Meeting Analyst Forecasts and Stock Returns

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Abstract

Firms whose quarterly earning announcements exactly match the most recent analyst consensus forecast enjoy higher long-lasting future returns. These firms tend to be larger and are followed by more analysts, whose forecasts have a smaller dispersion. The same is true for the larger sample of firms which have exactly met either the corresponding forecast or the previous announcement, in at least one of the previous four earning announcements. While the proportion of past quarters when forecasts are exactly met is positively related to future returns, the proportion of past quarters when forecasts are strictly beaten is negatively related to future returns. Return differentials based on past earning surprises are not easily explained by standard risk factors. Moreover, momentum is higher in stocks with non-negative surprises. A simple model shows that firms who anticipate investors' reaction to earnings performance might have incentives to manage their earnings in order to avoid negative surprises, and that exactly matching the forecasts or the previous announcements might help them with this objective. Model simulations show that firms managing earnings might perform better in the long run despite their medium term objective, and that overpricing and subsequent price reversals might occur, if investors ignore fundamentals as long as news are good.

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1 Introduction

This paper reports several relations between firms' past reported earnings and long-run future market performance. First, firms whose earnings announcements exactly match the last available analyst mean forecast have consistently better future returns over a period of five years than otherwise similar firms. The same is true for the larger sample of firms which have exactly met either the corresponding forecast or the previous announcement, in at least one of the previous four earning announcements. Second, firms with a high proportion of past quarters when strictly beating thresholds (either previous earnings or analyst forecasts) in the past two years have lower future returns than otherwise similar firms, while firms with a high proportion of past quarters when exactly meeting these thresholds enjoy higher future returns. At a closer look, this effect is concentrated in firms that meet or beat the analyst expectations. Third, the length of the sequence of past consecutive positive/negative earnings performance has predictive power for future returns. Specifically, in stocks exactly meeting expectations long sequences predict higher returns in the following year, while in stocks strictly beating expectations long sequences predict lower future returns. The various ways to predict returns based on past earnings are consistent, in the sense that the longer the sequence of exactly meeting forecasts, the higher the ratio of exactly meeting forecasts, the lower the ratio of strictly beating forecasts (to the extent that missing forecasts is relatively uncommon), the lower the sequence of strictly beating forecasts. These return differences are significant after controlling for standard risk factors and firm characteristics (size, book-to-market, analyst coverage, analyst forecast dispersion, past returns performance). Moreover, the study shows that momentum is higher in stocks with non-negative surprises. Robustness checks reveal that most of the findings are much more significant in the first half of the sample, 1993 to 2000, than in the second half covering years 2000 to 2007. The study is related and contributes to the literature on earnings surprises, analyst following and return predictability, as detailed below.

The literature on earnings management is vast. Healy and Wahlen [1998] provide a review structured around four important questions: why, how, how much and with what effects do firms manage earnings? There is evidence that firms window-dress earnings in order to show a better performance prior to public offerings, to increase managers' compensation, to avoid violating lending contracts, and to reduce regulatory costs, among others. Numerous studies design detection techniques and try to identify which types of accruals (the difference between accounting earnings and cash flow) are used, often looking at the distribution of earnings and accruals. A large literature examines the capital markets consequences, revealing that current earnings are good predictors of future cash flow performance, and that they are positively related with prices and returns around announcements (this relation is nonlinear, there are thresholds affecting the impact of earnings on the market reaction). Moreover, investors do not always take into account properly the possibility of earnings management, and appear negatively surprised by such allegations. The relation between earnings and prices has been examined to some extent, but no significant relation between earnings and long-run future returns has been documented, to my knowledge, perhaps because such relations are concentrated in a subsample of firms. For instance, prior research did not examine closely firms that *exactly* meet analyst expectations, event though a substantial number of firms exhibit this behavior. Some important findings in the accounting literature on earnings surprises follow.

Burgstahler and Dichev [1997] and Degeorge et al. [1999], among others, show that the distribution of earnings and certain accruals are not smooth, as it would be expected under the null of no earnings management. For instance, the empirical distribution of earnings has "too many" observation slightly above and "too few" observations slightly below thresholds given by zero, the previous announced earnings, and analysts' forecasts.

Burgstahler and Dichev [1997] provide evidence that firms manage reported earnings to avoid earnings decreases and losses. Looking at the cross-sectional distributions of earnings changes and earnings, they find unusually low frequencies of small decreases in earnings and small losses and unusually high frequencies of small increases in earnings and small gains.

Burgstahler and Eames [1998] provide evidence that downward revisions of forecasts occur more frequently when the revision would be sufficient to avoid a negative earnings surprise, suggesting managers influence on analysts forecast revisions. Moreover, Soffer et al. [2000] show that companies increasingly tend to warn investors about forthcoming unfavorable earnings.

Barth et al. [1999] find that firms with patterns of increasing earnings have higher fiscal year end prices and contemporaneous 12-month returns than otherwise similar firms, and that the effect is reduced significantly when a pattern of increasing earnings is broken.

Kinney et al. [2002] find that returns in the seven-day period surrounding earnings announcements are positively related to the magnitude of surprises and controlling for that, negatively related to analysts' forecasts dispersion.

Kasznik and McNichols [2002] find that firms meeting or exceeding expectations have significantly higher earnings forecasts and realized contemporaneous and future earnings than firms that do not, higher returns ending in the announcement month, as well as higher price three months after fiscal year end, the effect being stronger in firms followed by more analysts. Moreover, the higher stock prices of these firms are not fully explained by higher expected future earnings. They also find no significant market-adjusted returns one, two and three years after meeting expectations, that would indicate reversals of prior gains. In contrast, this study shows that reversals exist after periods with many positive earnings.

Similarly, Bartov et al. [2002] find that firms that meet or beat current analysts earnings expectations enjoy a higher return (by around 3 %) over the quarter than similar firms that fail to meet these expectations, controlling for current and past earnings. Examinations of abnormal returns over both a short window (consisting of the following quarter) and longer windows (up to three years following the earnings announcement) do not detect return reversals. After controlling for the forecast error (reported earnings minus earning forecasts at the beginning of the quarter), firms that meet or beat the forecasts in a given quarter exhibit significantly better accounting performance (return-on-assets, return-on-equity, prevalence of losses, the market-to-book ratio, the profit margin, and sales and earnings growth) over the following two years than firms that fail to meet earnings expectations.

Finally, Skinner and Sloan [2002] find that the under-performance of growth stocks relative to value stocks is highly concentrated around negative earning surprises. Negative surprises are as likely to happen in value and in growth stocks, but the magnitude of the negative effect on returns around announcement dates is higher in growth stocks. They measure the earnings surprise for a quarter by subtracting the median forecast of quarterly EPS (earnings-per-share) from realized quarterly EPS.

The finance literature has examined earnings surprises from a slightly different angle, by comparing current realized earnings with a measure of "normal" earnings. For instance, Chan et al. [1996] show that stocks with high SUE (standardized unexpected earnings, earnings surprises normalized by the standard deviation of earnings) outperform stocks with low SUE in the following six months, and that this effect is distinct from the momentum effect documented by Jegadeesh and Titman [1993] (past medium-term winners outperform past medium-term losers over the following year). Earnings to price ratios are also shown to have predictive power for future returns (Fama and French [1992]). The paper contributes to this literature on predicting returns with earnings information, and shows that the return differentials documented here are not easily explained in risk factor models such as the Fama and French [1992] model. This approach is different from that in the accounting literature, where financial risk is controlled for using accounting measures such as the debt-to-equity ratio or earnings variability.

A large literature examines how financial analysts impact stock returns. Diether et al. [2002] show that stocks with high dispersion in analysts' forecasts have lower future returns than stocks with low dispersion, supporting the idea that stocks with high dispersion are held by optimist investors, and their overpricing is corrected as they experience return reversals in the medium-term (over the next few months). This effect is stronger in small stocks, and does not significantly impact returns beyond 12 months. Since stocks that exactly meet analysts' forecasts exhibit a much lower dispersion in forecasts, this lower dispersion might explain part of the higher future returns. However, stocks that exactly meet forecasts tend to be larger, and they perform better consistently over five years, so the lower dispersion does not explain the findings completely.

Hong et al. [2000] provide evidence that analyst coverage impacts the speed of information diffusion. Specifically, negative momentum (past losers continue to be losers in the future) is more pronounced in stocks with low analyst coverage. In contrast, this study shows that momentum is higher in stocks with non-negative surprises (especially the positive momentum, past winners continue to be winners in the future), which tend to have a higher analyst coverage.

This study contributes to the literature by providing evidence that the path of realized earnings and earning surprises is informative for future returns beyond the effect of analyst coverage and analyst forecast dispersion already documented. Moreover, return differentials based on this information are not easily explained by standard risk models.

A simple model offers an intuition for the two effects. Larger firms, followed by more analysts, have more incentives and lower costs of managing earnings. They anticipate that investors value positive results (either relative to past earnings or to relative to analyst forecasts), so they manage earnings to avoid negative results. In the model, they often choose to report exactly the forecast, because reporting higher earnings now has two negative effects: it raises the bar for future announcements and it lowers the feasible set for future announcements; this might exceed the benefit of high short-term results. Firms' strategy turns out to work, and they enjoy good long-lasting market performance. In order to explain reversals, the model is slightly modified by making investors sensitive about the firms fundamentals. Specifically, they ignore the fundamental value as long as reported results are good, but revise their expectations using the fundamental value when earning reports are bad. Then, firms with long streaks of positive performance tend to become overpriced, and experience higher return reversals when bad news arrive.

The model takes for granted investors' expectations, which can be substantiated by behavioral observations. Using thresholds in order to categorize information is a way for investors simplify the complex data. The prospect theory developed by Kahneman and Tversky [2000] provides evidence that individuals evaluate risky alternatives as changes from a reference point, where the utility exhibits a kink, being steeper below this reference point. Benchmarks such as past earnings or forecasts are easily available, and there is anecdotal evidence that firms that slightly missed the benchmark were severely punished (see Skinner and Sloan [2002]). These benchmarks can easily become focal points if some market participants anticipate that others will use these benchmarks. Evidence of earnings management to meet the thresholds (see Burgstahler and Dichev [1997]) is consistent with the management anticipating the market's reaction and acting accordingly.

The idea that investors overreact to a long record of good news, making such stocks overpriced, has been modeled, among others, by Barberis et al. [1998]. They derive this behavior from a more primitive assumption that investors believe that earnings either follow a trend or oscillate (ignoring their true nature of a random walk) and use realized earnings to update the probability of each case. At its turn, this assumption can be grounded in two known biases: "conservatism" (slow updating of models in the face of new evidence, see Edwards [1968]) and "representativeness" (tendency of experimental subjects to view events as typical or representative of some specific class and to ignore the laws of probability in the process, see Kahneman and Tversky [2000]). Here, both biases are directly embedded in investors' expectations, through the assumption that they ignore fundamentals (conservatism) as long as news follow a consistent sequence (representativeness).

The paper proceeds as follows. Section 2 describes the data and presents initial empirical findings. Section 3 uses Fama-MacBeth regressions (see Fama and MacBeth [1973]) to refine these findings. Section 4 examines the results using risk factor models and conducts robustness checks. Section 5 develops the model. Section 6 concludes.

2 Initial Results

2.1 Data

The data in this study consists of firm-months selected on the following criteria:

Return data for the month is available on CRSP, the price at the end of the month is greater than $5, the share is classified as common (share code 10 or 11) and trades on one of the three major exchanges (NYSE, AMEX or NASDAQ), and the market capitalization is above the cutoff for the bottom NYSE decile for that month. For a given firm-month, past returns are cumulated only if there are no missing monthly returns for that period. Future returns are cumulated by treating missing returns as zero[1].

Some parts of the study use information on book-to-market (B/M), which is obtained from the quarterly COMPUSTAT files. For a given firm-month, the data for the reported information during the past quarter is used. Future excess returns with respect to the size and book-to-market matched portfolios are computed as follows: each month, selected stocks are ranked independently in size and book-to-market quintiles, and the future returns of the 25 size-B/M equal-weighted portfolios are computed; then, for a given firm-month, the corresponding portfolio future return is subtracted from the stock future return.

Data on analyst earnings forecasts and actual reported earnings is from the quarterly First Call Historical Database, which covers consistently years from 1990 on. New summary statistics are generated each time a broker begins or ends coverage of a security, revises an estimate, or begins or ends participation in First Calls database, and only the most recent estimate made by each broker is used in the summary statistics calculation. This study uses the last consensus forecast available for a given security and a given quarter, before the actual report. Of particular interest are the mean and standard deviation of the forecasts for earnings-per-share (EPS). In this study, earnings surprises relative to forecasts are captured by the variable $News$, which takes values -1 if reported earnings are smaller than the last available mean consensus forecast, 0 if it is precisely the same, and 1 if the report beats the consensus. The standard deviation of the forecasts is important because it proxies for dispersion of opinion, and has been observed to impact future returns (Diether et al. [2002]).

To sum up, the paper uses firm-months selected from CRSP for which there is information in First Call about past earnings surprises (at least one surprise available in the past year). For some parts of the study firm-years are required to be matched with recent (past quarter) fundamental-to-price ratios from COMPUSTAT[2].

Table 1 shows the number, as well as the size and B/M distributions, as of January of each year, of the firms in the sample. The left pane shows the size distribution of stocks with information in both CRSP and First Call, relative to the size quintiles based on the selected stocks from CRSP. The right pane shows the B/M distribution of stocks with information in both CRSP, First Call and COMPUSTAT, relative to the stocks from CRSP for which there is available B/M information on COMPUSTAT.

Since prior to 1993 the number of firms in the sample is too small, this study

[1]Effectively, these buy-and-hold future returns are computed by assuming that once the stock is delisted the proceeds are not re-invested during the period. If both the return and the delisting return are available for a given month, they are cumulated; if only the delisting return is available, this return is used as the monthly return; if neither are available, the monthly return is assumed to be zero. If the delisting code is available, but not the delisting return, then the latter is computed as the mean of the available delisting returns within the same share code and exchange.

[2]The "PERMNO" identifier from CRSP is matched with the "CUSIP" identifier from COMPUSTAT and First Call using the table "Cstlink" provided by CRSP.

Table 1: Number of firms and size and B/M quintile distributions

This table shows the size and B/M distributions, as of January of each year, of the firms with available earnings surprises, for which data on returns, size and B/M is also available. The left pane shows the size distribution of stocks with information in both CRSP and First Call, relative to the size quintiles based on the selected stocks from CRSP. The right pane shows the B/M distribution of stocks with information in both CRSP, First Call and COMPUSTAT, relative to the stocks from CRSP for which there is available B/M information on COMPUSTAT.

	Fraction of firms in size quintile (%)						Fraction of firms in B/M quintile (%)					
	Small				Big	Number	Low				High	Number
Year	Q1	Q2	Q3	Q4	Q5	of firms	Q1	Q2	Q3	Q4	Q5	of firms
1991	15	19	19	27	19	26	6	33	28	6	28	18
1992	12	17	21	35	15	718	9	14	21	25	31	718
1993	15	16	21	23	25	1916	15	19	20	22	23	1230
1994	15	17	21	22	25	2223	16	19	21	21	23	1464
1995	16	18	22	21	24	2360	16	20	20	22	22	1615
1996	17	18	21	22	23	2602	17	20	21	22	21	1857
1997	16	18	21	21	23	2843	18	19	20	21	22	1953
1998	18	18	20	21	23	2778	18	20	21	21	21	1893
1999	19	19	20	21	22	2900	19	20	20	20	20	1998
2000	18	19	20	21	21	3029	17	20	21	21	21	2093
2001	19	19	20	21	21	2822	19	20	21	21	20	2045
2002	19	19	20	21	21	2616	19	20	20	20	20	1876
2003	19	19	20	20	21	2229	19	20	20	21	20	1554
2004	19	20	20	20	21	2335	20	20	20	20	20	1589
2005	19	19	20	20	22	2157	19	20	20	20	20	1437
2006	19	19	20	20	21	2238	20	20	20	20	20	1516

covers the years 1993-2006[3]. Requiring information from COMPUSTAT significantly reduces the sample. However, this does not affect the main results, so for most of the paper, results are reported for excess returns (relative to size and B/M), since this alleviates the concern that the size and B/M effects described by Fama and French [1992] are responsible for the results.

The stocks covered by analysts reporting to First Call are slightly larger in market capitalization and have a higher B/M relative to the selected stocks that are not necessarily covered, the differences being concentrated in the first years of coverage. The fact that the differences are generally small is partly due to excluding firms in the bottom NYSE size decile.

For convenience, the variables used in the empirical analysis are listed and described in Table 2.

[3]Year 2007 is excluded because a minimum of one year of future returns is required.

Table 2: Description of empirical variables

This table lists and describes the variables used in the empirical analysis.

