

# Investor Recognition and Stock Returns

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## Abstract

It is well established that investment fundamentals, such as earnings and cash flows, can explain only a small proportion of the variation in stock returns. We find that investor recognition of a firm's stock can explain relatively more of the variation in stock returns. Consistent with Merton's (1987) theoretical analysis, we show that (i) contemporaneous stock returns are positively related to changes in investor recognition, (ii) future stock returns are negatively related to changes in investor recognition, (iii) the above relations are stronger for stocks with greater idiosyncratic risk and (iv) corporate investment and financing activities are both positively related to changes in investor recognition. Our research suggests that investors and managers who are concerned with firm valuation should consider investor recognition in addition to accounting information and related investment fundamentals.

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# **Investor Recognition and Stock Returns**

## **Abstract**

It is well established that investment fundamentals, such as earnings and cash flows, can explain only a small proportion of the variation in stock returns. We find that investor recognition of a firm's stock can explain relatively more of the variation in stock returns. Consistent with Merton's (1987) theoretical analysis, we show that (i) contemporaneous stock returns are positively related to changes in investor recognition, (ii) future stock returns are negatively related to changes in investor recognition, (iii) the above relations are stronger for stocks with greater idiosyncratic risk and (iv) corporate investment and financing activities are both positively related to changes in investor recognition. Our research suggests that investors and managers who are concerned with firm valuation should consider investor recognition in addition to accounting information and related investment fundamentals.

## **1. Introduction**

Starting with Ball and Brown (1968), a large body of accounting literature explores the relation between accounting information and stock returns. The general conclusion emerging from research in this area is that accounting information explains a surprisingly low proportion of the variation in stock returns. In summarizing early evidence, Lev (1989) finds that earnings can explain no more than 10% of the variation in stock returns and concludes that earnings are of limited usefulness to investors. More recently, Liu and Thomas (2000) extend early research to incorporate changes in expectations of future abnormal earnings and are able to explain up to 30% of the variation in stock returns. Yet, the majority of the variation in stock returns remains unexplained by fundamental variables such as cash flows and earnings.

In this paper we investigate the ability of Merton's (1987) model of capital market equilibrium under incomplete information to explain the remaining variation in stock returns. Merton shows that, holding fundamentals constant, firm value is increasing in the degree of investor recognition of the firm. The key behavioral assumption invoked by Merton's (1987) model is that investors only use securities that they know about in constructing their optimal portfolios. If relatively few investors know about a particular security, then the only way for markets to clear is for these investors take large undiversified positions in the security. These investors then require higher expected returns to compensate them for the increased idiosyncratic risk associated with their positions. Merton refers to the number of investors who know about a security as the degree of 'investor recognition' for that security and models the resulting capital market equilibrium. The key predictions of his model are (i) security value is increasing in

investor recognition, (ii) expected return is decreasing in investor recognition, (iii) the above two relations are increasing in the security's idiosyncratic risk, and (iv) financing and investing activities in the underlying firm are increasing in investor recognition. Our empirical results are uniformly consistent with these predictions and are both economically and statistically significant.

Our results make several contributions to existing research. First, our findings contribute to research on the determinants of stock returns. We show that investor recognition is an important determinant of expected returns and that innovations in investor recognition appear to be more important than earnings news in explaining contemporaneous stock returns. These results highlight the importance of investor recognition as a determinant of firm-level expected return news and contribute to the literature on the drivers of firm-level stock returns (e.g., Lev, 1989; Roll, 1989; Liu and Thomas, 2000; Vuolteenaho, 2002). The investor recognition hypothesis also explains Vuolteenaho's (2002) finding that expected return news is relatively more important in small firms. Vuolteenaho finds that the variance of cash flow news is greater in small firms, causing them to have increased idiosyncratic risk. Both Merton's (1987) theoretical analysis and our results confirm that the effect of investor recognition on expected returns is increasing in idiosyncratic risk.

Second, we reconcile conflicting evidence from previous research regarding the relation between investor recognition and future stock returns. Early research by Arbel, Carvell and Strebel (1983) finds evidence of the predicted negative relation. More recent research by Chen, Hong and Stein (2002) provides contradictory evidence of a positive relation between changes in investor recognition and future returns. We document that

changes in investor recognition are positively autocorrelated over short horizons. We further show that Chen et al.'s evidence of a positive relation between changes in investor recognition and future stock returns is attributable to this positive autocorrelation combined with the positive relation between changes in investor recognition and contemporaneous stock returns. After controlling for autocorrelation in changes in investor recognition, we find that changes in investor recognition have the predicted negative relation with future stock returns.

Third, our results suggest that investor recognition is an important determinant of corporate financial policy. We find that changes in investor recognition are strongly related to contemporaneous and future corporate financing and investing activities. This evidence corroborates Brennan and Tamarowski's (2000) conclusions regarding the role of corporate investor relations activities as a tool for lowering the cost of capital in firms that are raising capital.

Finally, our results suggest that investor recognition may help explain a number of 'anomalies' in stock returns. Prior research shows that corporate financing and investing activities are negatively related to future stock returns (see Ritter, 2003; and Titman, Wei and Xie, 2004) and that short-horizon stock returns exhibit positive 'momentum' (Jegadeesh and Titman, 1993). Investor recognition is related to each of these variables in such a way that their relations with future returns can be explained by the investor recognition hypothesis.

The remainder of the paper is organized as follows. Section 2 provides a more detailed description of the investor recognition hypothesis and develops our empirical

predictions. Section 3 describes our data, section 4 presents our results and section 5 concludes.

## **2. Hypothesis Development**

The idea that neglected stocks earn a return premium over recognized stocks has been in existence for many years (e.g., Arbel, Carvell and Strebel, 1983). Merton (1987) develops an asset pricing model that explains this apparent pricing anomaly. The key difference between Merton's model and standard asset pricing models such as the CAPM is that Merton's model assumes that investors only know about a subset of the available securities, and that these subsets differ across investors. This assumption means that some stocks are known to relatively few investors. Investors in these 'neglected' securities must therefore hold undiversified portfolios and so require a return premium for bearing idiosyncratic risk. The key implications of the model are that (i) the value of a security is increasing in the number of investors who know about the security, and (ii) the expected return on a security is decreasing in the number of investors who know about the security; and (iii) the above two relations are stronger for securities with greater idiosyncratic risk. Merton refers to his model as a model of capital market equilibrium with incomplete information. Subsequent research generally refers to the model and its implications as the 'investor recognition hypothesis'.

Merton (1987) also provides an extension of his basic model that examines the impact of endogenizing the choice of investor recognition on a firm's investment and financing decisions. This extension indicates that changes in investor recognition will be positively correlated with corporate financing and investing activities. If exogenous

events cause investor recognition of a firm's securities to increase, then the firm's cost of capital will fall and so its optimal level of financing and investing activities will increase. If exogenous events cause an increase in financing and investing activities, then the benefits from having a lower cost of capital will increase, so efforts to generate investor recognition of the firm's securities will increase.

Our empirical examination of the investor recognition hypothesis focuses on testing all four of the predictions identified above:

*P1: Security value is increasing in investor recognition.*

*P2: Expected return is decreasing in investor recognition.*

*P3: The above two relations are stronger for securities with greater idiosyncratic risk.*

*P4: Financing and investing are increasing in investor recognition.*

A number of previous studies provide empirical tests of subsets of these predictions. One line of research focuses on *P1* by examining the impact of events that increase investor recognition on firm value. Events studied include exchange listings (Kadlec and McConnell, 1994; and Foerster and Karolyi, 1999), initiation of analyst coverage (Irvine, 2003), addition to stock indices (Shleifer, 1986; Chen, Noronha and Singal, 2004), reduction of the minimum unit of trading (Amihud, Mendelson, and Uno, 1999), hiring of investor relations firms (Bushee and Miller, 2005), increases in advertising expenditures (Grullon, Kanatas, and Weston, 2004), and periods of unusual trading volume (Gervais, Kaniel and Mingelgrin, 2001; Kaniel, Li and Starks, 2003). These studies generally find that events increasing investor recognition lead to increases

in security value. We contribute to this literature by constructing a comprehensive measure of investor recognition and evaluating the relative importance of investor recognition in driving stock returns.

A second line of research focuses on *P2* by examining the association between changes in investor recognition and future stock returns. The evidence from this research is mixed. Early research by Arbel, Carvell and Strebel (1983) uses the number of institutional investors as a measure of investor recognition and finds evidence of the hypothesized negative relation between investor recognition and future stock returns. More recently, Chen, Hong and Stein (2002) find evidence of a positive relation between the change in the number of institutional holders and future stock returns. This finding is inconsistent with the negative relation predicted by the investor recognition hypothesis. Using a similar methodology to Chen, et al., Bodnaruk and Ostberg (2005) find evidence of the hypothesized negative relation using a sample of Swedish stocks.<sup>1</sup> We contribute to this literature by reconciling the inconsistent evidence in Chen et al. with the investor recognition hypothesis. We show that changes in investor recognition are positively autocorrelated. Since *P1* predicts that changes in investor recognition are positively correlated with contemporaneous returns, it is important to control for this autocorrelation when evaluating the relation between changes in investor recognition and future stock returns. After controlling for autocorrelation, we find that changes in investor recognition are negatively related to future stock returns, as predicted by *P2*.

A third line of research focuses on the relation between idiosyncratic risk and future stock returns and is indirectly related to *P3*. This research focuses on estimating the

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<sup>1</sup> In related research, Barber and Odean (2006) find that stocks that garner attention are disproportionately purchased by individual investors and subsequently earn poor returns.

unconditional association between idiosyncratic risk and future stock returns. The intuition behind this research is that since many investors hold undiversified portfolios, idiosyncratic risk should be priced. Results of this research are mixed. An early and influential study by Fama and MacBeth (1973) finds no role for idiosyncratic risk in explaining future stock returns. However, a more recent study by Malkiel and Xu (2004) finds evidence of the predicted positive relation between idiosyncratic risk and future stock returns. We contribute to this literature by providing more powerful tests of the hypothesized relation between idiosyncratic risk and stock returns. Intuitively, our *P3* examines whether idiosyncratic risk is more strongly positively related to future stock returns in stocks that are held by relatively undiversified investors (i.e., in stocks with low investor recognition). Our results are strongly consistent with *P3* and corroborate and extend the findings in Malkiel and Xu (2004).

Finally, to our knowledge there is no research that directly examines our *P4*. There are, however, numerous studies that examine the relation between corporate activities and future stock returns. Ritter (2003) summarizes the findings on a large body of evidence identifying a negative relation between corporate financing activities and future stock returns. Titman, Wei and Xie (2004) document a negative relation between capital expenditures and future stock returns. Our predictions *P4* and *P2* combine to suggest that the investor recognition hypothesis may provide an explanation for the negative stock returns following these corporate financing and investing activities. *P4* predicts that investor recognition is positively related to corporate financing and investing activities. *P2* predicts that investor recognition is negatively related to stock future returns. These

two predictions combine to generate the observed negative relation between corporate investing and financing activities and future stock returns.

### **3. Data and Variable Measurement**

Our tests require that we develop an empirical proxy for the investor recognition construct developed by Merton (1987). Merton's model consists of a large number of investors with identical initial wealths and he defines investor recognition of a security as the fraction of investors who know about the security. There are several issues to consider in developing an empirical proxy for Merton's construct. First, we cannot directly observe how many investors 'know about' a particular security. We can, however, observe the number of institutional investors who own a security. It seems reasonable to argue that the number of investors who know about a security is increasing in the number of investors that own the security. We therefore use ownership of a security as a proxy for knowledge of a security.

A second issue arising in the construction of an empirical proxy for investor recognition is that Merton's model assumes that all investors have identical initial wealths. This assumption is almost certainly violated in practice. Merton notes that extending his model to the more realistic case of a non-uniform distribution of initial wealth changes the appropriate investor recognition construct from the proportion of investors who know about the security to the fraction of total wealth owned by investors who know about the security. It is difficult for us to measure the wealth levels of investors, but we can restrict our analysis to relatively wealthy investors. We do so by

limiting our measure of investor recognition to investors filing Form 13F with the SEC.<sup>2</sup> 13F filings are required on a quarterly basis from all institutional investors with more than \$100 million of securities under their discretion. We therefore use the proportion of 13F filers holding a long position in that security as our empirical proxy for investor recognition of a security.

A third issue that arises in measuring investor recognition is that Merton's model predicts that firm value will be influenced by a host of other factors, including the magnitude of the firm's future cash flows, the exposure of the security to common factors and the size of the firm. It is difficult to control for these factors (particularly expected cash flows) in the cross-section, but it is easier to control for changes in a given firm over time. Accordingly, we conduct our empirical tests using a changes specification. Testing our predictions in changes instead of levels should increase the power of our tests by reducing omitted variable problems related to these other factors. Thus, our empirical tests employ the change in the proportion of 13-F filers holding a security as a proxy for the change in the investor recognition of that security. This variable is identical to the measure employed by Chen et al. (2002) as a measure of differences in opinion. Following Chen et al., we refer to this variable as  $\Delta\text{BREADTH}$ , denoting the change in the breadth of institutional ownership:

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<sup>2</sup> We also conducted our tests using an alternative measure of investor recognition that weights each institution by the total dollar amount of that institution's holdings. The total dollar amount of holdings serves as a proxy for the investable wealth of the institution. Results are qualitatively similar using this alternative measure. The drawback of this alternative measure is that our sample is restricted to large institutional investors who are required to file Form 13F with the SEC, so our measure of investor recognition is already biased in favor of large investors. Assuming that ownership by the smaller institutions in our sample is correlated with ownership by other smaller investors who are not included in our sample, equal weighting should provide a more representative measure of investor recognition.

$$\Delta\text{BREADTH}_{it} = \frac{\text{13F filers holding security } i \text{ at time } t - \text{13F filers holding security } i \text{ at time } t - 1}{\text{Total number of 13F filers at time } t - 1}$$

To ensure that our measure captures changes in the breadth of ownership rather than changes in the universe of institutions covered by our database, we compute this variable using only 13F filers that exist in our database in both quarters  $t$  and  $t-1$ .

A fourth issue with our measure of investor recognition is that it makes the assumption that investors only know about securities that they hold. If an investor buys a security that they didn't previously own, it seems reasonable to argue that they only just learned about that security. But if an investor sells a security that they previously owned, it is a stretch to argue that they forgot about that security.<sup>3</sup> Because the purchase of a security that was not previously owned is a cleaner measure of change in investor recognition, some of our tests decompose  $\Delta\text{BREADTH}$  as  $\Delta\text{BREADTH}_t = \text{IN}_t - \text{OUT}_t$ , where  $\text{IN}_t$  ( $\text{OUT}_t$ ) equals the fraction of 13F filers that have a zero (non-zero) holding of the stock at time  $t-1$  and a non-zero (zero) holding in the stock at time  $t$ . Similar measures are employed by Avner, Carvell and Strebel (1983) and Chen et al. (2002).

