. The hedge portfolio test also shows that the overpricing of discretionary accruals around earnings announcements is only apparent in growth stocks, which might be seen as evidence that the overpricing of discretionary accruals is actually related to growth characteristics around earnings surprises. Even when all trading days are taken into account, the overpricing of discretionary accruals is still not apparent in value stocks. In a robustness check it is investigated whether the return differentials are a reaction to common risk factors in earnings shocks rather than a behavioral phenomenon. It is found that there is no link between *HML, SMB* and accruals factors in earnings shocks and stock returns. Therefore, risk factors are unlikely to explain the results found in this research.

It is shown that earnings management and growth stocks are related. This is in line with the findings of Madhogarhia et al. (2009). However, the results do not support Beaver's (1986) presumption that *[t]he mispricing of accruals might in fact be the "glamour-stock" phenomenon in disguise*. This research provides evidence for the behavioral explanations for the value-growth and discretionary accruals anomaly, which are also found by Lakonishok et al. (1994) and Xie (2001). It has implications for the interpretation of the accounting numbers. For example, growth firms with high past earnings growth that is largely due to a discretionary accruals component are most likely to have transitory earnings, at least most likely to experience negative cumulative size-adjusted returns around subsequent earnings surprises. Thus, investors fail to correctly price the growth rates and discretionary accruals part leading to two extrapolations that are corrected around subsequent earnings announcements. The extrapolation of past growth rates is, based on the results in this paper, not the same as the extrapolation of the discretionary accruals. Therefore, investors should interpret stocks with high past earnings growth rates and positive discretionary accruals with extra care. It might indicate that those stocks prices are falling to earth during the subsequent year with highest losses clustered around earnings announcements.

A major limitation of the study is that the results critically hinge on the measurement of portfolio characteristics and the moment of portfolio formation. Although the effect of measurement errors is investigated by several robustness checks, some measures are disputable. For example, the research is largely based on earnings measurement based on a modified version of the cross-sectional Jones model. Several reasons justify the use of this model to detect earnings management in this study. However, a major issue with respect to earnings management remains the ability to identify the discretionary and non-discretionary part of accruals. Subsequently, it is not always apparent which discretionary accruals are truly due to earnings management. The modified Jones model abnormal accruals consist of unusual nondiscretionary accruals and discretionary accruals (Bernard and Skinner, 1996). Only the discretionary accruals capture earnings management. It is difficult to determine whether the market actually overprices the unusual nondiscretionary accruals or accruals from discretionary managerial behavior. To give the model more power, more refined measures of earnings management should be invented. Another drawback of this study is that the joint hypothesis problem cannot be resolved. The study is based on an event study that could suffer from bad model risk, which complicates the inferences for market efficiency. The use of different models for the calculation of the expected normal returns tries to mitigate this problem.

The findings suggest possible areas for future research. There are some remaining questions. For example, what are the incentives to manage earnings? Most research relates an empirical estimate of discretionary accruals to a firm characteristic. This study relates the empirical measure of discretionary accruals to the BM ratio. Further research could specify the precise nature of the underlying motives for earnings management. By specifying the underlying motives, it is easier to relate earnings management to other characteristics. Another unresolved issue is how widely available and examined data used with simple portfolio strategies that require only minor knowledge of accounting, can be associated with abnormal returns. By combining the two examined strategies, theoretically a return of 4.42% could have been earned in only twelve trading days. However, this research did not focus on the tradability of the portfolio. Future research could investigate the effect of transaction costs on the return of this strategy. Future research could also investigate other behavioral mispricing patterns around earnings announcement. At earnings announcements valuable information is released, so irrational pricing is likely to be corrected around these earnings announcements. Therefore, event studies on earnings announcements represent fertile avenues for future work on market anomalies.