Variable	Description
$R_{m,n}$ ($R^{ex}_{m,n}$)	Cumulative (excess) return from month m to month n, relative to the present. Returns are in excess of size and book-to-market matched portfolio returns.
$News$	Takes values 1, 0, -1 iff announced earnings beat, are strictly equal to, or miss the last available consensus forecast, respectively.
$News\_EPS$	Takes values 1, 0, -1 iff announced earnings beat, are strictly equal to, or miss previous reported earnings, respectively.
EPD	Earnings per dollar, computed as earnings per share divided by the share price.
σ_{EPD}	Standard deviation of the consensus EPD forecast prior to the earnings announcement.
News_pp (EPS_pp)	Number of consecutive past periods (quarters) with $News = 1$ ($News\_EPS = 1$), if most recent quarter has $News = 1$ ($News\_EPS = 1$), otherwise equals to 0.
News_p (EPS_p)	Number of consecutive past periods (quarters) with $News = 1$ or $News = 0$ ($News\_EPS = 1$ or $News\_EPS = 0$), if most recent quarter has $News = 1$ or $News = 0$ ($News\_EPS = 1$ or $News\_EPS = 0$), otherwise equals to 0.
News_0 (EPS_0)	Number of consecutive past periods (quarters) with $News = 0$ ($News\_EPS = 0$), if most recent quarter has $News = 0$ ($News\_EPS = 0$), otherwise equals to 0.
News_n (EPS_n)	Number of consecutive past periods (quarters) with $News = -1$ ($News\_EPS = -1$), if most recent quarter has $News = -1$ ($News\_EPS = -1$), otherwise equals to 0.
Rat_news_pos	Ratio of quarters with $News = 1$ in the past two years.
Rat_news_0	Ratio of quarters with $News = 0$ in the past two years.
Rat_eps_pos	Ratio of quarters with $News\_EPS = 1$ in the past two years.
Rat_eps_0	Ratio of quarters with $News\_EPS = 0$ in the past two years.
Rat_fut _news(_eps)_pos(_0)	Same, but for future two years.
Fut_1(2,3,4)_news	The $News$ variable 1,2,3 and 4 quarters into the future.
Fut_1(2,3,4)_eps	The $News\_EPS$ variable 1,2,3 and 4 quarters into the future.
Is_news_0(_1)	Takes the value 1 iff $News = 0$ ($News = 1$) and the value 0 otherwise.
Is_eps_0(_1)	Takes the value 1 iff $News\_EPS = 0$ ($News\_EPS = 1$); takes the value 0 otherwise.
Fut_1(2,3,4)_news_0(_1)	The Is_news_0 (Is_news_1) variable 1 (2,3,4) quarters into the future.
Fut_1(2,3,4)_eps_0(_1)	The Is_eps_0 (Is_eps_1) variable 1 (2,3,4) quarters into the future.
Meet_past_4	Takes the value 1 iff either Is_news_0 or Is_eps_0 take the value 1 for one of the past four earning announcements.
Int_n0_r1 (Int_n0_r2)	$Is\_news\_0 \cdot R_{-3,-1}$ ($Is\_news\_0 \cdot R_{-6,-3}$)
Int_n1_r1 (Int_n1_r2)	$Is\_news\_1 \cdot R_{-3,-1}$ ($Is\_news\_1 \cdot R_{-6,-3}$)
Int_size_rn_p(_0)	$Size \cdot Rat\_news\_pos$ ($Size \cdot Rat\_news\_0$)

2.2 Initial results

Table 3 shows the mean future buy-and-hold excess returns, relative to the size and B/M benchmarks, for the equal weighted portfolios based on past returns and on the $News$ variable described earlier. Specifically, each month stocks are ranked independently based on $R_{-6,-3}$, $R_{-3,-1}$ and $News$, in $3 \cdot 3 \cdot 3$ portfolios. For past returns, 0 denotes the low performers and 2 denotes the high performers. Both $R_{-6,-3}$ and $R_{-3,-1}$ are considered, because there is evidence that consistency in past performance predicts future returns (Grinblatt and Moskowitz [2004]), so this helps strengthening any observed patterns. $R_{-1,0}$ is omitted to help alleviate concerns about microstructure effects. Future excess return are observed for each portfolio each month, and the table reports the time series averages. Analyst following and analyst dispersion of opinion measures are also reported.

A strong pattern emerges: controlling for past returns, size and B/M, firms with $News = 0$ (firms that exactly meet expectations) perform better than firms that strictly beat or miss expectations, consistently in the subsequent five years. P-values for this difference in performance are Newey-West adjusted at 15 lags, and are very significant for the future performance over the following three years. The difference between the future returns of firms with $News = 1$ and firms with $News = -1$ is difficult to judge. In the next 6 months firms that beat expectations appear to do slightly better. Most firms strictly beat expectations, and a significant number of firms (around 20%) exactly match expectations. Momentum in the first year and reversals in the second and thirs years are also observed. Moreover, controlling for past returns, firms with $News = 0$ are larger in market capitalization than firms with $News = 1$, which at their turn are larger than firms with $News = -1$. Furthermore, stocks with $News = 0$ are followed by more analysts. Also, the consensus EPD forecasts prior to the earnings announcement for these stocks have a smaller dispersion, as measured by the standard deviation ($\sigma_{forecast} EPD$); this smaller dispersion might be due in part to the higher number of forecasts, but it cannot be explained entirely by it. Stocks with $News = 1$ are followed by more analysts, and have a smaller EPD forecast dispersion, than stocks with $News = -1$.

In order to understand whether stocks in different $News$ categories are also different in other relevant aspects, Table 4 examines past earnings performance measures, for the same portfolios sorted on past returns and $News$.

Indeed, Table 4 highlights other systematic differences among stocks in different $News$ categories, controlling for past returns. The table suggests that there is persistence in past earnings announcements behavior. Specifically, stocks with $News = 1$ have on average 2.5 previous consecutive quarters with $News = 1$, which is consistent with an average length of 5 consecutive quarters with $News = 1$ [4]. Stocks with $News = 0$ have the longest streak of non-negative $News$, namely around 9 consecutive quarters on average, while stocks with $News = 1$ have around 8 consecutive quarters of non-negative $News$. Stocks with $News = 0$ have on average two consecutive quarters of exactly matching analyst forecasts, which strengthens the case for the distribution of announced earnings not being smooth around these forecasts

[4] An average length of *previous* consecutive quarters of L implies an average length of consecutive quarters of $2 \cdot L$: $(1 + 2 + \cdots + 2L)/(2L) = L + 1/2$

Table 3: Future excess returns, controlling for past returns and $News$

Each month stocks are ranked based on $R_{-6,-3}$, $R_{-3,-1}$ and $News$, in $3 \cdot 3 \cdot 3$ portfolios. For past returns, 0 denotes the low performers and 2 denotes the high performers. Future excess return (with respect to the size and B/M benchmark portfolios) are observed for each portfolio each month, and the table reports the time series averages. The variables are explained in Table 2. P-values are Newey-West adjusted at 15 lags.

Rank for $R_{-6,-3}$	Rank for $R_{-3,-1}$	News	News with 5 % band (%)	N	Number analysts	EPD (%)	σ_{EPD} (%)	Financial (%)	Size (MM $)	$R^{ex}_{0,6}$ (%)	$R^{ex}_{6,12}$ (%)	$R^{ex}_{12,24}$ (%)	$R^{ex}_{24,36}$ (%)	$R^{ex}_{36,60}$ (%)
0	0	-1	-85	95	5.44	0.65	0.48	12	2317	-3.12	-0.25	2.40	2.62	-1.08
0	0	0	0	58	6.82	1.00	0.07	11	3593	-1.47	1.40	7.12	7.32	3.64
0	0	1	74	108	5.98	0.36	0.22	11	2985	-4.33	-1.25	3.37	2.84	-1.57
0	1	-1	-79	73	5.06	1.01	0.30	20	3078	-1.50	-0.41	-0.80	-0.35	-0.96
0	1	0	0	55	6.57	1.01	0.03	19	5198	0.22	1.24	3.77	4.68	3.30
0	1	1	71	119	5.85	0.91	0.14	18	4680	-0.76	0.12	-0.34	1.04	-3.38
0	2	-1	-85	68	4.75	0.57	0.45	13	2517	-1.64	0.14	-0.71	1.55	-0.24
0	2	0	0	58	6.17	0.76	0.06	14	3772	0.95	2.48	6.11	6.81	6.45
0	2	1	80	155	5.51	0.55	0.13	13	3194	-0.54	0.14	0.43	0.37	-0.55
1	0	-1	-78	78	5.08	1.22	0.29	21	3483	-1.11	0.03	-0.85	1.05	-0.10
1	0	0	0	59	6.63	1.09	0.05	19	5366	0.80	2.51	2.97	3.05	2.28
1	0	1	70	113	5.88	1.03	0.12	18	4437	-0.63	-0.04	0.15	1.36	-2.97
1	1	-1	-70	73	4.73	1.19	0.15	31	3553	-0.49	-0.05	-1.80	-1.56	0.90
1	1	0	0	71	6.34	1.04	0.04	31	6490	1.57	1.91	2.93	1.45	1.76
1	1	1	68	159	5.76	1.14	0.08	27	5505	0.40	0.48	0.08	-1.22	-0.50
1	2	-1	-77	43	4.59	0.75	0.25	23	3244	-0.13	0.79	-2.12	-0.65	2.94
1	2	0	0	48	6.12	0.79	0.04	22	4988	3.11	4.26	4.09	1.38	4.47
1	2	1	77	143	5.53	0.85	0.09	21	4254	1.08	0.63	-0.09	-1.74	-1.27
2	0	-1	-83	70	4.74	0.68	0.35	15	2432	-0.33	-1.41	-0.95	1.64	2.95
2	0	0	0	61	6.11	0.84	0.05	14	3768	2.79	2.33	6.53	5.94	8.80
2	0	1	77	146	5.39	0.65	0.14	13	3041	0.11	-0.74	0.03	-0.75	0.22
2	1	-1	-78	46	4.51	0.77	0.21	24	3219	0.16	0.28	-1.56	-0.89	3.09
2	1	0	0	51	6.16	0.81	0.04	22	5046	3.08	3.20	4.67	1.54	5.48
2	1	1	76	145	5.53	0.87	0.09	20	4399	1.67	0.38	-0.08	-2.32	-0.67
2	2	-1	-85	38	4.16	0.29	0.29	15	2014	3.24	2.59	-2.85	-2.80	5.36
2	2	0	0	46	5.71	0.54	0.04	16	3767	8.58	3.90	7.02	0.69	12.02
2	2	1	85	170	5.12	0.62	0.09	14	3222	3.57	0.11	-1.66	-3.34	3.94
P-value, $News = 0$ vs. $News \neq 0$ (%)					0	30	0	41	0	0	0	0	0.3	6.3

Table 4: Past earnings performance, controlling for past returns and *News*

This table examines past earnings performance measures, for the equal weighted portfolios formed by sorting firms on past returns and *News*. Portfolio characteristics are observed each month, and the table reports the time series averages. The variables are explained in Table 2.

Rank $R_{-6,-3}$	Rank $R_{-3,0}$	News	News_pp	News_p	News_0	News_n	Eps_pp	Eps_p	Eps_0	Eps_n	Ratio_ news_pos	Ratio_ news_0	Ratio_ eps_pos	Ratio_ eps_0
0	0	-1				1.729	0.370	0.508	0.059	1.069	0.385	0.146	0.477	0.053
0	0	0		4.601	1.564		0.765	1.371	0.160	0.629	0.405	0.450	0.544	0.100
0	0	1	2.637	3.934			1.068	1.334	0.051	0.551	0.700	0.125	0.575	0.053
0	1	-1				1.765	0.448	0.628	0.074	0.938	0.371	0.147	0.483	0.059
0	1	0		4.353	1.635		0.778	1.444	0.182	0.560	0.371	0.472	0.544	0.109
0	1	1	2.455	3.895			1.091	1.413	0.053	0.464	0.663	0.145	0.575	0.056
0	2	-1				1.802	0.446	0.596	0.064	0.975	0.356	0.137	0.470	0.056
0	2	0		4.178	1.625		0.803	1.482	0.184	0.545	0.362	0.487	0.544	0.115
0	2	1	2.397	3.783			1.172	1.498	0.050	0.421	0.673	0.144	0.585	0.057
1	0	-1				1.657	0.469	0.663	0.071	0.912	0.381	0.146	0.491	0.059
1	0	0		4.659	1.600		0.870	1.580	0.173	0.518	0.382	0.472	0.553	0.108
1	0	1	2.689	4.124			1.188	1.529	0.053	0.446	0.688	0.138	0.587	0.055
1	1	-1				1.716	0.528	0.776	0.095	0.798	0.364	0.147	0.496	0.068
1	1	0		4.370	1.643		0.928	1.775	0.208	0.445	0.361	0.479	0.558	0.118
1	1	1	2.596	4.123			1.214	1.608	0.052	0.385	0.661	0.156	0.587	0.060
1	2	-1				1.695	0.531	0.756	0.081	0.848	0.358	0.140	0.492	0.064
1	2	0		4.305	1.668		0.914	1.773	0.224	0.419	0.346	0.504	0.551	0.133
1	2	1	2.554	4.084			1.285	1.681	0.050	0.355	0.670	0.156	0.598	0.062
2	0	-1				1.579	0.513	0.714	0.070	0.880	0.375	0.137	0.488	0.059
2	0	0		4.402	1.545		0.906	1.645	0.193	0.477	0.378	0.482	0.555	0.116
2	0	1	2.761	4.110			1.298	1.658	0.055	0.384	0.704	0.135	0.604	0.058
2	1	-1				1.631	0.559	0.812	0.085	0.819	0.365	0.135	0.492	0.065
2	1	0		4.299	1.611		0.975	1.847	0.208	0.411	0.358	0.495	0.560	0.126
2	1	1	2.704	4.225			1.333	1.750	0.054	0.343	0.682	0.152	0.604	0.062
2	2	-1				1.680	0.511	0.759	0.087	0.860	0.330	0.126	0.471	0.065
2	2	0		4.090	1.605		0.938	1.842	0.226	0.381	0.337	0.522	0.555	0.142
2	2	1	2.595	4.004			1.392	1.813	0.050	0.308	0.683	0.154	0.616	0.067

(see Burgstahler and Dichev [1997] and Degeorge et al. [1999]). Also, stocks with $News = -1$ have on average 2 to 3 consecutive quarters of missing forecasts.

Examining columns "Eps_pp", "Eps_p", "Eps_0" and "Eps_n", that capture a firm's persistence in beating, meeting or missing a previous announcement (see Table 2), there appears to be a positive correlation between a firm's ability to beat or meet the forecast and its ability to beat or meet previous announcements. This is expected, since both are positively related to high earnings. In particular, firms with $News = 0$ or $News = 1$ have a much better ability to meet or beat previous announcements than firms with $News = -1$. Looking at "Eps_p", it is interesting that firms with $News = 0$ behave much more like firms with $News = 1$ than like firms with $News = -1$, supporting the idea that the distribution of earnings is not smooth around forecasts and previous announcements. In fact, stocks with $News = 0$ seem to have even longer streaks of non-negative earnings increments than stocks with $News = 1$.

Columns "Ratio_news_pos" and "Ratio_eps_pos" show that ratios of quarters with strictly positive news and increments in the past two years are monotonically increasing in $News$, while "Ratio_news_0" and "Ratio_eps_0" are highest for stocks with $News = 0$.

To sum up, stocks with $News = 0$ distinguish themselves as being larger and followed by more analysts, who have a smaller dispersion of opinion. These stocks have slightly longer streaks of meeting or beating analyst forecasts and previous announcements than stocks with $News = 1$, and much longer streaks than stocks with $News = -1$. These findings are not consistent with the hypothesis of no earnings management by firms, under which the sample of firms with $News = 0$ should be very small in the first place, and these firms should behave somewhere in between firms with $News = 1$ and firms with $News = -1$. However, these findings are consistent with the hypothesis, defended among others by Burgstahler and Dichev [1997] and Degeorge et al. [1999], that some firms manage earnings in order to meet or beat analyst forecasts and previous earnings. Moreover, in light of these findings, the fact that firms with $News = 0$ enjoy higher future stock returns is consistent with Barth et al. [1999] who find that firms with patterns of positive increments in earnings have higher fiscal year end prices, and that the effect is significantly reduced when these patterns are broken. More broadly, the findings from Table 3 and Table 4 are consistent with Kasznik and McNichols [2002] and Bartov et al. [2002] who find that firms that meet or beat expectations enjoy high contemporaneous returns. However, previous studies examined the market performance of stocks that meet or beat expectations, while this study examines explicitly firms that exactly meet expectations.

Even though these results are consistent with previous literature, they are not completely explained by extant theories, to my knowledge. For instance, it is known than stocks with high analyst forecast dispersion have lower future returns than stocks with low dispersion (see Diether et al. [2002]), and that this effect is stronger in small stocks, and does not significantly impact returns beyond 12 months. Since stocks that exactly meet analysts' forecasts exhibit a much lower dispersion in forecasts, this lower dispersion might explain part of the higher future returns. However, stocks that exactly meet forecasts tend to be larger, and they perform better consistently over five years, so the lower dispersion does not explain the findings completely.

The following hypothesis emerges: Larger firms, followed by more analysts, have more incentives and lower costs of managing earnings. They anticipate that investors value positive results, either relative to past earnings or to relative to analyst forecasts, so they manage earnings to avoid negative results. Firms' strategy turns out to work, and they enjoy good long-lasting market performance. However, under these circumstances it is not clear why a significant number of firms choose to report exactly the forecast, or why these firms have a lower analyst forecast dispersion. These issues will be elaborated later on.

According to the hypothesis above, firms with $News = 0$ should be more prone to meet or beat analyst forecasts and previous announcements in the future. Table 5 examines the average $News$ and $News\_EPS$, up to four quarters in the future, for the equal weighted portfolios sorted on past returns and $News$. These averages can be interpreted as the empirical probability of earnings meeting or beating the respective benchmark.

The table confirms that firms with $News = 0$ are the most prone to meet both previous earning announcements and analyst forecasts in each of the following four quarters. However, firms with $News = 1$ "outperform" firms with $News = 0$ at the probability of beating forecasts in the future four quarters.

The hypothesis that firms with $News = 0$ have higher future returns as a result of earnings management implies that, more broadly, firms with evidence of earnings management in the past should have better market performance, as well as more evidence of earnings management, in the future. Table 6 examines the future market and earnings performance of portfolios sorted on past returns and $Meets\_past\_4$. P-values for the differences between stocks with $Meets\_past\_4 = 0$ and $Meets\_past\_4 \neq 0$ are Newey-West adjusted at 20 lags.

The table confirms that the large sample of firms with $Meets\_past\_4 = 0$, which comprises more than 50% of the average cross-section, performs significantly better in the future than the sample of frms with $Meets\_past\_4 \neq 0$. Moreover, firms with $Meets\_past\_4 = 0$ are almost twice as likely to exactly meet forecasts or previous announcements during the future two years. A slightly higher, but significant, proportion of these stocks are listed as financial firms. Moreover, the analyst dispersion for these stocks is much lower.

Previous literature, such as Barth et al. [1999], documents that patterns of increasing earnings have predictive power for future returns. In the same spirit, Table 7 examines whether the length of the streaks of positive, zero or negative $News$ (variables "News_pp", "News_0" and "News_n") has an impact on future returns, future $News$ and future $News\_EPS$. Specifically, each month stocks are sorted independently into quartiles according to $R_{-6,0}$, and into eight bins according to "News_pp", "News_0" and "News_n", forming $4 \cdot 8 = 32$ portfolios. Specifically, bins 0, 1 and 2 rank stocks with positive "News_n" according to "News_n" increasingly; bins 3 and 4 rank stocks with positive "News_0" according to "News_0" increasingly; finally, bins 5, 6 and 7 rank stocks with positive "News_pp" according to "News_pp" increasingly.

Table 7 indicates that in stocks with $News = 0$, a longer streak of exactly meeting analyst forecasts predicts higher future excess returns over the following year, a larger

Table 5: Present and future earnings performance, controlling for past returns and News

This table examines present and future earnings performance measures, for the equal weighted portfolios formed by sorting firms on past returns and *News*. Portfolio characteristics are observed each month, and the table reports the time series averages. The variables are explained in Table 2.

