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Cash Flow News and the Investment Effect in the Cross-Section of Stock Returns

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Abstract

This study provides novel evidence that cash flow news quantitatively explains the investment effect in the cross-section of stock returns. The negative return predictability of asset growth, investment growth, and accruals is evident only through the cash flow news component of returns. The cash flow news returns associated with investment-sorted portfolios exhibit a reversal from the pre-formation period to the post-formation period. Such a return reversal is in line with reversals in firm fundamentals and becomes stronger for stocks with higher information uncertainty. Our findings are consistent with the expectational errors hypothesis and fail to support the risk-based explanation for the investment effect.

JEL Classification: G12; G14;

Keywords: Investment effect; q-theory; cash flow news; return decomposition.

1. Introduction

It is well documented that corporate investment is negatively associated with future stock returns, which is referred to as the investment effect or the asset growth effect (Titman, Wei, and Xie, 2004; Fama and French, 2006; Cooper, Gulen, and Schill, 2008). The key to understanding the investment effect is to determine the drivers of firm-level investment and the sources of stock returns, thus linking the incentives of corporate decisions to the corresponding capital market implications. The q-theory of investment successfully achieves this goal in modeling the effect of the marginal q on real investment decisions (e.g., Cochrane, 1996; Hou, Xue, and Zhang, 2015). The simple intuition is that a lower cost of capital leads to a higher net present value of expected cash flows and thus stimulates more investment, offering a risk-based explanation for the investment effect. In contrast, mispricing-based explanations posit that lower returns associated with high-investment firms, compared to low-investment firms, are due to management overinvestment (Titman, Wei, and Xie, 2004), investor expectational errors (Cooper, Gulen, and Schill, 2008), and/or limits to arbitrage (Lam and Wei, 2011; Lipson, Mortal, and Schill, 2011). It follows that if firm-level investment is mispriced by the market, subsequent realized stock returns largely reflect the corrections of market expectations.

In this study, we aim to gauge the extent to which the investment effect is consistent with the risk-based versus the mispricing-based explanations by quantifying the components in stock returns that reflect market expectations and changes in expectations. We use a return decomposition approach based on valuation models to separate the cash flow news component from the discount rate news component and the expected return component in realized stock returns.[1] The cash flow news component measures stock price changes due to changes in the

[1] The advantage of using valuation models for return decomposition is that cash flow expectations (proxied by analyst earnings forecasts) can be directly observed and applied. However, the approach relies on the assumption

market expectations of firm future cash flows, proxied by analyst earnings forecasts. The discount rate news component quantifies stock price changes due to changes in the firm cost of capital or in the discount rate. The expected return component, also called the cost of capital, is simply the ex ante discount rate that makes the current stock price equal to the present value of all expected future cash flows in a present value formula. Return decomposition is useful because it allows us to determine whether there is a systematic pattern of sizable unexpected returns that explains the investment effect. According to risk-based explanations, the lower total returns associated with high-investment firms should only be attributed to the expected return component. On the other hand, any systematic return pattern associated with cash flow news or discount rate news across investment-sorted portfolios would weaken the channel linking the cost of capital to optimal investment.

We construct stock portfolios based on three investment-related measures: asset growth, investment growth, and accruals.[2] We find consistent evidence that the negative return spread between high- and low-investment stocks is quantitatively explained by the spread in the cash flow news component. High-investment stocks underperform low-investment stocks not due to their lower expected returns but almost entirely as a consequence of their more severe negative cash flow shocks. We next explore the return dynamics from the pre- to the post-portfolio formation period. We find that the cash flow news return spread between high- and low-investment firms exhibits strong reversal; it is significantly positive in the year before portfolio formation and significantly negative in the year after. The evidence implies market expectational errors regarding firms' cash flows. Specifically, relative to low-investment firms, investors attach

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that analyst forecasts represent market expectations and the valuation model is the correct model used by the market. We check the robustness of the results by using different valuation models and by using the alternative vector autoregression (VAR) method.

[2] Our results are robust to other investment proxies such as the investment-to-assets ratio.

overoptimistic cash flow expectations to high-investment firms that are gradually corrected the subsequent year. We also find that discount rate news and expected returns do not play any role in explaining the investment effect. These results are new to the literature.

We then examine whether the reversal pattern of cash flow news is in line with firm fundamentals. The tests of firm characteristics indicate that high-investment firms indeed appear to be significantly more profitable and to have significantly higher sales growth than low-investment firms ex ante. However, this characteristic does not seem to persist, since the spreads in both profitability and sales growth shrink by more than 50% the subsequent year, accompanied by a significant drop of approximately two-thirds in the investment spread. The reversal of cash flow news returns is consistent with the market overestimating the persistence of firm fundamentals such as profitability and growth. Subsequent negative surprises in cash flows trigger the correction of market expectations and shape the stylized stock return pattern.

Additional tests lend further support to the importance of cash flow news in driving the investment effect. First, based on Fama-Macbeth (1973) cross-sectional regressions, we find that an increase of one standard deviation in investment corresponds to monthly total returns that are 16–24 basis points (bps) lower and monthly cash flow news returns that are 18–24 bps lower in the subsequent year. However, the association between investment and either future discount rate news returns or expected returns is economically insignificant. Second, we interact investment with information uncertainty using double sorts and demonstrate that high information uncertainty amplifies the role of cash flow news in the investment effect.[3] Finally, using firm-level return components estimated from the VAR method put forth by Vuolteenaho (2002), we find consistent evidence that cash flow news accounts for approximately 70% of the return

[3] We use stock return volatility, cash flow volatility, firm size, and firm age to proxy for information uncertainty.

spread between high- and low-investment firms and exhibits a strong reversal from the pre- to the post-formation period.

Overall, our study contributes to the literature by providing new evidence on the drivers of the investment effect. The role of cash flow news quantitatively explaining the investment effect is clear evidence consistent with the expectational errors hypothesis proposed by Lakonishok, Shleifer, and Vishny (1994) and Cooper, Gulen, and Schill (2008).[4] Related to our study, Lipson, Mortal, and Schill (2011) document systematic bias in perception using analyst forecast errors in support of the mispricing explanation for the asset growth effect. Different from these studies, we quantify the economic magnitude of the expectational errors to gauge their explanatory power for the investment effect. Furthermore, we demonstrate the formation and correction processes of investment mispricing by exploring the time-series patterns of return components. We show that the investment effect is not due to investors' systematically understating discount rates for high-investment firms, which would also have led to overvaluation. The reversal pattern of cash flow news returns supports the mispricing explanation that investors overreact to firm current fundamentals.

Our study also adds to the literature on the understanding of stock price movements in general and applications of return decomposition in particular. One of the applications is to use return variance decomposition to shed light on which return component (cash flow news or discount rate news) dominates time-series stock price movements (e.g., Campbell and Shiller, 1988; Chen and Zhao, 2009; Cochrane, 2011; Chen, Da, and Zhao, 2013). Another application decomposes the market beta into the cash flow beta and the discount rate beta to distinguish between the risk-based and mispricing-based explanations for an anomaly, such as the value

[4] Thus, an investment factor constructed by a long-short strategy reflects the differential in cash flow news returns between high- and low-investment firms.

effect (e.g., Campbell and Vuolteenaho, 2004).[5] We extend this literature by quantifying the economic magnitude of each return component to distinguish among different explanations for the investment effect.[6] We find that sorting firms on investment likely systematically sorts on errors of cash flow expectations, which is more consistent with the mispricing explanation.

The rest of the paper is organized as follows. Section 2 reviews the related literature. Section 3 describes the return decomposition methodology as well as its advantages and limitations. Section 4 reports and discusses our empirical findings. Section 5 concludes the paper.

2. Literature Review

Studies on the investment effect are either risk-based or mispricing-based. In risk-based studies, q-theory is typically used to justify the negative return predictability of investment (Cochrane, 1996; Liu, Whited, and Zhang, 2009; Hou, Xue, and Zhang, 2015). The intuition from modeling firm optimal investment is that a lower expected cost of capital generates a higher present value of projects, which leads to higher investment. Such a model implies that shocks in expected returns move current investment. Given the assumption of no systematic mispricing or the correction of mispricing, the future realized returns associated with investment-sorted portfolios would be approximately equal to their expected returns. The expected returns reflect the relative riskiness of firms' future cash flows.[7] For example, Titman, Wei, and Xie (2013) find that the asset growth effect is stronger for more developed financial markets that are better able

[5] More specifically, Campbell and Vuolteenaho (2004) apply the vector autoregressive regression (VAR) method to decompose the market beta ($Cov(Ret_i, Ret_m)$) into the cash flow beta ($Cov(Ret_i, CFret_m)$) and the discount rate beta ($Cov(Ret_i, DRret_m)$). They attribute the high returns of small and value stocks to the high cash flow betas that are linked with high risk premiums.

[6] This is a new application of return decomposition. The covariance of investment with stock returns ($Cov(I_{i,t}, Ret_{i,t+1})$) is equal to the sum of its covariances with cash flow news (($Cov(I_{i,t}, CFret_{i,t+1})$), discount rate news ($Cov(I_{i,t}, DRret_{i,t+1})$), and expected returns ($Cov(I_{i,t}, Eret_{i,t+1})$). The magnitudes of these covariances represent the relative importance of each component in driving the investment effect.

[7] Another risk-based explanation is derived from the real options model proposed by Berk, Green, and Naik (1999).

to align capital expenditures with the cost of capital but is unrelated to the country-specific corporate governance index.

In mispricing-based studies, two types of behavioral stories are prominent. Titman, Wei, and Xie (2004) propose the agency theory of overinvestment. They find that the investment effect is stronger for firms with weaker corporate governance and more empire building incentives. Cooper, Gulen, and Schill (2008) emphasize the mispricing story based on manager overconfidence and investor expectational errors to account for the negative return predictability of asset growth.[8] They provide evidence consistent with the expectational errors hypothesis in that firms sorted by asset growth exhibit reversals in operating margins and unanticipated news that shock investors are released around earnings announcements. Both types of behavioral stories underline investor overreaction to firm investment while remaining silent about how mispricing affects firm investment. Polk and Sapienza (2009) fill the gap by modeling corporate investment decisions in response to mispricing. Consistent with their predication, they find that more opaque firms and firms with shorter shareholder horizons cater more to mispricing due to the higher abnormal investment that is followed by lower returns.