Data used in our analyses are obtained from several resources. Data on the 13F filers is obtained from the CDA/Spectrum 13F institutional transaction quarterly data, covering the period from 1982 through 2004. Stock return data are extracted from the CRSP monthly and daily return files, financial statement data are obtained from the

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<sup>3</sup> Note, however, that the investor does not have to actually forget about the security for Merton's model to apply. The investor simply has to exclude the security from the set of securities in their investable universe. Institutional investors often restrict their investable universe using criteria such as market capitalization, index membership, exchange listing and liquidity. Thus, a security could experience a reduction in investor recognition because it undergoes a change in one or more of these criteria.

COMPUSTAT quarterly files and analyst data is obtained from the I/B/E/S monthly summary files.

Tests of  $P1$  and  $P2$  require a measure of stock returns. We use size-adjusted returns, computed as the difference between the security's return and the return on the security's size-matched decile portfolio over the corresponding period. Size-matched portfolios are based on decile assignments of market capitalization for all NYSE/AMEX stocks. Tests of  $P3$  require a measure of idiosyncratic security risk. We measure quarterly (annual) idiosyncratic risk as the square root of the sum over the prior 3 (12) months of monthly idiosyncratic risk measures. Following Brandt, Brav, and Graham (2005) and Campbell, Lettau, Malkiel, and Xu (2001), the monthly measures equal the sum of daily squared excess returns. Excess returns are computed by subtracting the daily value-weighted industry return from the security's daily return. Industry classifications are based on Fama and French (1997). To facilitate interpretation of the results, our idiosyncratic risk measures are ranked into deciles and the ranks are normalized to range from -0.5 to 0.5. We refer to the resulting measure as 'Rank i-risk'.

To rule out the possibility that changes in investor recognition are driven by news about earnings, our empirical tests employ a series of variables that are designed to capture earnings news. We compute measures of earnings news over both quarterly and annual return measurement intervals and use both reported earnings obtained from Compustat and analysts' consensus forecasts of earnings obtained from I/B/E/S. The change in quarterly earnings ( $\Delta\text{Earnings}_{\text{QTR}}$ ) is computed as the seasonal change in earnings before extraordinary items (COMPUSTAT data item 8) scaled by average total assets. The change in annual earnings ( $\Delta\text{Earnings}_{\text{ANN}}$ ) is computed as the change between

quarter  $t$  and  $t-4$  in the trailing twelve month earnings before extraordinary items (COMPUSTAT data item 8) scaled by average total assets. Forecast errors are computed as actual reported earnings (per I/B/E/S) minus the consensus earnings forecast outstanding immediately prior to the announcement date, divided by price at the beginning of the corresponding return measurement interval. The quarterly (annual) forecast revision equals the change in the consensus forecast of annual earnings between quarter  $t$  and quarter  $t-1$  ( $t-4$ ) scaled by price at the beginning of the corresponding return measurement interval. The quarterly (annual) revision in long-term growth equals the change in the consensus forecast of long-term EPS growth (per I/B/E/S) between quarter  $t$  and quarter  $t-1$  ( $t-4$ ).

Tests of  $P4$  require measures of financing and investing activities. We measure the amount of financing raised during the period as the net cash flows received from financing activities (COMPUSTAT data item 113), scaled by average total assets. We measure 'new' investment during the period as capital expenditures (COMPUSTAT item 90) minus sale of property, plant, and equipment (COMPUSTAT item 83) plus acquisitions (COMPUSTAT item 94) minus depreciation and amortization (COMPUSTAT item 77), deflated by average total assets (COMPUSTAT item 44). We deduct depreciation and amortization to control for investment that simply maintains productive capacity. All data items are from the COMPUSTAT quarterly files, and we cumulate across the trailing four quarters to measure these variables over annual measurement intervals. We also follow the convention of winsorizing these variables at the 1st and 99th percentiles to mitigate the impact of extreme outliers.

## 4. Results

### 4.1 Descriptive Statistics

Institutional ownership data is available on a quarterly basis. In order to study the effects of autocorrelation in  $\Delta\text{BREADTH}$ , we conduct our empirical tests using  $\Delta\text{BREADTH}$  measured over both quarterly and annual intervals (denoted  $\Delta\text{BREADTH}_{\text{QTR}}$  and  $\Delta\text{BREADTH}_{\text{ANN}}$  respectively). Our sample period is restricted to the 23-year period from 1982 to 2004 due to lack of institutional ownership data prior to 1982. We compute both quarterly changes and annual changes once every quarter, resulting in overlapping annual return measurement intervals.<sup>4</sup> For the entire sample with data available on both CDA/Spectrum and CRSP, we have a total of 457,651 quarterly observations and 409,756 annual observations. Panel A of table 1 presents distributional statistics for  $\Delta\text{BREADTH}$  using quarterly data. The mean value of  $\Delta\text{BREADTH}$  is generally positive (overall mean of 0.10%) and the median value is generally zero. Panel B reports similar statistics for the annual return measurement interval, indicating that both the means and medians are generally positive. Overall, the results indicate that there has been a slight tendency for institutions to diversify their holdings over our sample period. Note that  $\Delta\text{BREADTH}$  tends to be right skewed, indicating that a small number of stocks experience extremely large increases in institutional ownership.

In order for empirical tests of  $P2$  to be well-specified, it is important to control for autocorrelation in  $\Delta\text{BREADTH}$ . Table 2 provides statistics on autocorrelation in  $\Delta\text{BREADTH}$  using both quarterly and annual measurement intervals. Panel A of table 2 reports the mean quarterly value of  $\Delta\text{BREADTH}$  in event time for portfolios formed on

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<sup>4</sup> Our empirical tests control for the resulting serial correlation in investor recognition using the Newey-West technique with 4 quarterly lags.

the decile ranking of  $\Delta$ BREADTH in event quarter  $t$ . The quarter  $t$  mean values of  $\Delta$ BREADTH are 1.26% for the highest decile and -0.80% for the lowest decile. These numbers indicate that it is unusual for a given security to be added or removed by more than 1% of institutional investors during a single quarter. Perusing the corresponding values of  $\Delta$ BREADTH for quarters  $t-1$  and  $t+1$  reveals strong evidence of positive first order autocorrelation in quarterly  $\Delta$ BREADTH. Further perusal of quarters  $t-4$  through  $t+4$  suggests that autocorrelation persists at weaker levels well beyond one lead/lag.

Panel B of table 2 replicates panel A using the annual  $\Delta$ BREADTH measurement interval in place of the quarterly measurement interval. This table also reveals evidence of autocorrelation that lasts for up to three years. In contrast to panel A, however, the autocorrelation is not much stronger at one lead/lag than it is at three leads/lags. Figure 1 illustrates the autocorrelation in  $\Delta$ BREADTH by plotting the mean values of  $\Delta$ BREADTH in event time for the extreme quarter  $t$  deciles. The figure clearly demonstrates that  $\Delta$ BREADTH exhibits strong positive first order autocorrelation using quarterly data and weaker positive higher order autocorrelations that extend out at least three years.

Panels C and D corroborate the results in panels A and B using Pearson and Spearman correlation coefficients. Panel C highlights the high first order autocorrelations using quarterly changes (Pearson 12%, Spearman 7%). Panel C also indicates that the second order autocorrelations are weakly negative and the third and fourth order autocorrelations are positive. Panel D highlights the strong positive first order autocorrelations using annual data (Pearson 17%, Spearman 11%) and also indicates that these positive autocorrelations persist at higher orders.

In summary,  $\Delta\text{BREADTH}$  exhibits strong autocorrelation using both the quarterly and annual measurement intervals. It is important to control for this autocorrelation when testing  $P2$ . Recall that  $P2$  predicts that  $\Delta\text{BREADTH}$  is negatively related to future returns. However,  $P1$  predicts that  $\Delta\text{BREADTH}$  is positively related to contemporaneous returns. The combination of  $P1$  and positive autocorrelation in  $\Delta\text{BREADTH}$  leads to the prediction of a positive relation between  $\Delta\text{BREADTH}$  and future returns. The relation between  $\Delta\text{BREADTH}$  and future returns is therefore predicted to be negative by  $P2$ , but this relation is likely to be confounded by the positive relation resulting from  $P1$  in combination with positive serial correlation in  $\Delta\text{BREADTH}$ . Thus, well-specified tests of  $P2$  require controls for autocorrelation in  $\Delta\text{BREADTH}$ . One existing study that fails to include such controls is Chen, Hong and Stein (2002). Chen et al. find that firms with positive (negative)  $\Delta\text{BREADTH}$  have higher (lower) stock returns over the next four quarters. They attribute this result to a combination of differences in investor opinions and short sales constraints. An alternative explanation is that positive autocorrelation in  $\Delta\text{BREADTH}$  combines with  $P1$  to generate the higher future stock returns. Our empirical tests (presented in section 4.3) address this problem by controlling for future  $\Delta\text{BREADTH}$  when testing for the relation between current  $\Delta\text{BREADTH}$  and future returns.

#### 4.2 *Investor Recognition and Firm Value*

The first key prediction of Merton's model is that security value is increasing in investor recognition (our  $P1$ ). We test this prediction by examining the relation between  $\Delta\text{BREADTH}$  and contemporaneous changes in security value. We measure changes in

security value using size-adjusted returns, as defined in section 3. Table 3 reports average size-adjusted returns in event time for portfolios of firms formed on decile ranks of  $\Delta\text{BREADTH}$  in period  $t$ . Panel A of table 3 presents the results using quarterly measurement intervals for quarters  $t-4$  through  $t+4$ . *P1* predicts that average returns will be increasing in the rank of  $\Delta\text{BREADTH}$  during quarter  $t$ . The results are strongly consistent with this prediction, with returns increasing monotonically across  $\Delta\text{BREADTH}$  deciles. Returns for the lowest  $\Delta\text{BREADTH}$  decile are -11.0% and returns for the highest  $\Delta\text{BREADTH}$  decile are 14.4%, giving a return spread across the extreme deciles of 25.4%.

The second key prediction from Merton's model is that expected return is decreasing in investor recognition (our *P2*). We test this prediction by examining the relation between  $\Delta\text{BREADTH}$  and future size-adjusted returns. Inconsistent with *P2*, but consistent with the results in Chen et al., there is evidence of a weak positive relation between  $\Delta\text{BREADTH}$  and stock returns over quarters  $t+1$  through  $t+3$ . Recall, however, that  $\Delta\text{BREADTH}$  is positively autocorrelated, and these results do not control for autocorrelation in  $\Delta\text{BREADTH}$ . We will provide tests of *P2* that implement such controls in section 4.3. Finally, there is evidence of a strong positive relation between  $\Delta\text{BREADTH}$  and stock returns over quarters  $t-4$  through  $t-1$ , suggesting that investors are more likely to open a position in a security with strong recent past returns. This evidence is suggestive of a link between investor recognition and the well-known momentum effect in stock returns (see Jegadeesh and Titman, 1993).

Panel B of table 3 presents similar results to panel A using the annual return measurement interval for both  $\Delta\text{BREADTH}$  and returns. Consistent with *P1*, there is

again evidence of a strong positive relation between  $\Delta$ BREADTH and contemporaneous returns. Returns for the lowest  $\Delta$ BREADTH decile are -35.8% and returns for the highest  $\Delta$ BREADTH decile are 54.9%, giving a return spread across the extreme deciles of 90.7%. Looking at future returns, we see that there is a weak negative relation with one-year-ahead returns and a stronger negative relation with two-year-ahead returns. This evidence is broadly consistent with *P2*. It appears that the effects of autocorrelation in  $\Delta$ BREADTH on future returns are weaker in the annual data. There is also evidence of a strong positive relation between  $\Delta$ BREADTH and stock returns over the prior year, but this relation turns negative back further than one year. Thus, investors appear to be attracted to stocks with large returns over the last 4 quarters. These relations are illustrated graphically in figure 2.

There are at least two potential limitations of the results in table 3. First, there are no controls for contemporaneous news about firms' future cash flows. Merton's model holds future cash flows constant. In our empirical tests, however, it is possible that  $\Delta$ BREADTH is correlated with cash flow news. This would be the case if, for example, investors are attracted to firms with positive cash flow news. Such a scenario would confound tests of *P1*, causing us to mistakenly attribute the relation between  $\Delta$ BREADTH and contemporaneous stock returns to investor recognition instead of to cash flow news. Second, as mentioned above, there are no controls for autocorrelation in  $\Delta$ BREADTH. This confounds the interpretation of tests of *P2* concerning the relation between  $\Delta$ BREADTH and future stock returns. We therefore use multiple regression analysis to test *P1* and *P2* while implementing controls for cash flow news and autocorrelation in  $\Delta$ BREADTH.

Table 4 provides tests of *PI* that control for cash flow news through regressions of stock returns on contemporaneous  $\Delta$ BREADTH and proxies for cash flow news. We report results using both quarterly and annual return intervals. We also measure cash flow news using both earnings changes (e.g., Foster, 1977) and analyst forecast revisions (e.g., Liu and Thomas, 2000). Liu and Thomas demonstrate that incorporating information from both earnings surprises and analyst forecast revisions provides an effective proxy for cash flow news. Panel A of table 4 presents results using quarterly returns and earnings changes. We follow previous research in using seasonally differenced quarterly earnings for both the current and preceding quarter as the proxy for cash flow news (e.g., Foster, 1977). We include the preceding quarter because we measure stock returns over fiscal quarter intervals. During a fiscal quarter, earnings for the preceding quarter will typically be announced. In addition, it is possible that information will be released about earnings for the current quarter (e.g., management forecasts). We therefore expect both the current and preceding quarterly earnings changes to convey cash flow news during the current fiscal quarter. Panel B presents results using quarterly returns for the subsample of firms for which we have analysts' forecasts. For this sample we measure cash flow news using the earnings surprise announced during quarter  $t$  (Forecast Error), the change in the consensus analyst forecast of annual earnings per share between the beginning and the end of the quarter  $t$  (Revision in Annual Forecast) and the change in the long-term EPS growth forecast (Revision in Long-Term Growth). All analyst forecast variables are measured on a per share basis and Forecast Error and Revision in Annual Forecast are deflated by price at the beginning of the quarter.