Rank $R_{-6,-3}$	Rank $R_{-3,0}$	News	Ratio_fut news_pos	Ratio_fut news_0	Ratio_fut eps_pos	Ratio_fut eps_0	Fut_1 news_0	Fut_2 news_0	Fut_1 news_1	Fut_2 news_1	Fut_1 eps_0	Fut_2 eps_0	Fut_1 eps_1	Fut_2 eps_1
0	0	-1	0.456	0.138	0.525	0.050	0.140	0.141	0.385	0.435	0.046	0.051	0.504	0.526
0	0	0	0.449	0.286	0.507	0.092	0.333	0.298	0.393	0.417	0.097	0.092	0.463	0.493
0	0	1	0.557	0.159	0.505	0.054	0.161	0.171	0.570	0.550	0.057	0.056	0.443	0.493
0	1	-1	0.467	0.144	0.535	0.053	0.144	0.148	0.415	0.444	0.043	0.056	0.563	0.520
0	1	0	0.443	0.315	0.531	0.096	0.360	0.323	0.390	0.427	0.093	0.097	0.540	0.516
0	1	1	0.566	0.172	0.523	0.058	0.179	0.180	0.582	0.569	0.060	0.060	0.491	0.515
0	2	-1	0.462	0.145	0.546	0.050	0.144	0.144	0.421	0.457	0.041	0.053	0.596	0.538
0	2	0	0.447	0.319	0.547	0.101	0.360	0.331	0.419	0.446	0.105	0.105	0.579	0.529
0	2	1	0.580	0.173	0.535	0.060	0.170	0.176	0.624	0.592	0.063	0.062	0.537	0.534
1	0	-1	0.459	0.152	0.529	0.053	0.151	0.153	0.411	0.444	0.052	0.052	0.547	0.521
1	0	0	0.450	0.315	0.533	0.096	0.345	0.332	0.421	0.430	0.101	0.093	0.533	0.523
1	0	1	0.568	0.177	0.524	0.058	0.180	0.182	0.588	0.573	0.064	0.057	0.486	0.512
1	1	-1	0.464	0.158	0.543	0.061	0.161	0.168	0.423	0.447	0.058	0.062	0.599	0.529
1	1	0	0.447	0.331	0.560	0.101	0.367	0.352	0.416	0.439	0.102	0.109	0.594	0.543
1	1	1	0.583	0.181	0.541	0.062	0.177	0.186	0.615	0.595	0.065	0.066	0.525	0.538
1	2	-1	0.470	0.154	0.560	0.058	0.159	0.155	0.432	0.464	0.048	0.057	0.634	0.545
1	2	0	0.453	0.342	0.570	0.113	0.386	0.361	0.425	0.457	0.112	0.126	0.632	0.547
1	2	1	0.596	0.180	0.555	0.063	0.176	0.182	0.646	0.618	0.069	0.066	0.570	0.555
2	0	-1	0.457	0.145	0.533	0.055	0.147	0.151	0.412	0.448	0.051	0.056	0.558	0.526
2	0	0	0.456	0.313	0.540	0.103	0.357	0.334	0.416	0.445	0.114	0.113	0.551	0.514
2	0	1	0.581	0.174	0.532	0.061	0.175	0.176	0.621	0.595	0.063	0.065	0.524	0.520
2	1	-1	0.466	0.154	0.558	0.059	0.160	0.157	0.425	0.458	0.051	0.062	0.626	0.540
2	1	0	0.457	0.339	0.572	0.109	0.370	0.357	0.434	0.451	0.109	0.122	0.624	0.557
2	1	1	0.597	0.182	0.554	0.062	0.175	0.180	0.653	0.623	0.065	0.068	0.565	0.552
2	2	-1	0.475	0.144	0.569	0.055	0.145	0.138	0.446	0.480	0.047	0.054	0.664	0.560
2	2	0	0.474	0.332	0.588	0.113	0.376	0.347	0.460	0.477	0.115	0.129	0.668	0.570
2	2	1	0.618	0.174	0.568	0.062	0.159	0.175	0.700	0.648	0.066	0.069	0.614	0.576

Table 6: Future market and earnings performance, controlling for past returns and $Meets\_past\_4$

This table examines present and future earnings performance measures, for the equal weighted portfolios formed by sorting firms on past returns and $Meets\_past\_4$. Portfolio characteristics are observed each month, and the table reports the time series averages. The variables are explained in Table 2.

Rank for $R_{-6,-3}$	Rank for $R_{-3,-1}$	Meets past_4	N	σ_{EPD} (%)	Financial (%)	$R^{ex}_{0,6}$ (%)	$R^{ex}_{6,12}$ (%)	$R^{ex}_{12,24}$ (%)	$R^{ex}_{24,36}$ (%)	$R^{ex}_{36,60}$ (%)	Rat_fut news_pos	Rat_fut news_0	Rat_fut eps_pos	Rat_fut eps_0
0	0	0	123.958	0.0044	0.105	-0.051	-0.022	0.010	0.030	-0.010	0.523	0.126	0.509	0.045
0	0	1	136.726	0.0017	0.119	-0.019	0.012	0.063	0.041	0.005	0.473	0.228	0.519	0.076
0	1	0	108.405	0.0024	0.167	-0.017	-0.006	-0.008	0.004	-0.031	0.542	0.130	0.524	0.045
0	1	1	138.345	0.0013	0.199	0.000	0.009	0.015	0.023	0.005	0.485	0.248	0.533	0.081
0	2	0	128.702	0.0032	0.120	-0.019	-0.010	-0.015	0.009	-0.007	0.551	0.137	0.531	0.048
0	2	1	152.387	0.0011	0.144	0.006	0.021	0.040	0.031	0.029	0.502	0.248	0.548	0.083
1	0	0	111.601	0.0024	0.174	-0.015	-0.001	-0.009	0.014	-0.046	0.541	0.136	0.524	0.045
1	0	1	137.857	0.0009	0.205	0.003	0.011	0.019	0.018	0.024	0.477	0.257	0.531	0.083
1	1	0	126.887	0.0012	0.258	-0.005	-0.002	-0.009	-0.009	-0.017	0.564	0.137	0.542	0.046
1	1	1	175.613	0.0006	0.302	0.012	0.013	0.014	-0.001	0.015	0.493	0.265	0.551	0.090
1	2	0	100.881	0.0015	0.203	-0.001	0.004	-0.015	-0.010	-0.012	0.580	0.138	0.550	0.050
1	2	1	133.708	0.0008	0.220	0.024	0.022	0.020	-0.006	0.024	0.516	0.265	0.567	0.092
2	0	0	131.440	0.0026	0.127	-0.010	-0.023	-0.014	0.001	-0.001	0.550	0.139	0.527	0.050
2	0	1	145.560	0.0012	0.147	0.018	0.014	0.034	0.028	0.064	0.495	0.252	0.541	0.087
2	1	0	106.530	0.0014	0.196	-0.001	-0.004	-0.010	-0.021	-0.002	0.580	0.142	0.549	0.050
2	1	1	135.119	0.0007	0.218	0.031	0.020	0.021	-0.002	0.029	0.514	0.267	0.565	0.090
2	2	0	115.952	0.0015	0.139	0.016	-0.002	-0.024	-0.058	0.020	0.602	0.137	0.561	0.050
2	2	1	137.744	0.0008	0.144	0.068	0.024	0.019	0.004	0.089	0.545	0.254	0.580	0.090
P-value, $Meets\_past\_4 = 0$ vs. $\neq 0$ (%)				0	1.3	0	0	0.1	4.1	0.8	0	0	0	0

Table 7: Future return and earnings performance, controlling for past returns and *News* persistence

This table examines future returns and earnings performance measures, for the equal weighted portfolios formed by sorting firms independently in quartiles according to $R_{-6,0}$, and in eight bins according to "News_n", "News_0" and "News_pp". Portfolio characteristics are observed each month, and the table reports the time series averages. The variables are explained in Table 2.

Rank for $R_{-6,0}$	Rank for News	N	$R^{ex}_{0,6}$	$R^{ex}_{6,12}$	Number of analysts	Fut_1 News	Fut_2 News	Fut_1 Eps	Fut_2 Eps	Fut_3 Eps	Fut_4 Eps
0	0	104	-3.30	-2.18	4.788	-0.096	-0.084	0.175	0.036	0.134	0.099
0	1	101	-3.66	0.38	5.789	-0.003	0.071	0.063	0.097	0.138	0.074
0	2	76	-1.68	0.56	5.170	-0.153	-0.030	0.149	0.124	0.122	0.138
0	3	91	-1.67	1.42	6.248	0.141	0.156	0.080	0.095	0.145	0.117
0	4	42	0.49	3.53	7.924	0.117	0.166	0.082	0.126	0.157	0.200
0	5	125	-2.78	-0.07	5.434	0.253	0.229	-0.011	0.072	0.083	0.152
0	6	59	-3.16	-2.02	5.854	0.322	0.305	-0.038	0.021	0.154	0.129
0	7	81	-3.80	-0.91	6.650	0.450	0.399	-0.027	0.055	0.086	0.088
1	0	85	-0.75	0.02	4.203	-0.031	0.074	0.221	0.015	0.181	0.097
1	1	82	0.27	0.25	5.249	0.062	0.111	0.195	0.143	0.164	0.053
1	2	53	-0.97	-0.41	4.909	-0.097	-0.034	0.261	0.144	0.106	0.133
1	3	90	1.07	1.49	5.881	0.206	0.235	0.256	0.161	0.196	0.159
1	4	44	2.24	1.77	7.417	0.161	0.172	0.293	0.201	0.210	0.244
1	5	137	0.32	0.65	5.217	0.290	0.274	0.092	0.121	0.120	0.190
1	6	73	0.03	0.42	5.875	0.397	0.353	0.064	0.090	0.192	0.162
1	7	92	-0.11	0.20	6.719	0.525	0.477	0.117	0.149	0.130	0.134
2	0	77	-0.59	0.39	4.175	0.046	0.055	0.329	0.096	0.203	0.158
2	1	69	-0.22	-0.86	5.004	0.015	0.098	0.248	0.156	0.188	0.125
2	2	39	-1.01	0.40	4.799	-0.105	-0.032	0.296	0.145	0.163	0.156
2	3	88	1.44	2.22	5.790	0.218	0.257	0.343	0.215	0.245	0.198
2	4	44	3.16	3.69	7.361	0.192	0.209	0.381	0.295	0.271	0.304
2	5	143	1.13	0.39	5.134	0.337	0.313	0.166	0.160	0.151	0.226
2	6	90	1.24	0.64	5.735	0.436	0.388	0.148	0.132	0.248	0.176
2	7	106	0.03	0.16	6.576	0.566	0.514	0.197	0.178	0.179	0.168
3	0	57	1.97	0.25	3.848	-0.042	0.011	0.369	0.121	0.154	0.121
3	1	54	1.22	0.27	4.396	0.063	0.128	0.287	0.178	0.150	0.130
3	2	29	1.97	1.11	4.461	-0.084	-0.033	0.367	0.176	0.108	0.117
3	3	73	6.24	3.12	5.236	0.282	0.299	0.465	0.238	0.309	0.266
3	4	33	9.33	5.68	6.859	0.271	0.273	0.484	0.365	0.368	0.341
3	5	145	4.48	0.74	4.511	0.419	0.360	0.257	0.208	0.203	0.218
3	6	110	3.38	-0.36	5.283	0.561	0.460	0.279	0.190	0.226	0.189
3	7	120	0.18	-1.19	5.894	0.638	0.543	0.301	0.223	0.223	0.184

number of analysts following the firm, a higher probability of future EPS increases during the next four quarters, as well as lower $News$ over the next two quarters. In stock with $News = 1$, a longer streak of strictly beating analyst forecasts is also positively related to the number of analysts and to the $News$ variable, but *negatively* related to future excess returns, and ambiguously related to the probability of future EPS increases. For stocks with $News = -1$, it is difficult to find any pattern that holds in each quartile based on past returns. Moreover, the effects of persistence in $News$ on future returns appear to be stronger in stocks with high past returns.

Overall, these results suggest that the relation between past ability to meet or beat analyst forecasts is complex, being different for firms in each $News$ category. The fact that persistence in exactly meeting forecasts predicts future returns in an opposite way than persistence in strictly meeting forecasts supports the hypothesis that firms with $News = 0$ behave differently, trying to anticipate market reactions to reported earnings, and reporting earnings in a way rewarded by investors in the long run. This fact also suggests that a large part of firms with $News = 1$ are not trying as much to avoid negative news; as long as news are good these firms are rewarded and become overpriced, and when bad news arrive they experience return reversals. The last hypothesis is consistent with Barth et al. [1999], who find that the effects of patterns of increasing earnings on market performance are significantly reduced when these patterns are broken.

Since persistence in earning announcement behavior appears to have a significant predictive power for future returns, Table 8 provides another way of evaluating it, namely observing the ratio of quarters with $News = 1$ in the past two years ("Rat_news_pos"), as well as the ratio of quarters with $News = 0$ in the past two years ("Rat_news_0"). More precisely, each month firms are sorted independently in quartiles according to $R_{-6,0}$, and in tertiles according to "Rat_news_pos" in Panel A, and "Rat_news_0" in Panel B, forming $4 \cdot 3 = 12$ equal weighted portfolios, whose characteristics are then compared.

Panel A of Table 8 shows that the ratio of past quarters of beating forecasts is *negatively* related to future returns, as well as to future the future frequency of exactly meeting forecasts, and beating or meeting previous announcements. However, it is positively related to the future frequency of beating forecasts. This suggests that firms with the highest record of beating forecasts are mostly firms that do not try particularly to avoid bad news, and tend to experience return reversals as bad news, such as missing the forecast or the previous announcement, arrive. However, on average, they manage to get better $News$ in the future.

Panel B shows that the ratio of past quarters of exactly meeting forecasts is *positively* related to future returns, as well as to the frequency of meeting forecasts, and meeting or beating previous announcements, in the future. However, it is negatively related to the frequency of beating forecasts in the future.

Overall, it appears that firms with a high proportion of past quarters with positive performance in the past two years (either relative to forecasts or to previous earnings) have lower future returns than otherwise similar firms, while firms with a high proportion of past quarters when exactly meeting forecasts have higher future returns. Table 7 also indicates that the relation between past earnings performance and future return and earnings performance is complex, and different for firms in

Table 8: Future return and earnings performance, controlling for past returns and *Rat_news_pos* and *Rat_news_0*

This table examines future returns and earnings performance measures, for the equal weighted portfolios formed by sorting firms independently in quartiles according to $R_{-6,0}$, and in tertiles according to "Rat_news_pos" in Panel A, and "Ratio_news_0" in Panel B. Portfolio characteristics are observed each month, and the table reports the time series averages. The variables are explained in Table 2.

Panel A: Sorting based on $R_{-6,0}$ and "Rat_news_pos".

Rank for $R_{-6,0}$	Rk Rat_ news_pos	N	$R^{ex}_{0,6}$	$R^{ex}_{6,12}$	Rat_fut news_pos	Rat_fut news_0	Rat_fut eps_pos	Rat_fut eps_0	Fut_1 news_0	Fut_2 news_0	Fut_1 news_1	Fut_1 eps_0	Fut_2 eps_0	Fut_1 eps_1
0	0	207	-0.016	0.011	0.428	0.223	0.523	0.077	0.239	0.231	0.375	0.077	0.080	0.507
0	1	201	-0.027	0.002	0.502	0.175	0.521	0.055	0.187	0.184	0.470	0.058	0.057	0.486
0	2	190	-0.039	-0.015	0.577	0.156	0.510	0.053	0.161	0.160	0.590	0.051	0.053	0.471
1	0	207	0.008	0.012	0.434	0.257	0.539	0.088	0.276	0.265	0.395	0.088	0.089	0.558
1	1	198	0.002	0.005	0.523	0.190	0.534	0.062	0.200	0.202	0.518	0.064	0.064	0.539
1	2	185	-0.006	-0.001	0.603	0.162	0.535	0.054	0.161	0.164	0.632	0.057	0.057	0.532
2	0	196	0.019	0.018	0.437	0.275	0.556	0.094	0.297	0.291	0.406	0.095	0.100	0.585
2	1	201	0.008	0.008	0.533	0.199	0.551	0.066	0.208	0.205	0.538	0.067	0.070	0.568
2	2	194	-0.003	-0.001	0.616	0.167	0.551	0.056	0.160	0.165	0.659	0.057	0.056	0.569
3	0	176	0.065	0.030	0.466	0.261	0.570	0.096	0.278	0.271	0.458	0.097	0.106	0.629
3	1	184	0.037	0.011	0.555	0.194	0.562	0.067	0.195	0.197	0.595	0.066	0.075	0.610
3	2	209	0.009	-0.010	0.638	0.157	0.561	0.056	0.142	0.158	0.713	0.060	0.060	0.607

Panel B: Sorting based on $R_{-6,0}$ and "Rat_news_0".

Rank for $R_{-6,0}$	Rk Rat_ news_pos	N	$R^{ex}_{0,6}$	$R^{ex}_{6,12}$	Rat_fut news_pos	Rat_fut news_0	Rat_fut eps_pos	Rat_fut eps_0	Fut_1 news_0	Fut_2 news_0	Fut_1 news_1	Fut_1 eps_0	Fut_2 eps_0	Fut_1 eps_1
0	0	223	-0.048	-0.020	0.533	0.117	0.509	0.044	0.114	0.117	0.529	0.042	0.044	0.480
0	1	183	-0.018	0.002	0.519	0.159	0.522	0.053	0.165	0.165	0.484	0.052	0.054	0.494
0	2	192	-0.012	0.021	0.444	0.291	0.524	0.092	0.320	0.307	0.401	0.095	0.096	0.494
1	0	204	-0.010	-0.005	0.555	0.121	0.526	0.046	0.117	0.122	0.566	0.047	0.047	0.529
1	1	184	-0.002	0.003	0.542	0.173	0.538	0.055	0.178	0.181	0.541	0.055	0.057	0.546
1	2	202	0.016	0.019	0.456	0.318	0.545	0.103	0.347	0.332	0.427	0.106	0.106	0.555
2	0	203	-0.006	-0.009	0.571	0.128	0.540	0.049	0.119	0.125	0.595	0.048	0.049	0.558
2	1	180	0.003	0.006	0.556	0.175	0.553	0.058	0.179	0.176	0.561	0.057	0.058	0.573
2	2	208	0.025	0.025	0.466	0.330	0.564	0.106	0.359	0.349	0.452	0.110	0.114	0.591
3	0	220	0.010	-0.010	0.592	0.126	0.547	0.050	0.113	0.124	0.646	0.050	0.055	0.591
3	1	160	0.018	0.005	0.583	0.167	0.569	0.056	0.161	0.170	0.631	0.059	0.060	0.621
3	2	189	0.076	0.034	0.503	0.313	0.582	0.108	0.333	0.323	0.517	0.112	0.121	0.638

each $News$ category. Under the hypothesis that some firms manage earnings, often choosing to report exactly at levels given by forecasts or previous announcements, and are rewarded by the market in the medium to long run, while most firms alternate good and bad earning reports, being subject to overpricing and reversal episodes, it seems important to distinguish these types of firms in an empirical analysis. A good heuristic for a firm managing earnings seems to be whether the firm exactly matches forecasts in a given quarter ($News = 0$).