In sum, as opposed to the risk-based explanations, the mispricing explanations imply that the future realized returns associated with investment-sorted portfolios contain substantial market surprises due to ex ante biased expectations. In particular, according to the expectational errors hypothesis whereby investors mistakenly extrapolate firm current operating performance far into the future, we would predict that the return spread between high- and low-investment firms largely reflects cash flow shocks. A discount rate mispricing explanation may also be viable in which investors underestimate the risks or risk premiums associated with high-investment firms

[8] The expectational errors hypothesis is originally suggested by Lakonishok, Shleifer and Vishny (1994) to explain the value premium, which indicates that value firms outperform growth firms, proxied by book-to-market equity.

as compared to low-investment firms. In this case, high-investment firms experience relatively lower future returns mainly due to discount rate shocks.

Because the rational explanation models firm optimal investment triggered by future expected returns while the mispricing explanation focuses on the formation and adjustment of investor expectations, the two are not, in essence, exclusive. In this study, we aim to quantify the extent to which the information reflected in stock returns justifies the rational or mispricing explanation for the investment effect. Although this may also shed light on the motives of firm investment, our method based on return decomposition may not be appropriate or ideal for addressing the relative importance of these motives due to the nature of firm investment and profitability and stock returns all being endogenous.[9]

3. Return Decomposition

Return decomposition is commonly used to distinguish among the different underlying factors that drive stock price movements. Intuitively, stock prices can change due to expected compensation for the time value of money and risk. This component is always referred to as the expected return component. In addition, the total realized return contains the news component representing unexpected shocks to stock valuation. The news component of the stock price change can be further decomposed into cash flow news and discount rate news. To illustrate this, let $P_t = f(cf_t, dr_t, t)$ be a valuation function for a stock that incorporates cash flow expectation

[9] Chen, Da, and Larrain (2012) decompose changes in unexpected investment growth into terms related to stock returns and surprises in cash flow growth. They indicate that current cash flow surprises explain the variance of investment growth to the greatest degree. One challenge to their study is that investment growth, returns, and cash flow surprises are all endogenously determined.

(cf_t) and the discount rate (dr_t) into the stock price at time t.[10] The one-period realized stock return from t - 1 to t (Ret_t) can then be represented as[11]

$$Ret_t = \frac{\frac{\partial f_t}{\partial cf} \times \Delta cf}{P_{t-1}} + \frac{\frac{\partial f_t}{\partial dr} \times \Delta dr}{P_{t-1}} + \frac{\frac{\partial f_t}{\partial t} \times \Delta t}{P_{t-1}} = CFret_t + DRret_t + Eret_t, \quad (1)$$

where *CFret*, *DRret*, and *Eret* represent the cash flow news component, the discount rate news component, and the expected return component, respectively. The variable *CFret* is a proxy for price change due to earnings expectation news, holding both the discount rate and time constant. Similarly, *DRret* is a proxy for price change due to discount rate news, holding both the earnings expectation and time constant; *Eret* is the price change in the next period that is expected by investors at time t - 1 because, according to theory, neither the discount rate news nor the earnings expectation news is predictable beforehand. Ex post stock price movements incorporate all three components. A positive *CFret* is a result of an improved outlook for a firm's future earnings and a positive *DRret* implies a decreased investor risk perception for a firm. Although macro-level news (such as changes in risk aversion, interest rate movements, and liquidity shocks) is more likely to be related to discount rate news and firm-specific disclosures are, for the most part, related to cash flow news, both types of news can be commonly integrated in practice. The return decomposition is merely a mechanical quantification of the relative contribution from each of the return components. Pure disintegration in the economic sense is impractical.

To implement the approach, analyst earnings forecasts and supplementary accounting information are first used to estimate the implied discount rate in a valuation model.[12] Given all

[10] This return decomposition approach was first suggested by Chen, Da, and Zhao (2013).
[11] We add dividends, if any, back to P_t in the decomposition so that the total return includes both the dividend yield and capital gain.

the parameters of cf_t, cf_{t-1}, dr_t, and dr_{t-1} that contain information about earnings expectations and discount rates in consecutive periods, we can substitute these into the valuation model and quantify the three return components, as show in equations (3) to (5) below:[13]

$$Ret_t = \frac{P_t - P_{t-1}}{P_{t-1}} = \frac{f(cf_t, dr_t, t) - f(cf_{t-1}, dr_{t-1}, t-1)}{P_{t-1}}, \tag{2}$$

$$CFret = \frac{\frac{1}{2}[f(cf_t, dr_t, t) - f(cf_{t-1}, dr_t, t) + f(cf_t, dr_{t-1}, t) - f(cf_{t-1}, dr_{t-1}, t)]}{P_{t-1}}, \tag{3}$$

$$DRret = \frac{\frac{1}{2}[f(cf_t, dr_t, t) - f(cf_t, dr_{t-1}, t) + f(cf_{t-1}, dr_t, t) - f(cf_{t-1}, dr_{t-1}, t)]}{P_{t-1}}, \tag{4}$$

$$Eret = \frac{f(cf_{t-1}, dr_{t-1}, t) - f(cf_{t-1}, dr_{t-1}, t-1)}{P_{t-1}}. \tag{5}$$

We assume two hypothetical processes in which the expected return component and the two news components are incorporated:

Scenario 1: P_{t-1} $\quad +Eret \times P_{t-1}$: $\quad +CFret \times P_{t-1}$: $\quad +DRret \times P_{t-1}$: $\quad = P_t$

$\rightarrow f(cf_{t-1}, dr_{t-1}, t) \quad \rightarrow f(cf_t, dr_{t-1}, t) \quad \rightarrow f(cf_t, dr_t, t)$

Scenario 2: P_{t-1} $\quad +Eret \times P_{t-1}$: $\quad +DRret \times P_{t-1}$: $\quad +CFret \times P_{t-1}$: $\quad = P_t$

$\rightarrow f(cf_{t-1}, dr_{t-1}, t) \quad \rightarrow f(cf_{t-1}, dr_t, t) \quad \rightarrow f(cf_t, dr_t, t)$

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[12] One discount rate is estimated for each stock at a given time, which could be viewed as a long-term average or constant equivalent of a stock's future discount rate structure.

[13] To see the link between equation (1) and equations (3) to (5), note that $\frac{\partial f_t}{\partial x} \times \Delta x = \lim_{\Delta x \to 0} \frac{f(x+\Delta x, z) - f(x, z)}{\Delta x} \times \Delta x \approx \lim_{\Delta x \to 0} (f(x+\Delta x, z) - f(x, z))$. The numerators in equations (3) and (4) add up to $f(cf_t, dr_t, t) - f(cf_{t-1}, dr_{t-1}, t)$. The sum of numerators in equations (3) to (5) is equal to the numerator in equation (2). Therefore, the identity $Ret = CFret + DRret + Eret$ always holds, by construction. A numerical example illustrating the identity is available upon request.

The expected return component is known ex ante and therefore does not depend on either cf_t or dr_t. Equations (3) and (4) calculate the average cash flow news and average discount rate news components in the above two scenarios, respectively.[14]

To make our approach more general and less dependent on model-specific constraints, we apply four residual income models for the estimation. Each valuation model relies on its own set of assumptions in extrapolating earnings forecasts to long-run cash flows and discounting them back to the present. These four models include the models of Gebhardt, Lee, and Swaminathan (2001), or GLS; Claus and Thomas (2001), or CT; Ohlson and Juettner-Nauroth (2005), or OJ; and the modified price/earnings-to-growth (PEG) ratio model of Easton (2004), or MPEG. We discuss the models in detail in Appendix 1. Because there is little consensus in the literature regarding the preferred model, we follow Hail and Leuz (2006), Chen, Chen and Wei (2009, 2011), among others, and use the median of the implied discount rate estimates from the four models to mitigate the effect of measurement errors and outliers.[15] We then calculate the three return components from the corresponding valuation model using equations (3) to (5).

The residual income model-based return decomposition approach has the advantage of directly applying observables about market expectations. It does not rely on the predictability of the macroeconomic variables that forecast future discount rates. For example, Chen and Zhao (2009) indicate that the classical VAR-based return decomposition approach (Campbell and Shiller, 1988; Campbell, 1991) is sensitive to the state variables that are chosen in the estimation process and their time-series predictability.[16] Because we use consensus analyst earnings

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[14] Scenario 1 assumes that cash flow news is incorporated before discount rate news, while scenario 2 assumes the reverse order. We apply a balanced approach by taking the average estimate from the two scenarios.

[15] Our results are robust if we use the estimation of return components based on each individual valuation model.

[16] Chen, Da, and Zhao (2013) indicate that the residual income model-based approach generates the intuitive results that discount rate news dominates in explaining price movements in short horizons, while cash flow news dominates in explaining those in long horizons.

forecasts to proxy for market earnings expectations, the discount rate news component captures all residual news that cannot be explained by revisions in earnings forecasts or by the expected price movement portion. In the extreme case in which analyst earnings forecasts are uninformative about marginal investor expectations of a firm's earnings, the sum of the expected return and the discount rate news should replicate the pattern of the realized stock return. Thus, any finding on the cash flow news pattern is not a mechanical coincidence. This method is used by Lau, Ng, and Zhang (2012) to study the effect of the information environment on the volatility of equity risk premiums around the world.