The results in panels A and B of Table 4 confirm that the explanatory power of  $\Delta$ BREADTH with respect to contemporaneous stock returns is incremental to our proxies for cash flow news. The first column reports results using a simple regression of returns on contemporaneous  $\Delta$ BREADTH. The reported results are based on the time-series means of cross-sectional regressions by quarter, with t-statistics adjusted using the Newey-West correction. Consistent with *PI* and the results in table 3,  $\Delta$ BREADTH is positive and highly significant in both panels A and B. The second column of each panel reports results from regressions of returns on our proxies for cash flow news. Consistent with prior research, all proxies load with positive coefficients and are highly statistically significant. The third column of each panel reports results for multiple regressions containing both  $\Delta$ BREADTH and our cash flow proxies. All variables remain of approximately the same magnitudes and significance levels as in the earlier regressions.

In Panels C and D of table 4, we repeat the analysis of panels A and B using annual return measurement intervals. The explanatory power of both  $\Delta$ BREADTH and our cash flow proxies increase at the annual return measurement interval, and  $\Delta$ BREADTH continues to have significant incremental explanatory power over the cash flow news proxies. These results confirm that the relation between  $\Delta$ BREADTH and contemporaneous stock returns does not arise because  $\Delta$ BREADTH acts as a proxy for cash flow news. Rather, as predicted by Merton's model, it is consistent with a separate role for investor recognition in the determination of security values. Note also that the regression  $R^2$ s indicate that changes in investor recognition are even more important than cash flow news in explaining contemporaneous stock returns. In particular, the

regressions in panel D indicate that investor recognition explains 24.0% of the variation in contemporaneous annual returns, while cash flow news explains only 18.7%.

The final column of table 4 provides us with our first tests of  $P3$ . Recall that the intuition behind  $P1$  and  $P2$  is that investors in neglected stocks will require a risk premium to compensate them for bearing idiosyncratic risk. Ceteris paribus, greater idiosyncratic risk will command a greater the risk premium, and so  $P3$  predicts that  $P1$  will hold more strongly for securities with greater idiosyncratic risk. The regressions in the final column of table 4 include our measure of idiosyncratic risk (Rank i-risk) as both a main effect and an interactive effect with  $\Delta\text{BREADTH}$ . If  $P1$  holds more strongly for firms with greater idiosyncratic risk, then the coefficient on the interaction will be positive. Consistent with this prediction, the coefficient on the interaction is positive and highly statistically significant in all 4 panels of table 4. Intuitively, this result says that increases in investor recognition cause much greater increases in firm value for stocks with higher idiosyncratic risk. Figure 3 provides a graphical illustration of the economic magnitude of this result. This figure replicates figure 2, after decomposing the high and low  $\Delta\text{BREADTH}$  deciles into two equal halves around the median value of Rank i-risk. Thus, for each  $\Delta\text{BREADTH}$  decile, we can separately track the return performance of the high idiosyncratic risk securities and the low idiosyncratic risk securities. The figure illustrates that contemporaneous returns are more than twice as pronounced for the high idiosyncratic risk subsamples on both the positive and negative sides. Thus,  $P3$  is strongly supported for contemporaneous returns. We test  $P3$  in the context of future returns in the next subsection.

### 4.3 *Investor Recognition and Future returns*

The second key prediction of Merton's model is that expected return is decreasing in investor recognition (our *P2*). We test this prediction by examining the relation between  $\Delta\text{BREADTH}$  and *future* size-adjusted stock returns.<sup>5</sup> We have already seen preliminary evidence relating to this prediction in table 3. Recall that the results in table 3 reveal that the unconditional relation between  $\Delta\text{BREADTH}$  and future returns is positive for the first three quarters, and then turns negative beyond three quarters. However, the results in table 3 are confounded by the failure to control for autocorrelation in  $\Delta\text{BREADTH}$ . The tests in table 5 remedy this problem.

Table 5 reports results from regressions of period  $t+1$  size-adjusted stock returns on period  $t+1$   $\Delta\text{BREADTH}$ , period  $t$   $\Delta\text{BREADTH}$  and period  $t-1$   $\Delta\text{BREADTH}$  (accordingly, the variable  $\Delta\text{BREADTH}_{\text{QTR } t+1}$  in the regression results presented in table 5 represents the *contemporaneous* change in our investor recognition measure, while  $\Delta\text{BREADTH}_{\text{QTR } t}$  represents the prior's quarter change, relative to the size-adjusted returns). Recall that *P2* predicts that there will be a negative relation between  $\Delta\text{BREADTH}_t$  and future stock returns. We therefore predict that  $\Delta\text{BREADTH}_t$  will load with a negative coefficient. We include  $\Delta\text{BREADTH}$  for periods  $t-1$  and  $t+1$  to control for autocorrelation in  $\Delta\text{BREADTH}$ .

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<sup>5</sup> Merton's (1987) model predicts that there will be a negative relation between the level of investor recognition and expected returns. Strictly speaking, our changes specification should therefore focus on the relation between change in current period investor recognition and the *change* in expected returns for the future period relative to the current period. By focusing on levels of future realized returns, our analysis implicitly assumes that the current period expected return is a cross-sectional constant. To the extent that this approach results in a noisy measure of the change in expected return, it should reduce the power of our tests. Note that the alternative approach of using the change in realized returns as a proxy for the change in expected returns is not feasible, because the unexpected component of the current period realized return is related to the current period change in investor recognition through *P1*. Another approach of testing this prediction is to use a levels specification, but this involves an omitted variables problem (discussed earlier).

In order to illustrate the importance of controlling for autocorrelation, the first column of Panel A (quarterly) and Panel B (annual) of table 5 reports results from simple regressions of period  $t+1$  returns on period  $t$   $\Delta$ BREADTH. Without controls for autocorrelation, the coefficient on  $\Delta$ BREADTH <sub>$t$</sub>  is positive and marginally significant using quarterly data and negative and insignificant using annual data. These results are broadly consistent with the results we observed in table 2 and figure 2 and with the results reported in Chen et al. (2002). The second column adds controls for the autocorrelation by incorporating in the regression  $\Delta$ BREADTH for period  $t-1$  (two periods ago relative to return) and  $\Delta$ BREADTH for period  $t+1$  (contemporaneous change relative to return). Recall that  $\Delta$ BREADTH for time  $t$  influences returns at  $t+1$  through both the direct effect of Merton's hypothesis (high  $\Delta$ BREADTH implies low expected return) and indirectly through the autocorrelation in  $\Delta$ BREADTH (high period  $t$   $\Delta$ BREADTH implies high  $\Delta$ BREADTH at period  $t+1$  which implies high return at  $t+1$ ). To test for the former effect, we need to control for the latter one which we do by incorporating in the regression the period  $t+1$  (contemporaneous)  $\Delta$ BREADTH.

Consistent with  $P1$ ,  $\Delta$ BREADTH for period  $t+1$  loads with a significantly positive coefficient. Moreover, consistent with  $P2$ ,  $\Delta$ BREADTH for period  $t$  now loads with a significantly negative coefficient. The change in results between columns 1 and 2 illustrates the importance of controlling for autocorrelation in  $\Delta$ BREADTH in tests of  $P2$ . These results lead us to conclude that that the positive correlation between  $\Delta$ BREADTH and future returns in Chen et al. (2002) is likely to be driven by autocorrelation in  $\Delta$ BREADTH rather than their 'differences of opinion' explanation.

The final column of table 5 provides comprehensive tests of *P3*. *P3* predicts that both *P1* and *P2* will hold more strongly for securities with greater idiosyncratic risk. Recall that table 4 provides evidence in support of *P3* with respect to *P1*. The final column of table 5 simultaneously tests *P3* with respect to both *P1* and *P2*. This is accomplished by including interactions for idiosyncratic risk (Rank i-risk) with  $\Delta\text{BREADTH}_{t-1}$ ,  $\Delta\text{BREADTH}_t$  and  $\Delta\text{BREADTH}_{t+1}$ .<sup>6</sup> *P3* predicts that the coefficient on the  $\Delta\text{BREADTH}_{t+1}$  interaction will be positive (relating to *P1*) and the coefficient on the  $\Delta\text{BREADTH}_t$  interaction will be negative (relating to *P2*). The results are supportive of these predictions in both the annual and quarterly data. We have already seen that *P3* holds with respect to *P1* in table 4, so our current discussion focuses on tests of *P3* with respect to *P2*.

For the quarterly regressions in panel A of table 5, the coefficient on the interactive term “ $\Delta\text{Breadth}_{\text{QTR}t} \cdot \text{Rank i-risk}_{\text{QTR}t}$ ” is negative and marginally statistically significant ( $t=-1.9$ ). Note, however, that the relatively low statistical significance is attributable to a high standard error rather than a lack of economic significance. The coefficient on the main effect for  $\Delta\text{Breadth}_{\text{QTR}t}$  is -1.100, while the coefficient on the interaction is -2.341. Recall that the Rank i-risk is based on decile rankings that are scaled to range between -0.5 and +0.5, so the coefficient magnitudes suggest that the sensitivity of future returns to  $\Delta\text{Breadth}_{\text{QTR}t}$  is highly dependent on Rank i-risk. For example, the lowest Rank i-risk decile has an implied  $\Delta\text{Breadth}_{\text{QTR}t}$  coefficient of  $-1.100+0.5 \cdot 2.341=0.070$ , while the highest Rank i-risk decile has an implied  $\Delta\text{Breadth}_{\text{QTR}t}$

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<sup>6</sup> We also include a main effect for Rank i-risk in period  $t$ . For brevity, we omit main effects for Rank i-risk in periods  $t-1$  and  $t+1$ , because Rank i-risk is very highly autocorrelated. Including these additional variables has no material effect on the other regression coefficients.

coefficient of  $-1.100 - 0.5 \cdot 2.341 = -2.271$ . The results for the annual regressions in panel B of table 5 indicate that the coefficient on the interactive term “ $\Delta\text{Breadth}_{\text{ANN}i} \cdot \text{Rank } i\text{-risk}_{\text{ANN}i}$ ” is negative and both economically and statistically significant. Note that as with the quarterly data, the magnitude of the coefficient on the interactive term (-5.350) is about twice the coefficient on the main effect (-2.668), highlighting the importance of Rank i-risk in determining the strength of the negative relation between  $\Delta\text{BREADTH}$  and future returns. The economic significance of these results is quite striking. For a security in the lowest Rank i-risk decile (Rank i-risk=-0.5), the coefficient on  $\Delta\text{BREADTH}$  will be approximately zero, indicating that a change in  $\Delta\text{BREADTH}$  has no effect on expected return. But for a security in the highest Rank i-risk decile (Rank i-risk=0.5), the coefficient on  $\Delta\text{BREADTH}$  will be approximately -5. This means that an increase in  $\Delta\text{BREADTH}$  of 0.01 (i.e., attracting an additional 1% of existing institutional investors) reduces a security’s expected return by 0.05 (i.e., the expected return goes down by 5% of security price). In summary, the results in table 5 are uniformly consistent with *P3* and are highly economically significant.

The results in table 5 corroborate and extend recent research by Malkiel and Xu (2004). That paper documents evidence of a positive relation between idiosyncratic risk and future stock returns. They argue that these results arise because undiversified investors demand a premium for holding idiosyncratic risk. Our results show that as  $\Delta\text{BREADTH}$  increases (i.e., investors in a given stock become more diversified), the idiosyncratic risk premium falls, and this effect is more pronounced for stocks with high idiosyncratic risk.

Table 6 reports an additional set of tests that are designed to further discriminate between the differences of opinion hypothesis advanced by Chen et al. (2002) and the investor recognition hypothesis advanced in this paper. Under Chen et al.'s differences of opinion hypothesis, high  $\Delta\text{BREADTH}$  indicates that informed investors think that a stock is worth holding at its current price, and thus constitutes a positive signal for expected returns. Under the investor recognition hypothesis, high  $\Delta\text{BREADTH}$  indicates that more investors know about a security, thus driving its risk premium lower and hence its expected returns lower. Chen et al. attempt to discriminate between their hypothesis and the investor recognition hypothesis by decomposing  $\Delta\text{BREADTH}$  into IN-OUT (as defined in section 3). They argue that under the investor recognition hypothesis, if an investor decides to add a new security, it is quite likely to signal that the investor did not previously know about the security. However, if an investor decides to sell out of an existing security, it is harder to argue that this signals the investor 'forgot' about that security. Recall that  $\text{IN}_t$  measures new investors opening a position in the stock during period  $t$  and  $\text{OUT}_t$  measures existing investors closing a position in the stock during period  $t$ . Thus, following Chen et al.'s logic, the investor recognition hypothesis predicts that the negative relation between  $\Delta\text{BREADTH}$  and expected returns is driven by the IN component of  $\Delta\text{BREADTH}$ . Chen et al. regress future stock returns on IN and OUT and find that the coefficients are positive and of similar magnitudes across these two components. They interpret this evidence as consistent with their differences of opinion hypothesis and inconsistent with the investor recognition hypothesis.

As mentioned earlier in this paper, an alternative explanation for Chen et al.'s results is that the positive relation between  $\Delta\text{BREADTH}_t$  and future returns results from

autocorrelation in  $\Delta\text{BREADTH}_t$ . Recall from figure 1 that mean reversion in  $\Delta\text{BREADTH}$  is approximately symmetrical for positive and negative innovations. Thus, if positive autocorrelation in  $\Delta\text{BREADTH}$  is driving the positive unconditional relation between  $\Delta\text{BREADTH}$  and future returns, we expect this relation to be symmetrical for both IN and OUT. In contrast, the investor recognition hypothesis predicts that after controlling for autocorrelation in  $\Delta\text{BREADTH}$ , the negative relation between  $\Delta\text{BREADTH}$  and future returns will be primarily attributable to IN as opposed to OUT.

Table 6 begins by reporting regressions similar to those in Chen et al. The first column reports regressions of future returns on IN and OUT without controlling for autocorrelation in  $\Delta\text{BREADTH}$ . Similar to the results in Chen et al., the quarterly results in panel A reveal a significant relation that is approximately symmetrical across IN and OUT. The annual results in panel B are insignificant. The results in the second column of table 6 include controls for autocorrelation in  $\Delta\text{BREADTH}$  and tell a very different story, one that is uniformly consistent with the predictions of the investor recognition hypothesis. Recall from table 5 that after controlling for autocorrelation in  $\Delta\text{BREADTH}$ , there is a significantly negative coefficient on  $\Delta\text{BREADTH}_t$  using both quarterly and annual data. The results in table 6 show that this negative coefficient is entirely attributable to  $\text{IN}_t$ .  $\text{IN}_t$  is negative and highly significant in both the quarterly and annual regressions, while  $\text{OUT}_t$  is insignificant. Furthermore, the positive coefficient on  $\Delta\text{BREADTH}_{t+1}$  from table 5 is much stronger for  $\text{IN}_{t+1}$  than for  $\text{OUT}_{t+1}$  (note that the sign of the coefficient on OUT is reversed relative to that on  $\Delta\text{BREADTH}$ , because  $\Delta\text{BREADTH}=\text{IN}-\text{OUT}$ ). In other words, the positive association between  $\Delta\text{BREADTH}$  and contemporaneous returns is much stronger for IN than for OUT and the negative

relation between  $\Delta\text{BREADTH}$  and future returns is much stronger for IN than for OUT. These results are uniformly consistent with the investor recognition hypothesis.