Sections 3 and 4 examine and refine these findings using regression and factor model analysis, and Section 5 models the hypothesis of earnings management, providing reasons why firms that manage earnings often choose to exactly match forecasts or previous earnings.

3 Regression Analysis

This section examines the main findings from the previous section using Fama-MacBeth regressions (see Fama and MacBeth [1973]). Specifically, cross-section regressions are performed each month, obtaining time-series of coefficient estimates. The final coefficient estimates are computed as the sample mean of the time series, while the estimate standard errors are computed as the sample standard error of the mean. The dependent variables are $R^{ex}_{0,6}$ (Table 9) and $R^{ex}_{6,12}$ (Table 10), while explanatory variables include variables found to be related to future returns in the previous section, such as past return performance, past EPD performance and persistence, as well as indicators of the $News$ category and interaction terms. This approach is complementary to the one in Section 2, permitting a comparison of the explanatory power of various variables and the use of control variables, at the cost of parametric assumptions (a linear model in this case). Since a 6-lag autocorrelation is expected in the independent variables (due to overlapping of 6-month returns), and autocorrelation at more than 6 lags is expected in some of the explanatory variables (such as Rat_news_pos), the Fama-MacBeth estimator for the standard error is biased (see Petersen [2008]), therefore a Newey-West autocorrelation correction at 7 lags is performed (see Newey and West [1986]). Regressions are also performed in subsamples determined by the $News$ variable (the column are labeled $News = 0$, $News = 1$ and $News = -1$).

The first specification in Table 9, involving past returns and firm $Size$, shows that the coefficients for $R_{-3,-1}$, $R_{-6,-3}$ and $R_{-9,-6}$ are positive and highly significant, while the coefficient for $Size$ is insignificant. In fact, $R_{-3,-1}$ and $R_{-6,-3}$ are positively significant in all specifications, as well as in subsamples generated by $News$. This is in line with the momentum effect of Jegadeesh and Titman [1993], as well as with Grinblatt and Moskowitz [2004], who find that consistency in past market performance is positively related to future returns. Since $R^{ex}_{0,6}$ is adjusted for size, it is not surprising that $Size$ is insignificant.

In the second specification, it appears that the ratios of past quarters of exactly meeting forecasts (Rat_news_0) and previous announcements (Rat_eps_0) are positively and very significantly related to $R^{ex}_{0,6}$, confirming the results from Section 2. The coefficients for the ratios of past quarters of beating forecasts (Rat_news_pos)

Table 9: Fama-MacBeth regressions: $R^{ex}_{0,6}$ as dependent variable

This table reports coefficients and p-values for Fama-MacBeth regressions in which the dependent variable is $R^{ex}_{0,6}$, while explanatory variables include past return performance, past EPD performance and persistence, as well as indicators of the $News$ category and interaction terms. A description of these variables is provided in Table 2. P-values are labeled with "p"; they are Newey-West adjusted at 7 lags. The column ($News = 0$) indicates that the regression is performed on the $News = 0$ sub-sample; similarly for the ($News = 1$) and ($News = -1$) columns.

		p		p		p		p	$News = 0$	p	$News = 1$	p	$News = -1$	p
$R_{-3,-1}$	0.075	0.00	0.062	0.00	0.059	0.00	0.038	0.02	0.075	0.00	0.058	0.01	0.037	0.02
$R_{-6,-3}$	0.072	0.00	0.062	0.00	0.060	0.00	0.055	0.00	0.093	0.00	0.048	0.00	0.054	0.00
$R_{-9,-6}$	0.027	0.03	0.018	0.06	0.017	0.07	0.017	0.07	0.032	0.04	0.001	0.40	0.031	0.03
$R_{-12,-9}$	-0.019	0.15	-0.020	0.23	-0.020	0.23	-0.020	0.20	-0.024	0.39	-0.020	0.15	-0.003	0.90
$N_{analysts}$			0.001	0.31	0.001	0.28	0.001	0.30	0.002	0.07	0.001	0.95	0.002	0.05
EPD			-0.176	0.29	-0.171	0.33	-0.178	0.32	-1.126	0.05	-0.227	0.30	-0.221	0.48
σ_{EPD}			-0.039	0.90	-0.021	0.87	-0.058	0.95	-1.236	0.47	-0.640	0.33	0.284	0.50
Rat_news_pos			-0.007	0.26	-0.009	0.13	-0.009	0.14	-0.023	0.14	-0.008	0.33	-0.001	0.76
Rat_eps_pos			0.001	0.95	-0.006	0.55	-0.006	0.53	-0.013	0.55	0.001	0.91	-0.006	0.37
Rat_news_0			0.048	0.00	0.053	0.00	0.052	0.00	0.038	0.08	0.089	0.00	0.009	0.70
Rat_eps_0			0.105	0.00	0.103	0.00	0.100	0.00	0.102	0.00	0.116	0.00	0.055	0.09
Is_news_0					0.000	0.43	-0.004	0.17						
Is_news_1					0.005	0.12	0.007	0.02						
Is_eps_0					0.003	0.21	0.003	0.19	0.010	0.39	0.003	0.63	0.004	0.46
Is_eps_1					0.005	0.05	0.005	0.06	0.014	0.02	0.004	0.11	0.001	0.28
$Meet\_past\_4$					-0.003	0.16	-0.002	0.17			-0.006	0.99	0.002	0.91
$News\_pp$											0.000	0.59		
$News\_0$									-0.004	0.02				
$News\_n$													0.001	0.32
Int_n0_r1							0.049	0.04						
Int_n0_r2							0.044	0.02						
Int_n1_r1							0.023	0.32						
Int_n1_r2							-0.006	0.62						
$Int\_size\_rn\_p$							1.7E-10	0.85	2.9E-09	0.02	4.1E-10	0.41	6.6E-10	0.61
$Int\_size\_rn\_0$							-9.9E-11	0.84	2.5E-09	0.03	-1.6E-09	0.01	6.3E-11	0.41
$Size$	-8.0E-12	0.57	-2.9E-10	0.01	-3.0E-10	0.01	-3.1E-10	0.34	-2.7E-09	0.01	-2.2E-10	0.56	-5.6E-10	0.37
Mean R^2	0.035		0.061		0.065		0.072		0.122		0.082		0.096	

and previous announcements (Rat_eps_pos) are insignificant once Rat_news_0 and Rat_eps_0 are considered. The number of analysts following the stock is positively related to $R^{ex}_{0,6}$ in stocks with $News = 0$ and $News = -1$. Surprisingly, EPD has a negative sign, but is insignificant. Also insignificant is a measure for analyst opinion dispersion, σ_{EPD}, and the negative sign is consistent with Diether et al. [2002], who find that stocks with a lower dispersion in forecasts perform better. Moreover, $Size$ is very significant, suggesting that it is interacting with other explanatory variables. It is noteworthy that the mean R^2 in this specification is 6.1%, significantly higher than the 3.5% in the previous specification.

The third specification adds to the explanatory variables the indicators for the $News$ category Is_news_0 and Is_news_1, indicators for the $News\_EPS$ category Is_eps_0 and Is_eps_1, as well as the indicator for meeting either expectations or previous announcements sometime in the past four quarters $Meet\_past\_4$. Only Is_eps_1 is very significant, with a positive sign, and the significance appears to be concentrated in stocks with $News = 0$. Both Rat_news_0 and Rat_eps_0 remain very significant.

Given the importance of the $News$ category of a stock for predicting future performance, it is interesting to observe interactions of Is_news_0 and Is_news_1 with other predictors. Therefore, in the fourth specification, interactions of Is_news_0 (Is_news_1) with $R_{-3,-1}$ and $R_{-6,-3}$, namely Int_n0_r1 (Int_n1_r1) and Int_n0_r2 (Int_n1_r2) are introduced. Also, interactions of $Size$ with Rat_news_pos and Rat_news_0, namely $Int\_size\_rn\_p$ and $Int\_size\_rn\_0$ are considered, as suggested by the significance of $Size$ in the second and third specifications. Both Int_n0_r1 and Int_n0_r2 have positive coefficients and are very significant (with a p-value of less than 1%), indicating that momentum is higher in stocks with $News = 0$. $Size$, $Int\_size\_rn\_p$ and $Int\_size\_rn\_0$ are all insignificant, once the interaction of Is_news_0 with past returns is taken into account; this is consistent with the fact that firms with $News = 0$ tend to be larger. Adding all these interations increases the mean R^2 to 7.2%.

Another way to outline the difference in the market behavior among stocks in different $News$ categories is to perform the regression analysis in sub-samples determined by $News$. In stocks with $News = 0$, many of the explanatory variables are significant: $R_{-3,-1}$, $R_{-6,-3}$, $R_{-9,-6}$, $N_{analysts}$, Rat_news_0, Rat_eps_0, Is_eps_1, $Int\_size\_rn\_p$ and $Int\_size\_rn\_0$ are positively related to $R^{ex}_{0,6}$, while EPD, $News\_0$ and $Size$ are negatively related to $R^{ex}_{0,6}$; the negative sign for $News\_0$ in this specification is in contrast with the implication from Table 7 that $News\_0$ is positively related to $R^{ex}_{0,6}$ when no other controls are considered. Another possible reason for the discrepancy might by non-linearity between $News\_0$ and $R^{ex}_{0,6}$.

In the sub-sample of stocks with $News = 1$, variables $R_{-9,-6}$, $N_{analysts}$, EPD, Is_eps_1, $Int\_size\_rn\_p$ and $Size$ are no longer significant. $News\_pp$ (the number of previous consecutive quarters of strictly beating forecasts) is insignificant, and of opposite sign from what is expected from Table 7, which suggests a negative relation between $News\_pp$ and $R^{ex}_{0,6}$. To sum up, the significant and positively related to $R^{ex}_{0,6}$ are the explanatory variables $R_{-3,-1}$, $R_{-6,-3}$, Rat_news_0 and Rat_eps_0 , while the significant and negatively related to $R^{ex}_{0,6}$ is the explanatory variable $Int\_size\_rn\_0$.

Finally, for the stocks with $News = 1$ few explanatory variables are significant: $R_{-3,-1}$, $R_{-6,-3}$, $R_{-9,-6}$ and Rat_eps_0 all have positive coefficients.

To sum up, $R_{-3,-1}$, $R_{-6,-3}$ and $R_{-9,-6}$ have positive and significant coefficients for all specifications and $News$ sub-samples, except that $R_{-9,-6}$ is insignificant in

$News = 1$ stocks; this is consistent with the momentum effect. Interaction terms, as well as direct comparison of coefficients, suggest that momentum is higher in stocks with $News = 0$. $N_{analysts}$ is positively related to $R^{ex}_{0,6}$, the effect being driven by stocks with $News = 0$ and $News = -1$. EPD is significant only in stocks with $News = 0$, with a surprising negative sign. Rat_news_pos and Rat_eps_pos are insignificant once Rat_news_0 and Rat_eps_0 are considered, the latter two are very significant in all specifications, except for the subsample of stocks with $News = -1$. The indicators of $News = 0$ is insignificant, but is highly collinear with Rat_news_0; Is_news_1 is very significant in the fourth specification including interaction terms, but not in the third one. Is_eps_1 is very significant, especially in stocks with $News = 0$. In contrast with Table 7, $News\_pp$, $News\_0$ and $News\_n$ appear to be insignificant. Last but not least, market size interacts significantly with Rat_news_pos in stocks with $News = 0$, and with Rat_news_pos and Rat_news_0 in stocks with $News = 1$; controlling for this interaction, the size becomes insignificant, except for the sub-sample of firms with $News = 0$.

Table 10 performs the same analysis as before, but with $R^{ex}_{6,12}$ as dependent variable in the regressions. Results confirm that Rat_news_0 and Rat_eps_0 are very significant in predicting $R^{ex}_{6,12}$, especially in stocks with $News = 0$ and $News = 1$, just as they are in predicting $R^{ex}_{0,6}$. The coefficients for Is_eps_0 is positive and very significant, especially in firms with $News = 0$, despite the collinearity with Rat_eps_0. The ratio of past quarters of beating previous announcements (Rat_eps_pos) is negatively significant in $News = 0$ stocks. Moreover, $News\_0$ continues to be negatively significant, while $News\_pp$ and $News\_n$ continue to be insignificant, whereas Table 7 suggests that $News\_0$ is positively related to $R^{ex}_{6,12}$, while $News\_pp$ is negative related to $R^{ex}_{6,12}$. Past returns are much less significant for $R_{6,12}$ than for $R_{0,6}$, and the negative signs for $R_{-6,-3}$, $R_{-9,-6}$ and $R_{-12,-9}$ suggest reversals. In particular, $R_{-9,-6}$ is the only past return variable which is significantly negatively related to $R^{ex}_{6,12}$, especially in stocks with $News = 1$ and $News = -1$. Also, interaction terms of $News$ with past returns are not significant. $N_{analysts}$ is positively significant only in stocks with $News = -1$. Now, EPD is highly negatively significant in most specifications, except in stocks with $News = -1$. σ_{EPD} remains with an insignificant negative coefficient. The size effect is generally less significant for $R^{ex}_{6,12}$ than for $R^{ex}_{0,6}$, and this is also the case for the interactions of size with Rat_news_pos and Rat_news_0.

Overall, Sections 2 and 3 indicate that stocks that exactly meet analyst forecasts are in considerable proportion (around 20% of the firm-months in the sample), and they enjoy higher future performance than otherwise similar firms, controlling for size, book-to-market, past EPS performance, past return performance, analyst following and analyst dispersion. Moreover, the ratios of quarters when precisely meeting forecasts (Rat_news_0) and previous announcements (Rat_eps_0) in the past two years are positively related to returns over the following years. Also, the ratios of quarters when beating forecasts (Rat_news_pos) and previous announcements (Rat_eps_pos) in the past two years are negatively related to future returns, but this relation is insignificant when Rat_news_0 and Rat_eps_pos are controlled for. Section 3 shows that these effects are concentrated in firms that meat or beat analyst forecasts. Section 2 also suggets that $News\_0$ (the number of past consective quarters of exactly meeting

Table 10: Fama-MacBeth regressions: $R^{ex}_{6,12}$ as dependent variable

This table reports coefficients and p-values for Fama-MacBeth regressions in which the dependent variable is $R^{ex}_{6,12}$, while explanatory variables include past return performance, past EPD performance and persistence, as well as indicators of the $News$ category and interaction terms. A description of these variables is provided in Table 2. P-values are labeled with "p"; they are Newey-West adjusted at 7 lags. The column ($News = 0$) indicates that the regression is performed on the $News = 0$ sub-sample; similarly for the ($News = 1$) and ($News = -1$) columns.

		p		p		p		p	$News = 0$	p	$News = 1$	p	$News = -1$	p
$R_{-3,-1}$	0.019	0.12	0.005	0.31	0.004	0.35	0.016	0.27	0.005	0.70	-0.012	0.96	0.020	0.22
$R_{-6,-3}$	-0.005	0.93	-0.013	0.71	-0.014	0.67	-0.025	0.40	-0.012	0.87	-0.015	0.55	-0.021	0.50
$R_{-9,-6}$	-0.027	0.04	-0.030	0.02	-0.030	0.02	-0.029	0.02	-0.029	0.17	-0.031	0.02	-0.035	0.05
$R_{-12,-9}$	-0.023	0.06	-0.023	0.09	-0.023	0.08	-0.022	0.09	-0.026	0.10	-0.020	0.20	-0.026	0.29
$N_{analysts}$			0.001	0.34	0.001	0.33	0.001	0.41	0.001	0.61	0.001	0.61	0.002	0.03
EPD			-0.599	0.01	-0.600	0.01	-0.593	0.01	-1.833	0.00	-0.771	0.01	-0.364	0.18
σ_{EPD}			-0.856	0.18	-0.893	0.17	-0.869	0.19	-1.499	0.69	-1.440	0.18	-1.201	0.22
Rat_news_pos			0.006	0.50	0.008	0.46	0.009	0.38	0.026	0.19	-0.005	0.49	0.007	0.82
Rat_eps_pos			-0.007	0.67	-0.010	0.72	-0.010	0.71	-0.046	0.01	0.008	0.58	-0.008	0.98
Rat_news_0			0.052	0.00	0.060	0.00	0.062	0.00	0.097	0.00	0.070	0.00	0.011	0.97
Rat_eps_0			0.085	0.00	0.079	0.00	0.079	0.00	0.074	0.00	0.083	0.00	0.048	0.10
Is_news_0					-0.003	0.53	-0.005	0.32						
Is_news_1					-0.001	0.92	0.002	0.51						
Is_eps_0					0.008	0.02	0.009	0.02	0.016	0.03	0.009	0.11	0.002	0.76
Is_eps_1					0.003	0.87	0.003	0.90	0.015	0.02	0.001	0.84	-0.002	0.28
$Meet\_past\_4$					-0.005	0.09	-0.005	0.10			-0.005	0.74	0.001	0.53
$News\_pp$											0.001	0.47		
$News\_0$									-0.007	0.00				
$News\_n$													0.000	0.47
Int_n0_r1							0.006	0.69						
Int_n0_r2							0.019	0.36						
Int_n1_r1							-0.023	0.32						
Int_n1_r2							0.014	0.47						
$Int\_size\_rn\_p$							-1.5E-10	0.75	2.0E-09	0.10	-5.4E-10	0.82	-5.0E-10	0.97
$Int\_size\_rn\_0$							-4.1E-10	0.18	1.3E-09	0.16	-1.4E-09	0.01	-1.6E-09	0.11
$Size$	1.5E-10	0.96	-1.2E-10	0.16	-1.2E-10	0.16	1.7E-10	0.70	-1.6E-09	0.09	5.0E-10	0.65	4.8E-10	0.74
Mean R^2	0.025		0.053		0.057		0.063		0.106		0.071		0.094	

forecasts, in stocks that are meeting forecasts) is positively related to $R^{ex}_{0,6}$ and $R^{ex}_{6,12}$, while $News\_pp$ (the number of past consective quarters of strictly beating forecasts, in stocks that are beating forecasts) is negatively related to $R^{ex}_{0,6}$ and $R^{ex}_{6,12}$; however, these findings are not supported in Section 3, possibly because of non-linearities. Section 3 also indicates that momentum (winners over the past 6 months outperform losers, over the following 6 months) is higher in stocks that meet foreccasts. Section 4 further examines the robustness of these findings, by analysing whether excess returns can be explained in risk factor models, and by conducting other robustness checks.