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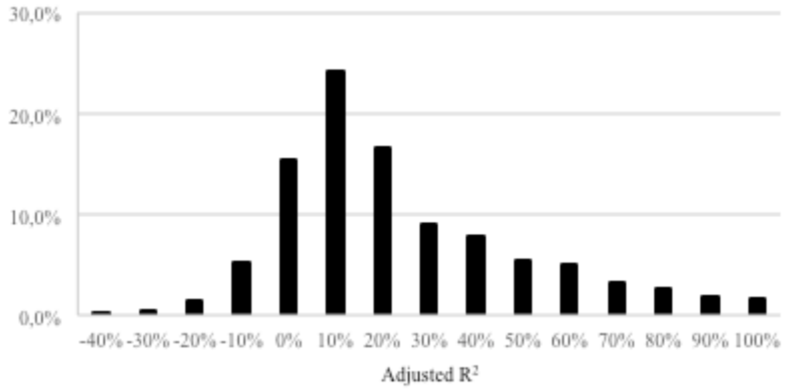
Appendix

Figure A1 Histogram adjusted R^2 regression (2)



This figure shows the distribution of the adjusted R^2 for the regression equations (2). The x-axis shows the values for the adjusted R^2. The y-axis shows the percentage of observations that fall into the category. The adjusted R^2 ranges between -0.498 and 0.99999.

Table A1 Descriptive statistics of variables Jones (1991) model

	Mean	Media	St. Dev.	Minimum	Maximum	Positive (%)
TA	-0.015	-0.012	0.352	-99.068	29.630	32.16
Δ REV	0.008	0.003	0.179	-22.111	43.188	55.77
PPE	0.587	0.480	0.758	0	192.104	98.56
NDA	-0.014	-0.012	0.213	-35.2	15.072	22.81
DA	0.0005	0.001	0.312	-74.108	34.565	51.17

This table is based on the original sample of 151,131 firm-quarter observations during 2000-2015. Variable definitions:

TA_t = total accruals measured as $\frac{TA_t}{A_{t-1}} = \frac{\Delta CA_t - \Delta CL_t - \Delta Cash_t + \Delta STD_t - Dep_t}{A_{t-1}}$

ΔREV_t = revenues in quarter *t* less revenues in quarter *t-1* divided by the total assets of period *t-1*

PPE_t = gross property, plant and equipment in quarter *t* divided by the total assets in period *t-1*

NDA_t = nondiscretionary accruals in quarter *t* divided by the total assets in period *t-1*

DA_t = discretionary accruals in quarter *t* divided by the total assets in period *t-1*

Table A2 Descriptive statistics and portfolio returns with earnings management deciles based on absolute value of discretionary accruals

Panel A: Book-to-market ratio

	Quarterly portfolio ranking											
	Growth									Value		
	1	2	3	4	5	6	7	8	9	10	10 minus 1	*t*-stat hedge
BM	0.107	2.08	0.280	0.349	0.420	0.499	0.590	0.710	0.895	3.757	3.650	2.87
Mean EM decile	6.029	5.822	5.752	5.487	5.275	5.226	5.309	5.206	5.310	5.479	-0.550	-8.73
Earnings surprise	-0.00003	0.00004	0.00007	-0.00003	-0.00001	-0.0002	-0.001	-0.001	-0.002	-0.004	-0.004	-6.55
Return	6.85%	4.79%	4.77%	7.77%	7.89%	10.58%	12.85%	12.12%	17.56%	35.34%	28.49%	4.88
SAR equal-weighted	-2.93%	-5.41%	-5.77%	-2.98%	-3.42%	-0.05%	1.81%	0.68%	5.84%	22.24%	25.16%	5.07
SAR value-weighted	-2.20%	-4.66%	-5.13%	-2.29%	-2.71%	0.58%	2.54%	1.50%	6.65%	23.55%	25.75%	4.98

Panel B: Absolute value of discretionary accruals based on cross-sectional Jones model

	Quarterly portfolio ranking											
	No earnings management									Earnings management		
	1	2	3	4	5	6	7	8	9	10	1 minus 10	*t*-stat hedge
EM	0.001	0.004	0.008	0.011	0.015	0.019	0.025	0.034	0.050	0.117	-0.116	29.50
Mean bm decile	5.774	5.613	5.698	5.669	5.539	5.538	5.274	5.322	5.348	5.051	0.723	6.78
Average earnings sur	-0.0001	-0.0004	-0.0004	-0.001	-0.001	-0.001	-0.001	-0.0005	-0.001	-0.002	0.002	5.06
AR	11.83%	10.75%	9.62%	10.15%	12.15%	12.17%	11.46%	13.12%	13.42%	12.29%	-0.45%	0.21
SAR equal	0.71%	-0.24%	-1.12%	-0.44%	1.47%	0.86%	0.66%	1.85%	1.88%	0.95%	-0.24%	-0.12
SAR value	1.49%	0.50%	-0.40%	0.23%	2.21%	1.71%	1.25%	2.67%	2.71%	1.86%	-0.37%	-0.18