On the other hand, by applying the residual income model-based return decomposition approach, the study is subject to limitations. The approach relies on the two assumptions that analyst earnings forecasts mirror market-wide expectations and that the residual income models are the exact models used by the market when valuing stocks. Violations of the assumptions would lead to estimation errors in the return components.[17] However, when the model-implied discount rate positively correlates with the unobserved market discount rate, such concern can be mitigated when we focus on the time-series changes in the discount rate and conduct cross-sectional comparisons. Evidence supporting the value relevance of analyst earnings forecasts and valuation model-implied discount rates abounds in the literature. For example, Givoly and Lakonishok (1980) and Stickel (1991) indicate that stock markets react favorably to upward revisions in analyst earnings forecasts, suggesting that these revisions promote price discovery. In this regard, residual income models are useful in describing changes in firm valuation.

In addition, Pástor, Sinha, and Swaminathan (2008) demonstrate analytically that, under plausible conditions, the implied cost of equity is perfectly correlated with conditional expected

[17] Note that both *CFret* and *DRret* would be affected similarly because they both rely on cash flow estimates and discount rate estimates. Since the three components add up to the total return, estimation errors in one component would translate into errors in the other components.

stock returns. In an empirical analysis, the authors construct the time-series–implied cost of capital for G7 countries and find a positive relation between the implied cost of capital and the variance in stock returns, both by country and at the global-market level. The results suggest that residual income models can adequately predict firm value, especially changes in firm value. For our study, the results should be reliable as long as measurement errors do not systematically distort the quantification of the three return components. In addition, we rerun our tests using the VAR-based estimates of the return components for a robustness check. The VAR-based estimates, although also subject to other constraints, do not depend on model-implied discount rates.

4. Empirical Results

4.1. Data description and summary statistics

We use monthly analyst earnings forecasts from the Institutional Brokers' Estimate System (I/B/E/S), including one- to three-year earnings per share and long-term growth rate forecasts. Annual accounting variables and monthly stock returns are from Compustat and the Center for Research in Security Prices (CRSP), respectively. The sample period is restricted to 1985–2012 by the data availability of the I/B/E/S. Following the literature, all financial firms are excluded from the sample. The monthly median I/B/E/S analyst forecasts are then matched with the Compustat accounting variables by aligning the forecasting periods to the fiscal year-end of the financial statement variables. The data are then merged with the monthly stock returns file. To decompose the stock return in month t, we need earnings forecasts at both months t and t - 1.

Each month, the GLS, CT, OJ, and MPEG valuation models are first applied to calculate the implied discount rates and then the three return components. The median discount rates among the four estimates are used to compute the corresponding return components, *CFret*, *DRret*, and *Eret*, which are used in the tests.[18] The three return components add up to the total realized return by design.[19] The screening process results in a final sample of 509,212 firm–month observations and approximately 1,700 firms per year.[20] Because we need timely analyst earnings forecast data to quantify return components, our sample tends to include only relatively large firms.

We use three measures of investment widely used in the literature: asset growth, *ΔA/A* (Cooper, Gulen, and Schill, 2008); investment growth, *ΔI/I* (Xing, 2008); and accruals, *Accruals* (Sloan, 1996; Fairfield, Whisenant, and Yohn, 2003).[21] The variable definitions are described in detail in Appendix 2. These variables have been shown to be negatively associated with future stock returns in the cross section.

Panel A in Table 1 presents summary statistics of our main variables. The cash flow news return (*CFret*) is, on average, negative, which is consistent with previous studies that indicate more downward forecast revisions than upward revisions due to the tendency of analyst forecasts to be overoptimistic.[22] The discount rate news return (*DRret*) has a distribution similar to that of total stock returns. The expected return (*Eret*) proves to be quite persistent, with a mean value of 0.9% per month and a standard deviation of 0.3%. From the distributions of the investment measures, we note relatively large cross-sectional variations in firm investment.

[18] The discount rate estimates from the four valuation models are highly correlated with each other, with correlation coefficients between 0.38 and 0.86. The corresponding *CFret* and *DRret* estimates from different models are also highly correlated with each other, with correlation coefficients ranging from 0.31 to 0.85 for *CFret* and from 0.51 to 0.88 for *DRret*. Detailed results are available upon request.
[19] To ensure data integrity, we require firms in the final sample to have at least 12 monthly observations and non-missing estimates of the return components covering more than 80% of each sample period. We winsorize the data by deleting observations that have extreme discount rate values.
[20] This is approximately one-quarter of the total number of observations in the CRSP monthly stock returns file during the same period.
[21] The results are robust if we use the ratio of investments to assets as the measure (Lyandres, Sun, and Zhang, 2008).
[22] The analyst literature documents such an optimism bias. Because we focus on the power of return components to explain cross-sectional stock returns, the optimism bias has little effect on the results if high- and low-investment stocks are equally affected.

Panel B presents the cross-correlations among the variables. First, we note that *DRret* and total return (*Ret*) are highly correlated, with a correlation coefficient of 0.57. This suggests that, on average, most stock price movements at the monthly frequency are due to discount rate news.[23] Thus, it would be surprising to discover a systematic pattern of cash flow news returns, given that *CFret* is unconditionally much less correlated with *Ret* than *DRret* is. Second, there is a highly negative correlation between *CFret* and *DRret*, which means that cash flow news and discount rate news, on average, exert offsetting pressures on stock prices.[24] For example, the arrival of new growth options leads to better earnings prospects (i.e., positive cash flow news) but also makes a firm riskier due to greater uncertainties in its future cash flows (i.e., negative discount rate news). Therefore, a small change in stock prices may be accompanied by substantial changes in firm fundamentals and risk. Return decomposition is useful because it captures the dynamics of these underlying forces.

The correlations among the three investment proxies range from 12% to 35%. This implies that, although they incorporate some commonalities of firm investment, each proxy may contain independently incremental information. Interestingly, the correlations between the investment proxies and total returns (cash flow news) are all significantly negative, with magnitudes in the range of 12% to 19% (11% to 14%), echoing the investment effect. However, the investment proxies do not exhibit significant correlations with discount rate news and exhibit positive correlations with the expected return component, in contrast with the investment effect.

[23] This may also be mechanical because the return decomposition method attributes all residual news not captured by analyst forecast revisions to the discount rate news component.

[24] The negative correlation may also be mechanical due to errors in estimating return components, if earnings forecasts do not perfectly proxy for investor expectations. To alleviate such concern, we remove extreme estimates of return components and also use the VAR-based return decomposition method to check the robustness of our results.

4.2. The investment effect

Table 2 presents the investment effect in the cross-section of the stock returns. The three panels correspond to the use of different investment proxies of investment in forming stock portfolios: asset growth (*ΔA/A*), investment growth (*ΔI/I*), and accruals (*Accruals*). Each year *t* at the end of March, we sort stocks into deciles by the investment proxy for the fiscal year ended in year *t* - 1. The stock portfolios are held for 12 months, from April of year *t* to March of year *t* + 1.[25] The hedge portfolio (D10–D1) denotes the long–short strategy that longs one dollar in the highest investment portfolio (D10) and shorts one dollar in the lowest investment portfolio (D1). The nearly monotonically decreasing pattern of total returns from D1 to D10 reveals the investment effect in the cross-section of stock returns. The average total returns associated with the hedge portfolio are significantly negative, with magnitudes ranging from 50 bps to 85 bps per month.

If the investment effect is driven by the discount rate differential between D1 and D10, we would expect a sizable and negative *Eret* to be associated with the hedge portfolio D10–D1. However, Table 2 demonstrates that *Eret* is economically insignificant in all three panels. The variable *DRret* for the hedge portfolio is insignificant as well, which suggests that the investment effect is not driven by time-varying risk or risk premiums. The only return component that is proven to account for the investment effect both economically and statistically is the cash flow news component. The variable *CFret* associated with the hedge portfolio is significantly negative, with magnitudes ranging from 67 bps to 76 bps per month, which quantitatively matches the total return of D10–D1. In the cross-section, the large cash flow news differential (*CFret*) between D9 and D10 drives the large return differential (*Ret*) between the two portfolios. For example, Panel

[25] We focus on a relatively more recent sample period and follow the literature by using April as the start month to ensure that all accounting information is publicly available. Fama and French (1992, 1993) form portfolios at the end of June. Our results are robust if we use the end of June as the portfolio formation time.

A indicates that D10 underperforms D9 by 33 bps in total returns and by 35 bps in cash flow news returns. This implies that the investment effect in the cross-section of stock returns is concentrated mainly among those stocks on the short side that exhibit substantially negative cash flow news.

4.3. Event-time properties

We now examine how the patterns of total returns and cash flow news returns associated with the investment effect vary over time from before to after portfolio formation. Table 3 tabulates the average monthly total returns and return components for the investment hedge portfolio D10–D1 in different event-time windows, from one year before to one year after the portfolio formation. During the time window from eleven to six months before portfolio formation, the hedge portfolio exhibits significantly positive cash flow news returns and positive total returns. The magnitude of the cash flow news is fairly large, ranging from 1.22% to 2.51% per month. The cash flow news component largely loses its significance in the next six-month window [-5, 0], which is just before portfolio formation. Entering the post-formation period of [1, 6] and [7, 12], the cash flow news component turns significantly negative, which is in line with the negative total returns. The discount rate news component is mostly negative in the year before portfolio formation and is insignificant in the post-formation year. Again, the expected return component is too small to have any economic significance.

We then illustrate this pattern by laying out the month-by-month total returns and return components associated with the investment hedge portfolio in Figure 1. The left panels exhibit a strong positive time series of *Ret* and *CFret* during the eleven to six months before portfolio formation that turns significantly negative after portfolio formation. In addition, the monthly

CFret bars largely parallel the *Ret* bars, with similar magnitudes, underlining the dominant impact of *CFret* in accounting for the investment effect. The right panels indicate that *DRret* is less persistent and fluctuates over time.[26] The magnitude of *Eret* is much smaller compared to the other two return components.