4 Risk-adjusted returns

This section examines whether the differences in portfolio returns observed in the previous sections can be explained by the risk models of Fama and French [1992] (F-F) and Carhart [1997]. According to the F-F model:

$$R_t - R^f_t = \alpha_{FF} + \beta_M(R^M_t - R^f_t) + \beta_{SMB}SMB_t + \beta_{HML}HML_t + \epsilon_t$$

where R_t is the return of a stock or portfolio to be tested (during the period t, here the month between dates $t-1$ and t), R^f_t is the risk-free return, R^M_t is the market return, SMB_t is a traded factor given by the return of a zero-investment portfolio long on stocks with low market capitalization (small) and short on stocks with high capitalization (big), HML_t is a traded factor given by the return of a zero-investment portfolio long on stocks with high book-to-market ratio (high) and short on stocks with low book-to-market (low), ϵ_t is an error term that is zero in expectation and uncorrelated with the factors, β_M, β_{SMB} and β_{HML} are the loadings of the portfolio on the factors, and α_{FF} is the intercept. Under the null hypothesis that the F-F model explains the portfolio return, α_{FF} should be zero.

The Carhart model adds the momentum factor to the F-F model:

$$R_t - R^f_t = \alpha_C + \beta_M(R^M_t - R^f_t) + \beta_{SMB}SMB_t + \beta_{HML}HML_t + \beta_{UMD}UMD_t + \epsilon_t$$

where UMD_t is a traded factor given by the return of a zero-investment portfolio long on stocks with high return over the past year (up) and short on stocks with low return over the past year (down), and β_{UMD} is the corresponding loading. Again, if the Carhart model explains the portfolio return, α_C should be zero.

Monthly data on the factors F-F and Carhart model factors, the market return and the risk-free rate are obtained from the website of Kenneth French[5]. In order to test whether a (non-zero investment) portfolio return R_t is explained by the models, time-series regressions with $R_t - R^f_t$ as dependent variable and the factors as explanatory variables are performed, and it is observed whether the intercept is significantly different from 0. If the portfolio to be tested is zero-investment, then the dependent variable is simply R_t, since the R^f_t component from the long side cancels with the one from the short side. Under the assumption that portfolio returns and factors are not significantly autocorrelated, the OLS standard errors are consistent. When testing

[5]http://mba.tuck.dartmouth.edu/pages/faculty/ken.french/data_library.html; more detailed descriptions of the factors are also available.

Table 11: Risk-adjusted excess returns based on News

This table examines the future 6 month performance of the equal-weighted portfolios consisting of stocks with $News = 0$ and $News \neq 0$ respectively, as well as the zero-investment portfolio long the portfolio with $News = 0$ and short the portfolio with $News \neq 0$. The table shows the loadings of the modified portfolio on the factors of the Fama-French and Carhart models. The modified portfolio held between t and $t+1$ consists of 1/6 the original portfolio at t, 1/6 the original portfolio at $t-1$, and so on. Using the modified portfolio makes OLS standard errors acceptable.

		Intercept	$R_M - R_f$	SMB	HML	UMD	R^2
$News \neq 0$		0.010					0.03
	p-values	0.02					
		0.000	1.118	0.588	0.246		0.95
	p-values	0.93	0.00	0.00	0.00		
		0.001	1.071	0.624	0.229	-0.139	0.97
	p-values	0.08	0.00	0.00	0.00	0.00	
$News = 0$		0.011					0.06
	p-values	0.00					
		0.002	1.069	0.478	0.346		0.90
	p-values	0.15	0.00	0.00	0.00		
		0.003	1.032	0.505	0.333	-0.106	0.91
	p-values	0.02	0.00	0.00	0.00	0.00	
$News = 0$		0.002					0.02
minus	p-values	0.07					
$News \neq 0$		0.002	-0.050	-0.111	0.100		0.34
	p-values	0.04	0.04	0.00	0.00		
		0.002	-0.038	-0.119	0.104	0.033	0.36
	p-values	0.09	0.12	0.00	0.00	0.06	

portfolios that are held more than one month, say M months, caution is needed in order to avoid autocorrelations. For instance $R_{t,t+M}$ is correlated with $R_{t-1,t+M-1}$. In this case, a new portfolio, comprised of $1/M$ of the original portfolio at t, $1/M$ of the original portfolio at $t-1$, and so on, is the portfolio actually tested[6]; in this case OLS standard errors are acceptable.

Table 11 examines whether the future 6 month performance of the equal-weighted portfolios consisting of stocks with $News = 0$ and $News \neq 0$ respectively, as well as the difference in performance, can be explained by the F-F and Carhart models. Looking at the 6 month performance makes it easier to compare the results with the findings from the previous sections, that $R^{ex}_{0,6}$ is higher for stocks with $News = 0$.

The variation in the $News \neq 0$ portfolio performance can be explained very well by both the FF and Carhart models, judging by the very high R^2 of over 95%. Moreover, the factor loadings for both models are all very significant. The loadings on HML and SMB are positive, in line with that facts that these firms tend to be smaller and with a high book-to-market. However, the UMD loading is negative. The

[6] More formally, if $R_{t,t+M}$ are the returns of the initial portfolio to be tested, the returns actually tested are $\tilde{R}_t = 1/M \sum_{i=1}^{M} R_{t-i+1,t-i+M+1}$.

intercept for the F-F model is insignificant, while the intercept for the Carhart model is positive with a p-value of 8%; this might be a consequence of the negative UMD loading, since the UMD factor is on average positive, so that a positive intercept is needed to compensate for the negative exposure.

For stocks with $News = 0$, the explanatory power of the models decreases slightly, but the R^2's are still very high at around 90%. As before, all loading are very significant, with the SMB and HML loading positive and the UMD loading negative. The intercept for the F-F model is more significant than previously, with a p-value of 15%, and the intercept for the Carhart model is very significant.

For the zero-investment portfolio long in firms with $News = 0$ and short in firms with $News \neq 0$, the explanatory power of the factor models decreases significantly. The R^2s are around 35%, while the intercepts are positive and significant with p-values of 4% for the F-F model and 9% for the Carhart model. This indicates that the higher returns enjoyed by firms that exactly meet analyst forecasts cannot be explained satisfactorily by these two models.

Looking at the magnitude of the returns, it appears that the stocks with $News = 0$ outperform the stocks with $News \neq 0$ by only 0.2% per month on average, less than Table 3 suggests (around 2% in 6 months). Part of the reason for this discrepancy is due to compounding and to persistence in returns. Specifically, firms that exactly meet expecations have consistently good returns, which get even better when compunded[7].

Table 12 examines whether the future 6 month performance of the equal-weighted portfolios consisting of stocks with $Meet\_past\_4 = 0$ and $Meet\_past\_4 \neq 0$ respectively, as well as the difference in performance, can be explained by the F-F and Carhart models. Looking at the 6 month performance makes it easier to compare the results with the findings from the previous sections, that $R^{ex}_{0,6}$ is higher for stocks with $Meet\_past\_4 = 0$.

Factor loadings are all very significant, and of the same sign as the loadings for the portfolios based on $News$, while intercepts are much more significant for portfolios based on $Meet\_past\_4$. In particular, the zero-investment portfolio performs much better, stocks with $Meet\_past\_4 = 0$ outperforming stocks with $Meet\_past\_4 \neq 0$ by around 0.4% per month. Moreover, these excess returns cannot be explained satisfactorily by the F-F and Carhart models, with intercepts being significant with p-values of less than 1%.

Table 13 examines whether the predictive power (suggested by Table 7, but not confirmed by Table 9) of the number of previous quarters of beating, meeting or missing analyst forecasts for future returns can be explained by the F-F or Carhart models. Specifically, it investigates the future 6 month performance of zero-investment portfolios constructed in the following way: for stocks with $News = 1$ ($News = -1$), long the equal-weighted portfolio of stocks with $News\_pp$ ($News\_n$) in the higher cross-sectional tertile, and short the stocks in the lower tertile; for stocks with $News = 0$, long the equal-weighted portfolio of stocks with $News\_0$ in the higher cross-sectional

[7] More formally, the compounded average of two returns, $(1 + \frac{r+R}{2})^2$, is smaller than the average of the compounded returns $\frac{(1+r)^2+(1+R)^2}{2}$

Table 12: Risk-adjusted excess returns based on $Meet\_past\_4$

This table examines the future 6 month performance of the equal-weighted portfolios consisting of stocks with $Meet\_past\_4 = 0$ and $Meet\_past\_4 \neq 0$ respectively, as well as the zero-investment portfolio long the portfolio with $Meet\_past\_4 = 0$ and short the portfolio with $Meet\_past\_4 \neq 0$. The table shows the loadings of the modified portfolio on the factors of the Fama-French and Carhart models. The modified portfolio held between t and $t+1$ consists of 1/6 the original portfolio at t, 1/6 the original portfolio at $t-1$, and so on. Using the modified portfolio makes OLS standard errors acceptable.

		Intercept	$R_M - R_f$	SMB	HML	UMD	R^2
$Meet\_past\_4 \neq 0$		0.008					0.02
	p-values	0.07					
		-0.002	1.148	0.644	0.166		0.95
	p-values	0.12	0.00	0.00	0.00		
		0.000	1.094	0.685	0.147	-0.158	0.97
	p-values	0.96	0.00	0.00	0.00	0.00	
$Meet\_past\_4 = 0$		0.012					0.06
	p-values	0.00					
		0.002	1.073	0.502	0.340		0.92
	p-values	0.07	0.00	0.00	0.00		
		0.003	1.036	0.529	0.327	-0.108	0.94
	p-values	0.00	0.00	0.00	0.00	0.00	
$Meet\_past\_4 = 0$		0.004					0.05
minus	p-values	0.00					
$Meet\_past\_4 \neq 0$		0.004	-0.075	-0.143	0.174		0.52
	p-values	0.00	0.00	0.00	0.00		
		0.003	-0.058	-0.155	0.180	0.049	0.54
	p-values	0.00	0.02	0.00	0.00	0.01	

half, and short the stocks in the lower half.

The results confirm the findings from Section 2. In stocks with $News = 1$, the intercept is negative and very significant in both the F-F and Carhart models, indicating that the excess return of the stock with low $News\_pp$ cannot be explained by the risk factors. The loadings on the market excess return are very significant and positive, suggesting that the under-performance of firms with high $News\_pp$ is more pronounced when markets are down. The loadings on SMB and on UMD are very significant and negative, suggesting that firms with high $News\_pp$ tend to be bigger, which is plausible, and losers in the past, which seems less plausible.

In stocks with $News = 0$, the intercept is positive and very significant in both the F-F and Carhart models, indicating that the excess return of the stock with high $News\_0$ cannot be explained by the risk factors. The loadings on HML and UMD are significant and positive, suggesting that stocks with high $News\_0$ tend to have a higher book-to-market in spite of being past winners, which seems surprising. Moreover, the loadings on SMB are very significant and negative, suggesting that firms with high $News\_0$ tend to be bigger.

However, in stocks with $News = 0$, neither the intercept nor the loadings are

Table 13: Risk-adjusted excess returns within *News*: long sequence of beating, meeting or missing forecasts versus short sequence

This table examines the future 6 month performance of zero-investment portfolios constructed in the following way: for stocks with $News = 1$ ($News = -1$), long the equal-weighted portfolio of stocks with $News\_pp$ ($News\_n$) in the higher cross-sectional tertile, and short the stocks in the lower tertile; for stocks with $News = 0$, long the equal-weighted portfolio of stocks with $News\_0$ in the higher cross-sectional half, and short the stocks in the lower half. The table shows the loadings of the modified portfolios on the factors of the Fama-French and Carhart models. The modified portfolios held between t and $t+1$ consist of 1/6 the original portfolios at t, 1/6 the original portfolios at $t-1$, and so on. Using the modified portfolio makes OLS standard errors acceptable.

		Intercept	$R_M - R_f$	SMB	HML	UMD	R^2
News = 1		-0.004					0.06
	p-values	0.00					
		-0.004	0.115	-0.137	-0.011		0.19
	p-values	0.00	0.00	0.00	0.77		
		-0.003	0.084	-0.114	-0.022	-0.091	0.27
	p-values	0.00	0.00	0.00	0.54	0.00	
News = 0		0.002					0.02
	p-values	0.06					
		0.002	-0.039	-0.184	0.056		0.44
	p-values	0.01	0.08	0.00	0.05		
		0.002	-0.027	-0.193	0.061	0.035	0.46
	p-values	0.02	0.23	0.00	0.04	0.03	
News = -1		0.003					0.00
	p-values	0.67					
		0.004	-0.185	0.114	-0.150		0.01
	p-values	0.51	0.30	0.54	0.52		
		0.007	-0.279	0.190	-0.186	-0.291	0.04
	p-values	0.28	0.12	0.31	0.42	0.03	

significant. Actually, the excess return itself is insignificant.

It is also noteworthy that in stocks with $News = 1$ the magnitude of the excess return is relatively high at around 0.4% monthly, compared to a magnitude of 0.2% monthly in stocks with $News = 0$.

Table 14 examines whether the under-performance of stocks with a high ratio of quarters when beating forecasts (high *Rat_news_pos*) can be explained by the F-F and Carhart models. Each month stocks are sorted cross-sectionally into tertiles according to *Rat_news_pos*, in order to form equal-weighted portfolios with stocks in each tertile and investigate the return performance of these portfolios over the following 6 months.

For stocks with low *Rat_news_pos* intercepts for both the F-F and the Carhart models are significant and positive, indicating that the returns of this portfolio is not explained by the risk factors. Moreover, all loadings are very significant, the loading

Table 14: Risk-adjusted returns according to the ratio of past quarters of beating analyst forecasts

This table examines the future 6 month performance of the equal-weighted portfolios consisting of stocks in different cross-sectional tertiles of *Rat_news_pos*, as well as the zero-investment portfolio long the portfolio the highest *Rat_news_pos* tertile and short the portfolio with the lowest tertile. The table shows the loadings of the modified portfolio on the factors of the Fama-French and Carhart models. The modified portfolio held between t and $t+1$ consists of 1/6 the original portfolio at t, 1/6 the original portfolio at $t-1$, and so on. Using the modified portfolio makes OLS standard errors acceptable.

		Intercept	$R_M - R_f$	SMB	HML	UMD	R^2
Rank = 0		0.011					0.06
low	p-values	0.00					
Rat_news_pos		0.002	1.023	0.560	0.343		0.93
	p-values	0.05	0.00	0.00	0.00		
		0.003	0.997	0.579	0.334	-0.075	0.93
	p-values	0.01	0.00	0.00	0.00	0.00	
Rank = 1		0.010					0.04
median	p-values	0.01					
Rat_news_pos		0.000	1.090	0.553	0.317		0.94
	p-values	0.72	0.00	0.00	0.00		
		0.002	1.040	0.590	0.300	-0.144	0.96
	p-values	0.03	0.00	0.00	0.00	0.00	
Rank = 2		0.008					0.02
high	p-values	0.06					
Rat_news_pos		-0.001	1.211	0.578	0.141		0.94
	p-values	0.32	0.00	0.00	0.00		
		0.001	1.152	0.622	0.119	-0.174	0.96
	p-values	0.53	0.00	0.00	0.00	0.00	
high minus low		-0.003					0.02
Rat_news_pos	p-values	0.05					
		-0.003	0.188	0.018	-0.202		0.49
	p-values	0.01	0.00	0.57	0.00		
		-0.002	0.155	0.043	-0.215	-0.099	0.55
	p-values	0.05	0.00	0.15	0.00	0.00	

on UMD being negative, and the loadings on the market return, SMB and HML being positive. The portfolio of stocks with median *Rat_news_pos* has an insignificant intercept in the F-F model, with very significant positive loadings on the three factors, but it has a significant positive intercept in the Carhart model, perhaps due to the negative UMD loading. Furthermore, the portfolio of stocks with high *Rat_news_pos* has an insignificant intercepts in both models.

The zero-investment portfolio long the stocks with high *Rat_news_pos* and short the stocks with low *Rat_news_pos* has significant negative intercepts in both models, with significant positive loadings on the market and significant negative loadings on HML and UMD. This indicates that the excess returns of stocks with low

Table 15: Risk-adjusted returns according to the ratio of past quarters of exactly meeting analyst forecasts

This table examines the future 6 month performance of the equal-weighted portfolios consisting of stocks in different cross-sectional tertiles of *Rat_news_0*, as well as the zero-investment portfolio long the portfolio the highest *Rat_news_0* tertile and short the portfolio with the lowest tertile. The table shows the loadings of the modified portfolio on the factors of the Fama-French and Carhart models. The modified portfolio held between t and $t+1$ consists of 1/6 the original portfolio at t, 1/6 the original portfolio at $t-1$, and so on. Using the modified portfolio makes OLS standard errors acceptable.

		Intercept	$R_M - R_f$	SMB	HML	UMD	R^2
Rank = 0		0.008					0.02
low	p-values	0.08					
Rat_news_0		-0.002	1.161	0.677	0.122		0.95
	p-values	0.13	0.00	0.00	0.00		
		0.000	1.110	0.715	0.104	-0.149	0.97
	p-values	0.96	0.00	0.00	0.00	0.00	
Rank = 1		0.009					0.04
median	p-values	0.01					
Rat_news_0		-0.001	1.119	0.530	0.379		0.92
	p-values	0.53	0.00	0.00	0.00		
		0.001	1.061	0.574	0.358	-0.170	0.95
	p-values	0.25	0.00	0.00	0.00	0.00	
Rank = 2		0.012					0.07
high	p-values	0.00					
Rat_news_0		0.003	1.033	0.470	0.303		0.90
	p-values	0.01	0.00	0.00	0.00		
		0.004	1.007	0.489	0.294	-0.075	0.90
	p-values	0.00	0.00	0.00	0.00	0.00	
high minus low		0.005					0.04
Rat_news_0	p-values	0.01					
		0.005	-0.128	-0.207	0.181		0.48
	p-values	0.00	0.00	0.00	0.00		
		0.004	-0.102	-0.226	0.190	0.074	0.51
	p-values	0.00	0.00	0.00	0.00	0.00	

Rat_news_pos are significant, as suggested by Table 8, and furthermore are robust to the risk factors.

Table 15 examines whether the over-performance of stocks with a high ratio of quarters when precisely meeting forecasts (high *Rat_news_0*) can be explained by the F-F and Carhart models. Each month stocks are sorted cross-sectionally into tertiles according to *Rat_news_0*, in order to form equal-weighted portfolios with stocks in each tertile and investigate the return performance of these portfolios over the following 6 months.