The sample (62,138 observations) comprises all firms (excluding financial institutions, insurance companies and real estate companies) listed on the NYSE, NYSE MKT (formerly known as the American Stock Exchange (AMEX)) and the NASDAQ with coverage on CRSP and Compustat from 2000 to 2015 with available data. Panel A provides the descriptive statistics and portfolio returns for portfolios based on the book-to-market (BM) ratio. The BM ratio is the ratio of book value of equity to market value of equity. Panel B presents the descriptive statistics and portfolio returns for portfolios based on absolute value of discretionary accruals. The discretionary accruals are approximated using the cross-sectional modified Jones model (1991).

BM	=	Mean book-to-market ratio
EM	=	Mean absolute value of discretionary accruals based on the cross-sectional modified Jones model (1991)
Mean BM decile	=	Mean book-to-market decile
Mean EM decile	=	Mean earnings management decile based on absolute value of discretionary accruals approximated by the cross-sectional modified Jones model (1991)
Earnings surprise	=	Average earnings surprise in the quarter following portfolio formation
Return	=	Average raw return in the quarter following portfolio formation
SAR equal-weighted	=	Size-adjusted returns in the quarter following portfolio formation. The size-adjusted return is calculated by subtracting the equal-weighted return of the size portfolio (based on the classification of all NYSE/AMEX/NASDAQ firms) the firm belongs to in that quarter from the raw return.
SAR value-weighted	=	Size-adjusted returns in the quarter following portfolio formation. The size-adjusted return is calculated by subtracting the value-weighted return of the size portfolio (based on the classification of all NYSE/AMEX/NASDAQ firms) the firm belongs to in that quarter from the raw return.

Table A3 Average number of trading days in postret interval

Panel A:	**Average number of days in postret interval BM deciles**			**Panel B:**	**Average number of days in postret interval per EM decile**		
BM decile	Negative	Zero	Positive	EM decile	Negative	Zero	Positive
1	39.776	35.024	35.259	1	41.676	37.636	37.903
	(-38;+1)	(-33;+1)	(-33;+1)		(-40;+1)	(-36;+1)	(-36;+1)
2	39.579	34.576	35.473	2	40.011	36.267	36.451
	(-38;+1)	(-33;+1)	(-33;+1)		(-38;+1)	(-34;+1)	(-34;+1)
3	38.707	35.113	35.915	3	39.566	36.106	36.136
	(-37;+1)	(-33;+1)	(-34;+1)		(-38;+1)	(-34;+1)	(-34;+1)
4	38.506	35.631	35.726	4	38.986	35.012	36.119
	(-37;+1)	(-34;+1)	(-34;+1)		(-37;+1)	(-33;+1)	(-34;+1)
5	38.793	36.208	36.342	5	38.989	36.417	36.070
	(-37;+1)	(-34;+1)	(-34;+1)		(-37;+1)	(-34;+1)	(-34;+1)
6	39.152	36.413	36.311	6	39.159	35.532	36.115
	(-37;+1)	(-34;+1)	(-34;+1)		(-37;+1)	(-34;+1)	(-34;+1)
7	39.204	36.572	37.340	7	38.786	35.685	36.390
	(-37;+1)	(-35;+1)	(-35;+1)		(-37;+1)	(-34;+1)	(-35;+1)
8	39.761	36.634	37.256	8	38.312	36.200	36.540
	(-38;+1)	(-35;+1)	(-35;+1)		(-36;+1)	(-34;+1)	(-35;+1)
9	39.822	37.734	38.075	9	39.056	35.621	36.576
	(-38;+1)	(-36;+1)	(-36;+1)		(-37;+1)	(-34;+1)	(-35;+1)
10	42.110	40.415	39.109	10	41.608	37.650	37.843
	(-40;+1)	(-38;+1)	(-37;+1)		(-40;+1)	(-36;+1)	(-36;+1)

This table provides the average number of trading days in the postret interval per category. Panel A summarizes the event windows for the BM deciles sorted on sign of the earnings surprise. Panel B presents the results for EM deciles categorized on sign of the earnings surprise. The event window starts on average twelve days before the end of the current fiscal quarter and ends the day after the announcement of earnings of the current quarter. Each cell presents the average number of trading days in the interval for the particular decile and the corresponding event window that is used as postret interval.