#### 4.4 *Investor Recognition and Real Corporate Activities*

The fourth key prediction from Merton's model is that corporate financing and investing activities are positively related to changes in investor recognition (our  $P4$ ). Recall that the intuition behind this prediction is that the increased valuation and lower expected return accompanying an increase in investor recognition lead to a reduction in the cost of capital, making new financing and investing activities more attractive. An important research design issue in developing tests of  $P4$  is the specification of the lag between changes in investor recognition and changes in firms' financing and investing activities. It is possible that it could take managers several quarters to implement changes in their firms' real activities. Rather than speculating as to the length of this implementation period, we examine financing and investing activities for a wide interval surrounding periods of extreme changes in investor recognition.

Empirical results for tests of  $P4$  are presented in table 7. This table reports the mean values of our corporate financing and investing variables for portfolios formed on decile ranks of  $\Delta\text{BREADTH}$ . Our corporate financing and investing variables are constructed using data from the statement of cash flows. Corporate financing activity is measured as net cash from financing activities, while corporate investing activity is measured as capital expenditures plus acquisitions less depreciation and sales of property and equipment. Both variables are deflated by average total assets. We report results using both quarterly and annual measurement intervals. For the quarterly measurement

interval, firms are ranked into deciles based on the magnitude of  $\Delta\text{BREADTH}$  in quarter  $t$ , and corresponding mean values of financing and investment are reported for quarters  $t-4$  through  $t+4$ . For the annual measurement interval, firms are ranked into deciles based on the magnitude of  $\Delta\text{BREADTH}$  in year  $t$ , and corresponding mean values of financing and investment are reported for years  $t-3$  through  $t+3$ .

Panel A of table 7 reports results for our financing variable. Consistent with *P4*, there is strong evidence of a positive contemporaneous relation between financing and  $\Delta\text{BREADTH}$  in both the quarterly and annual data. Using quarterly (annual) data, the spread in financing between the high and low  $\Delta\text{BREADTH}$  portfolios in period  $t$  is 2.95% (8.58%) with a corresponding  $t$ -statistic of 34.4 (42.9). These results are clearly both highly statistically and economically significant. There is also weaker evidence that  $\Delta\text{BREADTH}$  is related to future financing activities. Figure 4 provides a graphical illustration of the financing data from table 7 for the extreme investor recognition deciles. The figure clearly shows evidence of a positive relation in period  $t$  that gradually fades over the next two years. This evidence suggests that managers respond very quickly to increases in investor recognition, immediately raising new financing.<sup>7</sup>

Panel B of table 7 and panels C and D of figure 4 report corresponding results using the investment variable in place of the financing variable. The results are broadly consistent with those in panel A, with two notable exceptions. First, the contemporaneous relation between  $\Delta\text{BREADTH}$  and investment is considerably weaker

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<sup>7</sup> In unreported tests we decompose our financing variable into debt and equity financing and examine how each of these financing components relates to changes in investor recognition. We find that both debt and equity financing exhibit the relations documented for total financing, and that the relations are slightly stronger for debt financing. These results indicate that the relations documented in table 7 are not mechanically related to the increased shares outstanding arising from equity issuances.

than that for financing. Using quarterly (annual) data, the spread in investment between the high and low  $\Delta$ BREADTH portfolios is 0.40% (2.70%) with a corresponding t-statistic of 16.3 (32.2). Second, there is much stronger evidence of a positive relation between  $\Delta$ BREADTH and future changes in investment. Panel D of figure 4 illustrates that this positive relation extends for at least 3 years beyond the  $\Delta$ BREADTH ranking year. The story that emerges from table 7 and figure 4 is that firms immediately raise new financing in response to increases in investor recognition, and then gradually invest the proceeds over the next several years. This story is intuitively appealing, since it indicates that when the cost of capital is relatively low, firms raise enough new financing to cover their investment opportunities for the next several years.

Overall, the results in table 7 confirm that investor recognition is positively related to both financing and investing. In addition to confirming *P4*, these results provide a potential explanation for why previous research has found that both financing and investing are negatively related to future stock returns (e.g., Ritter, 2003; Titman, Wei and Xie, 2004). Previous research refers to these results as stock return ‘anomalies’, because they are difficult to reconcile with market efficiency. The investor recognition hypothesis provides a potential explanation for these anomalies. Merton’s model links both financing and investment to contemporaneous changes in investor recognition and provides an explanation as to why investor recognition has a negative relation with expected returns. Financing and investing could simply be proxies for investor recognition, thus explaining their negative relation with future returns. Unfortunately, empirical tests of this conjecture are problematic, because all we have to work with is  $\Delta$ BREADTH, which is itself a noisy proxy for investor recognition. It is unreasonable to

expect  $\Delta$ BREADTH to completely subsume these other variables in predicting future stock returns. It is likely that each of measures provides incremental information about the underlying investor recognition construct.<sup>8</sup>

## 5. Conclusions

This paper provides evidence suggesting that investor recognition is more important than accounting information in explaining the variation in stock returns. Consistent with Merton's (1987) theoretical analysis, we find that (i) security value is increasing in investor recognition, (ii) expected return is decreasing in investor recognition, (iii) the above two relations are increasing in a security's idiosyncratic risk, and (iv) financing and investing activities are increasing in investor recognition.

Our research has implications for the large body of existing research on the role of cash flow news versus expected return news in explaining cross-sectional variation in security returns (e.g., Roll, 1988; Campbell, 1991; Vuolteenaho, 2002). We identify investor recognition as an important determinant of expected return news and we show that changes in investor recognition appear to be as important as earnings surprises in explaining security returns. Our findings suggest that changes in investor recognition should be a particularly important determinant of stock returns for firms with relatively uncertain future payoffs, because idiosyncratic risk is greater in such stocks.

Our research also has implications for the large body of literature documenting 'anomalous' determinants of expected returns. We have already shown that investor recognition is related to financing and investment in such a way that investor recognition

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<sup>8</sup> In unreported empirical tests, we find that  $\Delta$ BREADTH, investment and external financing each have incremental explanatory power with respect to future returns.

provides a potential explanation for the negative returns following these activities. Investor recognition also has the potential to explain a number of other anomalies. For example, Sloan (1996) and Richardson, Sloan, Soliman and Tuna (2005) show that accruals are negatively related to future returns. Accruals basically represent investments in operating assets, and so increased investor recognition should lead to increased investment in accruals. As a second example, Jegadeesh and Titman (1993) show that stock returns are positively autocorrelated over measurement intervals of 3-12 months. Since changes in investor recognition are also positively autocorrelated over measurement intervals of 3-12 months, autocorrelation in investor recognition could drive momentum in stock returns. As a final example, Lakonishok, Shleifer and Vishny (1994) find that fundamental to price ratios (e.g., book-to-market, earnings-to-price) are positively related to future stock returns. Increased investor recognition will lead to higher security values and lower expected returns, thus inducing a negative relation between fundamental to price ratios and future returns. The challenge for future research in this area is to determine how much of the return predictability of these ‘anomalies’ is attributable to investor recognition.

Our research leaves several questions unanswered. Foremost among these are the determinants of investor recognition. What factors cause investors to be cognizant of some securities, but not others? Figure 2 suggests that investors tend to recognize stocks with strong recent price performance. The evidence in table 7 suggests that firms raising new financing engage activities that increase investor recognition. In fact, one can argue that a primary role of investment bankers is to enhance investor recognition of their clients’ securities. A second question concerns the measurement investor recognition.

Our  $\Delta$ BREADTH measure provides one potential proxy that performs well in empirical tests. But this measure has limitations and can likely be improved upon. The application of factor analysis to a broad range of investor recognition proxies offers one potential avenue for improvement.

Finally, our research highlights the value of corporate investor relations activities that increase investor recognition. We show that such activities have the potential to unlock large amounts of value and substantially lower the cost of capital. As such, our research provides additional evidence supporting Brennan and Tamorowski's (2000) claim that investor relations activities are an important determinant of value creation.

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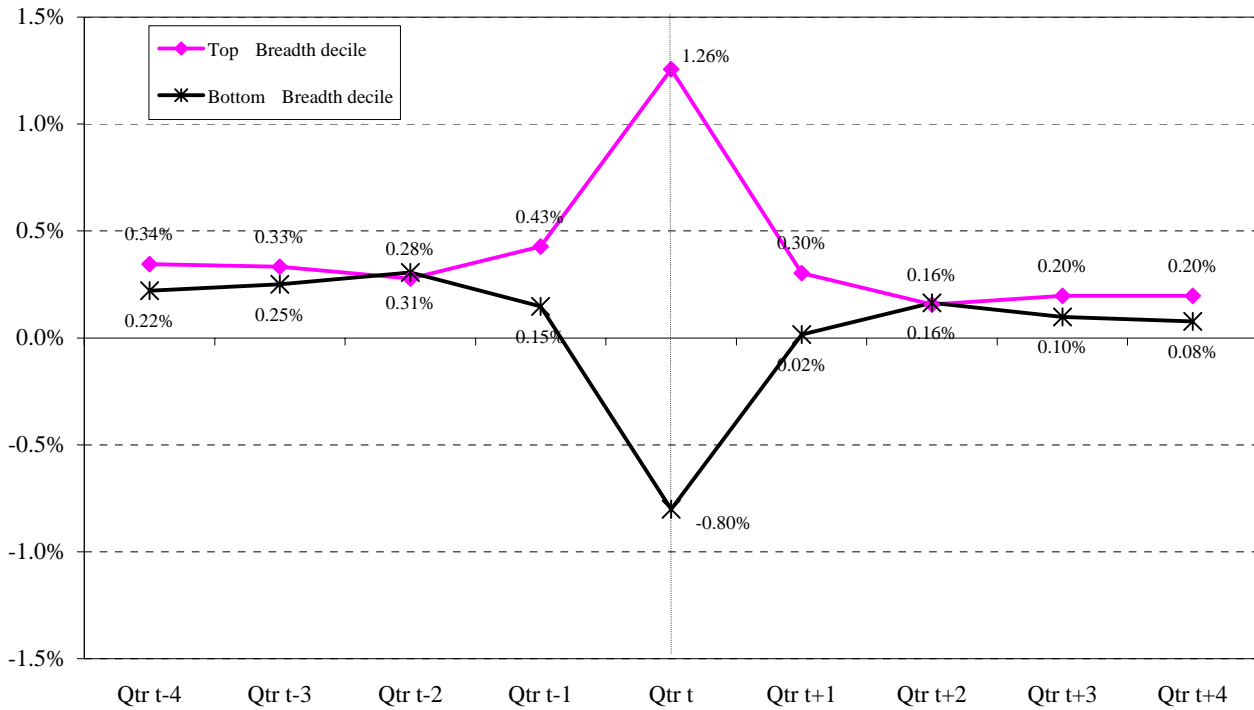
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## Figure 1

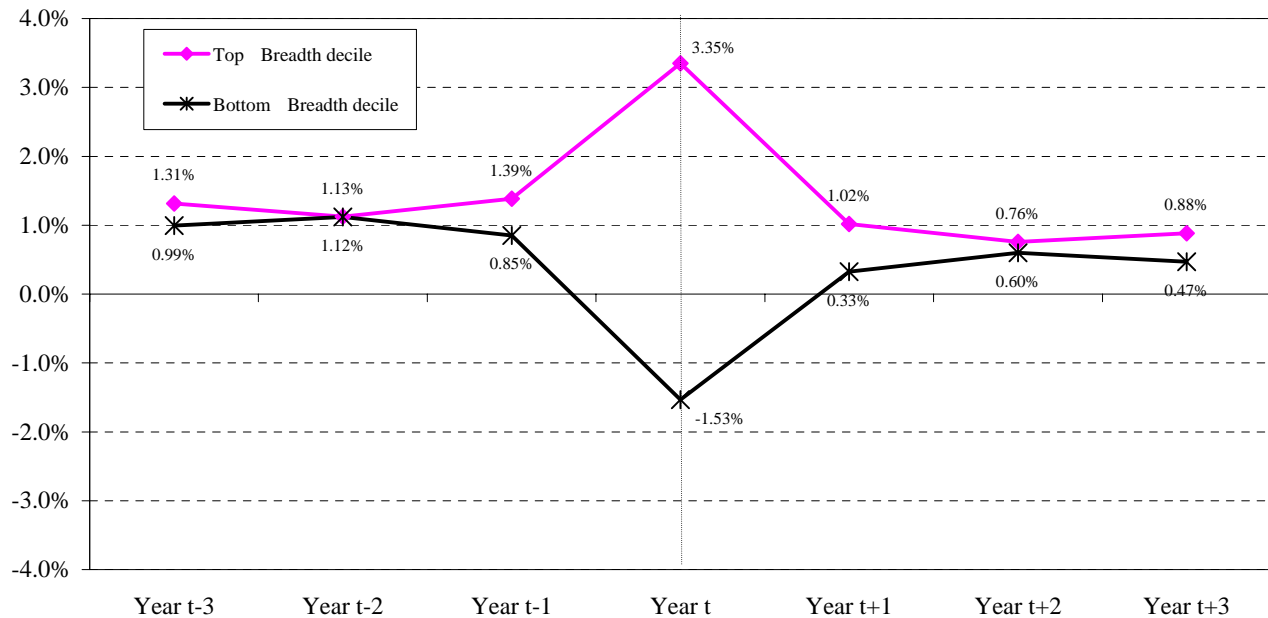
### Mean Reversion in the Change in Investor Recognition

Panel A depicts the average values of  $\text{Breadth}_{\text{QTR}}$  for the top and bottom quarter  $t$  decile rankings of  $\text{Breadth}_{\text{QTR}}$  in quarters  $t-4$  to  $t+4$ . Panel B depicts the average values of  $\text{Breadth}_{\text{ANN}}$  for the top and bottom quarter  $t$  decile rankings of  $\text{Breadth}_{\text{ANN}}$  in years  $t-3$  to  $t+3$ . Percentage quarterly change in breadth ( $\Delta\text{Breadth}_{\text{QTR}}$ ) equals the difference in the number of institutions (13F filers) holding the firm's stock at the beginning and at the end of the quarter divided by the total number of institutions at the beginning of the quarter and multiplied by 100. Percentage annual change in breadth ( $\Delta\text{Breadth}_{\text{ANN}}$ ) equals the difference in the number of institutions holding the firm's stock at the end of quarter  $t-4$  and at the end of the current quarter divided by the total number of institutions at the end of quarter  $t-4$ , and multiplied by 100.