Factor loadings are all very significant, and intercepts are very significant for

Table 16: Risk-adjusted excess returns: Momentum by News category

This table examines the momentum strategy, by $News$ category. Each month, winners are defined by having both $R_{-3,-1}$ and $R_{-6,-3}$ in the highest cross-sectional tertile, while losers have both $R_{-3,-1}$ and $R_{-6,-3}$ in the lowest cross-sectional tertile. This classification in winners and losers is independent of $News$. Zero-investment portfolios long the equal-weighted portfolio of winners and short the equal-weighted portfolio of losers are formed, and future 6 month returns are considered. In order to make OLS standard errors acceptable, the future 1 month return of a modified portfolio is used in the analysis. The modified portfolio held between t and $t+1$ consists of 1/6 the original portfolio at t, 1/6 the original portfolio at $t-1$, and so on. The table shows the loadings of the modified portfolio on the factors of the Fama-French and Carhart models.

		Intercept	$R_M - R_f$	SMB	HML	UMD	R^2
News = 0		0.009					0.02
	p-values	0.07					
		0.012	-0.482	0.558	-0.191		0.19
	p-values	0.01	0.00	0.00	0.24		
		0.001	-0.144	0.306	-0.071	0.986	0.76
	p-values	0.61	0.04	0.00	0.42	0.00	
News = 1		0.007					0.01
	p-values	0.16					
		0.008	-0.381	0.464	0.013		0.13
	p-values	0.09	0.00	0.00	0.94		
		-0.002	-0.041	0.210	0.135	0.993	0.75
	p-values	0.36	0.55	0.00	0.13	0.00	
News = -1		0.003					0.00
	p-values	0.51					
		0.005	-0.353	0.496	-0.119		0.13
	p-values	0.30	0.01	0.00	0.49		
		-0.006	0.002	0.231	0.008	1.036	0.74
	p-values	0.03	0.97	0.00	0.93	0.00	

the portfolio with high Rat_news_0 and for the zero-investment portfolio. The zero-investment portfolio based on Rat_news_0 has loadings and intercepts of the opposite sign as the zero-investment portfolio based on Rat_news_pos, and much more significant intercepts.

Table 16 examines the momentum strategy of Jegadeesh and Titman [1993], by $News$ category. There is a slight modification: each month, winners are defined by having both $R_{-3,-1}$ and $R_{-6,-3}$ in the highest cross-sectional tertile, while losers have both $R_{-3,-1}$ and $R_{-6,-3}$ in the lowest cross-sectional tertile. This classification in winners and losers is independent of $News$. Zero-investment portfolios long the equal-weighted portfolio of winners and short the equal-weighted portfolio of losers are formed, and future 6 month returns are observed. From Table 9 it is expected that momentum be stronger in stocks with $News = 0$ and $News = 1$.

Indeed, Table 16 confirms that winners significantly outperform losers in stocks with $News = 0$ and $News = 1$, while in stocks with $News = -1$ stocks the effect is less significant. Actually, the performance of the zero-investment portfolio long the past winners and short the past losers is positively significant at a 10% confidence level only in stocks that exactlt meet analyst expectations (with an average monhly return of 0.9% and a p-value of 7%), whereas in stocks that miss expectations winners outperform losers by only 0.3% monthly with a p-value of 51%, and in stocks that beat expectations winners outperform losers by 0.7% monthly with a p-value of 16%. Compared to Jegadeesh and Titman [1993], momentum in this sample is of smallar magnitude and less significant. Partly this is due to a much smaller sample (the cross-section is devided in $News$ categories, and the time series covers only 16 years), to the fact that the periods covered are distinct (1993 to 2006 here and 1965 to 1989 in Jegadeesh and Titman [1993]), and to the distinct ways of labeling winners and losers (in Jegadeesh and Titman [1993], winners have $R_{-6,0}$ in the highest cross-section decile, and losers have $R_{-6,0}$ in the lowest decile).

In the F-F three factor model, the excess return of winners is very significant in firms that exactly meet forecasts (the p-value is 1%), significant in stocks with $News = 1$ (the p-value is 9%), and insignificant in stocks with $News = -1$ (the p-value is 30%). In all $News$ categories, the loadings on the market are negative and very significant, consistent with the view that losers under-perform mostly when markets are down, while the loadings on the SMB factor are positive and very significant, supporting the idea that the momentum effect is stronger in smaller firms. It is interesting that momemtum is stronger in stocks with $News = 0$, despite the fact that these firms tend to be large. Generally, the explanatory power of the F-F model is quite low, with R^2s below 20%.

As expected, the inclusion of the UMD factor drastically improves the explanatory power, the R^2s of the Carhart model being around 75%. Excess returns are now insignificant in stocks with $News = 0$ and $News = 1$, but surprisingly they are very significant and negative in stocks with $News = -1$. This is partly due to the fact that in firms with $News = -1$ the excess returns are low, despite the high loading on the UMD factor, which is positive on average.

Overall, Table 16 confirms that momentum is stronger in firms that exactly meet forecasts. This also suggests that more efficient momentum strategies can be designed by taking into account the earnings behavior of firms.

To sum up, the results from this section support those from the previous sections, and refine them by showing that the excess returns on several zero-investment portfolios cannot be easily explained by the F-F and Carhart factor models. Specifically, firms with $News = 0$ outperform firms with $News \neq 0$ in the future 6 months (Section 2 suggests that the difference in performance lasts for longer periods, of up to 5 years, and Section 3 suggests that stocks with $News = 1$ outperform stocks with $News = -1$), firms high Rat_news_0 outperform firms with low Rat_news_0 (the previous sections indicate that the difference in performance can last at least one year, and Section 3 indicates that the effect is concentrated in firms that meet or beat analyst forecasts), firms low Rat_news_pos outperform firms with high Rat_news_pos (Section 3 indicates that this effect disappears when Rat_news_0 is controlled for), firms with $News = 0$ and a high $News\_0$ outperform firms with a low $News\_0$, and firms with $News = 1$ and a high $News\_pp$ under-perform firms with a low $News\_pp$

(the latter two effects also disappear when *Rat_news_0* is controlled for, according to Section 3), and momentum is stronger in stocks with $News = 0$. The various measures of past earnings performance seem to predict future returns in a consistent way, in the sense that the longer the sequence of exactly meeting forecasts, the higher the ratio of exactly meeting forecasts, the lower the ratio of strictly beating forecasts (to the extent that missing forecasts is relatively uncommon), the lower the sequence of strictly beating forecasts.

It is also interesting to determine whether the effects above are significant over smaller time periods. In order to do so, Table 17 examines the future 6 month performance of two zero-investment portfolios: the first one is long the equal-weighted portfolio of stocks with $News = 0$ and short the portfolio with $News \neq 0$, while the second one is long the equal-weighted portfolio of stocks with $Meet\_past\_4 = 0$ and short the portfolio with $Meet\_past\_4 \neq 0$. Similarly, Table 18 examines the future 6 month performance of two zero-investment portfolios: the first one is long the equal-weighted portfolio of stocks with *Ratio_news_0* in the highest cross-section tertile and short the portfolio with *Ratio_news_0* in the lowest tertile, while the second one is long the equal-weighted portfolio of stocks with *Ratio_news_pos* in the highest cross-section tertile and short the portfolio with *Ratio_news_pos* in the lowest tertile. The analysis is conducted separately over two sub-periods, 1993 to 1999 and 2000 to 2007.

Panel A of Table 17 shows that, while firms with $News = 0$ outperform firms with $News \neq 0$ in both sub-periods, the effect is very significant during 1993-1999 (the p-value is 1%), and insignificant during 2000-2007 (the p-value is 61%). This is also true for the excess returns in the F-F and Carhart models, they are very significant in the first sub-period, and insignificant in the later sub-period. These results suggest that the over-performance of firms that exactly meet expectations is very strong from 1993 until 1999; it is weaker from 2000 until 2007, and more difficult to detect statistically. Panel B shows that the same is true for excess returns based on *Meet_past_4*. Actually, excess returns are significant during both periods, but in the second sub-period they can be explained by the F-F and Carhart models.

Panel A of Table 18 shows that stocks with a high *Rat_news_0* over-perform significantly only in the first sub-period, and that excess returns cannot be explained by the factor models. Panel B shows that stocks with a high *Rat_news_pos* under-perform significantly only in the second sub-period, but the excess returns are not significant in the F-F and Carhart models. During the period 1993-1999 the zero-investment portfolio has insignificant positive returns on average, but its performance cannot be easily explained by the F-F and Carhart models, the p-values for the intercepts being 15% and 1% respectively. Even though zero-investment portfolios based on *Rat_news_0* and *Rat_news_pos* tend to perform in opposite ways, due to the fact that the higher the ratio of exactly meeting forecasts, the lower the ratio of strictly beating forecasts (to the extent that missing forecasts is relatively uncommon), this table shows that the two portfolios perform differently in each sub-period, suggesting that they capture different effects.

These results suggest that firms and markets changed their behavior along the hole sample period. One possible interpretation is that the markets observed the over-performance of firms that exactly meet expectations, and started to correct the overpricing during the second sub-period. This would be consistent with the under-

Table 17: Sub-period analysis: excess returns based on $News$ and excess returns based on $Meet\_past\_4$

This table examines the future 6 month performance of two zero-investment portfolios: in Panel A, long the equal-weighted portfolio of stocks with $News = 0$ and short the portfolio with $News \neq 0$; in Panel B, long the equal-weighted portfolio of stocks with $Meet\_past\_4 = 0$ and short the portfolio with $Meet\_past\_4 \neq 0$. The analysis is conducted separately over two sub-periods, 1993 to 1999 and 2000 to 2007. In order to make OLS standard errors acceptable, the future 1 month return of a modified portfolio is used in the analysis. The modified portfolio held between t and $t+1$ consists of 1/6 the original portfolio at t, 1/6 the original portfolio at $t-1$, and so on. The table shows the loadings of the modified portfolio on the factors of the Fama-French and Carhart models.

Panel A: long stocks with $News = 0$ and short stocks with $News \neq 0$.

	1993-1999						2000-2007					
	Intercept	$R_M - R_f$	SMB	HML	UMD	R^2	Intercept	$R_M - R_f$	SMB	HML	UMD	R^2
	0.002					0.08	0.001					0.00
p-values	0.01						0.61					
	0.002	0.002	-0.067	-0.062		0.09	-0.001	-0.095	-0.107	0.218		0.64
p-values	0.02	0.93	0.02	0.07			0.56	0.00	0.00	0.00		
	0.003	0.000	-0.078	-0.091	-0.078	0.19	-0.001	-0.082	-0.120	0.214	0.021	0.65
p-values	0.00	0.99	0.01	0.01	0.00		0.58	0.02	0.00	0.00	0.35	

Panel B: long stocks with high $Meet\_past\_4 = 0$ and short stocks with low $Meet\_past\_4 \neq 0$.

	1993-1999						2000-2007					
	Intercept	$R_M - R_f$	SMB	HML	UMD	R^2	Intercept	$R_M - R_f$	SMB	HML	UMD	R^2
	0.003					0.13	0.004					0.04
p-values	0.00						0.06					
	0.003	-0.021	-0.132	0.000		0.31	0.002	-0.132	-0.108	0.284		0.69
p-values	0.00	0.33	0.00	0.99			0.20	0.00	0.00	0.00		
	0.003	-0.023	-0.139	-0.020	-0.053	0.36	0.002	-0.106	-0.134	0.276	0.042	0.70
p-values	0.00	0.28	0.00	0.51	0.02		0.18	0.01	0.00	0.00	0.10	

Table 18: Sub-period analysis: excess returns based on *Ratio_news_0* and excess returns based on *Ratio_news_pos*

This table examines the future 6 month performance of two zero-investment portfolios: in Panel A, long the equal-weighted portfolios of stocks with *Ratio_news_0* in the highest cross-section tertile and short the portfolio with *Ratio_news_o* in the lowest tertile; in Panel B, long the equal-weighted portfolios of stocks with *Ratio_news_pos* in the highest cross-section tertile and short the portfolio with *Ratio_news_pos* in the lowest tertile. The analysis is conducted separately over two sub-periods, 1993 to 1999 and 2000 to 2007. In order to make OLS standard errors acceptable, the future 1 month return of a modified portfolio is used in the analysis. The modified portfolio held between t and $t+1$ consists of 1/6 the original portfolio at t, 1/6 the original portfolio at $t-1$, and so on. The table shows the loadings of the modified portfolio on the factors of the Fama-French and Carhart models.

Panel A: long stocks with high *Ratio_news_0* and short stocks with low *Ratio_news_0*.

	1993-1999						2000-2007					
	Intercept	$R_M - R_f$	SMB	HML	UMD	R^2	Intercept	$R_M - R_f$	SMB	HML	UMD	R^2
	0.004					0.13	0.005					0.03
p-values	0.00						0.11					
	0.004	-0.038	-0.145	-0.084		0.16	0.002	-0.221	-0.173	0.346		0.74
p-values	0.00	0.24	0.00	0.06			0.21	0.00	0.00	0.00		
	0.005	-0.041	-0.156	-0.113	-0.079	0.22	0.002	-0.182	-0.212	0.334	0.064	0.75
p-values	0.00	0.20	0.00	0.01	0.02		0.19	0.00	0.00	0.00	0.04	

Panel B: long stocks with high *Ratio_news_pos* and short stocks with low *Ratio_news_pos*.

	1993-1999						2000-2007					
	Intercept	$R_M - R_f$	SMB	HML	UMD	R^2	Intercept	$R_M - R_f$	SMB	HML	UMD	R^2
	0.000					0.00	-0.005					0.05
p-values	0.69						0.05					
	-0.001	0.091	0.097	0.015		0.26	-0.001	0.283	-0.073	-0.345		0.70
p-values	0.15	0.00	0.00	0.69			0.47	0.00	0.08	0.00		
	-0.003	0.094	0.111	0.053	0.103	0.39	-0.001	0.220	-0.011	-0.326	-0.103	0.749
p-values	0.01	0.00	0.00	0.13	0.00		0.39	0.00	0.80	0.00	0.00	

performance of firms with a good history of beating or meeting forecasts, which might have become overpriced during the first sub-period. Another possibility is that some exogenous event changed the way markets incorporate the earnings announcements into prices. A possible candidate for such an event could be Enron's collapse in 2001. Similarly, some events might have changed firm announcement behavior. For instance, Regulation FD from 2001 could have made it more difficult for firms to manipulate earnings.

Intuitively, the hypothesis advanced so far that some firms anticipate the market reaction to their earnings announcements and manage earnings in order to enjoy long-lasting good future market performance, and that their strategy works for a while until markets realize the overpricing, seem to help explain the results. In order to analyze the implications more precisely, a model is developed in Section 5, building on these hypothesis. The model highlights reasons for firms to report exactly the forecast or the previous announcement. Moreover, Monte Carlo simulations investigate whether the model can generate patterns similar to those observed in the empirical data.

5 Model

5.1 Description

The economy consists of firms, investors and a market maker. Investors submit market orders that maximize their one period ahead objective given their forecast for the stock price next period, which is based on past prices and earnings announcements. Most of the time, as long as news are good, fundamentals are ignored, but occasionally prices are revised toward the fundamental level. Budget constraints are not modeled explicitly, but in some specifications of the economy they are embedded in the price dynamics by imposing exogenous thresholds. On the other hand, firms have a medium-term horizon, of two periods. They know how their announcements affect price dynamics, and balance the effects of high earnings now with that of high earnings in the future. Since investors' expectations tend to be self-fulfilling, this model can "justify" a large variety of price dynamics. The main purpose of the model is to highlight the idea that firms might choose to manage their earnings in a way consistent with the data, provided investors have expectations consistent with behavioral observations. More precisely, investors value long streaks of good price and earnings performance, they value announcements meeting thresholds such as the analyst forecasts or the previous announcements, and they ignore fundamentals as long as news are good.

Overall, the model assumptions and conclusions are consistent with previous empirical observations, as well as with major findings from the previous sections. Kahneman and Tversky [2000] provide evidence that individuals evaluate risky alternatives as changes from a reference point, and benchmarks such as past earnings or forecasts are good candidates for reference points for reported earnings, since they are easily available. Indeed, there is anecdotal evidence that firms that slightly missed the benchmark were severely punished (see Skinner and Sloan [2002]), and significant evidence that meeting or beating forecasts and previous announcements is rewarded by the market (see Barth et al. [1999] and Bartov et al. [2002]). Moreover, there is evidence of earnings management to meet the thresholds (see Burgstahler and Dichev [1997]), which is consistent with firms anticipating the market's reaction and acting accordingly. Furthermore, known behavioral biases such as "conservatism" (slow updating of models in the face of new evidence, see Edwards [1968]) and "representativeness" (tendency of experimental subjects to view events as typical or representative of some specific class and to ignore the laws of probability in the process, see Kahneman and Tversky [2000]) motivate the assumption that investors ignore fundamentals (conservatism) as long as news follow a consistent sequence (representativeness).

The model implies that, with the right parameters, some firms find it profitable to manage earnings, trying to avoid missing the thresholds, and significantly often choosing to report exactly at the higher threshold. Monte Carlo simulations show that firms managing earnings might have a better long-run future performance. Moreover, when bad news strike, overpriced firms might experience reversals, and complex patterns between past and future earnings and market performance might occur. This behavior is consistent with main empirical findings from this study.

Each period firms observe realized earnings e_t (firms are not indexed for simplicity) and report $\tilde{e}_t = e_t + r_t$. Choosing to report $r_t \neq 0$, that is to manage the earnings, incurs a cost of c_t. There is a constraint on the extent of earnings management, namely that $|\sum_{i=1}^{t} \tilde{e}_t - \sum_{i=1}^{t} e_t| \leq h$, that is the total reported earnings cannot deviate too much from the realized ones. Also assume that e_t follows an AR(1) stationary process: $e_{t+1} = \rho \cdot e_t + \epsilon^e_{t+1}$, with ϵ^e normally distributed $N(0, \sigma_e^2)$. Shortly before the realization of e_t the analyst forecasts $f_t = \rho \cdot e_{t-1} + s_f \cdot \epsilon^e_t + \epsilon^f_t$ become public, where ϵ^f is normally distributed $N(0, \sigma_f^2)$ and $s_f \cdot \epsilon^e_t$ is the part of the forecast correlated with the realized earnings. If they choose to manage their earnings, firms maximize the two period (proxying for an intermediate horizon) objective function $E_t(R_{t+1} + R_{t+2})]$, where R_t is the share return[8]. In doing so, firms anticipate investors' reaction to $\tilde{e}_t$. As will become clear shortly, the model is effectively a two period model, that will be simulated for a cross-section of firms, for a certain period of time, in order to study the earnings and pricing dynamics.