Table A4 Size-adjusted returns BM deciles around earnings announcements using event window [-1;+1]

	Earnings surprise portfolio			
	Negative	Zero	Positive	All
1	-4.11%	-0.53%	3.73%	0.56%
(Growth)	(-6.07)	(-0.92)	(3.41)	(1.29)
	1,259	694	2,708	4,661
2	-3.29%	-1.47%	1.07%	-0.70%
	(-5.18)	(-2.17)	(1.70)	(-1.32)
	1,283	659	2,931	4,873
3	-0,03197	1.09%	2.61%	1.06%
	(-6.39)	(1.47)	(6.14)	(2.78)
	1,265	569	3,045	4,879
4	-1.70%	-0.43%	3.56%	1.62%
	(-2.97)	(-0.55)	(7.35)	(3.89)
	1,435	547	2,942	4,924
5	-1.31%	-0.76%	2.26%	0.79%
	(-2.51)	(-0.96)	(6.76)	(2.92)
	1,522	489	2,826	4,873
6	-2.60%	0.57%	2.91%	1.06%
	(-5.95)	(0.58)	(9.44)	(3.90)
	1,598	428	2,905	4,931
7	1.96%	-0.73%	3.06%	1.02%
	(-5.25)	(-0.72)	(8.11)	(3.99)
	1,695	369	2,785	4,849
8	-1.82%	0.19%	2.43%	0.63%
	(-3.52)	(0.24)	(8.32)	(2.00)
	1,713	419	2,695	4,827
9	-1.50%	-0.18%	4.22%	2.09%
	(-2.17)	(-0.18)	(8.80)	(3.78)
	1,814	373	2,512	4,699
10	-1.55%	-0.01%	5.58%	2.32%
(Value)	(-1.96)	(-0.01)	(7.22)	(3.67)
	1,774	335	2,074	4,183
All	-2.30%	-0.23%	3.13%	1.04%
	(-12.24)	(-0.82)	(16.89)	7.59
	15,358	4,882	27,423	47,663

The table presents the mean size-adjusted stock returns over the subsequent four quarters for portfolios of stocks formed on growth and the sign (positive, negative or zero) of the subsequent quarterly earnings surprise. Growth is measured using the BM ratio. Stock returns are cumulated over the period beginning the day before the earnings announcement and ending the day following the earnings announcement. Each cell reports the mean abnormal portfolio stock return, the *t*-statistic in parentheses and the number of observations in the portfolio.

Table A5 **CAPM-adjusted returns BM deciles around earnings announcements using long event window**

	Earnings surprise portfolio			
	Negative	Zero	Positive	All
1	-1.53%	-8.83%	-6.78%	-9.11%
(Growth)	(-9.48)	(-6.56)	(-6.61)	(-10.31)
	1,211	660	2,605	4,476
2	-10.86%	-7.16%	-5.95%	-7.66%
	(-7.20)	(-5.28)	(-3.97)	(-6.95)
	1,234	636	2,845	4,715
3	-7.72%	-4.78%	-4.16%	-5.41%
	(-7.02)	(-3.75)	(-4.63)	(-7.43)
	1,212	545	3,966	4,723
4	-5.93%	-4.80%	-2.12%	-2.44%
	(-5.58)	(-3.36)	(-2.28)	(-4.65)
	1,380	522	2,855	4,757
5	-4.61%	-4.10%	-2.26%	-3.13%
	(-4.29)	(-2.39)	(-2.50)	(-3.45)
	1,424	440	2,681	4,545
6	-1.88%	-7.95%	-1.75%	-1.81%
	(-2.17)	(-2.52)	(-3.01)	(-3.56)
	1,464	68	2,680	4,212
7	-2.16%	-1.68%	1.04%	-0.24%
	(-2.17)	(-0.86)	(0.93)	(-0.28)
	1,589	317	2,562	4,468
8	0.17%	2.40%	1.35%	1.26%
	(0.13)	(1.32)	(1.26)	(1.18)
	1,575	357	2,481	4,413
9	2.20%	-1.84%	3.76%	3.76%
	1.45	(-0.49)	(3.13)	(2.77)
	1,607	39	2,216	3,862
10	7.82%	8.33%	13.49%	11.10%
(Value)	3.87	(1.09)	(6.97)	(6.33)
	1,485	45	1,762	3,292
All	-3.80%	-2.49%	-0.37%	-1.47%
	(-7.68)	-4.40	(-0.86)	(-3.69)
	14,181	3,629	25,653	43,463