Taken together, the event-time dynamics of total returns and the return components suggest a reversal pattern in both *Ret* and *CFret*, with the reversal happening around portfolio formation. This means that the market expectations of the cash flow prospects associated with high-investment firms rise at the beginning of the high-investment period and fall after the high-investment period. The reversal in *Ret* and *CFret* could be indicative of overoptimistic cash flow expectations for high-investment firms, which are corrected gradually over time. In addition, the positive association between investment and cash flow news before portfolio formation could imply either expanding investments due to better cash flow prospects or a boost in cash flow expectations due to high investments.[27]

4.4. Characteristics of investment-sorted portfolios

Next, we explore whether the cash flow news pattern is consistent with signals about firm fundamentals. Because the investment hedge portfolio exhibits positive cash flow news during the year before portfolio formation and negative cash flow news during the holding period, we would expect reversals in the fundamentals for high-investment firms, in contrast to low-investment firms. In Table 4, we compare firm investment, profitability as measured by return on

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[26] For the investment hedge portfolio based on Accruals, the *DRret* component proves to be persistently negative in the pre-formation year. This could be due to investor perceptions of risk reduction for high-accrual firms or managers' incentive to use earnings management to delay bad news and corrections for overvaluation (Badertscher, 2011).

[27] Untabulated results show that the investment effect is time varying. The negative return predictability of investment weakens, especially in recent years. This could be due to more arbitrage activities that start to exploit profits (e.g., Chordia, Roll, and Subrahmanyam, 2011; Chordia, Subrahmanyam, and Tong, 2014).

assets (*ROA*), and sales growth (*ΔS/S*) between portfolios D1 and D10 and between the portfolio formation date (t = 0) and one year after formation (t = 1 year).

Table 4 confirms our prediction. It indicates that although D10 exhibits significantly higher profitability and sales growth than D1 during the year prior to portfolio formation, the differences decrease dramatically during the year after portfolio formation. On average, the difference in profitability shrinks by approximately two-thirds and the difference in sales growth shrinks by approximately one-half. In addition, the difference in the investment proxy decreases by at least two-thirds. For *ΔA/A*- and *Accruals*-sorted portfolios, D10 still appears to have greater investment growth one year after portfolio formation. However, for *ΔI/I*-sorted portfolios, D10 even exhibits significantly less investment growth than D1. The evidence implies that, if the market naively extrapolates current profitability and growth far into the future, it would end up with overoptimistic cash flow expectations associated with high-investment firms, which translates into negative cash flow shocks the subsequent year. Combined with the reversal pattern of cash flow news documented in the last section, this implication therefore suggests that the investment effect is likely to be driven by the expectational errors of cash flows due to the persistence of firm performance being overestimated by the market.

4.5. Fama–MacBeth cross-sectional regressions

We now conduct Fama and Macbeth (1973) cross-sectional regressions to observe whether inferences from portfolio analysis can be extended to the firm level. Table 5 presents the results. Each month, we run cross-sectional regressions of stock returns on the characteristics of firm size, book-to-market, profitability, and investment proxies. We then report the time-series averages of the coefficient estimates. The dependent variable is total returns in Panel A and the three return components in Panel B. We normalize all the independent variables to have zero mean and unit variance so that the regression coefficients directly indicate economic significance. The table indicates that a one-standard-deviation increase in the investment measures would predict significantly lower future total returns by approximately 15 bps to 24 bps per month and lower future cash flow news returns by approximately 18 bps to 24 bps per month. In column (4), where multiple investment proxies are included simultaneously, each of the measures proves to be significantly and negatively associated with future total returns and cash flow news returns. This means that the three investment measures have incremental predictive power for stock returns.

Columns (1) to (4) of Panel B of Table 5 indicate that, in our sample, investment proxies dominate other firm-level characteristics in predicting subsequent cash flow news in the cross-section of stock returns. The significant link between firm-level investment and cash flow news again highlights the importance of market cash flow expectations in explaining the investment effect. Column (5) shows that there is little predictability of investment proxies for subsequent discount rate news. Their associations with the expected return component are economically insignificant, as demonstrated in column (6). Interestingly, the column also indicates that the expected return component is negatively associated with firm size and positively associated with the book-to-market ratio. This is consistent with firm size and book to market being related to stock risk (Fama and French, 1992)

4.6. Information uncertainty and the investment effect

We now examine the interaction between information uncertainty and the investment effect to further digest the role of cash flow news. If the investment effect is indeed due to market expectational errors of cash flows, we would expect such an effect to be stronger for stocks with high information uncertainty than for those with low information uncertainty. According to Zhang (2006), information uncertainty impedes the information incorporation process and leads to a stronger stock price effect due to investor behavioral bias. We use stock return volatility (*SIGMA*), cash flow volatility (*CVOL*), firm size (1/*MV*), and firm age (1/*Age*) to proxy for information uncertainty.[28] Each year, stocks are first sorted into quintiles based on information uncertainty, from the lowest to the highest (U1 to U5). Within each quintile, the stocks are then further sorted into quintiles based on the investment proxy, from the lowest to the highest (D1 to D5). Portfolios are held for one year post-formation.

Table 6 presents the average monthly total returns and return components of the investment hedge portfolios (D5–D1) for the information uncertainty quintiles U1 and U5. We then statistically compare the differential between U1 and U5. When *SIGMA* is used as a proxy for information uncertainty, the monthly *Ret* spread associated with D5–D1 ranges from -0.18% to -0.09% in U1 and from -1.39% to -0.67% in U5. The corresponding *CFret* spread ranges from -0.17% to 0.02% in U1 and from -1.14% to -0.83% in U5. The evidence suggests that information uncertainty amplifies the investment effect through the cash flow news return component. Neither *DRret* nor *Eret* has any explanatory power to account for the sizable *Ret* between U5 and U1. The results are quite similar when *CVOL*, 1/*MV*, and 1/*Age* are used as the proxy for information uncertainty. In most cases, the differential between U5 and U1 is significant for both *Ret* and *CFret*. In sum, the investment effect is found to be mainly concentrated among stocks with high information uncertainty. Furthermore, the phenomenon is

[28] Li and Zhang (2010), Lam and Wei (2011), and Lipson, Mortal, and Schill (2011) also use stock return volatility to proxy for limits to arbitrage. They find that the asset growth effect is stronger when arbitrage costs are high. In contrast, we focus more on the origin of the investment effect. The cash flow news analysis can provide insight into the dynamics of market expectations.

mainly due to a stronger role of cash flow news associated with high information uncertainty in driving the negative return predictability of investment.

4.7. Robustness tests: VAR-based return decomposition

To ensure that our results are robust to alternative methods of return decomposition, we employ the traditional Campbell–Shiller (1988) VAR method to decompose stock returns and repeat our tests. We follow the approach suggested by Vuolteenaho (2002) and Chen, Da, and Zhao (2013) to calculate firm-level cash flow news (*CF news*) and discount rate news (*DR news*) and call *Diff* = *Ret* – *CF news* – *DR news* the expected return component (*Eret*). Appendix 3 discusses the procedures in detail.[29]

Table 7 presents the pre- and post-formation returns and VAR-based return components associated with the investment hedge portfolio (D10–D1). We first note that the investment effect is still explained in large part by the *CF news* component. The variable *CF news* accounts for approximately 70% of the total returns of the hedge portfolio when *ΔI/I* and *Accruals* are used as the investment proxy and for approximately 50% when *ΔA/A* is used. The variables *DR news* and *Eret* explain the remaining part, in approximately equal magnitudes. Their explanatory power is quite limited. Furthermore, we observe the reversal pattern of *CF news* from the pre-formation to the post-formation period. Panels B and C indicate that the post-formation negative *CF news* nearly offsets the pre-formation positive *CF news*. Taken together, the results indicate that our conclusion regarding the role of cash flow news in accounting for the investment effect

[29] Vuolteenaho (2002) develops a firm-level decomposition method based on Campbell and Shiller (1988) and Campbell (1991) by substituting dividends using the clean-surplus condition. Because the state variables in the model contain accounting information extracted from firm annual reports, the stock returns are decomposed at the annual horizon.

is robust using the VAR-based return decomposition framework and is not specific to the sample of stocks covered by analyst earnings forecasts.[30]

5. Conclusions

In asset pricing, the general investment effect whereby high-investment firms underperform low-investment firms is one of the most prominent stylized effects in the cross-section of stock returns. Risk-based explanations derive from the point of view that firms rationally expand (shrink) investments when the expected cost of capital is low (high). On the other hand, mispricing-based explanations hold the view that investment opportunities can be mispriced and the implementation of investment can be distorted by such issues as bad corporate governance or firms catering to an inefficient capital market. In this study, we empirically quantify the extent to which the investment effect is due to risk-based explanations compared to mispricing-based explanations. We analyze the information contained in stock returns to shed light on the role of cash flow expectations and discount rate expectations in driving the investment effect.

The baseline finding is that the investment effect based on a general set of investment proxies is almost exclusively explained by the cash flow news component. Higher investments are associated with more subsequent downward revisions in the expected future earnings of firms. We find that the return implication from these revisions in cash flow expectations quantitatively explains the negative return predictability of investment. In addition, we illustrate the formation and correction process of investment mispricing. The evidence demonstrates that the cash flow news associated with investment hedge portfolios exhibits a reversal from the pre-formation to

[30] The debate in the literature concerns whether VAR-based models or residual income-based models are more appropriate for measuring cash flow news versus discount rate news. We hold that, although both methods have their pros and cons, residual income-based models are preferred in a scenario where cash flow news plays a more important role. Analyst earnings forecasts allow us to directly measure cash flow news and potentially have less measurement noise than predictive regression-based models do.

the post-formation period. Similar patterns are observed with respect to the firm fundamentals of profitability, sales growth, and investment. The evidence supports the expectational errors hypothesis, that the market attaches too high (low) cash flow expectations to firms with high (low) investments and the expectational errors are corrected in the form of cash flow surprises correlated with the subsequent realization of firm fundamentals.

Furthermore, we find that information uncertainty amplifies the investment effect through the cash flow news component, consistent with the potentially more substantial market expectational biases associated with higher information uncertainty. We use alternative ways of measuring return components and the inferences remain unchanged.