Investors (a representative investor is assumed) observe the history of realized returns $R_1, \cdots, R_t$, forecasts $f_1, \cdots, f_t$ and reported earnings $\tilde{e}_1, \cdots, \tilde{e}_t$. Based on these, they forecast $R_{t+1} = F(\{R_i\}_{1,t}, \{f_i\}_{1,t}, \{\tilde{e}_i\}_{1,t}) + \epsilon^R_{t+1}$, with ϵ^R_{t+1} normally distributed $N(0, \sigma_R^2)$, and submit a buying/selling order of x_t in order to maximize the one-period objective $E_t(R_{t+1}) \cdot x_t - \gamma_I \cdot Var_t(R_{t+1}) \cdot x_t^2$, where γ_I stands for the representative investor's risk aversion[9]. They exhibit bounded rationality, in the sense that they decide their investments only one period ahead (short investment horizon), and that their forecasting model might differ from the true price generating process to some extent (this difference will be elaborated later on). More importantly, they

[8]Including a risk aversion component to the objective significantly burdens the algebra without adding to the basic intuitions. Moreover, it is not clear whether the management is risk averse overall, since forms of compensation such as stock options might induce a risk seeking behavior.

[9]A specification with investors being heterogeneous in their risk aversion, but having forecast functions that are linearly related to each other, would be equivalent to this one.

ignore hedging possibilities among stocks when formulating their demand; studying how correlations among stock prices affect reported earnings is left for future research. Therefore

$$x_t = \frac{E_t(R_{t+1})}{2 \cdot \gamma_I \cdot Var_t(R_{t+1})} = \frac{F(\{R_i\}_{1,t}, \{f_i\}_{1,t}, \{\tilde{e}_i\}_{1,t})}{2 \cdot \gamma_I \cdot \sigma^2_{R,i}} \tag{1}$$

The market maker simply observes the order flow x_t and sets the new price

$$R_{t+1} = \frac{P_{t+1} - P_t}{P_t} = \beta_m \cdot x_t + \epsilon^{R,m}_{t+1} \tag{2}$$

It is assumed that $\epsilon^{R,m}_{t+1}$ is normally distributed $N(0, \sigma^2_{R,m})$. If $\beta_m = 2 \cdot \gamma_i \cdot \sigma^2_{R,i}$ and $\sigma^2_{R,m} = \sigma^2_{R,i}$, which is assumed, then investors' expectation are self-fulfilling indeed. With some exceptions to be elaborated later on (when investors look at fundamentals and correct the overpricing, firms are taken by surprise), firms anticipate investors' short term behavior and know how the true price dynamics is influenced by their earnings announcement. Therefore, they might choose to manipulate earnings (provided this offsets the costs), maximizing their medium term objective. Investors are rational in the sense that they maximize their objective and that their forecasting model might be consistent with the price generating process, but *boundedly* rational in the sense they look only one period ahead and ignore correlations among stocks.

Consider the following specification for investors' expectations:

$$F(\{R_i\}_{1,t}, \{f_i\}_{1,t}, \{\tilde{e}_i\}_{1,t}) = \beta_R \cdot M^R_t + \beta_n \cdot M^n_t + \beta_e \cdot M^e_t + \beta_F \tag{3}$$

where M^R_t, M^n_t and M^e_t capture the persistence and magnitude of past returns, past earnings news ($\tilde{e}_t$ relative to f_t) and past earnings increases ($\tilde{e}_{t+1}$ relative to $\tilde{e}_t$), as well the effect of meeting or beating thresholds. More specifically, let

$$M^R_t = \sum_{i=0}^{t-1} \delta^i_R \cdot [R_{t-i} + x_R \cdot \mathbb{1}\{R_{t-i} \geq 0\}] \tag{4}$$

for a discount factor δ_R and a positive coefficient x_R that captures the assumption that investors care about the *presence* of positive (negative) returns in addition to the magnitude. Similarly, let

$$M^n_t = \sum_{i=0}^{t-1} \delta^i_n \cdot [\tilde{e}_{t-i} - f_{t-i} + x_n \cdot \mathbb{1}\{\tilde{e}_{t-i} - f_{t-i} \geq 0\}] \tag{5}$$

and

$$M^e_t = \sum_{i=0}^{t-1} \delta^i_e \cdot [\tilde{e}_{t-i} - \tilde{e}_{t-i-1} + x_e \cdot \mathbb{1}\{\tilde{e}_{t-i} - \tilde{e}_{t-i-1} \geq 0\}] \tag{6}$$

The exact parametrization of M^n_t and M^e_t is not important, as long as they are increasing in $\{\tilde{e}_i\}_{1,t}$, and have "kinks" at the "critical" values $\{\tilde{e}_i - f_i\}_{1,t}$ and $\{\tilde{e}_i - \tilde{e}_{i-1}\}_{1,t}$. So investors optimism increases with $\{\tilde{e}_i\}_{1,t}$, they do not take into account the possibility of earnings management. Also, their optimism decreases sharply (with a "kink") if earnings surprises are *strictly* negative, either $\tilde{e}_i - f_i < 0$

or $\tilde{e}_i - \tilde{e}_{i-1} < 0$.

Firms believe that the parametrization for F in Equation 3 always holds, and they make their choice of $\tilde{e}_t$ based on this premise. However, in the Monte Carlo simulations it is allowed that Equation 3 fail in those rare instances when the price attains very high levels with respect to the starting price (the initial price is $P_1 = 1$, reflecting the fundamental value, which is assumed constant throughout), or when a multitude of bad news arrive at the same time. Specifically, it is assumed that $F_t = 0$ when $P_t > \bar{P}$, reflecting the idea that there is a limit to the total wealth invested in stocks, and that $F_t = \beta_{reversal} \cdot (1/P_t - 1)$ when $P_t > 1$, $R_t < 0$, $\tilde{e}_t < f_t$ and $\tilde{e}_t < \tilde{e_{t-1}}$, reflecting the idea that when there are many bad news at the same time investors become more concerned about fundamentals. The parameter $\beta_{reversal}$ indicates the severity of the reversal[10], and can range between 0 and 1.

5.2 Solution

At time t firms choose r_t in $[-s_{t-1} - h, -s_{t-1} + h]$, where $s_t = \sum_{i=1}^{t} r_i$. Their choice impacts M_t^n and M_t^e, therefore the distribution of R_{t+1}, but also the possible choices of r_{t+1} in $[-s_{t-1} - r_t - h, -s_{t-1} - r_t + h]$, therefore R_{t+2}. In general, the higher r_t the lower r_{t+1}, and since $E_t(R_{t+1})$ is increasing in r_t, there is a balance to strike between $E_t(R_{t+1})$ and $E_t(R_{t+2})$.

Looking forward from t to $t+1$, firms assume their objective at $t+1$ to be simply $E_{t+1}(R_{t+2})$, so they assume the optimal choice at $t+1$ is $r_{t+1} = -s_{t-1} - r_t + h$. In doing so, they misjudge the real objective at $t+1$, namely $E_{t+1}(R_{t+2} + R_{t+3})$, and this inconsistency is a form of limited rationality for the firms. A possible interpretation is that the current management has no stake in the firm in the long run, from $t+3$ on, and that it underestimates the possibility of a management change in the medium run, at $t+1$. Using equations (1), (2) and (3) it follows that

$$
\begin{aligned}
E_t(R_{t+1}) = {} & \beta_R \cdot [R_t + x_R \cdot \mathbb{1}\{R_t \geq 0\}] \\
& + \beta_n \cdot [e_t + r_t - f_t + x_n \cdot \mathbb{1}\{e_t + r_t - f_t \geq 0\}] + \\
& + \beta_e \cdot [e_t + r_t - \tilde{e}_{t-1} + x_e \cdot \mathbb{1}\{e_t + r_t - \tilde{e}_{t-1} \geq 0\}] + \\
& + \beta_F + \beta_R \cdot \delta_R \cdot M_{t-1}^R + \beta_n \cdot \delta_n \cdot M_{t-1}^n + \beta_e \cdot \delta_e \cdot M_{t-1}^e
\end{aligned}
\tag{7}
$$

Moreover

$$
E_t(\mathbb{1}\{R_{t+1} \geq 0\}) = \Phi\big(\frac{E_t(R_{t+1})}{\sigma_{R,m}}\big) \tag{8}
$$

Firms also believe that

$$
E_t(R_{t+2}) = \beta_R \cdot E_t(M_{t+1}^R) + \beta_n \cdot E_t(M_{t+1}^n) + \beta_e \cdot E_t(M_{t+1}^e) + \beta_F \tag{9}
$$

[10] If $\beta_{reversal} = 1$, the expected value of P_{t+1} is the fundamental value, namely 1.

Now, using equations (4), (5) and (6) it follows with some algebra that

$$
\begin{aligned}
E_t(R_{t+2}) = {} & \beta_R \cdot [E_t(R_{t+1}) + x_R \cdot E_t(\mathbb{1}\{R_{t+1} \geq 0\})]+ \\
& + \beta_n \cdot [-s_{t-1} - r_t + h + x_n \cdot \Phi(\frac{-s_{t-1} - r_t + h}{\sqrt{(1-s_f)^2\sigma_e^2 + \sigma_f^2}})]+ \\
& + \beta_n \cdot \delta_n \cdot [e_t + r_t - f_t + x_n \cdot \mathbb{1}\{e_t + r_t - f_t \geq 0\}]+ \\
& + \beta_e \cdot [-s_{t-1} - 2 \cdot r_t + h - (1-\rho) \cdot e_t + x_e \cdot \Phi(\frac{-s_{t-1} - 2 \cdot r_t + h - (1-\rho) \cdot e_t}{\sigma_e})]+ \\
& + \beta_e \cdot \delta_e \cdot [e_t + r_t - \tilde{e}_{t-1} + x_e \cdot \mathbb{1}\{e_t + r_t - \tilde{e}_{t-1} \geq 0\}]+ \\
& + \beta_F + \beta_R \cdot \delta_R \cdot M_t^R + \beta_n \cdot \delta_n^2 \cdot M_{t-1}^n + \beta_e \cdot \delta_e^2 \cdot M_{t-1}^e
\end{aligned}
\tag{10}
$$

where $\Phi(.)$ is the cumulative normal distribution.

To sum up, at time t firms choose r_t in $[-s_{t-1} - h, -s_{t-1} + h]$ that maximizes the objective

$$E_t(R_{t+1} + R_{t+2}) \tag{11}$$

with $E_t(R_{t+1})$ and $E_t(R_{t+2})$ given by equations (10), (7) and (8). They will choose to manage the earnings only if the potential improvement in their objective offsets the costs of managing c_t.

5.3 Implications

First, it is noteworthy from equation (10) that if firms can impact the signal received by analysts, that is s_f and σ_f, they would prefer $s_f = 1$ and $\sigma_f = 0$, that is perfect analyst forecasts. This result is true in the "static" setting where s_f and σ_f are constants, with the intuition that, everything else equal, this makes is easier on average (under the assumption that $r_{t+1} = -s_{t-1} - r_t + h$, as firms believe to be the case at t) for firms too meet the threshold f_{t+1}. If they could vary from one period to the next, firms would balance the benefits of higher forecasts (positive market reaction in the short term) with the costs (thresholds more difficult to beat, as well as direct costs of managing forecasts). To the extent that firms that manage earnings are also prone to manage forecasts and decrease forecast dispersion, the very low dispersion in analyst forecasts observed in firms with $News = 0$ (see Table 4) is consistent with the hypothesis that they manage their earnings.

Due to the "kinks" in the objective function, it is likely that the optimal solution $\hat{r}_t$ to the firms' objective will verify $\hat{r}_t + e_t - f_t \geq 0$ and $\hat{r}_t + e_t - \tilde{e}_{t-1} \geq 0$, if feasible. It is also apparent that the objective function is dominated by a linear term in r_t, of slope

$$Slope_r = \beta_R \cdot (\beta_n + \beta_e) + \beta_n \cdot \delta_n + \beta_e \cdot \delta_e - \beta_e \tag{12}$$

The term $\beta_R \cdot (\beta_n + \beta_e)$ comes from the impact of r_t on $E_t(R_{t+2})$ via the term $\beta_R \cdot E_t(M_{t+1}^R)$ in equation 9, that is via the persistence in returns until time $t+1$. The term $\beta_n \cdot \delta_n + \beta_e \cdot \delta_e$ comes from the impact of r_t on $E_t(R_{t+2})$ via the persistence in meeting or beating forecasts and previous announcements up to time t. Finally, the term $-\beta_e$ is the net effect of $\beta_n + \beta_e$, the impact of r_t on $E_t(R_{t+1})$ via the persistence of earnings surprises and increases up to time t, and $-\beta_n - 2 \cdot \beta_e$, the impact of r_t on $E_t(R_{t+2})$ via the persistence of earnings surprises and increases up to time $t+1$. Intuitively, a high r_t can have a negative impact on the objective by "worsening" the opportunity set for r_{t+1} *and* by raising the bar for r_{t+1}, that is by decreasing the likelihood that $\tilde{e}_{t+1} > \tilde{e}_t$. The dominant slope $Slope_r$ is negative iff

$$\beta_e \cdot (1 - \delta_e - \beta_R) > \beta_n \cdot (\delta_n + \beta_R) \tag{13}$$

that is if β_n, δ_n, δ_e and β_R are small relative to β_e. Therefore, in some cases, it can be optimal for firms not to push $\tilde{e}_t$ as high as possible, and even go as low as the bounds f_t, e_{t-1} or $-s_{t-1}-h$. Interestingly, the importance of topping previous announcements can motivate firms to exactly meet forecasts, especially when forecast is higher than the previous announcement. However, it can be optimal to report exactly f_t or e_{t-1} even when $Slope_r$ is positive.

Figure 1 shows such an objective function for the following parameters and state variables: $\beta_R = 0.02$, $\beta_n = 0.001$, $\beta_e = 0.00165$, $x_R = 0.05$, $x_n = 0.1$, $x_e = 0.3$, $\delta_R = 0.6$, $\delta_n = 0.85$, $\delta_e = 0.45$, $\sigma_e = 1$, $\sigma_f = 0.5$, $\sigma_R = 0.03$, $\rho = 0.5$, $s_f = 0.5$, $h = 3$, $R_t = 0.02$, $f_t = 1$, $e_t = 0$, $\tilde{e_{t-1}} = -0.5$, $s_{t-1} = 0$, $M^R_{t-1} = 0.1$, $M^n_{t-1} = 1$, and $M^e_{t-1} = 1$. The choice of the parameters, although somewhat arbitrary, is guided by several considerings. For a range in past returns of the order of 100%, β_R implies a range for future quarterly returns of around 2%, which is similar in magnitude with the momentum effect. σ_e is pinned without loss of generality, and σ_f is assumed smaller. Then h corresponds roughly to three standard deviations of the difference between earnings and forecasts. σ_R is of similar magnitude as the historical expected quarterly return. x_R, x_n and x_e are an order of magnitude smaller that the standard deviation of R_t, $\tilde{e}_t - f_t$ and $\tilde{e}_t - \tilde{e}_{t-1}$ respectively. β_n is such that the sensitivity of returns to beating forecasts be of similar magnitude as the sensitivity to positive past returns. Finally, β_e is chosen such that the dominant slope from equation (12) be slightly negative, in order to increase the chance that the optimal solution is at one of the thresholds.

As expected, in this illustration of the objective function, two "kinks" occur, one at $f_t - e_t = 1$, and one at $\tilde{e}_{t-1} - e_t = -0.5$. In Monte Carlo simulations, in the vast majority of cases the objective is maximized either at the "critical" values $f_t - e_t$ and $\tilde{e}_{t-1} - e_t$, or at the border of the feasibility domain, $-s_{t-1} - h$ and $-s_{t-1} + h$.

In order to further evaluate the earnings and market performance of firms managing earnings, an economy consisting of N_M firms that manage earnings (in the sense that they choose the $\hat{r}_t$ that maximizes the objective) and N_N firms that do not manage earnings (they always report $r_t = 0$) is simulated for T quarters; a direct comparison between the behavior of these two types of firms is then possible. The decision of a firm to manage earnings is assumed exogenous, and valid for all periods. In an alternative specification, firms could compare expected benefits from management with costs, and manage only in some periods; however, this is left for future research. Specifically, the state variables associated with each firm evolve according to the following algorithm:

- At time 1 the price is $P_1 = 1$, the fundamental value. All other state variables,

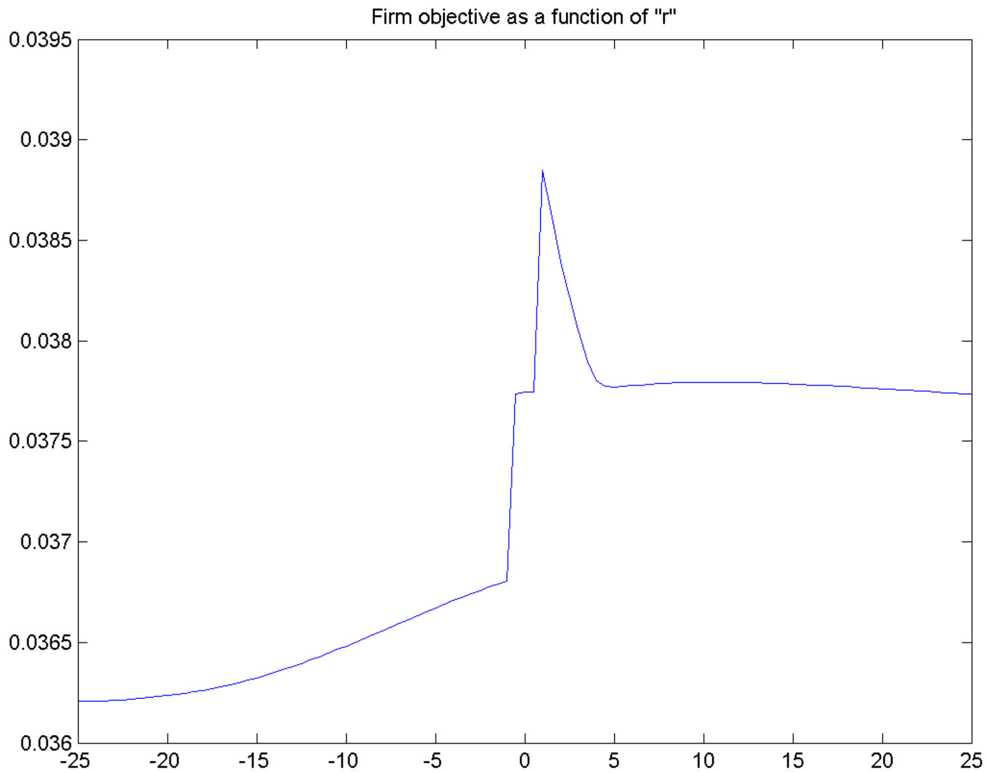

Figure 1: Example of firm's objective as a function of r_t

namely R_1, e_1, $\tilde{e_1}$, f_1, s_1, M_1^R, M_1^n and M_1^e are set to 0. The transition from time $t-1$ to t is done in a few steps.