The table presents the mean CAPM-adjusted stock returns over the subsequent four quarters for portfolios of stocks formed on growth and the sign (positive, negative or zero) of the subsequent quarterly earnings surprise. Growth is measured using the BM ratio. Stock returns are cumulated over the period beginning twelve days before the end of the fiscal quarter and ending the day following the earnings announcement. Each cell reports the mean abnormal portfolio stock return, the *t*-statistic in parentheses and the number of observations in the portfolio.

Table A6 **Size-adjusted returns earnings management deciles around earnings announcements using event window [-1;+1]**

	Earnings surprise portfolio			
	Negative	Zero	Positive	All
1	-2.08%	-0.95%	3.70%	1.38%
(Income	(-3.32)	(-0.93)	(7.75)	(3.23)
decreasing)	1,529	416	2,588	4,533
2	-2.83%	-0.23%	3.68%	1.21%
	(-6.29)	(-0.27)	(8.23)	(2.92)
	1,514	510	2,715	4,739
3	-1.76%	0.49%	2.61%	0.83%
	(-1.63)	(0.72)	(5.34)	(1.62)
	1,465	470	2,837	4,772
4	-3.07%	-0.75%	2.80%	0.56%
	(-5.31)	(-0.86)	(8.36)	(1.66)
	1,508	488	2,870	4,866
5	-2.06%	-0.63%	2.40%	0.78%
	(-3.89)	(-0.71)	(5.63)	(2.24)
	1,569	495	2,799	4,863
6	-1.79%	0.85%	2.47%	0.98%
	(-4.11)	(0.77)	(8.41)	(4.19)
	1,535	538	2,825	4,898
7	-1.80%	0.04%	2.94%	1.01%
	(-4.25)	(0.04)	(7.83)	(2.89)
	1,647	518	2,775	4,940
8	-1.89%	-1.80%	2.82%	1.07%
	(-3.24)	(-1.90)	(5.32)	(3.26)
	1,531	497	2,823	4,851
9	-0.90%	-0.48%	3.62%	1.84%
	-0.78	(-0.60)	(7.62)	(3.13)
	1,494	510	2,707	4,711
10	-3.16%	-0.98%	2.68%	0.29%
(Income	(-4.45)	(-1.17)	(5.48)	(0.71)
increasing)	1,566	440	2,484	4,490
All	-2.13%	-0.44%	2.97%	0.99%
	(-9.62)	(1.56)	(21.22)	(7.74)
	15,358	4,882	27,423	47,663

The table presents the mean size-adjusted stock returns over the subsequent four quarters for portfolios of stocks formed on earnings management and the sign (positive, negative or zero) of the subsequent quarterly earnings surprise. Earnings management is measured using the discretionary accruals obtained from the cross-sectional modified Jones model. Stock returns are cumulated over te period beginning the day before the end of the announcement and ending the day following the earnings announcement. Each cell reports the mean abnormal portfolio stock return, the *t*-statistic in parentheses and the number of observations in the portfolio.