**Panel A: Mean reversion in quarterly change in investor recognition ( $\Delta\text{Breadth}_{\text{QTR}}$ )**



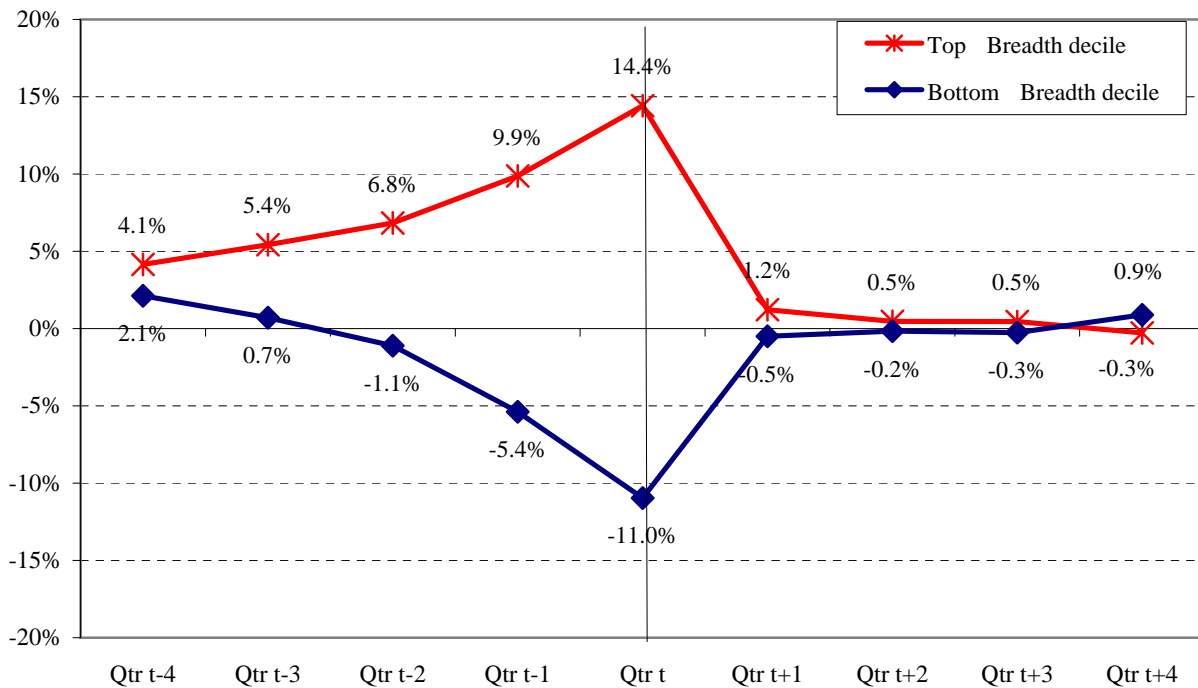
**Panel B: Mean reversion in annual change in investor recognition ( $\Delta\text{Breadth}_{\text{ANN}}$ )**



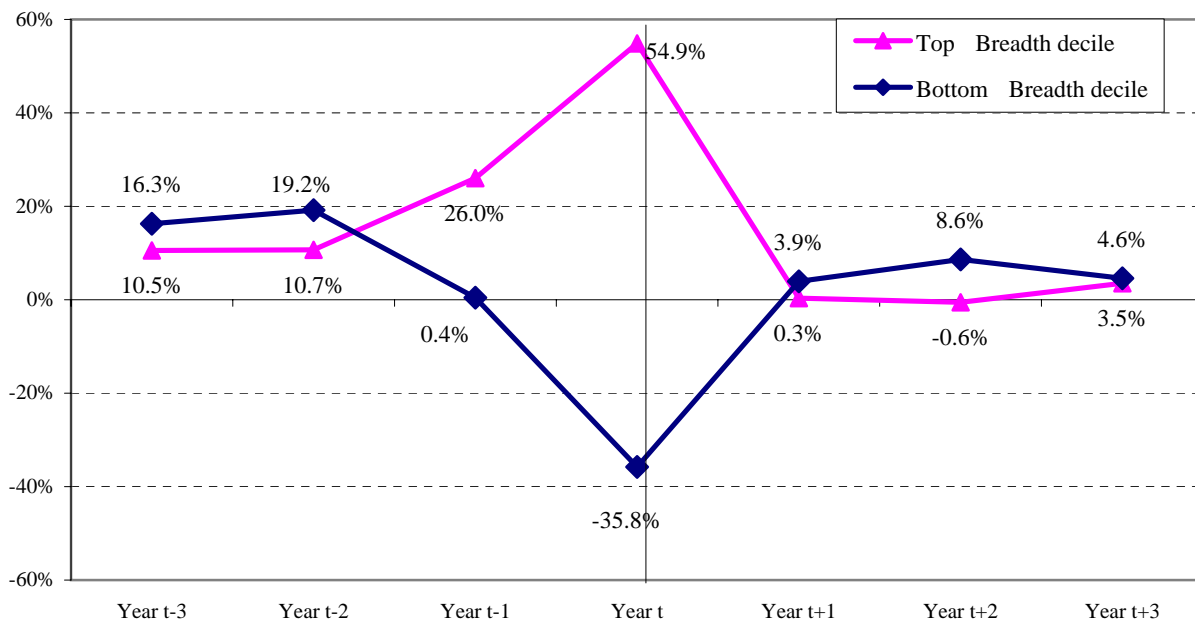
**Figure 2**  
**Quarterly and Annual Size-Adjusted Returns for the Highest and Lowest Decile Rankings of the Change in Investor Recognition**

Panel A depicts the average quarterly size-adjusted returns for the top and bottom quarter-t decile rankings of  $\Delta\text{Breadth}_{\text{QTR}}$  in quarters t-4 to t+4. Panel B depicts the average annual size-adjusted returns for the top and bottom quarter-t decile rankings of  $\Delta\text{Breadth}_{\text{ANN}}$  in years t-3 to t+3. Size-adjusted returns are computed as the difference between the return on a firm's size decile portfolio return and the return for the firm during quarter  $t+k$  or year  $t+k$ . Size portfolios are determined based on decile assignment for all NYSE/AMEX firms. Percentage quarterly change in breadth ( $\Delta\text{Breadth}_{\text{QTR}}$ ) equals the difference in the number of institutions (13F filers) holding the firm's stock at the beginning and at the end of the quarter divided by the total number of institutions at the beginning of the quarter and multiplied by 100. Percentage annual change in breadth ( $\Delta\text{Breadth}_{\text{ANN}}$ ) equals the difference in the number of institutions holding the firm's stock at the end of quarter t-4 and at the end of the current quarter divided by the total number of institutions at the end of quarter t-4, and multiplied by 100.

**Panel A: Quarterly returns for highest and lowest decile rankings of  $\Delta\text{Breadth}_{\text{QTR}}$**



**Panel B: Annual returns for highest and lowest decile rankings of  $\Delta\text{Breadth}_{\text{ANN}}$**



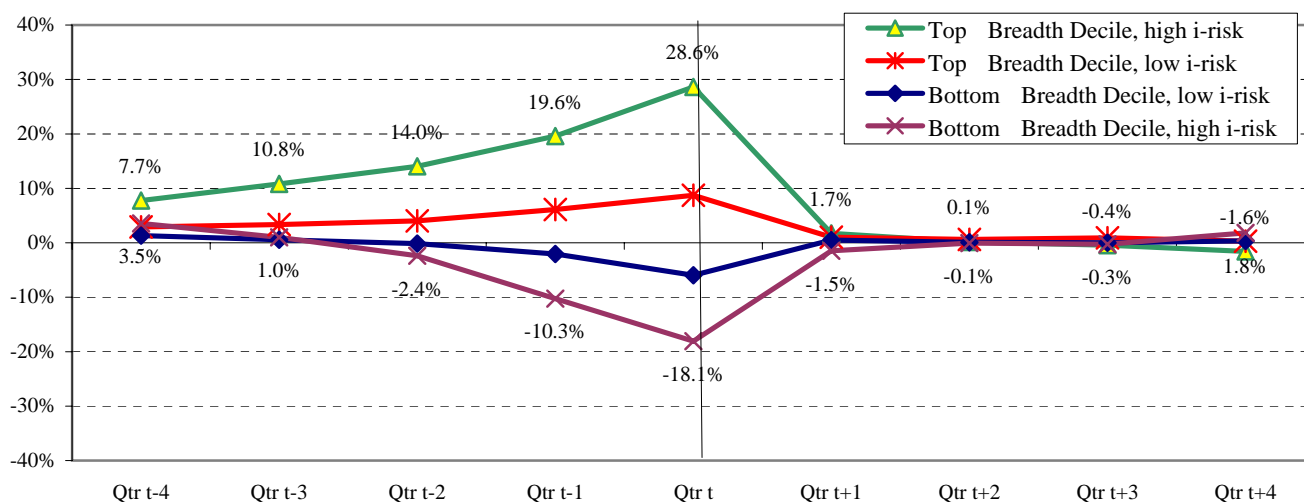
**Figure 3**

**Average Quarterly and Annual Size-Adjusted Returns for the Top and Bottom Decile Rankings of Change in Investor Recognition, by High and Low Idiosyncratic Risk**

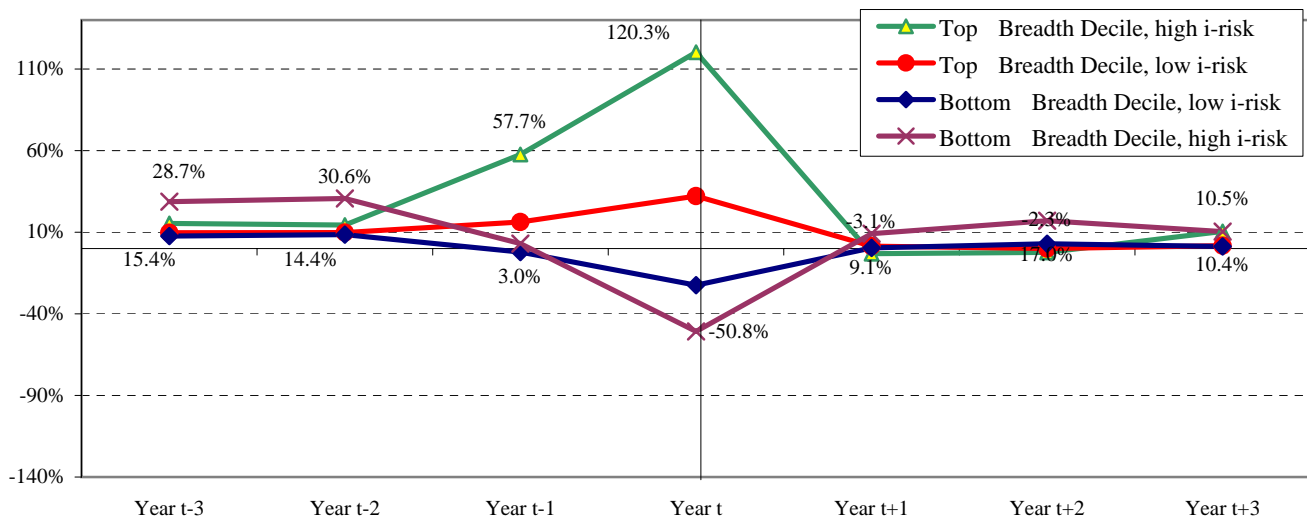
Panel A depicts the average quarterly size-adjusted returns for the top and bottom quarter- $t$  decile rankings of

$Breadth_{QTR}$  in quarters  $t-4$  to  $t+4$ , stratified by high and low quarterly idiosyncratic risk. Panel B depicts the average annual quarterly size-adjusted returns for the top and bottom quarter- $t$  decile rankings of  $Breadth_{ANN}$  in years  $t-3$  to  $t+3$ , stratified by high and low annual idiosyncratic risk. Size-adjusted returns are computed as the difference between the return on a firm's size decile portfolio return and the return for the firm during quarter  $t+k$  or year  $t+k$ . Size portfolios are determined based on decile assignment for all NYSE/AMEX firms. Quarterly (annual) idiosyncratic risk is the square root of the sum over the prior 3 (12) months of monthly idiosyncratic risk measures. The monthly measures equal the sum of the daily squared excess return, which equal the difference between the daily value-weighted industry return and the firm's daily returns. Industry classifications are based on Fama and French (1997). High (low) idiosyncratic risk are defined with respect to the quarterly median. Percentage quarterly change in breadth ( $Breadth_{QTR}$ ) equals the difference in the number of institutions (13F filers) holding the firm's stock at the beginning and at the end of the quarter divided by the total number of institutions at the beginning of the quarter and multiplied by 100. Percentage annual change in breadth ( $Breadth_{ANN}$ ) equals the difference in the number of institutions holding the firm's stock at the end of quarter  $t-4$  and at the end of the current quarter divided by the total number of institutions at the end of quarter  $t-4$ , and multiplied by 100.