- First, compute $e_t = \rho \cdot e_{t-1} + \epsilon_t^e$ and $f_t = \rho \cdot e_{t-1} + s_f \cdot \epsilon_t^e + \epsilon_t^f$.
- Compute R_t: if many bad news occur at $t-1$, that is $R_{t-1} < 0$, $\tilde{e_{t-1}} < f_{t-1}$ and $\tilde{e_{t-1}} < \tilde{e_{t-2}}$, returns reverse to fundamentals according to

$$R_t = \beta_{reversal} \cdot (1/P_{t-1} - 1) + \epsilon_t^R$$

Else, if the price is very high, above $\bar{P}$, the trend is assumed zero, so $R_t = \epsilon_t^R$. Else

$$R_t = \beta_R \cdot M_t^R + \beta_n \cdot M_t^n + \beta_e \cdot M_t^e + \beta_F + \epsilon_t^R$$

Also compute $P_t = P_{t-1} \cdot (1 + R_t)$.

- If the firm is of the type that manages earnings, choose $r_t = \hat{r_t}$, where $\hat{r_t}$ maximizes the objective $E_t(R_{t+1}) + E_t(R_{t+2})$, developed in equations (7), (9) and (10), in the range $[-s_{t-1} - h, -s_{t-1} + h]$. If the firm is not managing earnings, simply choose $r_t = 0$.
- Compute $\tilde{e_t} = e_t + r_t$ and $s_t = s_{t-1} + r_t$.

- Finally, update $M_t^R = R_t + x_R \cdot \mathbb{1}\{R_t \geq 0\} + \delta_R \cdot M_{t-1}^R$,
  $M_t^n = \tilde{e}_t - f_t + x_n \cdot \mathbb{1}\{\tilde{e}_t - f_t \geq 0\} + \delta_n \cdot M_{t-1}^n$ and
  $M_t^e = \tilde{e}_t - \tilde{e_{t-1}} + x_e \cdot \mathbb{1}\{\tilde{e}_t - \tilde{e_{t-1}} \geq 0\} + \delta_e \cdot M_{t-1}^e$.

Using the same parameter values as above, the economy is simulated for 300 periods (quarters), with $N_M = N_N = 200$. The ceiling price above which the return drift is zero is $\bar{P} = 7$, and $\beta_{reversal}$ is assumed to be 0.5. Approximately 18% of the firms in a cross-section report $\tilde{e}_t = f_t$, reflecting the fact that the firms managing earnings choose to exactly meet forecasts about 35% of the time; moreover, they report exactly the previous forecast about 30% of the time. It should be pointed out that, when the slope of the objective is not almost flat, the frequency of exactly meeting forecasts or previous announcements can be significantly reduced.

Figure 2 compares the typical and mean price path of firms that manage forecasts to the typical and mean price path of firms that do not. For firms that manage earnings, it takes 100 to 150 quarters for the price to reach the upper limit $\bar{P}$ (which reflects limited investor wealth); then, it moves around $\bar{P}$ until bad news arrive, at which point it reverses toward the fundamental value; however, it rapidly recovers and reaches $\bar{P}$ again; a reversal-recovery cycle takes about 50 quarters. On average, prices grow steadily for the first 100 quarters, they grow slowly and are more volatile during the following 100 quarters, then they stabilize a little short of $\bar{P}$. For firms that do not manage earnings, however, the price reaches $\bar{P}$ much less frequently, and reversals are more pronounced. On average, the price grows for the first 100 quarters, then stabilizes to a value much below $\bar{P}$. Overall, firms that manage earnings have a higher drift, even after reversals. Even if their objective is to perform well over only over the future 2 periods, they perform much better during the "growth" phase of 100 quarters, which also lasts longer, and their price stabilizes to a much higher value in the long run.

Due to the higher return drift for firms managing earnings, it is expected that they perform better during the "growth" phase. Most of these firms have $News = 0$ or $News = 1$, and it is difficult to anticipate which category should have higher future returns. However, as long as both categories have higher future returns than firms that do not manage earnings, in an economy with a mixture of managing and non-managing firms, stocks with $News = 0$ could perform better in the future. During the "steady" phase, all firms have an average return close to zero, but the variable $News$ is positively related to future returns, and it is expected that stocks with $News = 1$ perform better in the future. Figure 3 presents the time series of the average return during the future 4 quarters for portfolios based on the $News$ category of stocks in a given quarter.

Indeed, during the first 100 quarters, firms with $News = 0$ appear to perform better that firms with $News = 1$ over the next four quarters, while firms with $News = -1$ appear to perform significantly worse. Actually, even over the whole 300 quarters, the mean future four quarter return is highest for stocks with $News = 0$, namely 1.3%, while it is 1.1% for stocks with $News = 1$ and -0.2% for stocks with $News = -1$. The discrepancy is a little higher for the first 150 quarters, where future four quarter return are 1.5% for firms with $News = 0$, 1.2% for firms with $News = 1$, and 0.1% for firms with $News = -1$. With this model it appears to be difficult to have firms

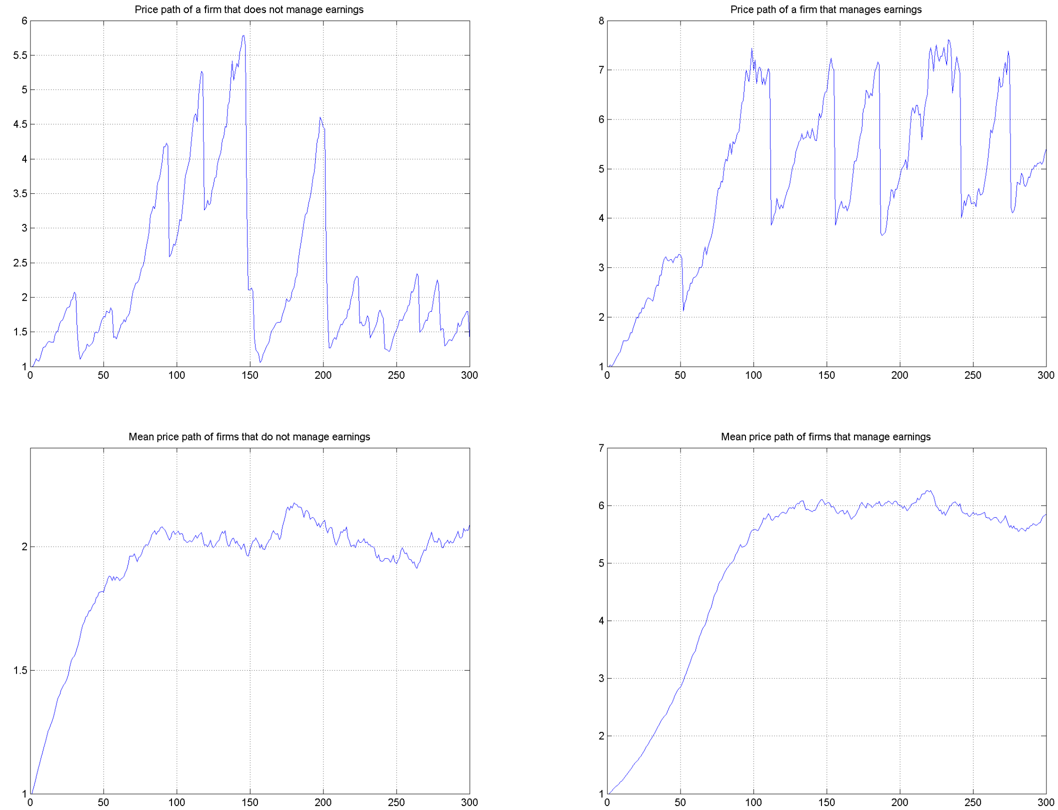

Figure 2: Sample price paths (upper) and mean price paths (lower) for firms that do not manage (left) and firms that do manage (right) earnings.

with $News = 0$ performs much better than firms with $News = 1$, as is the case in reality, suggesting that firms mnaging earnings chose to meet forecasts more ofter than what is suggested by the model. In order to achieve a significantly higher frequency of exactly meeting forecasts with this model, the dominant slope of firms' objective should be zero, and the error allowed in firms' reporting, h, should be very high.

The ratio of past quarters of meeting or beating forecasts, Rat_news_pos, is also expected to be related to future returns, since by construction returns are positively related to M^n, which is a measure of beating expectations in the past. During the growth period, this positive relation should hold in both firms that manage and firms that do not manage earnings. However, during the steady period, firms that manage earnings are more prone to more significant reversals while having better past performance than non-managing firms, and the overall result is more ambiguous. Figure 4 shows the time series of the average return during the future 6 quarters for portfolios based on the ratio of past 10 quarters of meeting or beating forecasts. More precisely, stocks are ranked cross-sectionally according to this ratio in tertiles.

Expectations are confirmed. During the first 100 quarters Rat_news_pos is clearly positively related to future returns. In fact, firms with a high ratio have mean future returns of 1.7% per quarter, firms with a median ration have future returns of 1.2% and firms with a low ratio have future returns of 0.7%. During the steady period, however, from quarter 100 on, Rat_news_pos is negatively, albeit weakly, re-

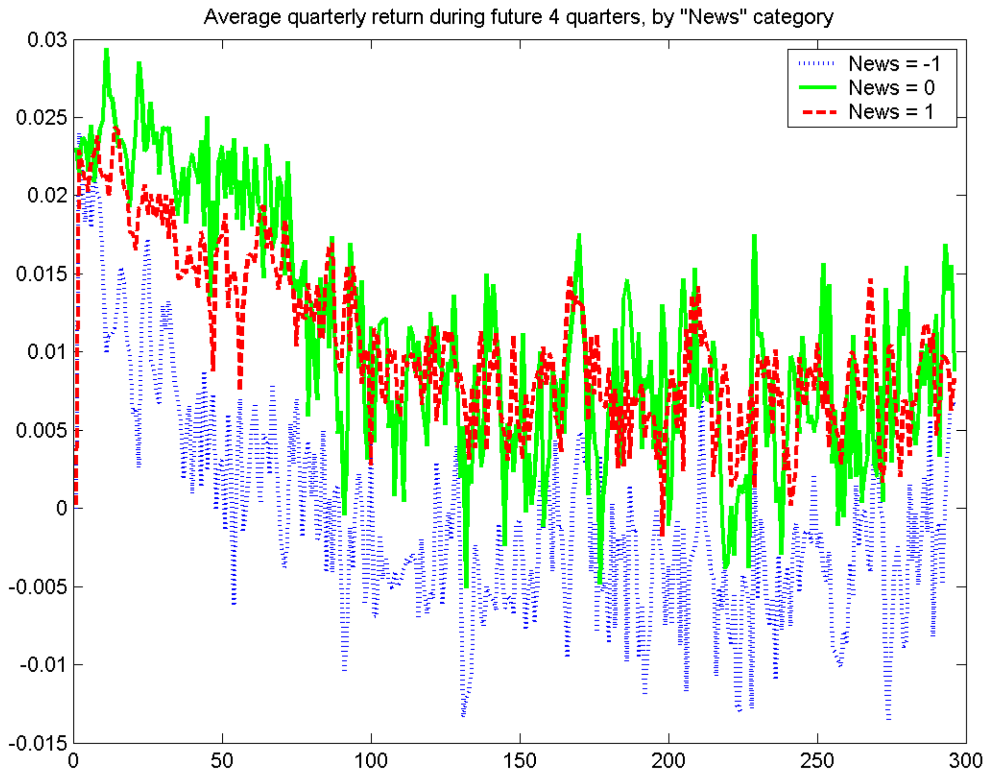

Figure 3: Average return over future 4 quarters for portfolios based on the *News* category.

lated to future returns: stocks with low *Rat_news_pos* have future returns of 0.4%, those with median *Rat_news_pos* have future returns of 0.37%, while stocks with high *Rat_news_pos* have future returns of 0.3%. The relation is weak because returns both reversals and recoverires have a higher magitude for stocks that manage earnings, which have a relatively high *Rat_news_pos*. This tendency of reversals during the steady period might be due to the fact that reversals tend to happen after high *Rat_news_pos*, while recoveries tend to happen after low *Rat_news_pos*, and reversals and recoveries are of similar magnitudes. Moreover, this tendecy of reversals counteracts the positive relation implicit in the generating process of returns.

Overall, the model outlines some reasons for which firms might choose to manage earnings in order to avoid missing thresholds such as analyst forecasts and previous announcements, as well as reasons for exactly meeting the thresholds, if firms have a medium-term objective. Simulations of the model show that it might be reasonable to expect a significant number of firms to exactly meet thresholds in a given month, and to expect firms that manage earnings to perform significantly better in the long run, even though their horizon is only medium-term. Also, firms that manage earnings might have a higher tendency to become overpriced and experience stronger reversals.

Simulation results are also consistent with the sub-period analysis in Tables 17 and 18, to the extent that the period 1993-1999 corresponds to the "growth" period,

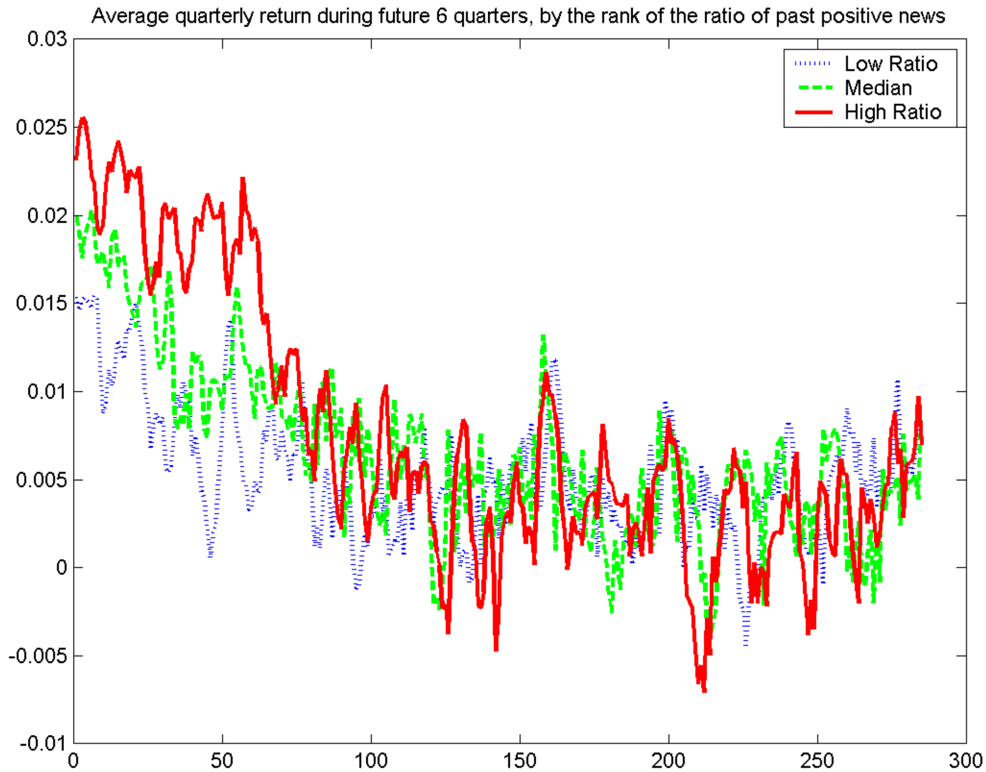

Figure 4: Average return over future 6 quarters for portfolios based on the ratio of past quarters of beating forecasts.

and the period 2000-2007 corresponds to the "steady" period in the model. Specifically, during the first sub-period stocks with $News = 0$ perform significantly better, and Rat_pos_news does not have much explanatory power for future returns, while in the second sub-period stocks with $News = 0$ perform only slightly better, and Rat_pos_news predicts lower future returns. Of course, the model assumes all firms are enlisted at the same time, but as long as the rate of enlistings is higher in the first period, or as long as capital available for stock investing (the model equivalent would be $\bar{P}$) grows faster in the first period, some of the considerings from the model might still apply.

6 Conclusion

The paper shows that firms whose earnings announcements exactly match the last available analyst mean forecast have consistently better future returns, and that the same is true for the larger sample of firms which have exactly met either the corresponding forecast or the previous announcement, in at least one of the previous four earning announcements. Moreover, firms with a high proportion of past quarters when strictly beating thresholds (either previous earnings or analyst forecasts) in the past two years have lower future returns than otherwise similar firms, while firms with a high proportion of past quarters when exactly meeting these thresholds enjoy higher future returns; the former effect is more pronounced during the 1993-1999 sub-period, while the second is more stronger from 2000 to 2007. Also, the length of the sequence of past consecutive positive/negative earnings performance has predictive power for future returns. Specifically, in stocks exactly meeting expectations long sequences predict higher returns in the following year, while in stocks strictly beating expectations long sequences predict lower future returns. Excess returns are significant after controlling for standard risk factors and firm characteristics (size, book-to-market, analyst coverage, analyst forecast dispersion, past returns performance). Moreover, the study shows that momentum is higher in stocks with non-negative surprises.

A simple model offers an intuition for the findings, developing the assumption of earnings management by larger firms, which are followed by more analysts. Firms anticipate that investors value positive results (either relative to past earnings or to relative to analyst forecasts), so they manage earnings to avoid negative results; they often choose to report exactly the forecast, because reporting higher earnings now has two negative effects: it raises the bar for future announcements and it lowers the feasible set for future announcements. Simulations of the model show that it might be reasonable to expect a significant number of firms to exactly meetthresholds in a given month, and to expect firms that manage earnings to perform significantly better in the long run, even though their horizon is only medium-term. Also, firms that manage earnings might have a higher tendency to become overpriced and experience stronger reversals.

This work can be extended in several ways. The study only considers the hypothesis of earnings management, ignoring the possibility of expectations management by firms (firms' ability to influence analyst expectations). In particular, in would be interesting to determine whether evidence of earnings management can be corroborated with empirical evidence of expectations management (possibly, a higher variation in analyst forecasts). The model could also be extended to account for expectations management, for correlation among stocks, or for the fact that firms are enlisted and delisted at different times.

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