Table A7 Total and announcement period returns for BM and earnings management deciles

Panel A: BM deciles			**Panel B: Earnings management deciles**		
	Total period return	Announcement period return		Total Period return	Announcement period return
1	-2.20%	0.56%	1	5.16%	1.38%
(Growth)	(-2.15)	(1.29)	(Income	(3.15)	(3.23)
	6.102	6,102	decreasing)	6,102	6,102
2	-4.66%	-0.70%	2	2.61%	1.21%
	(-5.13)	(1.32)		(1.65)	(2.92)
	6,070	6,070		6,070	6,070
3	-5.13%	1.06%	3	2.36%	0.83%
	(-3.34)	(2.78)		(1.54)	(1.62)
	6,091	6,091		6,076	6,076
4	-2.29%	1.62%	4	-0.32%	0.56%
	(-1.99)	(3.89)		(-0.18)	(1.66)
	6,072	6,072		6,086	6,086
5	-2.70%	0.79%	5	0.68%	0.78%
	(-1.84)	(2.92)		(0.41)	(2.24)
	5,929	5,929		6,063	6,063
6	0.58%	1.06%	6	2.31%	0.98%
	(0.40)	(3.90)		(1.37)	(4.19)
	6,093	6,093		6,096	6,096
7	2.54%	1.02%	7	-0.65%	1.01%
	(0.91)	(3.99)		(-0.45)	(2.89)
	6,090	6,090		6,088	6,088
8	1.50%	0.63%	8	0.39%	1.07%
	(0.98)	(2.00)		(0.26)	(3.26)
	6,073	6,073		6,085	6,085
9	6.66%	2.09%	9	1.68%	1.84%
	(3.03)	(3.78)		(0.97)	(3.13)
	6,086	6,086		6,087	6,087
10	23.55%	2.32%	10	-1.53%	0.29%
(Value)	(4.56)	3.76	(Income	(-0.92)	(0.71)
	6,057	6,047	increasing)	6,064	6,046
Hedge	25.75%	1.75%	Hedge	7.14%	1.09%
	(4.98)	(3.78)		(2.92)	(2.03)

This table (sample 62,138 firm-quarter observations) reports the total period return following the year of portfolio formation and the announcement period returns for portfolios based on BM (Panel A) and based on discretionary accruals (Panel B). Each cell reports the average return, the *t*-statistic in parentheses and number of observations in that cell.

Announcement period return	=	Cumulative return over the four three-day periods around each of the earnings announcements in the year following portfolio formation. The three-day period ends the day prior to the announcement day and ends the day thereafter.
Hegde portfolio return Panel A	=	Portfolio consisting of a long position in value stocks (BM decile 10) and an offsetting short position in growth stocks (BM decile 1).
Hegde portfolio return Panel B	=	Portfolio consisting of a long position in stocks with low discretionary accruals (earnings management decile 1) and an offsetting short position in stocks with high discretionary accruals (earnings management decile 10).

Table A8 **Value and growth firms differences in earnings management using the whole sample**

Dependent variable: ABSDA									
	1	2	3	4	5	6	7	8	9
GROWTH	0.0293*	0.0285*	0.0068*	0.0074*	0.0075*	0.0077*	0.077*	0.0032*	0.0030*
	(106.36)	(74.72)	(13.72)	(14.93)	(15.08)	(14.77)	(-14,72)	(5.94)	(5.52)
GROWTH*		0.0016*	0.0017*	0.0014*	0.0015*	0.0011***	0.0011***	-0.0001	-0.0001
INCINC		(2.88)	(2.87)	(2.37)	(2.74)	(1.87)	(1.88)	(-0.17)	(-0.26)
LSIZE			0.0028*	0.0039*	0.0039*	0.0039*	0.0039*	-0.0010*	-0.0009***
			(92.71)	(98.25)	(98.21)	(97.94)	(97.84)	(-2.28)	(-1.84)
ANALYST				-0.001*	-0.001*	-0.0010*	-0.001*	-0.0004*	-0.0003*
				(-36.29)	(-35.49)	(35.44)	(-35.34)	(-5.75)	(-4.38)
ROA					-0.0362*	-0.0457*	-0.0457*	-0.0067	-0.0066
					(-2.95)	(-2.36)	(-2.35)	(-1.44)	(-1.42)
ROA*INCINC						0.0400***	0.0402***	0.0996*	0.0996*
						(1.68)	(1.68)	(4.51)	(4.50)
D/E							-0.00001*	0.000001	0.000001
							-2.93	(0.82)	(1.02)
Year dummy	No	No	No	No	No	No	No	No	Yes
Firm dummy	No	No	No	No	No	No	No	Yes	Yes
Number of obs.	61,840	61,840	56,657	56,657	56,656	56,656	56,581	56,581	56,581
Adjusted R^2	0.173	0.173	0.249	0.262	0.264	0.265	0.265	0.437	0.438