**Panel A: Quarterly returns top and bottom decile rankings of  $\Delta Breadth_{QTR}$ , by idiosyncratic risk**



**Panel B: Annual returns for top and bottom decile rankings of  $\Delta Breadth_{ANN}$ , by idiosyncratic risk**

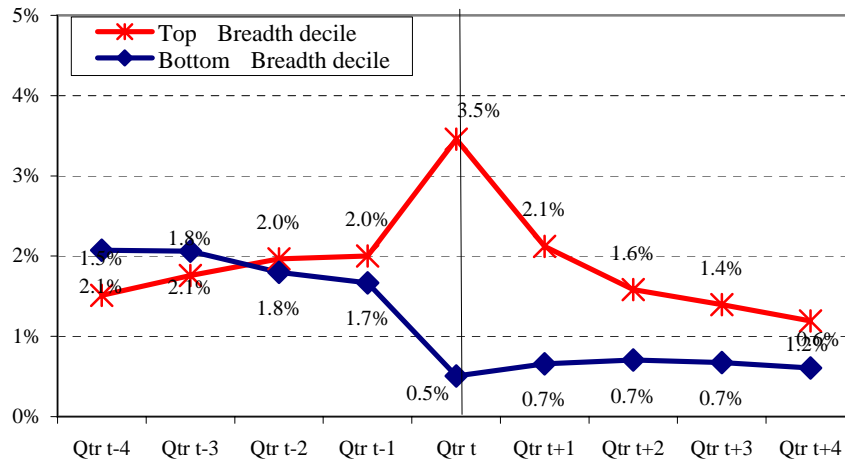


**Figure 4**

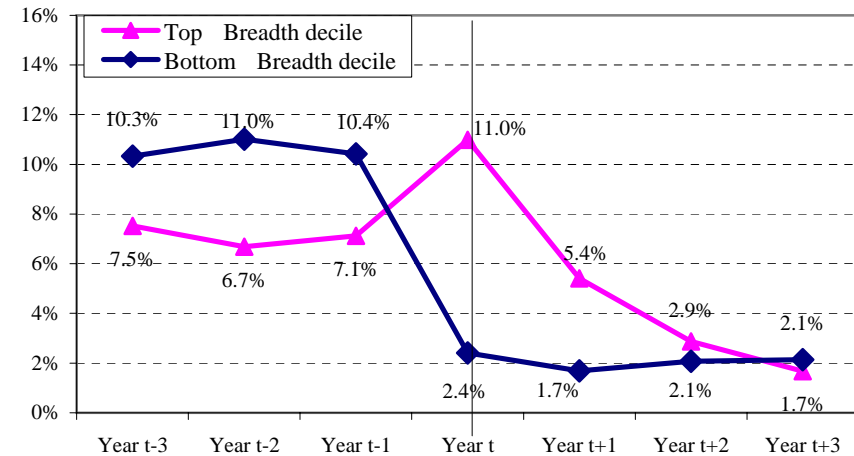
**Quarterly and Annual Financing and Investment for the Highest and Lowest Decile Rankings of the Change in Investor Recognition**

This figure reports averages of financing (Panels A and B) and investment (Panels C and D) variables in quarters t-4 to t+4, and in years t-3 to t+3 for the highest and lowest quarterly and annual decile rankings of Breadth. Compustat data requirement reduced the sample size to 204,541 quarterly and 188,757 annual observations in Panels A and B and 210,931 quarterly and 186,156 annual observations in Panels C and D, for the period 1988-2004. Quarterly (annual) financing is measured as the quarterly (trailing-twelve-months) sum of Cash Flows from Financing Activities (Compustat data #113), scaled by average Total Assets (Compustat data #44). Quarterly (annual) investment is calculated as the quarterly (trailing-twelve-months) sum of capital expenditure plus acquisitions, less depreciation and sales of property plant and equipment, scaled by average total assets (Compustat data item (90 + 94 - 77 - 83)/average 44). Percentage quarterly change in breadth ( $Breadth_{QTR}$ ) equals the difference in the number of institutions (13F filers) holding the firm's stock at the beginning and at the end of the quarter divided by the total number of institutions at the beginning of the quarter and multiplied by 100. Percentage annual change in breadth ( $Breadth_{ANN}$ ) equals the difference in the number of institutions holding the firm's stock at the end of quarter t-4 and at the end of the current quarter divided by the total number of institutions at the end of quarter t-4, and multiplied by 100.

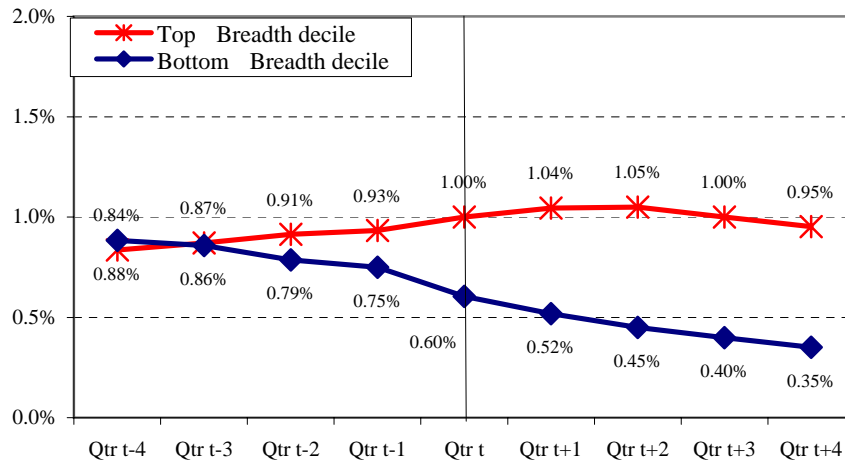
**Panel A: Quarterly change in financing**



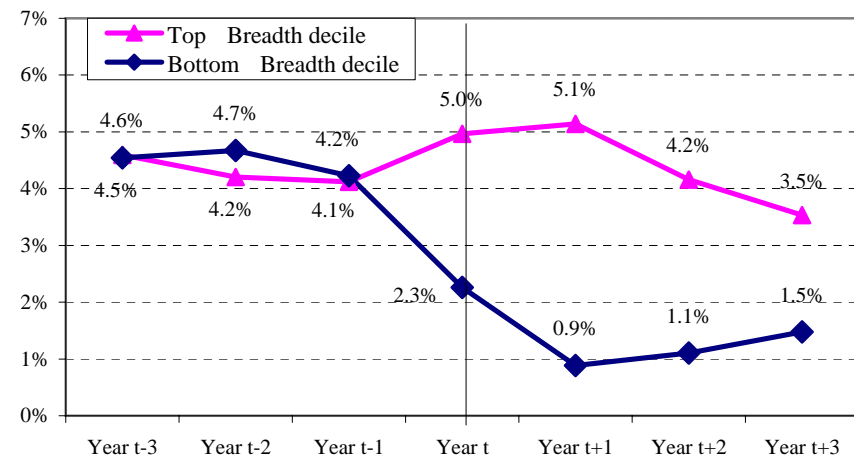
**Panel B: Annual change in financing**



**Panel C: Quarterly change in investment**



**Panel D: Annual change in investment**



**Table 1**  
**Descriptive Statistics for Quarterly and Annual Change in Investor Recognition**

This table reports statistics on our measure of investor recognition for observations that are available on both CDA/Spectrum 13F institutional transaction quarterly database and CRSP tapes. Percentage quarterly change in investor recognition ( $\Delta \text{Breadth}_{\text{QTR}}$ ) in Panel A equals the difference in the number of institutions (13F filers) holding the firm's stock at the beginning and at the end of the quarter divided by the total number of institutions at the beginning of the quarter and multiplied by 100. Percentage annual change in breadth ( $\Delta \text{Breadth}_{\text{ANN}}$ ) Panel B equals the difference in the number of institutions holding the firm's stock at the end of quarter t-4 and at the end of the current quarter divided by the total number of institutions at the end of quarter t-4, and multiplied by 100.

**Panel A: Quarterly change in investor recognition ( $\Delta \text{Breadth}_{\text{QTR}}$ )**

Year	N	Mean	Q1	Median	Q3	STD
1982	10,847	0.16%	-0.19%	0.00%	0.38%	0.79%
1983	12,030	0.10%	-0.18%	0.00%	0.19%	0.78%
1984	14,067	0.12%	-0.16%	0.00%	0.33%	0.72%
1985	14,438	0.21%	0.00%	0.00%	0.31%	0.97%
1986	15,370	0.03%	-0.14%	0.00%	0.15%	0.85%
1987	16,326	0.17%	-0.13%	0.00%	0.26%	0.78%
1988	16,996	0.08%	-0.12%	0.00%	0.25%	0.65%
1989	16,974	-0.05%	-0.13%	0.00%	0.12%	1.08%
1990	16,855	0.17%	-0.11%	0.00%	0.22%	1.03%
1991	16,905	0.05%	-0.11%	0.00%	0.11%	0.59%
1992	17,744	0.14%	-0.10%	0.00%	0.21%	0.61%
1993	19,376	-0.06%	-0.20%	0.00%	0.10%	0.71%
1994	22,008	0.12%	-0.11%	0.00%	0.21%	0.87%
1995	22,878	0.17%	-0.08%	0.08%	0.27%	0.59%
1996	24,269	-0.05%	-0.18%	0.00%	0.09%	0.66%
1997	25,674	0.20%	-0.08%	0.08%	0.27%	0.83%
1998	26,345	0.13%	-0.08%	0.00%	0.22%	0.95%
1999	25,790	0.16%	-0.08%	0.00%	0.22%	1.05%
2000	25,819	0.10%	-0.12%	0.00%	0.19%	0.80%
2001	25,146	0.02%	-0.11%	0.00%	0.12%	0.89%
2002	24,238	0.08%	-0.11%	0.00%	0.18%	0.81%
2003	23,528	0.15%	-0.05%	0.05%	0.27%	0.70%
2004	24,028	0.12%	-0.05%	0.05%	0.25%	0.61%
Overall	457,651	0.10%	-0.11%	0.00%	0.21%	0.81%

**Panel B: Annual Change in investor recognition ( $\Delta \text{Breadth}_{\text{ANN}}$ )**

Year	N	Mean	Q1	Median	Q3	STD
1982	9,348	0.38%	-0.21%	0.23%	0.70%	1.73%
1983	9,988	0.74%	0.00%	0.22%	1.26%	1.90%
1984	11,447	0.49%	-0.19%	0.20%	0.83%	1.63%
1985	12,737	0.76%	0.00%	0.35%	1.13%	1.79%
1986	13,177	0.79%	0.00%	0.34%	1.04%	2.02%
1987	14,145	0.47%	-0.16%	0.16%	0.64%	1.70%
1988	14,896	0.33%	-0.15%	0.15%	0.58%	1.40%
1989	15,305	0.48%	0.00%	0.14%	0.71%	1.64%
1990	15,412	0.12%	-0.29%	0.00%	0.38%	1.59%
1991	15,484	0.39%	-0.23%	0.12%	0.50%	1.72%
1992	15,634	0.43%	-0.12%	0.12%	0.69%	1.35%
1993	16,880	0.27%	-0.22%	0.11%	0.56%	1.44%
1994	18,829	0.10%	-0.22%	0.00%	0.34%	1.25%
1995	20,547	0.50%	-0.11%	0.11%	0.64%	1.55%
1996	21,276	0.25%	-0.19%	0.00%	0.48%	1.28%
1997	22,729	0.30%	-0.19%	0.09%	0.52%	1.28%
1998	23,206	0.64%	-0.09%	0.18%	0.89%	1.74%
1999	23,131	0.35%	-0.16%	0.08%	0.48%	1.78%
2000	22,931	0.58%	-0.16%	0.08%	0.75%	2.17%
2001	23,000	0.36%	-0.21%	0.07%	0.70%	1.67%
2002	22,731	0.18%	-0.19%	0.06%	0.50%	1.47%
2003	22,218	0.47%	-0.06%	0.12%	0.83%	1.37%
2004	22,225	0.61%	0.00%	0.29%	1.04%	1.26%
Overall	409,756	0.43%	-0.14%	0.12%	0.68%	1.63%

**Table 2**  
**Mean Reversion and Autocorrelations in the Change in Investor Recognition**

Panel A provides averages of  $Breadth_{QTR}$  in quarters  $t-4$  to  $t+4$  by decile rankings of current quarter  $Breadth_{QTR}$ . Panel B reports averages of  $Breadth_{ANN}$  from years  $t-3$  to  $t+3$  by decile rankings of current quarter  $Breadth_{ANN}$ . Panels C and D provides Pearson and Spearman correlation coefficients for quarterly and annual changes in investor recognition, respectively. Percentage quarterly change in breadth ( $Breadth_{QTR}$ ) equals the difference in the number of institutions (13F filers) holding the firm's stock at the beginning and at the end of the quarter divided by the total number of institutions at the beginning of the quarter and multiplied by 100. Percentage annual change in breadth ( $Breadth_{ANN}$ ) equals the difference in the number of institutions holding the firm's stock at the end of quarter  $t-4$  and at the end of the current quarter divided by the total number of institutions at the end of quarter  $t-4$ , and multiplied by 100.

**Panel A: Mean quarterly change in investor recognition, by rank of  $\Delta Breadth_{QTR}$  in quarter  $t$**

Rank of $Breadth_{QTR}$	Qtr t-4	Qtr t-3	Qtr t-2	Qtr t-1	Qtr t	Qtr t+1	Qtr t+2	Qtr t+3	Qtr t+4
Lowest	0.22%	0.25%	0.31%	0.15%	<b>-0.80%</b>	0.02%	0.16%	0.10%	0.08%
2	0.07%	0.09%	0.11%	0.07%	<b>-0.22%</b>	0.07%	0.10%	0.07%	0.06%
3	0.05%	0.05%	0.06%	0.05%	<b>-0.11%</b>	0.05%	0.06%	0.05%	0.06%
4	0.04%	0.03%	0.04%	0.02%	<b>-0.04%</b>	0.05%	0.05%	0.04%	0.03%
5	0.03%	0.03%	0.04%	0.04%	<b>0.00%</b>	0.04%	0.04%	0.03%	0.05%
6	0.04%	0.04%	0.01%	0.03%	<b>0.03%</b>	0.03%	0.04%	0.05%	0.03%
7	0.04%	0.04%	0.04%	0.03%	<b>0.11%</b>	0.04%	0.04%	0.04%	0.06%
8	0.07%	0.08%	0.05%	0.05%	<b>0.18%</b>	0.06%	0.06%	0.08%	0.08%
9	0.15%	0.13%	0.11%	0.13%	<b>0.38%</b>	0.13%	0.09%	0.11%	0.12%
Highest	0.34%	0.33%	0.28%	0.43%	<b>1.26%</b>	0.30%	0.16%	0.20%	0.20%

**Panel B: Mean annual changes in investor recognition, by rank of  $\Delta Breadth_{ANN}$  in year  $t$**

Rank of $Breadth_{ANN}$	Year t-3	Year t-2	Year t-1	Year t	Year t+1	Year t+2	Year t+3
Lowest	0.99%	1.12%	0.85%	<b>-1.53%</b>	0.33%	0.60%	0.47%
2	0.36%	0.36%	0.29%	<b>-0.37%</b>	0.28%	0.34%	0.28%
3	0.20%	0.19%	0.16%	<b>-0.15%</b>	0.19%	0.23%	0.21%
4	0.15%	0.14%	0.12%	<b>-0.03%</b>	0.18%	0.19%	0.18%
5	0.14%	0.13%	0.09%	<b>0.05%</b>	0.16%	0.17%	0.17%
6	0.18%	0.15%	0.13%	<b>0.16%</b>	0.20%	0.22%	0.22%
7	0.25%	0.21%	0.18%	<b>0.29%</b>	0.25%	0.25%	0.27%
8	0.39%	0.35%	0.33%	<b>0.54%</b>	0.37%	0.35%	0.37%
9	0.66%	0.60%	0.63%	<b>1.16%</b>	0.61%	0.52%	0.57%
Highest	1.31%	1.13%	1.39%	<b>3.35%</b>	1.02%	0.76%	0.88%