Overall, our study highlights the role of cash flow news in accounting for the investment effect and raises the question of why discount rates have little effect in moving investment, which is inconsistent with the q-theory explanation. More theoretical work is needed to help us understand to what extent and how firm investment is related to the capital market. A growing body of literature has been promoting the use of an investment factor to control for the systematic risks involved (Fama and French, 2015; Hou, Xue, and Zhang, 2015). Our study reveals that the empirical success of the investment factor could be due to systematic correlations of cash flow news among stocks. More studies are therefore called for to understand the market, as well as the fundamental forces that shape cash flow news correlations.

References

Badertscher, B. "Overvaluation and the Choice of Alternative Earnings Management Mechanisms." *The Accounting Review*, 86 (2011), 1491–1518.

Berk, J. B., R. C. Green, and V. Naik. "Optimal Investment, Growth Options, and Security Returns." *Journal of Finance,* 54 (1999), 1553–1607.

Campbell, J. Y. "A Variance Decomposition for Stock Returns." *Economic Journal*, 101 (1991), 157–179.

Campbell, J. Y., and R. J. Shiller. "The Dividend–Price Ratio and Expectations of Future Dividends and Discount Factors." *Review of Financial Studies*, 1 (1988), 195–228.

Campbell, J. Y., and T. Vuolteenaho. "Bad Beta, Good Beta." *American Economic Review*, 94 (2004), 1249–1275.

Chen, K. C. W., Z. H. Chen, and J. K. C. Wei. "Legal Protection of Investors, Corporate Governance, and the Cost of Equity Capital." *Journal of Corporate Finance*, 15 (2009), 273–289.

Chen, K. C. W., Z. H. Chen, and J. K. C. Wei. "Agency Costs of Free Cash Flow and the Effect of Shareholder Rights on the Implied Cost of Equity Capital." *Journal of Financial and Quantitative Analysis*, 46 (2011), 171–207.

Chen, L., Z. Da, and B. Larrain. "What Moves Aggregate Investment?" Working paper.

Chen, L., Z. Da, and X. Zhao. "What Drives Stock Price Movements?" *Review of Financial Studies*, 26 (2013), 841–876.

Chen, L., and X. Zhao. "Return Decomposition." *Review of Financial Studies*, 22 (2009), 5213–5249.

Claus, J., and J. Thomas. "Equity Premia as Low as Three Percent? Evidence from Analysts' Earnings Forecasts for Domestic and International Stock Markets." *Journal of Finance,* 56 (2001), 1629–1666.

Chordia, T., R. Roll, and A. Subrahmanyam. "Recent Trends in Trading Activity and Market Quality." *Journal of Financial Economics*, 101 (2011), 243–263.

Chordia, T., A. Subrahmanyam, and Q. Tong. "Have Capital Market Anomalies Attenuated in the Recent Era of High Liquidity and Trading Activity?" *Journal of Accounting and Economics*, 58 (2014), 41–58.

Cochrane, J. H. "A Cross-Sectional Test of an Investment-Based Asset Pricing Model." *Journal of Political Economy*, 104 (1996), 572–621.

Cochrane, J. H. "Presidential Address: Discount Rates." *Journal of Finance*, 66 (2011), 1047–1108.

Cooper, M. J., H. Gulen, and M. J. Schill. "Asset Growth and the Cross-Section of Stock Returns." *Journal of Finance*, 63 (2008), 1609–1651.

Easton, P. D. "PE Ratios, PEG Ratios, and Estimating the Implied Expected Rate of Return on Equity Capital." *Accounting Review*, 79 (2004), 73–95.

Fairfield, P. M., J. S. Whisenant, and T. L. Yohn. "Accrued Earnings and Growth: Implications for Future Profitability and Market Mispricing." *Accounting Review*, 78 (2003), 353–371.

Fama, E. F., and K. R. French. "The Cross-Section of Expected Stock Returns." *Journal of Finance*, 47 (1992), 427–465.

Fama, E. F., and K. R. French. "Common Risk Factors in the Returns on Stocks and Bonds." *Journal of Financial Economics*, 33 (1993), 3–56.

Fama, E. F., and K. R. French. "Profitability, Investment, and Average Returns." *Journal of Financial Economics*, 82 (2006), 491–518.

Fama, E. F., and K. R. French. "A Five-Factor Asset Pricing Model." *Journal of Financial Economics*, 116 (2015), 1–22.

Fama, E. F., and J. D. MacBeth, J. D. "Risk Return and Equilibrium: Empirical Tests." *Journal of Political Economy*, 81 (1973), 607–636.

Gebhardt, W. R., C. M. C. Lee, and B. Swaminathan. "Toward an Implied Cost of Capital." *Journal of Accounting Research*, 39 (2001), 135–176.

Givoly, D., and J. Lakonishok. "Financial Analysts' Forecasts of Earnings: Their Value to Investors." *Journal of Banking and Finance*, 4 (1980), 221–233.

Gode, D., and P. Mohanram. "Inferring Cost of Capital Using the Ohlson–Juettner Model." *Review of Accounting Studies*, 8 (2003), 399–431.

Hail, L., and C. Leuz. "International Differences in the Cost of Equity Capital: Do Legal Institutions and Securities Regulation Matter?" *Journal of Accounting Research*, 44 (2006), 485–531.

Hou, K., C. Xue, and L. Zhang. "Digesting Anomalies: An Investment Approach." *Review of Financial Studies*, 28 (2015), 650–705.

Lakonishok, J., A. Shleifer, and R. W. Vishny. "Contrarian Investment, Extrapolation, and Risk." *Journal of Finance*, 49 (1994), 1541–1578.

Lam, F. Y. E., and K. C. J. Wei. “Limits-to-Arbitrage, Investment Frictions, and the Asset Growth Anomaly.” *Journal of Financial Economics*, 102 (2011), 127–149.

Lau, S., L. Ng, and B. Zhang. “Information Environment and Equity Risk Premium Volatility around the World.” *Management Science*, 58 (2012), 1322–1340.

Li, D., and L. Zhang. “Does Q-Theory with Investment Frictions Explain Anomalies in the Cross Section of Returns?” *Journal of Financial Economics*, 98 (2010), 297–314.

Lipson, M. L., S. Mortal, and M. J. Schill. “On the Scope and Drivers of the Asset Growth Effect.” *Journal of Financial and Quantitative Analysis*, 46 (2011), 1651–1682.

Liu, L. X., T. M. Whited, and L. Zhang. “Investment-based Expected Return.” *Journal of Political Economy* 117 (2009), 1105–1139.

Lyandres, E., L. Sun, and L. Zhang. “The New Issues Puzzle: Testing the Investment-based Explanation.” *Review of Financial Studies*, 21 (2008), 2825–2855.

Ohlson, J. A., and B. E. Juettner-Nauroth. “Expected EPS and EPS Growth as Determinants of Value.” *Review of Accounting Studies*, 10 (2005), 349–365.

Pástor, L., M. Sinha, and B. Swaminathan. “Estimating the Intertemporal Risk-Return Tradeoff Using the Implied Cost of Capital.” *Journal of Finance* 63 (2008), 2859–2897.

Polk, C., and P. Sapienza. “The Stock Market and Corporate Investment: A Test of Catering Theory.” *Review of Financial Studies*, 22 (2009), 187–217.

Sloan, R. G. “Do Stock Prices Fully Reflect Information in Accruals and Cash Flows about Future Earnings?” *Accounting Review*, 71 (1996), 289–315.

Stickel, S. E. “Common Stock Returns Surrounding Earnings Forecast Revisions: More Puzzling Evidence.” *Accounting Review*, 66 (1991), 402–416.

Titman, S., K. C. J. Wei, and F. X. Xie. “Capital Investments and Stock Returns.” *Journal of Financial and Quantitative Analysis*, 39 (2004), 677–700.

Titman, S., K. C. J. Wei, and F. X. Xie. “Market Development and the Asset Growth Effect: International Evidence.” *Journal of Financial and Quantitative Analysis*, 48 (2013), 1405–1432.

Vuolteenaho, T. “What Drives Firm-Level Stock Returns?” *Journal of Finance*, 57 (2002), 233–264.

Wu, J., L. Zhang, and X. F. Zhang. “The Q-Theory Approach to Understanding the Accrual Anomaly.” *Journal of Accounting Research*, 48 (2010), 177–223.

Xing, Y. “Interpreting the Value Effect through the Q-Theory: An Empirical Investigation.” *Review of Financial Studies*, 21 (2008), 1767–1795.

Zhang, X. F. “Information Uncertainty and Stock Returns.” *Journal of Finance*, 61 (2006), 105–137.