This table shows the regression results for regression (6): $ABSDA = \beta_1\, GROWTH + \beta_2\, GROWTH * INCINC + \beta_3\, LSIZE + \beta_4\, ANALYST + \beta_5\, ROA + \beta_6\, ROA * INCINC + \beta_7\, \frac{D}{E} + \varepsilon$.

Where:

$ABSDA$ = Absolute value of discretionary accruals, which estimates are obtained from the Jones model described in section 3.2.

$GROWTH$ = Dummy variable to indicate growth stocks, where 1=growth firms and 0=value firms. Firms in the lower half of the BM range are classified as growth firms and firms in the upper half of the BM range as value firms.

$INCINC$ = Dummy variable for income increasing earnings management, where the variable equals 1 if discretionary accruals are positive and 0 if discretionary accruals are negative.

$LSIZE$ = Natural logarithm of the market value of equity for quarter *t-1*.

$ANALYST$ = Number of analysts that estimate earnings for quarter *t*.

ROA = Return on assets measured as net income (Compustat item 69) divided by total assets.

$\frac{D}{E}$ = Debt-to-equity ratio measured as long-term debt (Compustat item 51) divided by total assets minus long-term debt.

The sample consists of 61,751 firm quarter observations of which 30,950 are growth firm observations and 30,801 are value firm observations. The *t*-statistics are corrected for heteroscedasticity using White's consistent estimator for standard errors. * and *** denote significance levels at the 1 and 10% level respectively

Table A9 **Regression of cumulative size-adjusted returns around earnings announcements [-1;+1] on growth-value and earnings management characteristics**

			Positive earnings surprise				Negative earnings surprise				
	Intercept	ES	GOOD * ES	GOOD * GROWTH * ES	GOOD * INCR * ES	GOOD * GROWTH * INCR * ES	BAD * ES	BAD * GROWTH * ES	BAD * INCR * ES	BAD * GROWTH * INCR *ES	Adjusted R^2
Prediction		+	+	+/-	+/-	+/-	+	+	+	+	
Coefficient	0.002*	1.356*									0.041
	5.90	28.46									
Coefficient	-0.002*		2.524*	-0.085			0.871*	0.245**			0.049
	-5.92		20.49	-0.44			14.59	1.78			
Coefficient	-0.002*		2.775*		-0.507*		0.837*		0.227*		0.050
	-5.44		20.31		-2.69		12.03		2.09		
Coefficient	-0.002*		2.793*	-0.077	-0.506*		0.787*	0.236**	0.220*		0.050
	-5.27		18.57	-0.39	-2.68		10.75	1.71	2.02		
Coefficient	-0.002*		2.685*	0.301	-0.303***	-0.691**	0.779*	0.276*	0.242*	-0.097	0.050
	-5.28		16.47	1.07	-1.30	-1.77	10.28	1.54	2.03	-0.35	
N for dummy=1			34,066	17,829	17,717	9,311	20,401	8,870	10,227	4,469	

This table shows the estimation results of regression (7) and (8). The sample consists of 60,540 firm-quarter observations.