**Panel C: Pearson (above diagonal) and Spearman correlation coefficients for quarterly changes in investor recognition**

	$Breadth_{QTR t}$	$Breadth_{QTR t+1}$	$Breadth_{QTR t+2}$	$Breadth_{QTR t+3}$	$Breadth_{QTR t+4}$
$Breadth_{QTR t}$					
$Breadth_{QTR t+1}$	11.54%				
$Breadth_{QTR t+2}$	-4.42%	12.09%			
$Breadth_{QTR t+3}$	4.45%	-6.02%	12.34%		
$Breadth_{QTR t+4}$	7.80%	4.81%	-6.59%	12.09%	
$Breadth_{QTR t+4}$	4.52%	4.00%	-1.04%	6.72%	

**Panel D: Pearson (above diagonal) and Spearman correlation coefficients for annual changes in investor recognition**

	$Breadth_{YR t}$	$Breadth_{YR t+1}$	$Breadth_{YR t+2}$	$Breadth_{YR t+3}$
$Breadth_{YR t}$				
$Breadth_{YR t+1}$	16.72%			
$Breadth_{YR t+2}$	4.75%	17.90%		
$Breadth_{YR t+3}$	10.67%	4.70%	17.98%	
$Breadth_{YR t+3}$	5.09%	11.10%	11.13%	
$Breadth_{YR t+3}$	9.08%	5.29%		

**Table 3**

**Average Size-Adjusted Returns by Ranks of Change in Investor Recognition**

Panel A reports the average quarterly size-adjusted returns for the top and bottom quarter- $t$  decile rankings of  $Breadth_{QTR}$  in quarters  $t-4$  to  $t+4$ . Panel B reports the average annual size-adjusted returns for the top and bottom quarter- $t$  decile rankings of  $Breadth_{ANN}$  in years  $t-3$  to  $t+3$ . Size-adjusted returns are computed as the difference between the return on a firm's size decile portfolio return and the return for the firm during quarter  $t+k$  or year  $t+k$ . Size portfolios are determined based on decile assignment for all NYSE/AMEX firms. Percentage quarterly change in breadth ( $Breadth_{QTR}$ ) equals the difference in the number of institutions (13F filers) holding the firm's stock at the beginning and at the end of the quarter divided by the total number of institutions at the beginning of the quarter and multiplied by 100. Percentage annual change in breadth ( $Breadth_{ANN}$ ) equals the difference in the number of institutions holding the firm's stock at the end of quarter  $t-4$  and at the end of the current quarter divided by the total number of institutions at the end of quarter  $t-4$ , and multiplied by 100. The  $t$ -statistics are adjusted using the Newey-West correction with four lags.

**Panel A: Mean quarterly size-adjusted returns by ranks of  $\Delta Breadth_{QTR}$**

Rank of $Breadth_{QTR}$	Qtr $t-4$	Qtr $t-3$	Qtr $t-2$	Qtr $t-1$	Qtr $t$	Qtr $t+1$	Qtr $t+2$	Qtr $t+3$	Qtr $t+4$
Lowest	2.1%	0.7%	-1.1%	-5.4%	<b>-11.0%</b>	-0.5%	-0.2%	-0.3%	0.9%
2	-0.2%	-1.0%	-2.3%	-3.6%	<b>-4.9%</b>	-0.4%	0.0%	0.1%	0.5%
3	-1.1%	-1.4%	-2.3%	-3.3%	<b>-3.5%</b>	0.0%	0.1%	0.4%	0.3%
4	-0.8%	-1.4%	-1.5%	-1.6%	<b>-1.8%</b>	0.2%	-0.3%	0.2%	0.2%
5	-1.0%	-1.1%	-2.0%	-2.4%	<b>-2.7%</b>	-0.7%	-0.2%	0.5%	0.4%
6	-1.1%	-1.0%	-0.6%	-0.5%	<b>-0.7%</b>	-0.3%	0.2%	0.0%	0.4%
7	0.3%	-0.2%	-0.1%	0.3%	<b>0.0%</b>	-0.3%	0.1%	0.4%	0.3%
8	0.5%	0.6%	1.1%	1.4%	<b>1.9%</b>	0.4%	0.4%	0.2%	0.1%
9	2.2%	2.3%	3.1%	4.3%	<b>6.0%</b>	0.9%	0.6%	0.1%	0.3%
Highest	4.1%	5.4%	6.8%	9.9%	<b>14.4%</b>	1.2%	0.5%	0.5%	-0.3%
Highest-Lowest	2.0%	4.7%	7.9%	15.3%	<b>25.4%</b>	1.7%	0.6%	0.7%	-1.2%
$t$ -statistic	10.8	23.4	38.8	78.7	<b>138.4</b>	10.4	3.8	4.2	-6.6

**Panel B: Mean annual size-adjusted returns by ranks of  $\Delta Breadth_{ANN}$**

Rank of $Breadth_{ANN}$	Year $t-3$	Year $t-2$	Year $t-1$	Year $t$	Year $t+1$	Year $t+2$	Year $t+3$
Lowest	16.3%	19.2%	0.4%	<b>-35.8%</b>	3.9%	8.6%	4.6%
2	6.4%	4.5%	-7.9%	<b>-22.8%</b>	4.6%	6.8%	3.5%
3	0.6%	-1.6%	-6.3%	<b>-15.5%</b>	4.6%	5.0%	1.7%
4	-1.3%	-2.7%	-6.3%	<b>-10.6%</b>	3.3%	3.1%	2.3%
5	-0.2%	-2.0%	-5.0%	<b>-7.9%</b>	2.9%	2.5%	-0.2%
6	0.4%	0.8%	-0.1%	<b>-2.8%</b>	0.6%	1.8%	1.7%
7	3.2%	1.8%	3.2%	<b>3.3%</b>	1.0%	1.5%	1.6%
8	3.7%	5.6%	8.8%	<b>11.4%</b>	0.6%	0.8%	2.5%
9	8.0%	8.4%	16.9%	<b>23.8%</b>	1.2%	0.8%	3.2%
Highest	10.5%	10.7%	26.0%	<b>54.9%</b>	0.3%	-0.6%	3.5%
Highest-Lowest	-5.7%	-8.5%	25.6%	<b>90.7%</b>	-3.6%	-9.2%	-1.1%
$t$ -statistic	-8.4	-5.6	36.7	<b>115.7</b>	-6.4	-14.9	-1.7

Table 4

**Regression Analysis of Quarterly and Annual Size-Adjusted Returns on Contemporaneous Change in Investor Recognition, Measures of Earnings News, and Idiosyncratic Risk**

This table reports mean coefficient estimates and  $t$ -statistics from quarterly regressions of size-adjusted returns on change in investor recognition, ranks of idiosyncratic risk, current and prior change in reported earnings (Panel A and C) and analyst forecast errors, forecast revisions, and revisions in long-term growth reported during the calendar quarter (panel B and D). Variables in Panels A and B are measured over a quarter while variables in Panels C and D are measured over the prior four quarters. Percentage quarterly change in breadth ( $\text{Breadth}_{\text{QTR } t}$ ) equals the difference in the number of institutions (13F filers) holding the firm's stock at the beginning and at the end of the quarter divided by the total number of institutions at the beginning of the quarter and multiplied by 100. Percentage annual change in breadth ( $\text{Breadth}_{\text{ANN}}$ ) equals the difference in the number of institutions holding the firm's stock at the end of quarter  $t-4$  and at the end of the current quarter divided by the total number of institutions at the end of quarter  $t-4$ , and multiplied by 100. Quarterly (annual) idiosyncratic risk is the square root of the sum over the prior 3 (12) months of monthly idiosyncratic risk measures. The monthly measures equal the sum of the daily squared excess return, which equal the difference between the daily value-weighted industry return and the firm's daily returns. Industry classifications are based on Fama and French (1997). The idiosyncratic risk measures are ranked each quarter into deciles and the ranks are normalized to range from  $-0.5$  to  $+0.5$  (denoted Rank  $i\text{-risk}_{\text{QTR } t}$ ). Change in earnings in Panel A is computed as the seasonal change in earnings before extraordinary items (data #8) scaled by average total assets. Change in earnings in Panel C is computed as the change between quarters  $t$  and  $t-4$  in the trailing-twelve-months earnings before extraordinary items (data #8) scaled by average total assets. Forecast errors are computed as the actual reported earnings (per I/B/E/S) minus the consensus earnings forecast outstanding prior to the earnings announcement divided by price at the beginning of the period. The Quarterly (annual) revision in annual earnings forecast equals the change in the consensus annual earnings forecast between quarter  $t$  and quarter  $t-1$  ( $t-4$ ), scaled by price at the beginning of the period. The Quarterly (annual) revision in the long term growth equals the change in the consensus long term earnings growth forecast between quarter  $t$  and quarter  $t-1$  ( $t-4$ ). I/B/E/S data availability reduced the sample to 80 quarters (1985Q1 to 2004Q4) in panels B and D. Size-adjusted returns are computed as the difference between the return on a firm's size decile portfolio return and the return for the firm during quarter  $t+k$  or year  $t+k$ . Size portfolios are determined based on decile assignment for all NYSE/AMEX firms. The  $t$ -statistics are adjusted using the Newey-West correction with four lags.

**Panel A: Regressions using seasonally differences in quarterly earnings to measure cash-flow news**

	(1)	(2)	(3)	(4)
Intercept	-0.004	0.005	-0.003	-0.002
	-1.6	2.6	-1.3	-0.9
Breadth <sub>QTR <math>t</math></sub>	7.043		6.671	11.379
	15.3		14.9	21.0
Rank $i\text{-risk}_{\text{QTR } t}$				0.024
				1.2
Breadth <sub>QTR <math>t</math></sub> · Rank $i\text{-risk}_{\text{QTR } t}$				22.118
				16.5
Earnings <sub>QTR <math>t-1</math></sub>		0.565	0.505	0.478
		14.7	14.2	13.1
Earnings <sub>QTR <math>t</math></sub>		0.787	0.717	0.651
		14.0	14.5	13.8
R <sup>2</sup>	4.4%	3.0%	6.9%	13.2%
Average quarterly N	2,747	2,747	2,747	2,747

**Panel B: Regressions using forecast errors, quarterly forecast revisions, and quarterly revisions in long-term growth to measure cash-flow news**

	(1)	(2)	(3)	(4)
Intercept	-0.006	0.017	0.004	0.010
	-1.5	6.2	0.9	2.0
Breadth <sub>QTR <math>t</math></sub>	8.361		7.638	10.819
	15.3		14.4	18.1
Rank $i\text{-risk}_{\text{QTR } t}$				0.029
				1.2
Breadth <sub>QTR <math>t</math></sub> · Rank $i\text{-risk}_{\text{QTR } t}$				19.039
				13.4
Forecast Error <sub>QTR <math>t</math></sub>		1.008	0.902	0.873
		8.2	8.2	8.9
Revision in Annual Forecast <sub>QTR <math>t</math></sub>		2.046	1.493	1.377
		16.5	13.8	14.5
Revision in Long Term Growth <sub>QTR <math>t</math></sub>		0.090	0.058	0.051
		9.1	7.0	7.8
R <sup>2</sup>	10.4%	5.5%	13.8%	22.2%
Average quarterly N	1,710	1,710	1,710	1,710

**Table 4 - Continued**

**Panel C: Regressions using annual differences in trailing-twelve-months earnings to measure cash-flow news**

	(1)	(2)	(3)	(4)
Intercept	-0.042	0.031	-0.026	-0.037
	-4.4	4.1	-2.1	-3.4
Breadth <sub>ANN t</sub>	12.867		11.274	18.509
	11.1		9.2	9.9
Rank i-risk <sub>ANN t</sub>				-0.051
				-0.9
Breadth <sub>ANN t</sub> · Rank i-risk <sub>ANN t</sub>				35.305
				8.1
Earnings <sub>ANN t-1</sub>		0.028	-0.398	0.347
		0.1	-0.5	6.4
Earnings <sub>ANN t</sub>		1.609	1.647	1.000
		3.8	2.8	6.2
R <sup>2</sup>	12.2%	9.3%	18.1%	25.5%
Average quarterly N	2,478	2,478	2,478	2,478

**Panel D: Regressions using forecast errors, annual forecast revisions, and annual revisions in long-term growth to measure cash-flow news**

	(1)	(2)	(3)	(4)
Intercept	-0.069	0.088	-0.010	-0.003
	-4.5	10.0	-0.6	-0.2
Breadth <sub>ANN t</sub>	12.104		9.870	14.939
	9.3		7.5	9.6
Rank i-risk <sub>ANN t</sub>				-0.006
				-0.1
Breadth <sub>ANN t</sub> · Rank i-risk <sub>ANN t</sub>				24.933
				6.7
Forecast Error <sub>ANN t</sub>		3.024	2.726	2.246
		6.4	6.4	6.5
Revision in Annual Forecast <sub>ANN t</sub>		3.922	2.449	2.211
		15.6	10.9	13.1
Revision in Long Term Growth <sub>ANN t</sub>		0.306	0.187	0.163
		10.6	11.8	11.9
R <sup>2</sup>	24.0%	18.7%	32.0%	40.9%
Average quarterly N	1,376	1,376	1,376	1,376

**Table 5**

**Regression Analysis of Period  $t+1$  Size-Adjusted Returns (next quarter in Panel A and next year in Panel B) on Period  $t-1$ , Period  $t$ , and Period  $t+1$  Change in Investor Recognition, and Idiosyncratic Risk**

Panel A (B) of this table reports mean coefficient estimates and  $t$ -statistics from quarterly regressions of one-quarter-ahead (one-year-ahead) size-adjusted returns on prior, current, and next period measures of the change investor recognition and their interactive terms with idiosyncratic risk. The requirement of variable leads and lags reduced the sample size to 90 quarters in Panel A (1982Q2 to 2004Q3) and 84 quarters in Panel B (1983Q1-2003Q4). Size-adjusted returns are computed as the difference between the return on a firm's size decile portfolio return and the return for the firm during quarter $_{t+k}$  or year $_{t+k}$ . Size portfolios are determined based on decile assignment for all NYSE/AMEX firms. Quarterly (annual) idiosyncratic risk is the square root of the sum over the prior 3 (12) months of monthly idiosyncratic risk measures. The monthly measures equal the sum of the daily squared excess return, which equal the difference between the daily value-weighted industry return and the firm's daily returns. Industry classifications are based on Fama and French (1997). The idiosyncratic risk measures are ranked each quarter into deciles and the ranks are normalized to range from -.5 to +.5 (denoted Rank i-risk). Percentage quarterly change in breadth ( Breadth $_{QTR}$ ) equals the difference in the number of institutions (13F filers) holding the firm's stock at the beginning and at the end of the quarter divided by the total number of institutions at the beginning of the quarter and multiplied by 100. Percentage annual change in breadth ( Breadth $_{ANN}$ ) equals the difference in the number of institutions holding the firm's stock at the end of quarter  $t-4$  and at the end of the current quarter divided by the total number of institutions at the end of quarter  $t-4$ , and multiplied by 100. The  $t$ -statistics are adjusted using the Newey-West correction with four lags.