Appendix 1. Valuation Models

We use four valuation models to map firm earnings forecasts to their stock prices. The implied cost of capital is solved to make both sides of the respective valuation equation equal. The market expectations of firm earnings are proxied by the I/B/E/S analyst forecasts. The accounting variables are from Compustat and the stock pricing variables are from the CRSP. The following are the four valuation models:

(1) The model of Gebhardt, Lee, and Swaminathan (GLS, 2001)

$$P_t^* = B_t + \sum_{i=1}^{T-1} \frac{(FROE_{t+i} - R_{gls}) \times B_{t+i-1}}{(1+R_{gls})^i} + \frac{(FROE_{t+T} - R_{gls}) \times B_{t+T-1}}{(1+R_{gls})^{T-1} \times R_{gls}};$$

(2) The model of Claus and Thomas (CT, 2001)

$$P_t^* = B_t + \sum_{i=1}^{5} \frac{(FEPS_{t+i} - R_{ct} \times B_{t+i-1})}{(1+R_{ct})^i} + \frac{(FEPS_{t+5} - R_{ct} \times B_{t+4}) \times (1+g_{lt})}{(R_{ct} - g_{lt}) \times (1+R_{ct})^5};$$

(3) The model of Ohlson and Juettner-Nauroth (OJ, 2005) as implemented by Gode and Mohanram (2003),

$$P_t^* = \frac{E(EPS_{t+1})}{R_{oj}} + \frac{E(EPS_{t+1}) \times E[g_{st} - R_{oj} \times (1-POUT)]}{R_{oj} \times (R_{oj} - g_{lt})};$$

(4) The modified PEG ratio model of Easton (MPEG, 2004),

$$P_t^* = \frac{E(EPS_{t+1})}{R_{mpeg}} + \frac{E(EPS_{t+1}) \times E[g_{st} - R_{mpeg} \times (1-POUT)]}{R_{mpeg}{}^2};$$

where $P_t^* = P_t / (1+R_{gls})^{lag/12}$ is used to adjust the stock price so that P_t^* is one year before the I/B/E/S one-year-ahead earnings forecast date (fpedats); P_t is the before-dividend price in month *t*; B_t is the book value of equity per share in month *t*; *T* is set at 12; and $FROE$ is the earnings per share forecast divided by the book value of equity per share for the first three years, declining linearly to an equilibrium return on equity from the 4th year to the 12th year. The equilibrium return on equity is calculated as the past 10-year industry-level median return on equity. The industry level ROE is winsorized to a value between the risk-free rate and 0.3. The book value of equity is estimated using the clean-surplus condition $B_{t+1} = B_t + EPS_{t+1} - DPS_{t+1}$, where DPS_{t+i} is equal to EPS_{t+i} multiplied by $POUT$, $POUT$ is the current dividend payout ratio, and $FEPS_{t+i}$ is calculated using the long-term earnings growth rate from I/B/E/S or the growth rate implied by EPS_{t+2} and EPS_{t+3}. The long-term abnormal earnings growth rate, g_{lt}, is calculated using the contemporaneous risk-free rate minus 3%. The short-term earnings growth rate, g_{st}, is the average of the short-term earnings growth rate implied by EPS_{t+1}, EPS_{t+2}, and analysts' long-term growth rate forecasts.

Appendix 2. Variable Definitions

CFret	The cash flow news return component.
DRret	The discount rate news return component.
Eret	The expected return component.
I/A	The ratio of investments to assets, calculated as the annual change in gross property, plant, and equipment (Compustat item PPEGT) plus the annual change in inventories (item INVT), divided by the lagged book value of assets.
ΔA/A	Asset growth, calculated as the change in total assets (item AT) divided by lagged total assets.
ΔI/I	Investment growth, calculated as the growth rate of capital expenditure (item CAPX).
Accruals	Accruals, calculated as (ΔCA - ΔCash) - (ΔCL - ΔSTD - ΔTP) – Dep, where ΔCA is the change in current assets (item ACT), ΔCash is the change in cash or cash equivalents (item CHE), ΔCL is the change in current liabilities (item LCT), ΔSTD is the change in debt included in current liabilities (item DLC), ΔTP is the change in income taxes payable (item TXP), and Dep is the depreciation and amortization expense (item DP). All variables are scaled by lagged total assets.
ROA	Return on assets, calculated as net income (item NI) divided by lagged total assets.
ΔS/S	Sales growth, calculated as the growth rate of sales (item SALE).
Ln(MV)	Size, calculated as the log of the market value of equity at the fiscal year-end.
Ln(BM)	The book to market, calculated as the log of the book value of equity divided by the market value of equity at the fiscal year-end. The book value of equity is the sum of common equity (item CEQ) and deferred taxes (item TXDB).
SIGMA	Stock return volatility, calculated as the standard deviation of weekly market excess returns over the year ending at the formation month.
CVOL	Cash flow volatility, calculated as the standard deviation of cash flow from operations in the past five years (with a minimum of three years).
Age	Firm age, calculated as the number of years since the firm was first covered by the CRSP.

Appendix 3. VAR-Based Return Decomposition

We follow the predictive regression approach used by Vuolteenaho (2002) and Chen, Da, and Zhao (2013) to measure firm-level *CF news* and *DR news*. The approach is based on Campbell and Shiller's (1988) return log linearization. Specifically, the following VAR is specified:

$$Z_{i,t} = \Gamma Z_{i,t-1} + \mu_{i,t}, \qquad \text{(A1)}$$

where vector $Z_{i,t}$ contains the state variables of the log annual stock return (*r*), the log return on book equity (*roe*), and the log book-to-market ratio (*bm*), that is,

$$Z_{i,t} = [r\ roe\ bm]. \qquad \text{(A2)}$$

We calculate the annual stock returns from April of year *t* to March of year *t* + 1. We have $roe = \log(1 + NI/BV)$, where *NI* is net income and *BV* is book equity. The VAR coefficients of equation (A1) can be estimated from the panel using pooled prediction regressions per state variable. We control for year fixed effects, which is similar to de-meaning all variables cross-sectionally year by year. The variables *CF news* and *DR news* can be calculated using the following formulas:

$$CF\ news = (\mathrm{e1}' + \lambda')\mu_{i,t}, \qquad \text{(A3)}$$
$$DR\ news = -\lambda'\mu_{i,t}, \qquad \text{(A4)}$$

where e1 is a vector with the first element equal to unity and the remaining elements equal to zero, that is, $\mathrm{e1}' \equiv [1\ 0\ 0]$. $\lambda' = \mathrm{e1}'\rho\Gamma(\mathrm{I} - \rho\Gamma)^{-1}$, with Γ the point estimate of the VAR transition matrix in equation (A1) and $\rho < 1$ the discount coefficient, which is set to 0.96. The term $\mu_{i,t}$ is the firm-specific vector of residuals from the VAR in equation (A1). We then have *DR news* + *CF news* = $\mathrm{e1}'\mu_{i,t}$ from equations (A3) and (A4) and it is the return innovation.

The expected return component is therefore defined as

$$Eret = r - CF\ news - DR\ news. \qquad \text{(A5)}$$

Table 1. Summary statistics and correlations

Panel A: Summary statistics					
	Mean	Std dev	p99	Median	p1
Ret	0.012	0.133	0.411	0.009	-0.341
CFret	-0.006	0.146	0.502	0.000	-0.551
DRret	0.009	0.186	0.625	0.003	-0.525
Eret	0.009	0.003	0.019	0.008	0.004
ΔA/A	0.255	0.664	3.134	0.099	-0.304
ΔI/I	0.418	1.457	6.053	0.122	-0.767
Accruals	-0.026	0.119	0.404	-0.037	-0.278

Panel B: Cross-correlations						
	Ret	*CFret*	*DRret*	*Eret*	*ΔA/A*	*ΔI/I*
CFret	0.105***					
DRret	0.566***	-0.745***				
Eret	0.014***	-0.162***	0.127***			
ΔA/A	-0.019***	-0.013***	-0.002	0.045***		
ΔI/I	-0.012***	-0.011***	0.001	0.057***	0.354***	
Accruals	-0.012***	-0.014***	0.003	0.076***	0.240***	0.120***

Panel A reports summary statistics for total returns (*Ret*), the cash flow news component (*CFret*), the discount rate news component (*DRret*), the expected return component (*Eret*), asset growth (*ΔA/A*), investment growth (*ΔI/I*), and accruals (*Accruals*). Panel B reports the time-series averages of the monthly cross-sectional Pearson correlations. The superscripts ***, **, and * indicate significance at the 1%, 5%, and 10% levels, respectively. The sample period is from 1985 to 2012.

Table 2. Investment anomalies and return components

Panel A: Sorting by *ΔA/A*	*Ret*	*CFret*	*DRret*	*Eret*
D1 (lowest)	1.61	-0.47	1.17	0.91
D2	1.52	-0.41	1.05	0.88
D3	1.39	-0.44	0.95	0.87
D4	1.33	-0.44	0.91	0.86
D5	1.29	-0.53	0.95	0.86
D6	1.33	-0.53	1.00	0.86
D7	1.32	-0.55	1.01	0.86
D8	1.19	-0.69	1.01	0.87
D9	1.09	-0.84	1.04	0.89
D10 (highest)	0.76	-1.19	1.03	0.92
D10-D1	-0.85	-0.72	-0.15	0.01
(*t*-statistics)	(-4.27)	(-5.75)	(-0.67)	(1.22)
Panel B: Sorting by *ΔI/I*				
D1 (lowest)	1.55	-0.44	1.08	0.90
D2	1.47	-0.42	1.01	0.88
D3	1.35	-0.45	0.94	0.87
D4	1.27	-0.57	0.98	0.86
D5	1.27	-0.45	0.86	0.86
D6	1.24	-0.55	0.94	0.86
D7	1.24	-0.66	1.04	0.86
D8	1.21	-0.60	0.93	0.87
D9	1.13	-0.89	1.12	0.89
D10 (highest)	1.01	-1.11	1.20	0.93
D10-D1	-0.53	-0.67	0.11	0.02
(*t*-statistics)	(-3.57)	(-5.57)	(0.65)	(2.45)
Panel C: Sorting by *Accruals*				
D1 (lowest)	1.39	-0.48	0.98	0.89
D2	1.48	-0.47	1.09	0.87
D3	1.44	-0.41	1.00	0.86
D4	1.35	-0.43	0.92	0.86
D5	1.39	-0.44	0.98	0.85
D6	1.22	-0.50	0.85	0.86
D7	1.28	-0.56	0.97	0.87
D8	1.15	-0.81	1.09	0.87
D9	1.21	-0.88	1.19	0.89
D10 (highest)	0.89	-1.24	1.18	0.95
D10-D1	-0.50	-0.76	0.20	0.06
(*t*-statistics)	(-3.45)	(-5.94)	(1.09)	(4.97)

This table reports the portfolio-level monthly averages of total returns (*Ret*), the cash flow news component (*CFret*), the discount rate news component (*DRret*), and the expected return component (*Eret*). For each year *t* at the end of March, stocks are sorted into deciles based on the proxy for investment for the fiscal year ending in calendar year *t*-1. Decile 1 (D1) groups the lowest investment stocks, decile 10 (D10) groups the highest investment stocks, and D10–D1 is a zero-cost hedge portfolio that longs D10 and shorts D1. The portfolios are held for 12 months from April of year *t* to March of year *t*+1. The investment proxies are asset growth (*ΔA/A*) in Panel A, investment growth (*ΔI/I*) in Panel B, and accruals (*Accruals*) in Panel C. Equal-weighted average monthly returns are reported in percent. The sample period is from 1985 to 2012. The *t*-statistics are in parentheses.