$$CSAR_{it} = \alpha + \beta_1(GOOD_{it} \cdot ES_{it}) + \beta_2(GOOD_{it} \cdot GROWTH_{it} \cdot ES_{it}) + \beta_3(GOOD_{it} \cdot INCR_{it} \cdot ES_{it}) + \beta_4(BAD_{it} \cdot ES_{it}) + \beta_5(BAD_{it} \cdot GROWTH_{it} \cdot ES_{it}) + \beta_6(BAD_{it} \cdot INCR_{it} \cdot ES_{it}) + \varepsilon_{it} \quad (7)$$

$$CSAR_{it} = \alpha + \beta_1(GOOD_{it} \cdot ES_{it}) + \beta_2(GOOD_{it} \cdot GROWTH_{it} \cdot ES_{it}) + \beta_3(GOOD_{it} \cdot INCR_{it} \cdot ES_{it}) + \beta_4(GOOD_{it} \cdot GROWTHINCR_{it} \cdot ES_{it}) + \beta_5(BAD_{it} \cdot ES_{it}) + \beta_6(BAD_{it} \cdot GROWTH_{it} \cdot ES_{it}) + \beta_7(BAD_{it} \cdot INCR_{it} \cdot ES_{it}) + \beta_8(BAD_{it} \cdot GROWTHINCR_{it} \cdot ES_{it}) + \varepsilon_{it} \quad (8)$$

The variables in the regressions are defined as follows:

$CSAR_{it}$ = Cumulative size-adjusted abnormal return measured during the short event window [-1;+1] for firm *i* for the current period.
ES_{it} = Earnings surprise for firm *i* for the current period, computed as the median consensus of analyst forecasts in the latest month deflated by the close price at the last day of the quarter.
$GOOD_{it}$ = Positive earnings surprise dummy that equals 1 if actual earnings exceed forecasts
BAD_{it} = Negative earnings surprise dummy that equals 1 if actual earnings fall short of forecasts.
$GROWTH_{it}$ = Growth dummy that equals 1 if the stock falls in BM decile 1 to 5.
$INCR_{it}$ = Dummy that equals 1 if discretionary accruals are positive (indicating income increasing earnings management).
$GROWTHINCR_{it}$ = Growth decile interaction with income increasing earnings management dummy that equals 1 if discretionary accruals are positive.
Newey-West HAC standard errors are used. * and *** denote significance levels at the 1 and 10% one-tailed level respectively

Table A10 **Cell-based hedge portfolio test around earnings announcements [-1;+1] based on deciles**

		BM - decile			
		BM1	BM2-9	BM10	
Accrual - decile	Acc1	-0.20%	1.17%	**4.77%***	4.69%*
		(-0.17)	(-0.80)	**(3.40)**	(3.32)
		891	4,656	**698**	
	Acc2-9	0.77%**	0.90%*	2.00%*	1.22%**
		(1.98)	(3.63)	(3.14)	(2.56)
		4,502	40,247	4,953	
	Acc10	**-0.73%**	0.53%	-0.06%	0.67%
		(-0.80)	(1.19)	(-0.04)	(0.47)
		852	4,798	534	
		0.54%	0.64%	4.83%**	
		(0.17)	(1.40)	(2.08)	

This table shows the abnormal returns for a holding period around the four quarterly earnings announcements following portfolio formation based upon quarterly rankings of BM ratios and discretionary accruals. Deciles 2-9 have been condensed in one cell. The mean values reported are the means across 64 quarters. Each cell reports the abnormal returns, the *t*-statistic in parentheses and the number of observations. Bold cells represent the long and short portfolios based on the joint strategy.

Table A11 **Cell-based hedge portfolio test based on deciles**

		BM - decile			
		BM1	BM2-9	BM10	
Accrual - decile	Acc1	1.00%	2.06%***	**32.87%***	31.87%*
		(0.35)	(1.73)	**(4.48)**	(3.73)
		891	4,656	**698**	
	Acc2-9	-2.36%***	-0.28%	20.23%*	22.59%*
		(-1.93)	(0.22)	(4.16)	(4.73)
		4,502	40,253	4,953	
	Acc10	**-3.75%*****	-4.29%*	25.42%*	29.17%*
		(-1.71)	(-3.09)	(2.35)	(2.67)
		852	4,799	534	
		4.75%	6.35%*	7.45%	
		(1.37)	(3.46)	(0.55)	

This table shows the abnormal returns for a holding period of a year based upon quarterly rankings of BM ratios and discretionary accruals. Deciles 2-9 have been condensed in one cell. The mean values reported are the means across 64 quarters. Each cell reports the abnormal returns, the *t*-statistic in parentheses and the number of observations. Bold cells represent the long and short portfolios based on the joint strategy.