**Panel A: Regressions using quarterly measures (dependent variable is size-adjusted returns at quarter  $t+1$ )**

Intercept	0.001	-0.005	-0.004
	0.6	-1.7	-1.4
Breadth $_{QTR\ t-1}$		-0.029	-0.121
		-0.2	-0.7
Breadth $_{QTR\ t}$ (prior quarter)	0.375	-0.989	-1.100
	1.4	-3.2	-3.4
Breadth $_{QTR\ t+1}$ (contemporaneous)		9.635	12.307
		9.1	11.3
Rank i-risk $_{QTR\ t}$			-0.019
			-1.2
Breadth $_{QTR\ t-1}$ · Rank i-risk $_{QTR\ t-1}$			-0.505
			-1.2
Breadth $_{QTR\ t}$ · Rank i-risk $_{QTR\ t}$			-2.341
			-1.9
Breadth $_{QTR\ t+1}$ · Rank i-risk $_{QTR\ t+1}$			23.481
			8.8
Average quarterly N	4,010	4,010	4,010
R <sup>2</sup>	0.2%	5.2%	9.8%

**Panel B: Regressions using annual measures (dependent variable is size-adjusted returns in year  $t+1$ )**

Intercept	0.033	-0.013	-0.016
	3.2	-1.2	-1.3
Breadth $_{ANN\ t-1}$		-1.654	-1.287
		-4.3	-4.3
Breadth $_{ANN\ t}$ (prior year)	-0.634	-2.958	-2.668
	-1.2	-5.0	-4.9
Breadth $_{ANN\ t+1}$ (contemporaneous)		14.887	19.969
		8.6	11.0
Rank i-risk $_{ANN\ t}$			0.020
			0.4
Breadth $_{ANN\ t-1}$ · Rank i-risk $_{ANN\ t-1}$			-3.331
			-2.8
Breadth $_{ANN\ t}$ · Rank i-risk $_{ANN\ t}$			-5.350
			-3.4
Breadth $_{ANN\ t+1}$ · Rank i-risk $_{ANN\ t+1}$			36.739
			7.7
Average quarterly N	2,977	2,977	2,977
R <sup>2</sup>	0.4%	12.6%	19.9%

**Table 6**

**Regression Analysis of Period  $t+1$  Size-Adjusted Returns on the Decomposed ( $IN$  and  $OUT$ )  
Period  $t-1$ , Period  $t$ , and Period  $t+1$  Change in Investor Recognition**

Panel A (B) of this table reports mean coefficient estimates and  $t$ -statistics from quarterly regressions of one-quarter-ahead (one-year-ahead) size-adjusted returns on prior, current, and next period decomposed measures of the change investor recognition. The requirement of variable leads and lags reduced the sample size to 90 quarters in Panel A (1982Q2 to 2004Q3) and 84 quarters in Panel B (1983Q1-2003Q4). Our measure of investor recognition,  $\Delta BREADTH_t$ , is decomposed to  $\Delta BREADTH_t = IN_t - OUT_t$ , where  $IN_t$  ( $OUT_t$ ) equals the fraction of 13Ffilers in both period  $t-1$  and period  $t$  that have a zero (non-zero) holding in the stock in the prior period and a non-zero (zero) holding in the stock in the current period. Percentage quarterly change in breadth ( $Breadth_{QTR}$ ) equals the difference in the number of institutions (13F filers) holding the firm's stock at the beginning and at the end of the quarter divided by the total number of institutions at the beginning of the quarter and multiplied by 100. Percentage annual change in breadth ( $Breadth_{ANN}$ ) equals the difference in the number of institutions holding the firm's stock at the end of quarter  $t-4$  and at the end of the current quarter divided by the total number of institutions at the end of quarter  $t-4$ , and multiplied by 100. Size-adjusted returns are computed as the difference between the return on a firm's size decile portfolio return and the return for the firm during quarter  $t+k$  or year  $t+k$ . Size portfolios are determined based on decile assignment for all NYSE/AMEX firms. The  $t$ -statistics are adjusted using the Newey-West correction with four lags.

**Panel A: Regressions using quarterly measures of  $IN_{QTR}$  and  $OUT_{QTR}$**

Intercept	0.000	-0.006
	0.1	-2.3
$IN_{QTR\ t-1}$		-1.425
		-7.6
$IN_{QTR\ t}$	0.634	-2.818
	2.5	-6.3
$IN_{QTR\ t+1}$ (contemporaneous)		12.924
		11.5
$OUT_{QTR\ t-1}$		-1.785
		-6.1
$OUT_{QTR\ t}$	-0.741	-0.024
	-2.4	-0.1
$OUT_{QTR\ t+1}$ (contemporaneous)		-7.104
		-6.6
$R^2$	0.3%	6.2%
Average Quarterly N	4,651	4,651

**Panel B: Regressions using annual measures of  $IN_{ANN}$  and  $OUT_{ANN}$**

Intercept	0.032	-0.004
	3.7	-0.4
$IN_{ANN\ t-1}$		-4.049
		-8.2
$IN_{ANN\ t}$	-0.517	-10.729
	-1.1	-6.4
$IN_{ANN\ t+1}$ (contemporaneous)		20.966
		9.0
$OUT_{ANN\ t-1}$		-1.965
		-5.6
$OUT_{ANN\ t}$	0.178	0.248
	0.3	0.7
$OUT_{ANN\ t+1}$ (contemporaneous)		-4.638
		-6.2
$R^2$	0.6%	15.3%
Average Quarterly N	3,346	3,346

**Table 7**  
**Averages of Financing and Investment Variables by Ranks of Change in Investor Recognition**

This table reports averages of financing (Panel A) and investment (Panel B) variables in quarters t-4 to t+4, and in years t-3 to t+3 by quarterly and annual decile rankings of Breadth. Compustat data requirement reduced the sample size to 204,541 quarterly and 188,757 annual observations in Panel A and 210,931 quarterly and 186,156 annual observations in Panel B, for the period 1988-2004. Quarterly (annual) financing is measured as the quarterly (trailing-twelve-months) sum of Cash Flows from Financing Activities (Compustat data #113), scaled by average Total Assets (Compustat data #44). Quarterly (annual) investment is calculated as the quarterly (trailing-twelve-months) sum of capital expenditure plus acquisitions, less depreciation and sales of property plant and equipment, scaled by average total assets (Compustat data item (90 + 94 - 77 - 83)/average 44). Percentage quarterly change in breadth ( $\text{Breadth}_{QTR}$ ) equals the difference in the number of institutions (13F filers) holding the firm's stock at the beginning and at the end of the quarter divided by the total number of institutions at the beginning of the quarter and multiplied by 100. Percentage annual change in breadth ( $\text{Breadth}_{ANN}$ ) equals the difference in the number of institutions holding the firm's stock at the end of quarter t-4 and at the end of the current quarter divided by the total number of institutions at the end of quarter t-4, and multiplied by 100.

**Panel A: Financing by ranks of change in investor recognition**

Ranking of Breadth	Mean Quarterly Financing by Ranks of $\text{Breadth}_{QTR}$									Mean Annual Financing by Ranks of $\text{Breadth}_{ANN}$						
	Qtr t-4	Qtr t-3	Qtr t-2	Qtr t-1	Qtr t	Qtr t+1	Qtr t+2	Qtr t+3	Qtr t+4	Year t-3	Year t-2	Year t-1	Year t	Year t+1	Year t+2	Year t+3
Lowest	2.07%	2.06%	1.80%	1.67%	<b>0.51%</b>	0.66%	0.71%	0.67%	0.60%	10.33%	11.02%	10.42%	<b>2.41%</b>	1.69%	2.08%	2.14%
2	2.08%	2.25%	2.02%	1.86%	<b>1.15%</b>	1.35%	1.51%	1.41%	1.27%	9.72%	10.12%	8.79%	<b>3.56%</b>	3.89%	4.33%	4.40%
3	1.86%	1.56%	1.84%	1.58%	<b>1.15%</b>	1.51%	1.44%	1.35%	1.48%	7.75%	7.80%	7.26%	<b>4.28%</b>	5.22%	5.03%	4.63%
4	2.37%	2.72%	2.33%	2.25%	<b>2.02%</b>	2.16%	2.13%	2.18%	2.02%	9.00%	8.58%	7.89%	<b>6.20%</b>	5.59%	5.70%	4.62%
5	2.18%	2.10%	2.25%	2.16%	<b>1.96%</b>	2.26%	2.26%	1.99%	2.14%	7.78%	8.23%	7.72%	<b>7.23%</b>	7.28%	6.41%	5.84%
6	2.22%	2.12%	2.26%	2.32%	<b>1.89%</b>	2.07%	2.03%	2.32%	2.23%	7.73%	7.37%	7.20%	<b>6.30%</b>	6.40%	5.89%	4.43%
7	2.07%	1.98%	1.97%	1.89%	<b>1.80%</b>	1.87%	2.02%	1.90%	1.66%	8.22%	7.38%	8.03%	<b>6.82%</b>	6.91%	5.92%	4.98%
8	1.95%	1.91%	1.99%	1.96%	<b>1.87%</b>	2.00%	1.81%	1.75%	1.75%	8.05%	7.52%	7.81%	<b>7.60%</b>	6.51%	5.34%	4.31%
9	1.98%	2.00%	1.94%	2.11%	<b>2.02%</b>	1.83%	1.75%	1.55%	1.52%	7.42%	7.43%	7.87%	<b>8.53%</b>	6.14%	4.35%	3.39%
Highest	1.51%	1.76%	1.96%	2.00%	<b>3.46%</b>	2.12%	1.58%	1.39%	1.19%	7.53%	6.68%	7.13%	<b>10.99%</b>	5.41%	2.87%	1.67%
Highest-Lowest	-0.56%	-0.30%	0.17%	0.34%	<b>2.95%</b>	1.46%	0.88%	0.72%	0.59%	-2.80%	-4.33%	-3.29%	<b>8.58%</b>	3.72%	0.79%	-0.48%
<i>t-statistic</i>	-6.2	-3.4	1.9	3.9	<b>34.4</b>	19.6	12.5	10.5	8.7	-9.9	-16.5	-13.5	<b>42.9</b>	21.7	4.6	-2.6

**Panel B: Investment by ranks of change in investor recognition**

Ranking of Breadth	Mean Quarterly Investment by Ranks of $\text{Breadth}_{QTR}$									Mean Annual Investment by Ranks of $\text{Breadth}_{ANN}$						
	Qtr t-4	Qtr t-3	Qtr t-2	Qtr t-1	Qtr t	Qtr t+1	Qtr t+2	Qtr t+3	Qtr t+4	Year t-3	Year t-2	Year t-1	Year t	Year t+1	Year t+2	Year t+3
Lowest	0.88%	0.86%	0.79%	0.75%	<b>0.60%</b>	0.52%	0.45%	0.40%	0.35%	4.54%	4.67%	4.23%	<b>2.26%</b>	0.88%	1.11%	1.48%
2	0.63%	0.56%	0.50%	0.45%	<b>0.43%</b>	0.32%	0.29%	0.28%	0.24%	3.48%	3.07%	2.39%	<b>0.99%</b>	0.36%	0.66%	1.18%
3	0.36%	0.37%	0.32%	0.22%	<b>0.22%</b>	0.13%	0.11%	0.06%	0.08%	2.62%	1.97%	1.61%	<b>0.75%</b>	0.32%	0.71%	0.88%
4	0.23%	0.27%	0.24%	0.22%	<b>0.16%</b>	0.20%	0.18%	0.21%	0.19%	1.65%	1.47%	1.10%	<b>0.59%</b>	0.25%	0.41%	0.50%
5	0.17%	0.13%	0.15%	0.12%	<b>0.06%</b>	0.06%	0.04%	0.02%	0.02%	1.63%	1.22%	1.18%	<b>0.85%</b>	0.66%	0.71%	0.74%
6	0.20%	0.22%	0.25%	0.21%	<b>0.20%</b>	0.14%	0.14%	0.13%	0.11%	1.95%	1.67%	1.54%	<b>1.53%</b>	1.33%	1.13%	1.17%
7	0.42%	0.37%	0.37%	0.38%	<b>0.38%</b>	0.37%	0.33%	0.27%	0.28%	2.55%	2.32%	2.05%	<b>2.06%</b>	1.81%	1.49%	1.52%
8	0.49%	0.51%	0.52%	0.51%	<b>0.51%</b>	0.50%	0.46%	0.42%	0.39%	3.29%	2.90%	2.91%	<b>2.99%</b>	2.61%	2.35%	2.10%
9	0.73%	0.71%	0.73%	0.74%	<b>0.74%</b>	0.76%	0.73%	0.70%	0.67%	3.75%	3.61%	3.56%	<b>3.92%</b>	3.81%	3.18%	2.88%
Highest	0.84%	0.87%	0.91%	0.93%	<b>1.00%</b>	1.04%	1.05%	1.00%	0.95%	4.59%	4.21%	4.12%	<b>4.96%</b>	5.14%	4.16%	3.53%
Highest-Lowest	-0.05%	0.01%	0.13%	0.18%	<b>0.40%</b>	0.53%	0.60%	0.60%	0.60%	0.05%	-0.46%	-0.11%	<b>2.70%</b>	4.25%	3.05%	2.06%
<i>t-statistic</i>	-1.9	0.5	5.1	7.5	<b>16.3</b>	21.7	24.8	25.0	25.2	0.5	-4.7	-1.2	<b>32.2</b>	52.7	36.4	22.7