Table 3. Return components in event-time windows

Panel A: Sorting by *ΔA/A*	*Ret*	*CFret*	*DRret*	*Eret*
[-11, -6]	2.75	2.51	0.31	-0.06
	(8.98)	(10.65)	(0.87)	(-3.27)
[-5, 0]	0.06	1.08	-0.98	-0.04
	(0.17)	(4.30)	(-2.74)	(-2.57)
[1, 6]	-0.77	-0.68	-0.11	0.02
	(-2.80)	(-3.63)	(-0.36)	(1.37)
[7, 12]	-0.93	-0.75	-0.18	0.01
	(-3.21)	(-4.58)	(-0.58)	(0.92)
Panel B: Sorting by *ΔI/I*				
[-11, -6]	1.02	1.47	-0.42	-0.02
	(3.71)	(7.70)	(-1.42)	(-1.73)
[-5, 0]	-0.65	-0.13	-0.52	0.00
	(-2.44)	(-0.70)	(-1.71)	(0.05)
[1, 6]	-0.43	-0.97	0.52	0.03
	(-1.99)	(-5.39)	(2.18)	(2.53)
[7, 12]	-0.64	-0.37	-0.30	0.02
	(-3.08)	(-2.34)	(-1.17)	(2.68)
Panel C: Sorting by *Accruals*				
[-11, -6]	0.42	1.22	-0.82	0.02
	(1.96)	(6.08)	(-3.08)	(3.45)
[-5, 0]	-0.83	-0.15	-0.72	0.05
	(-3.82)	(-0.79)	(-2.59)	(4.40)
[1, 6]	-0.55	-0.74	0.13	0.07
	(-2.73)	(-3.93)	(0.50)	(5.38)
[7, 12]	-0.46	-0.79	0.27	0.06
	(-2.15)	(-4.49)	(1.05)	(4.02)

This table presents the monthly averages of total returns (*Ret*), the cash flow news component (*CFret*), the discount rate news component (*DRret*), and the expected return component (*Eret*) for the investment hedge portfolio (D10–D1) in different event-time windows around portfolio formation. Event-time windows [-11, -6], [-5, 0], [1, 6], and [7, 12] represent each of the four six-month windows (e.g., [1, 6] refers to the period from April of year *t* to September of year *t*). The investment proxies are asset growth (*ΔA/A*) in Panel A, investment growth (*ΔI/I*) in Panel B, and accruals (*Accruals*) in Panel C. Equal-weighted average monthly returns are reported in percent. The sample period is from 1985 to 2012. The *t*-statistics are in parentheses.

Table 4. Characteristics of investment anomalies

Panel A: Sorting by Δ*A/A*		*t* = 0	*t* = 1 year	Diff	*t*-statistics
D1	Δ*A/A*	-0.16	0.04	0.21	(14.33)
D10		1.44	0.36	-1.09	(-9.58)
D10–D1		1.60	0.31	-1.30	(-11.11)
t-statistics		(13.02)	(12.62)	(-11.11)	
D1	*ROA*	-0.05	0.00	0.05	(5.53)
D10		0.10	0.05	-0.05	(-7.02)
D10–D1		0.15	0.05	-0.10	(-10.51)
t-statistics		(8.30)	(4.20)	(-10.51)	
D1	*ΔS/S*	-0.01	0.04	0.05	(2.91)
D10		0.78	0.48	-0.31	(-6.36)
D10–D1		0.80	0.44	-0.36	(-8.51)
t-statistics		(13.34)	(13.90)	(-8.51)	
Panel B: Sorting by Δ*I/I*					
D1	Δ*I/I*	-0.56	0.71	1.27	(18.12)
D10		3.06	0.31	-2.74	(-18.77)
D10–D1		3.62	-0.40	-4.01	(-26.40)
t-statistics		(22.63)	(-6.40)	(-26.40)	
D1	*ROA*	0.02	0.04	0.01	(2.86)
D10		0.08	0.06	-0.02	(-3.82)
D10–D1		0.06	0.02	-0.04	(-5.53)
t-Stat		(5.42)	(2.89)	(-5.53)	
D1	*ΔS/S*	0.08	0.13	0.05	(2.28)
D10		0.60	0.33	-0.28	(-6.25)
D10–D1		0.52	0.19	-0.32	(-7.70)
t-statistics		(10.55)	(7.22)	(-7.70)	
Panel C: Sorting by *Accruals*					
D1	*Accruals*	-0.19	-0.08	0.11	(15.51)
D10		0.19	0.02	-0.17	(-15.33)
D10–D1		0.38	0.10	-0.28	(-18.19)
t-Stat		(20.12)	(13.19)	(-18.19)	
D1	*ROA*	0.00	0.03	0.03	(2.96)
D10		0.12	0.07	-0.05	(-7.75)
D10–D1		0.12	0.04	-0.09	(-5.69)
t-statistics		(7.38)	(6.92)	(-5.69)	
D1	*ΔS/S*	0.27	0.21	-0.07	(-1.94)
D10		0.53	0.31	-0.22	(-8.34)
D10–D1		0.26	0.10	-0.15	(-5.95)
t-statistics		(6.94)	(4.24)	(-5.95)	

This table presents the average characteristics of investment portfolios D1 and D10 at portfolio formation (*t* = 0) and one year after portfolio formation (*t* = 1 year). Here D10–D1 refers to the difference in characteristics between D1 and D10 and Diff refers to the change in characteristics from portfolio formation to one year after portfolio formation. Stocks are sorted into portfolios by asset growth (*ΔA/A*) in Panel A, investment growth (*ΔI/I*) in Panel B, and accruals (*Accrual*) in Panel C. The variable *ROA* is the return on assets and *ΔS/S* is the sales growth. The sample period is from 1985 to 2012. The *t*-statistics for Diff are in parentheses.

Table 5. Fama–MacBeth (1973) cross-sectional regressions

Panel A: Dependent variable = *Ret*

	(1)	(2)	(3)	(4)
Intercept	1.214***	1.216***	1.232***	1.211***
	(4.58)	(4.62)	(4.65)	(4.58)
Ln(MV)	-0.233***	-0.229***	-0.242***	-0.266***
	(-3.02)	(-2.88)	(-3.03)	(-3.39)
Ln(BM)	0.004	0.020	0.027	-0.011
	(0.06)	(0.25)	(0.33)	(-0.13)
ROA	0.048	0.023	0.055	0.076
	(0.66)	(0.33)	(0.72)	(0.95)
ΔA/A	-0.236***			-0.168***
	(-5.19)			(-4.05)
ΔI/I		-0.149***		-0.084**
		(-3.37)		(-2.16)
Accruals			-0.157***	-0.140***
			(-3.83)	(-3.56)
R-squared	0.03	0.03	0.03	0.03
N	333	333	333	333

Panel B: Dependent variable = *CFrer*, *DRret*, or *Eret*

	(1)	(2)	(3)	(4)	(5)	(6)
Dependent variable	*CFret*	*CFret*	*CFret*	*CFret*	*DRret*	*Eret*
Intercept	-0.661***	-0.652***	-0.650***	-0.677***	1.016***	0.871***
	(-3.54)	(-3.54)	(-3.50)	(-3.69)	(3.99)	(57.41)
Ln(MV)	0.059	0.057	0.046	0.023	-0.236***	-0.053***
	(1.30)	(1.21)	(0.93)	(0.46)	(-3.52)	(-14.03)
Ln(BM)	-0.031	-0.026	-0.015	-0.040	-0.018	0.047***
	(-0.46)	(-0.39)	(-0.22)	(-0.60)	(-0.24)	(10.23)
ROA	0.034	0.005	0.052	0.080	-0.004	-0.000
	(0.39)	(0.06)	(0.63)	(0.91)	(-0.05)	(-0.13)
ΔA/A	-0.240***			-0.148***	-0.034	0.014***
	(-5.14)			(-3.50)	(-0.76)	(4.71)
ΔI/I		-0.181***		-0.128***	0.032	0.011***
		(-4.00)		(-2.88)	(0.95)	(4.17)
Accruals			-0.203***	-0.186***	0.030	0.016***
			(-3.84)	(-3.43)	(0.68)	(7.01)
R-squared	0.01	0.01	0.01	0.01	0.02	0.10
N	333	333	333	333	333	333

(Table 5 continued)

This table present monthly Fama–Macbeth (1973) cross-sectional regressions from April 1985 to December 2012. Time-series averages of cross-sectional coefficient estimates and the average R-squared values are reported. The dependent variables are the total return (*Ret*) in Panel A and the cash flow news component (*CFret*), the discount rate news component (*DRret*), and the expected return component (*Eret*) in Panel B. The independent variables are size (Ln(MV)), book to market (LnBM), return on assets (ROA), asset growth (*ΔA/A*), investment growth (*ΔI/I*), and accruals (*Accrual*). All the independent variables are standardized to have zero mean and unit variance. The R-squared value is the average R-squared value and N is the number of monthly regressions. The *t*-statistics are in parentheses. The superscripts ***, **, and * indicate significance at the 1%, 5%, and 10% levels, respectively.

Table 6. Investment anomalies and information uncertainty

Panel A: ΔA/A (D5–D1)									
SIGMA	*Ret*	*CFret*	*DRret*	*Eret*	CVOL	*Ret*	*CFret*	*DRret*	*Eret*
U1	-0.18	0.02	-0.19	-0.01		-0.28	-0.21	-0.04	-0.02
U5	-1.39	-1.14	-0.25	0.00		-0.86	-0.73	-0.13	0.00
U5–U1	-1.21	-1.16	-0.05	0.01		-0.57	-0.52	-0.08	0.03
t-statistics	(-4.39)	(-4.56)	(-0.15)	(0.28)		(-2.44)	(-2.1)	(-0.27)	(1.57)
1/MV					1/Age				
U1	-0.36	-0.08	-0.26	-0.02		-0.34	-0.03	-0.31	-0.01
U5	-0.92	-1.09	0.13	0.03		-0.98	-0.68	-0.29	-0.02
U5–U1	-0.56	-1.01	0.40	0.05		-0.64	-0.65	0.02	-0.01
t-statistics	(-2.01)	(-4.07)	(1.2)	(2.21)		(-2.21)	(-2.63)	(0.06)	(-0.38)
Panel B: ΔI/I (D5–D1)									
SIGMA	*Ret*	*CFret*	*DRret*	*Eret*	CVOL	*Ret*	*CFret*	*DRret*	*Eret*
U1	-0.09	-0.06	-0.02	0.00		-0.23	-0.16	-0.06	-0.02
U5	-1.11	-0.88	-0.24	0.01		-0.56	-0.69	0.12	0.01
U5–U1	-1.02	-0.81	-0.22	0.01		-0.33	-0.54	0.17	0.03
t-statistics	(-4.39)	(-3.48)	(-0.73)	(0.96)		(-1.59)	(-2.13)	(0.55)	(2.51)
1/MV					1/Age				
U1	-0.36	-0.44	0.07	0.01		-0.21	-0.20	-0.02	0.00
U5	-0.48	-0.49	-0.02	0.03		-0.86	-0.60	-0.28	0.02
U5–U1	-0.12	-0.06	-0.09	0.03		-0.65	-0.40	-0.26	0.01
t-statistics	(-0.54)	(-0.22)	(-0.28)	(1.99)		(-2.71)	(-1.77)	(-0.82)	(1.21)
Panel C: Accruals (D5–D1)									
SIGMA	*Ret*	*CFret*	*DRret*	*Eret*	CVOL	*Ret*	*CFret*	*DRret*	*Eret*
U1	-0.13	-0.17	0.03	0.01		-0.19	0.00	-0.20	0.01
U5	-0.67	-0.83	0.11	0.05		-0.91	-1.01	0.06	0.05
U5–U1	-0.54	-0.66	0.08	0.05		-0.72	-1.02	0.26	0.03
t-statistics	(-2.17)	(-2.59)	(0.23)	(3.83)		(-3.52)	(-4.07)	(0.85)	(3.05)
1/MV					1/Age				
U1	-0.09	-0.20	0.11	0.00		-0.07	-0.03	-0.06	0.01
U5	-0.79	-0.83	-0.01	0.05		-0.48	-0.69	0.12	0.08
U5–U1	-0.70	-0.62	-0.12	0.05		-0.41	-0.66	0.18	0.08
t-statistics	(-3.29)	(-2.35)	(-0.38)	(2.72)		(-1.74)	(-2.65)	(0.58)	(3.62)

This table reports the average monthly returns in percent for the investment hedge portfolio across different information uncertainty groups. Each year stocks are sorted into quintiles based on information uncertainty for the fiscal year ending in calendar year *t*-1. Here U1 groups stocks in the lowest uncertainty quintile and U5 groups those in the highest uncertainty quintile. In each information uncertainty quintile, stocks are further sorted into quintiles based on the proxy for investment for the fiscal year ending in calendar year *t*-1. The proxies for investment are asset growth (*ΔA/A*) in Panel A, investment growth (*ΔI/I*) in Panel B, and accruals (*Accruals*) in Panel C. The portfolios are held for 12 months from April of year *t* to March of year *t*+1. The equal-weighted monthly returns and return components for the growth hedge portfolio (D5–D1) are presented. Information uncertainty is proxied by stock return volatility (*SIGMA*), cash flow volatility (*CVOL*), the inverse of firm size (1/*MV*), and the inverse of firm age (1/*Age*). The sample period is from 1985 to 2012. The *t*-statistics are in parentheses.

Table 7. VAR-based return decomposition

Panel A: Sorting by ΔA/A	*Ret*	*CF news*	*DR news*	*Eret*
[-12, 0]	1.34	2.91	-1.27	-0.30
	(5.73)	(13.58)	(-15.11)	(-1.99)
[1, 12]	-1.42	-0.75	-0.28	-0.40
	(-3.52)	(-3.14)	(-4.46)	(-2.53)
Panel B: Sorting by ΔI/I				
[-12, 0]	0.06	0.52	-0.27	-0.20
	(0.20)	(3.24)	(-5.30)	(-1.88)
[1, 12]	-0.82	-0.62	-0.08	-0.11
	(-4.17)	(-4.84)	(-2.17)	(-1.89)
Panel C: Sorting by Accruals				
[-12, 0]	-0.34	0.58	-0.70	-0.23
	(-1.49)	(3.86)	(-14.26)	(-2.28)
[1, 12]	-0.85	-0.61	-0.13	-0.10
	(-4.34)	(-3.90)	(-4.17)	(-1.42)

This table presents the monthly averages of total returns (*Ret*), the cash flow news component (*CF news*), the discount rate news component (*DR news*), and the expected return component (*Eret*) for the investment hedge portfolio (D10–D1) during the one year before portfolio formation [-11, 0] and the holding period [1, 12]. The return components are estimated using the VAR approach discussed in Appendix 3. The investment proxies are asset growth ($\Delta A/A$) in Panel A, investment growth ($\Delta I/I$) in Panel B, and accruals (*Accruals*) in Panel C. Equal-weighted average monthly returns are reported in percent. The sample period is from 1985 to 2012. The *t*-statistics are in parentheses.

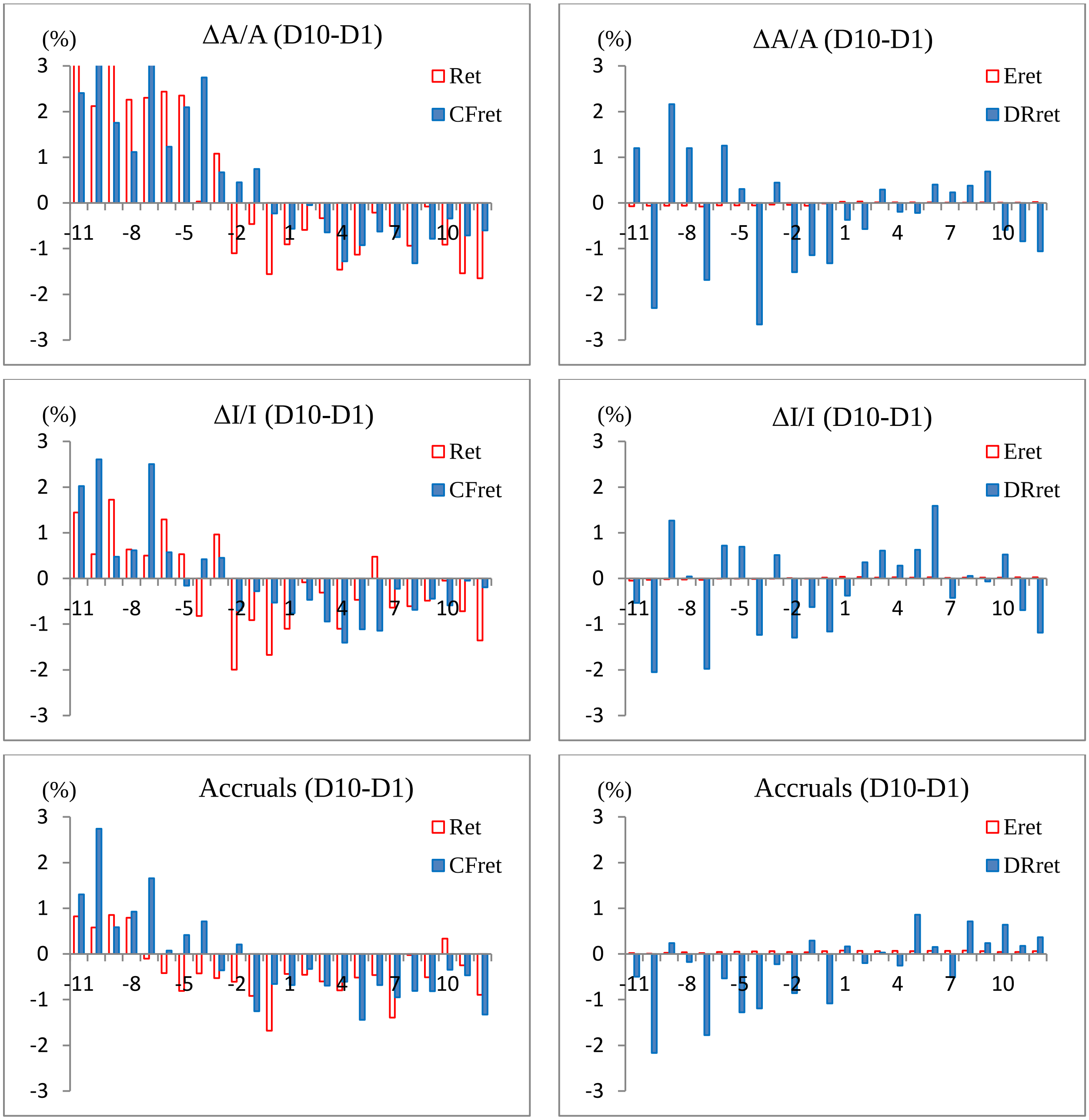

Figure 1. Event-time return distribution

The figures present the event-time returns for the investment hedge portfolios (D10–D1) based on asset growth (*ΔA/A*), investment growth (*ΔI/I*), and accruals (*Accruals*). Average equal-weighted monthly total returns (*Ret*), the cash flow news component (*CFret*), the discount rate news component (*DRret*), and the expected return component (*Eret*) from 12 months before portfolio formation to 12 months afterward are presented. The sample period is from 1985 to 2012.